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EL 3972

APOINGA

SECOND PARTIAL RELINQUISHMENT REPORT AT LICENCE EXPIRY/RENEWAL, FOR THE PERIOD 5/11/2007 TO 4/11/2012

Submitted by
Phoenix Copper Ltd
2012

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Tarnma EL 3972 EXPLORATION LICENCE

Partial Relinquishment REPORT

**For the period 05th November 2010 to
04th November 2012**

Phoenix Copper Limited
Adelaide

November 2012

1:100,000 map sheet	Apoinga 6730 Kapunda 6629 & Eudunda 6729
1:250,000 map sheet	Burra SI 54-5 & Adelaide SI 54-9

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1	Geochemical Soil Analyses EL3972	Digital file only
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ATTACHMENTS

1. EL 3972_Tarnma_2012_Partial_Relinquishment_Report_02_SurfaceGeochem_FPXRF.txt
2. EL3972_Tarnma_2012_Partial_Relinquishment_Report_03_FileListing.txt

SUMMARY

Tarnma exploration licence, EL 3972 (see FIGURE 1) is 342 sq kms in area north of Kapunda approximately 110km north of Adelaide. Several small copper prospects are scattered throughout the tenement.

Exploration in the tenement has focused on the search for copper oxide and copper carbonate mineralisation similar to that known to have been mined from the Burra and Kapunda deposits.

The most prospective portions of the tenement were covered with widely spaced geochemical analyses, with closer sample spacing's (to 20 m) in selected areas of interest.

Subsequently the least prospective areas i.e. the eastern two thirds of the tenement are being relinquished see figures 1 and 2.

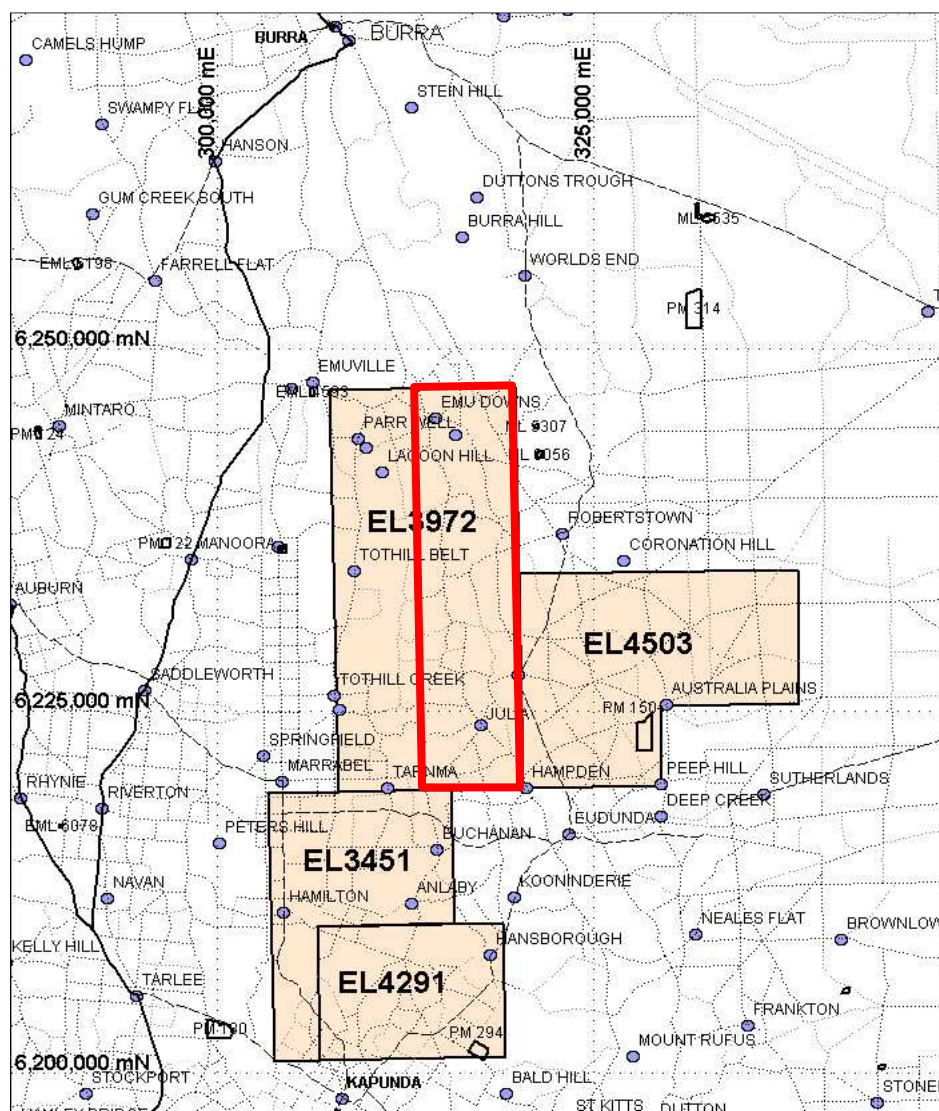


FIGURE 1: EUDUNDA GROUP of TENEMENTS INCLUDING TARNMA EL3972 LOCATION PLAN.

