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GR293 Third Group Annual Report

**Tennant Creek Region, Northern Territory
For the Period 16/10/2013 to 15/10/2014**

By

**Strongson Peng, B. App Sci
Senior Geologist, Minerals Invesco**

For:

Minerals Invesco Pty Ltd
PO BOX 1217 SOUTH PERTH, WA 6951

And

Minerals and Energy InfoCentre
Northern Territory Geological Survey
Department of Resources
GPO Box 3000
DARWIN NT 0801

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Contact details	Minerals Invesco Pty Ltd
Postal address	PO BOX 1217 South Perth, WA 6951
Fax	08 9367 2883
Phone	0408803332 or 08 9367 2882
Email for further technical details	Peng@mineralsinvesco.com.au
Email for expenditure	Peng@mineralsinvesco.com.au

Abstract

Exploration Licences 28413 & 28435 (the title group ID: GR293) were granted to Minerals Invesco Pty Ltd (Invesco) in the Tennant Creek Region of the Northern Territory on 17/08/2011 for a period of 6 years. The licences are essentially located in the Tomkinson Province with an overlap in the south with the Warramunga Province.

The Warramunga Formation, host of Tennant Creek Style Au-Cu mineralisation, may not extend further enough north, although all the previous drilling that failed to intersect the Warramunga Formation was shallow vacuum drilling (10 -15m). The area is structurally complex with magnetic trends associated with dolerite dykes and sills which make true ironstone bodies (such as those that host the gold and copper) difficult to identify.

The airborne geophysical survey flown over the lease area by UTS Geophysics in July 2012 was processed and interpreted and 14 targets have been selected using this interpretation.

In 2012-2013 tenure year 828 soil samples and 466 rock chip samples and some specimens were collected mainly on the aeromagnetic anomalies. So far there has not been any significant gold or base metal mineralization identified in the 2 tenement areas. However, geochemical exploration undertaken has been limited and surface sampling appears to be ineffective due to the transported nature of Quaternary sedimentary cover. Certainly, magnetic interpretation of geophysical data has identified magnetic ridges which are several kms in length. These ridges may have been folded into thicker meta-sedimentary sequences and fold hinges or anticlinal structures. Such structures are important gold bearing features in the Tennant Region. Also the field geologists think the west of the license is prospective for Uranium deposits.

In 2013-2014 tenure year 901.70 metres of diamond drilling was completed in 3 drill holes (1 inclined hole and 2 vertical holes). All core was geologically logged and a total of 60.35 meters core cut with 63 samples assayed for Au & Cu & U content. The maximum Au assay is 48 ppb, maximum Cu assay is 588 ppm, and the maximum U assay is 39 ppm. No Au, Cu or U mineralization were intersected in the 3 drill holes. Also to get the mineralization information in different strata in aeromagnetic or aeroradioactive areas roughly every 5 meters was assayed for ICP geochemical analysing Ag & As & Au & Bi & Cu & Hg & La & Mn & Nd & Pb & Sn & U & Y & Zn, the maximum Au assay is 143.16 ppb at a depth of 285 meters in ZK2.

In 2014-2015 tenure year about 400 metres in 2 holes of diamond drilling is proposed for testing the mineralization of geology and geophysical and geochemical composite anomalies.

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1 Introduction

1.1 Location & Access

The tenement group lies approximately 880 km south of Darwin along the Stuart Highway. **Figure 1** shows the exploration licences position with respect to the current infrastructure.

The licences area straddle the Stuart Highway and the ground can be accessed via a network of dirt roads.

1.2 Climate

Tennant Creek is located in the middle of the Northern Territory, 376.5 meters above sea level. Average maximum temperatures range from 24 degrees to 38 degrees, with an average of 22 days per year exceeding 40 degrees. Minimum temperatures range from 12 degrees in winter to 25 degrees in the hotter months.

Although Tennant Creek has a warm desert climate, it still receives a sizeable 452 mm (17.8 in) of annual precipitation (**Table 1**). It also has distinct wet and dry seasons. Most rain falls during the period from December to March, when temperatures are also at their highest. Temperatures fall during the dry months with sunny days and mild nights. There is 9.1 to 10.4 hours of sunshine per day with an average of 155 clear days per year. Prevailing winds are from the east to south-east.

The dry season (May to October) in Tennant Creek is relatively sunny with cool nights and mornings. The wet season (November to April) is hot and humid with occasional rainfall.

Table 1 Climate data for Tennant Creek (1969-2014)

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Temperature														
Mean maximum (°C)	36.7	35.6	34.3	31.6	27.5	24.5	24.6	27.6	31.7	34.8	36.4	37.2	31.9	45 1969-2014
Mean minimum (°C)	25.0	24.4	23.2	20.4	16.3	12.8	12.3	14.4	18.4	21.7	23.8	24.9	19.8	45 1969-2014
Rainfall														
Mean (mm)	111.3	126.0	56.1	18.0	8.5	5.2	4.8	1.5	7.7	20.3	41.1	69.6	472.1	45 1969-2014

red = highest value blue = lowest value

Product IDCJCM0029 Prepared at Thu 01 May 2014 17:35:00 PM EST

Source: "[Climate statistics for Tennant Creek](#)".

