FARRANDS HILL PROJECT
PARTIAL RELINQUISHMENT REPORT

to the Department of Primary Industry and Resources

for the period 27/03/06 to 16/01/17 for

EL9843

Date: January 2017

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Principal – Land Management
Northern Star Resources Ltd
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Project Name: Farrands Hill

Combined Report number: GR183/11

Tenement: EL9843

Tenement operator: Northern Star (Tanami) Pty Ltd

Tenement holder: Northern Star (Tanami) Pty Ltd (25%); Tanami (NT) Pty Ltd (75%)

Report type: Annual

Report title: Partial Relinquishment Report to the Department of Primary Industry and Resources for the period 27/03/06 to 16/01/17

Report period: 27/03/06 to 16/01/17

Author: A Mukherji, Principal – Land Management, Northern Star Resources Ltd

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1:250 000 map sheet: SF52-03 Granites

1:100 000 map sheet: Ptilotus 4957

Target commodity: Gold

Keywords: Palaeoproterozoic, Tanami Group Inlier, Mt Charles Formation, Killi Killi Formation, Birrindudu Group, Dead Bullock Formation, The Granites, GIS Compilation, Regional Soil Geochemical Analysis, MIRA Depth of Cover Study, Regional Structural Interpretation

Prospects drilled: N/A

List of assays: N/A

Distribution: Department of Primary Industry & Resources (NT) (1)
Northern Star Resources Limited (WA) (1)
Central Land Council (NT) (1)
SUMMARY

This report describes exploration activities primarily for gold undertaken by Northern Star (Tanami) Pty Ltd and previous operators over the partially relinquished portion EL9843 as part of the Farrands Hill Project GR183/11 between grant date on the 27 March 2006 until partial relinquishment on the 16 January 2017. The centre of the Project area is located approximately 550km northwest of Alice Springs along the Tanami Road to Rabbit Flat thence 18km northeast via exploration tracks. The Project is also located approximately 42km east-southeast of the Company’s Central Tanami Project gold processing plant which is currently under care and maintenance.

Work completed over the partially relinquished portion of the tenement by previous operators and Northern Star (Tanami) Pty Ltd comprised:

- data reviews;
- a regional soil geochemical analysis;
- MIRA depth of cover analysis with assessment of regional tectono-stratigraphy of the Tanami; and
- a preliminary regional structural interpretation; and

Following NST’s 25% acquisition and farm-in of the Central Tanami Project from Tanami Gold (NT) Pty Ltd in early 2015, work completed by NST has resulted in the identification of 14 out of 22 blocks to be non-prospective for gold and consequently partially relinquished in January 2017. There are 8 remaining non-contiguous blocks of EL9843.
Legend

- EL9843 Relinquished Area
- EL9843 Current Area

Work completed:
- Historic GIS data compilation
- Regional soil geochemical analysis
- MIRA Depth of Cover Study
- Regional structural interpretation

Exploration Index and Location Plan
EL9843 Partial Relinquishment - Farrands Hill
(Tanami Joint Venture)

Figure 1

GDA94 Zone 52
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1 INTRODUCTION

This report describes exploration activities primarily for gold undertaken by Northern Star (Tanami) Pty Ltd (NST) and previous operators over the partially relinquished portion of EL9843 as part of the Farrands Hill Project GR183/11 between grant date on the 27 March 2006 until partial relinquishment on the 16 January 2017. The centre of the Project area is located approximately 550km northwest of Alice Springs along the Tanami Road to Rabbit Flat thence 18km northeast via exploration tracks (Figure 1). The Project is also located approximately 42km east-southeast of the Company’s Central Tanami Project (CTP) gold processing plant which is currently under care and maintenance.

Open pit gold mining and ore treatment operations commenced at the CTP in 1987. Mining operations ceased in September 2001 when the plant was leased by Newmont to treat ore from the Groundrush pit from October 2001 to October 2005. The plant was placed on care and maintenance in 2005 and rehabilitation works on all mineral leases was undertaken up to March 2010.

In 2010, Tanami Gold (NT) Pty Ltd (TNT) acquired the CTP as part of a divestment package from Newmont Mining Corporation. In early 2015 NST entered into a Joint Venture with TNT to explore for and mine gold at the CTP and surrounding regional tenure.

