EL 29953 Surrendered Portion

Secret Treasure

Report two years to 14th February 2016

Ripple Resources Pty Ltd

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Neil Wilkins M.Sc

4th April 2016
Summary ................................................................................................................................. 3
1.0 Introduction ......................................................................................................................... 4
2.0 Location and Access ........................................................................................................... 4
3.0 Licence Details .................................................................................................................... 5
4.0 Geology and Previous Exploration .................................................................................... 5
5.0 Exploration Completed during the Reporting Period ....................................................... 8
   5.1 Frogtech Basin Study ...................................................................................................... 8
   5.2 Evaluation of the Wollogorang and Mcdermott formations ........................................ 8
6.0 Results and Conclusions .................................................................................................. 11

Figures
Fig. 1 Location and access ........................................................................................................ 4
Fig. 2 Stratigraphic column ....................................................................................................... 6
Fig. 3 Previous Ripple drilling and EM anomalies ................................................................. 7
Fig. 4 Barney Creek distribution from prior work ................................................................. 8
Fig. 5 Tilted Frogtech Image with targets ........................................................................... 9
Fig. 6 Frogtech with local targets ......................................................................................... 9
Fig. 7 Schematic section through HYC mine into Frogtech targets ................................... 10
Summary

Ripple Resources is a fully owned subsidiary of Armour Energy Ltd. Armour has been exploring the gas and oil resources of the McArthur Basin, and has made a significant gas discovery in the Glyde sub basin.

Ripple has selected Exploration Licences within areas inside the Armour Energy permits, and has been cooperating with Armour in order to evaluate these ELs for their base metal potential.

This cooperation has involved modifications and extensions to the Armour program so that it has greater relevance for base metal exploration. Additionally the techniques and concepts used in hydrocarbon exploration overlap with leading edge base metal exploration.

Base metal exploration within these Licences is challenging because of the rugged topography and cover geology. Breccia hosted and stratiform mineralisation trends into the area from outcropping areas, the most notable being the Bald Hills - HYC trend and Western Emu fault. The imputed depths of mineralisation are believed to range from about 500m – 1500m, which is below the limit of airborne EM penetration.

Previous exploration by Amoco Minerals (and Petroleum) and by BHP RTZ and MIM relied on airborne EM as a target generating technique. Amoco conductors within this EL were interpreted as Mainoru formation which lies in the cover sequence.

A Falcon airborne gravity and magnetics survey has been flown, imaged and interpreted. No part of this survey covered any part of EL 29953.

One gravity anomaly adjacent to the Emu fault was diamond drilled to 1275m in hole LP3. The hole was subsequently logged with downhole geophysics including IP. This hole was drilled into adjacent EPM 29837, but has strong implications for the ELs which are the subject of this report.

This hole intersected 75m of semi massive pyrite infill and replacements hosted by the Cooley breccia member of the Barney Creek formation. This is considered significant because it demonstrates that the Falcon survey has generated drill targets due to sulphides, and also it demonstrates that a significant hydrothermal sulphide system has mineralised the Barney Creek Formation in the area.

A basin wide study was commissioned using Frogtech analysis. This used all known geological and geophysical data to model the basin structure and depth to Wollogorang formation a large area, including all of EL 29953. The Frogtech analysis implies that the depth to the Barney Creek formation may not be excessive in the southern and eastern part of the EL. In addition, there are repetitions of HYC style structural controls hidden under the cover formations. These targets have been selected for ongoing exploration within EL 29953. There is no precise knowledge about the targets at depth, as there are no outcrops and there has never been drilling, because of the extreme topography.

The northern and western portion of EL 29953 has been surrendered because of the greater depth to targets as demonstrated by Frogtech analysis.
1.0 Introduction

Ripple Resources Pty Ltd was set up by DGR Global Ltd for the purpose of exploring for base metals within areas of the McArthur and Mount Isa basins that were being examined by Armour Energy Ltd for gas and oil. After the float of Armour Energy, Ripple Resources was sold to Armour at cost. Since that time, Armour has been providing funding and much of the operating resources for Ripple. Armour Energy has since restructured by bringing in American Energy Partners (AEGP) as a major shareholder, and as the manager and funds provider for the NT petroleum exploration.

AEGP is committed to paying a substantial sum to Armour Energy which will fund Ripple Resources as a separately managed entity. At this time, AEGP is attempting to withdraw from the commitment, and the matter is before the courts.

