Open File Envelope No. 12,007

EL 3972

APOINGA

FIRST PARTIAL SURRENDER REPORT FOR THE PERIOD 5/11/2007 TO 4/11/2009

Submitted by
Copper Range (SA) Pty Ltd
2010

Enquiries: Customer Services Branch
Minerals and Energy Resources
7th Floor
101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
Facsimile: (08) 8204 1880

Government of South Australia
Primary Industries and Resources SA

COPPER RANGE (SA) PTY LTD

PARTIAL SURRENDER REPORT
to 3rd November 2009

EL 3972 – Apoinga

TITLE:	PARTIAL SURRENDER REPORT FOR EL 3972 – Apoinga for the Period Ending 04/11/2009
HOLDER:	COPPER RANGE (SA) Pty Ltd
OPERATOR:	COPPER RANGE (SA) Pty Ltd
1:250,000 SHEET:	Burra SI 54-5, Adelaide SI 54-9
1:100,000 SHEET:	Apoinga 6730, Clare 6630 Kapunda 6629, Eudunda 6729,
AUTHOR:	Adrian Brewer
SUBMITTED BY:	Mark Arundell
DATE:	19th April, 2010
KEYWORDS:	Tarnma Anticline, unbreached anticline, salt diapirs, Skillogalee Dolomite
DISTRIBUTION:	1. Copper Range (SA) Pty Ltd, Perth Office 2. Department of Primary Industries and Resources, South Australia

TABLE OF CONTENTS

SUMMARY

EL 3972 – Apoinga occurs within the northern Mt Lofty Ranges comprising Proterozoic rocks of the Adelaide Fold Belt. The main prospect area within EL 3972 is the Tarnma Anticline which is a N-S trending fold, cored by Skillogalee Dolomite. This structure represents an unbreached anticline in a favourable regional structural setting, occurring between the historic mining centres of Burra to the north and Kapunda to the south.

Copper Range has developed a new model for sediment-hosted copper mineralisation within the Adelaide Fold Belt which targets areas where a reductant-bearing fluid has ponded against a suitable structural or stratigraphic trap. An influx of copper-bearing fluid precipitates copper sulphides in a porous sandstone horizon. An unbreached anticline, such as at Tarnma, provides a suitable target as fluid flow-through of saline brines would have been significantly retarded and fluid escaping from compacting sediments may 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.

In this reporting period Copper Range has undertaken further reconnaissance visits to the Tarnma Anticline area, also investigating known copper and gold occurrences within the tenement area. A detailed appraisal of the Tarnma Anticline has been completed.

The area relinquished in considered to have low potential for the discovery of significant mineralisation.

1. INTRODUCTION

The Tarnma Anticline Project is the main exploration focus within EL 3972. The Tarnma Anticline is an unbreached anticline (salt diapirism has not penetrated through to the surface) which has the potential to have trapped copper-bearing fluids beneath a reducing cap horizon, with only minor leakage of fluids to the surface.

Tarnma lies within a favourable regional structural zone which includes the Kapunda copper mine to the south and the Burra copper Mine to the north. Copper Range has undertaken reconnaissance rock chip sampling which produced some elevated copper values that provides encouragement for further investigation.

2. LOCATION AND ACCESS

The Apoinga tenement (EL 3972) is situated in the Northern Mt Lofty Ranges, approximately 150km north of Adelaide (Figure 1). It has good access off the main Barrier Highway to the east of the tenement with a dense network of dirt roads that cross the tenement.

3. TENURE DETAILS

The Apoinga tenement EL 3972 was taken out by Copper Range (SA) Pty Ltd, a wholly-owned South Australian subsidiary of International Base Metals Ltd that was floated on the ASX as an independent company in December 2006. Tenement details are summarised in Table 1.

Tenement number	Date granted	Expiry date	Project name	Licensee and operator	Locality	Area km²	Area retained km²
EL 3972	05/11/07	04/11/09	Apoinga	Copper Range (SA) Pty Ltd	~25km N of Kapunda	470	342

Table 1. Summary of tenement details

4. MINING HISTORY AND PREVIOUS EXPLORATION

4.1 Mining

The area has numerous old workings. Several smaller workings occur in the immediate vicinity of the Apoinga EL, but only two mineral occurrences are located within the current tenement boundaries.

Apoinga Gold Claim is an iron-quartz lode that was worked in 1930. No gold was officially recorded.