Area being relinquished in red.

Keywords

Tarnma

Cambrian, Ordovician

siltstones, carbonates, glacial tillites, sandstones, microgranite, lithic breccia

fault, fold, diapiric breccia, diapir margin, anticlinal cores

copper, malachite, azurite, sulphides, chalcocite, hematite, sericite

porphyry, skarn, structurally controlled ores, hydrothermal alteration

Adelaide Geosyncline, Tarnma inlier,

Delamerian Orogeny

Burra Group, Rhynie Sandstone, Skillogalee Dolomite

1. INTRODUCTION

This Final technical report reviews the historical exploration activity and the exploration potential of tenement EL 3972, and identifies all activities undertaken on the portion to be relinquished, see **FIGURE 2**.

2. TENURE

EL No	EL Name	Registered Holder	Area (sq km)	Application Grant Date	Expiry Date	Renewal Date and Action Taken	Area Relinquished (sq km)	Area Retained (sq km)
3972	Tarnma	Phoenix Copper Limited	342	5/11/2007	5/11/2012	4 /10 /2012 Part Relinquished	213	129

TABLE 1. TENEMENT DETAILS

3. NATIVE TITLE

On the 21st of November 2011 the Ngadjuri Nation #2 applied to the Federal Court of Australia to recognise a native title claim covering an area of 26,200 square kilometres, about 35 km north of Adelaide. The proposed claim area covers all of Tarnma.

4. GEOLOGY

The Tarnma tenement is located between Burra and Kapunda on the Burra SI 54-5 and Adelaide SI 54-9, 1:250,000 map sheets and on the Apoinga 6730, Kapunda 6629 and Eudunda 6729, 1:100,000 map sheets.

4.1 Regional Geology Adelaide Geosyncline

The Tarnma tenement is located in the Adelaide Geosyncline, a major sedimentary basin, filled with a thick sequence of Neoproterozoic (~850–545 Ma) to Cambrian (545–515 Ma) rocks, which overlies deeply subsided Palaeo-proterozoic to Meso-proterozoic basement, (see **FIGURE 3**).