2 Tenure

The 2 exploration licenses EL28413 & 28435 were granted on 17 August 2011 and amalgamated annual and expenditure reporting was approved on 23 April 2013 and allocated the report ID: GR293. The group tenements full details are provided in [Table 2](#). This report covers the EL's third year of tenure.

Table 2 Details of tenements in GR 293-13

Tenement	Holder	Granted	Expiry	Sub Blocks	Area
EL28413	Minerals Invesco Pty Ltd	17 Aug., 2011	16 Aug.,2017	113	362.92km ²
EL 28435	Minerals Invesco Pty Ltd	17 Aug., 2011	16 Aug.,2017	5	16.21km ²

3 Regional Context

3.1 Regional geology

The Tomkinson Province forms the northern part of the Tennant Creek Region. It overlies the rocks of the Warramunga Province to the south ([Figure 2](#)). The Tomkinson Creek Province forms a platform of younger sedimentary rocks. The Warramunga Province directly south of Tomkinson Creek Province is a mixture of sedimentary rocks (shales and siltstones) and intrusive rocks (buried granites). These provinces have two distinct geological histories and hence the gold and copper mineralization of the Warramunga Province has not been replicated in the Tomkinson Creek Province. Instead the Tomkinson Creek Province is known for its manganese deposits hosted by the Bootu Creek Formation.

The gold-copper-bismuth mineralization of the TCMF is predominantly hosted in magnetite-chlorite-hematite ironstones or sheared variants. The ironstones and mineralization are localized in EW to WNW trending structures that have historically been referred to as “lines”. The ironstones and mineralization are discordant to the folded Warramunga Formation rocks and tend to be located in structural flexures, near the hinge zones of the fold axes.

The sulphide content of these primary deposits rarely exceeds 10% and common ore minerals include chalcopyrite, native gold, cobaltite and bismuthinite. The gold-dominant oxide and primary ores are generally free-milling, which can result in high recoveries (up to 98%) being achieved.

Oxidation extends up to 120 meters below the surface and, within the ironstones, results in a hematite-goethite-quartz-clay assemblage. The copper mineralization is typically leached and depleted while the gold mineralization can be spectacularly upgraded.

The Tomkinson Creek Province is known for its manganese deposits hosted by the Bootu Creek Formation.

3.2 Project geology

GR293 is essentially located in the Tomkinson Province ([Figure 2](#)) where no gold deposits or occurrences have been discovered and Warramunga Formation has not been detected.

The Warramunga Formation is thought to underlie the Tomkinson sediments (un-metamorphosed sandstone, shale and volcanics) in the extreme southern portion of GR293 but is yet to be intersected. Most drilling done on magnetic targets has intersected dolerite sills and dykes. The area is structurally complex with three main deformations resulting in moderate to steep open folds oriented ESE–WNW. Faulting appears to have structurally controlled the many dolerite dykes and sills that intrude the predominately sandstone lithology ([Figure 3](#)).

3.3 Known mineralization

The Tennant Creek field is typified by multiple high-grade gold and gold-copper-bismuth deposit predominantly hosted in magnetite-chlorite-hematite ironstones or sheared variants. Based on historical data, the mineralization occurs in small-to-medium sized lenses within sheared ironstone. The lenses are usually high grade with most gold deposits averaging 15–20g/t and copper 2–4%.

Some primary deposits in the TCMF are hosted predominantly in magnetite ironstones (e.g. White Devil); others are mixed hematite-magnetite (Chariot) or hematite-dominant (Edna

Beryl, Malbec). Shear zone-hosted gold-copper mineralization outside of the ironstones, further indicates the diversity of mineralization styles present in the district. Other gangue minerals include chlorite, muscovite, talc, dolomite and sericite.

A recent revision of the age dates from the Tennant Creek region now indicate a much closer temporal relationship between the mineralization and the Tennant Creek Intrusive complex – a further factor that indicates similarities with other iron oxide copper-gold (IOCG) deposits such as Olympic Dam and Prominent Hill in the Gawler Craton of South Australia, and Ernest Henry within the Cloncurry District of North Queensland.

Furthermore the TCMF is no different to other IOCG provinces, in that the metal assemblages and concentrations vary from deposit to deposit. Some deposits, such as Nobles Nob, Juno and White Devil are predominantly gold systems; Warrego is a gold- copper-bismuth deposit; while Peko and Geko are copper-gold deposits ([Figure 2](#)). Similarly for uranium, although apart from a known resource at the North Star mine and reports of uranium from Edna Beryl and Warrego, its distribution and concentration is at this stage unknown.

Currently in Tennant Creek Region Peko gold mine is in care and maintenance, and Warrego and Geko gold mines are both in feasibility. No economic mineralization has been identified on the project area.

