

## **TORRENS PROJECT - EL 4771**

- **Type of report** **ANNUAL TECHNICAL REPORT**
- **Reporting period** **1 August 2011 to 31 July 2012**
- **Tenement number** **EL 4771**
- **Name of project** **TORRENS PROJECT**
- **Name of tenement holder** **DAKTYLOI METALS PTY LTD**
- **Name of operator** **DAKTYLOI METALS LIMITED**
- **Author of report** **PETER ANDREWS**
- **Date of report** **3 November 2012**

## **TORRENS PROJECT - EL 4771**

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#### **Summary of Activities Conducted**

During the first tenure year for EL 4771, the open file data was reviewed with emphasis on potential copper mineralisation, this being the main mineral sought. This work was complemented by a review of the available geophysics, by a consultant (see Geophysics section below) and follow-up field reconnaissance assessing old copper workings and targets.

#### **Keywords**

Parachilna & Orroroo 1:250,000, Mount Craig, Copper, Review of Data & Geophysics

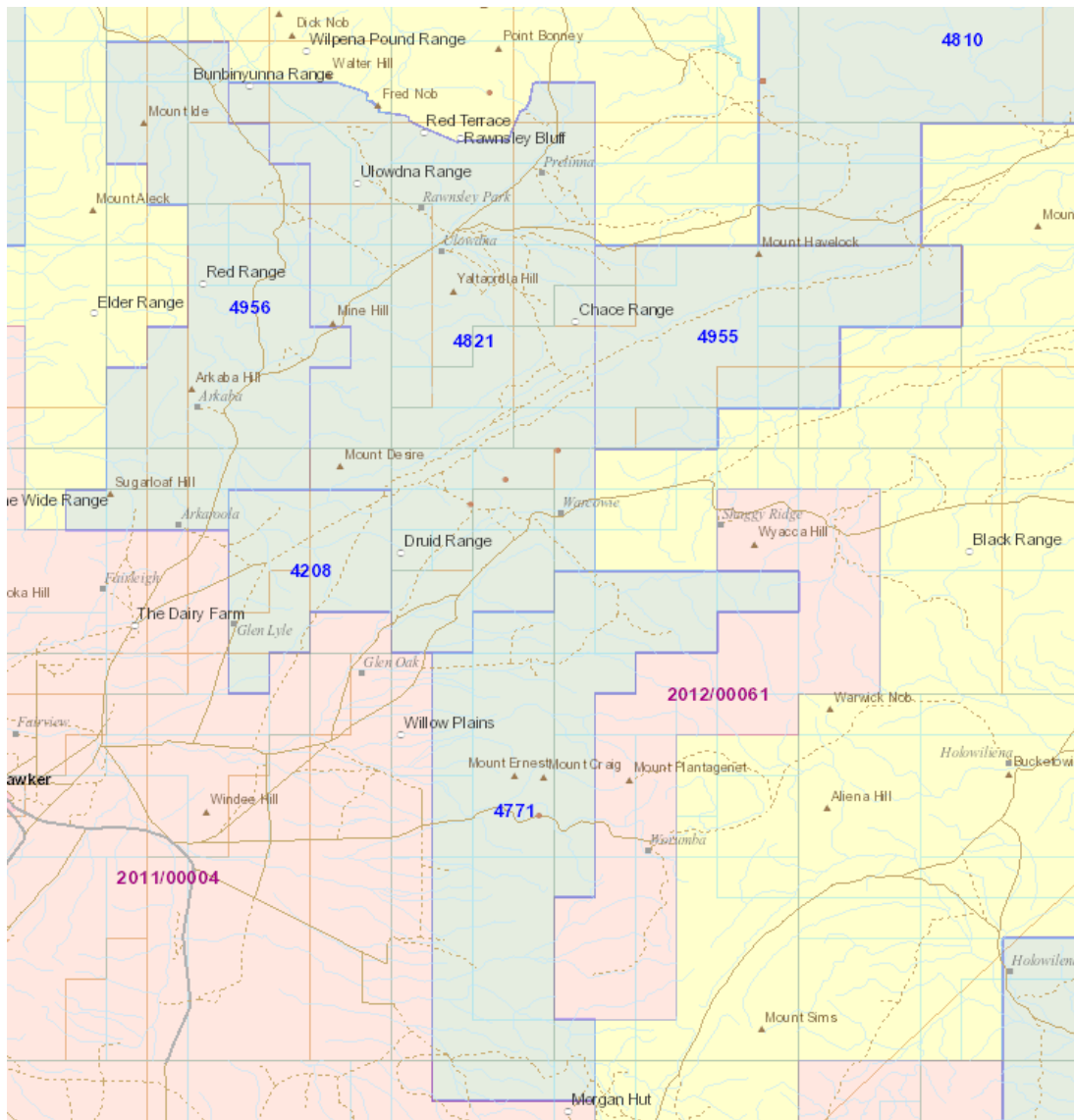
## Introduction

EL 4771 was applied for on 13 December 2010 as (2010/00377) and was granted on 22 June 2011 for 2 years with a total expenditure \$9,000.

EL 4757 covers approximately 157km<sup>2</sup> in the Mount Craig area (Figure 1) on the Parachilna & Orroroo 1:250,000 map sheets. It is located about 100km northeast of Port Augusta and 30km east of Hawker..