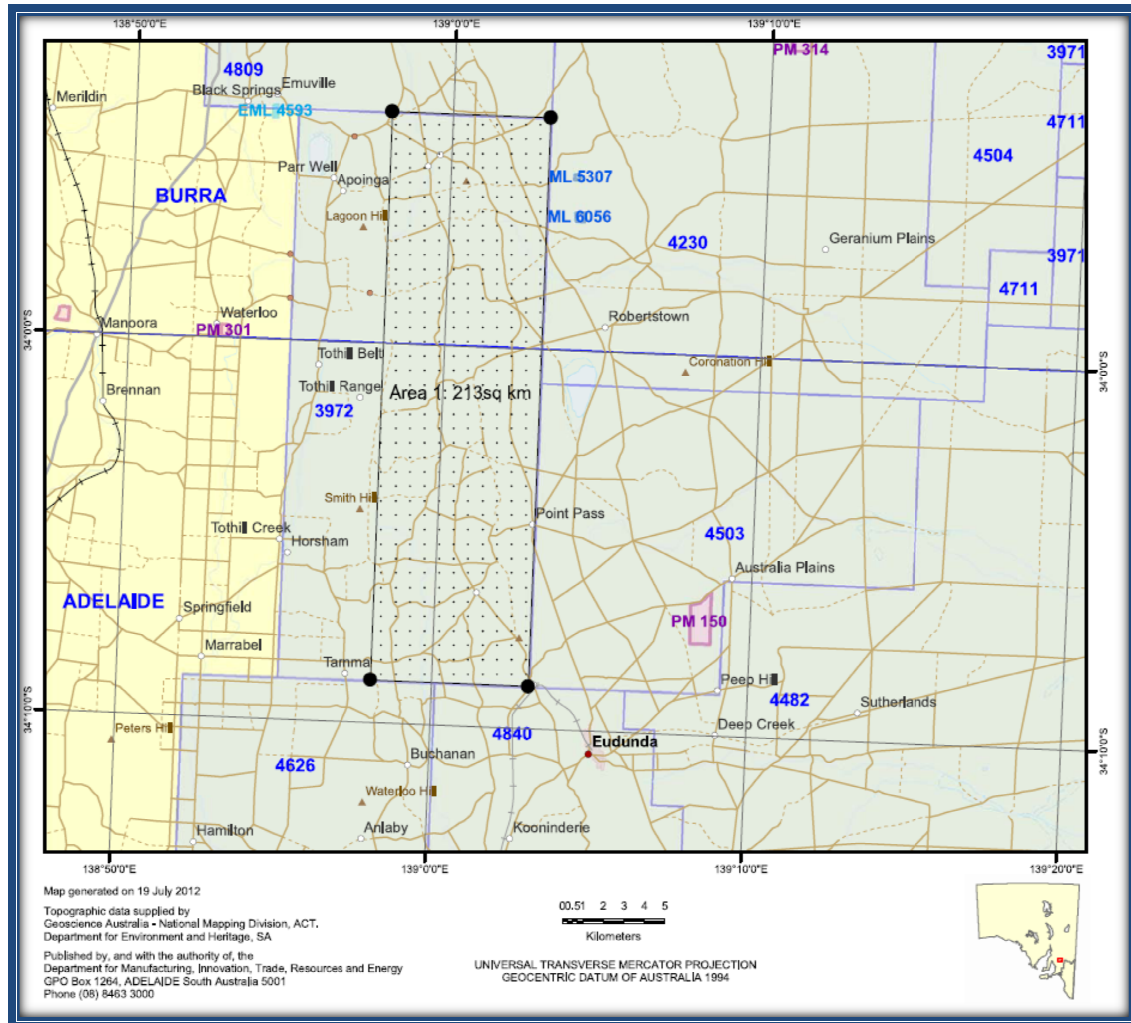


FIGURE 2: EL 3972 Portion to be Relinquished dotted.

During the Neoproterozoic in the Adelaide Geosyncline, deposition commenced with the sediments of the Warrina Supergroup (Callanna and Burra Groups), deposited largely in rift basins and including some mafic volcanic rocks and evaporitic sediments in the lower part. These were followed by sandstone and carbonate rocks, deposited by rivers and along coastal regions, and siltstone, resulting from invasion by the sea.

After a pause, sedimentation resumed with the Heysen Supergroup (Umberatana and Wilpena Groups), which commenced with sediments deposited during a world-wide glacial episode; some of these contain cobbles and huge boulders of rocks such as granite and volcanic rock which must have been carried by glaciers from hundreds of kilometres away.

After the glaciers melted, the sea again invaded the basin and deposited siltstone and carbonate rocks in shallow to deep water before a second glacial period ensued.

Pre-Tertiary sequences in the area trend in a north south direction and consist of rocks of the Adelaidean System and the Kanmantoo Group. In the west of the Mt. Lofty Ranges, phyllites, quartzites and dolomites of the Willouran Series (River Wakefield Group) crop out, succeeded to the east by sandstones, siltstones, dolomites, quartzites and shales of the Burra Group. East of the Gilbert Ranges, tillites, shales, siltstones and limestones of the

Umberatana Group crop out, along with members of the Burra Group, in the cores of anticlines, and minor outcrops of Ulupa Sandstone (Wilpena Group) in the synclines.

The Tarnma Diapir situated 4 kilometres west of Tarnma crops out within the Burra Group in the core of one of the anticlines.

4.2 Local Geology

The tenement lies to the north and north east of the town of Kapunda and covers northward-striking Burra Group sediments that outcrop in a north-trending anticline, overlain by the Umberatana Group. The Umberatana group extends eastwards to Eudunda where it is overlain by Quaternary sediments and in the west forms a broad valley between Burra Group sediments.

The country rock host to the mineralisation in the Monster Mine at Burra is the Skillogalee Dolomite member of the Burra Group (Nb, see figure 3) of Adelaidean (Torrensian) age. The Skillogalee Dolomite is comprised of massive dolomite, siltstone, stromatolitic and cryptalgal laminated dolomite, with minor sandstone and limestone. Rocks of the Burra Group including Skillogalee Dolomite occurs in the north eastern portion of the tenement.

The Kapunda Mine occurs 20km south of the tenement boundary and hosts some of the most significant copper mineralisation in the Adelaide Fold Belt. Copper mineralisation here occurs towards the top of the Tapley Hill Formation that variably comprises dolomitic and carbonaceous shales and siltstones and lenticular doloclastic and stromatolitic dolomites.

Rocks of the Umberatana Group occur through the center of the tenement. Copper minerals that precipitated during sedimentation were remobilized into veins during folding. Similar deposits occur near the base of the formation at Mountain of Light, Mount Coffin and Lynda near Leigh Creek.

The Normanville Group (En, see figure 3) of Cambrian age deposited in a widespread marine transgression following the hiatus at the end of the Proterozoic. These rocks are carbonate dominant and contain important deposits of industrial mineral and base metal deposits.

