EL23687, EL 27317 and EL 27318

Lake Woods

Final Report

11 June 2003 to 29 April 2011

Cover Photo: Google image of a portion of the project area showing the arenaceous sandstone ridges, brown colluvium derived from dolerite (centre) and the extensive black soil plains (left) which surround Lake Woods

Authors: compiled by M.M.Buskas
Tenure Holders: Crossland Diamonds Pty Ltd
Submitter of Report: Crossland Uranium Mines Ltd
Date of Report: 14 June 2011
# Table of Contents

1 Summary ................................................................................................................ 1
2 Introduction ............................................................................................................ 2
3 Location and Access .............................................................................................. 2
4 Tenure .................................................................................................................... 3
5 Previous Exploration ............................................................................................. 4
6 Geology .................................................................................................................. 6
   6.1 Regional Geology ........................................................................................... 6
   6.2 Project Geology .............................................................................................. 6
      6.2.1 Lake Woods Beds ....................................................................................... 6
          6.2.1.1 Stratigraphic setting and depositional environment ......................... 6
          6.2.1.2 Sedimentary Rock Types ..................................................................... 7
      6.2.2 Intrusive Rocks ............................................................................................ 9
7 Structure ............................................................................................................... 10
8 Economic Geology ............................................................................................... 12
9 Exploration Activities ........................................................................................... 13
10 Conclusions ......................................................................................................... 21
11 Expenditure .......................................................................................................... 21
12 Bibliography ........................................................................................................ 21
List of Figures

Figure 1. Tenements Location 3
Figure 2. Lake Woods geology and previous exploration 5
Figure 3. 2005 Diamond Sample Locations 14
Figure 4. 2005 geochemical sample locations. 15
Figure 5. Regional magnetic 16
Figure 6. Lake Woods total magnetic intensity 18
Figure 7. Drill hole locations. 19
1 Summary
The Lake Woods project is located 700 km south of Darwin and 200 km north of Tennant Creek. The project area is centred on the Ashburton Range which runs north-south along the eastern margin of Lake Woods, a large seasonal lake. The Stuart Highway passes through the centre of the area. The Geology of the region is represented by the Middle Proterozoic Renner Group sediments, which have been intruded by pre-Cambrian dolerite. Previous exploration within the district has focused on the potential for diamonds and base metals but has been limited due to poorly developed drainage and widespread alluvial and aeolian cover.

The area was originally identified as conceptual target area based on proprietary methods and modelling conducted by Paradigm Geoscience Pty Ltd. Exploration and associated activities conducted on the relinquished ground in the period 11 June 2003 to 29 April 2011 consisted of:

- literature studies and compilation of historical exploration data
- project planning utilising the historical data
- Field geological reconnaissance and collection of alluvial stream sediment and rock samples.
- Preparation and mineralogical examination of diamond samples.
- reinterpretation of government magnetics-radiometrics data
- airborne EM (TEMPEST) survey and subsequent geophysical modelling
- reconnaissance geological mapping and follow up ground truthing of geophysical anomalies
- Aircore and diamond drilling
2 Introduction

This report describes the results of exploration activities conducted within the surrendered area during the eight years of tenure from June 2003 to April 2011. Field work carried out on the entire tenement in the reporting period was of a regional nature and extended into the adjacent project licences. The area relevant to this report was covered by both government and Crossland airborne geophysical surveys. Regional sampling, aircore drilling, diamond drilling, and airborne geophysical surveys are the only recorded exploration activities within the area.

The Lake Woods Project area was selected as a conceptual target area using confidential technology supplied by Paradigm Geoscience renamed Global Geoscience Limited. The aim of the technology is to identify targets for mineral exploration with the same signatures as major mineral deposits. The method offers a means to identify important mineral resources without the need to acquire title to broad areas, with the resultant demanding access and land use challenges. Because of the restricted areas selected, more intensive exploration than would be normal in greenfields exploration can be focussed on the limited area by even junior mineral explorers such as the holders.

Recent field activities (2008-2010) and on-going geophysical interpretation have resulted in new concepts relevant to base metal and diamond exploration in the project area.

