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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

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EL 50/86

LETTER
3.5.'88
REFERS.

REPORT NO 7/88

EL 50/86 TASMANIA

Annual Report on Exploration Completed in the Trial Harbour-Strahan Area of Western Tasmania to 13/5/88

Prepared for National Mineral Sands Pty. Ltd.

A. Dove
G. Lee
May 1988

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DISTRIBUTION

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LIST OF FIGURES

002

CONTENTS

SYNOPSIS

REPORT

003

788005

SYNOPSIS

1. AIM

To examine the Tasmanian west coast between Trial Harbour and Strahan 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 has given impetus to examination of areas previously considered to be unattractive.

3. SUMMARY AND CONCLUSIONS

3.1 EL 50/86 covers 33 km² of the Tasmanian west coast between Trial Harbour and Strahan.

3.2 A study of aerial photographs covering the licence area was completed and is shown as Figure 2 of this report.

3.3 Field investigations concentrated on surveying and hand augering 17 shallow holes.

3.4 Three drill holes were selected for laboratory heavy mineral separation.

3.5 Heavy mineral contents are shown in Appendix 2.

3.6 Mineralogical study of the heavy minerals is shown in Appendix 3.

3.7 Heavy mineral contents ranged between 0.12 and 0.26%.

3.8 The economic minerals are zircon 2%, rutile 1%, leucoxene 5%.

3.9 Considering the results and the small area of the licence it is not a high priority exploration target.

3.10 It is possible that higher concentrations of mineral do occur at a depth below which hand augering can penetrate, however it is unlikely that the mineral suite will change significantly.

4. RECOMMENDATION

4.1 It is recommended that no further work be undertaken during the winter period and that the situation be reviewed later in 1988 before further field work is undertaken.

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REPORT

5. INTRODUCTION

Preliminary exploration was carried out by Peter H. Stitt & Associates on behalf of National Mineral Sands (formerly Butlers No. 27) on the west coast of Tasmania between Trial Harbour and Strahan, within EL 50/86.

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 two 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.

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 a traverse line.

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TENEMENT INFORMATION

Exploration Licence 50/86 is held by National Mineral Sands Pty. Ltd. It covers an area of 33 square kilometres on the west coast of Tasmania between Trial Harbour and Strahan (see Figure 1).

The area comprises:

3 km^2 private property

23 km^2 State Forest

2 km^2 Crown Land

The EL is adjoined to the north by EL 19/86, 21 km^2 in the name of R.W. Creasy. To the south EL 1/86, 122 km^2 is held by Aztec Exploration Ltd. Both of these adjoining EL's are prospective for mineral sands, covering the greater part of Ocean Beach and the hinterland from Macquarie Harbour to Trial Harbour.

7. AERIAL PHOTOGRAPHY INTERPRETATION

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

Scale: 1:42,000

Date: 7/11/84

Run: 22 Nos. 054, 055, 056, 057

Run: 23 Nos. 050, 051, 052, 053

The interpretation map (Figure 2) shows 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:

- The coastline is dominated by recent, often mobile to semi-mobile, aeolian dunes.

- There is an area with a faint lineation, suggesting strandlines, behind the modern-day beach.

- It is possible that the aeolian dunes overlie older beach deposits which may contain strandlines with heavy mineral concentration.

- The eastern two-thirds of the area is non-prospective for mineral sands.

8. FIELD INVESTIGATIONS

8.1 Survey

Seventeen drill holes were located along a 1 kilometre traverse line running perpendicular to the strike of the strandlines and the coastline.

The survey of the drill holes was by tape, compass and abney level. Holes on the western end of the line were spaced 40m. apart. On the eastern end of the line additional holes were drilled, spaced 100m. x 200m. apart.

8.2 Drilling

All drilling in the current programme has been confined to hand augering equipment. Due to the inaccessibility of the area, all equipment had to be carried, so drilling was limited to above water table.

