

PETER H. STITT & ASSOCIATES PTY. LTD.
MINING AND GEOLOGICAL CONSULTANTS

5TH FLOOR,
KING YORK HOUSE,
32 YORK STREET,
SYDNEY N.S.W. 2000
PHONE: (02) 29 1403
FAX: (02) 262 2395

MICROFILMED

REPORT NO 29/88

OPEN FILE

E.L. 51/86

Relinquishment Report for Exploration Carried Out in the
Woolnorth Area of North Western Tasmania

Prepared for National Mineral Sands Pty. Ltd.

89-2907

MINES	
File Ref.	EL 51/86
12 JAN 1989	
Doc. Ref.	
Action Officer	Initials
LETTER	
13.12.88	
REFERS	
Resubmit to	Date

A. Dove
December, 1988

89-2907

DISTRIBUTION LIST:

Brian Williams, Geopeko

David Gillett, National Mineral Sands

Tasmanian Department of Mines

Andrew Dove, Peter H. Stitt & Associates Pty. Ltd.

File

CONTENTS

SYNOPSIS

	Page
1. AIM	1
2. REASON	1
3. SUMMARY & CONCLUSIONS	1
4. RECOMMENDATION	

REPORT

5. INTRODUCTION	3
6. TENEMENT INFORMATION	5
7. AERIAL PHOTOGRAPHY INTERPRETATION	6
8. FIELD INVESTIGATIONS	7
8.1 Survey	7
8.2 Drilling	7
9. LABORATORY INVESTIGATIONS	
10. DISCUSSION	11
11. APPENDIX	14

LIST OF FIGURES

FIGURE 1 - Area of Relinquishment

APPENDIX 1 :- Drill Logs - Woolnorth, Lines 1 and 2.

S Y N O P S I S

1. AIM

To examine the Tasmanian north west coast between Woolnorth and Marrawah for economic heavy mineral sand occurrences.

2. REASON

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

3. SUMMARY & CONCLUSIONS

- 3.1 EL 51/86 originally covered 145 km² on the Tasmanian west coast between Marrawah and Woolnorth.
- 3.2 The area for relinquishment covers 82 km² to the north of Australian Map Grid line 548 0000 mN.
- 3.3 A study of aerial photographs covering the licence area was completed.
- 3.4 Field investigations were carried out at Woolnorth (Studland Bay) with three traverse lines drilled using hand drilling methods.
- 3.5 Heavy mineral grades in the north of Studland Bay range from 0.11 to 1.23% and average approximately 0.5%. In the south of Studland Bay grades range from 0.12 to 0.73% and average approximately 0.20%.
- 3.6 Mineralogy of one sample, comprising a composite of three drillholes from the initial drilling south of Studland Bay yielded zircon 2%, rutile 1%, Leucoxene 14% and monazite <1%.

3.7 Mineralogy of two samples from the subsequent drilling programme yielded similar results, zircon up to 2%, rutile 1%, leucoxene up to 18% and monazite <1%.

3.8 There is very little difference in the mineralogy above and below the water table, indicating that if an older strandline system underlies the Aeolian dunes the mineralogy does not change significantly.

4. RECOMMENDATION

Results obtained from exploration in the Woolnorth area of this licence have indicated that no further work is warranted. It is therefore recommended that the northern part of this licence be relinquished and that all future efforts be concentrated in the southern part of the licence area.

R E P O R T

5. INTRODUCTION

A programme of exploration was carried out by Peter H. Stitt & Associates on behalf of National Mineral Sands Pty. Ltd. (formerly Butlers No. 27 Pty. Ltd.) on the north west coast of Tasmania along Studland Bay near Woolnorth.

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

During the past 3 years the world market has been dominated by a short fall in supply to meet the demand, particularly for TiO_2 pigment minerals, zircon and rare earth heavy minerals. As a consequence the price for these minerals has risen to historically high levels. Predictions for the future supply and price of titanium and zirconium raw materials is one of buoyancy.