The Tomkinson Province is overwhelming known for its manganese deposits, with the Bootu Creek Manganese Mine still in operation ([Figure 2](#)). The Bootu Creek Manganese Mine has an ore reserve of 20.5Mt at 21.4% Mn. The manganese mineralization is hosted in the Bootu Creek Formation of the Tomkinson Creek Group. Of the 23 recorded mineral occurrences, 22 are sedimentary-hosted manganese occurrences or deposits, with one zinc occurrence known in the far north of the province. None of these occurrences are located on or near Minerals Invesco's exploration licenses.

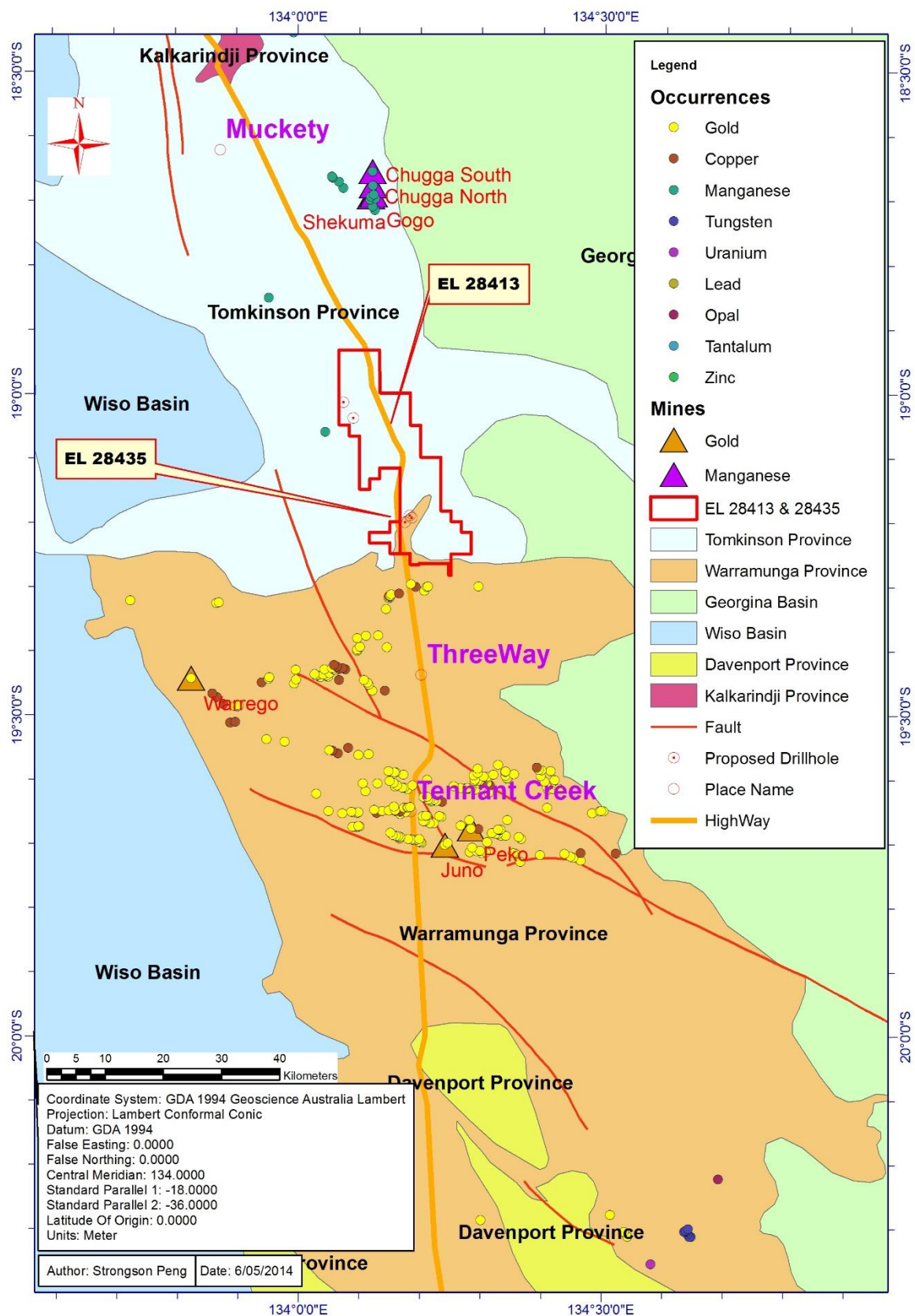


Figure 2 Geological setting with mines and mineral occurrences

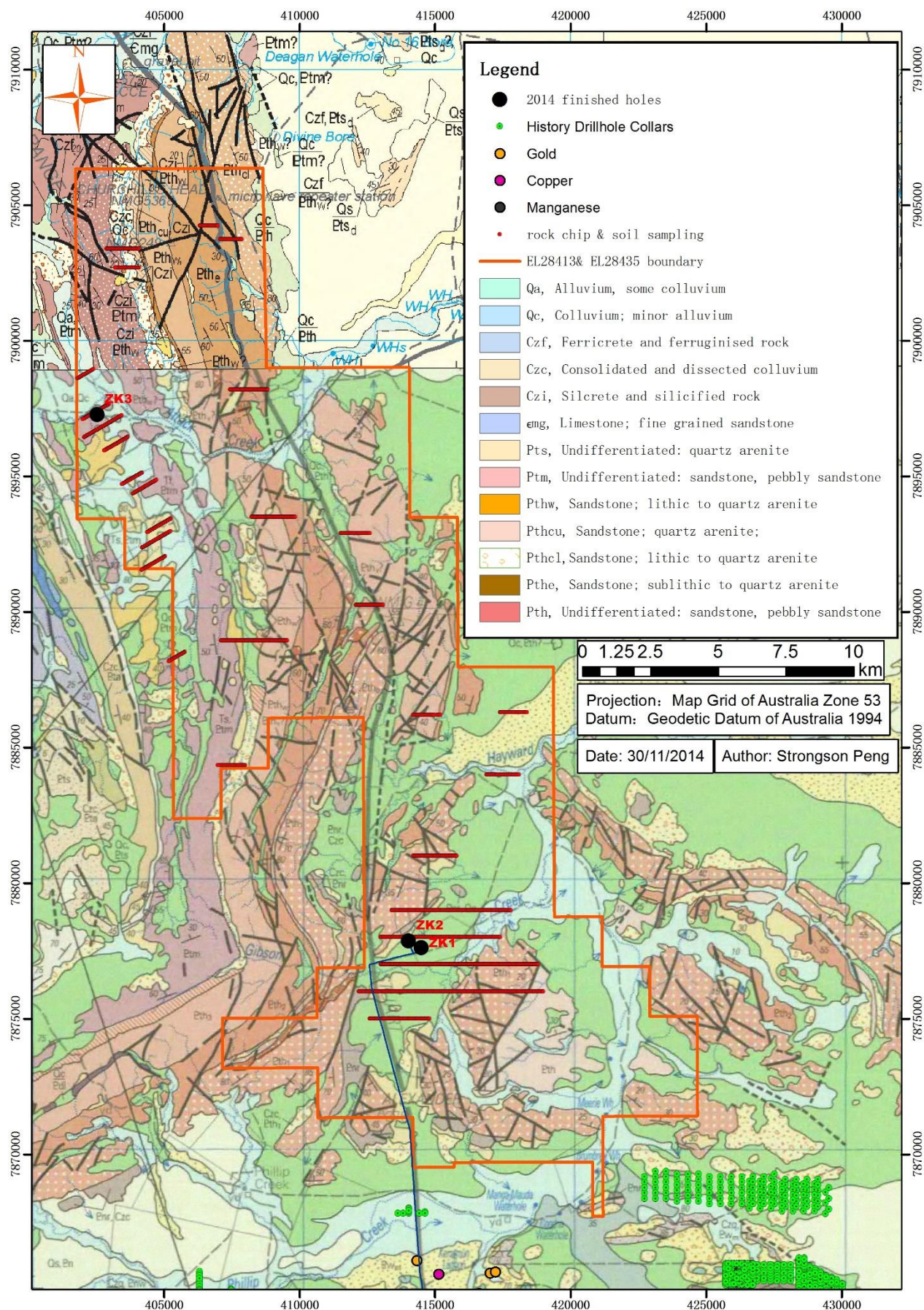


Figure 3 Geology map with history drill hole collars & mineral occurrences

4 Previous Work

Two regional scale gravity anomalies along a north–south gravity ridge are clearly visible on the 2001 Tennant Creek gravity data ([Figure 4](#)). Giants Reef Mining (GRM) and Emmerson Resources (ERM) considered both as primary regional targets but failed to delineate any distinct geophysical targets that could be tested by drilling. Complicating geophysical interpretation is the abundance of dolerite sills and dykes in the area. Normandy Gold drilled over 100 RAB and several RC holes just outside of the southern extent of the project without encouragement. Most of these holes were drilled on magnetic targets that turned out to be dolerite. The dolerite is barren of mineralization and all holes failed to intersect the Warramunga Formation.

Previous explorers believed the classical Au–Cu TCMS mineralization style would not be found in this area but were encouraged by the fact that low order magnetic anomalies and gravity highs can be used to define new targets. Examples of these are the Billy Boy and Marathon deposits.

2011-2012 Minerals Invesco conducted a detailed airborne geophysical survey over the lease area and 14 targets were selected using data interpretation ([Figure 5](#)). 2D modeling was conducted on the anomalous magnetic field by using program ModelVision. [Figure 5](#) shows TMI image of the project. Grids profiles were constructed in directions orthogonal to strike in order to obtain meaningful depth estimated. [Table 3](#) shows anomaly positions (MGA94) and depth to top. It may be noted that depth to top values range from 40 m to 810 m with an average of 274 m. Magnetic susceptibilities values are also given in [Table 3](#) which vary from 0.04 to 0.55 with an average of 0.17 (SI). Length of anomalies is also noted, varying from 200 m to 1000 m with an average of 485 m. Magnetic interpretation of geophysical data has identified magnetic ridges which are several kms in length. These ridges may have been folded into thicker meta-sedimentary sequences and fold hinges or anticlinal structures. Such structures are important gold bearing features in the Tennant Region. In [Figure 6](#) the red block shows the Uranium areas of interest.

