



KIRKLAND LAKE GOLD



## **GROUP ANNUAL REPORT GR425**

**EL25054 AND EL28902**

***Chessman Project***

**For Period Ending 17 April 2018**

**Katherine SD5309 1:250,000**

**Eva Valley 5469 1:100,000**

**Katherine 5369 1:100,000**

**Maranboy 5468 1:100,000**

**Manbulloo 5368 1:100,000**

Distribution:-

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## TABLE OF CONTENTS

1	EXECUTIVE SUMMARY.....	3
2	COPYRIGHT.....	4
3	INTRODUCTION.....	4
4	LOCATION AND ACCESS.....	5
5	TENEMENT DETAILS.....	6
6	GEOLOGICAL SETTING .....	7
6.1	Regional Geology .....	7
6.2	Local Geology.....	8
7	PREVIOUS EXPLORATION .....	9
8	PREVIOUS EXPLORATION GR425.....	11
8.1	2016-2017 .....	11
9	EXPLORATION CURRENT PERIOD 2017-2018 .....	11
10	CONCLUSIONS AND RECOMMENDATIONS .....	11
11	REFERENCES.....	12

## LIST OF FIGURES

Figure 1: Lease Location .....	5
Figure 2: Regional geology based on Kilkenny Gold 1998 Interpretation .....	8

## LIST OF TABLES

Table 1: Leasing Details .....	6
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## DIGITAL APPENDICES

File Name	Format
GR425_A_2018_01_ReportBody	pdf
GR425_A_2018_02_additionalassays	txt

## **1 EXECUTIVE SUMMARY**

Exploration Licences EL25054 and EL28902 are located about 20 km east of Katherine. They surround the Maud Creek gold deposit, which Kirkland Lake Gold Ltd ("KL Gold") have under consideration for development. This is the first group annual report combining the two licences, which were previously reported separately.

The geology of the Project area comprises folded Palaeoproterozoic meta-sedimentary and volcanoclastic sequences. These are unconformably overlain by the Meso- Proterozoic Kombolgie Sandstone, which forms scarps. Flat-lying areas are covered by Cambrian Antrim Plateau basalts, and Cambro-Ordovician limestone covers much of southern part of EL25054. Economically important rock units of the project area comprise greywackes, mudstones and tuffs of the Palaeoproterozoic Tollis Formation and Maud Dolerite which intrudes as irregular bodies up to 200m in width.

Exploration activities are now managed by PNX Metals Ltd ("PNX") as part of an earn-in deal. During the past reporting year, six drill samples from the Tractor Corner prospect on EL25054, were submitted for major element analysis.

## **2 COPYRIGHT**

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Any information included in the report that originates from historical reports or other sources is listed in the “References” section at the end of the document.

This report may be released to open file as per Regulation 125(3)(a).

## **3 INTRODUCTION**

EL25054 and EL28902 covers strategic landholding around the Maud Creek Gold Deposit which contains approximately one million ounces of gold. KL Gold have recently completed a Preliminary Economic Assessment (“PEA”) on the Maud Creek deposit which is being contemplated for development, and so exploration success on EL25054 and EL28902 would be considered particularly useful for this project.

The Tollis Formation and Maud Creek Dolerite host the Maud Creek gold deposit on the adjacent mining tenements. The same lithological units are found within EL25054 and EL28902 and continue under cover of the Daly Basin, where they are obscured by shallow Cambrian cover. The Cambrian cover is also considered a target for SEDEX mineralisation.

This report is the second annual group report (GR425) combining the two licences. It covers the period 18<sup>th</sup> April 2017 to 17<sup>th</sup> April 2018.

## 4 LOCATION AND ACCESS

The leases are located about 20 km east of Katherine, and surround the Maud Creek Project on three sides. Minor tracks and fence lines give access either east or south west of Maud Creek or north from the Stuart Highway via a track to King River and Rodgers Knoll (Figure 1).

Due to close proximity to Katherine, much of the underlying cadastre is freehold title, with some areas of crown land. The Nitmiluk National Park containing the Katherine Gorge borders the north of the lease and the Cutta Cutta Caves National Park, containing an underground limestone cave system lies to the south. Both of these are popular tourist attractions and a source of monetary income to the region.