This tenement is part of the larger Torrens Project held by Daktyloi Metals Pty Ltd comprising EL 4771, 4821 4955, 4946 & 5014.

It is intended to apply for Combined Reporting Status for all the Torrens Project areas after submission of this Annual Report.



**Figure 1** EL 4771 – Torrens Project

## **History and Exploration Rationale**

Daktyloi initially applied for EL 4821 north of EL 4771 in November 2009 as part of its first 3 EL applications in South Australia. EL 4821 was not granted until after EL 4771.

The Torrens Project tenements and the total area have been added to as more knowledge has been gained through research and interpretation by Daktyloi's promoter Peter Andrews a geologist and corporate consultant, iDaktyloi's consultant geologist, Peter Lewis and from a geophysical review by Daktyloi's Consultant Geophysicist, Martin Zengerer.

Daktyloi's Torrens Project in the Adelaide Geosyncline now comprises 5 granted Exploration Licences covering 756km<sup>2</sup>. It is prospective for copper and Rare Earth Elements (REE). There are several old copper workings in the greater Torrens Project area, but there seems to have been limited drilling.

Adjoining Exploration Licences EL 4771 and EL 4821 are located some 30km east of Hawker on the central western margin of the Adelaide Geosyncline. Two newer Exploration Licences EL 4955 & EL 4956 were granted adjoining EL 4821 to the east and west. Just granted EL 5014 covers potential copper mineralisation extensions identified from geophysics.

## **Geology**

EL 4771 is within the Adelaide Geosyncline which historically hosts the majority of South Australia's gold and copper mines.

The Torrens Project tenements flank, straddle and extend along 'diapiric' structures hosting extensively mineralized (primarily copper) cores of carbonate breccia flanked by 'in sequence' Neoproterozoic lithologies.

The structures are disrupted by major east northeast and northwest trending regional faults adjacent to the Torrens Hinge Zone, the interpreted boundary of the Gawler Craton and the Adelaide Geosyncline.

Numerous abandoned copper workings occur within 'diapiric breccias' and flanking Adelaidean stratigraphy within the Project area (Figure 2).

The similarity of the Neoproterozoic sequences outcropping within EL 4771, EL 4821 and EL 5014 to those that characterise the mineralised sedimentary rocks of the Zambian Copperbelt in Southern Africa is well documented. In particular, the oldest and lower-most representatives of the sequence, the Callanna Beds and the Burra Group, can be equated with the Katanga Group, whereas the Umberatana Group equates to the Kundulungu Group. This has resulted in several waves of exploration activity by past explorers and the area has been systematically covered by stream geochemistry and to a very limited extent drill testing. The drill holes are shown on Figure>>>

Whilst drilling has confirmed the validity of the 'Copperbelt' model, the ground has yet to be subjected to geophysical survey utilising current techniques. (see Consultant's review).

## Previous Work

Previous work in the general Torrens Project area is summarised as follows:

Prospecting at Iron King occurred between 1896 and 1897, but no ore was produced. The main shaft contained stains of copper carbonates and surface pits intersected formation which assayed at 32% Cu and traces of silver.

Copper was discovered at Wirrawilka in 1861 and a large amount of work commenced with 30 men employed under a Cornish mine captain. Twenty trial pits and six shafts were sunk, adits put in and good assays constantly maintained from the orebodies in all of the workings. Finances expired at the end of 1862 and operations were suspended. Some further work was done in 1865 and 1866 and again in 1888 when old workings were restored and extended and new shafts and drives put in. During this period of mining over 25 tons at 30% Cu were produced. Once again, financial difficulties led to the mines closure at the end of 1888.

The Willow Creek Mine was first worked in 1888. Further prospecting was carried out between 1899 and 1907. Recorded production is of 15 tons of ore from 1907.

Mining at Napoleon began in 1861 when a copper lode was found in the banks of a creek. A large number of lodes were found, one claim alone containing over 26 separate lodes. One wide lode assayed 30% Cu. Work ceased in 1863 when company funds ran out.

The Kirwan Mine produced 4 tons of ore at 30% Cu in 1861. The mine was reopened in 1888 and again in 1899 and a small tonnage at 23% Cu was produced.

The Wyacca Mine was first worked between 1861 and 1867 and was reworked in 1888 and again between 1896 and 1907. Initially the mine produced 6 tons of ore at 40% Cu per week. Later mining produced 154 tons at 3% Cu. worked in 1888 and again between 1896 and 1907.

Mining also occurred at the Wyacca Creek Barite Mine, which produced 316 tons of barite between 1946 and 1955.