2012-2013 part license area's soil sampling and rock chip sampling are completed mainly on the aero-magnetic or radioactive anomalies. A few significant gold mineralization identified in the south tenements area and a few significant Uranium and base metals mineralization identified in the northwest tenements area.

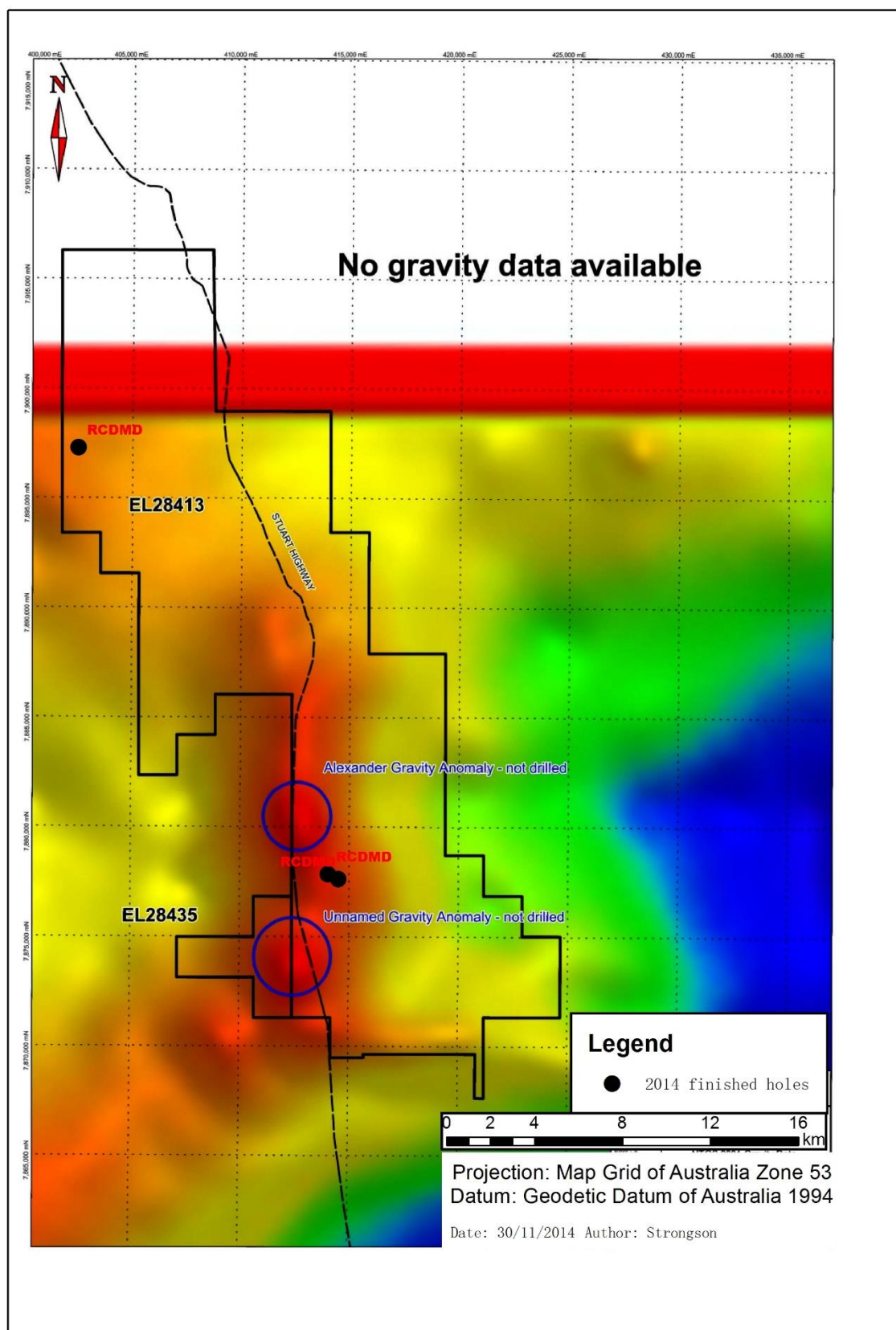


Figure 4 Regional gravity map

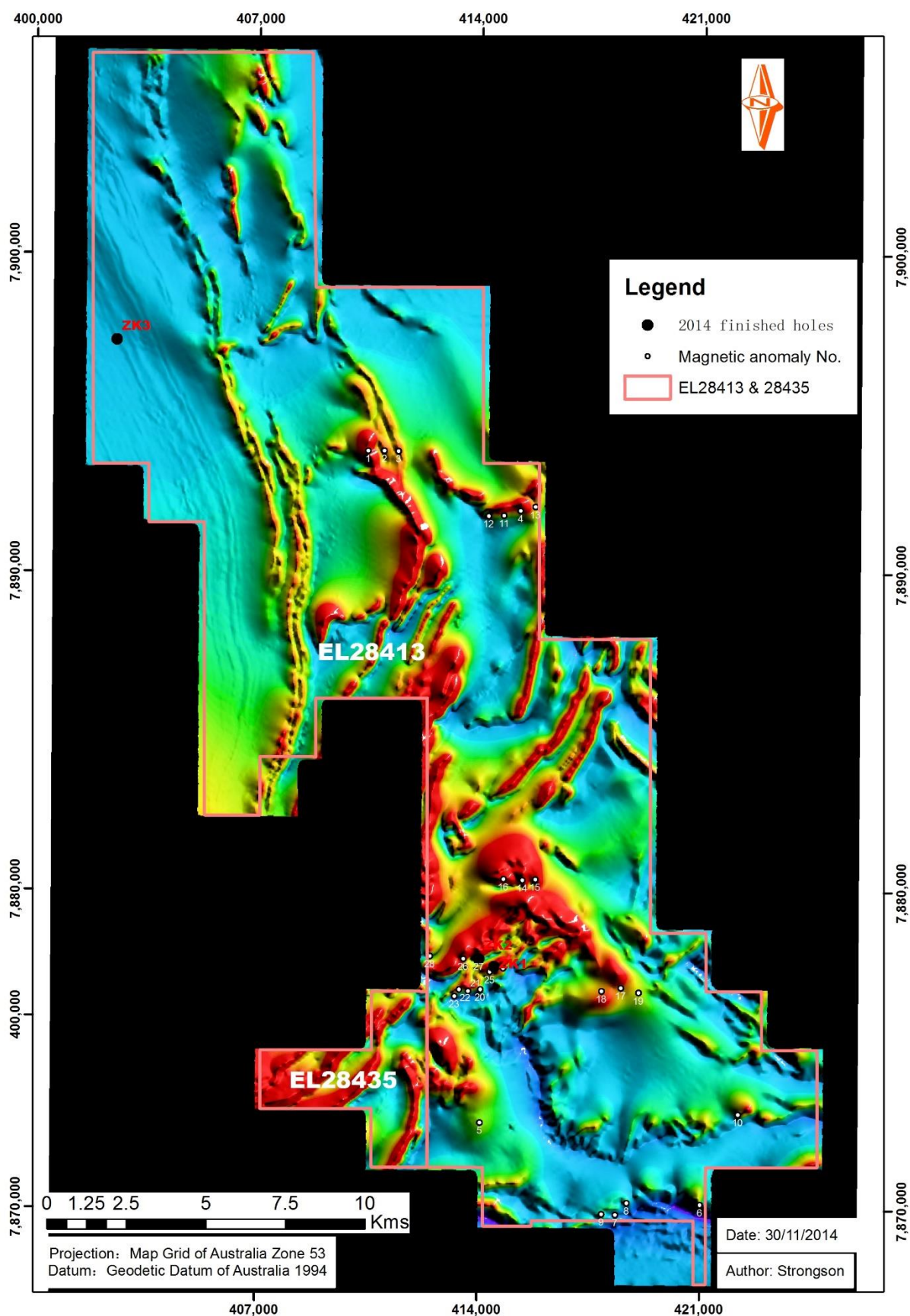


Figure 5 Aeromagnetic map with anomaly positions

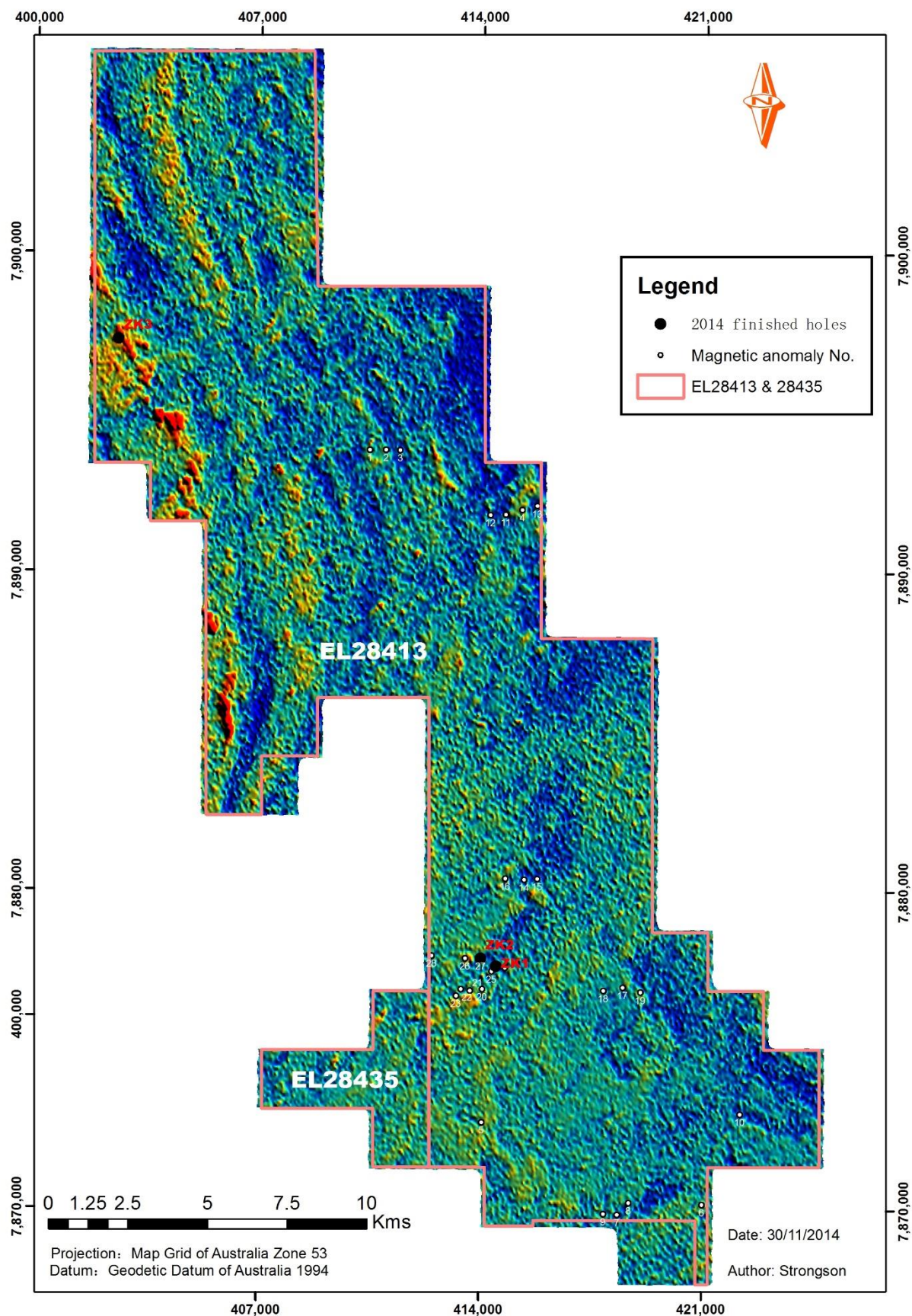


Figure 6 Radioactive map

Table 3 Anomaly positions (MGA94) with model parameters

Body	Easting	Northing	Depth to top (m)	Susceptibility (SI)	Thickness(m)	Dip (°)	Strike Azimuth (°)	Length (m)	Depth Extent (m)
1	410440	7893817	188	0.55	50	60	5	583.6	500
2	410947	7893823	169	0.10	50	60	5	583.6	500
3	411395	7893812	162	0.10	50	60	5	600	500