Access within the tenement is provided via minor tracks and fence lines predominantly from the Stuart Highway, which runs parallel to the southern boundary of the tenement. Earlier reports note that traversing within the tenement is difficult due to remnant spear grass covering most of the area, and deeply incised creeks and gullies only accessible by helicopter.

Topography within the tenement varies with undulating plains, ridges and mesas. Drainage is via small creeks and gullies to the major Katherine River to the northwest of the lease, and King River and Roper Creek, which both cut through the eastern side of the lease.

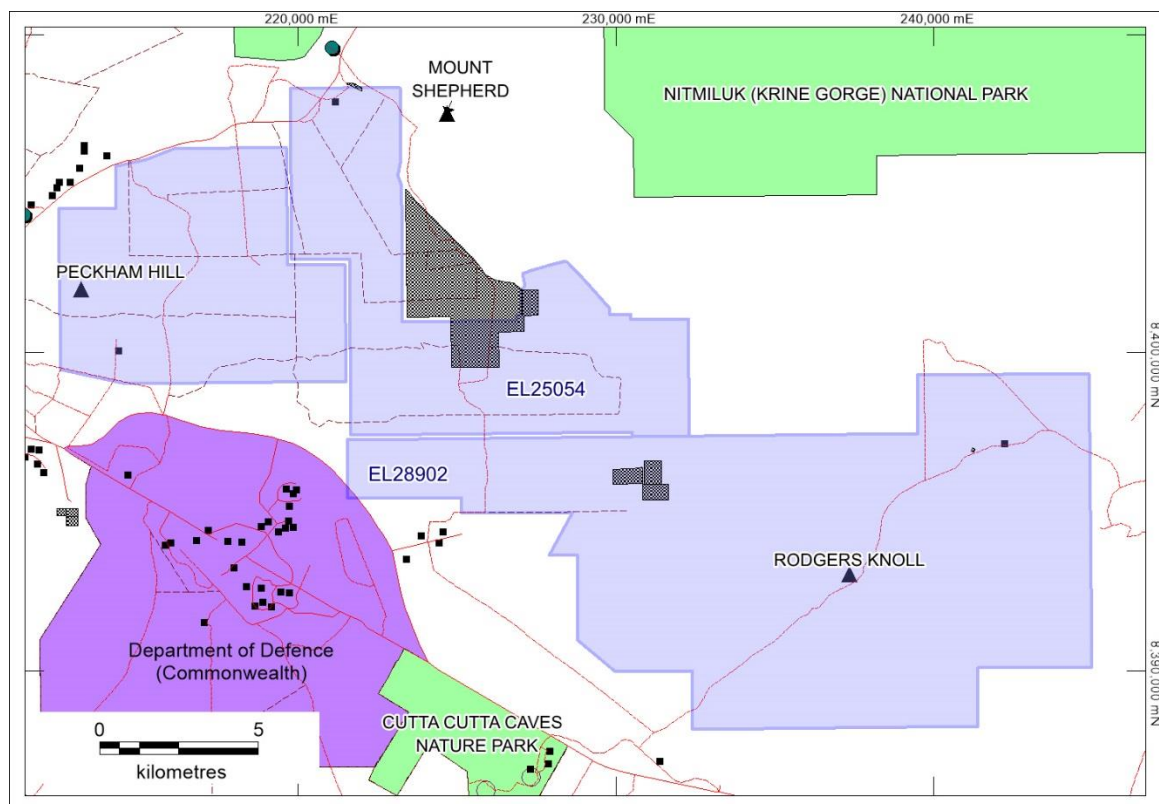


Figure 1: Lease Location

## 5 TENEMENT DETAILS

EL25054 originally covered an area of 125.9 square kilometres and was first granted to Terra Gold Mining Limited on 18 April 2006. GBS Gold International (GBS) acquired Terra Gold Mining Ltd on 7 November 2005. KL Gold (then Crocodile Gold) took over the assets of the failed GBS in November 2009. The area was reduced in 2008 and again in 2010.

EL28902 originally covered an area of approximately 653.23 square kilometres and was granted to Crocodile Gold (now KL Gold) on the 30<sup>th</sup> March 2012. The lease was reduced in 2012, 2014 and again in 2015.

