TENNANT CREEK OPERATIONS PO Box 294, Tennant Creek, Northern Territory 0861 Phone (08) 8962 0399 Fax (08) 8962 0377

## **FIRST ANNUAL REPORT**

### FOR EXPLORATION LICENCE 9421

## FOR THE PERIOD 13/6/96 TO 12/6/97

#### TENNANT CREEK DISTRICT, NORTHERN TERRITORY

### PACKER PROSPECT

**TENNANT CREEK 1:250,000 SHEET SE 53-14** 

**VOLUME 1 OF 1** 

AUTHOR:

J E STOTT

**EXPLORATION GEOLOGIST** 

DATE:

**JUNE 1997** 

**AUTHORISED BY: DISTRIBUTION:** 

NT DEPARTMENT OF MINES & ENERGY

- TENNANT CREEK/DARWIN OFFICE

NORMANDY GOLD PTY LIMITED - TENNANT CREEK OFFICE

NORMANDY EXPLORATION LIMITED 

- KENT TOWN LIBRARY

ACACIA RESOURCES LIMITED

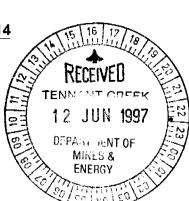
itents of this report remain the property of Normandy Gold Pty Limited and may not be published in whole or in part nor a company prospectus without the written consent of the Company.

ant Creek Library No:

97039

Kent Town Library No: 21361

EXP:TM:NGW:97297.DOC



1



## **CONTENTS**

		Page
	LIST OF FIGURES LIST OF TABLES LIST OF APPENDICES	
1.	SUMMARY	1
2.	INTRODUCTION	2
	<ul><li>2.1 Location and Access</li><li>2.2 Tenement Status</li></ul>	2 2
3.	GEOLOGICAL SETTING	2
	<ul><li>3.1 Regional Geology</li><li>3.2 Local Geology</li></ul>	2 2
4.	PREVIOUS EXPLORATION	3
5	EXPLORATION SUMMARY RESULTS (13/06/96 TO 12/06/97)	3
	5.1 Aboriginal Work Clearances 5.2 Reprocessing Aeromagnetic Data 5.3 Regional Aeromagnetic Interpretation 5.4 Regolith Mapping 5.5 Regional RAB Drilling	4 4 4 4
6.	EXPLORATION EXPENDITURE (29/11/95 TO 28/11/96)	5
7.	CONCLUSIONS AND RECOMMENDATIONS	5
8.	PROPOSED EXPLORATION AND EXPENDITURE (13/06/97 TO 12/6/98)	5
9.	ENVIRONMENTAL FACTORS	6
10.	REFERENCES	7
COMM	MODITIES: Gold, Copper	

## **LIST OF FIGURES**

Figure No.	<u>Title</u>	Scale
1	Location Plan	1:250,000
2	Regional Aeromagnetic Interpretation	1:250,000
3	EL 9421 Regolith Map	1:75,000
4	Regional RAB Drill Hole Location	1:100,000
5	Regional RAB Lithology, Section 26800 North	1:100,000
6	Regional RAB Bedrock Geochemistry Au (ppb)	1:100,000
7	Regional RAB Bedrock Geochemistry Cu (ppm)	1:100,000
8	Regional RAB Bedrock Geochemistry Bi (ppm)	1:100,000
9	Regional RAB Bedrock Geochemistry As (ppm)	1:100,000
10	Regional RAB Palaeosol BLEG Pb (ppm)	1:100,000
11	Regional RAB Palaeosol BLEG Zn (ppm)	1:100,000
12	Regional RAB Palaeosol BLEG Ag (ppm)	1:100,000
13	Regional RAB Palaeosol BLEG Mn (ppm)	1:100,000
14	Regional RAB Palaeosol BLEG Fe (%)	1:100,000
15	Regional RAB Palaeosol BLEG Ni (ppm)	1:100,000
16	Regional RAB Palaeosol BLEG Co (ppm)	1:100,000

## **LIST OF TABLES**

Table No.	<u>Title</u>
1	Work Completed on EL 9421 (13/06/96 to 12/06/97)
2	Exploration Expenditure for EL 9421 from 13/06/96 to 12/06/97
3	Proposed Exploration Expenditure for EL 9421 from 13/06/97 to 12/06/98

## LIST OF APPENDICES

Appendix No.	<u>Title</u>
1	Regional RAB Drill Hole Locations, Lithology's and Assays
2	Bibliographic Data Sheet

REPORT NO:

97039

TITLE:

FIRST ANNUAL REPORT FOR EL 9421 FOR THE PERIOD 13/06/96

TO 12/06/97, TENNANT CREEK DISTRICT, NORTHERN TERRITORY,

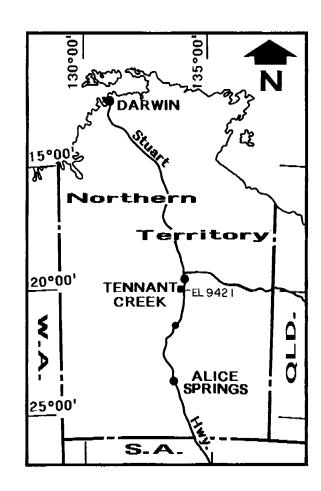
PACKER PROSPECT

AUTHOR:

J E STOTT

DATE:

**JUNE 1997** 



#### 1. SUMMARY

The Packer Licence is located in the East Billiat group of tenements 50km SW of Tennant Creek. It is managed by a joint venture consisting of Normandy Gold Pty Limited (51.4%) who are in Joint Venture with Acacia Resources Ltd (48.6%). Exploration in this area is targeting Tennant Creek style ironstones, structural targets in iron rich lithology's and volcanic exhalative style deposits, for Au/Cu mineralisation.

Exploration Licence 9421 (EL 9421) comprises 57 blocks and was granted on 13/05/96. Exploration of EL 9421 during its first year of tenure has included:

- Regolith Mapping
- Reprocessing Regional Aeromagnetics
- Regional Aeromagnetics interpretation
- Regional RAB Drilling
- 2 holes for 54m

#### 2. INTRODUCTION

EL 9421 is located in the East Billiat Group of tenements and is currently being explored for Tennant Creek style ironstones, structural targets in iron rich lithology's and volcanic exhalative deposits that host economic Au/Cu mineralisation. This work is carried out under a Joint Venture agreement between Normandy Gold Pty Limited (Normandy) and Acacia Resources Limited. Normandy are presently the exploration managers for licence.

Exploration carried out on EL 9421 on behalf of the Desertex JV has included regolith mapping, regional RAB drilling, reprocessing regional aeromagnetics and interpreting regional aeromagnetics.

### 2.1 Location and Access

EL 9421 is located approximately 35km SW of Tennant Creek and lies within the Tennant Creek station pastoral lease. Access is via a station track that turns off from the Stuart Highway 35km S of Tennant Creek, opposite Kelly Bore. Terrain within EL 9421 is relatively flat and vehicle access to most areas is possible.

#### 2.2 Tenement Status

EL 9421 was granted on 13/05/96 and comprises 57 blocks. It is due to expire on 12/05/02 and the first reduction is due on 04/04/98. The License lies within the boundaries of Tennant Creek Station, which is owned by Normandy.

#### 3. GEOLOGICAL SETTING

### 3.1 Regional Geology

The geological understanding of the Tennant Creek Inlier has been recently advanced by detailed geological mapping over the Tennant Creek and Flynn 1:100,000 map sheets (Donnellan et al. 1995), precision dating of stratigraphic components of the region (Compston, 1995) and regional geophysical interpretations.

The oldest exposed Proterozoic lithofacies in the Tennant Creek Inlier are the metasedimentary rocks of the Warramunga Formation, which are the host to the ironstone-Au-Cu-Bi mineralisation of the Tennant Creek Goldfield. These Palaeoproterozoic metasediments were deposited approximately 1860 Ma. Deformation and intrusion of the Warramunga Formation by volumous porphyries and granitoids occurred during the Barramundi Orogeny (1858 Ma to 1845 Ma).

Following deformation and uplift the volcanics and volcaniclastics of the Flynn Sub-Group were erupted (1845 Ma to 1827 Ma), with intrusion of porphyries and minor granitoids into the Warramunga Formation. An additional deformation event preceded the deposition of the Hatches Creek Group/Tomkinson Creek Sub-Group (1820 Ma to 1785 Ma) and the intrusion of late-stage granitoids and porphyries into both the Warramunga Formation and Flynn Sub-Group at 1650-1712 Ma.

#### 3.2 Local Geology

EL 9421 covers an area of aeolian sands, some alluvium and minor laterite surfaces with no outcrop present. A swamp is located in the west of the lease.