Modern concepts regarding the formation of sediment hosted base metal deposits have given new emphasis to the century old model that the metals were introduced along with hydrocarbons, either in conventional trap sites or within basin centred accumulations.

There was an opportunity to modify and extend the Armour program so that Ripple Resources could benefit from aspects of the petroleum evaluation which were relevant to base metals. Ripple and Armour have employed a basin wide approach towards exploration, and has widened its search away from the Batten trough and the Barney Creek formation.

2.0 Location and Access

The surrendered portion of the EL extends over 40 km in an east west strip immediately north east of the HYC mine leases at MacArthur River. Access is best made via tracks from the Borroloola Burketown road. Within much of the EL, access is difficult due to a rugged physiography. Helicopter support is essential in those areas.
3.0 Licence Details
EL 29953 was granted on the 14th February 2014 for 5 years. It covered 141 blocks with an area of 465 sq kms. It is subject to 50% minimum reduction every second year. Native Title and Heritage clearances have been handled concurrently with overlapping EP 171 and EP 176.

A reduction of 71 blocks has been applied to the EL effective from the beginning of the third year.

4.0 Geology and Previous Exploration

Most of the area is comprised of the flat lying late Proterozoic Bukalara sandstone, and shales and sediments of the Roper Group. These form a rugged plateau and obscure the prospective McArthur Basin, which is faulted and gently folded. The formations of prime interest are the Barney Creek and adjacent/underlying Coxco dolomite member. Most mineralisation of note lies between the Coxco and the Caranbirini member of the Lynott Formation, but some bitumen Ç galena- sphalerite infills extend up as far up sequence as the Bessie Springs sandstone in the Roper Group. In the south, within ELs 29954 and 55, BHP drilling has revealed bitumen chalcopyrite galena sphalerite infills within thick strongly organic dolomitic shales of the McDermott formation. As a rule, the lower formations with hydrocarbon shows as shown in Fig.2 are those with mineralisation.

The economically significant lead zinc copper deposits are part of the Mt. Isa Ç McArthur metallic province, which is the most productive zinc district in the world. Locally, the HYC mine is the only producer, with a global resource of over 200 million tonnes of lead zinc with minor copper. New exploration by Rox Resources (Teck) has enhanced the nearby Myrtle and Teena deposits by means of deeper drilling and larger richer intercepts. They are typical of the basin hosted deposits which are normally richest in the structurally lowest sites, within the most organic dolomitic shales.

Other zinc-lead copper deposit types are known, and are mainly of the porosity infill type, where hydrocarbons and metals have migrated into trap sites usually in solution breccias or decarbonated dolomitic shales. Locally, these include the Coxco, Cooleys and Ridge deposits. Century in Queensland is the largest known deposit of this type, and is currently the worlds largest source of zinc. At Century, the stratiform sulphide mineralisation occurs in a matrix of live oil occupying secondary porosity sites, and adjacent smaller mines have produced pitch as well as silver lead. Renewed exploration at Walford Creek (in Queensland, close to the NT border) has discovered significant Mt. Isa style copper cobalt phases that overprint the silver lead zinc. This style is also present in breccias at Cooleys, but is not economically significant.

Locally, the major previous work on the Bukalara Plateau was done by Amoco and its J-V partners and has been reported in CRs 1979-192, 1979-013, 1980-064, 1981-28, 1982-228 and 393, 1983-24 and 48, and 1986-299. Amoco found outcropping Barney Creek shales and breccias in what was named the Glyde sub basin. Subsequent drilling found little evidence of proximal hydrothermal sulphide deposition in the sub basin, although it did encounter gas flows within hydrothermal breccias close to the Emu fault. The Glyde sub basin boundaries are reactivated growth faults that are displaced variable distances away from the original planes of movement.

Very little is known about the Barney Creek formation in EL 29953 itself. EM conductors defined by Amoco were ascribed to pyritic bituminous shales of the Mainoru formation within the Roper Group cover.
The EL area has seen virtually no base metal exploration due to the difficult topography and the problematical cover sequences. To understand the targets that may lie within the EL, a compilation must rely on extrapolation from exploration outside of the EL itself. Most of the relevant work in the exposed areas to the north and west was done by MIM and more recently by the Rox Resources – Teck joint venture. The latter partnership has had considerable success in improving the Myrtle and Teena stratiform deposits by locating and drilling the structurally lowest portions of the Barney creek formation within localised metalliferous sub basins. Rox – Teck encountered a problematic strong gas flow at Myrtle and oil has also been reported in earlier drilling by MIM.

