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MINES
EL 45/86
LETTER
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R E P O R T N O 4/88

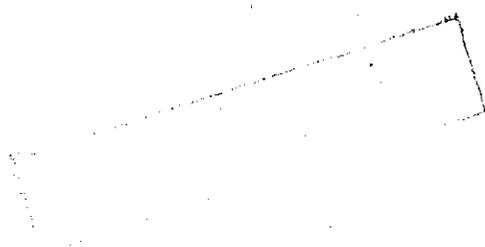
EL 45/86 TASMANIA

Annual Report on Exploration Completed on
The Northern Coastal Areas of King Island
to 17/4/88



Prepared for National Mineral Sands Pty. Ltd.

A. Dove
G. Lee
April 1988



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DISTRIBUTION

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Tasmanian Department of Mines (Hobart)

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File " " " " "

SYNOPSIS

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1. AIM

To investigate the potential for mineral sand occurrences in the north-western and eastern 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 45/86 covers 241 km² along the west, north and east coastal areas of King Island.
- 3.2 Previous work was undertaken in the area of Yellow Rock in the late 1960's; and in the Disappointment Bay-Lavinia Point area between 1973 and 1978. Although heavy mineral concentrations exceeding 1% were recorded in both areas, no mineralogical information was reported.
- 3.3 A study of aerial photographs covering the licence area was completed and is shown as Figure 2 of this report. The study has revealed a number of prospective strandline deposits, particularly the hinterland of Nine Mile Beach.

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- 3.4 Field investigations concentrated on surveying and drilling 87 hand auger and case sludged holes on 5 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 Concentrations of mineral were found in the Sea Elephant hole SE 16, where the mineralogy showed significant rutile, zircon and leucoxene.
- 3.9 The Manana area gave consistent heavy mineral grades, about 0.5%, with significant rutile, zircon and leucoxene content.
- 3.10 Yellow Rock and Lake Flannigan samples contained relatively low heavy mineral contents and mineralogy low in rutile, zircon and leucoxene.
- 3.11 The Martha Lavinia samples showed a high concentration of heavy mineral (4.2%) on the back of the beach. This grade was not sustained in other holes although concentrations greater than 0.5% occur. Significant rutile zircon and leucoxene do occur in the heavy mineral suite.
- 3.12 Heavy mineral suites from the eastern areas can be readily magnetically separated to give a non magnetic fraction containing greater than 80% economic minerals; rutile, zircon and leucoxene.

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4. RECOMMENDATIONS

Further work should be directed toward examining the potential for economic heavy mineral concentrations in the hinterland to Nine Mile Beach (west of Saltwater Creek), which is the northern strike extension of the strandline system containing the Naracoopa and Back Beach deposits.

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 45/86, in King Island, Tasmania. The object of the programme was to test prospective areas for economic deposits of mineral sand, particularly rutile, zircon, ilmenite, leucoxene 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 five traverse lines.

In addition to EL 45/86 the Company holds title to the adjoining EL 93/87 and has entered into an agreement with Sanidine N.L. with respect to EL 28/85. Exploration Licence 28/85 covers the abandoned Naracoopa heavy mineral sand mine area which is known to contain remaining reserves.

Exploration within EL 45/86 is directed at locating additional reserves of rutile, zircon, ilmenite, leucoxene and monazite bearing sands which could supplement the known Naracoopa reserves.

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6. TENEMENT INFORMATION

Exploration Licence No. 45/86 is held by National Mineral Sands and covers an area of 241 square kilometres on the northern end of King Island, see figure 1.

The area comprises 32 km² of Crown Land, 4 km² of Sea Elephant River Wildlife Sanctuary and Australian Heritage Act Registered Entry, and 205 km² of Private Property. An area of 4 km² was excluded from the original application as it was the Lavinia Nature Reserve.

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7. PREVIOUS WORK

Kenneth McMahon & Partners Pty. Ltd. carried out exploration activities in the Yellow Rock area north-west of the island. Exploration started in September 1968 when twenty-three holes were drilled at various spacings on locations running west to east across the north and centre of the area. A further thirty holes were drilled at fifty foot intervals, north of previous lines, during December, 1968.

It was discovered that the major dunes, which were very calcareous, contained only trace quantities of H.M. As a result, lines were planned running parallel to the coast, to cross the new dunes. One line was drilled between July and October 1969 and then abandoned. This line contained five holes and eight intervals of heavy mineral content greater than 1%.

Work has also been carried out by Kibuka Mines around Lavinia Point and Disappointment Bay in the north of the island between 1973 and 1978. Holes were drilled 50 metres apart and lines were spaced at 400 metre intervals. The heavy mineral content was found to be less than 1%, with the maximum concentration of 4% found in the south-east corner of Disappointment Bay.

This earlier work concentrated on locating heavy mineral concentrations. No record is available of any mineralogical studies on the heavy concentrates.

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8. AERIAL PHOTOGRAPHY INTERPRETATION

Aerial photography interpretation using the most recently available black and white photography from Tasmaph was carried out over the E.L. 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 location 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 is along the East Coast, particularly in the hinterland of Nine Mile Beach (see Fig. 2). This is also the most environmentally sensitive area, particularly since it adjoins the Lavinia Nature Reserve. It does, however, have a well-developed sequence of strandlines in a situation not dissimilar to Jerusalem Creek and Tea Gardens on the New South Wales North Coast. Unfortunately the strandline development continues into the nature reserve, which would also be highly prospective.

Along the West Coast on the southern end of Yellow Rock Beach a small development of strandline occurs. It is possible that the hinterland of Yellow Rock Beach contains strandlines overlain by aeolian dunes.

Along the balance of the west coast of King Island aeolian dunes occur but overlie Precambrian granite which outcrops along the present-day coastline. The potential for heavy mineral concentrations within these aeolian dunes must be considered lower than for the strandline developments on other parts of the island.

9. FIELD INVESTIGATIONS

9.1 Survey

Drillholes 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.

Five traverse lines designated Sea Elephant (S.E.), Manana (M), Yellow Rock (Y.R.), Lake Flannigan (L.F.) and Martha Lavinia (M.L.) were drilled within the exploration licence (see Figure 2).

The survey of the drillholes was by tape, compass and Abney hand level. Holes were spaced 40 metres apart along traverse lines at Sea Elephant, Manana, Yellow Rock and Martha Lavinia; and 80 metres apart along Lake Flannigan 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 drilling crew, with a total of 87 holes and 514.66 metres drilled for 521 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 many finished shallower due to calcrete or indurated layers, difficult drilling or basement.

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

Sea Elephant Traverse:

Traverse extended 800 metres, incorporating 21 drill holes. Many of these holes were shallow, as indurated layers or extremely difficult drilling was encountered. Due to standing water all holes had to be sludged after 1 metre. Heavy mineral traces were not visually detected.

Manana Traverse:

Traverse extended 1080 metres, incorporating 24 drill holes. All holes were very shallow encountering induration at very shallow depths, often at 1 metre. Sludging had to be implemented almost immediately due to standing water. Samples collected, however, show encouraging heavy mineral concentrations.

Yellow Rock Traverse:

Traverse extended 480 metres, incorporating 12 drill holes. Heavy mineral was not detected, with most holes only penetrating calcareous sand.

Lake Flannigan Traverse:

Traverse extended 1760 metres, incorporating 24 drill holes.

Like Yellow Rock traverse, most drilling only penetrated the calcareous sand, with heavy mineral concentration not detected.

Martha Lavinia Traverse:

Traverse was only short, due to heavily vegetated dunes with only 6 drill holes managed along a 160 metre line. Concentrations of heavy minerals were present on the beach, though further inland they were not visible.

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 sample 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 composite samples 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 and side tilt of

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 10, and the detailed mineralogical
analyses are presented in Appendix 3 of this report.

TABLE 1
Tabulation of Heavy Mineral Grades

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Depth metres)	HEAVY MINERAL GRADES %																
	SE16	SE72	SE76	SE80	M16	M20	M44	M48	M52	M56	M60	YR16	LFO	LF8	LF32	LF88	LF136
0-1	0.2	0.1	0.1	0.3	0.7	0.6	0.7	0.7	0.8	0.7	0.5	0.5	0.2	0.2	0.2	0.2	0.2
1-2	0.3	0.1	<0.1	0.4	0.6	0.5	0.7	0.6	0.4	0.4	0.5	0.5	0.3	0.2	0.2	0.3	0.2
2-3	0.3		0.1	0.2	0.6	0.6			0.6	0.4		0.4	0.2	0.3	0.2	0.3	0.2
3-4	0.3			0.4		0.5				0.4		0.5	0.2	0.2	0.2	0.1	0.2
4-5	0.1									0.9		0.6	0.2		0.2	0.2	0.2
5-6	0.3											0.6	0.3		0.1	0.2	0.2
6-7	2.3											0.6			0.2	0.2	0.2
7-8												0.6			0.2	0.2	0.3
8-9												1.3			0.2	0.2	0.2
9-10															0.2	0.2	0.2
Average Grade	0.54	0.1	<0.1	0.33	0.64	0.55	0.7	0.68	0.6	0.5	0.5	0.58	0.23	0.23	0.19	0.2	0.2

TABLE 1 - continued

Tabulation of Heavy Mineral Grades - Martha Lavinia

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Depth (metres)	HEAVY MINERAL GRADES %					
	ML 0	ML 4	ML 8	ML 12	ML 16	ML 20
0-1	0.4	0.6	0.7	0.1	0.2	0.5
1-2	4.2	0.4	0.6	0.1	0.4	0.6
2-3	0.5	0.5	0.5	0.1	0.3	0.4
3-4	0.1	0.7	0.5	0.2	0.3	0.5
4-5		0.2	0.3	0.1	0.4	0.6
5-6		0.2	0.1	0.1	0.3	0.5
6-7		0.2	0.1	0.1	0.2	0.5
7-8		0.1	0.1	0.2	0.1	0.4
8-9		0.2		0.2		0.3
9-10						0.4
Average Grade	1.3	0.35	0.4	0.1	0.3	0.5