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

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

separators are now capable of more finely tuned separations to upgrade ilmenite and chromite products which have been rejected in the past.

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

6. TENEMENT INFORMATION

Exploration Licence 51/86 is held by National Mineral Sands Pty. Ltd. and covers an area of 145 km² on the north-west coast of Tasmania. The relinquishment area includes all the land north of 548 0000 (AMG) and covers 82 km².

The remaining portion of 63 km² will be retained as EL 51/86 (see Figure 1).

7. AERIAL PHOTOGRAPHY INTERPRETATION

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

Scale 1:42,000

Date: January 1983

Run 1 Nos 107 to 113

Run 1A Nos 172 to 175

Run 2 Nos 181 to 188

Run 3 Nos 79 to 85

Run 4 Nos 70 to 76

Run 5 Nos 90 to 97

The interpretation showed 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 following points are noteworthy:

- . A prospective area for mineral concentration would be Studland Bay.

- . In this area Aeolian dunes may overlies strandline development.

8. FIELD INVESTIGATIONS

8.1 Survey

Drillholes were located on traverse lines generally orientated east-west and perpendicular to the coastline so as to cross any strandlines which may be present.

In the Studland Bay area traverse lines were located in topographically low areas to avoid drilling high Aeolian sand dunes. The expectation was that significant concentrations of heavy minerals would occur in strandlines underlying Aeolian dunes. The lines were surveyed by tape and compass, with abney level determination of surface topography. For the most part holes were spaced 40m. apart.

The location of the traverse lines is shown on Figure 1.

Woolnorth:	Line 1	W-Line 1
(Studland Bay)	Line 2	W-Line 2
	Line 2 redrill	W-Line 2, redrill

8.2 Drilling

All drilling for the programme was by hand auger and hand operated cased sludging, using Dormer Engineering equipment. Holes were hand augered to water table using 50 mm. diameter hand auger. When water table was reached 50 mm. casing was inserted into the hole and the hole was advanced by sludging using a whistle top sludger on aluminium extension rods.

Drilling was completed at rock basement, pebbles, thick clay or thick peat layers. Where there was no impediment to drilling, holes were

terminated at 10m. depth, since hand drilling below this depth becomes increasingly slow.

Samples from the drilling were bagged at 1 or 2 metre intervals. Where samples were obtained by sludging they were weighed in the field to check on weight variation due to sand boiling into the casing.

The drilling was carried out using a Tasmanian field crew. At Woolnorth, two traverse lines, one a redrill to obtain greater depths, plus a number of scattered scout holes, were drilled, for a total of forty-nine drill holes.

9. LABORATORY INVESTIGATIONS

Those samples that were assayed for heavy minerals during the period were treated by R.H.F. Laboratories, Smithton, 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.

The heavy minerals for each interval were 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 25° and side tilt of 18°.

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

Mineralogical analyses of the samples not previously recorded are presented in Appendix 1 of this report.

10. DISCUSSIONWoolnorth (Studland Bay)

Originally one traverse line plus a number of scout holes were drilled in the southern end of Studland Bay. The traverse line extended over 560 metres incorporating 15 holes, with a maximum depth obtained of 8 metres. Another five holes were drilled in the frontal dunes north and south of the traverse line.

Heavy mineral separation was carried out on three selected drillholes based on the most encouraging results from field observations. The results ranged from 0.35 to 0.67 wt.%. The heavy minerals obtained from the three drillholes were subsequently bulked together for mineralogical examination.

The economic minerals noted amongst the heavy mineral suite were:

Zircon	2%
Rutile	1%
Leucoxene	14%
Monazite	<1%

It should be pointed out, however, that these samples were obtained from above the water table. The mineralogy may be considerably different for those heavy mineral concentrations occurring at depths below which hand-augering was able to penetrate, since strandline deposits may be encountered.

Subsequent drilling involved both hand augering and hand cased sludging for depths below water table. Two traverse lines were drilled, Line 1 in the north of Studland Bay, and Line 2 in the south. Line 2 involved re-drilling the previous traverse line,

so that samples below the water table were obtained. All samples in both lines had heavy mineral separations carried out.