In 2014, PNX Metals (then Phoenix Copper) signed a farm in deal, which covers all of EL25054, EL28902 and ML30293. KL Gold still retains the main Maud Creek mineral lease to the north of EL25054 (Figure 1). PNX are the current operators and have earned 51% interest in the tenements at the time of this report.

During 2018, 50% of EL28902 was relinquished.

**Table 1: Leasing Details**

Lease	First Granted	Next Expiry	Holder	Blocks	Area (sqkm)	Comments
EL25054	18/04/2006	17/04/2018	Newmarket Gold Holdings Pty Ltd	21		GR425
EL28902	30/03/2012	29/03/2018	Newmarket Gold Holdings Pty Ltd	33		GR425
ML30293	14/04/2014	13/04/2024	Newmarket Gold Holdings Pty Ltd		114.32 Ha	Separately Reported

## 6 GEOLOGICAL SETTING

### 6.1 REGIONAL GEOLOGY

The Project area is situated at the exposed southern margin of the Pine Creek Orogen, a tightly folded sequence of Lower Proterozoic rocks, 10km to 14km in thickness, laid down on a rifted granitic Archaean basement during the interval ~2.2-1.87Ga. The sequence is dominated by pelitic and psammitic (continental shelf shallow marine) sediments with locally significant inter-layered cherty tuff units. Pre-orogenic mafic sills of the Zamu Dolerite event (~1.87Ga) intruded the lower formations of the South Alligator Group (Ahmad et al 1993). During the Top End Orogeny (Nimbuwah Event ~1.87-1.85Ga) the sequence was tightly folded, faulted and pervasively altered with metamorphic grade averaging greenschist facies with phyllite in sheared zones.

The Project area straddles the southern margin of exposed Palaeoproterozoic rocks of the Pine Creek Orogen represented by the Finnis River Group. Only the upper part of the Finnis River sequence is represented and comprises the greywacke/tuff assemblage of the Tollis Formation (~1870Ma) with interleaved mafic rocks of the Dorothy Volcanic Member. The sediment source for the Tollis Formation was volcanic-rich, juvenile and proximal. The Maud Creek goldfields are hosted within the Maud Creek Dolerite which intrudes the Tollis Formation (Figure 2).

The Tollis Formation is unconformably overlain by the Edith River Group. The Edith River Group is dominated by the Plum Tree Creek Volcanics, which are an extensive ignimbrite suite that covers 6,000 km<sup>2</sup>. The Edith River Group is overlain concordantly by the Katherine River Group of the McArthur Basin (~1820-1710Ma). At Maud Creek, the Katherine River Group is represented by the Kombolgie Formation, the lowest Formation in the Group.

Numerous NE-trending dolerite and/or lamprophyre dykes cut the Lower Proterozoic sequence and have a magnetic expression.