TABLE 2

Comparison of Mineralogy

MINERAL	SE 16 0-5m.	SE 16 5-7m.	M56 0-4m.	M 56 4-4.56m.	YR 16 0-9m.	LF 32 0-10m.	ML 0 0-3m.
MAGNETITE	11	11	4	23	5	6	5
ILMENITE	21	34	25	12	12	10	26
GARNET	4	9	3	5	9	9	16
TOURMALINE	13	12	39	41	18	29	28
RUTILE	7	5	5	1	1	1	9
ZIRCON	13	13	8	<1	3	1	9
STAUROLITE	1	1	1	1	1	1	2
PYROXENE	-	-	-	-	7	5	-
AMPHIBOLE	1	-	-	-	3	1	-
OLIVINE	-	-	-	-	-	-	-
EPIDOTE/ZOISITE	1	1	-	<1	9	3	<1
ALUMINO-SILICATES	2	1	1	<1	6	4	3
LEUCOXENE	8	11	10	<1	6	2	1
QUARTZ	3	1	4	1	1	2	1
SHELL	-	-	-	-	7	13	1
ROCK FRAGS/COMPOSITES	-	1	-	<1	7	10	<1
MICA/CHLORITE	-	1	-	-	2	3	-
SULPHIDES	-	-	-	<1	-	-	<1
APATITE	-	-	-	-	4	-	-
CASSITERITE	-	-	-	<1	-	1	-
MONAZITE	<1	<1	<1	1	<1	1	<1
SCHEELITE	<1	-	-	-	<1	-	-
SECONDARY DEP	18	-	-	16	-	-	-
AVERAGE GRADE H.M.	0.24	1.3	0.45	0.9	0.58	0.19	1.3

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11. RESULTS AND DISCUSSION

To date twenty-four drill holes have been analysed; seven came from the Manana traverse, five from Lake Flannigan, four from Sea Elephant, six from Martha Lavinia and one from Yellow Rock. This has been done to give an idea of the grades and details on mineralogy in the areas.

The Sea Elephant traverse crosses the northern extension of the strandlines containing the Naracoopa deposits of Lanherne Beach and Back Beach.

Of the four holes analysed from the Sea Elephant traverse, most intervals show grade at $\leq 0.4\%$, (see Table 1). Drill hole SE 16 however shows a great increase in grade for the interval 6-7m. This increase to 2.3% heavy mineral increases the average grade for the hole to 0.54% and may represent a concentration at an old beach level, subsequently buried.

The heavy mineral from drill hole SE 16 was bulked into two composites; 0-5m. and 5-7m. on the basis of colour and grain size. Mineralogical study showed that while each sample was comparable in rutile, zircon and leucoxene, there were significant differences in ilmenite and secondary deposits. The composition of secondary deposits has not been positively determined, however it seems likely that they are organically derived authentic heavy minerals which form under anaerobic conditions.

A number of the drill holes along the Sea Elephant traverse failed to reach the base of sand deposition. It is possible that concentration of mineral similar to that in hole SE 16 may occur near the base of the sand body at other locations.

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The highest and most consistent heavy mineral content was along the Manana traverse, where all holes averaged 0.5% or greater heavy mineral (see Table 1).

The heavy mineral from M 56 was bulked into two composites; 0 - 4.0 and 4.0 - 4.5 metres for mineralogical examination. There was marked variation between the samples with the 0 - 4 m. intervals having 23% rutile, zircon and leucoxene while the 4.0 - 4.56 m. interval only having about 2%. Both samples had large quantities of tourmaline greater than 35%, and significant amounts of ilmenite and magnetite. The 4.0 - 4.56 m. interval has a large percentage of secondary deposits, again indicating an anaerobic environment causing authigenic mineral formation.

The Yellow Rock drill hole (YR 16) showed consistent grades for all intervals approx. 0.5% with an increased percentage for the final interval 8.0 - 8.5 m. (see Table 1) at 1.3%. This sudden increase probably represents an older beach deposit underlying the more recent calcareous dune.

The mineralogy of the holes consists of only 10% rutile, zircon and leucoxene, with the major minerals being ilmenite and tourmaline (see Table 2).

The Lake Flannigan drill holes shows consistently poor grades $\leq 0.3\%$ for every interval, with the average for all three holes of 0.2% heavy mineral (see Table 1).

The mineralogy of LF 132 (Table 2) shows that rutile, zircon and leucoxene only make up 4% of the total heavy mineral. The sample is dominated by tourmaline, and has a large percentage

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of shell, indicating an aragonite rich calcareous sand.

The drill holes tested at Martha Lavinia showed encouraging signs, especially with an interval of 4.2% heavy mineral (see Table 1).

The mineralogy however is dominated by ilmenite, tourmaline and garnet, with 19% of the make up being rutile, zircon and leucoxene (Table 2).

Mineralogical studies for each of the samples containing significant rutile, zircon and leucoxene values show that these minerals can readily be magnetically concentrated into the non-magnetic or the 1.6 amp magnetic fraction from the Frantz separation. If economic quantities of heavy mineral are located it would seem that a non-magnetic product containing the valuable minerals could be produced.

Investigations to date have been of a regional nature. They indicate that heavy minerals deposited on the eastern side of King Island comprise a suite containing significant rutile, zircon and leucoxene. Heavy minerals deposited on the western side of the island are depleted in economic minerals with higher quantities of rock fragments, pyroxenes and other minerals which indicate a less mature heavy mineral suite.

The most attractive exploration target for further investigation is the northern strike extension of the strandline system containing the Naracoopa and Back Beach deposits. South of Sea Elephant River this strandline system has been investigated, however to the north in the hinterland of Nine Mile Beach (west of Saltwater Creek) no previous investigations have been

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carried out. Priority should be given to examination of this area, particularly in the event of a reverse circulation drilling rig being available on King Island.

Additional targets for exploration are the strandlines at Manana and the coastal beach concentrations at Disappointment Bay and White Beach on the north coast.

APPENDIX 1

Drill Hole Descriptive Logs

Traverse lines drilled:

1. Sea Elephant Road - SE
2. Manana - M
3. Yellow Rock - YR
4. Lake Flannigan - LF
5. Martha Lavinia - ML

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - SEA ELEPHANT

LINE NO: 1

HOLE NO: SE 0

LOGGED BY: ANDREW DOVE

DATE DRILLED: 6/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine grained, dark grey then white			
1 - 2		SAND, medium to fine grained, white			
2 - 3	3.75	AS ABOVE to 2.5 then START SLUDGING Then dark greyish brown, indurated sand.			
3 - 4	3.25	SAND, medium to coarse grained, some very coarse grey indurated.			
4 - 5	3.5	AS ABOVE			
5 - 6	3.25	SAND, amber and brownish grey, medium grained. Shell rich.			
6 - 7	4.0	SAND, coarse to very coarse. Shell rich with very coarse shell fragments. Some pebbles. END OF HOLE on pebble base			

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CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE4
 DATE DRILLED: 6/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine grained. Dark grey to black, indurated. START SLUDGING			
1 - 2	4.0	AS ABOVE			
2 - 3	4.0	AS ABOVE			
3 - 4	4.0	AS ABOVE			
4 - 5	5.0	SAND, coarse grained, dark grey.			
5 - 5.7	5.25	SAND, coarse to very coarse grained with pebbles. Some sludge coming into casing. Then into black mud. Some leaves in coarse sand. END OF HOLE. mud			

025

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 8
 DATE DRILLED: 6/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine, dark grey to black, indurated. STARTED SLUDGING			
1 - 2	2.75	AS ABOVE			
2 - 3	4.5	AS ABOVE			
		END OF HOLE 3m. Mud			

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CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 12
 DATE DRILLED: 6/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium dark grey then white. STARTED SLUDGING			
1 - 2	4.5	SAND, fine to medium grained, light grey, slightly organic.			
2 - 3	3.5	SAND, fine to medium grained, dark grey, slightly indurated.			
3 - 4	3.5	AS ABOVE			
		END OF HOLE 4.0m. Mud			

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 16
 DATE DRILLED: 6/7/87

027

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey. Slight indurated. STARTED SLUDGING		0.4	0.2
1 - 2	3.0	AS ABOVE		0.2	0.3
2 - 3	4.0	AS ABOVE		4.0	0.3
3 - 4	4.25	AS ABOVE, becoming darker and medium grained.		16.8	0.3
4 - 5	5.75	AS ABOVE, becoming granular at base.		<u>%+1000 um</u> 10.6	0.1
5 - 6	4.0	AS ABOVE		19.8	0.3
6 - 7	4.0	SAND, light grey, fine grained, occasional granules, mica and calcrete present at basement		8.7	2.3
		END OF HOLE 7.0m.			
			Average		0.54

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028

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 20
 DATE DRILLED: 6/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey, indurated. STARTED SLUDGING			
1 - 2	2.5	SAND, fine grained, light grey, contains minor H.M.			
2 - 3	5.0	SAND, fine grained, light grey, contains indurated layer.			
3 - 4	6.25	SAND, medium to coarse grained, light grey, slightly organic.			
4 - 4.5	1.25	AS ABOVE, hit basement, prob. calcrete.			
		END OF HOLE 4.5m. BAsement			

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - SEA ELEPHANT

LINE NO: 1 HOLE NO: SE 24

LOGGED BY: ANDREW DOVE

DATE DRILLED: 6/7/87

029

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium grained, dark grey to brown, indurated. STARTED SLUDGING			
1 - 2	4.25	SAND, fine-medium grained, white, slightly organic.			
2 - 3	4.5	AS ABOVE becoming coarser (medium grained)			
3 - 4	4.75	AS ABOVE, coarser. Coarse grained to granular.			
4 - 5	4.0	AS ABOVE, H.M. visible			
5 - 6	3.0	AS ABOVE, mica present.			
6 - 6.3	1.5	SAND, fine grained, light grey, some granules. Hit basement. END OF HOLE 6.3m. Basement. Large Pebbles.			

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CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - SEA ELEPHANT

LINE NO: 1

HOLE NO: SE28

LOGGED BY: ANDREW DOVE

DATE DRILLED: 6/7/87

030

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine grained, dark grey then white. STARTED SLUDGING			
1 - 2	5.0	AS ABOVE, hit hard indurated layer. END OF HOLE 1.9m. Hard indurated layer.			