Line 1 extended 560 metres incorporating fifteen drill holes, with a maximum depth of 9 metres and a minimum of 2.5 metres. All holes were terminated, due to either basement, peat layers or clay. Heavy mineral grades ranged from 0.11 to 1.23 wt.% with the average grade approximately 0.5 wt.%. The grades decrease from west to east.

Line 2 incorporated twelve drillholes over a distance of 440 metres, with all holes (except W-44) terminating at Basement. Maximum depth obtained was 7.5 metres and the minimum 0.5 metres. The depths obtained using hand cased sludging were not much greater than those of hand augering. Hence it can be concluded that water table is close to the bottom of the sand. The heavy mineral grades range from 0.12 to 0.73 wt.% and average approximately 0.20%.

The heavy minerals obtained for each line were bulked together for mineralogical examination, with the results recorded in Appendix

A comparison of the economic minerals amongst the heavy mineral suite is shown below:

	Woolnorth (Line 1)	Woolnorth (Line 2)
Zircon	1	2
Rutile	1	1
Leucoxene	18	17
Monazite	<1	<1

The above results show there is no change in mineralogy between samples obtained above or below the water table indicating that if an underlying strandline system exists the mineralogy is similar to that of the Aeolian dune near the surface.

Exploration undertaken to date in the Woolnorth area of the licence has only yielded low levels of economic mineral sand concentrations. These levels are significantly lower than those considered to be economic. The exploration has sampled what are considered to be all of the potential economic sand bodies in the area. As a consequence of the results obtained the Company has decided to relinquish the northern part of the licence and to concentrate its efforts in areas with greater economic potential.

11. APPENDIX

APPENDIX I - Mineralogy Results

APPLIED PETROGRAPHIC SERVICES

SPECIALIZING IN PETROGRAPHIC ANALYSIS OF GEOLOGICAL AND INDUSTRIAL SAMPLES

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

2A RAILWAY AVENUE
STANMORE
SYDNEY, N.S.W. 2048

Phone: (02) 516 4808

CLIENT: PETER H. STITT & ASSOC. PTY LTD

APS REPORT NO.: M 122

ATTENTION: ANDREW DOVE

DATE: 5.12.88

SAMPLE DETAILS: WOOLNORTH (LINE 1) W-0; W-4; W-12; W-16; W-20; W-24; W-28; W-32
W-36; W-40; W-44; W-48; W-52; W-56.

	TOTAL	HAND MAG	0.5A MAG	0.9A MAG	1.2A MAG	1.2A NON MAG
ZIRCON	1	-	-	-	-	5
RUTILE	1	-	-	-	-	2
LEUCOXENE	18	-	-	-	-	69
LEUCOXENISED ILMENITE	1	-	-	-	3	-
ILMENITE	11	-	84	16	-	-
MAGNETITE	<1	100	-	-	-	-
GARNET	5	-	3	10	-	-
SPINEL	1	-	-	1	1	-
IRON OXIDES	9	-	11	16	2	-
TOURMALINE	6	-	-	8	4	4
MAFICS*	44	-	2	49	90	7
ALUMINO-SILICATES	3	-	-	-	-	10
PYRITE	<1	-	-	-	-	1
SHELL	<1	-	-	-	-	1
CORUNDUM	-	-	-	-	-	-
QUARTZ	<1	-	-	-	-	1
MONAZITE	<1	-	-	-	<1	-

*Mafics: Mainly olivine, with some pyroxene, amphibole, epidote, chlorite.