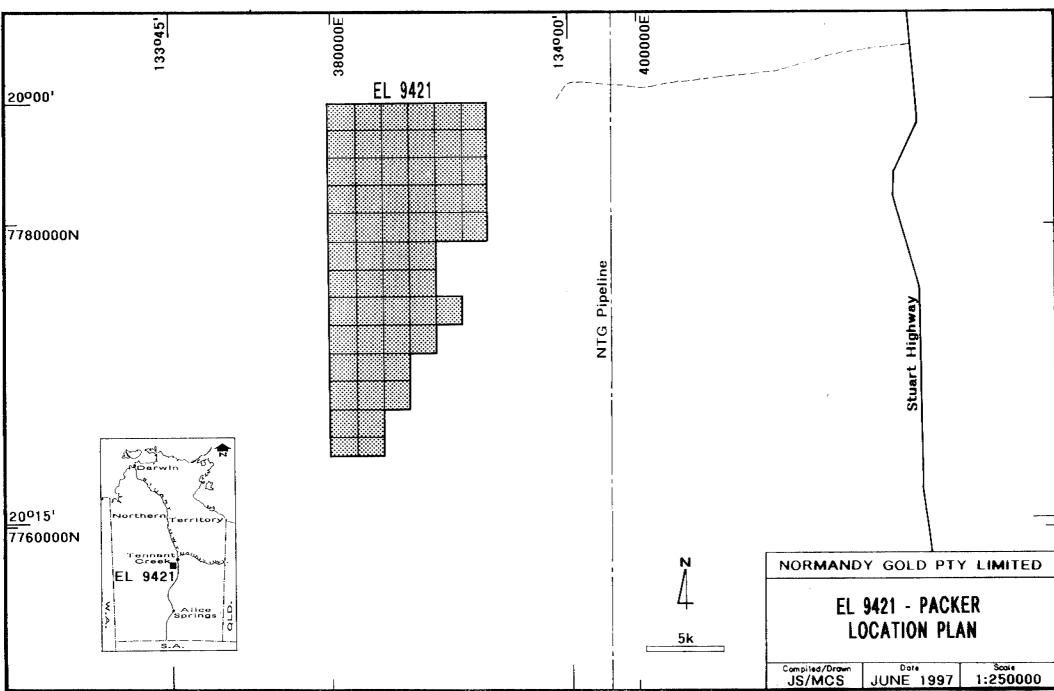


Figure No. 1

#### 4. PREVIOUS EXPLORATION

Previous exploration within EL 9421 has been undertaken by several companies.

#### 1976-1979

Three separate regional aeromagnetic surveys were conducted by Geopeko Limited (2 surveys) and Nobelex (Australia Development Ltd) (1 survey).

#### 1981 - Occidental Minerals

A regional aeromagnetic survey was conducted leading to identification of several magnetic anomalies within EL 9421. This was followed by grid controlled ground magnetic follow-up of all anomalies, with some also gravity surveyed. Anomalies T5 and T6 were then computer modelled.

## 1981-1985 Geopeko Limited/Shell Company of Australia Limited

Regional aeromagnetic survey over areas not covered by previous explorers, leading to the identification of a new anomaly (E301). This anomaly was then followed up with ground magnetics. A geological airphoto lineament study was also completed during this time.

#### 1987-1989 - PNC Exploration

Exploration was focused and a large area of land around and including EL 9421. PNC Exploration's strategy in 1987 focussed on exploring uranium deposits occurring at the unconformable contact between Archean basement and the younger Warramunga Formation north of EL 9421.

#### 5. EXPLORATION SUMMARY RESULTS (13/06/96 TO 12/06/97)

EL 9421 has been investigated by an exploration programme in the first year of tenure that has included regional aeromagnetic data, reprocessing and interpretation, regolith mapping and regional RAB drilling.

A summary of work completed to June 1996 is shown below:

# TABLE 1 WORK COMPLETED ON EL 9421 (13/06/96 TO 12/06/96)

#### **AEROMAGNETICS**

- Reprocessing regional data
- Regional Interpretation

**REGOLITH MAPPING** 

REGIONAL DRILLING

- 2 Regional RAB Holes (54m)

#### 5.1 Aboriginal Sacred Site Clearances

Prior to any significant exploration work taking place on EL 9421 an Aboriginal Areas Protection Authority (AAPA) clearance was submitted on 22 July 1996. The clearance was for work activities up to and including mining and was received on 25 October 1996. Several sacred site areas were identified and exploration activities will not take place near these areas.

#### 5.2 Reprocessed Regional Aeromagnetic Data

Aeromagnetic data from the Bureau of Mineral Research (BMR) flown in 1981 with a 3km line spacing and GeoPeko aeromagnetic mosaic data flown in 1984 with a 400m line spacing was reprocessed. The reprocessed aeromagnetic data was used as a mapping tool to identify areas of the more magnetic Warramunga Formation sediments.

#### 5.3 Regional Aeromagnetic Interpretation

Consultant Geologist, Geoff Dickson, carried out a regional magnetic interpretation of bedrock geology in the Tennant Creek region and interpreted the magnetic units present as being Warramunga Formation sediments (Refer to Figure 2). A local aeromagnetic interpretation of EL 9421 was then done based on Dickson's interpretation that suggested Warramunga Formation rocks were present).

### 5.4 Regolith Mapping

A regolith map for the Billiat region including the Packer licence was made from an aerial photograph interpretation and consequent field inspection. The regolith was divided into 3 major divisions, deposition, residual and erosional. Each division was then further subdivided based on the material present. (Refer to Figure 3). The map provides an indication of which geochemistry technique would be suitable for areas within the licence. The large areas of depositional regolith present would make soil sampling results unreliable and vacuum drilling would therefore be required to penetrate the overlying cover in areas where geochemical work is planned.

#### 5.5 Regional RAB Drilling

A regional RAB drilling programme was also undertaken in EL 9421 to determine regolith, depth of cover and bedrock lithology. Two vertical holes for 197m were drilled along existing tracks. Both holes were abandoned prematurely (22+32m) due to water and drilling problems.

Two bedrock samples consisting of at least 2kg of the last 5m of bedrock material were submitted to Australian Laboratory Services (Townsville) for low level ZARG analysis on Au, Cu, Pb, Zn, Ag, Fe, Mn, Mo, Cd, Co, Bi and Ni. Refer to Appendix 1 for lithological legend, lithology hole locations and hole geochemistry. Figures 4-16 show the RAB hole locations, bedrock lithology's Au, Cu, Bi, Pb and Zn bedrock geochemistry (ZARG).

Data from the RAB drilling also confirmed the results of the regolith mapping. Depositional material noted in the RAB logs correlate with the different depositional zones on the regolith map.

## 6. EXPENDITURE INCURRED DURING THE PERIOD 13/06/96 to 12/06/97

The exploration expenditure in year one of tenure for Exploration Licence 9421 is outlined in Table 2.

TABLE 2 EXPLORATION EXPENDITURE FOR EL 9421 FROM 13/06/96 TO 12/06/97

EXPENSE		COST
<b>Employee Cos</b>	sts	\$ 9,329
Overheads		\$ 696
Drilling		\$ 1,530
Assays		\$ 667
Operating Cos	sts	\$ 3,341
Tenement Co	sts	\$ 6,918
	TOTAL	\$ 22,481
	Covenant	\$ 31,000

### 7. CONCLUSIONS AND RECOMMENDATIONS

The scarcity of RAB drilling within EL 9421 was caused by drilling difficulties as a result of water and caving problems. Because of this no general interpretation of the bedrock throughout the licence can be made.

Further drilling is therefore planned, both to follow up aeromagnetic targets and to provide further geochemical information on the bedrock.

# 8. PROPOSED EXPLORATION AND EXPENDITURE FOR THE PERIOD 13/06/97 TO 12/06/98

Exploration during the second year of tenure will focus on identifying and testing of magnetic targets. An aeromagnetic survey will be carried out over some parts of the lease to define magnetic features.

Identified targets will then be RAB drill tested for goechemical anomalies. Proposed exploration expenditure for year two of tenure is as follows:

TABLE 3
PROPOSED EXPLORATION EXPENDITURE FOR EL 9421 FROM 13/06/97 TO 12/06/98

EXPENSE		COST
Employee Costs	\$	4,200
Overheads	\$	3,000
Drilling	\$	1,600
Assays	\$	700
Operating Costs	\$	3,000
Specialist Services	\$	18,000
Tenement Costs	<u>\$</u>	500
TOTAL	\$	31,000

\97297.doc\

#### 9. ENVIRONMENTAL AND REHABILITATION FACTORS

Normandy has commenced an active rehabilitation programme over much of the Tennant Creek field. This commitment has been reinforced within the Normandy Group with the appointment of a Group Environmental Engineer to oversee and implement the Group's guidelines and objectives. In addition to this an Environmental Superintendent has been engaged at Tennant Creek to design and implement the Group's objectives throughout the Tennant Creek area.

