ANNUAL REPORT
16th February 2012 to 15th February 2013
EL 28185 – Tarlee

TITLE: Second Annual Report for EL 28185 Tarlee
for the Period ending 15th February 2013

HOLDER: COPPER RANGE (SA) Pty Ltd

OPERATOR: CARAVEL ENERGY Ltd

1:250,000 SHEET: Larrimah SD 53-13, Daly Waters SE 53-01

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**SUMMARY**

Exploration work for phosphate mineralisation was carried out on EL28185. The EL was deemed prospective due to similarities in the geology with that hosting recently discovered phosphate mineralisation in the Cambrian Georgina Basin of the Northern Territory.

Work carried out during the reporting period included a 24 hole regional exploration drilling program on EL 28185.

Drilling at the Larrimah Project intersected significantly anomalous phosphate mineralization in a stratigraphic setting analogous to known major phosphate deposits in the Georgina Basin. Phosphate mineralization appears to be hosted by a zone of weathered clays, siltstones and chert silcrete, located at the top of the Cambrian carbonate sequence. Significantly anomalous phosphate mineralisation was intersected at the top of the Cambrian sequence in a number of holes on EL28185, with a best intercept of 5m @ 1.97% P₂O₅ in LAC020.

Intersections of phosphate mineralisation deepen towards the south. While no economic grade phosphate intercepts were obtained, the widely spaced, grass roots nature of the drilling program means that sufficient potential remains for the discovery of economic phosphate mineralisation that should be tested by further drilling.
1. **INTRODUCTION**

Phosphate mineralisation is the primary target of EL28185. The area is considered prospective due to similarities in the geology with that hosting recently discovered phosphate mineralisation in the Cambrian Georgina Basin of the Northern Territory.

2. **LOCATION AND ACCESS**

EL28185 “Tarlee” lies to the south-west of the town of Larrimah, approximately 40km west of the Stuart Highway and approximately 180km south of Katherine in the Northern Territory (Figure 3). The license area can be accessed by Western Creek Road from Larrimah or from the Sturt Plateau Road (Gorrie/Dry River Road) Turnoff which commences off the Stuart Highway a few kilometres to the south of Mataranka. Within the licence area station tracks and the North Australian Railway Corridor provide possible access.

The license covers parts of Avago and Sunday Creek cattle stations, which are part of the Sturt Plateau pastoral area; land tenure is pastoral leasehold. The land-surface is flat to gently undulating and is covered by open tropical savannah woodland, with only small areas of cleared, improved pasture in the vicinity of the station homesteads. Soils consist chiefly of sands and sandy loam, with smaller areas of lateritic gravels or clays. Natural drainage in the area is intermittent, flowing only briefly after heavy rain. Permanent natural surface water is restricted to a few clay pans, so the local pastoral industry relies heavily on water-bores.

![Figure 1](Larrimah Phosphate Project Tenement Location Plan)
3. TENURE DETAILS

EL28185 "Tarlee" was granted to Copper Range (SA) Pty Ltd (Copper Range) on 23/02/2011 for a period of 6 years expiring on 15/02/2017. Copper Range is a fully owned subsidiary of Caravel Energy Limited (Caravel). The EL covers 500 blocks or 1647.91 square kilometres. This report covers the EL’s second year of tenure.

4. REGIONAL GEOLOGY

After Lindsay-Park, 2011 and Randall M et al, 1969

Exploration licence 28185 lies within the Dunmarra Basin. The Dunmarra Basin is recognised (NTGS) as an intracratonic basin overlying the Georgina, Wiso and Daly Basins. The Dunmarra Basin is characterised by unmetamorphosed sandstone and mudstone of between Jurassic and Cretaceous age. There are no known mineral occurrences hosted by Dunmarra Basin sediments.

Within the tenement area numerous water bores have been drilled and the cuttings from these provide adequate evidence of the buried stratigraphy and the thickness of the units. The oldest and deepest unit encountered in the drilling is the Lower Cambrian Antrim Plateau Volcanics. The Antrim Plateau Volcanics are a basaltic unit up to 250m thick which is thought to underlie most of the Larrimah and Daly Waters 1:250,000 map sheet area. In the water bore drilling the basaltic unit and its weathered products are encountered at about 50 to 80m depths.

Overlying the Antrim Plateau Volcanics are the Middle Cambrian Montejinni and Tindall Limestones of the Daly Basin. Both are described as limestone, dolomitic limestone, minor siltstone and mudstone. Both Formations contain the same fossil assemblage of Biconulites, Girvanella, hyolithids, gastropods and trilobites. Further work on these Formations may reveal they are the same unit. Overlying the Cambrian Limestone Formations is the Cambro-Ordovician Jinduckin Formation, however these sandstone, siltstone, marl and carbonate rocks appear to be restricted to the Northwest of the Larrimah Sheet area and have not been recognised in water bores drilled in the licence area.

Extensively developed within the licence area is the Lower Cretaceous Mullaman Beds and Tertiary lateritised material including sand and ferruginous rubble (Figure 3 and Figure 3). The Mullaman Beds comprise quartz sandstone, siltstone and claystone. The available water bore data indicates the thickness of the sequence over the Middle to Lower Cambrian Limestone varies from just a few metres to as much as 30m in place.
Figure 2   Geology Map with Larrimah Phosphate Project EL’s 28184 & 28185 (after BMR SD6313 Larrimah)
5. PREVIOUS EXPLORATION

A review of the previously completed exploration work on eleven exploration titles that impinge on EL’s 28184 and 28185 was completed and was reported in the 2012 Annual Report (Mees, 2012).