4	415245	7891951	99	0.15	50	60	75	400	500
5	414063	7872717	741	0.05	1000	60	345	1000	1000
6	421006	7870161	170	0.10	50	80	315	600	400
7	418346	7869833	249	0.10	80	50	45	600	400
8	418693	7870202	74	0.04	30	50	45	200	400
9	417903	7869854	286	0.10	80	50	45	600	400
10	422190	7873004	810	0.04	200	60	270	200	800
11	414729	7891806	40	0.12	75	60	85	400	300
12	414244	7891786	50	0.08	75	60	100	400	300
13	415720	7892073	147	0.10	40	60	30	300	500
14	415364	7880343	210	0.28	100	80	15	500	500
15	415770	7880363	236	0.15	100	80	15	500	500
16	414777	7880369	299	0.40	120	70	340	500	500
17	418486	7876966	539	0.20	200	70	15	800	500
18	417876	7876866	637	0.20	200	70	15	800	500
19	419042	7876814	600	0.10	200	70	15	800	500
20	414067	7876899	159	0.20	100	70	10	200	500
21	413678	7876848	168	0.20	100	70	10	200	500
22	413391	7876891	103	0.10	60	70	10	200	500
23	413248	7876688	65	0.10	60	70	10	200	500
24	414778	7877576	167	0.10	100	70	10	300	500
25	414363	7877454	200	0.10	120	70	10	300	500
26	413522	7877864	314	0.30	150	70	30	600	500
27	414014	7877865	253	0.20	100	70	30	400	500
28	412472	7877944	225	0.10	80	70	350	600	500

5. Exploration Concept

In the southern area of EL28413 & EL28435 the Warramunga Formation is thought to extend north under the more recent sediments of the Tomkinson Group.

Warramunga Province is the most important province for Gold (Au), Copper (Cu) and Bismuth (Bi) occurrences and mines. It is often referred to as the “Tennant Creek Mineral Field (TCMF)” and has produced world-class gold deposits such as Warrego (41,228kg Au) and Nobles Nob (34,580kg Au). Collectively, TCMF has produced over 5.5MOz of gold and 470,000t of copper, being one of the highest grade goldfields in Australia.