EL 27317 and EL 27218 were surrendered on 6 April 2011. EL 23687 was automatically cancelled on 29 April 2011 due to the granting of 2 SEL (28198 and 28199) which encompass all of the surrendered area.

3 Location and Access

The Lake Woods project is located 700km south of Darwin and 200km north of Tennant Creek. The project area is centred on the Ashburton Range which runs north-south along the eastern margin of Lake Woods, a large seasonal lake. The Stuart Highway passes through the centre of the area and the recently completed North Australian Railway is located 40km to the west. The small town of Elliot lies immediately to the north and Renner Springs is located 40km to the south.

The western portion of the project area is dominated by sandstone ridges of the Ashburton Range, which slope off to the west towards Lake Woods. East of the Highway the land slopes off to the east and into the vast plains of the Barkly Tableland where most of the country is open but generally covered with low, thick scrub. Access to the area is good with a combination of station tracks, disused stretches of the Highway, and good off road conditions between the sandstone ridges.

The tenement lies on Tandyidgee and Powell Creek Stations owned by Consolidated Press Holdings Limited, and Helen Springs Station owned by Stanbroke Pastoral Company Pty Ltd. Two native title claims are present within the area covered by the EL:

- D6038/01 Powell Creek, lodged on 21/06/01, NNTT number DC01/37.
- D6036/01 Tandyidgee/ Powell/ Helen Springs, lodged on 21/06/01, NNTT number DC01/35.
Figure 1. Tenements Location

4 Tenure

EL 23687 was granted to Crossland Diamonds Pty Ltd for a six-year term on 11 June 2003. The tenement was reduced to 16 blocks or 52.1 km² for the final term of the licence, which ended on 10 June 2009. Renewal of the licence for a further two years (years 7 and 8) was granted in 2009. The tenement was automatically cancelled on 19 April 2011 pending rationalisation of SEL 28198 and SEL 28199.
EL 27317 was granted on November 10, 2009. The tenement consists of 8 blocks or 26.03 km².

EL 27318 was granted on November 10, 2009. The tenement consists of 1 block or 3.255 km². There have been no reductions to date.

EL 27317 and EL 27318 were surrendered on 6 April 2011.

### 5 Previous Exploration

Exploration for base metals was undertaken by Aberlour in 1971-1972 and by Lone Pine Gold/NT Gold Mining/Rosequartz Mining during 1988-1990. The latter group undertook geological mapping and limited geochemical sampling but failed to identify any base metal anomalism. Their activities were limited to the Ashburton Range where rock exposure is good. Overall, there has been very limited exploration for commodities other than diamonds in the area.

Ashton Mining Ltd explored the area for diamonds between 1983 and 1991 under exploration licences 4337 and 4345. They collected 75 gravel and 30 loam samples covering most of the western half of the project area at a nominal density of one sample every 1-2km along drainage. The gravel samples consisted of 40 kg of <4 mm material. Many of the samples were collected from the area between the Ashburton Range and Lake Woods where the land is very flat and the creeks are choked with sand. The eastern half of the area was not sampled because of the lack of drainage. Five of the Ashton samples contained single microdiamonds. Two of the microdiamonds were described as clear, colourless stones while the remainder comprised small irregular cubes of pink-brown and grey colour. Whilst Ashton considered the high concentration of diamonds in this area as interesting they decided to focus on other areas in the Northern Territory and relinquished the licences. Aberfoyle Exploration P/L were in JV with Ashton for some of this period.

In the early 1990’s CRA Exploration held tenure over an area totalling 14,800 km² and covering the eastern half of the Lake Woods project area. CRA considered the area prospective for diamonds and flew a detailed magnetic-radiometric survey over an area of 10,900 km². The survey was flown in 1992 at flight line spacing of 300 m and a terrain clearance of 60 m. Of the 53 targets CRA selected for follow-up only one falls within the Lake Woods project area and it was explained as a cultural feature. No further work was undertaken by CRA within the project area.

In 1999 the NTGS flew the South Lake Woods Survey at a line spacing of 400 m and a flying height of 60 m. This survey covers most of the project area and when combined with the earlier CRAE survey, full coverage is achieved.