POINTS COUNTED	-	-	564	579	536	556
WEIGHT	6.3594g	0.0146g	0.2077g	3.1835g	1.2752g	1.6784g
WEIGHT %	100%	0.2%	3.3%	50.1%	20.0%	26.4%


J. McNULTY

APPLIED PETROGRAPHIC SERVICES

SPECIALIZING IN PETROGRAPHIC ANALYSIS OF GEOLOGICAL AND INDUSTRIAL SAMPLES

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

2A RAILWAY AVENUE
STANMORE
SYDNEY, N.S.W. 2048

Phone: (02) 516 4808

CLIENT: PETER H. STITT & ASSOC. PTY LTD

APS REPORT NO.: M 122

ATTENTION: ANDREW DOVE

DATE: 5.12.88

SAMPLE DETAILS: WOOLNORTH (LINE 2) W-0; W-4; W-8; W-12; W-16; W-20; W-24;
W-28; W-32; W-36; W-40; W-44.

	TOTAL	HAND MAG	0.5A MAG	0.9A MAG	1.2A MAG	1.2A NON MAG
ZIRCON	2	-	-	-	-	6
RUTILE	1	-	-	-	-	2
LEUCOXENE	17	-	-	-	-	62
LEUCOXENISED ILMENITE	5	-	-	7	16	-
ILMENITE	8	-	61	8	-	-
MAGNETITE	1	100	-	-	-	-
GARNET	2	-	11	2	-	-
SPINEL	1	-	2	1	-	-
IRON OXIDES	7	-	14	10	-	-
TOURMALINE	18	-	2	26	21	1
MAFICS*	32	-	10	46	51	1
ALUMINO-SILICATES	2	-	-	-	-	9
PYRITE	5	-	-	<1	2	19
SHELL	<1	-	-	-	10	-
CORUNDUM	<1	-	-	-	-	<1
QUARTZ	<1	-	-	-	-	1
MONAZITE	<1	-	-	-	<1	-

*Mafics: Mainly olivine, with some pyroxene, amphibole, epidote, chlorite.

POINTS COUNTED	-	-	568	594	528	521
WEIGHT	4.4012g	0.0104g	0.2220g	2.9134g	0.0809g	1.1745g
WEIGHT %	100%	0.2%	5.1%	66.2%	1.8%	26.7%



J. McNULTY

000

APPENDIX 1

DRILL LOGS - WOOLNORTH

LINES 1 AND 2.

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 1 HOLE NO: WO

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

023

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber. Abundant fine shell, becomes orange at 1.5m. H.M. present. Started sludging 1.0m.		0.05	0.93
2.0 - 2.5		SAND, fine to med. grained, orange. Abundant fine shell. H.M. present. END OF HOLE 2.5m. Rock		0.03	1.17
					Average 0.98

20

689021

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 1 HOLE NO: W4

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

024

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, abmer, abundant fine shell, H.M. traces. Started sludging 2.0m.		0.02	0.65
2.0 - 3.0		SAND, fine to medium grained, orange, abundant fine shell. H.M. trace.			
3.0 - 4.0		AS ABOVE END OF HOLE 4.0m. Rock		0.49	0.58
		Average			0.62

17

689022

CLIENT: NATIONAL MINERAL SANDS

AREA: WOOLNORTH

LOGGED BY: ANDREW DOVE

TITLE NO: 51/86

LINE NO: 1 HOLE NO: W8

DATE DRILLED: March, 1988

025

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber, abundant fine shell.		0.10	0.56
2.0 - 4.0		AS ABOVE, becomes orange at base. Started sludging 2.6m. Went dark at base. END OF HOLE 4.0m. Rock		0.33	0.86
		Average			0.71

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 1 HOLE NO: W12

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

026

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber, abundant fine shell. Started sludging 1.5m.		0.07	0.63
2.0 - 3.0		SAND, fine to medium grained, orange borwn. Abundant fine shell.		0.02	0.55
3.0 - 4.0		SAND, fine to medium grained, light grey, abundant fine white shell, hit wood layer.		0.39	0.69
4.0 - 5.0		AS ABOVE		0.12	0.32
5.0 - 5.5		AS ABOVE END OF HOLE 5.5m. Wouldn't turn			
		Average			0.55