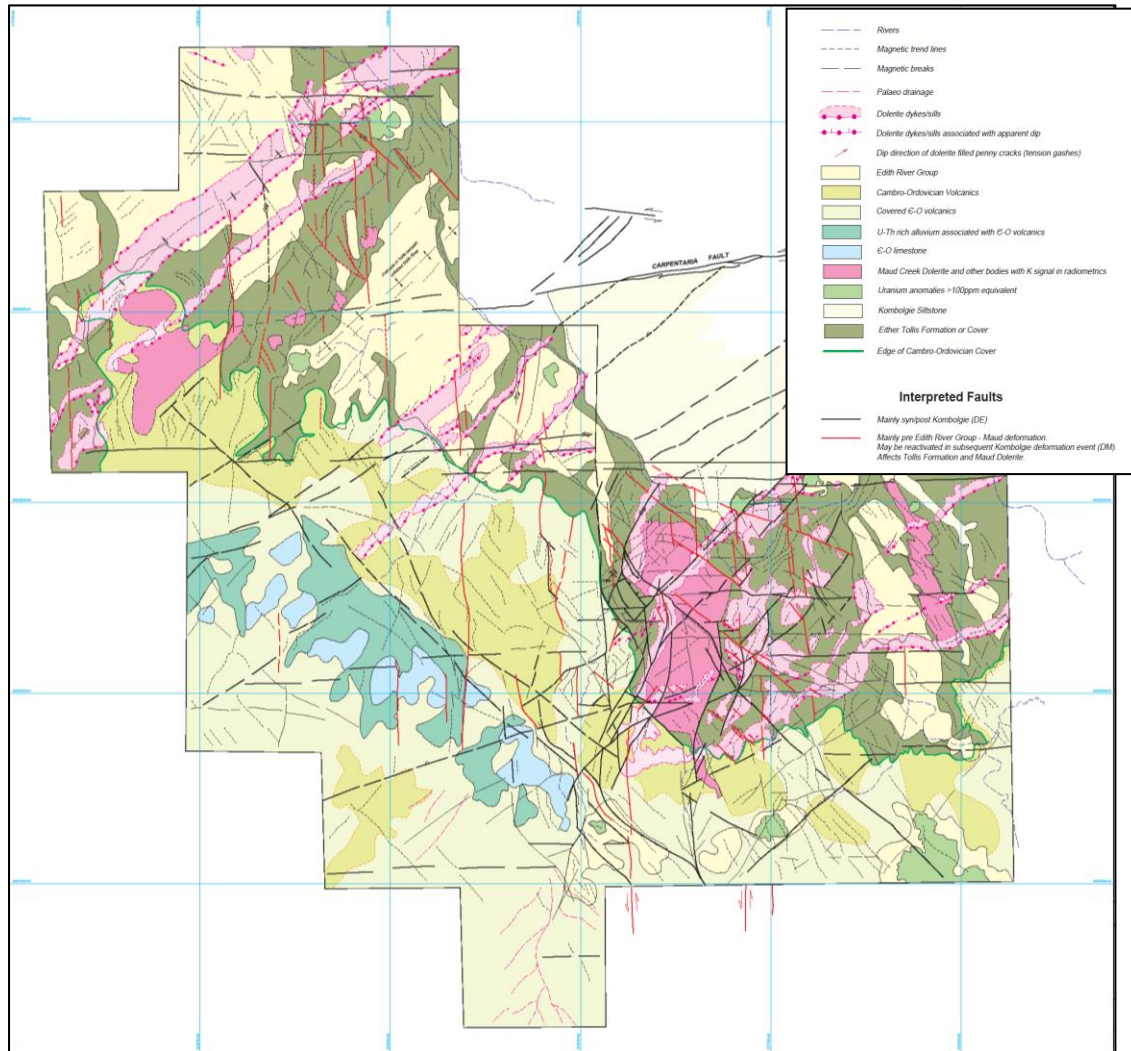
A depositional hiatus occurred between the middle Proterozoic and earliest Cambrian time which ended with the extrusion of the Antrim Plateau Volcanics in the early Cambrian (~510Ma), part of a widespread outpouring of sub-aerial basaltic lava in northern Australia and elsewhere. Numerous copper occurrences have been noted within and on the margins of the Antrim Plateau Volcanics, but to date none of significant size.

The Jindare Formation is a poorly documented unit wedged between the Antrim Plateau Volcanics (possibly interfingering with them) and the younger Daly Basin sediments. This is the primary target host for SEDEX mineralisation, consisting of sandstone, siltstone, shale, and conglomerate with a thickness of up to 200m.

Gently dipping Cambrian rocks of the Daly River Group unconformably overlie the Antrim Plateau Volcanics and are probably conformable with the underlying Jindare Formation, and in the area of study comprise the Tindall Limestone, which forms widespread outcrops around the margin of the Daly Basin. Although considered a secondary target, there is some potential for Mississippi Valley- type carbonate hosted Pb-Zn deposits within the limestone.

Gold mineralisation at the nearby Main Zone deposit at Maud Creek (North of EL25054) occurs at the sheared/brecciated contact between bedded Tollis Formation sediments (footwall) and mafic

tuff (hanging wall). The contact (Main Zone Structure) is a north striking, east dipping complex multistage reverse dislocation cut by cross-faults which interacted to assist dilation and focusing of the mineralisation (Harmony, 2002). Other known mineral occurrences in the project area are Mount Gates, Chessman-Red Queen and Carpentaria Valley. No gold occurrences have been reported in EL25054.



