Project Memo

Client: Excalibur Mining Corporation Ltd
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Attention: Ms Samantha Kemp
From: T Naidoo, M Greentree

Project No: EXA005
Revision No: 0

Project Name: Brown’s Range Exploration Potential Review

Subject: Major findings of SRK’s review

1 Introduction
The Tanami Region is described as a poorly exposed, mostly Palaeoproterozoic province within the North Australian Craton, which hosts a number of significant gold deposits in diverse settings (Crispe et al., 2007). Excalibur currently manages a joint venture which holds a granted exploration licence (EL25207) in the Browns Range area of the Tanami Region, and has applied for a further four exploration licenses (EL25178, EL25179, EL25123 and EL25124) to the east of EL25207 (Figure 2-1).

2 Geological Setting
The following description of the regional geology is sourced primarily from Ahmad et al. (2009).
The Tanami Region forms part of the Palaeoproterozoic orogenic domains of the North Australian Craton, and has a transitional relationship with the Aileron Province of the Arunta Region to the south. Its southern margin is marked by a sharp increase in metamorphic grade associated with east-trending structures, and its eastern boundary defined by the easternmost presence of the Dead Bullock Formation within the stratigraphy (Figure 2-1).

Seismic interpretations suggest the existence of a suture in the underlying crust between the Tanami-Arunta transition (PCZ in Figure 2-1), although any suture must predate deposition of the Tanami Group. To the north, the Tanami Region is unconformably overlain by the Palaeoproterozoic Birrindudu Basin and the Palaeozoic Wiso Basin.

Rocks of possible Archean age crop out on the southern margin of the Browns Range granite complex (Browns Range metamorphics) and in the east in the De Bavay Hills region (Crispe et al., 2007). Neoarchaean rocks are believed to be widespread, and are thought to form the basement to the outcropping Palaeoproterozoic rocks of the Tanami Region.
The most extensive Palaeoproterozoic unit is the Tanami Group, which is subdivided into the basal Dead Bullock and overlying Killi Killi formations (Figure 2-2). The Dead Bullock Formation is described as “a~1 km thick, upwardly-fining sequence of sandstone, siltstone, shale, chert, and rare volcanic rocks” (Bagas et al., 2010). The basal Ferdies Member of the Dead Bullock Formation consists of a sandy siltstone fining upwards into graphitic units and BIF of the Callie Member, which constitutes the largest gold-producing region (Figure 2-3) in the Northern Territory at Dead Bullock Soak (Lambeck et al., 2010). The Killi Killi Formation, which consists of turbiditic siliciclastic rocks, also hosts gold, but is less extensively mineralised. Dolerite sills intrude the Tanami Group.
The fact that the Dead Bullock Formation appears to be restricted to the eastern and central part of the Tanami Region suggests that the Tanami Basin was deepest in this area. The close association of many deposits and prospects with carbonaceous and Fe-rich units in the Tanami Group suggests that the original architecture of the Tanami Basin influenced the later lode-gold mineral system (Figure 2-4 and Figure 2-5).

**Figure 2-2:** Schematic summary of stratigraphic, igneous and structural events in the Tanami Region

*Asterisks denote units hosting significant gold mineralisation*

*Source: Crispe et al. (2007)*
Figure 2-3: Regional interpreted geology and gold deposits in the Tanami Region

Source: Ahmad et al. (2009)
The Tanami Group is unconformably overlain by the Ware Group, which is dominated by sandstone and felsic volcanic rocks. The Tanami Region also contains intrusive granitic rocks dominated by the Frankenia, Coomarie and Browns Range domes. These domes have a low, but variable magnetic intensity, consistent with multiple intrusive phases. Interpretation of magnetic and gravity data led to the inference that more than half of the Tanami basement is possibly composed of granite, however more recent seismic data indicates that the extent of granite may be much more restricted, and although some bodies are aerially extensive, they are relatively thin (<2 km). Most of the granitic bodies intruded the Tanami and Ware groups and their emplacement was coincident with protracted regional deformation.
3 Known Mineralisation

3.1 Mineralisation Styles

There are at least 121 identified gold occurrences in the Tanami Region (Ahmad et al., 2009), and these can be divided into five distinct deposit types:

1. Au-quartz veins in carbonaceous siltstone. These contain very minor sulphides and are generally discordant to bedding. Mineralisation occurs in subparallel, sheeted quartz veins within a structural corridor. The Callie deposit is currently the only known example of this type of mineralisation.

2. Au-sulphide (arsenopyrite, pyrite and pyrrhotite) ± quartz ± carbonate veins in banded iron formation and chert, e.g. West Bullakitchi, Shoe, Quorn, Villa, Triumph Hill. These veins follow a particular stratigraphic horizon of iron-rich, cherty metasedimentary rocks within the Dead Bullock Formation. Deposits are present in The Granites and Dead Bullock Soak goldfields, and have large tonnages and higher grades than those in the Tanami goldfield. In most aspects, they are similar to the BIF-hosted deposits of the Pine Creek Orogen.