The drilling was carried out using a Tasmanian field crew, with a total of seventeen holes and 19.5 metres drilled for 20 samples. All samples were collected and bagged at one metre intervals. All holes were drilled to water table, with the maximum depth obtained only two metres.

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.

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9. LABORATORY INVESTIGATION

Those samples that have been assayed for heavy minerals during this period were treated by R.H.F. Laboratories, Smithton, using the procedure outlined below.

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

Results are reported in Appendix 2.

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

The method adopted for mineralogical study was:

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

. 1.6 amp Frantz magnetics

. 1.6 amp Frantz non-magnetics

using a frantz magnetic separator with forward slope of 20^{o} and side tilt of 12.5^{o}.

2. Weigh each magnetic fraction.

3. Optically identify mineral grains and point count the available grains for each magnetic fraction.

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

10. DISCUSSION

Heavy mineral separations carried out on three selected samples have given contents between 0.12 and 0.26 wt.%. The heavy minerals obtained from the three samples were subsequently bulked together for mineralogical examination with results recorded in Appendix 3.

The economic minerals noted amongst the heavy mineral suite were:

Zircon	2%
Rutile	<1%
Leucoxene	5%

All other minerals in the samples were of no economic interest. However it is pointed out that the small sample weight of 0.19 gms is insufficient to obtain a meaningful result on anything other than the major mineral components, thus monazite and cassiterite may well be present but in levels <1% of the total.

Considering the results over-all for this exploration licence and the small area of sand bearing terrain covered by the licence (approximately 10 sq. kilometres), the licence by itself is not a high priority exploration target. Also considering the low level of economic minerals within the heavy mineral suite, the area is even less attractive. It is possible, though, that concentrations of mineral do occur at a depth below which hand augering was able to penetrate, that is beneath the water table higher grade mineral concentrations may occur. However it is unlikely that the mineral suite would contain sufficient economically viable mineral to make it attractive as a top priority exploration target.

For this exploration licence to become a higher priority target, heavy mineral contents in excess of 1% would be required and the heavy mineral suite would need to contain a minimum of 20% saleable minerals (rutile,

013

zircon and leucoxene).

During the forthcoming period, exploration on EL 50/86 will not be possible due to the climatic conditions prevailing at this time. It is suggested that no further work be undertaken during this period and that the situation be reviewed during October or November, 1988 with a view to what, if any, further work should be undertaken during the next summer field season.

Additional information will then be available from the other areas under exploration by the Company, which will influence the future programme on EL 50/86.

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APPENDIX 1

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Drill Hole Descriptive Log

Traverse Line Drilled

Henty River - H.R.

CLIENT: NATIONAL MINERAL SANDS

AREA: HENTY RIVER

LOGGED BY: ANDREW DOVE

TITLE NO: 50/86

LINE NO: 1 HOLE NO: H.R. 0

DATE DRILLED: October, 1987

015

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse to very coarse grained, white, contains abundant smooth pebbles.		22.41	0.12
1 - 2		AS ABOVE.			
		END OF HOLE 2m. Water.			
		Average			0.12

288017

CLIENT: NATIONAL MINERAL SANDS

AREA: HENTY RIVER

LOGGED BY: ANDREW DOVE

TITLE NO: 50/86

LINE NO: 1 HOLE NO: H.R. 4

DATE DRILLED: October, 1987

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse to very coarse grained, white, contains abundant coarse pebbles.			
1 - 1.5		AS ABOVE. Hit water.			
		END OF HOLE. 1.5m. Water.			

7883018

CLIENT: NATIONAL MINERAL SANDS

AREA: HENTY RIVER

LOGGED BY: ANDREW DOVE

TITLE NO: 50/86

LINE NO: 1 HOLE NO: H.R. 8

DATE DRILLED: October, 1987

017

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse to very coarse grained, white, contains abundant pebbles.			
		END OF HOLE. 1m. Water.			

788019

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 50/86

AREA: HENTY RIVER

LINE NO: 1 HOLE NO: H.R. 12

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse to very coarse grained, white, abundant shell fragments. HIT WATER. 1m.			