Exploration for base metals was undertaken by Aberlour in 1971-1972 and by Lone Pine Gold/NT Gold Mining/Rosequartz Mining during 1988-1990. The later group undertook geological mapping and limited geochemical sampling but failed to identify any base metal anomalism. Their activities were limited to the Ashburton Range where rock exposure is good.
Figure 2. Lake Woods geology and previous exploration
6 Geology

6.1 Regional Geology
The Lake Woods project area is located in the southeast corner of the NTGS 1:250,000 Geological Map Series Beetaloo sheet SE 53-6. Geologically it is within the Ashburton Province (1400-1700 Ma), which consists of a sequence of unmetamorphosed and weakly deformed, predominantly shallow marine sediments. The Ashburton Province overlies the Warramunga Province, which is deformed by the Tennant Orogeny (1850 Ma) and intruded by granites of the same age. The Ashburton Province is in turn, overlain by Palaeozoic sediments of the Georgina and Wiso basins to the east and west respectively. Based on the magnetic patterns, both the Wiso and Georgina Basins are probably represented in the project area.

The oldest rocks that outcrop in the tenements are Middle Proterozoic evaporitic sandstones and conglomerates of the Renner Group, which form the ridges of the Ashburton Range. The sequence is intruded by a sill consisting of ‘dolerite’ and the newly determined alkali syenite/gabbro (1295+/-14 Ma). The intrusive rocks have been shown to be more widespread than past mapping suggests as they tend to be susceptible to intense weathering and therefore recessive.

The Renner Group is designated as Mesoproterozoic in age and unconformably overlies the Namerinni and Tompkinson Creek Groups south of the tenement area near Renner Springs. It is divided into five formations, namely the Gleeson, Baralandji, Powell, Wiemty and Jangirulu. Conformably overlying the Jangirulu Formation are the Lake Woods Beds. Within the latter, recent mapping by J Seeley (2008) has identified several cycles of deposition, in which similar lithologies are repeated three or four times from east to west over a distance of 20 km. This conformable bedded sequence comprises quartz arenite, hematitic quartz arenite, arkosic sandstone, dolomitic siltstones and grey shales.

6.2 Project Geology
The project area is centred on the Ashburton Range which forms a gentle, north plunging anticline with a near north south axis running parallel and immediately east of the Stuart Highway. Mapping by Crossland personnel has resulted in the following observations and interpretations.

6.2.1 Lake Woods Beds

6.2.1.1 Stratigraphic setting and depositional environment
Conformably overlying the Jangirulu Formation of the Renner Group are the Lake Woods Beds, which underlie most if not all of the mapped portions of the tenement area. There are at least five recognisable lithologies exposed from east of the Stuart Highway through to Lake Woods in the west. There appears to have been several cycles of deposition in which similar lithologies are repeated three or four times from east to west over 20 kilometres. The conformable bedded sequence comprises quartz arenite, hematitic quartz arenite, arkosic sandstone, dolomitic siltstones and grey shales. A substantial dolerite sill was intruded into the sedimentary sequence and is exposed in
western parts of the area. The stratigraphic sequence was adequately covered by mapping along east-west traverses normal to the clearly defined structural trends of the area (see the front cover of this report).

Folding is not evident within the tenement. Strikes taken on the full lithological sequence across the region are consistent and within the range 340° to 360° degrees. Dips are consistently to the west, however, the angle decreases westwards to become almost flat lying. Immediately west of Stuart Highway exposures of quartz arenite dip west at 50° to 60° degrees. In central parts of the area dips decrease form 40° to 20° degrees and reduce to 10° degrees or less in the most westerly outcrops.

The overall structure west of the highway is suggestive of a gentle warp since exposures examined within five kilometres to the east have low angle westerly dips. Several road cuttings 20 to 25 km to the south have exposed quartz arenite with low angle dips to the east. If these rocks are a southerly extension of the Lake Wood Beds then a possible anticline is present. North and immediately east, satellite imagery shows a shallow syncline centred about 370000 E and 8020000 N with an axial trend of 340° and parallel to structures west of the highway.