As an example of the Group's commitment to environmental issues several active rehabilitation programmes are currently being undertaken in the Tennant Creek field. These include programmes at Nobles Nob, Eldorado, White Devil and Warrego.

An Environmental Management Plan for the Company's Tennant Creek Operations (Fowler, 1993) has been submitted to the Department of Mines and Energy under separate cover (March 1993). This plan details the strategies to be implemented over various areas following completion of exploration programmes and mining operations.

#### 10. REFERENCES

Davidson, G.J., (March 1984): Annual Report on Exploration Licence 2719 for the period 16/2/83 to 15/2/84. Bonney Well 1:250,000 Sheet, Tennant Creek. Report No: 08.2146 (84025).

Davidson, G.J., (January 1985): Annual and Final Report on Exploration Licence 2719 for the period 16/2/84 to 15/2/85. Bonney Well 1:250,000 Sheet, Tennant Creek. Report No: 08.2752 (85009).

Harbon, P.G., (March 1982): Annual Report on Exploration Licence 2719 for the period 16/2/81 to 15/2/82. Bonney Well 1:250,000 Sheet, Tennant Creek. Report No.: 82038.

Harbon, P.G. (March 1983): Annual Report on Exploration Licence 2719 for the period 16/2/82 to 15/2/83. Bonney Well 1;250,000 Sheet, Tennant Creek. Report No: 83020.

Donnellan, N., Hussey, K.J., Morrison, R.S.; 1995. Explanatory Notes for Flynn and Tennant Creek 1:100,000 Sheets, Northern Territory Geological Survey.

Fowler, B., 1993. Environmental Management Plan 1993. Report No. 94177. Normandy Limited.

Le Messurier, P; Williams, B.T; and Blake, D.H., 1990. Tennant Creek Inlier - Regional Geology and Mineralisation. Geology of the Mineral Deposits of Australia and Papua New Guinea (Ed. F.E. Hughes), pp 829-838. (The Australasian Institute of Mining and Metallurgy).

Mackie A, 1989. Annual Report on Exploration Licence 5200, PNC Exploration.

Wyche S and Simons B; 1987 Explanatory Notes Bonney Well 1:250,000 Sheet. Northern Territory Geological Survey.

Compston, D.M., 1995 Time constraints on the evaluation of the Tennant Creek Block, Northern Australia. Precamb. Res. 71, 107-129.

# **APPENDIX ONE**

REGIONAL RAB DRILLHOLE LOCATIONS, LITHOLOGY'S AND ASSAYS

## NORMANDY GOLD PTY LIMITED EL 9421 (PACKER) Drill Hole Collar Information

внір	Easting (GRID)	Northing (GRID)	RL (m)	Total Depth (m)
RGBT-003	383000.0	7786114.0	0.00	22.00
RGBT-004	386468.0	7787458.0	0.00	31.00

NORMANDY GOLD PTY LIMITED EL 9421 (PACKER) Downhole Lithology

BHID	FROM (m)	TO (m)	LITHOLOGY CODE
RGBT-003 RGBT-003 RGBT-003 RGBT-003 RGBT-004 RGBT-004 RGBT-004 RGBT-004 RGBT-004 RGBT-004	0.00 2.00 6.00 15.00 20.00 0.00 3.00 5.00 19.00 21.00 27.00	2.00 6.00 15.00 20.00 22.00 3.00 5.00 19.00 21.00 27.00 31.00	RS AL/q AL/GR AL/GR ALGRSAP? CLY RS AL/qCLY AL/q AL/CLY SIL/CHT Si/h

## LITHOLOGICAL LEGEND FOR TENNANT CREEK

## ROCK TYPE / MINERALOGY / STRUCTURE, ALTERATION AND TEXTURE

## **ROCK TYPE**

AGL	- ARGILLITE	HSH	- HAEMATITE SHALE
AMP	- AMPHIBOLITE	HSL	- HAEMATITE SILTSTONE
AS	- ALTERED SEDIMENTS	LAMP	- LAMPROPHYRE
BIF	- BANDED IRON FORMATION	M	- MAGNETITE ROCK
CA	- CALCRETE	PEG	- PEGMATITE
CG	- CONGLOMERATE	QFP	- QUARTZ-FELDSPAR PORPHYRY
CHT	- CHERT	QP	- QUARTZ PORPHYRY
		QZT	- QUARTZITE
CL	- CLAY	SBX	- SEDIMENTARY BRECCIA
CO	- COLLUVIUM		- SILICIC CAPROCK
CRB	- CARBONATES	SC	
D	- DOLOMITE ROCK	SERP	- SERPENTINITE
DOL	- DOLERITE	SH	- SHALE
DR	- DIORITE	SIL	- SILCRETE
EX	- EXCARBONATE	SL	- SILTSTONE
FER	- FERRICRETE	SS	- SANDSTONE
GR	- GRANITE	ST	- SCHIST
			- TUFF
GRD	- GRANODIORITE	TF	
G₩	- GREYWACKE	NOCO	RE - NO CORE
Н	- HAEMATITE ROCK .		

## **MINERALOGY**

a act Au bi bn bt c Carb cc,ct cp	<ul> <li>amphibole</li> <li>actinolite</li> <li>gold</li> <li>bismuthinite</li> <li>bornite</li> <li>biotite</li> <li>chlorite</li> <li>carbonate (undifferentiated)</li> <li>chalcocite</li> <li>chalcopyrite</li> </ul>	h j k li m ml mv po py Q,q	<ul> <li>haematite</li> <li>jasper</li> <li>kaolin</li> <li>limonite</li> <li>magnetite</li> <li>malachite</li> <li>muscovite</li> <li>pyrrhotite</li> <li>pyrite</li> <li>quartz</li> </ul>
ср Ct	<ul><li>chalcopyrite</li><li>cuprite</li></ul>	Q,q s	<ul> <li>quartz</li> <li>sericite</li> </ul>
Сu	- native copper	sl	<ul><li>sphalerite</li><li>specularite</li></ul>
d/qj cv	- covellite - dolomite	sp T,t	- talc
ep gn,gl	<ul><li>epidote</li><li>galena</li></ul>	tr tm	<ul><li>tourmaline</li><li>tremolite</li></ul>

## STRUCTURE, ALTERATION AND TEXTURE

В,Ы	- bleaching	Fz	<ul> <li>fracture zone</li> </ul>
b	- blebs	Lm	- laminated
Bd	- bedding	Si	<ul> <li>silicification</li> </ul>
BOCO	- base of complete oxidation	Sz	- shearzone
Bx	- breccia	V	<ul> <li>vein (prefix mineral eg qV)</li> </ul>
cl	- clay	1	<ul> <li>interbedded</li> </ul>
Ds,ds	- disseminated	*, )	<ul> <li>stringer mineral</li> </ul>
F	- fault	>	<ul> <li>denotes dominant lithology</li> </ul>
Fol	- foliated	-	<ul><li>grading (eg GW-SL)</li></ul>

BHID	Sample Number	FROM (m) Detection	TO (m) n Limit :	Au ppb 0.1	Cu ppm 1	BI ppm 2	As ppm 1
RGBT-003 RGBT-004			22.00 31.00	TR TR	13.00 8.00	TR TR	5.00 6.00

BHID	Sample Number	FROM (m) Detection	TO (m)	Pb ppm	Zn ppm >1	Ag ppm 0.2	Cd ppm 0.2
RGBT-003 RGBT-004		15.00	22.00 31.00	9.00 58.00	18.00 6.00	TR TR	1.00

BHID	Sample Number	FROM (m) Detection	TO (m) Limit :	FE % 0.01	MN ppm 5	CO ppm 1	Ni ppm >1
RGBT-003			22.00 31.00		330.00 249.00	6.00 3.00	13.00 9.00

BHID	Number		TO (m) Limit	Mo ppm : >1	
		. 15.00 . 20.00		TR 1.00	

# **APPENDIX TWO**

BIBLIOGRAPHIC DATA SHEET

## **BIBLIOGRAPHIC DATA SHEET**

REPORT NUMBER

97039

REPORT NAME

FIRST ANNUAL REPORT FOR EL 9421 FOR THE PERIOD 13/06/96 TO 12/06/97, TENNANT CREEK DISTRICT, NORTHERN TERRITORY, PACKER

**PROSPECT** 

PROSPECT NAME(\$)

