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<tr>
<td><strong>TITLES/TENEMENTS</strong></td>
<td>GR232 (EL 27304, EL 27960)</td>
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<tr>
<td><strong>REPORT TITLE</strong></td>
<td>GROUP EXPLORATION REPORT FOR THE PERIOD FEBRUARY 15TH 2014 TO FEBRUARY 14TH 2015 (CARPENTARIA PROJECT)</td>
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<tr>
<td><strong>AUTHORS</strong></td>
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<td>MANGANESE</td>
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<td><strong>DATE OF REPORT</strong></td>
<td>30 MARCH 2015</td>
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<td>GDA94/ZONE 53</td>
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<td><strong>250 000 K MAPSHEET</strong></td>
<td>ROBINSON RIVER</td>
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<td><strong>100 000 K MAPSHEET</strong></td>
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Report prepared by
INTERNATIONAL GEOSCIENCE PTY LTD

On behalf of
UNIVERSAL SPLENDOUR INVESTMENTS PTY LTD
Group Exploration Report for the period February 15th 2014 to February 14th 2015 (Carpentaria Project)

30 March 2015

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EXECUTIVE SUMMARY

During September 2014 a field visit was made to EL 27304 to inspect drill sites from the previous year. Photographic evidence was provided to the NT Department of Mines and Energy for rehabilitation purposes. All drill sites are showing excellent signs of regrowth and no further work is expected.

A short field visit to EL 27960 was also made in September 2014 but unfortunately no mineralisation was identified and the tenement has been completely relinquished.

A full evaluation of EL 27304 is recommended to evaluate the potential of other commodities.
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1 INTRODUCTION

The Carpentaria project area consists of 2 tenements, EL 27304 and 27960 (Figure 1).

During September 2014 a field visit was made to EL 27304 to inspect drill sites from the previous year. Photographic evidence was provided to the NT Department of Mines and Energy for rehabilitation purposes. All drill sites are showing excellent signs of regrowth and no further work is expected.

A short field visit to EL 27960 was also made in September 2014 but unfortunately no mineralisation was identified and the tenement has been completely relinquished.

A full evaluation of EL 27304 is recommended to evaluate the potential of other commodities.

1.1 Access

The main access into the project area is via Carpentaria Highway which crosses the southwest corner of EL 27304. From this highway there are several tracks into the project area.
1.2 Regional Geology

The manganese prospects within the Carpentaria project area are located in the southeast of the McArthur Basin, Northern Territory. The Palaeoproterozoic to Mesoproterozoic McArthur Basin is an intracratonic platform basin with an aerial extent of 200 000 km$^2$. This basin unconformably overlies metamorphosed and deformed sequences of the Pine Creek Orogen to the west, Murphy Inlier to the south and Arnhem Inlier to the east (Figure 2). The Murphy Inlier was a palaeogeographical high separating the McArthur Basin from the South Nicholson Basin and Lawn Hill Platform (Plumb, 1987). In the Batten and Walker Fault Zones, some 12 km of shallow water sediments were deposited compared to about 4 km on the Arnhem, Bauhinia, Caledon and Wearyan shelves (Plumb et al 1990).

Stratigraphic correlations across the McArthur Basin given in Figure 3 are largely based on Rawlings (1999). The basal units are represented by “transitional domains” (1830-1820 Ma) of igneous activity and sedimentation that followed deformation of the Pine Creek Orogen and equivalent strata. The overlying Katherine River Group and equivalents (1815-1710 Ma) consist of fluvial to shallow marine arenite and conglomerate alternating with lutite and basic volcanics. Minor felsic volcanics, shallow intrusives, carbonate and shale are also present in the sequence. These sediments were deposited throughout the McArthur Basin during an extensional event (Plumb, 1994).

The McArthur Group and equivalents (1670-1600 Ma) include stromatolitic-evaporitic carbonate alternating with shale, siltstone and minor sandstone. Deposition of this group was largely confined to the Walker, Urapunga and Batten Fault Zones. The overlying Nathan Group - and equivalents (1600-1570? Ma) - consist of a mainly stromatolitic and evaporitic carbonate (eg. Karns Dolomite) and sandstone sequence deposited in a broad shallow-water to marginal marine sag basin.

Following major uplift, erosion and basin-wide regolith formation, the cyclic arenite and lutite sequence of the Roper Group and equivalents (1490-1420 Ma) were deposited on a basin-wide scale. Sedimentary oolitic ironstone is present at several intervals within the Roper sequence and is best developed within the Sherwin Formation.
Figure 2: Regional geology and location of Fe and Mn deposits in McArthur Basin.
Figure 3: Schematic Proterozoic stratigraphy of McArthur Basin (modified from Rawlings 1999).
2 RECENT WORK

In September of 2014 a short 2 day field visit was made to EL 27960 to investigate for any obvious signs of surface mineralisation. Unfortunately no mineralisation was identified and therefore the tenement has been relinquished.