Large exposures of quartz arenite show well preserved ripple marks, mud cracks and cross bedding. These are common features seen throughout the area and the best examples of which crop out along the old highway. Based on the consistency of the ripple morphology throughout the stratum, provenance appears to have been from the southwest.

The environment of sedimentary deposition for a large proportion of the observed rock types is considered to be intertidal shallow water with a paleoclimate that probably remained arid for lengthy periods prior to a new sedimentary cycle. The inter cycle arid climate is substantiated by the presence of fossil mud cracks and by probable laterite formation. The laterite occurs as intraformational or interbedded ferruginous breccias and its possible origins are discussed in a later section.

Finer grained sediment types such as dolomitic siltstone or mudstone together with grey shales were deposited on a marginal platform or in slightly deeper waters of an evolving basin.

6.2.1.2 Sedimentary Rock Types

- Quartz arenite

Quartz arenites are the most common visible rocks to crop out throughout the project area. They comprise white to grey massive or bedded indurated flaggy sandstones, resistant to weathering, and forming north-northwest striking ridges. Essentially they are quartz-rich sandstones, in which rounded quartz grains have overgrowths and are cemented by colloidal silica. In metamorphic terms the rock is quartzite, however in the absence of any regional metamorphism, quartz grain cementation is primarily a function of the diagenetic process and induration.

Individual beds of quartz arenite vary in thickness from a few centimeters to greater than five metres and extend laterally for tens of kilometres; these major lithological horizons can be traced along strike for over 80 km on satellite imagery.
Columnar jointing caused by the contact effect of the sill is a distinctive feature of the arenite immediately overlying the intrusion (Photo 1). Another contact-related phenomenon can be seen in thin section, where the quartz grain component of the arenite has been ‘welded’ to form a quartzite.

Hematitic quartz arenites with ferricrete and breccia development are interbedded with the quartz arenites; these ferruginous arenites are laterally extensive and display similar current bedding and ripple structures to the arenites (Photos 2 and 3). Iron oxide acts as part of the cement within the arenite and most probably is dominated by hematite. Several origins are proposed as possible sources for the abundant iron oxides present in these rocks.

- One is that weathering and dissolution of ferromagnesian minerals in the sill produced iron-rich solutions that percolated down joints and fractures in the underlying arenite and recrystallised as a ferruginous cement.
- Periodic deposition of iron oxide precipitated from seawater during sandstone accumulation.
- The ‘breccias’ could have been formed by the fluidity of evaporate minerals in the contact dolomitic siltstone that were subsequently weathered to form a spongy limonitic breccia matrix.

- **Dolomitic siltstone and shale**

Dolomitic mudstones or siltstones are found in the south central part of the surveyed area bordered by ridges of the resistant arenites. These recessive softer sediments crop out at the head of a broad valley and are largely covered by colluvium. Downstream from the outcrops the valley is 1.5-2 km wide with extensive alluvial flats and a sand filled drainage system.

The outcrops of dolomitic siltstone are confined to small dendritic drainages imposed on thick colluvial cover and only two or three small exposures enabled strike and dip readings to be taken. Beds strike 340°-350° with westerly dips of 45°-50° indicating that the dolomitic and shale sequence conformably overlies arenites to the east and underlies the arenaceous rocks immediately west of the outcrops.

Soft dolomitic sediments and shales are easily weathered, which accounts for their lack of exposure. In all outcrops they are particularly friable and easily crumble into powder or small fragments. Gypsum crystals form within exposed dolomitic siltstone layers (Photo 4) and in accumulated piles of eroded dolomitic material in creek beds. Gypsum crystals are common in shales and aeolian sands where there is a source of calcium and sulphur. Sulfurous acid produced during weathering of iron sulphides is a possible source of sulphur for gypsum production. While no visible pyrite was seen during mapping of the outcrops the overlying grey shale may indicate euxinic facies-type deposition with reducing conditions that may have enabled the growth of syngenetic pyrite or deposition of anhydrite. More probably, the gypsum formed during sedimentation or diagenesis of the sediment, and could have been accompanied by other evaporitic minerals.

