



# Normandy NFM Limited

N O R T H F L I N D E R S E X P L O R A T I O N

annual report

## REPORT FOR THE ARTHUR HILLS PROJECT COVERING THE 1999 FIELD SEASON

### EXPLORATION LICENCES COVERED BY THIS REPORT:

EL8473	FERAL
EL9560	BARON
EL9561	KAISER

1:250,000 Sheet Reference:	MOUNT THEO	SF52-08
	MOUNT PEAKE	SF53-05

1:100,000 Sheet Reference:	PATRICIA	5255
	TURNERS DOME	5254
	STUDHOLME	5355
	GILES	5354

- DISTRIBUTION:**
- NT DEPARTMENT OF MINES AND ENERGY
  - NORMANDY EXPLORATION

The contents of this report remain the property of Normandy NFM Limited and may not be published in whole or in part nor used in a company prospectus without the written consent of the Company.

MEH SMITH

FEBRUARY 2000

NORMANDY RN: 25988

CR 2000-0062

# OPEN FILE

## SUMMARY

The area covered by the Arthur Hills Project, located approximately 300km north west of Alice Springs and 80km NNE of Yuendumu, is being explored for economic gold mineralisation.

The Arthur Hills Project tenements described in this report are held by Normandy NFM Ltd in Joint Venture with Normandy Tennant Creek Ltd. Normandy NFM Ltd are tenement managers.

During 1998, Normandy NFM negotiated an agreement with the NT DME to provide a group reporting arrangement for the Arthur Hills Project exploration licences. It was also agreed that the report would cover a calendar year (field season) rather than anniversary year. A submission date of the 28<sup>th</sup> of February each year was established. This report represents the first Arthur Hills Project annual report and as such, describes the exploration activity pertaining to all granted exploration licences within the Project from their respective 1999 grant dates to 31/12/99. It thus includes exploration licences 8473 (Feral), 9560 (Baron) and 9561 (Kaiser).

Exploration activities proposed for the Project area during 1999 could not be completed as the Central Lands Council had not completed the necessary ground clearances in time for the 1999 field season.

Work proposed had included:

- Reconnaissance vacuum and RAB drilling traverses
- Lag and CRC sampling as appropriate.

A comprehensive and wide-ranging exploration program is proposed for the Arthur Hills Project in the upcoming field season. This will include a comprehensive, project-wide lag, soil and CRC sampling programme. Follow-up RAB/aircore drilling will also be completed if necessary in order to develop geochemical anomalies and better understand the regolith and bedrock lithotypes.

## TABLE OF CONTENTS

	Page Number
1. INTRODUCTION .....	1
2. TENEMENT DETAILS .....	1
3. LOCATION AND ACCESS .....	1
4. PREVIOUS EXPLORATION .....	1
4.1 PREVIOUS EXPLORATION BY OTHER COMPANIES.....	1
5. GEOLOGY .....	3
5.1 REGIONAL GEOLOGY.....	3
5.2 LOCAL GEOLOGY .....	4
6. WORK UNDERTAKEN .....	4
7. FORWARD PROGRAM .....	4
8. REFERENCE LIST / ANNUAL REPORT BIBLIOGRAPHY .....	5

## LIST OF FIGURES

Figure 1: Normandy NFM Tenements (Arunta Region, NT) Showing the Location of EL's 8437, 9560 & 9561 ...	2
---	---

## LIST OF TABLES

Table 1: Tenement Summary for the Arthur Hills Project .....	1
Table 2: Geological History of the Northern Arunta Inlier (after Collins et al, 1995) .....	3

## 1. INTRODUCTION

This document is the first project group report to be completed for the Arthur Hills Project. It describes exploration activities associated with exploration licences held by Normandy NFM, namely EL's 8473, 9560 and 9561. The document represents an interim report covering the period between the respective grant dates (Table 1) and the end of the field season (31/12/1999).