Through the Aboriginal Land Rights Act (1976) the CTP and surrounding tenure sits on land that is owned by the Warlpiri People for which the Central Land Council (CLC) acts as a representative body corporate. All personnel and vehicles entering Aboriginal Land are recorded through the CLC, with the CLC also forming a major part of the approvals process for exploration and mining activities/proposals.

The climate is semi-arid with rainfall averaging approximately 400 mm per annum. Most rainfall occurs as summer storms associated with the monsoon season between November and March. Daily temperatures range from winter minima of near zero to summer maxima of about 48C. The mean maximum temperature ranges
from 26C in June/July to 39C in November/January. The area is devoid of surface water except in small soakages after heavy rain. The Tanami Desert in which the leases are situated is typically dominated by smooth plain-lands widely covered in aeolian sand with a vegetation cover described as tall open acacia scrubland with a hummocky grass under-story (spinifex).

2 TENURE
On 30 March 2010 the tenements which comprise the CTP and surrounding tenure were acquired by TNT, a wholly owned subsidiary of Tanami Gold NL, from Otter Gold NL. Otter is a wholly owned subsidiary of Newmont Asia Pacific.

In February 2015, a Heads of Agreement was executed between TNT and NST whereby NST agreed to progressively acquire a 60% joint venture interest in the tenements, of which the CTP tenements are a part, by sole funding all expenditure required to bring the CTP back into commercial production which shall be achieved once the CTP processing plant has been refurbished and is operated for a 30 day period or has produced 5,000oz of gold.

As part of the consideration of the Heads of Agreement, NST has acquired a 25% registerable interest in the tenement.

Table 1  Tenement Details – Farrands Hill Project

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<th>Tenement</th>
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<th>Current Area (blocks)</th>
<th>Grant Date</th>
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<td>EL9843</td>
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3 GEOLOGY
3.1 REGIONAL
The Tanami region is centered 600 km northwest of Alice Springs and straddles the Northern Territory-Western Australia border. Its relationship to the surrounding tectonic units is poorly known. The contacts with the Arunta Province to the south and the Tennant Inlier to the east are not exposed but appear to be major shear
zones in the magnetic data (Hendrickx et al., 2000). The geology of the Tanami region comprises a sequence of folded Palaeoproterozoic metasediments and minor metamafic volcanic and intrusive rocks unconformably overlying Achaean basement. Much of this is hidden beneath thin unconsolidated cover.

The known Archaean is very restricted. Limited dating (SHRIMP zircon U-Pb) of the supracrustal rocks is consistent with an Archaean protolith (ca. 2,500 Ma) with high grade metamorphic activity ascribed to the Barramundi event at 1,880 Ma (Hendrickx et al., 2000).

The basal part of the Palaeoproterozoic stratigraphy is the Tanami Group, comprising the lower Dead Bullock Formation and the upper Killi Killi Formation. The Tanami Group is inferred to have been deposited in a transgressive passive marginal environment following the cessation of major extension and faulting associated with rifting (Hendrickx et al., 2000). The locally extensive mafic volcanic bearing Stubbins Formation and Mount Charles Formation are laterally correlated with the Dead Bullock Formation (Bagas et al., 2008).

Folding and low- to middle-greenschist facies regional metamorphism affected the Tanami Group at approximately 1,840 Ma. The metamorphic grade tends to increase from the northwest to the south-east and adjacent to the local granites (see below) that accompanied this event, which has been denoted as the Tanami Orogenic Event (Vandenberg et al., 2001).

Unconformably overlying the Tanami Group is the complex Ware Group. This was deposited over the Tanami Group in a series of small extensional basins. The Ware Group includes the Mount Winnecke Formation, the Nanny Goat Volcanics and the Wilson Formation (Crispe et al., 2002).

Granitic lithologies constitute approximately 60% of the geology of the Tanami Region, and predominantly comprise ‘I-type’ biotite ± hornblende monzogranites and granodiorites (Dean, 2001). The granite suites are believed to represent over-
lapping igneous events between approximately 1,840 and 1,790 Ma with the Winnecke Suite (1,820-1,830 Ma), the Coomarie Supersuite (1,810-1,820 Ma) and the Frederick Suite (1,790-1,810 Ma) defined by Dean (2001).

The age(s) of gold mineralisation in the Tanami region are poorly constrained, inferred based upon geological relationships that can be confusing and sometimes contradictory. Overall, most geochronological data point to an age of circa 1,800 Ma for late (D₅) gold in the Tanami region. The age of the apparently earlier gold event (D₁ or D₃ at The Granites) is not constrained (Huston et al, 2006).