It is proposed that this unit acted as a pathway for the intrusion, causing assimilation of the sediment into the magma. The varied composition of the dolomitic and evaporitic-type sedimentary assemblage is likely to have compositionally affected the margins of the intrusive body.
Photo 1. Spectacular columnar jointing in quartz arenite.

6.2.2 Intrusive Rocks
An extensive sill-like intrusion is located on the western flank of the anticline, forming a pronounced escarpment. It is highly weathered in outcrop and has limited cliff-face exposures over some ten kilometers, beyond which it remains covered by the sediments or is obscured by thick alluvium and colluvium in the valley floor and sides (Photo 5).

In the 1980’s the intrusion was noted by personnel involved in drainage sediment surveys, who were sampling for diamonds, but little importance was attached to it. During government mapping of the Helen Springs sheet (Hussey et al 2001), the presence of dolerite intruding the Lake Woods beds was noted but only mentioned in passing in the explanatory notes. It appears that the composition, the lateral extent and thickness of the sill and its regional setting went largely un-noticed until the 2008 drilling programme results were assessed and integrated with the government aeromagnetic data. This led to a reinterpretation by Crossland’s consultants. Magnetics show the intrusion to have a potential strike length in excess of 50 km ( Figure 5). Petrographic studies and XRD identifications carried out at ANU, Canberra (Seeley, 2009) determined that samples of the intrusive consisted of a “complex quartz-bearing alkali syenite with a mineralogy and texture derived from un-mixing during differentiation” (Seeley, 2009).

Further scrutiny of the magnetics suggested that a strong and complex magnetic signature located immediately west, as well as to the east of the project boundary, could represent a previously unknown volcanic/sub-volcanic terrane. It was suggested that the syenite/gabbro could be related to this terrane with a consequent increase in the prospectivity of the region.
The data shows a typical volcanic-terrane magnetic signature. The interpreted volcanics may be an unrecognised more easterly extension of the Early Cambrian Antrim Plateau Volcanics, which cover vast areas of the western and northwestern Northern Territory or alternatively, a previously unknown older volcanic field.

Photo 2. The photo shows the contorted contact between gypsiferous sediment (pale) and the overlying hematitic quartz arenite beds.

7 Structure

Structure within the tenement area is relatively simple comprising an asymmetrical anticline with a small warp on the western flank limb. The anticlinal axis is located immediately east of the Stuart Highway and has a gentle NNW plunge.

The conformable bedding sequence trends 340° for the most part with dips of 50°- 60° immediately west of the anticlinal axis. Bedding dips decrease to 10°-20° in the most westerly exposures of arenaceous rocks. In the south of the area the stratigraphic sequence undergoes flexure as the strike of the bedding swings from 340° to 020°.

Based on satellite image interpretation and field mapping there is little evidence of normal, reverse or strike slip faulting within the project area.
Photo 3. Ferruginous layered and brecciated sandstone

Photo 4. Gypsiferous dolomitic sediment
8 Economic Geology

No known mineralised occurrences are present within the tenements. Historically, the regional emphasis has been directed towards exploration for base metals and diamonds but this has been hampered by poorly developed drainage systems combined with widespread colluvial cover. The Renner Group was apparently correlated with sediments in the McArthur Basin, which host the McArthur River base metal deposits; however more recent mapping has shown that the correlated units belong to the older Tomkinson Creek Group, which is in unconformable contact with the Renner Group. Favourable rocks in the former contain uneconomic occurrences of Pb-Zn-Cu sulphides. The Bootu Creek Manganese deposits occur in the Bootu Formation, which is included within the Tomkinson Creek Group.

The most recent interpretation of the geological setting of the Target Area suggests that deposit types likely to occur in this geological environment include base metals in the Palaeozoic sediments, copper-nickel in intrusive complexes, stratabound manganese similar to the Bootu Creek deposits, and diamonds within sub-cropping intrusive pipes. Sedimentary phosphate deposits are also a possibility in this type of environment. Assuming that the subsurface magnetic signature does represent an igneous province, then two possible economic scenarios are proposed:

- a southeasterly extension of the Cambrian Antrim Plateau Volcanics (Kalkarindji Continental Flood Basalt Province). The Antrim volcanic terrane is comparable to a number of other continental flood basalt terrains around the world, all of which are associated with world class mineral deposits particularly Ni-Cu, Cr and PGE’s.
• a discrete alkaline igneous complex. Alkaline complexes around the world are
associated world class deposits of Cu, Au, REE’s Ti, P and diamonds.