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801032

031

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 32
 DATE DRILLED: 6/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey. STARTED SLUDGING			
1 - 2	4.0	SAND, medium grained, light grey.			
2 - 3	5.0	AS ABOVE, white.			
3 - 4	7.0	AS ABOVE becoming very coarse			
4 - 5	3.75	AS ABOVE			
5 - 6	5.0	AS ABOVE, granules and occasional pebbles.			
6 - 7	4.5	AS ABOVE, contained hard indurated layer			
7 - 8	4.0	AS ABOVE. Hit hard layer			
		END OF HOLE 8.0m. Indurated layer.			

29

801033

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - SEA ELEPHANT

LINE NO: 1

HOLE NO: SE 36

LOGGED BY: ANDREW DOVE

DATE DRILLED: 6/7/87

032

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium grained, dark grey then light grey STARTED SLUDGING			
1 - 2	3.5	SAND, fine-medium grained, light grey			
2 - 3	5.0	AS ABOVE			
3 - 4	5.25	AS ABOVE			
4 - 5	5.0	AS ABOVE, becoming coarser			
5 - 6	7.0	AS ABOVE, very coarse to granular END OF HOLE 6.0m. Mud			

30

801034

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - SEA ELEPHANT

LINE NO: 1 HOLE NO: SE 40

LOGGED BY: ANDREW DOVE

DATE DRILLED: 6/7/87

033

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium, dark grey, indurated. STARTED SLUDGING			
1 - 2	4.0	SAND, fine-medium grained, light grey. Went thru bit indurated layer			
2 - 3	5.0	SAND, fine-medium grained, light grey.			
3 - 4	7.0	AS ABOVE, SAND becoming whiter			
4 - 5	7.0	AS ABOVE, becoming coarser, occasional granules, hit hard layer END OF DRILLING 5.0m. hard layer			

31

801035

034

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - SEA ELEPHANT

LINE NO: 1

HOLE NO: SE 44

LOGGED BY: ANDREW DOVE

DATE DRILLED: 6/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium, dark grey STARTED SLUDGING			
1 - 2	3.0	SAND, fine-medium grained, light grey to white.			
2 - 3	3.75	AS ABOVE, getting coarse			
3 - 4	5.0	AS ABOVE, getting coarse, light grey			
4 - 5	6.5	AS ABOVE, went thru an indurated layer			
5 - 6	2.5	SAND, dark brown, fine-medium grained, indurated.			
6 - 7	2.75	AS ABOVE END OF HOLE 7.0m., got too tight			

32

801036

035

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 48
 DATE DRILLED: 6/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine, dark grey, indurated. STARTED SLUDGING			
1 - 2	3.0	SAND, fine-medium grained, light grey.			
2 - 3	3.5	SAND, fine-medium grained, white			
3 - 4	6.0	AS ABOVE			
4 - 5	3.5	AS ABOVE, hit hard indurated layer. END OF HOLE 5m. Indurated layer			

33

801037

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 52
 DATE DRILLED: 6/7/87

036

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine grained, dark grey STARTED SLUDGING			
1 - 2	3.5	SAND, medium to coarse, dark grey then white.			
2 - 3	5.5	SAND, medium to coarse, white.			
3 - 4	5.0	AS ABOVE			
4 - 5	3.5	AS ABOVE, then dark grey indurated, becoming coarser.			
5 - 6	4.0	SAND, dark grey, indurated, coarse to very coarse. END OF HOLE. Hard indurated layer 6.0m.			

34

801038

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 56
 DATE DRILLED: 6/7/87

0337

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to coarse, dark grey then white. STARTED SLUDGING			
1 - 2	4.5	SAND, medium to coarse, white.			
2 - 3	4/5	AS ABOVE then dark grey, indurated.			
3 - 4	3.5	SAND, dark grey, indurated, becoming coarser. END OF HOLE 4.0m. due to hard drilling			

35

801039

038

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 60
 DATE DRILLED: 6/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse to medium, slight dark grey then white. STARTED SLUDGING			
1 - 2	5.0	SAND, coarse to medium, white.			
2 - 3	4.5	AS ABOVE			
3 - 4	4.5	SAND, medium to coarse grained, light grey.			
4 - 5	4.0	AS ABOVE			
5 - 6	4.0	AS ABOVE, becoming very coarse to granular END OF HOLE 6.0m. becoming too tight			

36

801040

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 64
 DATE DRILLED: 6/7/87

639

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to coarse, slightly dark grey then white. STARTED SLUDGING			
1 - 2	4.0	SAND, white, medium to coarse grained, hit dark grey indurated layer END OF HOLE 2m. Indurated layer			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - SEA ELEPHANT

LINE NO: 1 HOLE NO: SE 68

LOGGED BY: ANDREW DOVE

DATE DRILLED: 6/7/87

040

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, white with slight dark grey, medium to coarse grained STARTED SLUDGING			
1 - 2	4.75	SAND, white then dark grey, medium to coarse grained.			
2 - 3	4.5	SAND, dark grey, medium to coarse grained, indurated.			
3 - 3.5	2.75	AS ABOVE, coarse to granular END OF HOLE 3.5m. got too tight			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - SEA ELEPHANT

LINE NO: 1 HOLE NO: SE 72

LOGGED BY: ANDREW DOVE

DATE DRILLED: 6/7/87

1401

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to coarse grained, dark grey slightly then white.			0.1
1 - 2	6.0	SAND, light grey, medium to coarse Started sludging 1.5m. hitting hard indurated layer END OF HOLE 2.0m. hard indurated layer			0.1
		Average			0.1

39

801043

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 76
 DATE DRILLED: 6/7/87

042

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to coarse, slightly dark grey then white			0.1
1 - 2	5.5	Started sludging 1.3m. SAND, medium to coarse, white, becoming granular			<0.1
2 - 2.3	1.5	AS ABOVE, granular, hit hard indurated layer. END OF HOLE 2.3m. Hard indurated layer			0.1
		Average			<0.1

40

801044

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - SEA ELEPHANT
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: SE 80
 DATE DRILLED: 6/7/87

043

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1	4.0	SAND, medium to coarse grained, slightly dark grey then white. Started sludging 0.7m.			0.3
1 - 2	3.0	SAND, fine-coarse grained white then light grey.			0.4
2 - 3	4.0	SAND, fine-coarse grained, light grey.			0.2
3 - 4	3.0	AS ABOVE, hit hard indurated layer.			0.4
		END OF HOLE 4.0m. Hard indurated layer.			
		Average			0.33

41
801045

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 0

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

044

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to coarse grained, dark grey then white.			
1 - 2		SAND, medium grained, white then brown, indurated.			
2 - 3		SAND, brown, indurated, medium grained.			
3 - 4		SAND, medium grained, dark grey, indurated.			
		STARTED SLUDGING			
4 - 4.6	2.25	SAND, fine grained, white, hit hard indurated layer. END OF HOLE 4.6m. Indurated Layer			

42

801046

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

045

AREA: MANANA

LINE NO: 1 HOLE NO: M 4

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to coarse, dark grey then light grey.			
1 - 2		SAND, medium grained, white.			
2 - 3	4.5	SAND, fine to medium grained, dark grey-brown, indurated.			
		STARTED SLUDGING 2.5m.			
3 - 3.7	2.25	SAND, fine grained, white, hit indurated layer			
		END OF HOLE 3.7m. Hard indurated layer			

43

801047

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 8

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

046

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, light grey.			
1 - 2		SAND, fine grained, white			
2 - 3		SAND, fine grained, dark grey, indurated. STARTED SLUDGING			
3 - 3.5	2.5	SAND, fine grained, white, hit hard indurated layer END OF HOLE 3.5m. Hard indurated layer			

44

801048

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 12

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

047

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, light grey then white.			
1 - 2		SAND, fine to medium grained, white. STARTED SLUDGING			
2 - 2.7		SAND, fine grained, white, hit hard dark grey indurated layer. END OF HOLE 2.7m. Indurated layer			

45

801049

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 16

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

048

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white STARTED SLUDGING		1.6	0.7
1 - 2	4.0	SAND, fine grained, light grey.		4.8	0.6
2 - 2.6	2.5	AS ABOVE, hit hard indurated layer. END OF HOLE 2.6m. Indurated		8.4	0.6
		Average			0.64

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 20

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

049

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white			0.6
1 - 2		SAND, fine grained, white, with minor dark grey			0.5
2 - 3		SAND, medium to coarse grained, dark grey, indurated			0.6
3 - 4	5.0	SAND, fine to medium grained, dark grey then white - STARTED SLUDGING 3.6m. Hit hard indurated layer. END OF HOLE 4.0m. Indurated			0.5
		Average			0.55

47

801051

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 24

LOGGED BY: ANDREW DOVE

DATE DRILLED:

17/7/87

050

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.			
1 - 2		SAND, fine to medium grained, white with minor dark grey.			
2 - 3		SAND, fine grained, dark grey-brown, indurated. STARTED SLUDGING			
3 - 4	3.5	SAND, fine grained, grey, went through hard indurated dark grey layer END OF HOLE 4.0m. Indurated			

48

801052

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 28

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine grained, dark grey then light grey. Slightly indurated. STARTED SLUDGING			
1 - 1.6	2.5	SAND, fine grained, light grey, indurated. END OF HOLE 1.6m Indurated			

051

49

801053

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 32

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

052

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then light grey. STARTED SLUDGING			
1 - 1.5	1.25	SAND, fine grained, light grey, hit indurated dark grey layer END OF HOLE 1.5m. Indurated			

50

801054

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 36

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

053

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine and medium grained, dark grey then light grey. STARTED SLUDGING END OF HOLE 1.0m. Hard dark grey indurated layer			

51

801055

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 40

LOGGED BY: ANDREW DOVE

DATE DRILLED:

17/7/87

054

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND - fine to medium grained, dark grey, indurated. END OF HOLE 1.0m. Indurated			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 44

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

055

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then light grey, indurated. STARTED SLUDGING		2.3	0.7
1 - 1.4	1.5	SAND, fine grained, light grey. Hit hard dark grey indurated layer, some H.M. END OF HOLE 1.4m. Indurated		5.7	0.7
		Averge			0.7

53

801027

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 48

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/ /87

056

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.		4.5	0.7
		STARTED SLUDGING			
1 - 1.3	1.25	SAND, fine grained, dark grey, indurated. Hit hard, dark grey indurated layer.		8.6	0.6
		END OF HOLE 1.3m. Indurated			
		Average			0.68