EL 9421

PACKER PROSPECT

OWNER/JV PARTNERS

NORMANDY GOLD PTY LIMITED / ACACIA

**RESOURCES LIMITED** 

**KEYWORDS** 

WARRAMUNGA GROUP, FLYNN SUBGROUP,

AEROMAGNETICS, EL 2719, EL5200, REGIONAL RAB

DRILLING, BILLIAT

COMMODITIES

GOLD, COPPER

**TECTONIC UNIT** 

TENNANT CREEK INLIER

1:250,000 MAP SHEET

**TENNANT CREEK SE 53-14** 

(52)

1:100,000 MAP SHEET

**KELLY 52/4** 

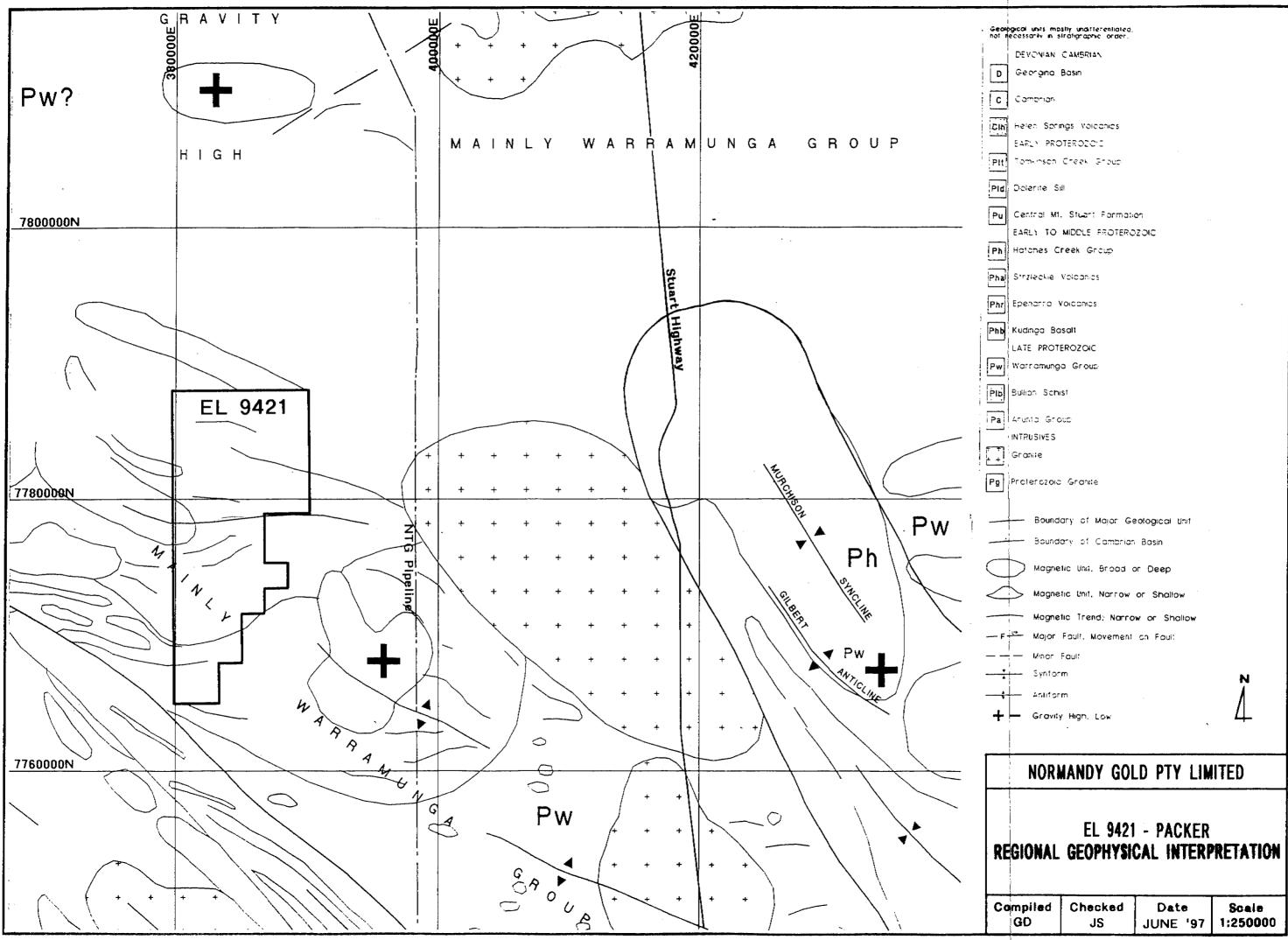
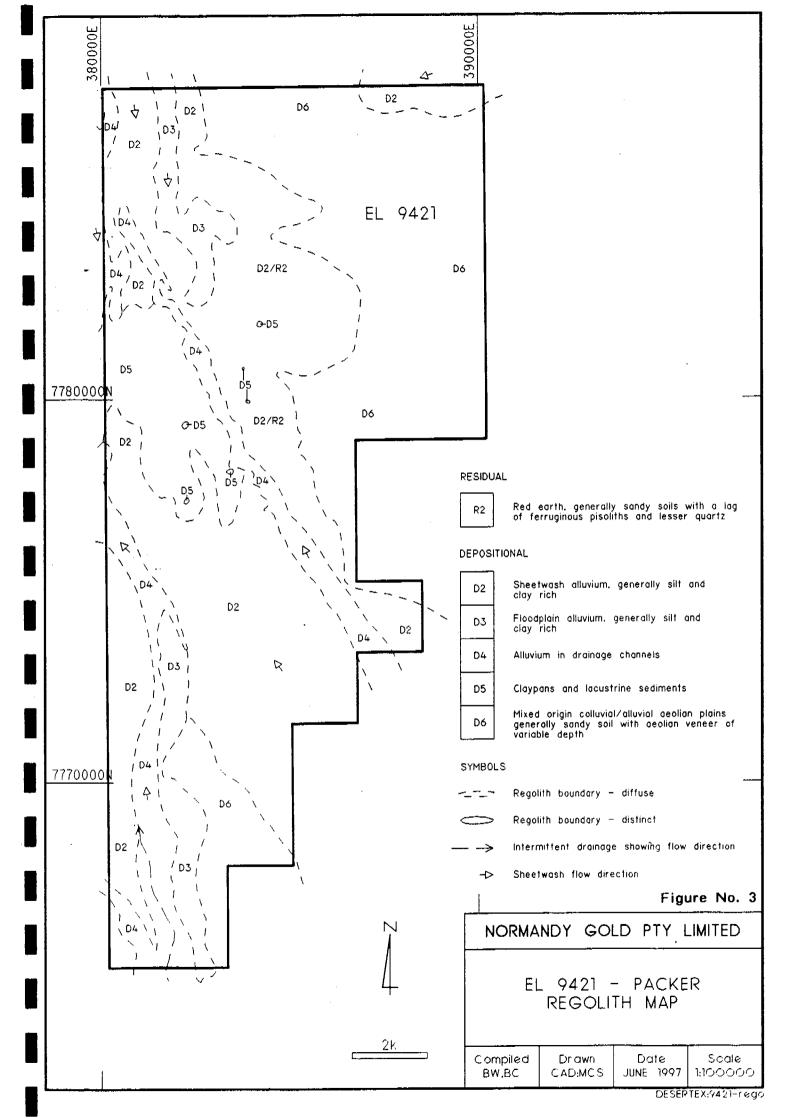