3. Au-carbonate-sulphide ± quartz veins. These are unique to the East Bullakitchie deposit and occur as concordant and discordant veins within metamorphosed sedimentary rock, which probably had a carbonate precursor.

4. Au-quartz-carbonate veins in basalt of the Mount Charles Formation. The veins are present as breccia fills, veins and stockworks within lower greenschist-facies basalt, greywacke, siltstone and shale. The basalt is vesicular, has pillow structures and has undergone propylitic alteration. These deposits occur in clusters in the Tanami goldfield and have lower tonnages and grades.

5. Au-quartz veins in dolerite, e.g. Groundrush

Declared gold resources as at 1996 for the Tanami and Dead Bullock Soak goldfields are provided in Table 3-1 and Table 3-2 respectively, as an indication of the size of the deposits. As quoted by Smith et al. (1998) individual BIF-hosted deposits at Dead Bullocks Soak ranged from approximately 10 000 oz (Sleepy Hollow) to approximately 327 000 oz (Villa).

Table 3-1: Proved and Probable Ore Reserves for deposits within MLs 167 and 168 (Tanami Goldfield), at 30 June 1996

<table>
<thead>
<tr>
<th>Deposit</th>
<th>Tonnage (Mt)</th>
<th>Grade (g/t Au)</th>
<th>Estimated contained gold ('000 oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dogbolter Area</td>
<td>1.033</td>
<td>3.8</td>
<td>126</td>
</tr>
<tr>
<td>Redback Area</td>
<td>1.614</td>
<td>3.4</td>
<td>177</td>
</tr>
<tr>
<td>Jim’s Find</td>
<td>1.050</td>
<td>3.2</td>
<td>108</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3.697</strong></td>
<td><strong>3.4</strong></td>
<td><strong>411</strong></td>
</tr>
</tbody>
</table>

Source: Tunks and Marsh (1998)
Table 3-2: Identified Mineral Resources, Dead Bullock Soak MLS 154, at 31 December 1996

<table>
<thead>
<tr>
<th>Deposit</th>
<th>Tonnage (Mt)</th>
<th>Grade (g/t Au)</th>
<th>Estimated contained gold ('000 oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Callie</td>
<td>9.779</td>
<td>7.0</td>
<td>2203</td>
</tr>
<tr>
<td>Bif-hosted Deposits</td>
<td>6.382</td>
<td>3.5</td>
<td>719</td>
</tr>
<tr>
<td>Dead Bullock Soak Total</td>
<td>16.161</td>
<td>5.6</td>
<td>2922</td>
</tr>
</tbody>
</table>

Source: Smith et al. (1998)

3.2 Gold Camps

Most of the gold deposits in the Tanami Region are grouped in three goldfields: Tanami, The Granites and Dead Bullock Soak (Figure 2-3).

3.2.1 Dead Bullock Soak

The Dead Bullock Soak goldfield comprises eight deposits, most of which have been mined out. The exception is the Callie deposit, which is currently being mined by underground methods and contains the only remaining resources and reserves of this goldfield. Mineralisation is hosted in rocks of the Dead Bullock Formation.

The Callie Member of the Dead Bullock Formation hosts the Callie deposit, and comprises quartz-chlorite-sericite schist with minor graphitic and rare chert intervals. Smith et al. (1998) note that the deposits are within or adjacent to east-trending anticlinorial fold closures, and add that mineralisation is restricted to easterly-trending structural corridors that transect the fold plunges.

3.2.2 Granites

Mineralisation at The Granites goldfield is also hosted by the Dead Bullock Formation, which in this area comprises laminated to bedded chert, BIF, siltstone, schist, greywacke, basic volcanic rocks, and minor intermediate and acid volcanic rocks. The strata are steeply dipping and strongly folded, with superimposed, later open folds.

3.2.3 Tanami

The lodes at the Tanami goldfield are hosted by an alternating succession of basalt and mudstone with rare greywacke and chert belonging to the Mount Charles Formation. The deposits are located between two granite plutons, the Coomarie and Frankenia domes, both of which postdate the Mount Charles Formation and are expressed as pronounced gravity lows. Gold mineralisation occurs within clusters of quartz-carbonate veins, associated with sericite-pyrite alteration. The ore shoots range from 1 – 20 m in thickness, 20 -300 m in length and 10 – 70 m in vertical extent. Higher gold grades occur adjacent to the ore shoot boundaries. Calcite, siderite and quartz are the main gangue minerals and pyrite is the main sulphide, comprising 5 – 20% of the veins. The orebodies are oxidised to a depth of about 60 m. Tunks and Marsh (1998) indicate that the strike directions of the deposits are generally 000°, 020° or 060°.
4 Geological Models

Lode-gold provinces such as the Yilgarn and Superior cratons host gold in a variety of lithologic types (predominantly mafic volcanic rocks in greenstone belts and BIF) and structural settings, whereas in contrast to these regions, two of the three major goldfields in the Tanami Region (The Granites and Dead Bullock Soak goldfields) are hosted exclusively in sedimentary rocks, particularly those which are more chemically reactive such as carbonaceous or iron-rich units (Lombeck et al., 2010). Furthermore, sediment-hosted gold deposits contain 77% of the Tanami gold resource, with carbonaceous sedimentary rocks hosting 61% of the gold, and banded iron formation hosting 16% (Lombeck et al., 2010).