**Figure 2: Regional geology based on Kilkenny Gold 1998 Interpretation**

## 6.2 LOCAL GEOLOGY

The geology of the Project area comprises older Palaeoproterozoic meta-sedimentary and volcanoclastic sequences. These are unconformably overlain by the Meso- Proterozoic Kombolgie Sandstone, which forms scarps. Flat-lying areas are covered by Cambrian Antrim Plateau basalts, and Cambro-Ordovician limestone covers much of southern part of EL 25054. Economically important rock units of the project area comprise greywackes, mudstones and tuffs of the Palaeoproterozoic Tollis Formation. The Maud Dolerite intrudes the Tollis Formation and forms



irregular bodies up to 200m in width. The margins of the Maud Dolerite are strongly sheared, with mineralised quartz-filled shear zones. The Tollis Formation hosts the Maud Creek Gold Project on adjacent tenements.

The old Maud Creek workings were hosted within the Maud Dolerite. Gold occurs in quartz-hematite lodes varying from a few centimetres to a metre in width, trending NE and NW.

## **7 PREVIOUS EXPLORATION**

The Maud Creek goldfield was discovered around 1890, but the field was virtually abandoned in 1891. The goldfield was reworked between 1932 and 1934, but due to treatment difficulties only a small amount of gold was recovered. Approximately 400 tonne of ore was extracted from around 20 shallow shafts (6-12m depth) with drives around 15-20m long. The ore grade was around 30-45g/t Au.

Between 1966 and 1973 several companies explored the area for copper and uranium. Drilling of siliceous and gossanous breccias intersected anomalous copper and molybdenum in pyritic zones. Gold was not evaluated.

CSR explored the area for Kalgoorlie-style gold deposits during 1985 and 1986. Placer purchased all of CSR's Australian mineral assets in August 1988 and continued exploration of the project until 1992. In 1992, Placer granted a 5-year option to explore their tenements, and the option was exercised in 1994. Exploration activities included grid establishment and reconnaissance RAB drilling, stream sediment and rock chip sampling, airborne magnetic and radiometric survey (UTS Geophysics), aerial photography and geological mapping.

Pancontinental Mining along with JV partners explored for uranium mineralisation in the early 1970's. A target zone was the ABC prospect which reportedly had 1,073t @ 0.4% U as estimated by the BMR, and is located in the McAddens Creek Volcanic Member. Radiometric anomalies were followed up, but did not reveal any uranium concentrations.

Hunter Resources (through Eupene Exploration) conducted a stream sediment sampling programme to test the Proterozoic units for gold mineralisation. Stream sediment samples were collected from creeks draining Early Proterozoic rocks. Five kg samples were collected for cyanide leach gold analysis and also analysed for As, Cu, Pb and Zn by AAS. All Au values were <1ppb, and As <10ppm. Mild anomalism in Cu, Pb and Zn were attributable to Antrim Plateau Volcanics.

Trescabe Pty Ltd explored the Maud Creek project for base metal and gold. Twenty-two (5kg) BLEG stream sediment samples were collected, with a maximum value of 13.9ppb Au. There was no follow up work done on the anomaly.

Hill 50 Gold NL conducted minor exploration over the area including a review of airborne magnetic data and geological mapping.

The tenement then passed to Harmony Gold, then to Terra Gold Mining and on to GBS Gold Australia with little exploration conducted during this time.

GBS Gold Australia went into voluntary administration in 2008 and remained under care and maintenance with no exploration work completed. A review of the Maud Project was conducted which included EL25054. KL Gold then took over all GBS assets including EL25054 in November 2009.

During the 2011 reporting period, the flying of a detailed VTEM Geophysical survey of the tenement. A total of 584 line kilometres were flown over the Maud Creek project with 356 of these assigned to EL25054. This survey was flown between July and August 2011. The majority of the VTEM surveying on EL25054 was conducted at a sensor height of around 35-45 metres with line spacing's of 400m. The fly lines were generally in a northwest direction. Southern Geoscience, a geophysical consultancy group based in Perth, reviewed and reported on the data captured. A detailed report of the survey was delivered, which included the generation of several anomalies for follow up.