Figure No. 2



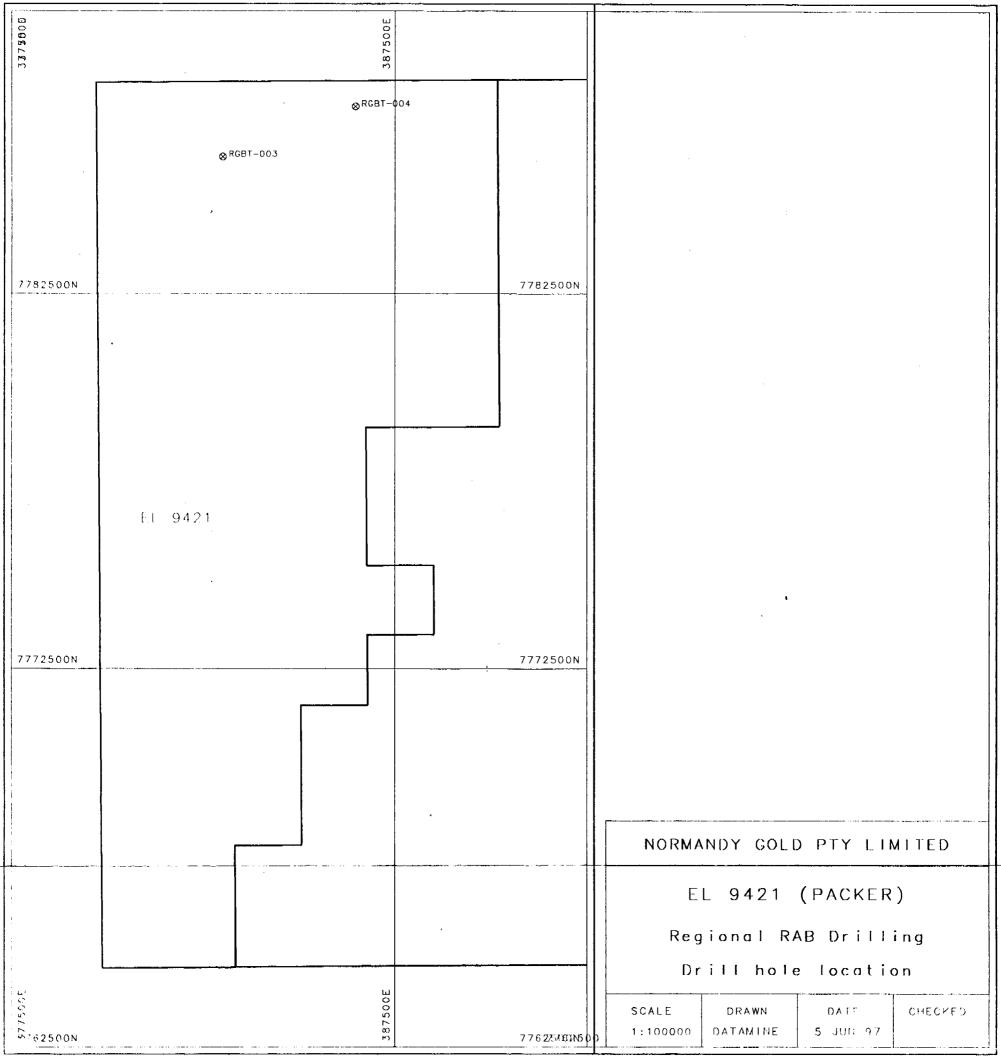


Figure No. 4

NORMANDY GOLD PTY LIMITED LEGEND REGIONAL RAB Plot file jN26800.P LHS LITHO . SECTION 26800 NORTH RHS NONE ppb. INFLUENCE 1200 Metres. Colour by AU ranges - 10 CHECKED DRAWN DATE SCALE 1:10**0**00 DATAMINE 11 JUN 97 Figure No. 5 AL/q AL/GR AL/CLY ALGRSAP? SIL/CHT