Eudunda District Regional Geology Legend		
MAP	NAME	STRATIGRAPHIC DESCRIPTION
Quaternary		
Qpa		Undifferentiated Pleistocene alluvial/fluviol sediments
Qha		Undifferentiated Holocene alluvial/fluviol sediments
Ql		Undifferentiated Quaternary lacustrine/playa sediments
Q/ca		Undifferentiated Quaternary aeolian sediments
Tertiary		
TE Qr1		Alluvial, Colluvial, Regolithic Clastics , Silicified, Ferruginised
Ordovician / Cambrian		
Ek	Kanmantoo	Sandstone , siltstone occasionally sulphidic, metamorphosed.
Ek2		Pyritic, carbonaceous metasiltstone, calcsiltstone and shale
En	Normanville	Limestone, sandstone, shale, volcanics.
Neoproterozoic - Sturtian		
Nb	Burra	Siltstone, laminated shale, sandstone, dolomite bl-gy to pk
Ny	Yudnamutana	Diamictite, siltstone, pebbly conglomerate, orthoquartzite. Glaciomarine.
Nw	Wilpena	Quartzite, siltstone, shale calcareous
Nu	Umberatana	Tillite, sandstone, siltstone, arkose, dolomite, quartzite, shale, greywacke.
Ne	Yerelina	Siltstone, sandstone, diamictite.

LEGEND TO MAJOR GEOLOGICAL UNITS SHOWN ON REGIONAL GEOLOGY MAP

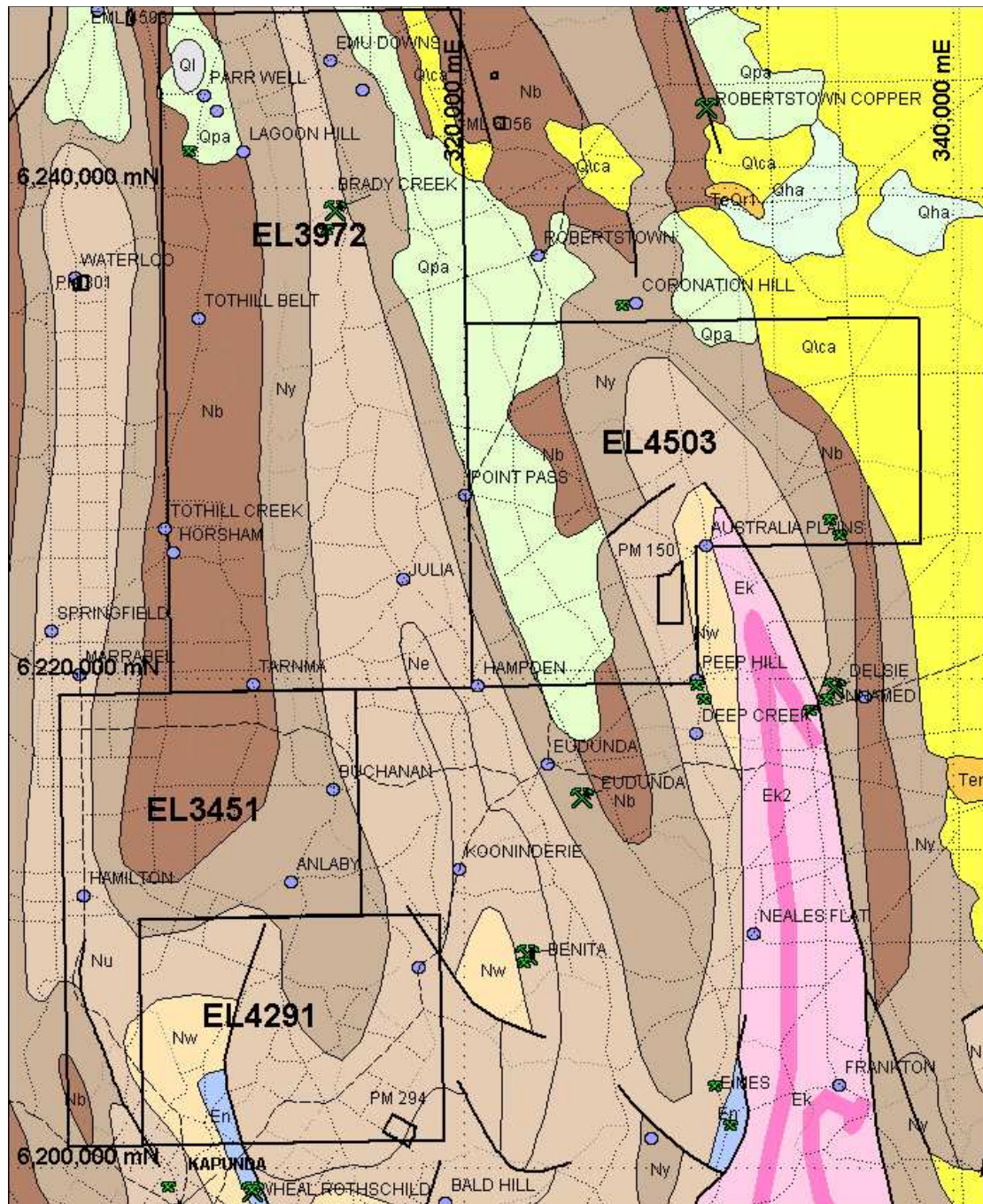


FIGURE 3. REGIONAL GEOLOGY.