## 2. TENEMENT DETAILS

Granted tenements within the Arthur Hills Project make up a total of 908 graticular blocks for 2923 sq km. A summary of tenement details for the exploration licences is listed in Table 1. The present breakdown between the JV partners is as follows:

Normandy NFM Limited	50%
Normandy Tennant Creek Limited	50%

**Table 1: Tenement Summary for the Arthur Hills Project**

Licence	Detail	Date	Blocks	Km <sup>2</sup>	Expiry
EL8473	Grant:	29/04/99	102	328	28/04/05
EL9560	Grant:	29/04/99	359	1156	28/04/05
EL9561	Grant:	29/04/99	447	1439	28/04/05

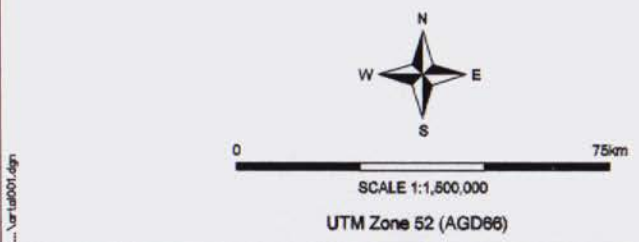
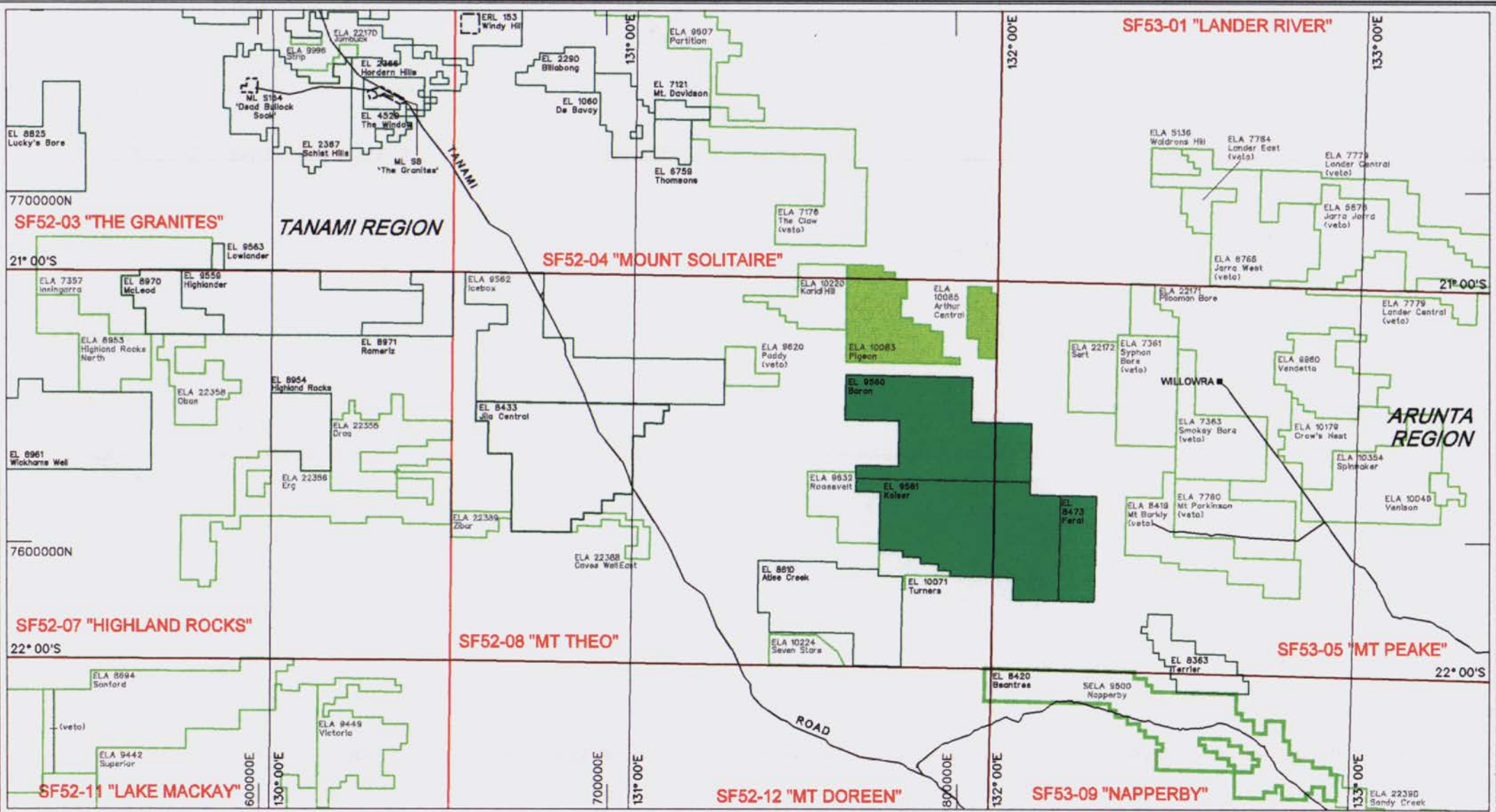
## 3. LOCATION AND ACCESS