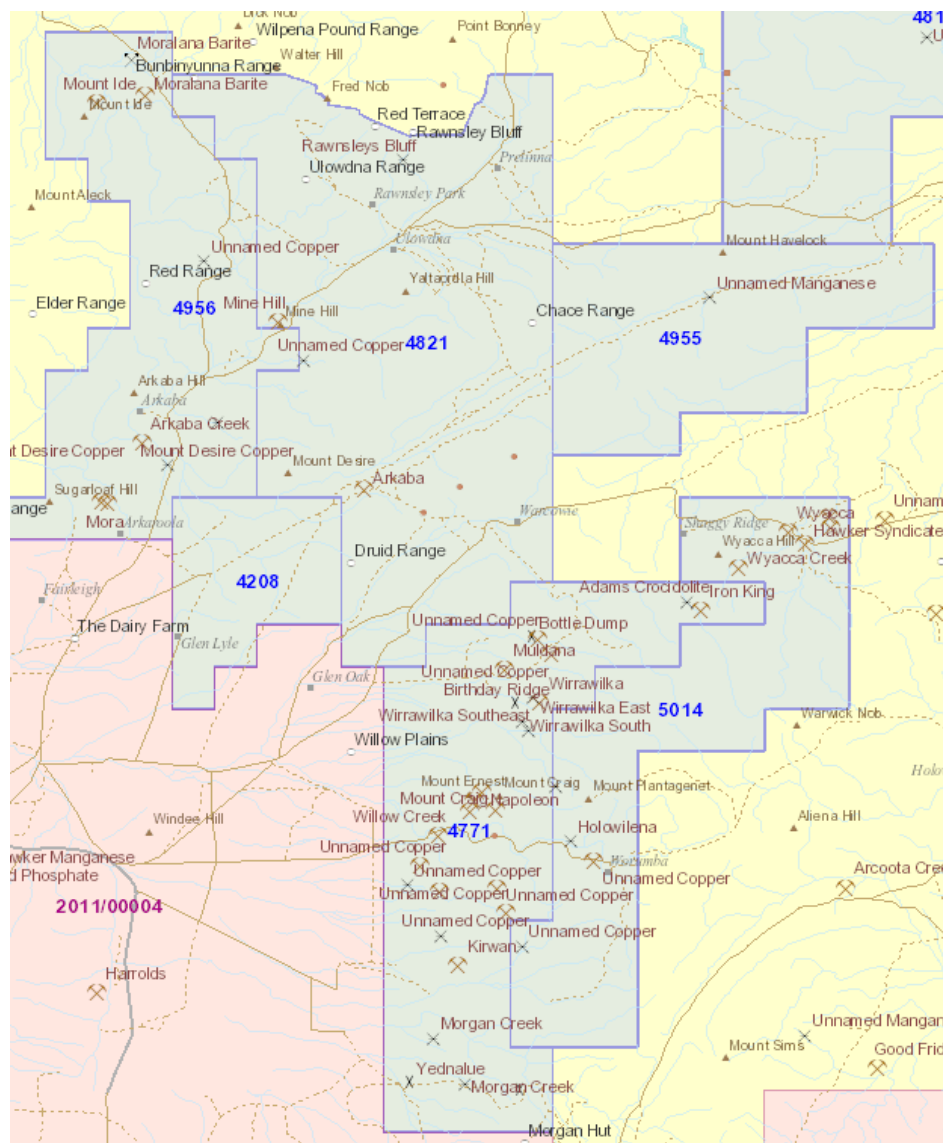
Under a special mining lease, CAMS leases explored the Iron King, Napoleon, Willow Creek and Wirrawilka mine areas. Workings were examined and it was concluded that mineralisation occurred within dolomites as narrow lodes in shear zones or within sedimentary rocks as narrow lodes filling transverse fractures or faults. An IP survey over the Wyacca Mines found anomalies on all 9 lines that were followed up with a series of shallow drill holes in which scattered primary sulphides were found. The sulphides were predominantly pyrite with small amounts of chalcopyrite and the best intersection was 23m at 0.3% Cu. An extensive stream sediment survey was carried out in the centre of the Worumba Diapir. They thought that the prospects lacked sufficient fracturing and brecciation to provide adequate sites for a large-scale mineral deposit and no further work was undertaken.

All prospects, apart from Wirrawilka and Wyacca, were rejected. They identified another prospect to the south west of Wyacca in the apex of a drag fold and also commented that the fold at Wyacca seemed to have some controlling influence over the localisation of mineralisation. A stream sediment survey was undertaken over the area surrounding the Worumba Homestead, including the Wyacca area.

A second stream sediment survey showed anomalous Cu values in the vicinity of Wyacca, upstream from the known mineralisation, suggesting a second mineralised zone. At Wyacca prospect 22, the average copper content over 20m of an extensive shear zone was 1.57% Cu. Seven holes were drilled at Shaggy Ridge to test a narrow barite vein. No follow up drilling was undertaken.

In 1979-1980, Mines Exploration undertook a strike-orientated residual soil geochemistry survey in an attempt to located mineralised zones within the Tindelpina Shale. The results were felt to indicate that the shale horizon is barren of significant base metal mineralisation and no further exploration was undertaken.

A joint venture between Freeport of Australia and Swan Resources produced an aeromagnetic survey which showed anomalies in the Worumba diapir that were considered to be caused by dolerite or diorite intrusions. Stream sediment sampling over the diapir showed no significant mineralisation. No further work was carried out with regards to base metal exploration. The joint venture then discovered a paleo-placer diamond deposit in the Springfield Basin to the south. They also searched for primary kimberlitic sources for the diamonds. A stream sediment survey did not recover any diamond indicator minerals.



**Fig 2 Historic Mines**

From 1984-1986, Utah Development Corporation held two ELs over the Mt Plantagenet and Kirwan Mine areas. The Wyacca, Willow Creek, Wirrawilka and Niggly Gap areas were mapped in detail and extensive geochemical sampling (rock chip and soil) of vertical profiles and traverses were undertaken. Targets were identified at Wirrawilka and Wyacca which were tested by reconnaissance drilling. This was followed up by diamond drilling a total of eight holes. All exploration was focussed towards finding a stratiform copper deposit, but nothing of significance was discovered and the tenements were allowed to lapse.