The post gold mineralisation Birrindudu Group has an interpreted Neoproterozoic age and unconformably overlies the other components of the Tanami region. The exact age is unconstrained but must be less than 1,800 Ma owing to field relationships with the granites. The Birrindudu Group is interpreted as representing shallow marine platform sediments. Three constituents comprise the Birrindudu Group: Gardiner Sandstone; Talbot Well Sandstone and Coomarie Sandstone (Blake et al, 1979). Local exposures of the Cambrian Antrim Plateau Basalt also occur through the Tanami Region (Hodgson, 1975).

### 3.2 LOCAL

The majority of the tenements are covered by variable thickness of unconsolidated alluvial and aeolian deposits with only sparse minor outcropping of bedrock, except on the flank of Farrand’s Hills in the south of EL 9843 where there is extensive outcrop of Gardiner Sandstone. Bedrock is predominantly interpreted by magnetic and gravity characteristics with sparse outcrop and drill holes.

Although widespread exploration is at an early stage, gold mineralisation appears to occur at the top of the Dead Bullock Formation, similar to The Granites and some of the Dead Bullock Soak deposits.
4 PREVIOUS EXPLORATION

During 1989 -1998, 126 AC, VAC & RAB holes were completed for 2,657m on previous tenure with the maximum assay value returned of 0.362ppm Au in C1RB0856, currently on EL9834 (616988.5E, 7784563N, MGA94_52). A total of 127 LAG, BLEG and rock chip samples were later collected on EL9843. These assay results are not recorded in the TNT database.

The tenements were explored by Otter as part of the Tanami Exploration Agreement area. Following acquisition of the tenements in 2010 no on ground exploration was conducted by TNT on EL9843. Work was limited to desktop assessment of the Project area.

In 2011, TNT continued with its desktop assessment of the tenements; as a result, a regolith sampling and partial mapping programme was designed but not undertaken during the 2011 field season due to departure of personnel.

During 2012 a total of 322 soil, 3 lag and 32 rock chip samples were systematically taken on north-south orientated sample lines at 400m by 400m spacing in previously sparsely sampled areas and in areas with the presence of geophysical anomalies. The best overall gold assay result returned was 0.008ppm and came from a sandstone float sample (X504614) on EL9843.

In September 2012 Southern Geoscience Consultants in Perth, Western Australia, completed a merger of various reprocessed open file, government and Tanami-supplied airborne magnetic datasets over the wider TNT tenement holdings including the Farrand’s Hill Project area.

In 2015, the CTP underwent a number of regional geological review processes through the use of both external geological consultants and internal TNT geologists. With the introduction of new JV partner NST to the Project, exploration carried out through a large proportion of that year was predominately focused on the review of the results from existing exploration across the entire tenement package to enable
NST to form a solid understanding of the CTP and surrounding tenure in order to be able to effectively explore the Project going forward.

In addition to significant office-based reviews a geological reconnaissance trip was conducted with both TNT and NST geologists in November 2015.

5 WORK COMPLETED

Following acquisition of TNT’s Central Tanami Project and surrounding tenure, NST initiated an intensive programme of data validation and compilation of TNT’s original database into NST’s new corporate acQuire database system together with historic GIS geochemical and geophysical datasets to support regional targeting exercises with field reconnaissance to ground-truth historical geological and structural mapping.

5.1 REGIONAL SOIL GEOCHEMICAL ANALYSIS

The “regional soil geochemical analysis” process employed a number of statistical and investigative techniques designed to extract as much information from the TNT dataset as possible. These included:

- exploratory Data Analysis to investigate the various statistical populations and how these relate to real sample controls;
- a thorough review of element associations with respect to gold;
- Principal Component Analysis (PCA) to investigate the associations gold has with various element assemblages;
- Cluster Analysis to identify any correlation between statistical associations and spatial distribution;
- gridding to delineate areas of anomalism in individual elements; and
- a lithogeochemical review to explore the suitability of the data for constraining lithological or stratigraphic observations.

Targeting identified a total of 144 zones of interest in the region where two different ranking methodologies were applied to the results which identified a number of key areas for future exploration. The primary targeting method consistently identified areas of known mineralisation including the CTP, Pendragon (Western Tanami) and the Groundrush mining areas.
Both ranking methods consistently highlighted the Western Tanami as a favourable district, containing in excess of 55% of the top 15 targets from both ranking methods.