788020

CLIENT: NATIONAL MINERAL SANDS

AREA: HENTY RIVER

LOGGED BY: ANDREW DOVE

TITLE NO: 50/86

LINE NO: 1 HOLE NO: H.R. 16

DATE DRILLED: October, 1987

019

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, white, fine pebble fragments.			
		END OF HOLE. 1m. Water.			

783021

020

CLIENT: NATIONAL MINERAL SANDS

AREA: HENTY RIVER

LOGGED BY: ANDREW DOVE

TITLE NO: 50/86

LINE NO: 1 HOLE NO: H.R. 20

DATE DRILLED: October, 1987

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, white with abundant fine pebble fragments.			
		END OF HOLE. 1m. Water.			

788022

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 50/86

AREA: HENTY RIVER

LINE NO: 1 HOLE NO: H.R. 24

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, white, contains abundant fine pebble fragments.			
		END OF HOLE. 1m. Water.			

021

788023

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 50/86

AREA: HENTY RIVER

LINE NO: 1 HOLE NO: H.R. 36

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

022

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, white, contains abundant fine pebbles.			
		END OF HOLE. 1m.			

788024

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 50/86

023

AREA: HENTY RIVER

LINE NO: 1 HOLE NO: H.R. 44

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, light grey, some organic, abundant fine pebbles.		3.61	0.26
		END OF HOLE. 1m. Water.			

788025

CLIENT: NATIONAL MINERAL SANDS

AREA: HENTY RIVER

LOGGED BY: ANDREW DOVE

TITLE NO: 50/86

LINE NO: 1 HOLE NO: H.R. 48

DATE DRILLED: October, 1987

024

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, grey, some organics and some pebbles.			
		END OF HOLE. 1m. Water.			

788026

CLIENT: NATIONAL MINERAL SANDS

AREA: HENTY RIVER

LOGGED BY: ANDREW DOVE

TITLE NO: 50/86

LINE NO: 1 HOLE NO: H.R. 52

DATE DRILLED: October, 1987

025

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, grey, some organics and pebbles fragments.			
		END OF HOLE. 1m. Water.			

788027

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 50/86

AREA: HENTY RIVER

LINE NO: 1 HOLE NO: H.R. 026

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, white, some fragments of pebble. END OF HOLE. 1m.			

788028

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 50/86

AREA: HENTY RIVER

LINE NO: 1 HOLE NO: H.R. 60

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, white, orange pebble fragments.			
		END OF HOLE. 1m.			

78S029

CLIENT: NATIONAL MINERAL SANDS

AREA: HENTY RIVER

LOGGED BY: ANDREW DOVE

TITLE NO: 50/86

LINE NO: 1 HOLE NO: H.R. 64

DATE DRILLED: October, 1987

028

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, grey, abundant orange pebbles fragment.			
		END OF HOLE. 1m. Water.			

788030

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 50/86

029

AREA: HENTY RIVER

LINE NO: 1 HOLE NO: H.R. 74

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, coarse grained, grey, contains abundant orange pebbles fragments.			
		END OF HOLE. 1m. Water.			

788031

030

CLIENT: NATIONAL MINERAL SANDS

TITLE NO: 50/86

AREA: HENTY RIVER

LINE NO: 1 HOLE NO: H.R. 84

LOGGED BY: ANDREW DOVE

DATE DRILLED: October, 1987

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium to coarse grained, abundant fine fragments of pebbles.		4.33	0.26
1 - 2		AS ABOVE.			
		END OF HOLE. 2m.			
		Average			0.26

788032

CLIENT: NATIONAL MINERAL SANDS

AREA: HENTY RIVER

LOGGED BY: ANDREW DOVE

TITLE NO: 50/86

LINE NO: 1 HOLE NO: H.R. 104

DATE DRILLED: October, 1987

031

Interval (m)	Wet Wt. (kg)	Description	% Slime	% +600 um	% H.M.
0 - 1		SAND, medium grained, white with fine orange fragments.			
		HIT WATER. 1.0m.			

