Titleholder: Geotech International Pty Ltd
Operator: Minemakers Australia Pty Ltd
Tenement: EL26710 (Booda Bore)
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This annual and final report describes exploration activities completed over the life of EL26710 (the Booda Bore prospect). EL26710 is a joint venture between Minemakers Australia Pty Ltd (MAPL) and Geotech International Pty Ltd. Exploration is aimed at the discovery of economic phosphate deposits proximal to the Alice Springs-Darwin railway. Such deposits are known to occur in shallow marginal marine sediments at the eastern edge of the Georgina Basin and associated with a basement high at MAPL’s Wonarah project located approximately 220 km to the east-southeast. The presence of economically significant phosphate mineralisation in the eastern Georgina Basin has yet to be established.

The tenement is located 120 km northeast of Tennant Creek on the 1:250,000 HELEN SPRINGS SE53-10 and the 1:100,000 BRUNCHILLY 5760 map sheets. The geology in the immediate area consists of Palaeoproterozoic Tomkinson Creek Group, a dominantly arenaceous sequence, particularly in the basal portions, with siltstone and shale more important in the upper portions. This stratigraphy is overlain by undeformed Middle Cambrian sedimentary rocks. Early Cambrian lithologies are represented by the Helen Springs Volcanics that consist of amygdaloidal tholeiitic basalt and a basal sandstone unit. The Middle Cambrian Gum Ridge Formation was deposited in shallow shelf epicontinental seas subject to episodic peritidal influence. Lithologies consist principally of limestone and associated phosphorite units. Preliminary research involved an office study of the airborne magnetic data and phosphorus assaying of water bore cuttings. Field work comprised the collection of a total of 17 soil and 13 maglag samples. No anomalous analytical results were returned. The tenement was relinquished as part of the rationalisation of the regional phosphate exploration joint venture with Geotech International.
1. INTRODUCTION

This report describes exploration activities completed on a EL26710, Booda Bore prospect, over its life. The tenement was operated by Minemakers Australia Pty Ltd (MAPL). Exploration was aimed at the discovery of economic phosphate deposits proximal to favorable infrastructure, particularly the Alice Springs-Darwin railway. Such deposits are known to occur in shallow marginal marine sediments at the eastern edge of the Georgina Basin and associated with basement highs such as at MAPL’s Wonarah project located approximately 220 km to the east-southeast.

2. LOCATION

EL26710 is located 114 km north-northeast of Tennant Creek in the Northern Territory (Figure 1). The tenement lies on the 1:250,000 HELEN SPRINGS SE53-11 and the 1:100,000 BRUNCHILLY 5760 map sheets. The tenement covers relatively flat land within two pastoral properties, viz. Banka Banka and Brunchilly. Land use is dominated by cattle grazing.

3. TENURE

The original EL26710 covered 144 blocks (468.60 km²) and was granted on 24 October 2008 to Geotech International Pty Ltd (Geotech) for a period of six years. In 2011, a total of 36 blocks were relinquished, leaving 108 blocks for the retained tenement. A further 54 blocks was relinquished in 2012 and the final tenement area comprised 54 blocks (349.25 km²).

A joint venture agreement between Minemakers Australia Pty Ltd and Geotech was signed on 12 May 2009. The agreement provides participating interests for Minemakers (80%) and Geotech (20%), with Geotech being free-carried from expenditure contributions until a Decision to Mine. Field exploration activities were subject to consultations with the pastoral lessee and, through the Northern Land Council, with the Native Title claimants (Banka Banka Native Title Claim NTD 6005/01).
Figure 1: Location of EL26710.
4. GEOLOGY

The Booda prospect is located on the eastern edge of the Palaeoproterozoic Tomkinson Creek Group, a dominantly arenaceous sequence particularly in the basal portions with siltstone and shale more important in the upper portions (Donnellan, 2004). This stratigraphy is overlain by undeformed Middle Cambrian marine sedimentary rocks that comprise the western edge of the Georgina Basin which has been divided into two sub-basins called Barkly and Undilla (Figures 2 and 3). Early Cambrian deposition is represented by the Helen Springs Volcanics that consist of amygdaloidal tholeiitic basalt and a basal sandstone unit. These rocks unconformably overlie the Tomkinson Creek Group.