54

801058

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 52

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

257

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, light grey then white.		5.2	0.8
1 - 2		SAND, fine grained, dark brown indurated STARTED SLUDGING		10.0	0.4
2 - 3	3.5	SAND, fine grained, light grey, hit dark grey indurated layer. Some H.M. END OF HOLE 3.0m. Indurated		4.3	0.6
		Average			0.6

55

801059

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 56

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

058

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then light grey.		2.7	0.6
1 - 2		SAND, fine to medium grained, dark brown, indurated.		3.7	0.4
2 - 3		SAND, medium to coarse grained, white, some H.M. STARTED SLUDGING		11.5	0.4
3 - 4	40 kg	SAND, fine to medium grained, white, some H.M.		11.3	0.4
4 - 4.56	2.75	AS ABOVE. Hit dark, grey indurated layer. END OF HOLE 4.56m. Indurated layer		11.2	0.9
		Average			0.5

56

801060

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 60

LOGGED BY: ANDREW DOVE

DATE DRILLED:

17/7/87

059

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, light grey then white.		2.1	0.5
1 - 2		SAND, medium to fine grained, white then dark grey, indurated.		1.4	0.5
		END OF HOLE 2.0m. Indurated			
		Average			0.5

57

801061

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 64

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

000

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, white H.M. present.			
1 - 2	1.5	AS ABOVE. Hit dark grey indurated layer. END OF HOLE 1.2m. Indurated			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 68

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

1301

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white. STARTED SLUDGING			
1 - 1.5	2.5	SAND, medium to fine grained, light grey. Hit indurated dark grey layer. END OF HOLE 1.5m. Indurated.			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 72

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

062

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey, indurated. STARTED SLUDGING			
1 - 1.50	2.0	SAND, fine to medium grained, light grey. Hit indurated layer. END OF Hole 1.50m. Indurated			

60

801064

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 76

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

063

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, light grey to dark grey. H.M. present. Hit dark grey indurated layer. END OF HOLE 1.0m. Indurated			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 80

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

064

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white. STARTED SLUDGING			
1 - 1.20	0.25	SAND, fine to medium, light grey. Hit indurated dark grey layer. END OF HOLE 1.20m. Indurated			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 84

LOGGED BY: ANDREW DOVE

DATE DRILLED:

18/7/87

005

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white, hit indurated layer. END OF HOLE 1m. Indurated layer.			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 88

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

068

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white. END OF HOLE 1m. Indurated			

64

801068

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 92

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

067

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white. END OF HOLE 1m. Indurated			

65

801069

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 96

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

068

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey, indurated. END OF HOLE 1.0m. Indurated			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1 HOLE NO: M 100

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

069

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey, indurated. END OF HOLE 1.0m. Indurated			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 104

LOGGED BY: ANDREW DOVE

DATE DRILLED:

19/7/87

070

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey, indurated. END OF HOLE 1.0m. Indurated			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MANANA

LINE NO: 1

HOLE NO: M 108

LOGGED BY: ANDREW DOVE

DATE DRILLED: 19/7/87

170

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey, indurated. END OF HOLE 1m. Indurated			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 0

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

072

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, white, fine grained.			
1 - 2	5.25	AS ABOVE, started sludging 1.5m.			
2 - 3	3.5	AS ABOVE			
3 - 4	4.0	AS ABOVE - mica present			
4 - 5	3.5	AS ABOVE, some minor organics, and fine shell.			
5 - 6	4.25	AS ABOVE			
6 - 6.3	2.5	AS ABOVE			
		END OF HOLE 6.3m. Gravel.			

70

801074

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 4

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

073

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, dark grey then white, fine grained.			
1 - 2		SAND, fine grained, white. Fine shell fragments.			
2 - 3		AS ABOVE STARTED SLUDGING			
3 - 4	4.25	AS ABOVE. Mica present.			
4 - 5	3.5	AS ABOVE END OF HOLE 5.0m. Gravel			

71

801075

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 8

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

07A

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white			
1 - 2		SAND, fine grained, white, fine shell fragments STARTED SLUDGING			
2 - 3	3.0	AS ABOVE. Mica present.			
3 - 4	3.25	AS ABOVE			
4 - 5	4.25	AS ABOVE END OF HOLE 5.0m. Gravel and coarse shell.			

CLIENT: NATIONAL MINERAL SANDS.

AREA: KING ISLAND - YELLOW ROCK

LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86

LINE NO: 1 HOLE NO: YR 12

DATE DRILLED: 12/7/87

075

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white. STARTED SLUDGING			
1 - 2	4.0	SAND, fine grained, white, fine shell fragments.			
2 - 3	3.0	AS ABOVE			
3 - 4	3.5	AS ABOVE, then hit coarse gravel END OF HOLE 4.0m. - Gravel.			

73
801077

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 16

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

076

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.		0.2	0.5
1 - 2		SAND, fine grained, white, fine shell.		0.0	0.5
2 - 3		AS ABOVE.		0.0	0.4
3 - 4		AS ABOVE.		0.1	0.5
4 - 5		AS ABOVE		0.0	0.6
5 - 6		AS ABOVE		1.0	0.6
6 - 7		AS ABOVE		0.8	0.6
		STARTED SLUDGING			
7 - 8	4.0	AS ABOVE becoming coarser at base		13.4	0.6
8 - 8.5	3.0	AS ABOVE, becoming very coarse		23.9	1.3
		END OF HOLE 8.5m. Very coarse.			
		Average			0.58

74

801078

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 20

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

077

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine, dark grey, then white.			
1 - 2		SAND, fine grained, white, fine sand fragments.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE, minor dark grey sand.			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE, some coarse gravel occurring.			
		END OF HOLE 10m.			

75

801079

CLIENT: NATIONAL MINERAL SANDS
 AREA: KING ISLAND - YELLOW ROCK
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: YR 24
 DATE DRILLED: 12/7/87

078

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

76

801080

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 28

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

079

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

77

801081

080

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 32

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine, dark grey to white.			
1 - 2		SAND, fine grained, white, fine shell fragments.			
2 - 3		AS ABOVE			
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.			

78

801082

181

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 36

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.			
1 - 2		SAND, fine grained, white, fine shell fragments.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE, some organics occurring.			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE, no organic, just white sand, and fine shell.			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10.0m.			

79

801083

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 40

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

032

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

80

801084

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: KING ISLAND - YELLOW ROCK

LINE NO: 1 HOLE NO: YR 48

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

083

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium dark grey then light grey.			
1 - 2		SAND, fine to medium grained, dark grey then white.			
2 - 3		SAND, fine grained, white, fine shell fragments.			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
		STARTED SLUDGING			
5 - 6	3.25	AS ABOVE			
6 - 7	4.5	AS ABOVE			
7 - 7.7	3.5	AS ABOVE, hit hard, indurated layer.			
		END OF HOLE 7.7m. hard indurated layer			

81

801085

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 0

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

084

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine grained, dark grey then amber, fine shell fragments			0.2
1 - 2		SAND, medium grained, amber, abundant fine shell. STARTED SLUDGING			0.3
2 - 3	3.0	SAND, fine grained, white, abundant fine shell.			0.2
3 - 4	3.0	SAND, fine to medium grained, light grey, abundant shell.			0.2
4 - 5	3.0	AS ABOVE but becoming darker			0.2
5 - 6	3.0	SAND, coarse grained, grey, abundant coarse shell.			0.3
		END OF HOLE 6.0m. Mud.			
		Average			0.23

82

801086

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 8

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

085

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine grained, dark grey then amber.			0.2
1 - 2		SAND, fine grained, white with abundant fine shell. STARTED SLUDGING			0.2
2 - 3	3.0	AS ABOVE			0.3
3 - 4	3.0	AS ABOVE			0.2
		END OF HOLE 40m. Hit hard basement.			
		Average			0.23

83

801087

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 16

LOGGED BY: ANDREW DOVE

DATE DRILLED: 12/7/87

026

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, medium to coarse grained, white, abundant shell fragments			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE, slightly finer			
6 - 7		AS ABOVE, fine grained			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE			
		END OF HOLE 9.0m. Didn't sludge			

84

801088

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1

HOLE NO: LF 24

LOGGED BY: ANDREW DOVE

DATE DRILLED:

14/7/87

087

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium, dark grey they amber. Abundant fine shell.			
1 - 2		SAND, medium to coarse, white, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE, getting finer			
5 - 6		AS ABOVE, medium to fine.			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE, becoming coarser			
9 - 10		AS ABOVE			
		end of hole 10m.			

85

801089

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 32

LOGGED BY: ANDREW DOVE

DATE DRILLED: 14/7/87

088

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine grained, dark grey then white. Abundant fine shell.		9.0	0.2
1 - 2		SAND, medium to coarse grained, white. Abundant fine shell.		23.2	0.2
2 - 3		AS ABOVE		26.3	0.2
3 - 4		SAND, medium to fine white, with minor organics, abundant shell fragments.		% +1000 um	
4 - 5		AS ABOVE		1.5	0.2
5 - 6		AS ABOVE		0.9	0.2
		STARTED SLUDGING		0.4	0.1
6 - 7	3.5	AS ABOVE, becoming slightly darker		0.4	0.2
7 - 8	3.0	AS ABOVE, grey.		1.3	0.2
8 - 9	2.75	AS ABOVE		0.5	0.2
9 - 10	3.25	AS ABOVE		0.5	0.2
		END OF HOLE 10m.			
			Average		0.19

86

801090

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 40

LOGGED BY: ANDREW DOVE

DATE DRILLED: 14/7/87

089

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to fine grained, dark brown then white. Abundant fine shell.			
1 - 2		SAND, medium grained, white. Abundant fine shell. STARTED SLUDGING			
2 - 3	3.0	AS ABOVE			
3 - 4	3.0	AS ABOVE, grey			
4 - 5	3.25	AS ABOVE, medium to coarse			
5 - 6	3.5	AS ABOVE			
6 - 7	2.75	AS ABOVE, contains wood fragments			
7 - 8	2.75	AS ABOVE, hit hard layers of bark and wood. END OF HOLE 8m. Wood.			