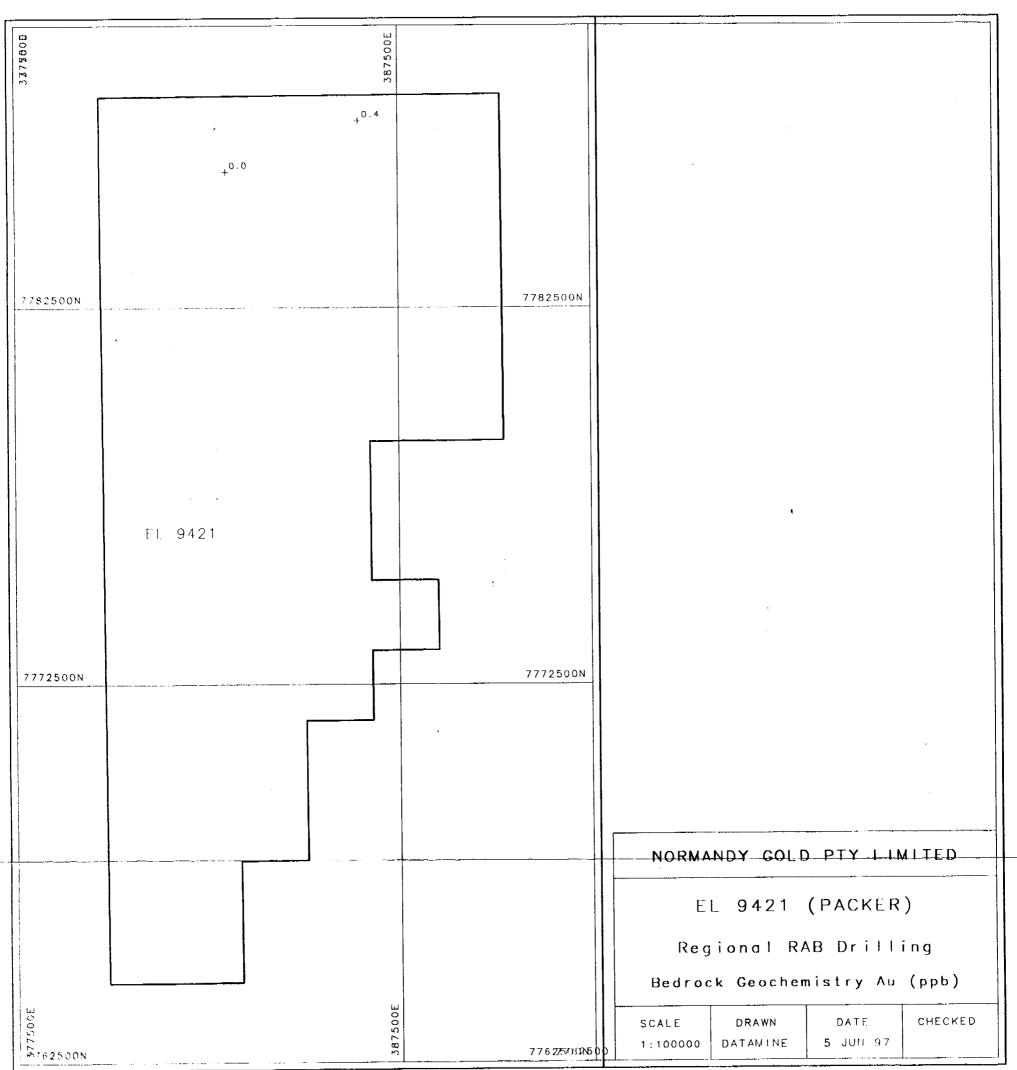


Figure No. 6

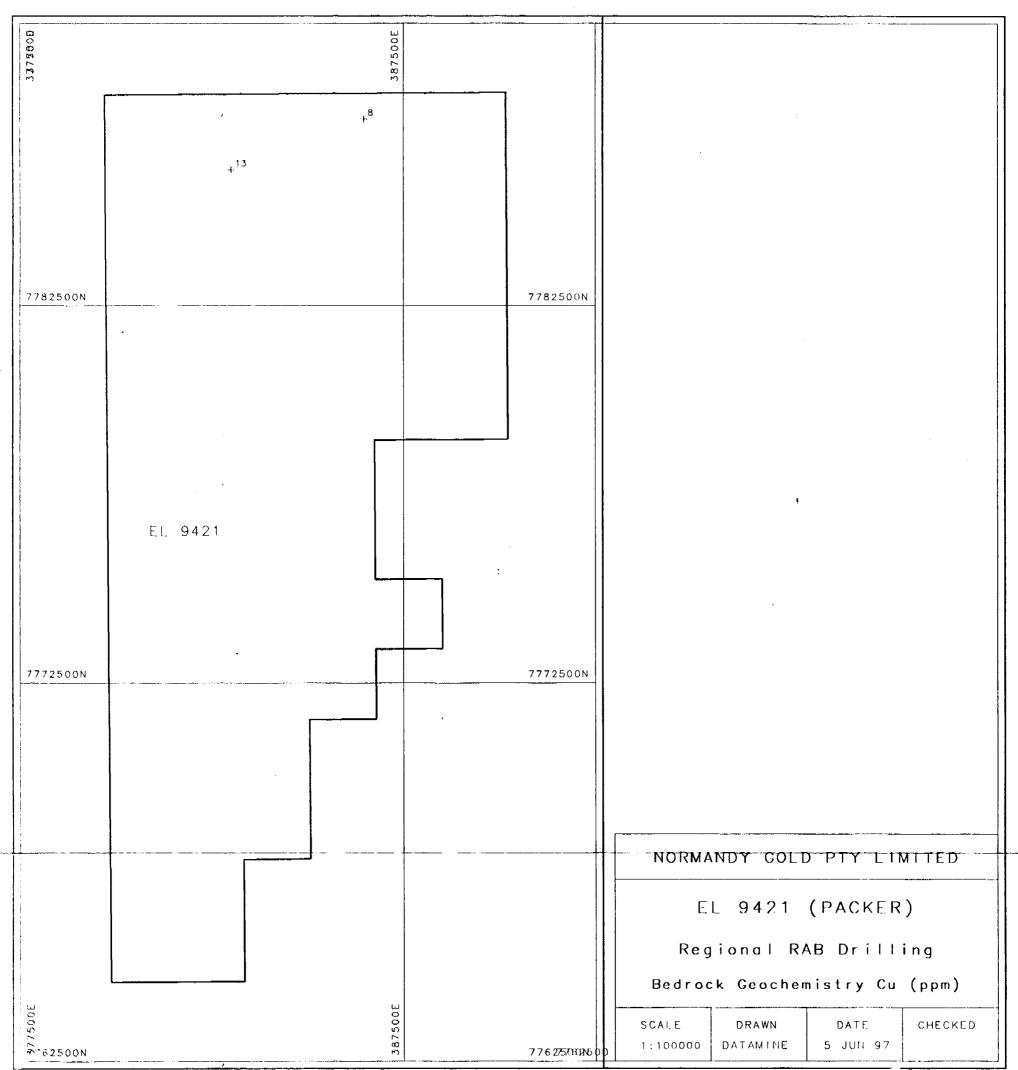


Figure No. 7

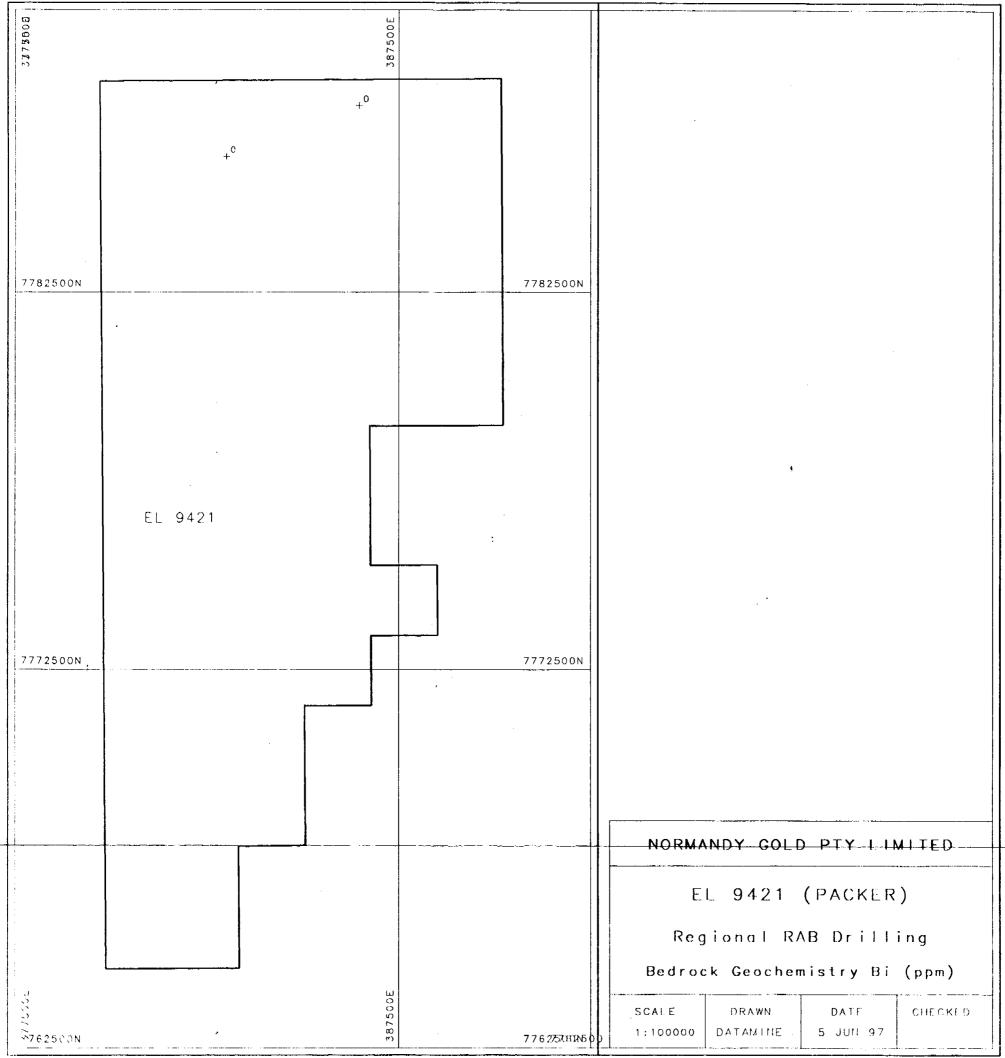