Fig. 2 Stratigraphic column - note that the >200m thick McDermott formation black dolomitic shales and evaporites have been removed from this official version, despite its widespread distribution about 150m above the Siegal volcanics. It is considered too relevant to ignore.
A compilation was made of previous exploration using data and reports covering the adjacent areas. From this (Fig.4) it can be seen that strong mineral systems lie to the west, and that they trend into the covered areas just to the south of the EL.

The ENE striking Bald Hills structure has localised the Teena CW fold & Wickens Hill CHYC sub basins, in situations where NNW striking structures are transected. Adjacent to HYC, the Bald Hills structure also has breccia hosted copper. These strongly discordant growth faults are apparently important in localising the best mineralisation. The growth faults are difficult to map conventionally because they have not been reactivated since Barney Creek time, and there is little or no magnetic contrasts in most localities. They are implied from stratigraphic information gained from drilling and from geochemical trends, as much as outcrop mapping.

Two major activities were conducted by Ripple during the first year. A Falcon airborne gravity survey did not cover any of this EL, and a diamond drill hole cored to 1275metres in hole LP3. The latter was outside the project area, but verified the existence of a thick hydrothermal sulphide system in the Barney Creek formation.

Armour Energy (and previous Amoco) drilling and geophysics further south in the Glyde gasfield has verified a hydrothermal breccia system affecting the Coxco dolomite at the base of the Barney Creek formation adjacent to the Emu fault zone. The breccias and adjacent shales have minor zinc lead sulphides and contains gas (and live oil?) under pressure.
Fig. 4 Barney Creek distribution from prior work. Sub basins are outlined in purple, definite growth faults are solid grey, interpreted are dashed. Mineralising structures are red.

5.0 Work Conducted During the Reporting Period

5.1 Frogtech Basin Study
The purpose of the survey was to provide information that would allow structural interpretation of the areas obscured by cover, at the same time as identifying fault bounded sub basins that may host sulphide accumulations. Figure 6 shows a 3D image with some targets illustrated.

Frogtech uses geophysical geological and downhole information to generate an image of the basin structure. The pale colours are areas of shallow McArthur group, darker areas are deeper. The Emu fault system is clearly illustrated as are the other growth faults controlling sub basinal development.

The hydrothermal system along the Emu fault sets (it is more than one fault) is regionally extensive, but is only known from outcrops and drill cores that are comprised of rocks below the Lynott formation. The other fault systems have mineralised hydrothermal breccias but these have been poorly documented. A more subtle ENE set is of prime importance in the Mcarthur Basin and in the adjacent part of the Mt. Isa superbasin. These have been strongly highlighted in the HYC ÇTeena area.

Targets have been selected for drilling within Ripple ELs to the south.
Within and around EL 29953, Frogtech has identified a series of fault bound basins about 2km to 3km above the level of the Wollogorang formation, which is a good magnetic marker. This places these small
basins at about the level of the Barney Creek formation if it is present. Fig. 7 shows what mineralisation could occur in these covered trough margin targets.

![Fig.7 Schematic section ENE through the HYC mine area into the EL 29953 targets](image)

5.2 Evaluation of the Wollogorang and McDermott Formations

A study was commissioned to examine drill cores from the McDermott and Wollogorang formations with the purpose of evaluating their mineral (and hydrocarbon) potential. This is CSIRO report EP151255 by Spinks Smid and Pages.

The McDermott core was from GSD7 which is just outside the southern end of the Barney creek project area. The Wollogorang formation was from DD91RC18 and 91 HC1 which are located well to the north east on Pungalina station.

Both formations contained anoxic sequences and weak mineralisation. If euxinic sub basins can be located then the more massive SEDEX style of mineralisation could be developed. As it is, these anoxic
carbonate facies are prospective for breccia hosted copper and lead zinc adjacent to hydrothermally active faults.

These two formations occur at great depths in EL 29953, beyond the level of exploration. The study does suggest that several levels of mineralisation occur, and other levels are possible above the Barney Creek formation which would be more relevant to this EL.

6.0 Results and Conclusions
The Frogtech basin analysis has identified fault bound sub basins. The depths to HYC equivalent targets are a somewhat deep but may actually lie immediately under the Roper Group unconformity.

The shallowest HYC member drill targets are on the eastern margin of the Ripple EL. It is estimated that expensive drillholes 500m deep would be necessary to merely understand the stratigraphy in this area. This expense would be greater in the surrendered portion of the EL.

The geological uncertainty is highest in the deeper lying surrendered portion of the EL.