87

801091

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 48

LOGGED BY: ANDREW DOVE

DATE DRILLED: 14/7/87

090

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium, dark grey then white. Abundant fine shell. STARTED SLUDGING			
1 - 2	4.25	SAND, medium grained, white, abundant fine shell.			
2 - 3	3.25	AS ABOVE becoming finer.			
3 - 4	3.0	AS ABOVE becoming grey			
4 - 5	3.25	AS ABOVE			
5 - 6	3.25	AS ABOVE, grey			
6 - 7	3.25	AS ABOVE, hit hard wood layer END OF HOLE 7m. - Wood			

88

801092

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1

HOLE NO: LF 56

LOGGED BY: ANDREW DOVE

DATE DRILLED: 14/7/87

1091

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.			
1 - 2		SAND, medium grained, white. Abundant fine shell. STARTED SLUDGING			
2 - 3		SAND, medium grained, white, incl. some organics. Abundant fine shell.			
3 - 4	4.5	SAND, medium grained, light grey, abundant fine shell.			
4 - 5	4.0	AS ABOVE, dark grey, wood pieces END OF HOLE 5.0m. Hit layer of hard wood.			

89

801093

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 72

LOGGED BY: ANDREW DOVE

DATE DRILLED: 14/7/87

092

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white			
1 - 2		SAND, fine grained, white, fine shell fragments.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE, went from calcrete layer.			
4 - 5		SAND, fine grained, slightly organic, white to light grey. Abundant fine shell.			
5 - 6		SAND, fine grained, white, fine shell fragments.			
6 - 7		AS ABOVE			
7 - 8	3.5	AS ABOVE, started sludging 7.5m.			
8 - 9	4.0	AS ABOVE			
9 - 10	4.0	AS ABOVE, hit mud.			
		END OF HOLE 10.0m. Mud.			

90

801094

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1

HOLE NO: LF 80

LOGGED BY: ANDREW DOVE

DATE DRILLED:

15/7/87

093

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white			
1 - 2		SAND, fine to medium grained, white, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE, slightly grey.			
6 - 7		AS ABOVE, hit wood layer.			
		END OF HOLE 7.0m. Wood.			

91

801095

CLIENT: NATIONAL MINERAL SANDS
 AREA: LAKE FLANNIGAN
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: LF 88
 DATE DRILLED: 16/7/87

09A

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine-medium grained, dark grey then white.			0.2
1 - 2		SAND, fine to medium grained white, abundant shell fragment.			0.3
2 - 3		AS ABOVE, slightly organic.			0.3
3 - 4		AS ABOVE, just white.			0.1
4 - 5		AS ABOVE			0.2
5 - 6		AS ABOVE			0.2
6 - 7		AS ABOVE			0.2
7 - 8		AS ABOVE			0.2
8 - 9		AS ABOVE			0.2
9 - 10		AS ABOVE			0.2
		END OF HOLE 10.0m.			

92

801096

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 96

LOGGED BY: ANDREW DOVE

DATE DRILLED: 16/7/87

095

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.			
1 - 2		SAND, fine to medium grained, white, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE, slightly organic.			
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.			

93

801097

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1

HOLE NO: LF 104

LOGGED BY: ANDREW DOVE

DATE DRILLED:

16/7/87

096

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.			
1 - 2		SAND, fine to medium grained, white, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE, shell slightly coarser.			
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.			

76

801098

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 112

LOGGED BY: ANDREW DOVE

DATE DRILLED: 16/7/87

097

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then slightly white.			
1 - 2		SAND, fine to medium grained, white, 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			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE, becoming grey, increase in organics.			
		END OF HOLE 10m.			

95
801099

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1

HOLE NO: LF 120

LOGGED BY: ANDREW DOVE

DATE DRILLED:

16/7/87

098

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, slight dark grey then white, abundant fine shell.			
1 - 2		SAND, fine to medium grained, white, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE, slightly organic			
4 - 5		AS ABOVE			
5 - 6		AS ABOVE, no organics.			
6 - 7		AS ABOVE			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10.0m.			

96

801100

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 128

LOGGED BY: ANDREW DOVE

DATE DRILLED: 16/7/87

099

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.			
1 - 2		SAND, fine to medium grained, white, abundant fine shell.			
2 - 3		AS ABOVE			
3 - 4		AS ABOVE			
4 - 5		AS ABOVE, contains minor organics.			
5 - 6		AS ABOVE, contains minor organics.			
6 - 7		AS ABOVE but no organics			
7 - 8		AS ABOVE			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10m.			

97

801101

CLIENT: NATIONAL MINERAL SANDS
 AREA: LAKE FLANNIGAN
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: LF 136 South
 DATE DRILLED: 16/7/87

100

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

98

801102

CLIENT: NATIONAL MINERAL SANDS
 AREA: LAKE FLANNIGAN
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: LF 136 North
 DATE DRILLED: 16/7/87

101

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey to white, minor fine shell.		16.1	0.2
1 - 2		SAND, fine to medium grained, slightly dark grey then white, abundant fine shell.		18.0	0.2
2 - 3		SAND, fine to medium grained, white, abundant fine shell.		10.1	0.2
3 - 4		AS ABOVE		4.6	0.2
4 - 5		AS ABOVE		4.1	0.2
5 - 6		AS ABOVE		8.8	0.2
6 - 7		AS ABOVE		8.4	0.2
7 - 8		AS ABOVE		8.8	0.3
8 - 9		AS ABOVE, slightly organic		11.1	0.2
9 - 10		AS ABOVE		5.5	0.2
		END OF HOLE 10m.			
			Average		0.21

69

801103

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 144

LOGGED BY: ANDREW DOVE

DATE DRILLED: 16/7/87

102

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white, minor fine shell.			
1 - 2		SAND, fine to medium grained, white, abundant shell (medium size)			
2 - 3		AS ABOVE, shell fine.			
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 10m.			

100

801104

CLIENT: NATIONAL MINERAL SANDS
 AREA: LAKE FLANNIGAN
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: LF 152
 DATE DRILLED: 16/7/87

103

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, slight dark grey then white, abundant fine shell.			
1 - 2		SAND, fine to medium grained, white, 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			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE, slightly organic			
		END OF HOLE 10m.			

101

801105

CLIENT: NATIONAL MINERAL SANDS
 AREA: LAKE FLANNIGAN
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: LF 160
 DATE DRILLED: 17/7/87

104

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.			
1 - 2		SAND, fine to medium grained, white, 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			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10m.			

102

801106

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 160

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

105

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.			
1 - 2		SAND, fine to medium grained, white, 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			
8 - 9		AS ABOVE			
9 - 10		AS ABOVE			
		END OF HOLE 10m.			

103

801107

CLIENT: NATIONAL MINERAL SANDS
 AREA: LAKE FLANNIGAN
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: LF 168
 DATE DRILLED: 17/7/87

106

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

104

801108

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: LAKE FLANNIGAN

LINE NO: 1 HOLE NO: LF 176

LOGGED BY: ANDREW DOVE

DATE DRILLED: 17/7/87

107

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

105

801109

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MARTHA LAVINIA

LINE NO: 1 HOLE NO: ML 0

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

108

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		MINERAL evident along the beach. SAND, medium grained, shell fragments, H.M. present. STARTED SLUDGING		3.1	0.4
1 - 2	4.25	AS ABOVE, some black SHALE fragments		6.6	4.2
2 - 3	5.5	SAND, grey, shell fragments and abundant black SHALE fragments, medium grained.		4.8	0.5
3 - 4	5.0	AS ABOVE, hit very coarse shell. END OF HOLE 4.0m. Coarse Shell		17.3	0.1
		Average			1.3

106

801110

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MARTHA LAVINIA

LINE NO: 1 HOLE NO: ML 4

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

109

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium grained, white, shell fragment		0.7	0.6
1 - 2		AS ABOVE		0.3	0.4
2 - 3		AS ABOVE, some organics		1.0	0.5
3 - 4		AS ABOVE, no organics		1.6	0.7
		STARTED SLUDGING			
4 - 5	4.0	AS ABOVE		7.5	0.2
5 - 6	4.0	SAND, grey, fine to medium grained, shell fragment, and black shale.		4.3	0.2
6 - 7	5.0	AS ABOVE		10.6	0.2
7 - 8	5.0	AS ABOVE		7.2	0.1
8 - 8.3	2.0	AS ABOVE		5.4	0.2
		END OF HOLE Coarse Shell			

107

8011111

110

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MARTHA LAVINIA

LINE NO: 1 HOLE NO: ML 8

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, white, slightly organic		0.5	0.7
1 - 2		SAND, fine to medium grained, white, abundant shell		0.5	0.6
2 - 3		AS ABOVE		0.5	0.5
3 - 4		AS ABOVE		0.8	0.5
		STARTED SLUDGING			
4 - 5	4.0	AS ABOVE		1.1	0.3
5 - 6	5.5	AS ABOVE, becoming grey		2.9	0.1
6 - 7	5.5	SAND, fine to medium grained, grey, abundant shell and fine black shale		3.7	0.1
7 - 7.5		AS ABOVE		18.2	0.1
		END OF HOLE 7.5m. Coarse shell			

108

801112

CLIENT: NATIONAL MINERAL SANDS
 AREA: MARTHA LAVINIA
 LOGGED BY: ANDREW DOVE

TITLE NO: EL 45/86
 LINE NO: 1 HOLE NO: ML 12
 DATE DRILLED: 18/7/87

111

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white		0.5	0.1
1 - 2		SAND, medium grained, white, abundant shell.		2.7	0.1
2 - 3		AS ABOVE		0.1	0.1
3 - 4		AS ABOVE		0.4	0.2
4 - 5		AS ABOVE		1.2	0.1
5 - 6		AS ABOVE		3.9	0.1
6 - 7		AS ABOVE, becoming brown		1.2	0.1
7 - 8		AS ABOVE		1.2	0.2
8 - 8.5		AS ABOVE		1.7	0.2
END OF HOLE 8.5m. Didn't sludge					

109

801113

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MARTHA LAVINIA

LINE NO: 1 HOLE NO: ML 16

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

112

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium white, some organics.		0.7	0.2
1 - 2		SAND, fine to medium grained, white then black.		0.2	0.4
2 - 3		SAND, fine to medium white to brown		0.2	0.3
3 - 4		sand, fine to medium grain, light brown		0.4	0.3
4 - 5		AS ABOVE		0.8	0.4
5 - 6		AS ABOVE		0.7	0.3
6 - 7		AS ABOVE then grey, some organics		25.0	0.2
7 - 7.80	4.5	AS ABOVE, becoming coarser. Occasional pebble. STARTED SLUDGING 7.5m. Hit hard dark grey indurated layer. END OF HOLE 7.8m. Indurated		+ 1mm % 10.6	0.1