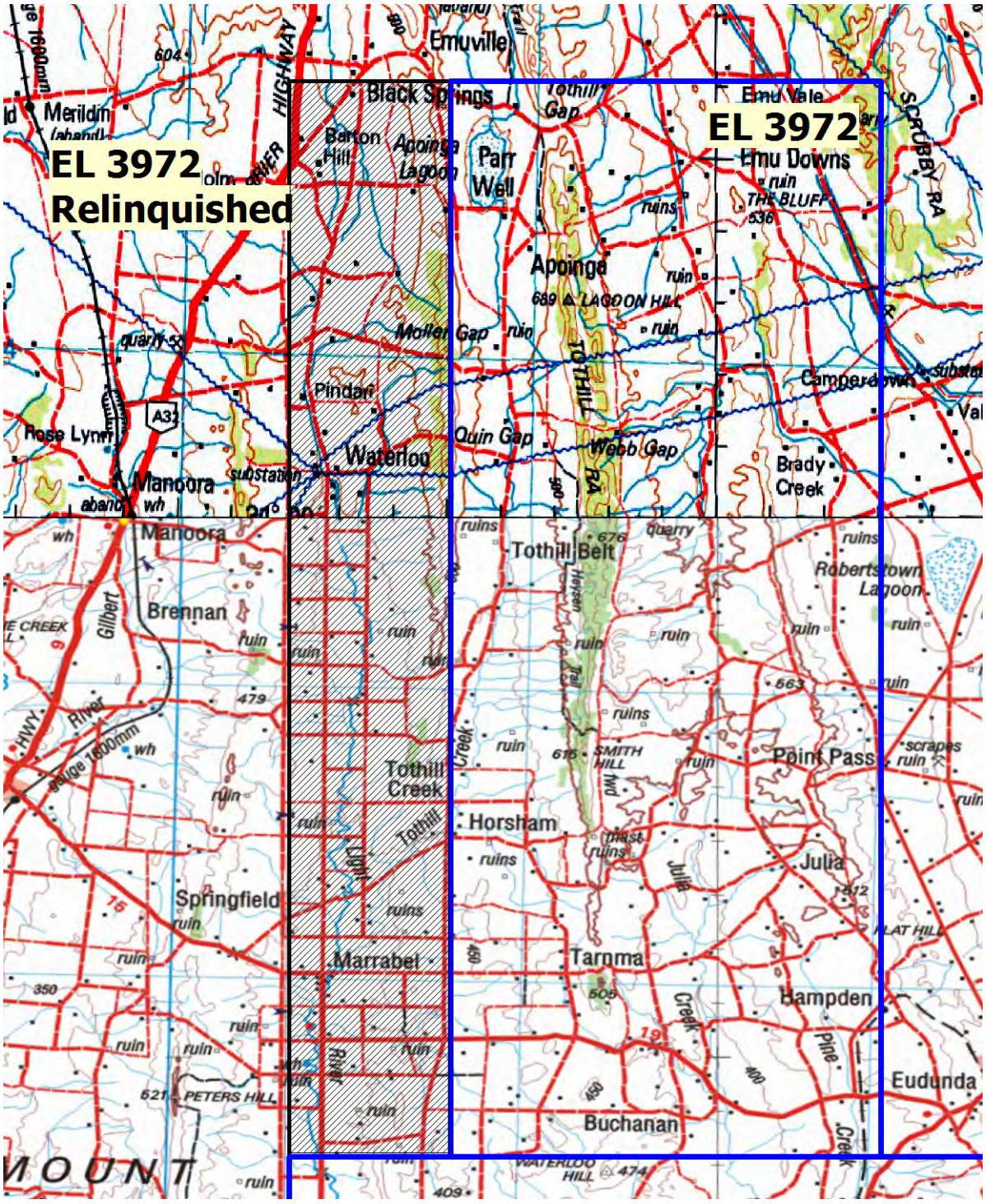

Figure 1 – Project Location

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.

4.2 Past 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.

1988 – 1989 BP Australia Gold Pty Ltd

BP Australia Gold explored for sediment-hosted gold deposits in the Apoinga area. They undertook a BLEG stream sediment sampling programme and indentified 3 anomalous results within the Mt Rufus area, to the west of the current EL. They recommended follow-up work but none was undertaken.

1972 – 1973 Australian Aquitane Petroleum Pty Ltd

Australian Aquitane undertook a regional stream sediment sampling programme targeting silicified shales and dolomites within the core of N-S trending anticlines in the Burra District. Detrital heavy mineral panning yielded pyrite, malachite and chrysocolla but did not lead to the discovery of a new mineral discovery. The current EL was not targeted.