Exploration Licences within the Arthur Hills Project are located approximately 300km north west of Alice Springs and 80km NNE of Yuendumu (Figure 1). Access from Alice Springs is via the Stuart Highway to the north, and then utilising the Tanami Road to the northwest. Old station tracks of variable quality are then used to gain access to the licences. Alternatively, access can be gained via the Stuart Highway to Aileron and thereafter utilising station tracks through the Pine Hill, Coniston and Mt Denison stations. The tenements are entirely within Aboriginal freehold land.

## 4. PREVIOUS EXPLORATION

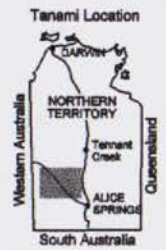
### 4.1 Previous Exploration by Other Companies

Other exploration companies in and around the Arthur Hills Project area have conducted limited exploration. Sons of Gwalia explored for Granites, Callie and Tanami Mine-style gold mineralisation within areas to the north. This included lag sampling, regolith mapping, RAB, vacuum and aircore drilling. Gold results to 68ppb were returned from a mafic intrusive complex within the former EL7632 while a 30ppb gold result was obtained from the former EL7633. Also of note, was an 18ppb gold result from RAB drilling in metasediments within the former EL7632.



**Normandy NFM Limited**  
 NORTH FLINDERS EXPLORATION  
 ARTHUR HILLS PROJECT  
 TENEMENT LOCATION MAP

FIGURE 1  
 09/02/00



## 5. GEOLOGY

### 5.1 Regional Geology

The Arunta Inlier is one of the largest Proterozoic Inliers in Australia. Mapping by the BMR during the 1960s and 1970s resulted in the subdivision of the Arunta Inlier into three major tectonic provinces: northern, central and southern (Shaw et al. 1984). Palaeo-Proterozoic stratigraphy was grouped into three major divisions: Division 1, Division 2 and Division 3, based on facies assemblages and lithological correlations, (Stewart et al. 1984). Division 1 rocks were inferred to be the oldest, comprising mafic and felsic granulites. Division 2 rocks are mainly represented by turbiditic metasediments. Division 3 rocks comprise platform-style quartzite, shale and carbonate sequences unconformably overlying Division 1 and 2 rocks. All three Palaeo-Proterozoic divisions are intruded by K-feldspar megacrystic granitoids. The three Proterozoic divisions, as well as the granitoids, are unconformably overlain by Neo-Proterozoic cover sequences.

A more recent review of the tectonostratigraphic relations of the Arunta Inlier by Collins and Shaw (1995) has suggested that the Arunta Inlier should be sub-divided into only northern (older) and southern (younger) tectonic provinces, separated by the Redbank Thrust Zone. Furthermore, they consider that in the northern tectonic province boundaries between Division 1 and Division 2 rocks are gradational and that both are part of the same tectonostratigraphic unit. They have therefore proposed a revision of the tectonostratigraphic nomenclature, abandoning the Divisions in favour of lithological assemblages. In the northwestern Arunta Inlier, Divisions 1 and 2 are replaced by the "Lander Assemblage". Several deformations are recognised in the Lander Assemblage prior to deposition of the "Reynolds Assemblage" (formerly Division 3). These deformations are collectively termed the "First Tectonic Cycle". Further deformations occurred following deposition of the Reynolds Assemblage which collectively are termed the "Second Tectonic Cycle". Metamorphism associated with the first tectonic cycle is prograde, whereas metamorphism associated with the second tectonic cycle is retrograde.

A summary of geological history and nomenclature for the northwestern Arunta Inlier is presented in Table 2.