110

801114

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: EL 45/86

AREA: MARTHA LAVINIA

LINE NO: 1 HOLE NO: ML 20

LOGGED BY: ANDREW DOVE

DATE DRILLED: 18/7/87

113

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, dark grey then white.		0.9	0.5
1 - 2		SAND, fine to medium grained, brown.		0.1	0.6
2 - 3		SAND, fine to medium grained, brown, then white.		0.0	0.4
3 - 4		SAND, fine to medium grained, white. Minor fine shell.		0.1	0.5
4 - 5		AS ABOVE		0.0	0.6
5 - 6		AS ABOVE, slightly organic		0.2	0.5
6 - 7		AS ABOVE		0.2	0.5
7 - 8		AS ABOVE		0.3	0.4
8 - 9		AS ABOVE		0.3	0.3
9 - 10		SAND, fine to medium grained, white then brown.		0.1	0.4
		END OF HOLE 10 metres			

111
801115

APENDIX 2

Results of Laboratory Heavy Mineral
Separations

115



DEPARTMENT OF MINES—TASMANIA

LAUNCESTON OFFICES
287 WELLINGTON STREET
SOUTH LAUNCESTON 7249

TELEPHONES:

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

TELEX 58764

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 µm %</u>	<u>% Heavy Mineral</u>
875055	M.L. 0	0 - 1	3.1	0.4
056		1 - 2	6.6	4.2
057		2 - 3	4.8	0.5
058		3 - 4	17.3	0.1
059	Lf 32	0 - 1	9.0	0.2
060		1 - 2	23.2	0.2
061		2 - 3	26.3	0.2
			<u>+ 1.00 mm</u>	
875062		3 - 4	1.5	0.2
063		4 - 5	0.9	0.2
064		5 - 6	0.4	0.1
065		6 - 7	0.4	0.2
066		7 - 8	1.3	0.2
067		8 - 9	0.5	0.2
068		9 - 10	0.5	0.2
875139	BB 160	0 - 1	1.2	0.3
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

- 2 -

<u>Reg. No</u>		<u>Description</u>	<u>+600 μm %</u>	<u>% Heavy Mineral</u>
875145	BB 160	6 - 7	4.9	0.9
146		7 - 8	3.0	0.9
147	M 56	0 - 1	2.7	0.6
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
153		1 - 2	1.4	0.5
			<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 μm %</u>	
875193	YR 16	0 - 1	0.2	0.5
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
201		8 - 9	23.9	1.3
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
276	SE 16	0 - 1	0.4	0.2
277		1 - 2	0.2	0.3
278		2 - 3	4.0	0.3
279		3 - 4	16.8	0.3

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<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 



TELEPHONES:

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

TELEX 58764

LAUNCESTON OFFICES
287 WELLINGTON STREET
SOUTH LAUNCESTON 7249

26th October 1987

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

Reg. Nos 875548-67

Dear Sir,

Please find below results of samples submitted
to this laboratory and stated to be from the King Island area.

<u>Reg. No</u>	<u>Description</u>	<u>+ 600 μm %</u>	<u>% Heavy Mineral</u>
875548 M 44	0 - 1	2.3	0.7
549	1 - 1.4	5.7	0.7
550 M 48	0 - 1	4.5	0.7
551	1 - 1.3	8.6	0.6
552 M 52	0 - 1	5.2	0.8
553	1 - 2	10.0	0.4
554	2 - 3	4.3	0.6
555 LF 136 North	0 - 1 *	16.1	0.2
556	1 - 2	18.0	0.2
557	2 - 3	10.1	0.2
558	3 - 4	4.6	0.2
559	4 - 5	4.1	0.2
560	5 - 6	8.8	0.2
561	6 - 7	8.4	0.2
562	7 - 8	8.8	0.3
563	8 - 9	11.1	0.2
564	9 - 10	5.5	0.2
565 M 16	0 - 1	1.6	0.7
566	1 - 2	4.8	0.6
567	2 - 2.6	8.4	0.6

* 8.6% Slime

Yours faithfully,

P. L. James
(P. L. James)

Analyses by *P. L. James* Acting Chief Chemist & Metallurgist

DEPARTMENT OF MINES—TASMANIA



TELEPHONES:

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

TELEX 58764

29 October 1987

LAUNCESTON OFFICES
287 WELLINGTON STREET
SOUTH LAUNCESTON 7249

Peter Stitt & Assoc. Pty Ltd
5th Floor
York House
32 York Street
SYDNEY NSW 2000

Reg. Nos 875568-581 & 875616-634

Dear Sir

Please find below results of samples submitted to this laboratory and stated to be from the King Island area.

<u>Reg. No</u>	<u>Description</u>	<u>% (+600µm)</u>	<u>% Heavy Mineral</u>
875568	M 20 0-1	5.1	0.6
569	1-2	4.9	0.5
570	2-3	15.9	0.6
571	3-4	5.8	0.5
572	LF 88 0-1	4.1	0.2
573	1-2	2.4	0.3
574	2-3	2.8	0.3
575	3-4	5.8	0.1
576	4-5	3.5	0.2
577	5-6	3.6	0.2
578	6-7	2.8	0.2
579	7-8	3.2	0.2
580	8-9	2.1	0.2
581	9-10	7.5	0.2
616	SE 72 0-1	18.2	0.1
		<u>% (+1.00µm)</u>	
617	1-2	2.9	0.1
618	SE 76 0-1	5.2	0.1
619	1-2	20.1	<0.1
620	2-2.3	44.8	0.1
621	SE 80 0-1	3.7	0.3
622	1-2	6.8	0.4

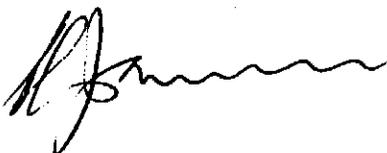
100

(2)

<u>Reg. No</u>	<u>Description</u>	<u>% (+100µm)</u>	<u>% Heavy Mineral</u>
875623	SE 80 2-3	16.0	0.2
624	3-4	7.5	0.4
625	LF 0 0-1	13.2 % (+600µm)	0.2
626	1-2	4.1	0.3
627	2-3	2.8	0.2
628	3-4	3.0	0.2
629	4-5	4.2	0.2
630	5-6	3.4	0.3
631	LF 8 0-1	9.1	0.2
632	1-2	3.6	0.2
633	2-3	2.8	0.3
634	3-4	3.9	0.2

Analyses by *J. Rhodes*

Yours faithfully



(P L James)
ACTING CHIEF CHEMIST & METALLURGIST

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DEPARTMENT OF MINES—TASMANIA

801123

TELEPHONES:

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

TELEX 58764

LAUNCESTON OFFICES
287 WELLINGTON STREET
SOUTH LAUNCESTON 7249

6th November 1987

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

Reg. Nos 875677-93 875703-19875744-53

Dear Sir,

Please find below results of samples submitted to this laboratory and stated to be from the King Island area.

<u>Reg. No</u>	<u>Description</u>	<u>% + 600 μm</u>	<u>% Heavy Mineral</u>
875677 ML 4	0 - 1	0.7	0.6
678	1 - 2	0.3	0.4
679	2 - 3	1.0	0.5
680	3 - 4	1.6	0.7
681	4 - 5	7.5	0.2
682	5 - 6	4.3	0.2
683	6 - 7	10.6	0.2
684	7 - 8	7.2	0.1
685	8 - 8.3	5.4	0.2
686 ML 16	0 - 1	0.7	0.2
687	1 - 2	0.2	0.4
688	2 - 3	0.2	0.3
689	3 - 4	0.4	0.3
690	4 - 5	0.8	0.4
691	5 - 6	0.7	0.3
692	6 - 7	25.0	0.2
		<u>+ 1mm %</u>	
693	7 - 8	10.6	0.1
		<u>% + 600 μm</u>	
875703 ML 8	0 - 1	0.5	0.7
704	1 - 2	0.5	0.6
705	2 - 3	0.5	0.5
706	3 - 4	0.8	0.5
707	4 - 5	1.1	0.3
708	5 - 6	2.9	0.1
709	6 - 7	3.7	0.1
710	7 - 8	18.2	0.1

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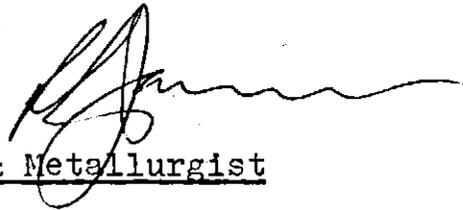
<u>Reg. No</u>	<u>Description</u>	<u>+ 600 μm %</u>	<u>% Heavy Mineral</u>
875711 ML 12	0 - 1	0.5	0.1
712	1 - 2	2.7	0.1
713	2 - 3	0.1	0.1
714	3 - 4	0.4	0.2
715	4 - 5	1.2	0.1
716	5 - 6	3.9	0.1
717	6 - 7	1.2	0.1
718	7 - 8	1.2	0.2
719	8 - 8.5	1.7	0.2
875744 ML 20	0 - 1	0.9	0.5
745	1 - 2	0.1	0.6
746	2 - 3	0.0	0.4
747	3 - 4	0.1	0.5
748	4 - 5	0.0	0.6
749	5 - 6	0.2	0.5
750	6 - 7	0.2	0.5
751	7 - 8	0.3	0.4
752	8 - 9	0.3	0.3
753	9 - 10	0.1	0.4

Yours faithfully,

(P.L. James)

Acting Chief Chemist & Metallurgist

Analyses by.....
J. Rhodes



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APPENDIX 3

Mineralogical Study of Heavy Mineral Concentrate

Samples examined:

1. Composite of Sea Elephant hole - SE 16, 0 - 5m.
2. Composite of Seal Elephant hole - SE 16, 5 - 7m.
3. Composite of Manana hole - M 56, 0 - 4m.
4. Manana hole - M 56, 0 - 4.56m.
5. Composite of Yellow Rock hole - YR 16, 0 - 9m.
6. Composite of Lake Flannigan hole - LF 32, 0 - 10m.
7. Composite of Martha Lavinia hole - ML 0, 0 - 3m.