Lease	Holder	Start date	End date	Activities
EL 223	Utah Development Co. Ltd	1975	1976	No data
EL 381	CRA Exploration Pty Ltd	1978	1979	Soil sampling, rock chip sampling
EL1548	BP Australia Gold Pty Ltd	1988	1989	BLEG stream sed sampling
SML 685	Australian Aquitane Petroleum Pty Ltd	1972	1973	Regional stream sediment sampling

Table 2. Summary of previous work carried out in the Apoinga tenement area

5. EXPLORATION RATIONALE

Copper Range is targeting sediment-hosted copper deposits associated with fluid flow related to diapirism within the Adelaidean basin.

Prospectivity for sediment-hosted copper mineralisation is also considered to be high in situations where salt diapirs have not breached the surface, but have disrupted topography sufficiently to form domes or anticlines. A diapir crops out adjacent to the Burra Mine but not at Princess Royal, Kapunda or Tarnma where strongly disrupted sediments in anticlines suggest diapirs or salt ridges may be present at depth.

These situations are appealing as fluid flow-through of saline brines would have been significantly retarded and fluid escaping from compacting sediments may 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.

Unbreached anticlines may also represent roll-over anticlines where downthrown blocks have rotated on a listric fault surface during extension and basin development. These features occur parallel to basin margins and are known to be a focus of copper mineralisation in the Zambian Copperbelt, where cross cutting transfer faults have provided fluid pathways to channel mineralising fluids into structural or stratigraphic traps (El Desouky et al 2008).

Rocks exposed in the Tarnma Anticline 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.

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 to the east of the current tenement area.

6. REGIONAL GEOLOGY

Regionally, the area lies within the Adelaide Fold and Thrust Belt, which contains Neoproterozoic to late Cambrian sequences. Rock types recognised within this Precambrian, fault-bounded intracratonic trough are Neoproterozoic in age (1400 to 570 Ma) with terrestrial and marine clastic, chemical and glaciogenic sediments (Preiss 1987). These formations have been deformed and metamorphosed (generally to greenschist facies) by at least two major orogenic episodes: the Proterozoic Adelaide Fold Belt orogenic event and a later Early Palaeozoic Delamerian Orogeny (Preiss 1987). Following uplift caused by these deformations, erosion of the exposed older formations has taken place and younger Palaeozoic and Cainozoic sediments unconformably overly the Adelaidean sequences in places.

The Apoinga tenement covers Adelaidean sediments predominantly of the Burra and Umberatana Groups of the Adelaide Fold Belt. These rocks have been folded into a series of N-S trending anticlines and synclines that traverse the tenement.

The central part of the tenement contains the Tarnma Anticline, which is a long, narrow N-S trending fold, lying between the Burra and Kapunda Mines. The centre 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 (pers comm.) 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 with respect to diapirs.

7. WORK COMPLETED BY COPPER RANGE (SA) PTY LTD

Copper Range has undertaken 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. His model has been derived from experience with major sedimentary copper deposits in Africa, USA, China and elsewhere. This reconnaissance work identified the Tarnma Anticline as a prospective location for sandstone-hosted copper mineralisation below a dolomite seal.

7.1 Geochemistry

Copper Range has previously undertaken a 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. Sample data was reported in the previous period.

A separate report on the Tarnma Anticline was prepared and is attached as Appendix 1.

At this stage a program of intensive surface and subsurface geochemical sampling of the Skillogalee Dolomite and accompanying mapping is recommended particularly within where the dolomite is cut by NE-trending structures. Sampling will provide vectors towards the sighting of drill holes to test the prospective underlying Rhynie Sandstone.
(samples not in surrendered area)

8. CONCLUSIONS AND RECOMMENDATIONS

The following outcomes were achieved from this years work in EL 3972:

- Identification of Tarnma as an unbreached anticline that may have trapped circulating fluids within underlying Rhynie Sandstone
- Completed a detailed appraisal of the Tarnma Anticline area.

The area relinquished in considered to have low potential for the discovery of significant mineralisation.

9. REFERENCES

Dyson, I.A., 1996. A new model for diapirism in the Adelaide Geosyncline. *MESA Journal,* 3:41-48.