9 Exploration Activities

During years 1 and 2 (2003-2005) the company collected a total of 17 stream sediment
mineralogical samples for diamonds and indicator minerals from within the tenement and
surrounding area. Samples consisted of 15-20kg sample of -1.2mm screened stream
sediment collected from carefully selected heavy mineral trap sites. Samples were
submitted to Global Diamond Exploration Services Pty Ltd of Wembley, WA (GDES) for
processing and observation. Samples were sent by GDES to a commercial laboratory
for processing to produce a heavy mineral concentrate. Sample concentrates were then
returned to GDES and checked for indicator minerals, diamonds and microdiamonds.

Four of the twelve samples collected each contained a single microdiamond. In total,
seven of the seventeen samples collected by Crossland Mines contained a single
microdiamond and two of these are clear/translucent, unresorbed octahedra. The
microdiamond distribution suggests a potential source in the central-eastern part of the
licence area. Two other samples each contained a single chromite of uncertain origin.
The chromite grains are of interest but may be derived from a source other than
kimberlite. Results are listed in Appendix 1.

Additionally the company collected a total of 38 geochemical samples: 24 stream
sediment, 3 pisolite, 7 aeolian sand/soil, and 4 rock chip samples. Stream sediment
samples consisted of approximately 200g of <180 micron (-80#) material collected from
active sites in the stream bed where elements transported in solution could be adsorbed
onto fine particles or precipitates. It was hoped that further prospecting would reveal
more extensive distribution of the ferruginous shale which returned anomalous
geochemical results in 2003. It eventuated that there was no more suboutcrop of this
material and the previous occurrence seemed to be a window protruding from beneath
(?)unconformably) overlying sandstone, or aeolian sand. To attempt to map distribution of
the anomalous shale, pisolite samples were collected from the >1.2mm fraction of the
Aeolian sand, while soil/sand samples were collected from the <1.2mm fraction.

All geochemical samples were prepared by North Australian Laboratories of Pine Creek,
and fire assay prills prepared for analysis by ICPMS for Au, Pd, and Pt. The prills and
pulps were forwarded to NT Environmental Laboratories and analysed for a suite of 61
other elements by Inductively Coupled Plasma (ICP-MS/ OES). Results are listed in
Appendix 1.
Figure 3. 2005 Diamond Sample Locations
Figure 4. 2005 geochemical sample locations.
In 2006 Crossland Director and geophysicist Mr. R. L. Richardson reviewed the available airborne magnetic data concluding there were features of interest as potential drill targets given the indications of prospectivity outlined above. However these needed further definition before drill targets could be nominated. Furthermore it was possible that potentially diamondiferous pipes and shallow sulphide accumulations associated with the evaporate-dolerite contacts could be characterised by electromagnetic geophysical techniques. A decision was taken to commission a Hoist EM survey to take advantage of the availability of that equipment at the nearby Bootu Creek manganese project in August 2006, but the contractors experienced instrument problems and were unable to undertake the survey. Attempts to have a survey done in the current year were rewarded in August, when Fugro Airborne Surveys Pty Ltd undertook a survey of 845 line km using the TEMPEST system.

Figure 5. Regional magnetics
Fugro Airborne Surveys Pty Ltd undertook a survey of 845 line km using the TEMPEST system in August 2007. All survey data was reviewed by Mr. R. L. Richardson who concluded that there were some features of interest as potential drill targets. Flight line by line profiles are found in Appendix 2.

**Magnetics**
Based on a number of mapped traverses across the structures and comparing the geology with the geophysical plan and individual cross-sections it is confirmed that the western magnetic anomaly coincides with exposed dolerite. The dolerite appears conformable with the sedimentary sequence and is of sufficient thickness and north-south lateral extent to have a significant non-exposed dimension to the east, beneath the valley floor. This interpretation was substantiated by recent air core drilling across the valley which found dolerite beneath the thick alluvial cover.