Though lithogeochemistry was found to be of value when using similar data populations, the TNT geochemical dataset unfortunately shows significant variability across the area of interest so applying a broad lithogeochemical review of the data as-is will not provide any useful information.

Target polygons were developed around all gold anomalies, where available and deemed geologically necessary pathfinder anomalism was also included. By using two separate methodologies to rank the final targets, it is believed a sufficient representation of anomalous target areas has been identified even with the large variability in sample densities and analytical methods. Figure 2 shows the Farrands Hill area with no target polygons currently defined.
A summary report was completed in late August with its purpose being to review the current status of the regional drilling dataset and assess the reliability in using the drilling data for production of regolith and depth of cover map products. Investigation of the dataset involved the analysis of collar, geological logging, sampling and assay information. Analysis of the data from a spatial perspective was incorporated to provide an introduction to the condition and scale of the drilling. This report has been passed onto an external consultant with a proposal to create a regional regolith map and 2D/3D Depth of Cover product (section 5.2).

5.2 MIRA DEPTH OF COVER STUDY

In December 2016, NST commissioned geological consultants, Mira Geoscience of West Perth, Western Australia, to undertake a Depth of Cover (DoC) map and to categorise the regolith within the whole of NST’s Tanami tenure. The DoC project will be undertaken in two stages with the initial stage to model the base cover and the second stage to interpret and classify the cover and regolith materials.

The proposed work is as follows:

Stage 1

- import and perform QC of existing drilling and geophysical data; and
- define the base of cover interface based on drilling and extend this away from drill hole constraints using geophysical inversion of magnetic and airborne electromagnetic data.

This process will entail an initial phase of data compilation and assessment, followed by preparation of a starting model from outcrop (if present) and drill hole pierce point constraints, and from existing depth of cover interpretations by CRC-LEME and Geoscience Australia. Modelling will initially consider a two-layer model consisting of transported cover and basement. Some QA/QC of the drilling database will be performed by computing the differences between the existing cover models and drilled cover thicknesses and identifying (and potentially removing) large outliers. The final cover model will be based primarily on the drilling, and on interpretation of airborne electromagnetic (AEM) and magnetic data away from the drill holes.
Stage 2

- ASTER and LANDSAT 7 interpretation; and
- radiometric interpretation.

Interpretation of regolith materials will be based on supervised classification of remote-sensing and airborne radiometric data using techniques such as self-organising maps (SOM). The output from this process will be a raster image of classified regolith types. Note that this classification will require raw ASTER data (not simply images). If ASTER data is not available it will be necessary to purchase 1-2 scenes of data, and to have appropriate processing applied. Modelling will be carried out in Gocad Mining Suite.

The area of interest is shown in the Figure 3 (NST tenure in blue polygons) and is ~110 km EW and 75 km NS. The Farrands Hill group of tenements are located west of the CTP. Magnetic and AEM survey polygons are shown in black and red respectively.

This work has not yet been initiated but should commence in January 2017 with stage 1 to be completed at the end of February 2017.
As part of an integrated approach to an in-house regional tectono-stratigraphic map, a review and assessment of all available previous interpretation maps was made to understand the basis of all previous interpretations and to demonstrate how small scale interpretations relate to those made on more regional scales. In addition, components were identified that perhaps lacked insight or factual evidence and to formulate methods to fill this knowledge gap and produce in-house tools/products for geological reference ie: regional interpretations. Also reliability of current drilling datasets can be measured including sub-data such as regolith and assay metadata.

5.3 PRELIMINARY STRUCTURAL INTERPRETATION

As part of producing an in-house regional tectono-stratigraphic map, a revised structural interpretation is required. A preliminary interpretation has been created and will be modified as interpretations change through the remainder of the process. Figure 4 is a map showing the structural interpretation underlain by current exploration tenure.
6 CONCLUSIONS AND RECOMMENDATIONS

Following NST’s 25% acquisition and farm-in of the Central Tanami Project from Tanami Gold (NT) Pty Ltd in early 2015, work completed by NST has resulted in the identification of 14 out of 22 blocks to be non-prospective for gold and consequently partially relinquished in January 2017. There are 8 remaining non-contiguous blocks of EL9843.
7 REFERENCES


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