APPLIED PETROGRAPHIC SERVICES

SPECIALIZING IN PETROGRAPHIC ANALYSIS OF GEOLOGICAL AND INDUSTRIAL SAMPLES

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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: YR 16, 0 - 9 Composite (APS 106/9)

APS JOB NO.: M 106

MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	5	42	-	-	-	-
ILMENITE	12	-	14	18	-	-
GARNET	9	12	10	11	2	1
TOURMALINE	18	4	22	21	20	1
RUTILE	1	-	-	-	5	11
ZIRCON	3	1	3	2	6	18
STAUROLITE	1	1	1	1	1	-
PYROXENE	7	6	10	7	6	3
AMPHIBOLE	3	8	3	3	1	-
OLIVINE	-	-	-	-	-	-
EPIDOTE/ ZOISITE	9	2	10	9	15	2
ALUMINO SILICATES	6	3	6	5	6	10
LEUCOXENE	6	1	5	7	6	10
QUARTZ	1	-	1	-	1	3
SHELL	7	3	7	6	6	27
ROCK FRAGS/ COMPOSITES	7	12	4	6	16	2
MICA/CHLORITE	2	3	3	1	6	1
SULPHIDES	-	-	-	-	-	-
APATITE	4	2	1	3	5	15
CASSITERITE	-	-	-	-	-	-
MONAZITE	<1	-	-	<1	<1	<1
SCHEELITE	<1	-	-	-	-	<1
NO. OF POINTS		368	530	558	481	488
WEIGHT	4.91g	0.56g	0.71g	2.63g	0.79g	0.22g
%	100	11	15	54	16	4

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DATE: 30.11.87

SAMPLE DETAILS: LF 32, 0 - 10 Composite (APS 106/7)

APS JOB NO.: M 106

MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	6	47	-	-	-	-
ILMENITE	10	-	28	14	-	-
GARNET	9	12	22	9	7	1
TOURMALINE	29	8	16	37	50	4
RUTILE	1	-	-	-	2	3
ZIRCON	1	1	-	2	1	3
STAUROLITE	1	3	1	-	-	-
PYROXENE	5	3	9	5	7	-
AMPHIBOLE	1	2	4	1	-	-
OLIVINE	-	-	-	-	-	-
EPIDOTE/ Zoisite	3	-	1	4	8	-
ALUMINO SILICATES	4	-	2	4	4	7
LEUCOXENE	2	1	1	3	1	2
QUARTZ	2	1	1	1	1	7
SHELL	13	6	4	4	3	70
ROCK FRAGS/ COMPOSITES	10	16	8	11	19	1
MICA/CHLDRITE	3	1	3	5	1	3
SULPHIDES	-	-	-	-	-	-
APATITE	-	-	-	-	-	-
CASSITERITE	1	-	-	-	-	1
MONAZITE	1	1	1	1	1	1
SCHEELITE	-	-	-	-	-	-
NO. OF POINTS		402	556	403	420	534
WEIGHT	2.19g	0.26g	0.24g	1.16g	0.25g	0.28g
%	100	12	11	53	11	13

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DATE: 30.11.87

SAMPLE DETAILS: ML 0, 0 - 3 Composite (APS 106/1)

APS JOB NO.: M 106

MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	4	94	-	-	-	-
ILMENITE	26	-	60	22	-	-
GARNET	16	5	39	10	4	1
TOURMALINE	28	<1	<1	59	66	1
RUTILE	9	-	<1	<1	16	38
ZIRCON	9	<1	1	<1	4	42
STAURDLITE	2	-	<1	5	-	-
PYROXENE	-	-	-	-	-	-
AMPHIBOLE	-	-	-	-	-	-
OLIVINE	-	-	-	-	-	-
EPIDOTE/ ZIRCON	<1	-	-	1	<1	-
ALUMINO SILICATES	3	-	-	2	6	11
LEUCOXENE	1	1	-	<1	2	4
QUARTZ	1	<1	<1	-	<1	4
SHELL	1	-	-	1	2	1
ROCK FRAGS/ COMPOSITES	<1	-	<1	-	-	-
MICA/CHLDRITE	-	-	-	-	-	-
SULPHIDES	<1	<1	-	-	-	-
APATITE	-	-	-	-	-	-
CASSITERITE	-	-	-	-	-	-
MONAZITE	<1	-	-	<1	<1	<1
SCHEELITE	-	-	-	-	-	-
NO. OF POINTS		509	527	531	516	524
WEIGHT	5.2g	0.23g	1.47g	2.15g	0.28g	1.07g
%	100	4	28	42	5	21

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DATE: 30.11.87

SAMPLE DETAILS: M 56, D - 4 Composite (APS 106/2)

APS JOB NO.: M 106

MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	4	96	-	-	-	-
ILMENITE	25	-	82	28	-	-
GARNET	3	3	15	2	<1	-
TOURMALINE	39	<1	2	47	73	2
RUTILE	5	-	<1	2	9	21
ZIRCON	8	-	-	6	3	34
STAUROLITE	1	-	<1	2	<1	-
PYROXENE	-	-	-	-	-	-
AMPHIBOLE	-	-	-	-	-	-
OLIVINE	-	-	-	-	-	-
EPIDOTE/ ZIRCON	-	-	-	-	-	-
ALUMINO SILICATES	1	-	-	1	1	4
LEUCOXENE	10	-	1	9	12	26
QUARTZ	4	1	<1	3	2	13
SHELL	-	-	-	-	-	-
ROCK FRAGS/ COMPOSITES	-	-	-	-	-	-
MICA/CHLORITE	-	-	-	-	-	-
SULPHIDES	-	-	-	-	-	-
APATITE	-	-	-	-	-	-
CASSITERITE	-	-	-	-	-	-
MONAZITE	<1	<1	<1	<1	<1	1 - 2
SHEELITE	-	-	-	-	-	<1
NO. OF POINTS		435	509	558	505	542
WEIGHT	1.81g	0.08g	0.13g	1.21g	0.17g	0.22g
%	100	5	7	67	9	12

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APPLIED PETROGRAPHIC SERVICES

SPECIALIZING IN PETROGRAPHIC ANALYSIS OF GEOLOGICAL AND INDUSTRIAL SAMPLES

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

DATE: 30.11.87

SAMPLE DETAILS: M 56, 4 - 4.56 (APS 106/3)

APS JOB NO.: M 106

MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	23	97	-	-	-	-
ILMENITE	12	-	77	11	-	-
GARNET	5	2	22	5	-	-
TOURMALINE	41	<1	-	82	38	-
RUTILE	1	-	-	-	3	6
ZIRCON	<1	-	-	-	<1	-
STAURDLITE	1	-	-	2	-	-
PYROXENE	-	-	-	-	-	-
AMPHIBOLE	-	-	-	-	-	-
OLIVINE	-	-	-	-	-	-
EPIDOTE/ ZOSITE	<1	-	-	-	1	-
ALUMINO SILICATES	<1	-	-	-	<1	2
LEUCOXENE	<1	-	<1	<1	2	-
QUARTZ	1	1	1	-	-	1
SHELL	-	-	-	-	-	-
ROCK FRAGS/ COMPOSITES	<1	-	<1	-	-	-
MICA/CHLDRITE	-	-	-	-	-	-
SULPHIDES	<1	<1	-	-	-	-
APATITE	-	-	-	-	-	-
CASSITERITE	<1	-	-	-	<1	<1
MONAZITE	1	-	-	-	<1	<1
SCHEELITE	-	-	-	-	-	-
SECONDARY DEPS.	16	<1	-	-	56	91
NO. OF POINTS		435	505	545	500	236 (small sample)
WEIGHT	0.51g	0.12g	0.05g	0.22g	0.08g	0.04g
%	100	23	10	43	16	8

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DATE: 30.11.87

SAMPLE DETAILS: SE 16, 0 - 5 Composite (APS 106/4)

APS JOB NO.: M 106

MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	11	88	-	-	-	-
ILMENITE	21	-	73	54	-	-
GARNET	4	2	14	8	1	-
TOURMALINE	13	5	6	31	48	4
RUTILE	7	-	-	-	22	13
ZIRCON	13	4	1	2	1	24
STAUROLITE	1	-	1	1	-	-
PYROXENE	-	-	-	-	-	-
AMPHIBOLE	1	-	-	1	-	1
OLIVINE	-	-	-	-	-	-
EPIDOTE/ ZIRCON	1	-	-	1	1	-
ALUMINO SILICATES	2	-	1	-	-	3
LEUCOXENE	8	1	1	1	19	15
QUARTZ	3	-	1	-	-	6
SHELL	-	-	-	-	-	-
ROCK FRAGS/ COMPOSITES	-	-	-	-	-	-
MICA/CHLORITE	-	-	-	-	-	-
SULPHIDES	-	-	-	-	-	-
APATITE	-	-	-	-	-	-
CASSITERITE	-	-	-	-	-	-
MONAZITE	<1	-	-	-	<1	<1
SCHEELITE	<1	-	-	-	-	<1
SECONDARY DEPS.	18	-	4	3	8	34
NO. OF POINTS		422	507	500	419	548
WEIGHT	2.21g	0.28g	0.24g	0.55g	0.08g	1.06g
%	100	12	11	25	4	48

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

DATE: 30.11.87

SAMPLE DETAILS: SE 16, 5 - 7 Composite (APS 106/6)