A short visit was made to the previous drill sites on EL 27304 to monitor the rehabilitation progress. All drill sites are showing excellent signs of regrowth and no further monitoring is expected. Photographic evidence was previously submitted to the NTGS.
3 PREVIOUS WORK

3.1 Manganese Potential

International Geoscience identified two manganese prospects within USI’s Carpentaria Project area. The *Interpreter* was discovered in 2011 and was the main focus for the 2012 field program. *Lucky Horse* Prospect was identified in late 2011, and assessed in late 2012. Both prospects consist of Mesoproterosoic Karns Dolomite unconformably overlying Palaeoproterozoic Echo Sandstone (Figure 4 and Figure 5). Based on the Robinson River Map (SE53-4) sheet the Echo Sandstone has been placed in the Tawallah Group but the correlating unit on the Calvert Hills map sheet (SE53-8) has been mapped as Masterton Sandstone of the McArthur Group. For the purpose of this report Echo Sandstone will be used to describe the unit unconformably underlying the Karns Dolomite.

From field observations - manganese was observed consistently at the unconformity between the Echo Sandstone and Karns Dolomite, massive manganese and high grade hand specimen assays – a sedimentary intra-basinal marine deposition model was preferred. This model was used throughout the 2012 and 2013 field program (Figure 7).

A section of outcropping manganese displaying bedding was ~1.5m thick and the base was not observed.

Samples were collected by Ben Li and Matthew Finn during the 2012 field season (Figure 5). A geochemical and petrographic study was undertaken by UWA student Ben Li (Li, 2012). The samples were surface grab samples of sandstone, dolomite and high grade manganese. The sandstone samples indicate a wave-influenced to tidal-influence depositional environment.

The dolomite is a grey to brown very fine-grained bedded sequence. The deposition of this sequence indicates a transgression and period of low terrestrial material deposition, sedimentary processes replaced by precipitate deposits.

Manganese ore mineralogy and microtexture suggest that, both manganese oxide and microcrystalline quartz in the Interpreter Prospect were chemically deposited in marine environment of a local basin. This is also supported by geochemical data (Figure 6). The surface expression of the manganese and extent of outcrop was significant and warranted follow-up with drill testing.

At the end of the 2012 field season a sedimentary manganese mineralisation model was identified as the most suitable and robust model given the evidence to-date. The model proposed that the manganese mineralisation was deposited along the unconformity between the Echo Sandstone and Karns Dolomite (Figure 7).

A ground gradient array IP survey was completed in 2012, which showed a positive correlation of high chargeability to outcropping manganese, and high resistivity to outcropping sandstone, see Figure 8 and Figure 9.

The drill program was also planned to test this correlation and assess whether geophysical methods could be applied on a larger scale to the tenement wide exploration plan.

From an economic perspective high-grade manganese at the surface with continuity to shallow depth, but laterally extensive is the most prospective style of mineralisation.
Figure 4: Previous outline of EL 27304 over the NTGS 250K geology of the *Interpreter* Prospect and surroundings.
Figure 5: Location of samples for geochemical investigation within the EL 27304 of Carpentaria Project, GDA 1994 MGA Zone 53.
Figure 6 A: Diagram used to discriminate hydrothermal vs. detrital components in mixed sediments after Peter and Goodfellow (1996); B, C and d: Diagnostic plots to differentiate sedimentary manganese deposits from different depositional environments (b and c: after Nicholson, 1992; D: after Maynard, 2010).
Figure 7: Stratigraphic block diagram for the *Interpreter* manganese prospect. Proposed mineralisation model in 2012.
Figure 8 IP gradient array chargeability grid over a portion of the Interpreter. Overlay is of the outcropping geology and the underlay is the Bing Map remote sensing image.

Figure 9: IP gradient array resistivity grid over a portion of the Interpreter. Overlay is of the outcropping geology and the underlay is the Bing Map remote sensing image.
3.2 RC Drilling program

Following positive observations and the development of a model for sedimentary manganese at the *Interpreter* prospect, a drill program was recommended to test the model and extent of any manganese mineralisation. The program was designed to test several features including:

- Varying responses from a ground IP survey,
- The depth extent of surface manganese,
- Stepping out from surficial manganese mineralisation to test continuity and depth extent, and
- the veracity of the model developed from previous fieldwork.

A planned program of 57 drill holes was presented in the Mine Management Plan and submitted to the Department of Mines and Energy, Northern Territory Government. The local landowners, Pungalina and Calvert Hills Station, were informed of the activities. Track and drillpad clearing commenced, contracted to MacMillan Pastoral Company, based at Calvert Hills Station.

3.2.1 Summary of Drilling

Drilling was contracted to Australian Mineral and Waterwell Drilling Pty Ltd. The program was completed using reverse circulation drilling of 5.5 inch holes by UDR650 drill rig. Access to the east of the creek was available from the old Pungalina track; a new access track was prepared to the west of the creek. Both tracks are directly off of the Carpentaria Highway.