**Table 2: Geological History of the Northern Arunta Inlier (after Collins et al, 1995)**

Age	Regional Event	Tectonic Cycle
400-300 Ma	Alice Springs Orogeny	Third Tectonic Cycle
850 Ma	Deposition of Vaughan Springs Quartzite	
≥ 1635 Ma 1780 - 1760 Ma	<b>Warbudali Tectonic Event (Mt Doreen - Yuendumu) (equivalent to Chewings Orogeny ?)</b> Weldon Tectonic Event (Anmatjira - Reynolds Range) Hardy Tectonic Event (Mt Doreen - Yuendumu) (equivalent to Strangways Orogeny ?)	Second Tectonic Cycle (retrograde metamorphism)
1820 - 1780 Ma	Deposition of Reynolds Assemblage	
1860 - 1820 Ma 1880 Ma	Stafford Tectonic Event Yuendumu Tectonic Event (equivalent to Barramundi Orogeny ?)	First Tectonic Cycle (prograde metamorphism)
≥ 1880 Ma	Deposition of the Lander Assemblage	

## 5.2 Local Geology

BMR mapping in the Arthur Hills Project area is dominated by Quaternary cover sequences, principally aeolian sand, calcrete and red soil. Small outcrops of Palaeo-Proterozoic Lander Rock Beds also are found. The BMR interpret the majority of the recent cover within the Arthur Hills Project area to be underlain by Lander Rock Beds.

West northwest-orientated, strike-extensive quartz veins traverse the northern reaches of the area including the 'Arthur Hills'.

## 6. WORK UNDERTAKEN

No in-ground work was completed within the Arthur Hills Project area during its 1<sup>st</sup> year of tenure. Normandy NFM are still waiting to receive a significant site clearance report from the Central Lands Council before the proposed work programme can commence. This is expected shortly after which an extensive project-wide reconnaissance surface sampling programme is planned.

Office-based work included a Project-wide tenement review consisting of an analysis of all available data sets in order to refine the planned exploration programme.

## 7. FORWARD PROGRAM

Proposed work for the Arthur Hills Project exploration licences will include:

- Project-wide surface sampling consisting of lag and soil sampling as appropriate in order to produce a comprehensive geochemical coverage of the project area. Analysis will be for gold, arsenic and a range of multielements.
- Composite rock chipping will also be conducted where appropriate.
- After verification of geochemical anomalies, grid-based surficial sampling will be completed at reduced spacings over areas of anomalism.
- Regolith RAB or aircore drilling may be warranted in order to provide a better understanding of bedrock lithotypes.
- RAB or aircore drilling may also be utilised in order to follow up on grid-based geochemical anomalies.
- A project-wide review of all exploration data will be completed in order to assess the areas prospectivity to host economic gold mineralisation.

## 8. REFERENCE LIST / ANNUAL REPORT BIBLIOGRAPHY

### References

- Collins, W. J. and Shaw, R. D. 1995 : Geochronological Constraints On Orogenic Events In The Arunta Inlier : A Review. *Precambrian Research*, 71(1-4), p315-346.
- Offe, L. A., 1978: Mount Peake 1:250 000 Geological Series. Bureau of Mineral Resources, Geology and Geophysics.
- Shaw, R.D. and Stewart, A.J., 1975. Arunta Block, regional geology. In *Knight, C. L.* (Editor), *Economic Geology of Australia and Papua New Guinea: 1 Metals*. AusIMM, Melbourne.
- Shaw, R. D.; Stewart, A. J. and Black, L. P. 1984: The Arunta Inlier : A Complex Ensialic Mobile Belt In Central Australia. Part 2 : Tectonic History. *Australian Journal of Earth Sciences* 31: 457-484.
- Stewart, A. J., 1976: Mount Theo 1:250 000 Geological Series. Bureau of Mineral Resources, Geology and Geophysics.
- Stewart, A. J., Shaw, R. D. and Black, L. P. 1984: The Arunta Inlier : A Complex Ensialic Mobile Belt In Central Australia. Part 1: Stratigraphy, Correlations and Origin. *Australian Journal of Earth Sciences* 31 : 445 - 455.
- Warren, R.G., Stewart, A.J. and Shaw, R.D., 1974: Summary of Information on Mineral Deposits of the Arunta Complex, Alice Springs Area, NT BMR Record 1974/117
- Young, D. N.; Fanning, C. M.; Edgoose, C. J.; Blake, D. H.; Shaw, R. J. and Camacho, A. 1995: U - Pb Zircon Dating Of Tectonomagmatic Events In The Northern Arunta Inlier, Central Australia. *Precambrian Research*, 71, 71-43.