Deformation recognised in the seismic data resulted in structures that focussed gold-related mineralised fluid flow. Therefore, sites of gold deposition are likely to be in structures generated by these deformations, i.e. northeast and northwest thrusts and antiformal thrust stacks (Goleby et al., 2009).

5 Conclusions

Excalibur’s tenements are shown in relation to known mineral occurrences, surface geology and magnetic structure in Figure 5-1. A subjective evaluation of the gold potential for the various areas covered by Excalibur’s tenement holding is provided in Table 5-1, and discussed below.

<table>
<thead>
<tr>
<th>Area</th>
<th>Geology</th>
<th>Structure</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western portion of EL25207</td>
<td>Dead Bullock Formation</td>
<td>Positive</td>
<td>High</td>
</tr>
<tr>
<td>Eastern portion of EL25207</td>
<td>Birrindudu and Wiso Basins</td>
<td>Locally positive</td>
<td>Low</td>
</tr>
<tr>
<td>EL25178</td>
<td>Killi Killi, Ware and Winnecke</td>
<td>Highly positive</td>
<td>High</td>
</tr>
<tr>
<td>Western portion of EL25123</td>
<td>Ware Group</td>
<td>Positive</td>
<td>Reasonable</td>
</tr>
<tr>
<td>Eastern portion of EL25123</td>
<td>Wiso Basin and Granite</td>
<td>Positive</td>
<td>Low</td>
</tr>
<tr>
<td>EL25179 and EL25124</td>
<td>Wiso and Georgina Basin</td>
<td>Poor</td>
<td>Low</td>
</tr>
</tbody>
</table>

The presence of Dead Bullock Formation lithologies adjacent to granite in the northwestern portion of EL25207 enhances its prospectivity for gold, as does the presence of notable structures. The magnetic data indicates that the structures, and presumably the Dead Bullock Formation lithologies, continue under the overlying Birrindudu cover, which is likely to be thinnest in areas of immediate onlap.

The eastern portion of EL25207 is characterised by younger Birrindudu and Wiso Basin lithologies. This area is not considered prospective, as target lithologies associated with known mineralisation are either absent, or only present at depth.

EL25178 is also prospective for gold, due to the presence of Palaeoproterozoic sediments (Killi Killi and Ware Group) and volcanics (Winnecke Granophyre), the apparent structural complexity, and the proximity to known gold occurrences in the same stratigraphy. The eastern portion of this tenement, which is underlain by younger Georgina Basin sediments, is considered less prospective. The southern portion of the tenement is most prospective.

The western portion of EL25123 is also prospective for gold, based on the presence of Ware Group sediments, structure and the proximity of known gold occurrences in the Ware Group.
EL25179 and EL25124 are considered less prospective, as they are covered by younger sediments of the Georgina and Wiso Basins.

The tenement area is not considered prospective for uranium. The basin structure is not considered consistent with the unconformity-related uranium model, and the lack of known uranium occurrences in this region of the Northern Territory, despite the gold mining, is a negative factor.
Figure 5-1: Gold and Uranium occurrences in Tanami Region
6 Recommendations

SRK considers that the western portion of EL25207 is the most prospective of the tenement package, and recommends that it be tested for gold mineralisation by drilling. SRK recommends that drilling should be targeted based on a close-spaced (high resolution) magnetic survey, complemented by detailed structural mapping, to identify structures of potential interest, and ascertain the depth to these structures. Drilling can then test these structures for the presence of gold mineralisation.

In the case of sulphide mineralisation, high resolution EM surveying may also help in directly targeting the mineralisation. Southern Geoscience stated in their report that the 2008 RepTem airborne survey quality was “fair to good for general mapping-interpretation purposes”, but that “the effectiveness of the survey for detection of discrete, massive sulphide type anomalies is questionable”. Whilst it is likely that these potential deposits lack sufficient sulphide to produce “bulls-eye” EM targets, it is likely that areas containing more sulphides will be identified by appropriately optimised and interpreted EM methods.

A high-resolution magnetic (and possibly EM) survey of EL25178 and the western portion of EL25123 would also be the next logical step if Excalibur wanted to test them for gold mineralisation. Structural interpretations and target identification from these surveys would then potentially yield drill targets for testing.

7 References