Structural interpretation of the area comprises a warp on the flank of a broad anticline. If this interpretation is correct then central and eastern magnetic anomalies may well outline the near surface trace of dolerite sill (or flow?) on either side of the shallow anticline referred to in the structural section; the bulk of the anticlinal portion of the projected sill has been eroded although the most easterly magnetic horizon may reflect a buried portion of dolerite. However, the area is largely sand covered with no visible outcrops.

**Conductive Horizons**
At least two distinct zones of conductive material or overburden are recognised in the mapped area. The first type of conductive horizon forms parallel zones which occur in close proximity and generally immediately east of the linear magnetic anomalies. These zones coincide with laterite caps or colluvial and alluvial material derived from dolerite or laterite. Abundant pisolitic material and red sand develops on the valley floors or adjacent to laterite caps in close proximity to the laterite and dolerite. Pisolites and ferruginous cemented laterite both exhibit weak magnetic susceptibility with a hand magnet. There is sufficient material both in lateral extent and thickness to suggest that these surficial accumulations are the source of conductors and conductive overburden.

The western conductive zone is the strongest and widest zone and occurs well to the west of the magnetic anomaly, dolerite outcrops or obvious conductive material. This anomaly is developed within the black soil flats marginal to Lake Wood. Lake Wood is a seasonal, closed drainage basin with varied amounts of water at any one time. Both water table and ground water salinity most probably fluctuate markedly from season to season and year to year. There are extensive salt flats surrounding the lake in dry seasons and even away from visible surficial salts, dissolved salts and ground water are probably the most obvious source of electrolytes and the cause of the western conductivity zone.
Rock chip geochemical sampling was carried out during an extensive mapping program in July 2008. The main objective of the survey was to determine the nature and composition of the stratigraphic succession underlying colluvium and alluvium in the valleys between arenaceous ridges. Laterite sampling was also carried out to determine if there were any pathfinder elements that could lead to buried or distal ore bodies. A total of 12 samples were taken and submitted to Northern Territory Environmental Laboratories Pty. Ltd. for multi-element analysis using ICPMS and ICPOES. The location and results of the analysed samples are given in Appendix 3.

The mapping and sampling was followed up by air core drilling, a program of east-west traverses across the bedding strike was designed to determine the composition of the buried stratigraphic sequence. Holes were angled at 60 degrees to the east to best intersect beds dipping west at 50 to 60 degrees. Figure 7 shows the location of drill sites and samples on the two traverses designed to determine the stratigraphy in recessive
zones. Drill logs of all air core drill holes are found in Appendix 4 and the photographic record of these logs is found in Appendix 5.

Results of the drill traverses showed that Lines 2 in the east encountered soft both oxidised and reduced siltstones and mudstones and gypsum bearing shales; composite samples were taken for assay. Line 3 was drilled in the most westerly valley and in which a large dolerite sill forms an escarpment along the western side. Drilling along Line 3 determined that the dolerite sill continued beneath the alluvium of the valley floor. The base of the sill was not encountered but the information gained suggests that the dolerite sill is laterally extensive with a true thickness in excess of 40m.

Figure 7. Drill hole locations.
In 2009, on the basis of previous research carried out by the company’s consultants, it was proposed to drill three holes into and through the intrusion, firstly to determine its relationship with the intruded rocks, secondly to acquire samples for petrography, chemistry, mineral content and age dating and thirdly to ascertain if there were indicators of economic potential resulting from a more detailed understanding of the intrusion. This work was completed as part of the Northern Territory Government’s geophysics and drilling collaborations initiative.

The programme consisted of three diamond drill hole, two of which fall within the tenements covered by this report. Selection of drill hole locations was based upon:

- **LWDDH1- 359649E 8012518N (EL 27317).** Sited on a mag high, which is one of several that form an elongate arc of mag highs, presumably tracing the edge of the layered intrusion.