In 1989, Maldon Minerals explored the area for lead, silver and gold associated with the Ameroo Formation sediments around the Baratta/Eukaby area to the east, and copper associated with the Worumba diapirs. They interpreted the copper mineralisation to be associated with basic lavas or rafts of older sediments that had been brought up in the diapirs. After a literature study, they considered the Worumba area to not be prospective for large deposits and no further work was undertaken.

From 1989-1991, CRA Exploration held a large tenement covering the Arkaba and Worumba diapirs. Initially they conducted a stream sediment sampling survey over both areas and most of the elevated base metal values occurred in samples draining the Worumba diapir. They also sampled for diamond indicator minerals but results were negative.

In 1998, Pima Mining undertook a preliminary geochemical survey focussing on identified magnetic anomalies and old mine workings in the Worumba Anticline. This survey failed to identify any gold or base metal anomalism and Pima refocussed its exploration to magnesite.

From 2006-2011, Copper Range held 2 ELs covering much of the current Torrens Project area.

Copper Range's initial targets in the Adelaide Fold Belt were secondary near-surface oxide copper deposits that are structurally controlled, related to hydrothermal events focused along faults late in the deformational history of the region. They were of the view that there has been insufficient exploration for oxide copper resources in the Adelaide Fold Belt. They saw the possible opportunity to establish a central copper SX-EW plant, sourcing oxide copper feed from a number of deposits. The company is also targeting primary sediment-hosted copper deposits as much of the previous exploration for copper in the Adelaide Fold Belt has been based on the assumption that copper mineralisation was emplaced during or shortly after deposition of the host sedimentary rocks, i.e. syngenetic or early diagenetic deposits. Before Copper Range's work, exploration had been largely confined to the stratigraphic horizons that host mineralisation at Burra (Skillogallee Dolomite of the Burra Group) and Kapunda (Tapley Hill Formation, Umberatana Group), and to areas of known mineralisation, e.g. Wyacca, Wirrawilka etc. By contrast, Copper Range's view was that primary sediment-hosted stratiform sulphide bodies may be epigenetic, forming in reactive strata and in dilatant sites adjacent to significant through-going structures. The use of spectral (satellite) imagery has been used to identify zones of alteration that indicate appropriate stratigraphic horizons and substantial fluid movement.

This method had generated targets that are not related to known mineralisation and thus had not been explored in the past. A concentration of old copper mines and workings occur in the Wyacca Mines area. These occurrences appear to be structurally complex. Whilst previous exploration was in some places quite detailed, controls on ore localisation remain poorly understood and much of the work was ill-defined. During Copper Range's exploration, the Wyacca (EL 3492) and Worumba (EL 3450) tenements were considered together, as part of their Hawker Project

EL 3492 was originally taken out to cover the old workings at Wyacca as part of the Hawker Project area to explore for shallow oxide copper associated with old mines and workings in the Worumba anticline. A review of past exploration reports was accompanied by preliminary field visits to the most prospective areas of old workings.

Whilst there are other prospects within EL 3492, Wyacca was the focus of exploration in the tenement. The use of aerial photography and Aster satellite imagery, accompanied by field visits to the area surrounding the Wyacca Mine identified a chalcopyrite-bearing quartzite unit in the footwall to the known mineralisation. As a result, their main targets in the Wyacca tenement were areas of alteration, associated with structures at the boundary between the quartzites of the Yudnamutana Subgroup and the Tindelpina Shale at the base of the Tapley Hill Formation. Preliminary mapping and rock chip sampling identified targets at a hill north of Wyacca Hill and directly south of the old workings (known as Wyacca Hill target), an altered iron-rich ridge east of the old workings (known as Ironstone Ridge). A soil sampling grid (regoleach) was completed over the Wyacca prospects.

The Worumba tenement area (EL 3450) was originally taken up due to the high concentration of old mines and workings throughout the Worumba anticline. These provided initial targets for shallow copper oxide deposits. A review of past exploration reports was accompanied by preliminary field visits to the most prospective areas of old workings. Most of the old workings are associated with dolerite rafts/intrusions and these were considered to be local occurrences and not likely to have sufficient tonnage potential. Workings to the west of the Wirrawilka mining area were considered the most prospective due to the extensive outcrop of malachite-bearing dolomite (Birthday Ridge) and sandstone/marl highlighted by Utah Development Co. Ltd and BHP Minerals who undertook costeaning and limited drilling that indicated lateral extent of the zone. This zone was targeted as a sedimentary-hosted copper deposit, and the exploration model was based on the potential presence of a copper oxide blanket developed above primary disseminated sulphides within the sandstone/carbonates. Preliminary rock chip sampling of malachite-bearing dolomites and sandstones (Birthday prospect) was undertaken, and followed up with a soil sampling grid (regoleach) to determine the extent of mineralisation under extensive alluvial cover.

Shallow RC drilling (30-50m) was focussed on the known outcrop and attempted to locate structures that might have controlled the development of an oxide blanket. A total of 1446m in 38 RC holes were drilled, to a maximum depth of 55m. Originally a grid of 40m hole spacing and 100m line spacing was planned, but the lack of mineralisation in the extensive black shale resulted in many of the original holes being rejected in favour of attempts to follow copper-bearing stratigraphy and intersect possible structures. Holes were terminated at the base of oxidation or generally ended at 40m if no mineralisation had been intersected.