23

689024

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 1

HOLE NO: W24

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

029

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber. Abundant fine shell.		0.10	0.25
2.0 - 4.0		AS ABOVE, went through black organic layers.		0.09	0.42
4.0 - 5.0		SAND, fine to med. grained, amber. Abundant fine shell. H.M. trace.			
		Started sludging 4.5m.			
5.0 - 6.0		AS ABOVE		0.02	0.79
6.0 - 7.0		AS ABOVE, becoming darker.			
7.0 - 8.0		SAND, fine to medium grained, brownish grey, abundant fine shell. H.M. trace.		0.22	0.46
8.0 - 8.6		AS ABOVE. Yellow brown. H.M. present		0.03	0.27
		END OF HOLE 8.6m. rock			
		Average			0.47

26

689027

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 1

HOLE NO: W 28

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

000

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber. Abundant fine shell. H.M. traces.		0.05	0.25
2.0 - 4.0		AS ABOVE, H.M. traces. Started sludging 4.0m.		0.16	0.25
4.0 - 5.0		AS ABOVE, darker at base. H.M. traces.		0.05	0.48
5.0 - 6.0		AS ABOVE, dark grey.			
6.0 - 7.0		AS ABOVE			
7.0 - 7.2		AS ABOVE END OF HOLE 7.2m. Clay		0.49	0.58
		Average			0.37

683028

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 1 HOLE NO: W32

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

CC1

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber. Grey at base. Abundant fine shell. Started sludging 2.0m.		0.04	0.24
2.0 - 3.0		SAND, fine to medium grained, dark grey. Abundant fine white shell.		0.21	0.49
3.0 - 4.0		AS ABOVE, Hit brown clay at base. END OF HOLE 4.0m. Clay and gravel			
			Average		0.37

CLIENT: NATIONAL MINERAL SANDS

AREA: WOOLNORTH

LOGGED BY: ANDREW DOVE

TITLE NO: 51/86

LINE NO: 1 HOLE NO: W 36

DATE DRILLED: March, 1988

CC2

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber, grey at base, abundant fine shell Started sludging 2.0m.		0.07	0.20
2.0 - 3.0		SAND, fine to medium grained, light grey, abundant fine white shell.		0.44	0.57
3.0 - 3.2m.		AS ABOVE Hit clay and gravel END OF HOLE 3.2m.			
			Average		0.34

689030

CLIENT: NATIONAL MINERAL SANDS

AREA: WOOLNORTH

LOGGED BY: ANDREW DOVE

TITLE NO: 51/86

LINE NO: 1 HOLE NO: W40

DATE DRILLED: March, 1988

683

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber, grey at base. Abundant fine shell. Started sludging 1.9m.		0.04	0.39
2.0 - 3.0		SAND, fine to medium grained, amber. Abundant fine shell. H.M. trace.		0.02	0.48
3.0 - 3.45		AS ABOVE, becoming greyer towards base. Hit dark hard organic layer. END OF HOLE 3.45m. Hard dark organic layer			
		Average			0.43

30

689031

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 1 HOLE NO: W 44

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

COA

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to med. grained, amber. Abundant fine shell. Started sludging 1.5m.		0.08	0.26
2.0 - 3.0		AS ABOVE. H.M. trace.		0.02	0.37
3.0 - 3.5		AS ABOVE, grey. END OF HOLE 3.5m. Hard, black organic layer.			
		Average			0.31

750000

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 1 HOLE NO: W48

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

605

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber. Abundant fine shell. Started sludging 1.5m.		0.01	0.29
2.0 - 3.0		AS ABOVE, grey at base. Hit dark hard organic layer.			
3.0 - 3.2		AS ABOVE END OF HOLE 3.2m. Hard layer.		0.52	0.42
Average					0.34

689033

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 1 HOLE NO: W56

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

CC7

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber. Abundant fine shell.		0.30	0.30
2.0 - 4.0		AS ABOVE, went through dark grey organic layer.		0.29	0.26
4.0 - 6.0		SAND, fine to med. grained, amber. Abundant fine shell. Started sludging 5.0m.		0.06	0.11
6.0 - 7.0		AS ABOVE		0.01	0.23
7.0 - 7.2		AS ABOVE, dark grey, hit dark layer. END OF HOLE 7.2m. Hard layer			
		Average			0.22

