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

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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 3rd October 2005 to 2nd October 2009, consisted of

- literature studies and compilation of historical exploration data
- project planning utilising the historical data
- 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
2 Introduction

This report describes the results of exploration activities conducted within the relinquished blocks during the four years of tenure from October 2005 to October 2009. 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 groups of relinquished blocks relevant to this report were covered by both government and Crossland airborne geophysical surveys. These surveys are the only recorded exploration activities within the relinquished areas.

The Lake Woods Project area was selected as a conceptual target area using confidential technology supplied by Paradigm Geoscience recently 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 (2008-2009) and on-going geophysical interpretation have resulted in new concepts relevant to base metal and diamond exploration in the project area.

3 Location and Access

Exploration Licence EL24520 is located approximately 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. See Figure 1. The Stuart Highway passes through the tenement and the North Australian Railway is located 40 km to the west. The small town of Elliot lies immediately to the north and the Renner Springs Roadhouse is located 40 km to the south.

The licence is dominated by north-south striking sandstone ridges of the Ashburton Range, which slope off to the west towards Lake Woods. East of the highway the land slopes gently to the east, into the Barkly Tableland. The country is fairly open but is covered in places with low, thick scrub. Access is good with a combination of station tracks, disused stretches of the old Stuart Highway, and good off road conditions between the sandstone ridges.

4 Tenure

EL24520 was granted for a six-year term commencing on 3rd October 2005 and expiring 2nd October 2011. The title originally covered an area of 165 one minute graticular blocks (539.5 km²), extending between 133°31’E and 133°46’E and 17°36’S to 18°02’S. A reduction to 109 blocks (356.43 km²) took place in 2009 at the end of Year 4. See Figure 2 for locations of the relinquished blocks.

The EL is held by Crossland Diamonds Pty Ltd, a wholly owned subsidiary of Crossland Mines Pty Ltd, which in turn is a wholly owned subsidiary of Crossland Uranium Mines Limited.

The ground is within the Elliot (5662) and Helen (5661) 1:100,000 mapsheets and SE53-06 Beetaloo and SE53-10 Helen Springs 1:250,000 mapsheet.
Figure 1.
Figure 2
5 Previous Exploration

Exploration activities within the district prior to Crossland’s (and associated companies) involvement have focused on the potential for diamonds and base metals. Work has been limited due to poorly developed drainages and widespread alluvial and aeolian cover.

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 1-2 km 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.

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.

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. See Figure 3. 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 project area are Middle Proterozoic evaporitic sandstones and conglomerates of the Renner Group, which form the ridges of the Ashburton Range. The
sequence is intruded by pre-Cambrian ‘dolerite’, which may be more widespread than current mapping suggests, as it is strongly weathered and recessive.

The Renner Group is designated as Mesoproterozoic in age and unconformably overlies the Namerinni and Tomkinson Creek Groups south of the tenement area near Renner Springs. It is divided into five formations, namely the Gleeson, Baralandji, Powell, Wiernty and Jangirulu. Conformably overlying the Jangirulu Formation are the informally named Lake Woods Beds.

### 6.2 Project Area 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 a detailed subdivision of the project area stratigraphy. Recent mapping by Crossland’s consultant 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. Please refer to the Lake Woods Combined Technical Report (Melville et al 2009) for a detailed coverage.

### 6.3 Structure

Structure within the project area is relatively simple comprising an asymmetrical anticline with a small warp on the western flank limb. The anticlinal axis is immediately east of the Stuart Highway with 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°.

### 6.4 Economic Geology

No known mineralised occurrences are present within the project. 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.
7 Exploration Activities

For Years 1 and 2 (2005-2007) the following more general activities were carried out on a project wide basis, including the now relinquished portions. No rock, soil, stream sediment or gravel samples are recorded as being collected in the subject areas.

- Literature research of previous exploration, geological and geophysical surveys over the EL and surrounding district, including data compilation
- Acquisition and interpretation of NTGS geological and airborne geophysical data sets
- Research on the geology and exploration signature of potential target deposits
- Geological reconnaissance of the area and surrounds
- Processing and interpretation of results

Geophysical exploration techniques applied included the interpretation and modelling of the government magnetic data by Crossland’s consulting geophysicist. It was concluded that there were features of interest, which could be potential drill targets. See Figures 4 and 5 on the following pages.

Year 3 (2007-2008) - Fugro Airborne Surveys Pty Ltd undertook a survey of 845 line km using the TEMPEST system. The survey was centered over the southern part of EL24520, including several of the relinquished blocks. For reference, specifications of the TEMPEST system and the Lake Woods survey data are presented in the Appendices Folder in ‘Renewal Report for EL23687’ (Buskas et al June 2009). Figure 6 in this report illustrates the survey coverage in relation to the relinquished blocks.

No specific exploration activities were carried out in Year 4.
Figure 4
Figure 5
Figure 6
8 Bibliography


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