Most of the previous titles were taken out for the purpose of diamond exploration and without exception the only work done in the current title has been gravel sampling. Apart from water-bores no exploration drill-holes have ever been completed on EL28185.

Work carried out during the 2012 reporting period included desk top studies, a historical data review, the sampling of drill cuttings from 10 different water-bores held in the NTGS core library using a hand held XRF machine for a total of 309 individual samples. These historical water bore data were used to determine approximate depths to and thickness of the Cambrian sequence (Figure 4). An RC-Aircore drilling program was designed, a Mine Management Plan (Lindsay-Park, 2011) was submitted and authorisation was granted (AN 0645-01, granted on 9th September 2011) for drilling to proceed. RC Drilling scheduled for late 2011 had to be delayed until after the reporting period due to difficulties locating a suitable drilling contractor.
Figure 4  Water Bore Location Plan showing thickness contours of the Cambrian statigraphy based on water-bore logs
6. EXPLORATION RATIONALE

The Lower to Middle Cambrian aged Limestones in the Northern Territory host several large tonnage stratiform phosphate deposits. A review of phosphate potential along the Adelaide – Darwin rail line corridor in the Northern Territory completed by Copper Range and identified an area of Cambrian sediments prospective for phosphate under Cretaceous cover. The Cambrian sediments have a number of phosphate prospects derived from historic government drill holes (Bureau of Mineral Resources [BMR] now Geoscience Australia). The holes were located near the town of Larrimah. For example, BMR Larrimah 3 is reported to have 1 to 7% P₂O₅ from 120-130ft. Copper Range aims to test the limestone sequence within EL28185 under the Cretaceous cover in areas where the cover is estimated to be thin enough to allow for potentially economic stripping rates; in addition these areas of thinner cover may represent areas of basement highs prospective for phosphate mineralisation.

7. WORK COMPLETED DURING THE CURRENT REPORTING PERIOD

Work carried out on EL28185 during the reporting period consisted of a 24 hole regional exploration drilling program carried out from 18/04/2012 to 14/05/2012. Drilling was also completed on EL28184.

The area of drilling covers parts of Tarlee, Avago, Western Creek, Middle Creek, Gorrie, Birdum Creek and Cow Creek stations to the west of the town of Larrimah, NT.

Drilling at the Larrimah Project intersected significantly anomalous phosphate mineralization in a stratigraphic setting analogous to known major phosphate deposits in the Georgina Basin. Phosphate mineralization appears to be hosted by a zone of weathered clays, siltstones and cherty silcrete, located at the top of the Cambrian carbonate sequence.

A total of 187 samples (both EL 28185 & 28185) were submitted to Amdel Darwin for analysis. These samples are mainly 5m composite spear samples. Significantly anomalous phosphate mineralisation was intersected at the top of the Cambrian sequence in a number of holes on EL28185, with a best intercept of 5m @ 1.97% P₂O₅ in LAC020.

Intersections of phosphate mineralisation deepen towards the south. While no economic grade phosphate intercepts were obtained, the widely spaced, grass roots nature of the drilling program means that sufficient potential remains for the discovery of economic phosphate mineralisation on EL28185 that should be tested by further drilling.

A report on the drilling program is included as EL28185_2013_A_02.pdf. Drillhole data is included as appendices EL28185_2013_A_03_COLL2013A.txt, EL28185_2013_A_04_GEO2013A.txt, EL28185_2013_A_06_LITHCODE2013A.txt and EL28185_2013_A_05_ASS2013A.txt.
8. CONCLUSIONS AND RECOMMENDATIONS

Drilling at the Larrimah Project has intersected significantly anomalous phosphate mineralization in a stratigraphic setting analogous to known major phosphate deposits in the Georgina Basin. Phosphate mineralization appears to be hosted by a zone of weathered clays, siltstones and cherty silcrete located at the top of the Cambrian carbonate sequence.

This zone may represent both a pre-Cretaceous weathering surface over the Cambrian carbonate stratigraphy and a separate stratigraphically distinctive sequence. Primary phosphate mineralisation may have undergone secondary upgrading as a result of dissolution and re-deposition by weathering processes, possibly controlled by palaeotopography in the form of a trough like structure. While drilling is too widely spaced to come to any definite conclusions about trends of the mineralization, it appears that anomalous follows a broadly North-South trend roughly centred on the railway line.

Intersections of phosphate mineralisation deepen towards the south. While no economic grade phosphate intercepts were obtained, the widely spaced grass roots nature of the drilling program means that sufficient potential remains for the discovery of economic phosphate mineralisation on EL28185 and this should be tested by further drilling.

It is recommended that the area of LAC019-LAC020 should be further evaluated by drilling to determine if the intersections in these holes are marginal to thicker, higher grade mineralization. Infill drilling at 1km spacing along existing tracks and along a new east-west traverse centred on LAC019 (should adequately test this area. While mineralisation was intersected at 40-53 metres, at the top of the carbonate sequence, it would be prudent to test the sequence to greater depth, both to test for mineralisation and to establish the carbonate stratigraphy to assist in correlating between drill holes.

9. REFERENCES


Randal, M et al. 1969. Larrimah Sheet SD5313 1:250,000 Geological Map Series, BMR.
Larrimah Phosphate Project: EL’s 28185 and 28185 RC Exploration Drilling, April – May 2012