4.3 Tarnma Anticline

The Tarnma Anticline is a conceptual copper target based upon the model of copper rich fluids percolating up faults through the sedimentary pile, dissolving copper into the fluid and then precipitating it out in a receptive layer of the stratigraphy capped by an impervious layer. Princess Royal 40km north would be an example of a breached anticline where the current surface is below the historic impervious cap.

The Tarnma Anticline is a long, narrow N-S trending fold, lying between the Burra and Kapunda Mines in the northern Mt Lofty Ranges (see **figure 4**). The anticline occupies the western side of EL3972 and the central portion of EL3451. The middle of the fold exposes Burra Group siltstones, shales and carbonates with Sturtian-age tillites (Appila Tillite) along both limbs. Dyson (1996) interpreted a diapir within the core of the fold which he termed the Tarnma Diapir, however, preliminary inspection of the area by Wolfgang Preiss of PIRSA (Copper Range 2008) suggests that although strongly disrupted carbonates of the Skillogalee Dolomite are present, there is no diapir in the classic sense. The fold represents an unbreached anticline.

Prospectivity for sediment-hosted copper mineralisation is considered to be high in situations where diapirs have not breached the surface, but have disrupted topography sufficiently to form domes or anticlines. The evaporate sequence remains covered by folded and faulted younger rocks that reflect the anticlinal structure created by the buoyant salt (Rowan & Vendeville 2006). A diapir outcrops adjacent to the Burra Mine but not at Tarnma where strongly disrupted sediments in anticlines suggests diapirs or salt ridges may be present at depth.

These situations are appealing as fluid flow-through of saline brines would have been significantly reduced and fluid escaping from compacting sediments would have been focused into the core of these structures, with only slow leakage along minor fracture zones. Such a scenario would allow fluids to pond within structural and stratigraphic traps, and the collection of several pulses of fluid expulsion, increasing the availability of reductant and subsequent copper-bearing fluid as it is prevented from flowing out of the system.

Rocks exposed in the Tarnma Anticline (see **figures 3 and 4**) consist largely of pelites and carbonates and as such would make ideal cap rocks to prospective hosts below. Rhynie Sandstone lies stratigraphically below Skillogalee Dolomite which is the oldest unit exposed in the Tarnma Anticline. Although there are no recorded occurrences of copper in the anticline there is evidence of hydrothermal alteration hosted by Skillogalee Dolomite in the axial region of the fold (Copper Range 2008). Vuggy, drusy quartz-lined fractures and Fe/Mn oxide filled veins were observed.

An adequate supply of reductant-containing sediments is also present with Bethel Shale, a black carbonaceous shale within the Saddleworth Formation and locally pyritic Tapley Hill Formation along the western arm of the anticline. Base metal mineralisation which could

represent leakage from a larger underlying system was exploited in small mines within a synclinal structure to the west of the Tarnma Anticline – e.g. New Hope and Belvidere Mines.

Recently reprocessed regional aeromagnetic data indicates a magnetic low within the core of the Tarnma Anticline which could represent magnetite depletion due to the hydrothermal alteration which was observed at surface. NE – trending structures which cut across the core of the anticline and could possibly represent original transfer faults can also be observed from the magnetics.

Preliminary reconnaissance sampling in the core of the anticline has returned anomalous Cu values to 500ppm Cu and possible association with Co, As, Cr and V. Surface samples shows textural evidence of hydrothermal alteration in zones of brecciation with silicification +/- K alteration. Follow-up grid-controlled soil/RAB sampling is recommended, particularly within the magnetic low and where dolomite is cut by NE-trending structures.