The drilling highlighted that the mineralisation is lithologically controlled in sandstone and dolomite beds within a thick sequence of black shale. Whilst insufficient mineralisation was intersected, the drilling programme did emphasise the potential for significant sediment-hosted copper mineralisation both locally within the Worumba tenement and throughout the company's other tenements within the Adelaide Fold Belt. Sediment-hosted copper deposits were to be targeted using alteration features determined by Aster satellite imagery and aerial photography.

### **Daktyloi's exploration**

Concentration has been on building up the tenement base to cover extensions of the potentially mineralised zones.

Reprocessing and interpretation by Daktyloi's Consulting Geophysicist has led to a renewed interest in the copper potential of the Project area. His summary report forms a later part of this document. His work shows that there are new structural targets in the same geological environment of previous exploration for copper.



Figure 3 shows there has been really very little drill testing of this major stratigraphy.

## **Geophysics Reviewed**

Mathew Zengerer a South Australian based consultant geophysicist was engaged to review the available data covering EL 4757. Extracts from his “*Preliminary Geophysical Summary Report on Daktyloi’s Torrens Project*” are as follows:

### ***Introduction***

*This summary report has been prepared for Daktyloi Metals Pty Ltd with reference to its 100% owned Exploration Licences comprising its Torrens Project. It is intended to be used with reference to the general summary reports created for this project. For the purpose of this report, they are treated as one EL, as they share common boundaries.*

### ***Geophysical Summary***

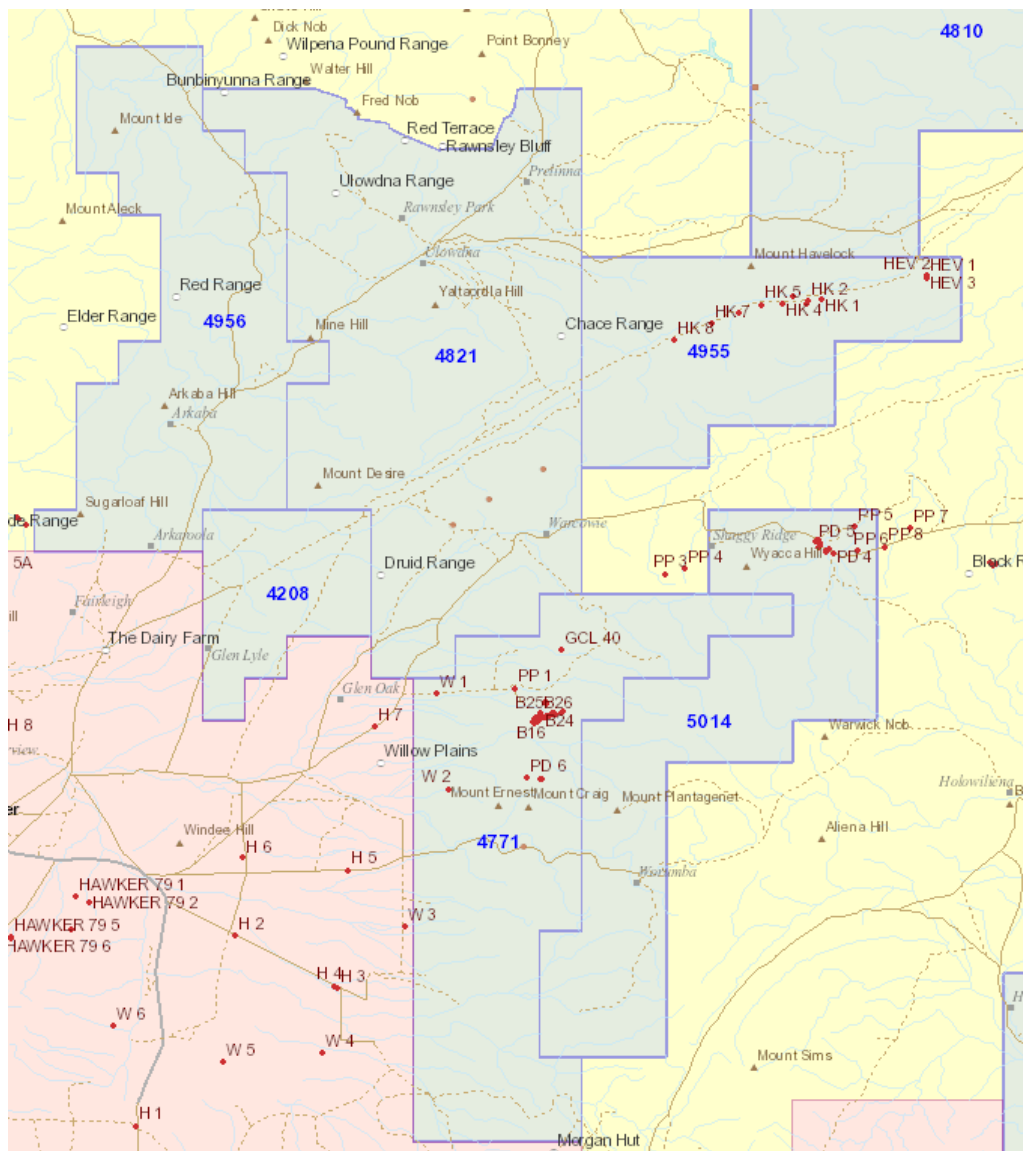
*Figure 9 shows existing gravity stations over tenement and state gravity images, respectively. The gravity coverage is mainly historical traverses along roads and adjacent to Cu discoveries on EL 4771. Some 10km national grid points are also visible. Recent along-road gravity traverses correspond in part to collection of deep crustal seismic data which also transects EL 4771. This seismic line, 09GA-CGA1, is a Geoscience Australia seismic line collected as part of a national programme of deep crustal seismic traverses designed to improved understanding of crustal architecture and mineral systems. It is the only seismic line in the area. Generally gravity coverage is very poor and of pre-2000s historical quality.*