- **LWDDH3 - 358965E 8014899N (EL 23687).** The immediate area is rather complex magnetically. The hole tested the strong linear mag feature that defines the margin of the complex mag domain to the west and the smooth mag domain to the east. This feature may be a separate intrusive along the domain boundary and independent of the more flat dipping syenite.

Results from this drilling provide the possibility of a lower crustal-upper mantle origin for the intrusive material and could suggest that the magma was generated proximal to the diamond/graphite stability field, which could account for the presence of microdiamonds in the streams draining outcrops of the sill. An original composition for the intrusion could have been lherzolite or alkaline gabbro. There is however complication in determining a composition for the primary magma resulting from the total assimilation of a thick sediment (siltstone/dolomitic siltstone) sequence by the magma during passive emplacement.

Sixteen samples were collected from drill hole LWDDH01 and sent to ALS laboratories for analysis. See Appendix 8 for the tabulation of these results correlated with the sample depths. Several different methods of analysis were used, which are summarised below.

- **Au, Pt, Pd :** Lab method code PGM-MS24 – FA then ICP-MS finish using a 50 g sample. Detection limit 0.001-1 ppm.

- **Ag, Ba, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Ga, Gd, Hf, Ho, La, Lu, Mo, Nb, Nd, Ni, Pb, Pr, Rb, Sm, Sn, Sr, Ta, Tb, Th, Tl, Tm, U, V, W, Y, Yb, Zn and Zr :** Lab method code ME-MS81 for Rare Earths and Trace Elements. Variable detection limits. Results in ppm.

- **As, Bi, Hg, Sb, Se :** Lab method code ME-MS42 for ultra-trace level method, 4 acid near-total digestion. Variable low levels of detection. Results in ppm.

- **Ag, As, Cd, Co, Cu, Mo, Ni, Pb, Zn :** Lab method code ME-4ACD81, fusion with lithium metaborate. Low detection level. Results in ppm.

- **SiO2, Fe2O3, CaO, Mgo, Na2O, K2O, Cr2O3, TiO2, MnO, P2O5, SrO, BaO: Lab method ME-ICP06, fusion with lithium metaborate. Results in %.**
There were also specific analyses for Carbon, Sulphur and LOI

There were no indications of significant anomalous base or precious metals. Drill logs, and assay results can be found within Appendix 6 and 7

A 7 kg sample of core from the central portion of the sill in hole LWDDH03 was submitted for age determination to the Australian National University in Canberra. The work was undertaken by Dr. Mark Fanning of ANU. The sample is No.73501 and was taken from the interval 73.39 to 73.88 m

From the current data set the best estimate for the crystallisation age of the scarce baddeleyite grains recovered from the sample is 1295 ± 14 Ma.

Full details of the drilling collaboration are listed within Northern Territory Government Open File Report CR2010-0226

10 Conclusions

The geology and economic potential of the region has been studied in some detail over the three years of activities on the licence and the project area as a whole. The latest programme of diamond drilling, while providing useful data, was not conclusive in supplying positive evidence towards the economic prospectivity of the region. There remains the question of the origin of the microdiamonds and the nature of the regional scale magnetic terrane as determined from the reinterpretation of the magnetics data. Is there a connection between the anomalous accumulations of unusual microdiamonds and the suggested ‘new’ volcanic terrane? Further work on tracking down the possible sources of microdiamonds is probably justified. There is potential for the presence of Cambrian phosphate deposits in younger sediments on both the western and eastern sides of the Ashburton Ranges. The presence of phosphatic rocks of probable economic interest in both the Wiso and Georgina basins has been established.

11 Expenditure

The principal activities included office studies (data acquisition, compilation and interpretation), report compilation, geophysical surveys (implementation, data acquisition and interpretation) and field work. Over the period of tenure a expenditure reached $253529.30 on EL23687, $42700.29 on EL 27317, and $12427.72 on EL 27318. See expenditure statements in Appendix 9.

12 Bibliography


CR1990-0131 Annual and Final Report A. Romanoff Rose Quartz Mining EL6333


Melville, P.M., 2010. EL 23687 , EL 24250, EL 25631, EL 27317, and EL 27318 Lake Woods Project Combined Annual Report 3 October 2009 to 2 October 2010