El Desouky, H.A., Muchez, P., Dewaele, S., Boutwood, A. & Tyler, R., 2008. Postorogenic origin of the stratiform Cu mineralization at Lufukwe, Lufilian Foreland, Democratic Republic of Congo. *Economic Geology*, v. 103, pp. 555-582.

Mason, D.O. and Mayer, T.E. **1979**. Eudunda. Progress, partial relinquishment and final reports to licence expiry for the period 26/1/1978 to 25/1/1979. CRA Exploration Pty Ltd. Open File Envelope 3233.

Ognar, S., D'Auvergne, P. **1973**. Burra. Progress and final reports to licence expiry for the period 26/3/1972 to 25/3/1973. Australian Aquitane Petroleum Pty Ltd. Burra Ridge Pty Ltd. Open File Envelope 1995.

Tedder, I.J. **1976.** Progress report Flat Hill area, EL 223, SA. Utah Development Co. Ltd. Open file envelope 2730

Walker, M.D., **1989**. Robertstown. Progress, partial relinquishment and final reports to licence expiry/surrender for the period 30/11/1988 to 29/11/1989. BP Australia Gold Pty Ltd. Open File Envelope 8108.

APPENDIX 1

TARNMA ANTICLINE REPORT

SAMPLING RESULTS FROM THE TARNMA ANTICLINE

The Tarnma Anticline, a long, narrow N-S trending fold, lies between the Burra and Kapunda Mines in the northern Mt Lofty Ranges. The centre of the fold exposes Burra Group siltstones, shales and carbonates with Sturtian-age tillites (Appila Tillite) along both limbs (Figure 1). 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 (pers comm.) 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 with respect to diapirs.

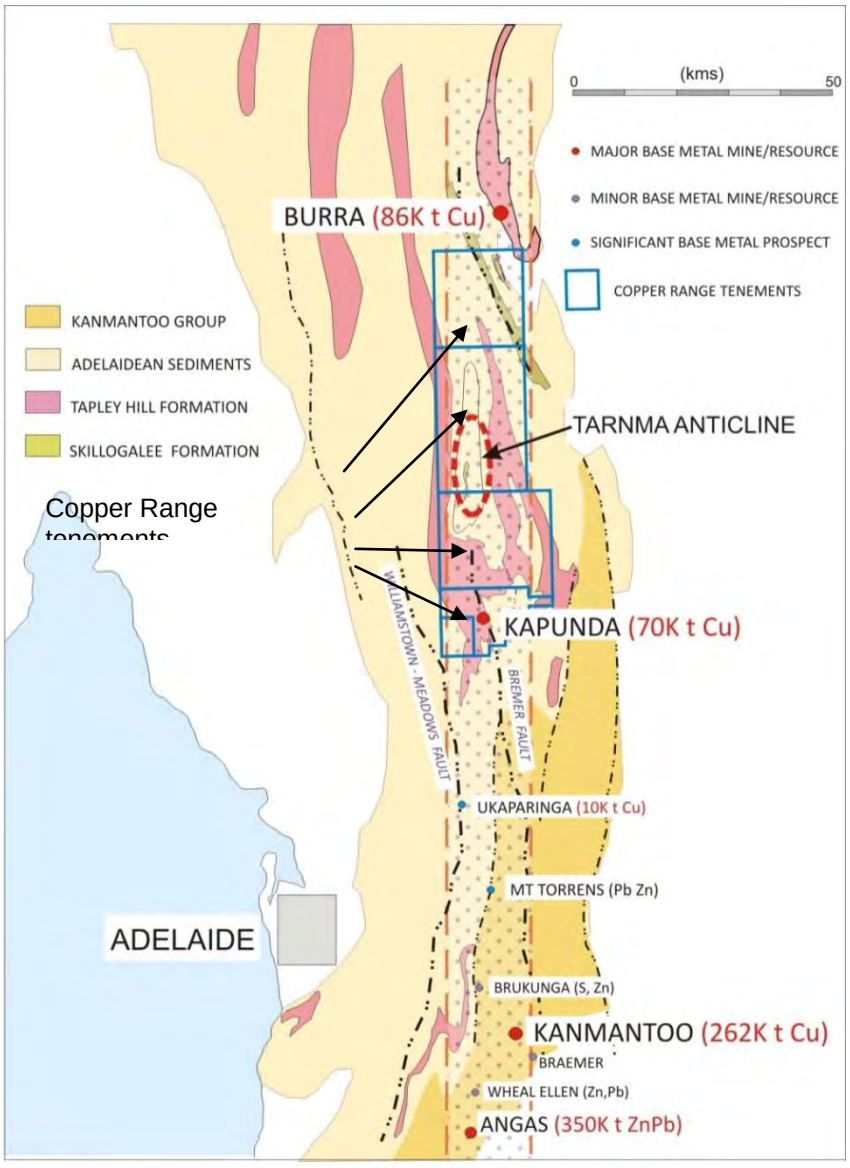

Figure 1. Location and geology of the Tarnma Anticline and base metal mineralisation