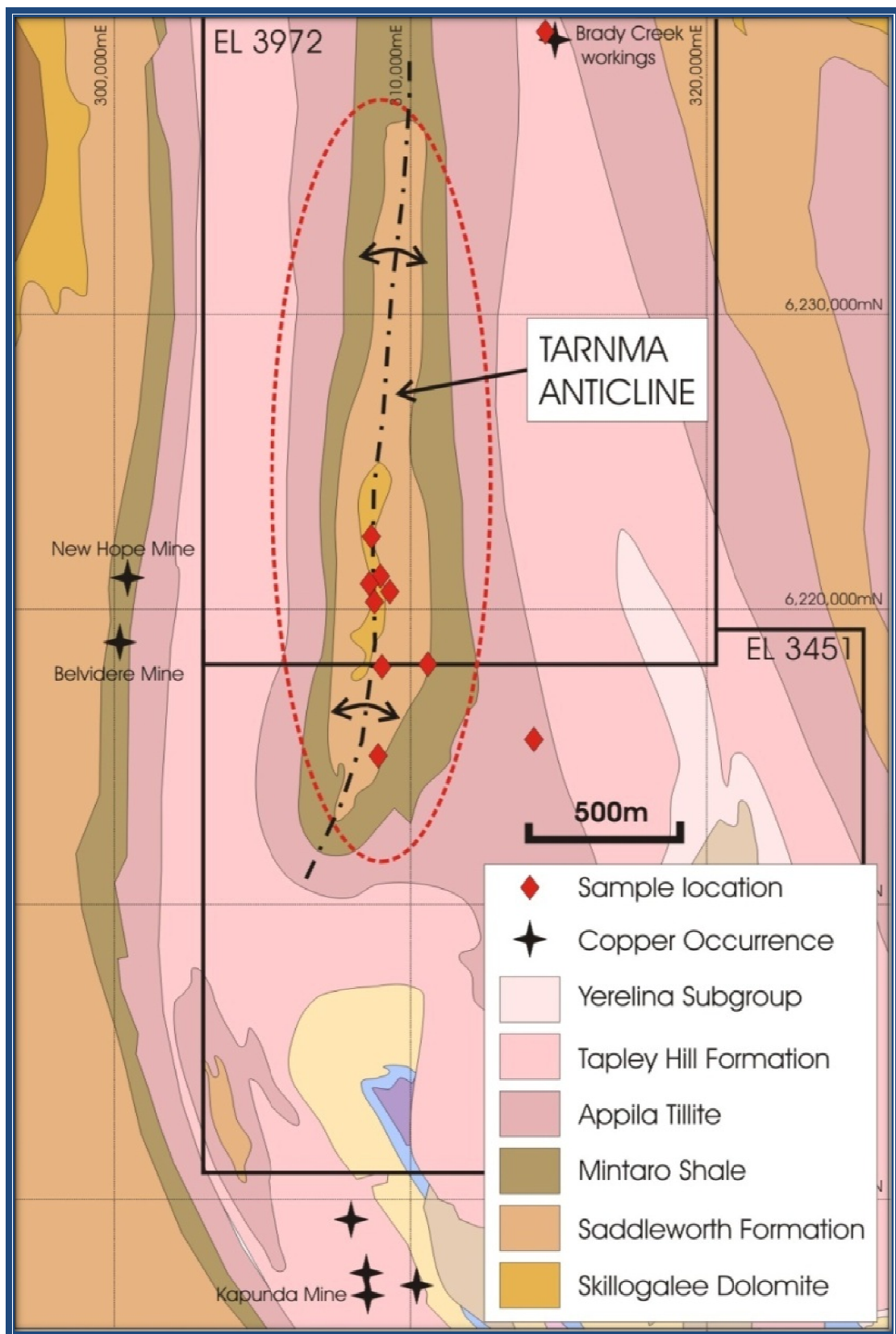


FIGURE 4: GEOLOGICAL MAP OF THE TARNMA ANTICLINE

4.4 Physiography

The topography consists of ridges, footslopes and alluvial plains. Soils are acid and alkaline, shallow with rock outcrops on the ridges and slopes, deep and poorly drained on the plains (Laut et al 1977). Extensive cultivation occurs within the areas of lower relief, with native vegetation more common along the n-s trending ridgelines that form the higher relief in the landscape. Native vegetation consists of:

- Red gums and blue gums along water courses

- Peppermint gum/blue gum open Woodland on hill slopes, and along minor water courses

- Native grasslands on hills, slopes and flats.

A percentage of the Peppermint Grassy Woodlands, and Grassland may qualify for the Environment Protection and Biodiversity Conservation Act (EPBC) Nationally Threatened Species and Ecological Communities.

The north-south running ridges consist mainly of outcropping to subcropping rocks of Burra and Umberatana groups of Adelaide system, the main prominent ridges are formed by tillites, fluvioglacial greywackes, siltstone, Arkosic sandstone and dolomite.

4.5 Regolith

The ridges consist mainly of outcropping to subcropping rocks. The valleys have calcrete present throughout often concealed under a layer of top soil or sand.

5. PREVIOUS EXPLORATION

Little work has been undertaken within the current licence area, although numerous other EL's have covered the area, with most of the previous work being focussed in the Burra area to the north, and the Kapunda area to the south.