The Middle Cambrian Gum Ridge Formation was deposited in shallow shelf epicontinental seas subject to episodic peritidal influence. Lithologies consist principally of limestone that includes fine-grained sandstone, siliciclastic mudstone, bioclast, oncoid, styolilthic and cryptomicrobial limestone, marly limestone, fossiliferous nodular chert; carbonate and evaporitic pseudomorphs (Hussey et al., 2001). Occasional trilobites, brachiopods and sponge spicules occur in this formation. There are a number of mapped exposures of Gum Ridge Formation in and adjacent to the tenement and geological mapping has identified a number of exposures of slightly younger and related Anthony Lagoon beds (op. cit.). The Gum Ridge Formation is the primary target for phosphorite mineralisation.

![Figure 2. Stratigraphy and phosphate occurrences of the Georgina Basin (after Khan et al, 2007).](image)
Figure 3. Location of EL26710 in the Barkly Sub-Basin of the Georgina Basin (after Khan et al, 2007).
5. WORK COMPLETED

5.1 Office Research

During the first year of tenure, office research was completed over the entire tenement. Airborne magnetic data indicate the presence of basement highs and embayments, features that are considered to favour phosphorite accumulation. Some near-surface magnetic highs are considered to represent sub-surface basalt of the Helen Springs Volcanics. Preliminary research involved identifying water bores in the immediate area and ascertaining whether these had been tested for phosphate (Khan et al., 2007). The target stratigraphy is known to be flat-lying to gently dipping and it was considered that any near-surface phosphorite would have a geochemical signature that could be identified by soil and/or maglag sampling. Basement highs and embayments would then be targeted in the geochemical survey where local station tracks allowed access.
Figure 4: Exploration Index Plan.
5.2 Geochemical survey

A geochemical survey was conducted over station tracks within the tenement during early February 2010. A total of 17 soils and 13 maglag samples were collected on a traverse on the relinquished part of the tenement (Figure 4).

Soil samples were collected from a depth of about 15 cm with an average sample weight in the range 1200-1300 gm. Maglag samples were not always available at each site. Average sample weight was 20-30 gm.

The soil and rock samples were forwarded to ALS Laboratory, Mt Isa. The soil samples were sieved to -80#, pulverised and digested in a multi-acid digest and assayed using ME-MS41, ICP-MS, ICP-AES techniques for the following 51 elements: Ag, Al, As, Au, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Fe, Ga, Ge, Hf, Hg, In, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Rb, Re, S, Sb, Sc, Se, Sn, Sr, Ta, Te, Th, Ti, U, V, W, Y, Zn and Zr. The rock samples were pulverised and digested in a multi-acid digest and assayed using ME-MS41, ICP-MS, ICP-AES techniques for the same 51 elements listed above. The results are reported in Laboratory Reports MI10020779 (rocks) and MI1024320 (soils).

Due to a misunderstanding the maglag samples were not submitted with the rock and soil samples, but were submitted to Genalysis Laboratories Pty Ltd, Perth in early November 2010. For samples ≤ 25 gm (no preparation); samples >25 gm were pulverised. An aqua regia digest was used and the following elements were assayed: ICP-OES for P, Fe, Mn; ICP-MS for As, Cd, Ce, La, Pb, U and Th. The results are reported in Laboratory Report 1286_0_1015483.
6. DISCUSSION

No anomalous analyses were returned indicating that near surface phosphate was probably not present in the samples areas.

7. CONCLUSIONS

The tenement was part of a phosphate exploration joint venture between Minemakers Australia Pty Ltd and Geotech International Pty Ltd. The tenemented area was postulated to be adjacent to the western edge of the Georgina Basin based on regional gravity and magnetics and therefore potentially a place of phosphate deposition during the Cambrian. The joint venture was dissolved in early 2013 on the basis that the tenements had low prospectivity for phosphate and that any phosphate present would be likely to be typical Georgina Basin phosphorite; very high silica content, very low reactivity and therefore unlikely to be able to sold as a beneficiated rock. The alternative development route of downstream processing of mined phosphate rock into a phosphoric acid or fertiliser product via the typical “wet” process is considered to be an even more difficult sell as the capital costs would be very high. Minemakers has decided to focus on the development of its Wonarah deposit and manufacture of superphosphoric acid using a proprietary, cheaper process and consequently is not interested in further greenfields phosphate exploration.

8. REFERENCES


Pellatt A. (2011) Annual Report for EL26710 (Booda Bore) for the period ending 24 October, 2011. Minemakers Australia Pty Ltd