*Magnetics surveying from the area is shown in Figure 4. It is dominated by state 400m line coverage which is adequate for regional exploration. A 300m-spaced 1980s survey clips the bottom of EL 4771.*

*As far as can be determined from public information, no other geophysical surveys have been performed in the area.*

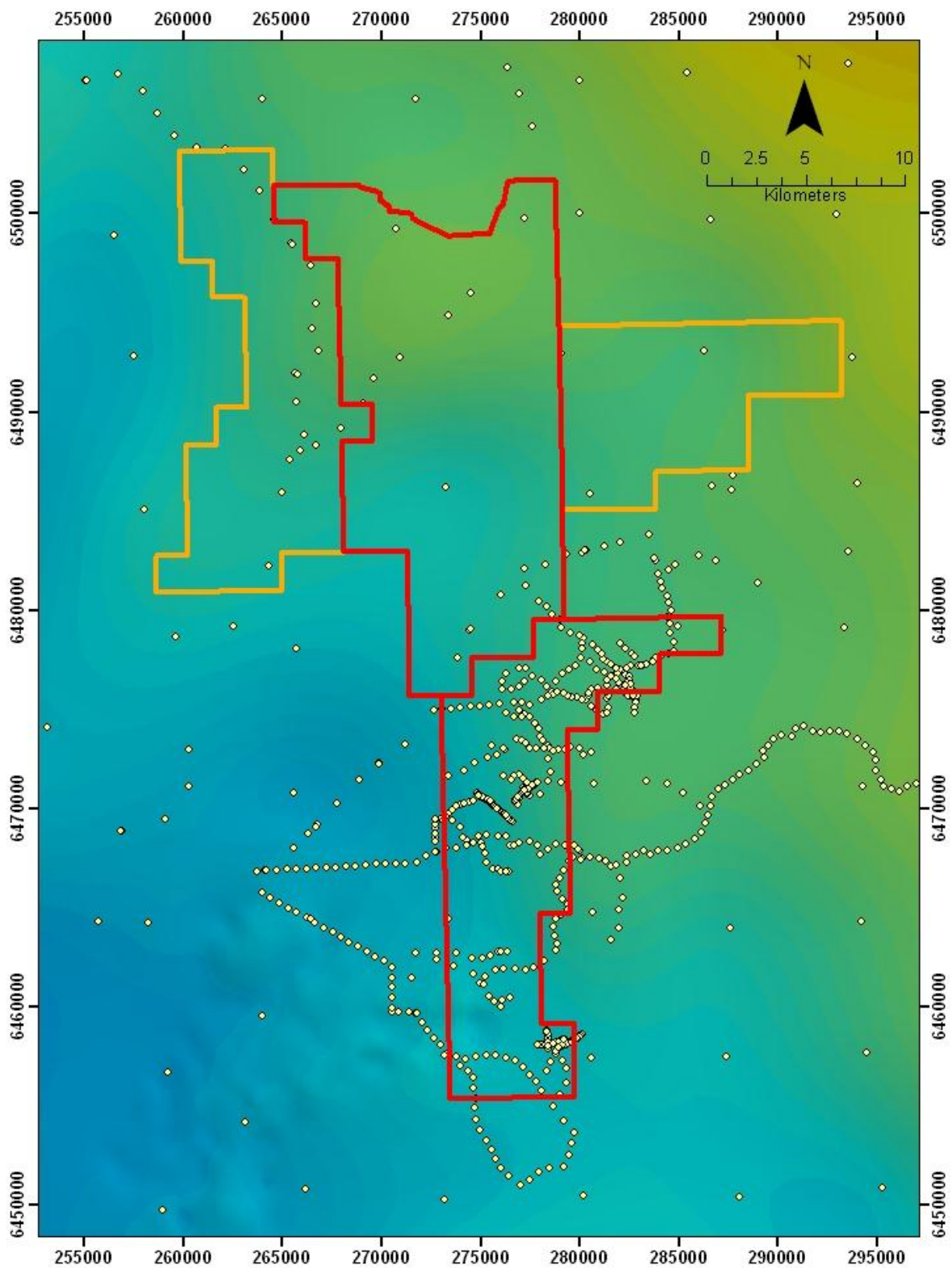
### ***Comments and Recommendations***

*The best geophysical tools for improving mineral prospectivity in the short term would be a higher resolution, 100m magnetics and radiometrics survey. This may improve structural mapping, iron and radioactive element prospectivity and possibly show alteration due to base metal mineralisation. The close spatial association of Cu deposits to magnetic anomalies in the Callanna Group (Figures 10 and 11) warrants further investigation. Ironstone deposits are also associated with magnetic anomalies, whereas radiometrics may be useful for detection of REEs close to surface. Gravity surveys may also assist with deposit detection and structural mapping, though terrain access might be difficult.*