1978 – 1979 CRA Exploration Pty Ltd

CRA's EL 381 covered part of the current exploration licence. They were conducting a regional exploration programme for sediment-hosted base metals and undertook follow up geochemical sampling in a location to the east of the current EL where SADME had previously identified anomalous base metal horizons within Kanmantoo Group metasediments. No further work was undertaken.

2007 - 2010 CRJ Pty Ltd

Copper Range undertook a review of previous exploration in the region and paid several reconnaissance visits to the Tarnma Anticline area.

These visits have included a visit by US-based geological consultant Dr Jon Thorson. Dr Thorson has assisted Copper Range in developing a new conceptual model for sandstone-hosted copper mineralisation within the Adelaide Fold Belt.

This reconnaissance work identified the Tarnma Anticline as a prospective location for sandstone-hosted copper mineralisation below a dolomite seal.

Copper Range also undertook an initial rock chip sampling programme which aimed to locate copper anomalism within the core of the Tarnma Anticline that may represent slow

leakage from a larger copper concentration locked beneath the outcropping Skillogalee Dolomite.

Mining

The area has numerous old workings. Several smaller workings occur in the immediate vicinity of the Tarnma EL, but only one mineral occurrence is located within the current tenement boundaries.

The *Brady Creek workings* consisted of several shafts and a 60ft cross cut. Gold was not found in sufficient quantities to make the mine payable and no copper was produced.

6. EXPLORATION BY PHOENIX COPPER

- **Geochemistry:** Geochemical sampling, a total of 2,420 FPXRF readings have been taken (1,212 on the portion relinquished) and added to databases, (see **figure 5**).
- **Geophysics:** Geophysical Review, Reprocessing and Interpretation was undertaken and targets were generated . A solid geology interpretation generated from the geophysical data is shown in **figure 6**.
- **Data Collection:** Several historical reports were used as planning tools for the exploration completed.
- **Data Entry:** All geochemical samples taken by Phoenix Copper program have been entered into their corresponding “master databases” created by Phoenix Copper.
- **Geology:** Reconnaissance visit to understand the tenement boundaries and the state mapped geological units.

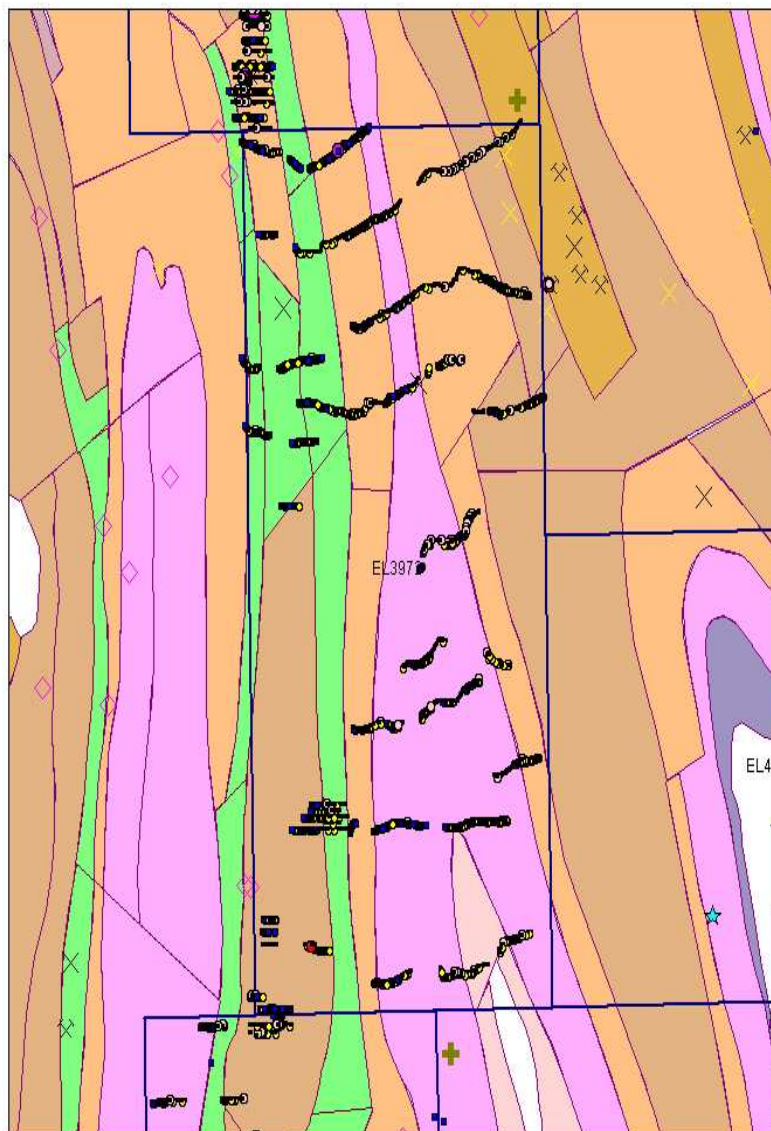


Figure 2
PHOENIX COPPER LIMITED
Tarnma - EL3972
Geochemical Sampling
over Solid Geology