Warramunga Province has been extensively explored since the 1930s. The vast majority of gold and copper deposits are related to rocks with high iron content. These rocks are called “Ironstones” or banded iron rocks and are confined to the Warramunga Formation, which is located in the central and northern parts of the Warramunga Province.

Magnetic interpretation of geophysical data has identified magnetic ridges which are several kms in length. These ridges may have been folded into thicker meta-sedimentary sequences and fold hinges or anticlinal structures. Such structures are important gold bearing features in the Tennant Region. This conceptual model will be tested initially by a detailed magnetic survey with gravity highs followed by diamond core drilling. Drill hole ZK1 located at aeromagnetic anomaly No 24 & 25 with Magnetic susceptibility readings 0.1 SI and interpreted model depth 167-200m. Drill hole ZK2 located at aeromagnetic anomaly No 27 with Magnetic susceptibility readings 0.2 SI and interpreted model depth 253m. Drill hole ZK5 located at aeromagnetic anomaly No 23 with Magnetic susceptibility readings 0.1 SI and interpreted model depth 65m.

The Tomkinson Province is overwhelming known for its manganese deposits hosted by the Bootu Creek Formation., with the Bootu Creek Manganese Mine still in operation. The Bootu Creek Manganese Mine has an ore reserve of 20.5Mt at 21.4% Mn. The manganese mineralization is hosted in the Bootu Creek Formation of the Tomkinson Creek Group. Also the field geologists think the west of the project area is prospective for Uranium deposits. Drill hole ZK3 & ZK4 located at radioactive anomalies with maximum Manganese assay 10780 ppm, and maximum Uranium assay 22 ppm.

6 Work Completed (2013-2014)

In 2013-2014 tenure year 901.70 metres of diamond drilling was completed in 3 drill holes (1 inclined hole and 2 vertical holes) ([Table 4](#), [Table 5](#)). Drillcore is now in Darwin following completion of the current drilling program. The main purpose of drill hole ZK1 & ZK2 was to test the aeromagnetic anomaly and the ZK3 was to test the aeroradioactive anomaly. All core was geologically logged without core photography or geophysical downhole surveying. A total of 60.35 metres of core was cut with 63 samples assayed for Au, Cu & U content. No significant intersections were found in the drill holes. The maximum Au assay is 48 ppb, maximum Cu assay is 588.2 ppm, maximum Ag assay is 1.41 ppm and the maximum U assay is 39.45 ppm. Other element content was low and No Au or Cu or U mineralization were intersected in the 3 drill holes. Also to get the mineralization information in different strata in the aeromagnetic and aeroradioactive areas roughly every 5 metres was assayed for ICP geochemical analyzing Ag & As & Au & Bi & Cu & Hg & La & Mn & Nd & Pb & Sn & U & Y & Zn ([Appendix1](#)), the maximum Au assay is 143.16 ppb in about depth of 285 meters of ZK2. The rock from the drill core in ZK1 & Zk2 is mainly dolerite and Granodiorite with moderate chloritization and little Sulfide in fractures and Siliceous veins. The magnetic anomaly maybe resulted by the thick, the rock from the drill core in ZK3 is mainly gray Quartz Sandstone and celadon siltstone and purplish red siltstone and mudstone with Siliceous veins interweaving, fine grained sulphide in the veins, the radioactive anomaly maybe resulted by the northwestern fault. Drilling was smooth with few difficulties in the broken ground from the drilling daily report, no collar blowouts, and no lost circulation or major water inflow intersected.

Table 4 finished holes with holes parameters

Hole_id	zone	Easting_MGA	Northing_MGA	elevation	dip	Azimuth	Hole Depth	Pre-Collar Depth
ZK1	53	414492	7877620	296	-90	0	302.5	25.1
ZK2	53	414012	7877861	304	-90	0	401.4	45.0
ZK3	53	402529	7897281	314	-70	60	197.8	65.8

Table 5. Summary drilling table example

Hole Type	Hole Number Range	No of Holes	Total Metres
Diamond	ZK1-3	3	901.70
Grand Total	-	3	901.70

7 Conclusions & Recommendations

The Warramunga Formation, host of Tennant Creek Style Au-Cu mineralisation, may not extend further enough north, although all the previous drilling that failed to intersect the Warramunga Formation was shallow vacuum drilling (10-15m). The area is structurally complex with magnetic trends associated with dolerite dykes and sills which make true ironstone bodies (such as those that host the gold and copper) difficult to identify.

In 2013-2014 tenure year no mineralization body has been identified in the 3 drill holes.

In 2014-2015 tenure year geochemical sampling will be planned in other aeromagnetic anomaly target areas after carefully studying the history exploration work. Also about 400 meters 2 holes of diamond drilling will be proposed for testing the mineralization of geology and geophysical and geochemical composite anomalies .

8 References

Craig Bentley, 2012, EL 28413 Tennant Creek, First Annual Report for period 17 August 2011 to 16 August 2012.

Craig Bentley, 2012, EL 28435 Tennant Creek, First Annual Report for period 17 August 2011 to 16 August 2012.

9 Appendices

Appendix 1: ANALYTICAL REPORT.pdf