Prospectivity for sediment-hosted copper mineralisation is also considered to be high in situations where salt 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 crops out adjacent to the Burra Mine but not at Princess Royal, Kapunda or even Tarnma where strongly disrupted sediments in anticlines suggest diapirs or salt ridges may be present at depth.

Preliminary rock chip sampling of the core of the anticline is encouraging. Anomalous copper values were recorded in a number of samples.

Significantly elevated copper values (>100ppm Cu) are recorded from iron-enriched samples of dolomite and siltstone. In total, 10 of the 19 samples taken show evidence of copper enrichment. Notably, elevated copper values (>50ppm Cu) are also present in non-ferruginous material, which confirms that the high copper values are not simply related to late-stage iron-enrichment as a result of the weathering process.

These results indicate that copper may be leaking up through the axis of the anticline from a source below, including silica leakage (quartz veins and silicification of the Skillogalee Dolomite). A sandstone or dolomitic siltstone in the subsurface may been partially dissolved which liberated silica. Combined with elevated Cu, lots of Fe and some anomalous Co, As, Cr and V as well as possible potassium alteration (elevated K in rock chip samples) it provides an interesting target than in more favourable economic times would be worthy of follow-up sampling and drilling.

Note that all of these samples are part of the area retained so no results are reported.

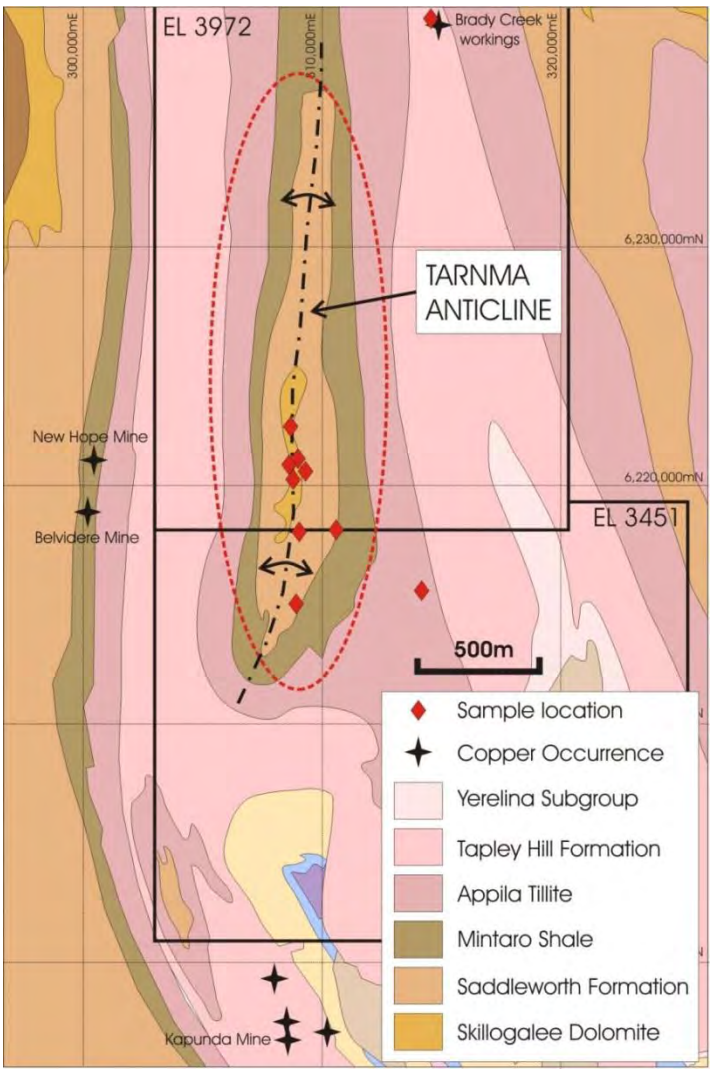

Figure 2. Geological map of the Tarnma Anticline, showing sample locations