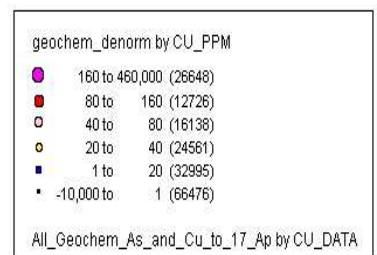


FIGURE 5. GEOCHEMICAL SAMPLING BY COPPER PPM

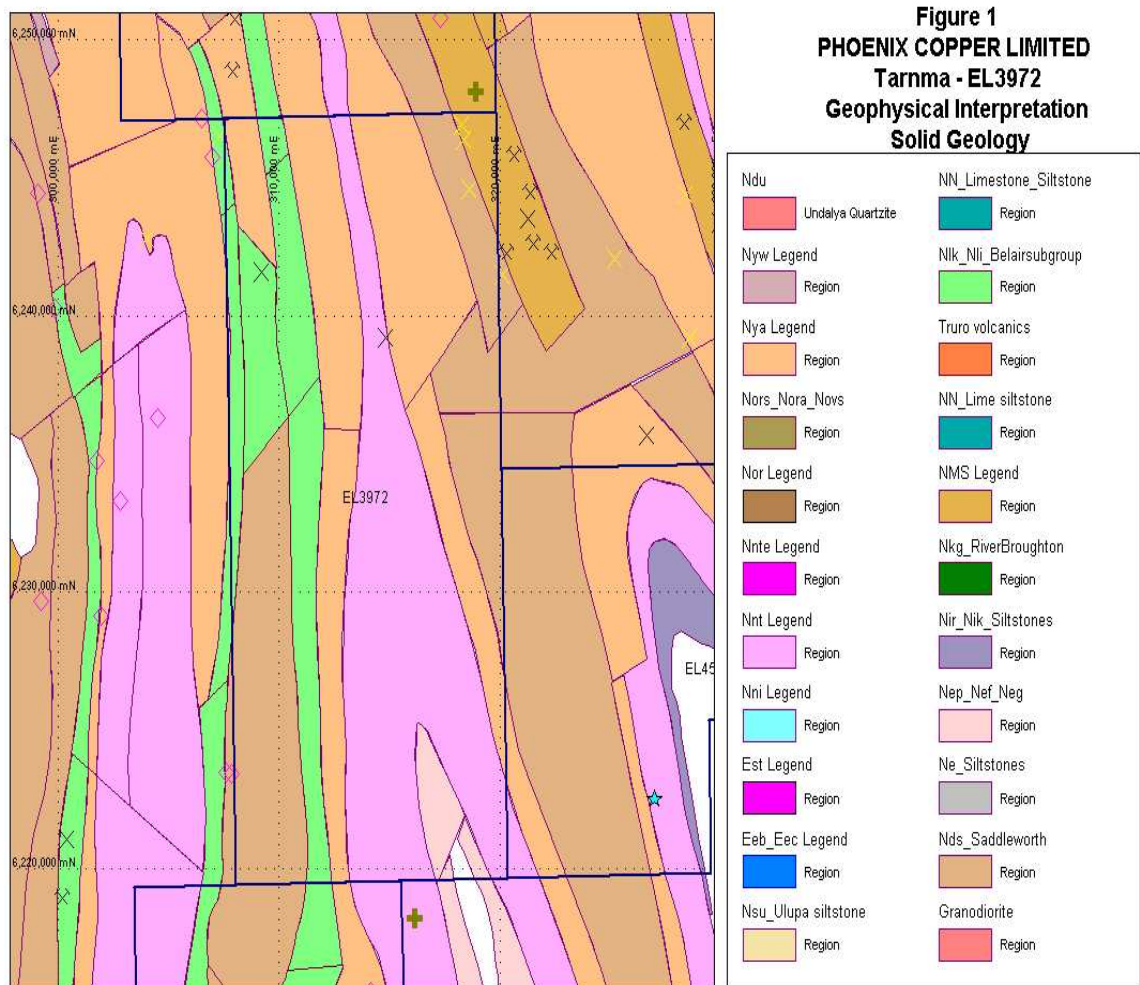


FIGURE 6. GEOPHYSICAL SOLID GEOLOGY INTERPRETATION

APPENDIX 1

Geochemical Soil Analyses

EL3972

Digital Data only