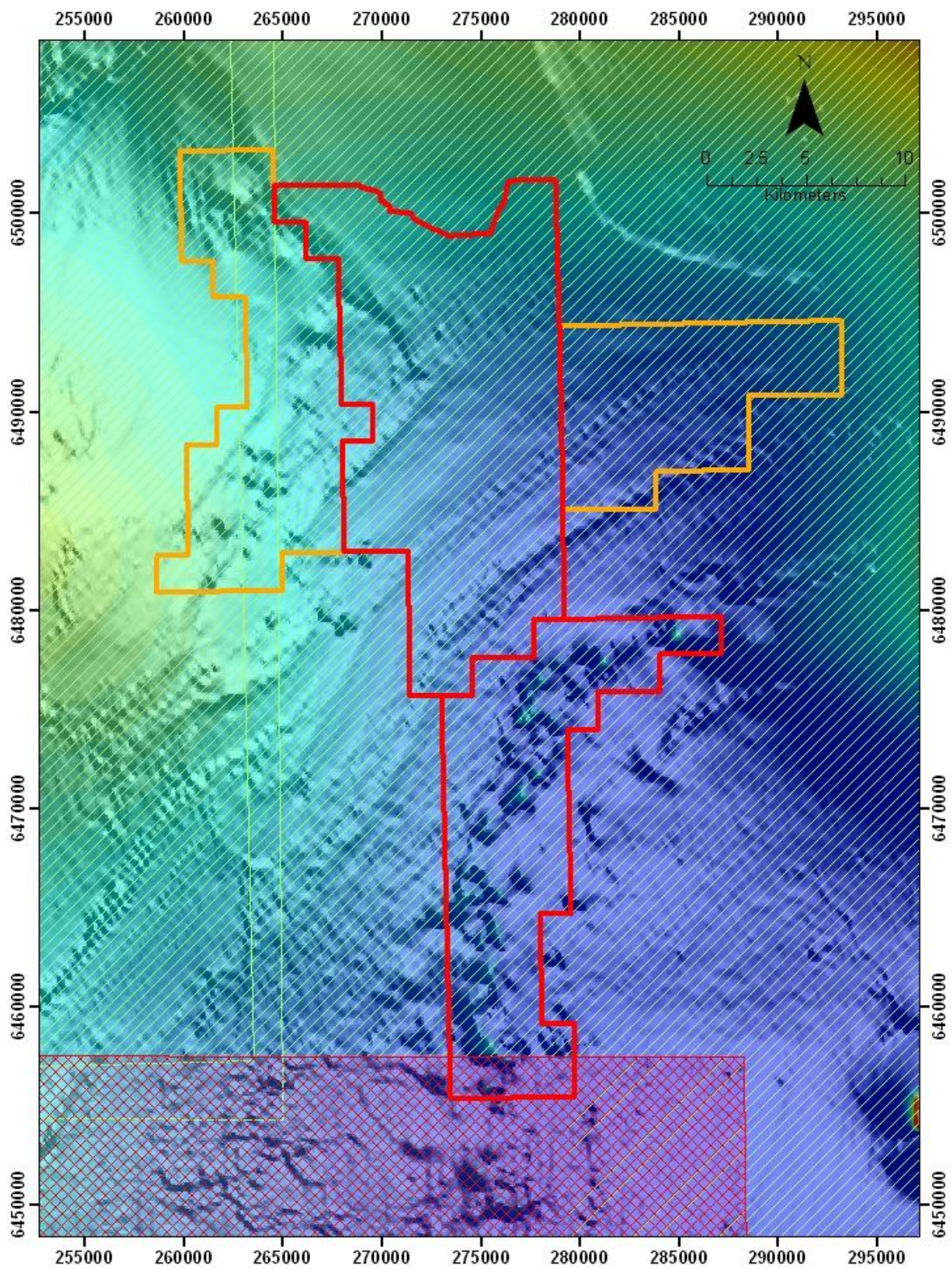
**Figure 3 Drillholes**

*Electrical surveys are the other obvious geophysical technique for base metals. Ground or Airborne EM and/or Magneto-telluric (MT) surveys are also very useful for detecting conductors. It would be recommended to have a look at alteration mineralogy of existing deposits as well to help determine the types of conductivity responses. Electrical surveys should probably follow an initial magnetics/radiometrics survey, although a prospect-scale survey could be performed based on current Cu-deposits and mapping. Seismic is probably not useful for exploration in this area.*