Figure No. 8

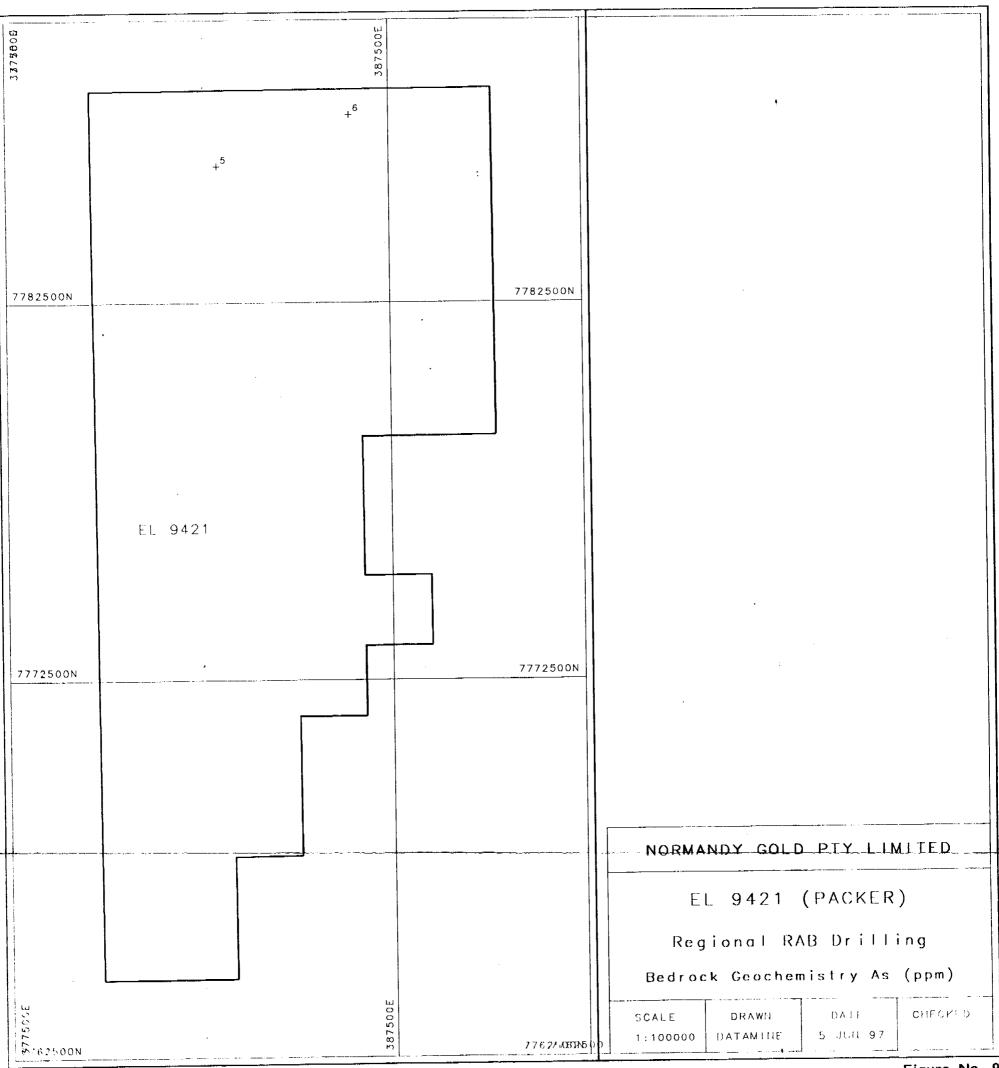


Figure No. 9

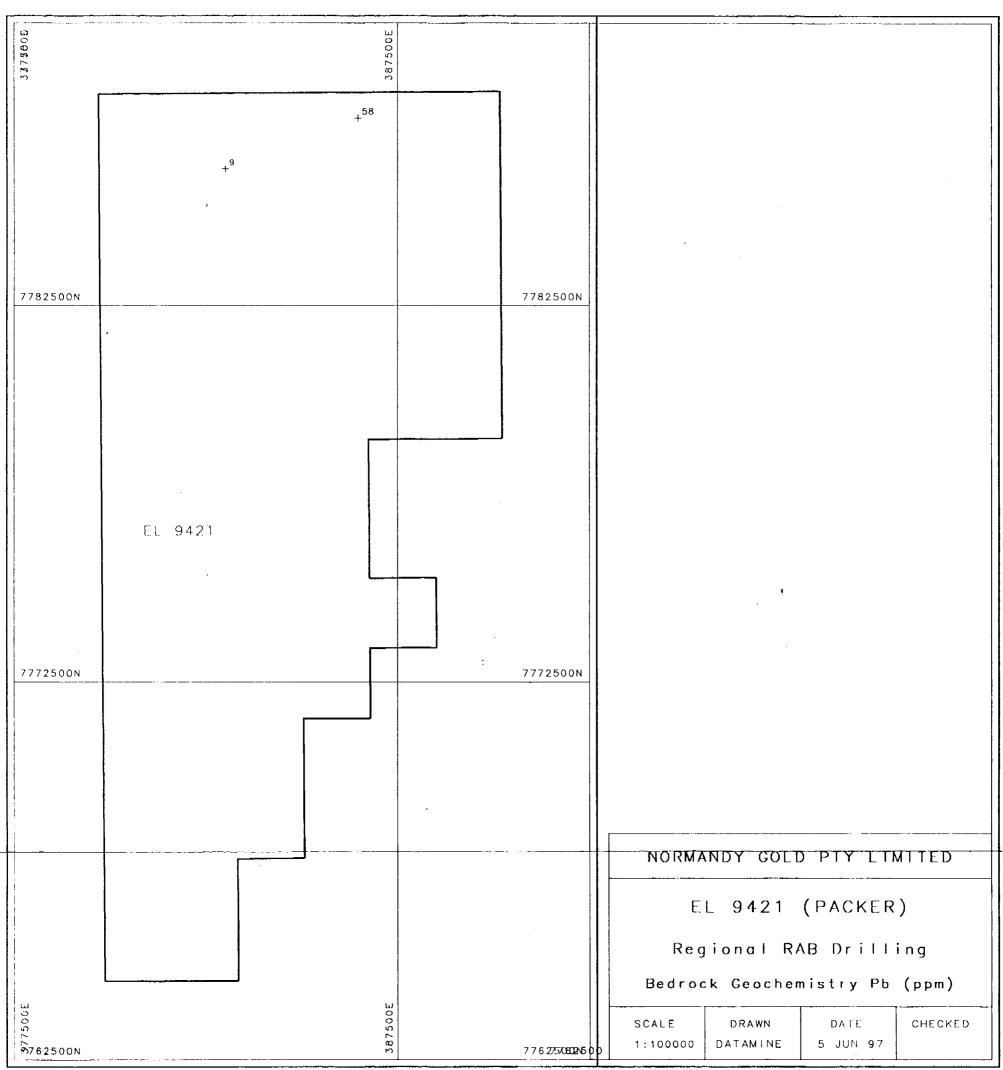
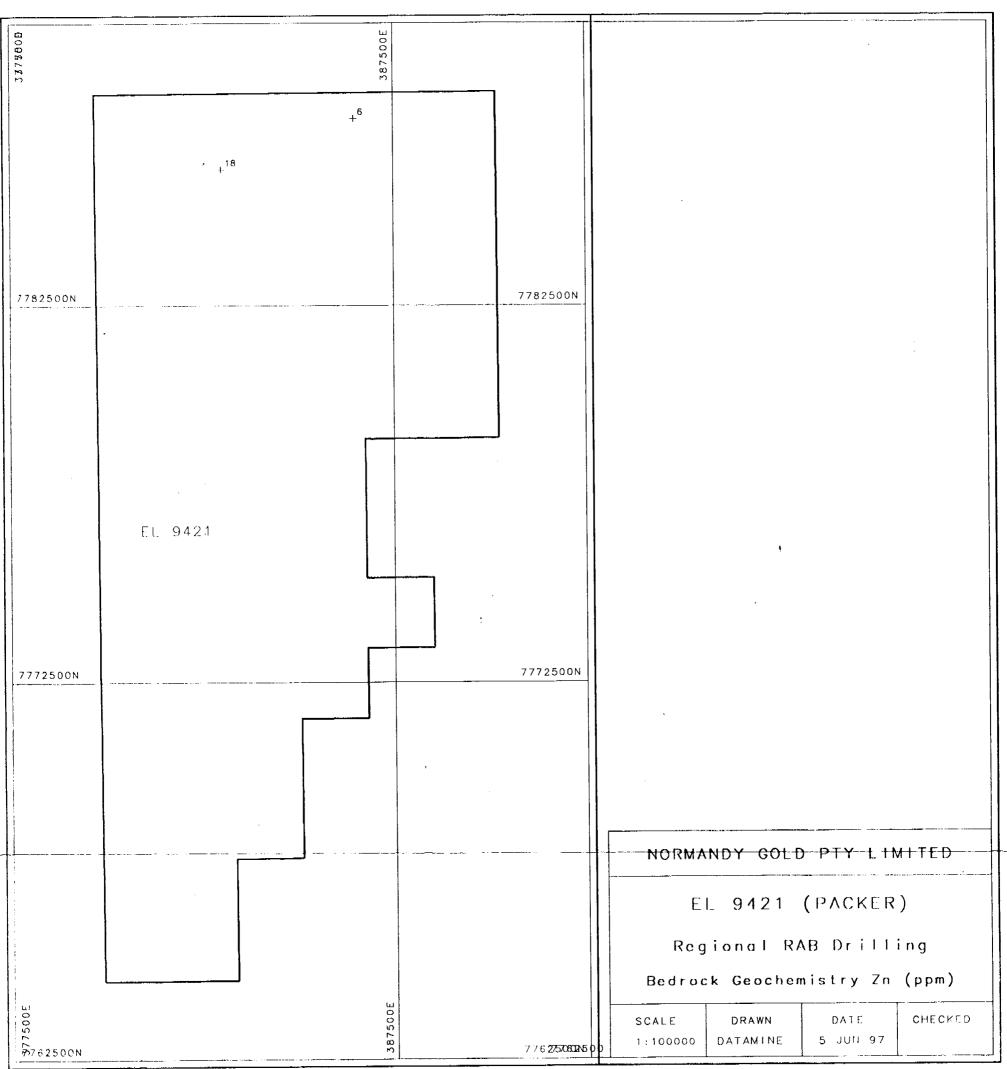