34

689035

CLIENT: NATIONAL MINERAL SANDS

AREA: WOOLNORTH

LOGGED BY: ANDREW DOVE

TITLE NO: E.L. 51/86

LINE NO: 2 HOLE NO: W-0

DATE DRILLED: October, 1987

008

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, abundant fine shell, H.M. trace. Hit Water.			

689036

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W-4

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

609

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 0.5		SAND, fine to medium grained, amber to orange brown, abundant shell, H.M. traces. END OF HOLE. 0.5m. Water.			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 8

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

640

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

37

689038

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 12

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

041

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, abundant shell. H.M. trace. END OF HOLE. 1.0m. Water.			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 16

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

042

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

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 20

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

C-3

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

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLWORTH

LINE NO: 2 HOLE NO: W 24

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

CIA

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, abundant shell, H.M. trace. END OF HOLE. 1.0m. Water.			

41

689042

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 28

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

045

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 -1		SAND, fine to medium grained, amber, abundant fine shell.			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 32

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

016

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, abundant fine shell, H.M. trace. HIT ROCK.			

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 36

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

047

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, abundant fine shell, H.M. Trace.			
1 - 2		AS ABOVE.		0.14	0.35
		END OF HOLE. 2.0m.			
		Average			0.35

44

689045

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 40

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

048

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber at top then orange then grey at base, abundant fine shell.			
1 - 2		SAND, fine to medium grained, orange then grey, amber at base. (White sand at base contains shell p. H.M.?)			
2 - 3		SAND, fine to medium grained, amber, abundant shell, H.M. trace.			
		HIT WATER. 3.0m.			

45

689046

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLWORTH

LINE NO: 2 HOLE NO: W 44

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

0.9

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, contains abundant shell.			
1 - 2		AS ABOVE			
2 - 3		AS ABOVE. H.M. Trace.			
3 - 4		SAND, fine to medium grained grey at top then orange, amber last 10 cm.			
4 - 5		SAND, fine to medium grained, amber, abundant fine shell, H.M. trace.			
		END OF HOLE. 5.0m. Water.			

46

689047

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 48

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

020

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, abundant fine shell.			
1 - 2		AS ABOVE, H.M. trace.			
2 - 3		AS ABOVE, H.M. trace.			
3 - 4		AS ABOVE, H.M. trace,			
4 - 5		SAND, fine to medium grained, mottled white and orange.			
5 - 6		SAND, fine to medium grained orange and amber mottle, fine abundant shell.			
6 - 7		SAND, fine to medium grained, amber, abundant fine shell, H.M. trace.			
		HIT WATER. 7.0m.			

47

689048

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: E.L. 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W 52

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

115

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, abundant fine shell.			
1 - 2		AS ABOVE, H.M. traces.		0.10	0.52
2 - 3		AS ABOVE, H.M. traces.			
3 - 4		AS ABOVE, H.M. trace, slightly darker at base.		0.09	0.45
4 - 5		SAND, fine to medium grained, amber, abundant fine shell, H.M. traces.		0.08	0.41
5 - 6		AS ABOVE, H.M. traces.			
6 - 7		AS ABOVE, reddish brown at base.		0.03	0.39
7 - 8		SAND, fine to medium grained, amber, red-brown mottle, abundant fine shell.			
		END OF HOLE. 8m. Kept caving in.			
		Average			0.44

48

689049

CLIENT: NATIONAL MINERAL SANDS
 AREA: WOOLNORTH
 LOGGED BY: ANDREW DOVE

TITLE NO: E.L. 51/86
 LINE NO: 2 HOLE NO: W56
 DATE DRILLED: October, 1987

022

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, fine to medium grained, amber, abundant fine shell, H.M. traces.			
1 - 2		AS ABOVE.			
2 - 3		AS ABOVE.			
3 - 4		AS ABOVE.			
END OF HOLE. 4m. Kept caving in.					