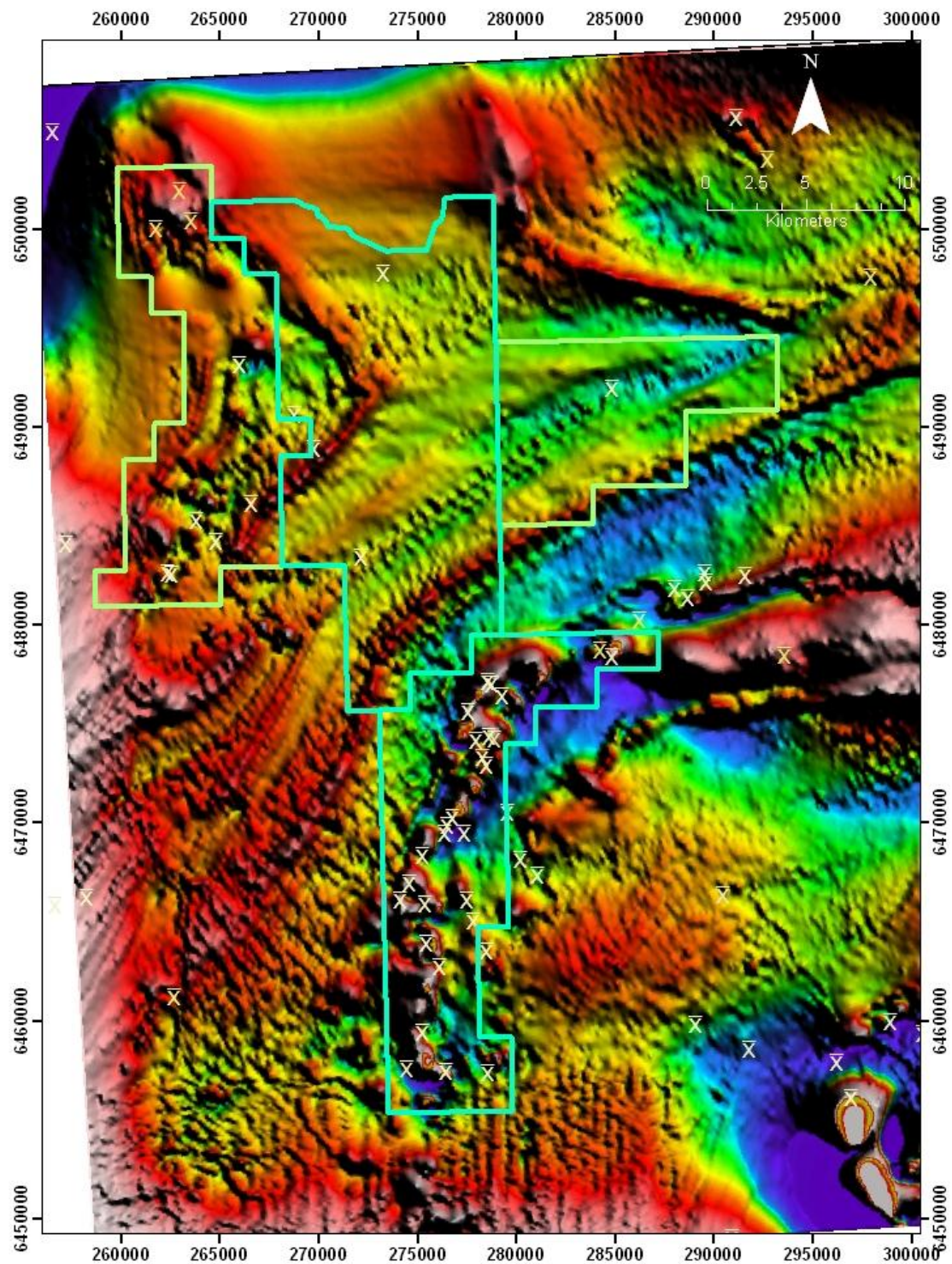
**Figure 4** Existing gravity stations over State Gravity image.





**Figure 5** *State Total Magnetic Intensity image with survey boundaries,*





**Figure 6** *Enhanced Magnetic Intensity image with survey boundaries and old copper mines*

## Environment

No environmental matters arose during the tenement year as minimal fieldwork was undertaken.

## Expenditure

The following expenditure has been reported in six Monthly Reports to 31 July 2012.

	\$
Geologists & geophysicist	30,020
Vehicles, fuel, etc	1,425
Accommodation & meals	2,075
Rent	1,287
<hr/>	
<b>Total cumulative expenditure</b>	<b>\$34,807</b>

## Conclusions

The Torrens Project presents an assemblage of granted tenements with new exploration targets, mainly for copper, plus zinc-lead and a potential for Rare Earth Metals. Despite several generations of previous exploration, there has been very limited drill testing of the 756km<sup>2</sup> tenement area, and that drilling is concentrated near very few of the historic copper mine workings, mainly on this EL 4771.

Planning is underway for more than the reconnaissance fieldwork to follow up the results of the data, geological and geophysical reviews discussed in this report.



Peter Andrews  
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3 November 2012

# DAKTYLOI METALS PTY LTD

17 November 2013

Ms Sue Watson  
DMITRE Minerals  
Mineral Resources Group  
GPO Box 1671  
Adelaide SA 5001

Dear Ms Watson

## **FINAL TECHNICAL REPORT EXPLORATION LICENCE – EL 4771**

We have received your letter requesting the outstanding Final Technical Report for EL 4771 previously held by Daktyloi Metals Pty Ltd.

EL 4771 expired on 31 July 2013.

This letter confirms that there was no field work completed during the term of EL 4771 other than a reconnaissance visit by Chinese geotechnical personnel with Daktyloi's consulting geologist. This visit followed an airborne VTEM and magnetic survey over part of the licence and two adjoining licences held by Daktyloi.  
(VTEM data - see *Government of South Australia Mineral Resources Website*)

At the time of its expiry, EL 4771 was part of Daktyloi's Torrens Project for which Daktyloi has Combined Reporting Status. We note that the Technical Report under this Status to 17 September 2013 has been received by DMITRE. It contains the geophysical survey and interpretation data referred to above.

We therefore submit this letter in lieu of the Final Technical Report for EL 4771.

Regards



Peter Andrews  
Director & Joint Company Secretary

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