A total of 8 RC holes were drilled for 400m on the project testing soil geochemical anomalies identified from past work. One of these anomalies lies to the south of the main Maud Creek deposit on EL25054. Results from the drilling were not encouraging with no significant intersection noted in any of the holes.

KL Gold utilized Mercator Geological Services (a consultancy group based in Halifax, Nova Scotia, Canada) to commence work on a detailed geospatial database of all hard copy and digital data on file on site. This included maps, reports, GIS files, Geophysical files, drillhole and surface geochemical databases. Over a period of around 6 months a total of 841.6GB of data comprising nearly 781,000 files was sent to Canada for inclusion in the new database. These files consisted of over 20,000 library scans, 937 access databases and around 30,000 Mapinfo TAB files. There were also 7,000 geophysical files sent for the database.

The products of this work include a geodatabase and document review database.

In 2012, KL Gold conducted a 1657 Ionic Leach Soil sample program across the Chessman-Red Queen and Chlorite Hill Prospects; 20 stream sediment samples were also taken along with 43 Rock Chip samples during basic site recon of green field targets. A stream sediment program comprising a total of 164 samples was conducted over the Maud Creek Project area. Samples of -75 micron material were taken were sent to Australian Laboratory Services in Townsville to assay for 51 Elements by Aqua Regia, ICP-MS and ICP-AES. Results were interpreted, along with historical geochemical data, by Dr Nigel Brand of Geochemical Services Pty Ltd.

During 2013, rock chip sampling was undertaken in conjunction with field reconnaissance work in the Copper Breccia and Silver Lead Zinc Anomaly that was discovered with the Stream Sediment sampling program conducted in 2012. 15 samples were taken to test the extent of these anomalies.

The outcomes of this field reconnaissance and rock chip sampling were the identification of a hematite quartz breccia on a possible contact between the Jindare and Antrim Volcanics. To the west of the Awas locality, an approximate north-south trending zone of copper secondary minerals was located in what looks to be a historic alluvial mining stockpile. This trend was traceable over at least 1000m as malachite staining on carbonate nodules and joints within a weathered hematitic matrix.

In late 2014, management of exploration was handed over to PNX Metals as part of a farm in deal. PNX reprocessed the geophysical imagery and used the VTEM and magnetic datasets and to generate new targets. This led to a drilling proposal at Tractor Corner which was submitted and accepted under the NT drilling and geophysics co-funding initiative.

## **8 PREVIOUS EXPLORATION GR425**

### **8.1 2016-2017**

During the first group reporting year, four rock chip samples were collected east of the Chessman prospect on EL25054, and magnetic plate modelling of selected targets was undertaken. Two diamond holes, TCDD001 and TCDD002 were drilled into geophysical SEDEX targets under the co-funding initiative for a total of 580.8m.

No significant drill results were encountered. One rock chip sample, CRK002, returned 4.79% Cu which requires follow up. A number of geophysical targets were identified that require follow up.

## **9 EXPLORATION CURRENT PERIOD 2017-2018**

During this, the second year of group reporting, no further fieldwork was undertaken, other than rehabilitation of previous drilling sites.

Six sample pulps were assayed for major elements, primarily to check the quality of the Tindall Limestone in the top part of the 2016 drilling. The limestone has been recrystallised and the magnesia content is relatively high, with the six samples producing a weighted average of 33.1% CaO and 7.3% MgO.

## **10 CONCLUSIONS AND RECOMMENDATIONS**

The rock chip sampling has discovered a copper occurrence (sample CRK002 – 4.79% Cu) previously unknown to the east of the Chessman gold prospect (ML30293). This occurs in a structurally complicated area, as evidenced by disrupted magnetic dykes. Follow up work needs to investigate the extent and possible source of this occurrence.

Drilling at Tractor Corner has downgraded the prospect for SEDEX style mineralisation, however the drilling has shown that the VTEM appears to be imaging basement under Cambrian cover. A number of other conductors in the tenement area identified, some of which have the same orientation as the Maud Creek gold deposit. The potential for discovery of gold mineralisation within the leases is considered high.

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