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: WO

LOGGED BY: ANDREW DOVE

Redrill
DATE DRILLED: March, 1988

003

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber. Abundant fine shell - orange-brown at base. Trace of H.M. END OF HOLE 2.0m. Rock		1.17	0.73

50

689051

PROJECT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W4

LOGGED BY: ANDREW DOVE

DATE DRILLED: ^{Redrill} March, 1988

004

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0.5		SAND, fine to medium grained. Orange-grey. Abundant fine shell. END OF HOLE 0.5m. Rock		0.04	0.34

51

689052

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W8
Redrill

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

055

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1.7		SAND, fine to medium grained, light grey to grey. Abundant fine shell - grey brown at base. END OF HOLE 1.7m. Dark brown layer.		0.04	0.22

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W16
Redrill

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

007

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber - grey at base. Abundant fine shell.		0.07	0.21
		Started sludging 1.5m.			
2.0 - 2.7		SAND, fine to medium grained, grey to dark grey. Abundant fine shell. Contains organics.		0.06	0.18
		END OF HOLE 2.7m. Hard black layer			
		Average			0.20

54

689055

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W20

Redrill

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

008

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, light grey. Abundant fine shell.		0.02	0.22
		Started sludging 1.0m.			
2 - 2.8m.		AS ABOVE. Dark brown at base.		0.01	0.22
		END OF HOLE 2.8m. Hard brown layer.			
		Average			0.22

55

689056

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W40
Redrill

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

003

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber then grey at about 1.0m. then back into amber. Abundant fine shell.		0.09	0.29
2.0 - 4.0		SAND, fine to med. grained, amber. Some grey layers. Abundant fine shell. Started sludging 4.0m.		0.08	0.12
4.0 - 4.5		SAND, fine to med. grained, grey. Abundant fine shell. END OF HOLE 4.5m. Hard dark layer.		0.11	0.23
		Average			0.21

60

689061

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 51/86

AREA: WOOLNORTH

LINE NO: 2 HOLE NO: W44
Redrill

LOGGED BY: ANDREW DOVE

DATE DRILLED: March, 1988

004

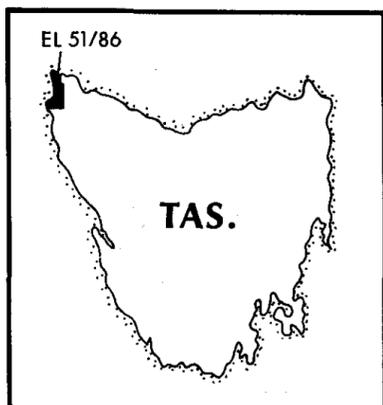
Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 2.0		SAND, fine to medium grained, amber. Abundant fine shell.		0.09	0.21
2.0 - 4.0		AS ABOVE. Hit some grey layers.		0.04	0.21
4.0 - 6.0		AS ABOVE Started sludging		0.05	0.14
6.0 - 7.0		SAND, fine to medium grained, grey. Abundant shell fragments.			
7.0 - 7.4		AS ABOVE END OF HOLE 7.4m. Hard dark layer		0.16	0.12
		Average			0.17

61

689062

5500000mN (AMG)

310000mE



WOOLNORTH POINT

WOOLNORTH

5490000mN

Woolnorth Road

5480000mN

AREA OF RELINQUISHMENT

STUDLAND BAY

LINE 1

w-56

w-0

LINE 2

w-56

w-0

Smithton

5470000mN

MOUNT CAMERON WEST ABORIGINAL SITE

EL 51/86

5 cm

ANN BAY



SCALE 1:50000

0 1 2 3 4 km.

NATIONAL MINERAL SANDS

EL 51/86

AREA OF RELINQUISHMENT

Author: A. DOVE Date: NOV '88 Fig.No.: 1

689063