APS JOB NO.: M 106

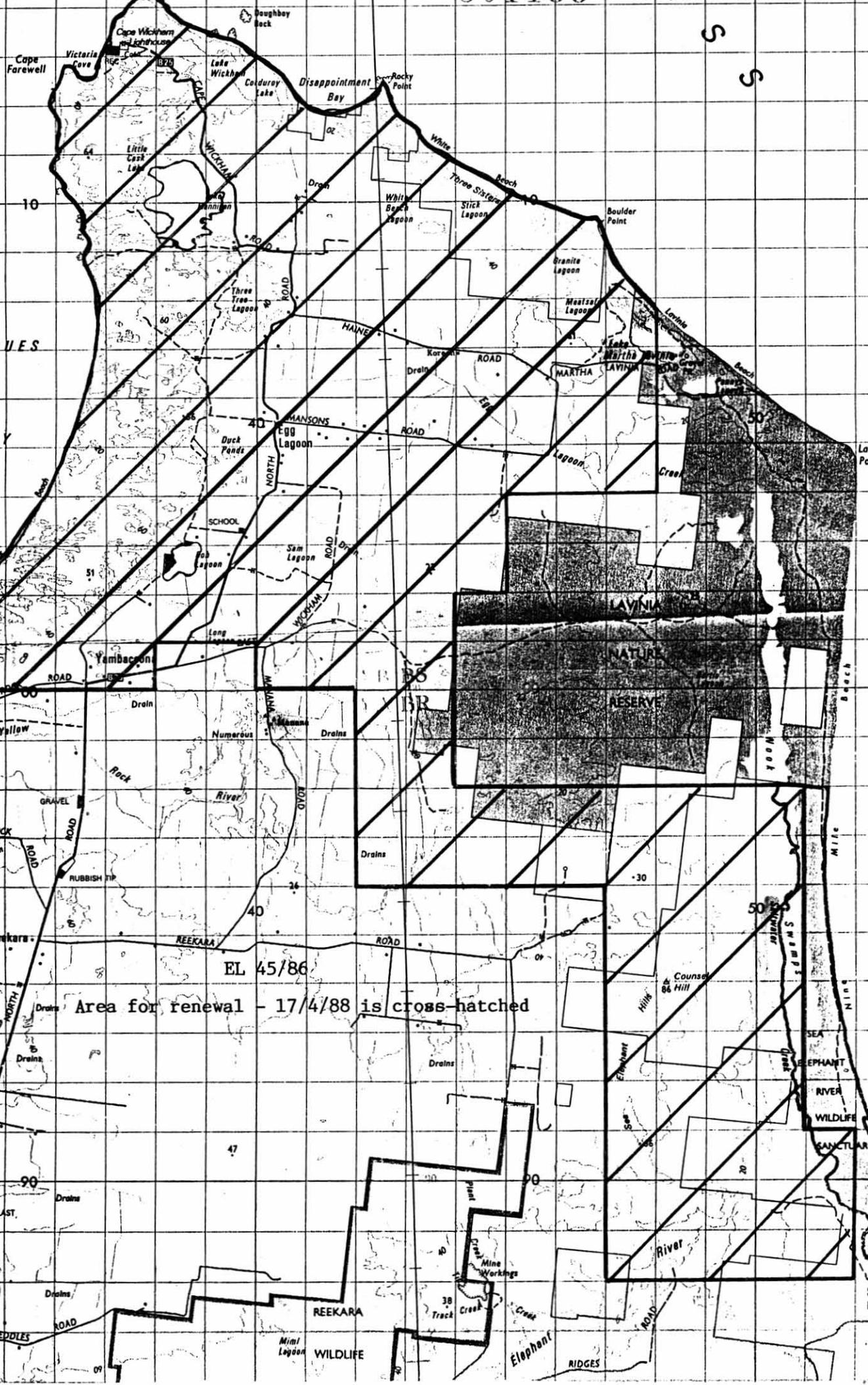
MINERAL	TOTAL	HAND MAGS.	0.5A MAG	1.0A MAG	1.6A MAG	1.6A NON-MAG
MAGNETITE	11	89	-	-	-	-
ILMENITE	34	-	90	49	-	-
GARNET	9	6	9	13	3	1
TOURMALINE	12	3	1	16	45	2
RUTILE	5	-	-	-	15	21
ZIRCON	13	1	-	7	7	45
STAURDLITE	1	1	-	2	1	-
PYROXENE	-	-	-	-	-	-
AMPHIBOLE	-	-	-	-	-	-
OLIVINE	-	-	-	-	-	-
EPIDOTE/ ZOBISITE	1	-	-	1	-	-
ALUMINO SILICATES	1	-	-	1	8	5
LEUCOXENE	11	1	1	11	15	21
QUARTZ	1	-	-	1	1	3
SHELL	-	-	-	-	-	-
ROCK FRAGS/ COMPOSITES	1	-	-	-	7	2
MICA/CHLORITE	1	-	1	-	-	-
SULPHIDES	-	-	-	-	-	-
APATITE	-	-	-	1	1	1
CASSITERITE	-	-	-	-	-	-
MONAZITE	41	41	41	41	41	41
SCHHEELITE	-	-	-	-	-	-
NO. OF POINTS		539	531	522	512	532
WEIGHT	2.90g	0.37g	0.23g	1.60g	0.14g	0.56g
%	100	13	8	55	5	19

131

801133

A
S
S

CAPE WICKHAM



PHOQUES

BAY

EL 45/86

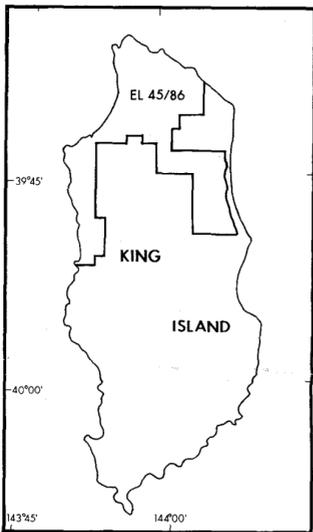
Area for renewal - 17/4/88 is cross-hatched

COPY

CAPE WICKHAM

BASS

STRAIT



Lake Flannigan

EL 45/86

Lake Martha Lavinia

Yambacoon

Reekara

SEA ELEPHANT RIVER WILDLIFE SANCTUARY

OCEAN

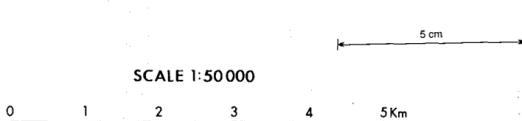
SOUTHERN

To CURRIE

750

757

801134



NATIONAL MINERAL SANDS

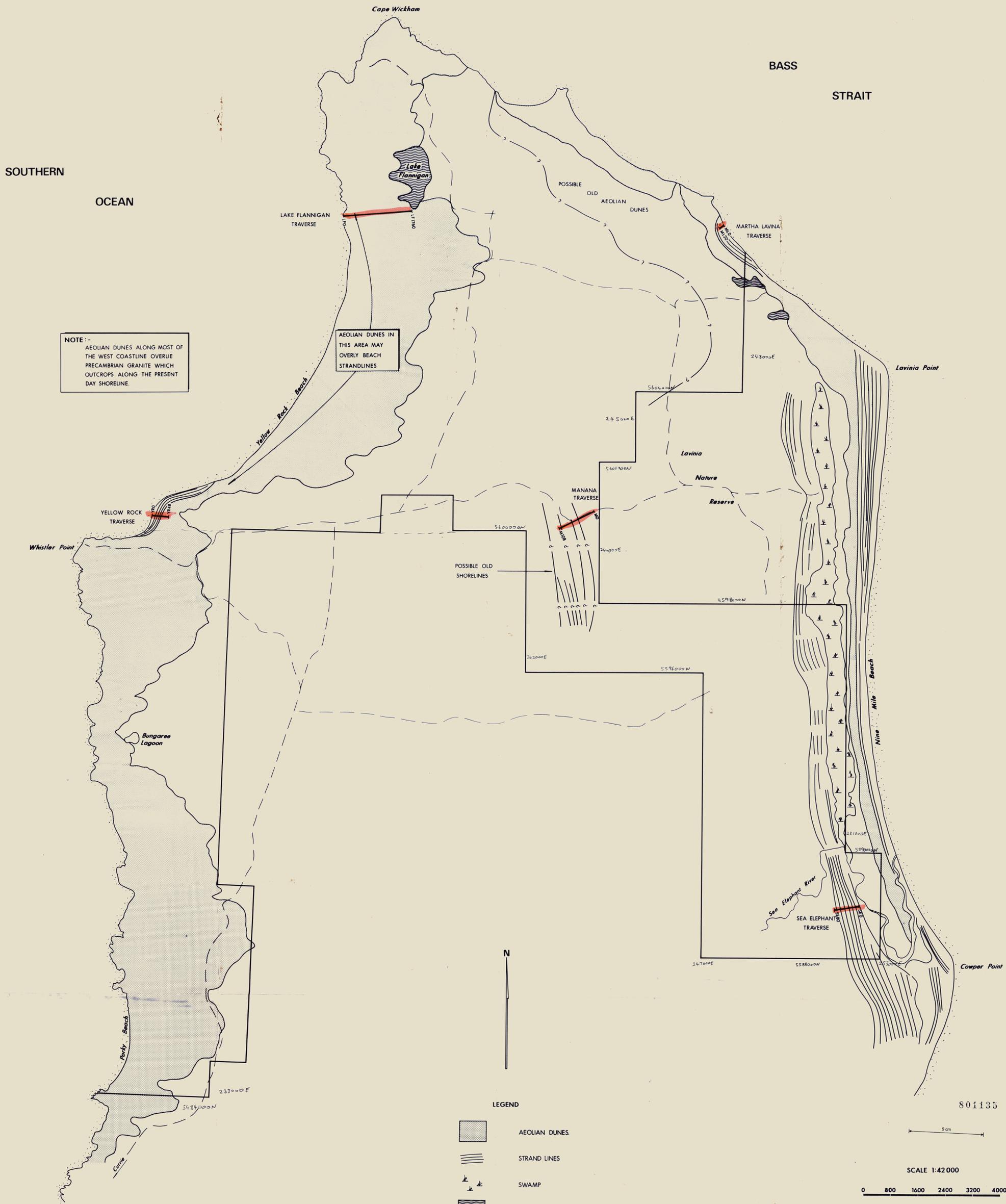
KING ISLAND-TASMANIA

88-2789

LOCATION MAP

EL 45/86

DATE: MARCH '88 FIG.No.: 1



NOTE:
 AEOLIAN DUNES ALONG MOST OF THE WEST COASTLINE OVERLIE PRECAMBRIAN GRANITE WHICH OUTCROPS ALONG THE PRESENT DAY SHORELINE.

AEOLIAN DUNES IN THIS AREA MAY OVERLY BEACH STRANGLINES

LEGEND

-  AEOLIAN DUNES
-  STRAND LINES
-  SWAMP
-  LAKE
-  ROAD OR TRACK

801135

5 cm

SCALE 1:42 000

0 800 1600 2400 3200 4000 m.

NATIONAL MINERAL SANDS
 EL 45/86 TASMANIA
 88-2789
AIR PHOTO INTERPRETATION
KING ISLAND (NORTH)
 Author: G.LEE Date: March '88 Fig.No.: 2