788033

788034

032

APPENDIX 2

Results of Laboratory Heavy Mineral Separations.

RAW DATA DOCUMENTATION FOR HEAVY MINERAL SEPARATION

Sample No.		Wt% of +600u	Wt% of -600u	Wt% of Heavy Mineral
STRAHAN				
HENTY RIVER (Line 1)				
EL 50/6				
HR84	0-2.0m	4.33	95.67	0.26
HR0	0-2.0m	22.41	77.59	0.12
HR44	0-1.0m	3.61	96.39	0.26

APPENDIX 3

Mineralogical results for composite of heavy minerals from HRO, HR44 and HR84.

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APPLIED PETROGRAPHIC SERVICES

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Strawberry Hills
Sydney, N.S.W. 2012

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

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

CLIENT: Peter H. Stitt & Assoc. Pty Ltd

APS REPORT NO.: M114

ATTENTION: Mr. G. Lee

DATE: 12.4.88

SAMPLE DETAILS: HR 0, 44, 84 Composite (APS 114/1)

	TOTAL	HAND MAGS	0.5A MAGS	0.9A MAGS	0.9A NON-MAGS*
MAGNETITE	5%	100%	-	-	-
OTHER BL. OPS.	9	-	34%	7%	-
GARNET	8	-	46	6	-
TOURMALINE	27	-	-	35	17%
ALUMINO-SILICATES	8	-	-	2	42
OTHER SILICATES	61	-	20	46	-
SHELL	2	-	-	1	5
QUARTZ	<1	-	-	-	3
ZIRCON	2	-	-	1	8
RUTILE	<1	-	-	-	1
LEUCOXENE	5	-	-	2	24
NO. OF POINTS	-	-	210**	329**	153**
SCHEELITE	-	-	-	-	-
MONAZITE	-	-	-	-	-
CASSITERITE	Insufficient sample for tin test				
SAMPLE WEIGHT	0.19g	0.01g	0.02g	0.13g	0.03g
%	100	5	11	68	16

* Insufficient sample to separate below 0.9A

** Insufficient sample for full count

J McNulty (Manager)

036

Trial Harbour

OCEAN BEACH

EL 50/86

Henty River Traverse

ZEEHAN OLD LINE ROAD

HENTY ROAD

Henty River

HENTY ROAD

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5 cm

SCALE 1: 50 000

0 1 2 3 km.

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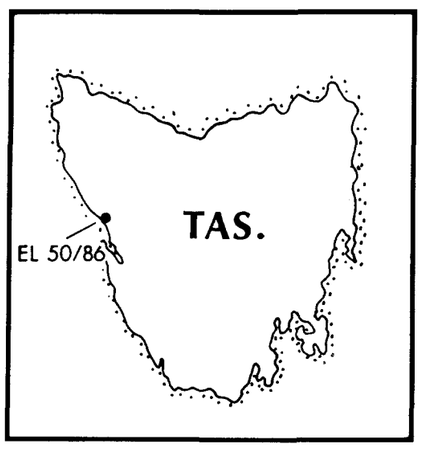

NATIONAL MINERAL SANDS

EL 50/86 TASMANIA

88- 2803

LOCATION MAP

Author: A.DOVE	Date: MAY '88	FIG. No. : 1

037

LITTLE HENTY RIVER

5354000N.

356000E

5350000N

5348000N

Henty River Traverse

SOUTHERN

OCEAN

Zeehan

358000E

5347000N

354000E

HENTY RIVER

Strahan

N

LEGEND

AEOLIAN DUNES

TRACK

DISCONTINUOUS STRAND LINES.

5 cm

SCALE 1:42 000

0 800 1600 2400 3200 4000 m.

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NATIONAL MINERAL SANDS

EL 50/86 TASMANIA

88-2803

AIR PHOTO INTERPRETATION

BLUESTONE CREEK

Author : G. LEE	Date : MAY '88	Fig : 2