Figure No. 10



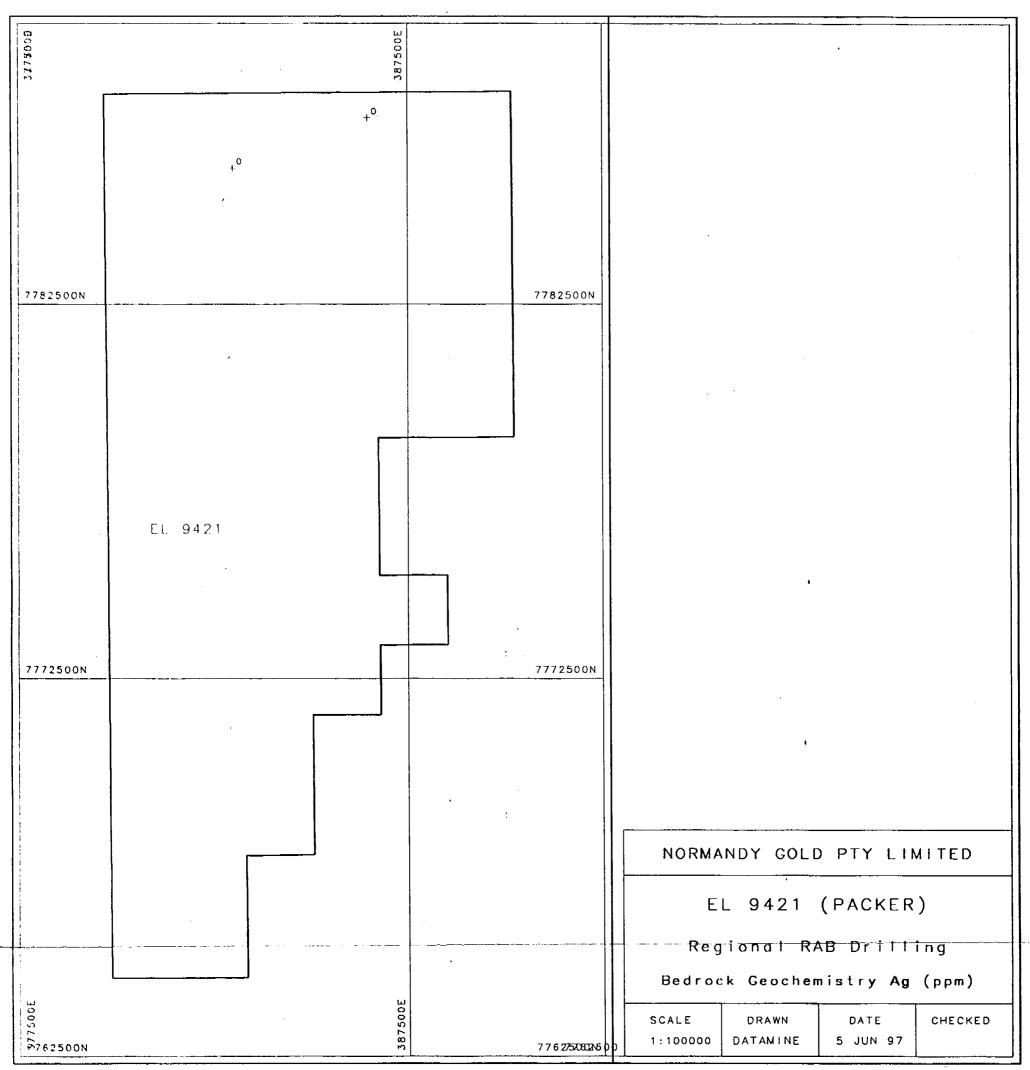


Figure No. 12

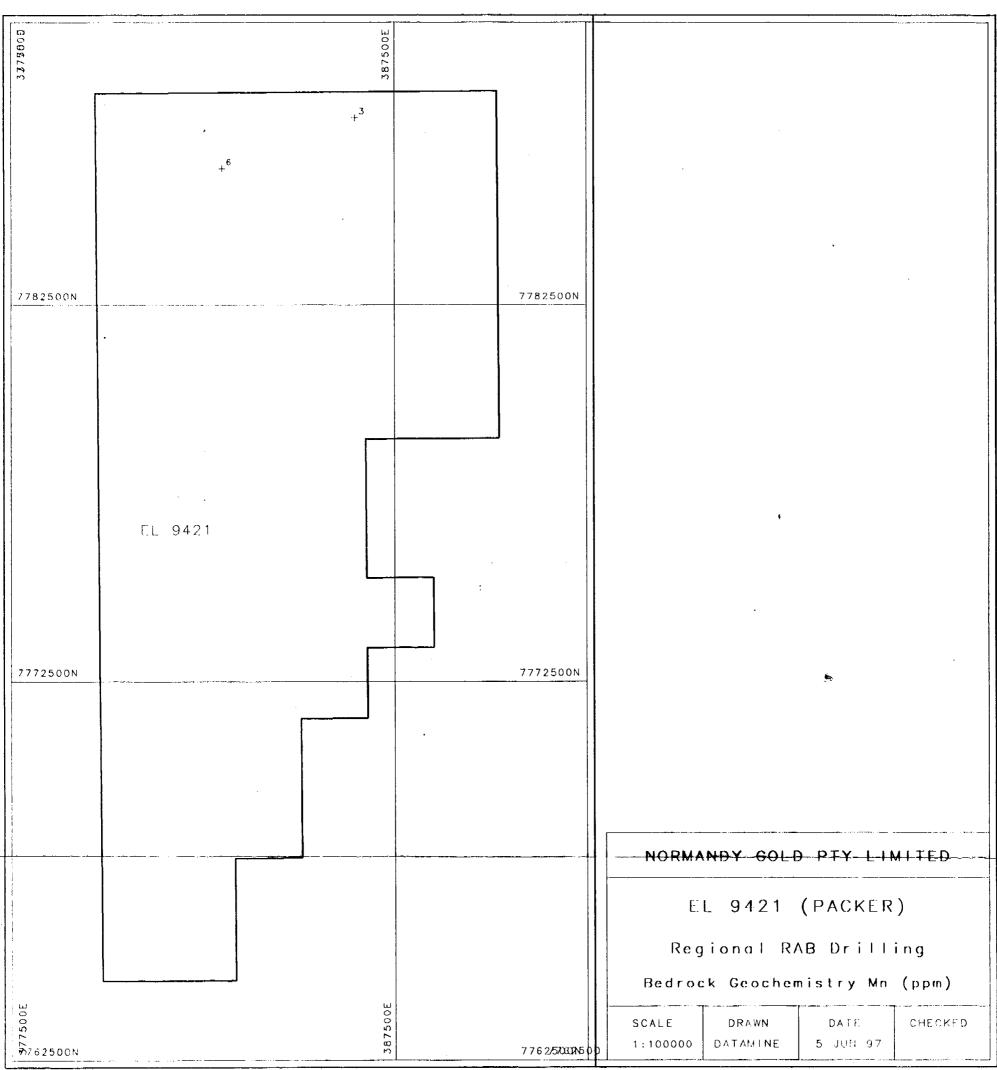


Figure No. 13

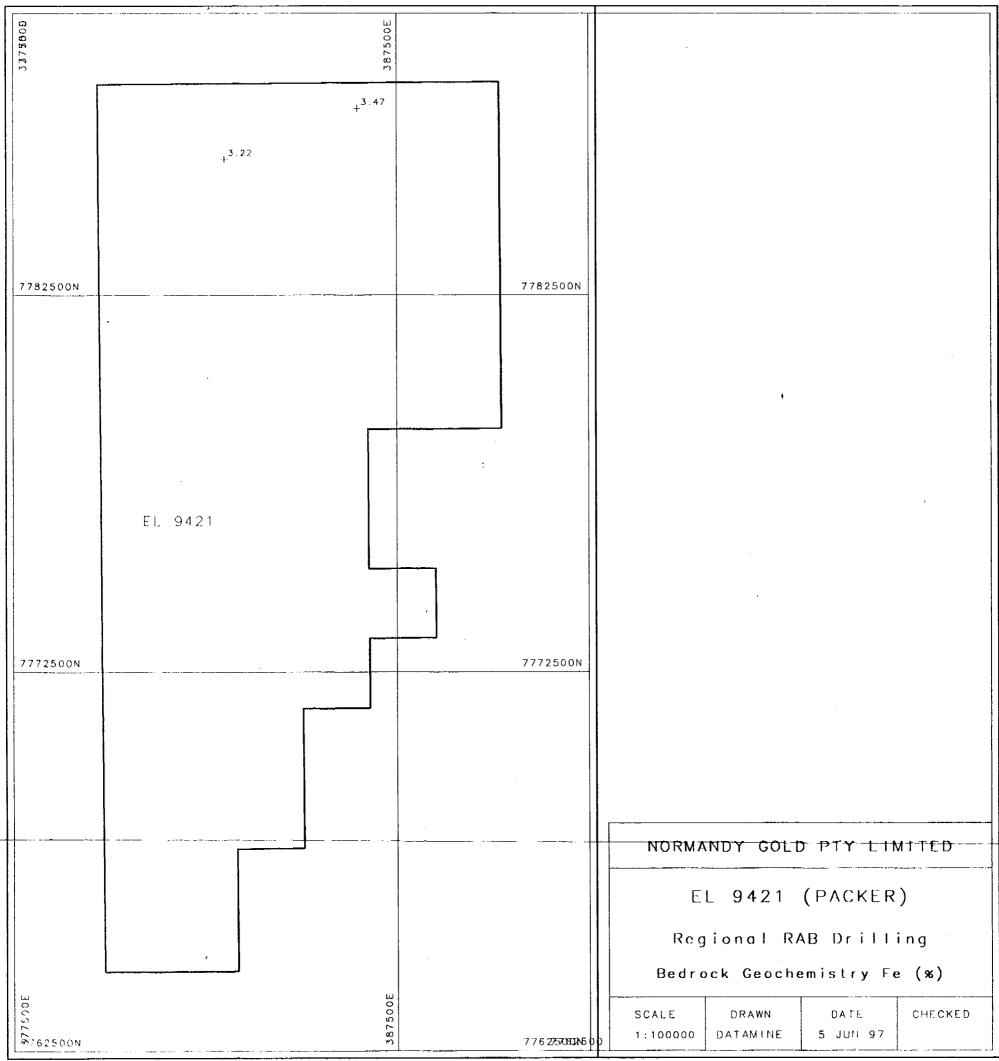


Figure No. 14