The program completed 19 vertical drill holes, with a total of 426m drilled (Table 1, Figure 12). The geologists collected 223 samples, including field duplicates, standards and blanks. Further information on drilling procedures is available from the International Geoscience RAB, Aircore and RC Drilling Manual (Finn, 2013). Drilling was completed between 13\textsuperscript{th} September and 16\textsuperscript{th} September 2013. The drill holes were shallow, the deepest hole being 37m, due to the style of mineralisation being targeted and the methodology; following mineralisation from surface to test the depth extent.

One problem with this method was the lack of return of fines, especially at surface. On several occasions no sample was recovered from the first few meters. Where this was observed by the geologist the samples were combined for a composite sample.

<table>
<thead>
<tr>
<th>Hole Type</th>
<th>Hole Number Range</th>
<th>No of Holes</th>
<th>Total Metres</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC</td>
<td>USIC001-USIC019</td>
<td>19</td>
<td>426</td>
</tr>
<tr>
<td>Grand Total</td>
<td>-</td>
<td>19</td>
<td>426</td>
</tr>
</tbody>
</table>

As is standard in any drill testing, drilling began with the known, i.e. where manganese mineralisation is observed at surface. The drill holes then followed a step-out pattern to assess the lateral extent of mineralisation. Drill testing of variable chargeable and resistivity responses was completed in order to provide geological/lithological information on the cause of the varying response. In the long term, this will influence how IP surveys are interpreted and assist further targeting.
Figure 10 Location of RC drill holes completed in September 2013.

3.2.2 Results

3.2.2.1 Geological Description of Rock Chips

The local geology maps show two main lithologies; the Echo sandstone and the Karns Dolomite. Both were identified in rock chips. The weathering profile is well developed; fresh rock was not intersected in any drill hole.

The Echo Sandstone is a pink medium to coarse grained sandstone with silica cementation. The sandstone is more resistive to weathering. The Karns Dolomite is grey to brown in colour, and often shows a manganese association as interbedded cryptocrystalline manganese, or as flecks within the dolomite. The Karns dolomite is known to be enriched in manganese. The rock chips show typical limestone/dolomite concave fracture. The dolomite has a high proportion of glauconite, present as soft rounded aggregates and massive amorphous concentrations on dolomite fragments.
At the contact the units are strongly weathered and yield a high clay content, kaolinite and glauconite. This was problematic during the drilling as the clays caused blockages of the hammer, and therefore delays in the drilling.

The contact between the dolomite and sandstone is generally sharp, and easy to identify due to the colour difference, rock chip shape and presence or absence of clays.

3.2.2.2 Alteration and Weathering

The RC drill method was considered the most appropriate technique due to the planned hole depths and known extent of weathering. The weathering profile indicates a thin lateritic cap, with strong weathering of the near-surface lithology, whether dolomite or sandstone. The dolomite is weathered to clay-rich unit, whereas the sandstone weathers to unconsolidated sands with minor kaolinite content. The zone of high clay content observed at the unconformity contact may indicate a focus of groundwater flow due to a contrast in permeability between the two units.

Silica alteration was observed within the dolomite, identified as chert within the dolomite unit. The sandstone is reddish-pink indicating hematite staining. Cooke et al. (1998) states meteoric fluids were probably responsible for the carbonate diagenesis and dolomitization.

Silicification was observed in USIC003, USIC005, USIC006, USIC007, USIC008, USIC011, USIC012, USIC014, USIC016 and USIC017.

3.2.2.3 Mineralisation

At surface, manganese is seen within lateritic conglomerates, as large pebbles of massive replacement, and in one instance, as an outcrop exhibiting bedding at least 1.5m thick. Drilling confirmed this surface expression as secondary, due to weathering, remobilisation and in some cases replacement of dolomite. Of the 19 drill holes, only USIC006 intersected manganese at the contact of the dolomite and sandstone.

Manganese was identified in rock chips as a dark, blue-black, cryptocrystalline mineral. The mineralisation was strongly associated with dolomite, with dolomite chips often showing flecks of manganese interbedded in the sequence.
The potential for primary manganese is represented by the presence of interbedded manganese within the Karns dolomite. However, these zones appeared to be minor and did not extend laterally to the nearest drill hole. The Karns dolomite is known to be enriched in manganese, and therefore the interbedded zones may be the reflection of this enrichment.

Manganese samples taken from surface on previous forays have provided high grade manganese assay results. This was not repeated by the drill samples.

3.2.2.4 IP targets

Having tested the sedimentary deposition model, the drilling continued with the aim of identifying the source of the IP anomalism and correlating the geology to the geophysical response, see Table 2.

Table 2 IP response and Geology of drill hole.

<table>
<thead>
<tr>
<th>HOLE ID</th>
<th>IP RESPONSE</th>
<th>GEOLOGY</th>
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<tbody>
<tr>
<td></td>
<td>RESISTIVITY</td>
<td>CHARGEABILITY</td>
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<tr>
<td>USIC001</td>
<td>LOW - MODERATE</td>
<td>MODERATE</td>
</tr>
<tr>
<td>USIC002</td>
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</tr>
<tr>
<td>USIC003</td>
<td>LOW</td>
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</tr>
<tr>
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<td>HIGH</td>
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<tr>
<td>USIC005</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
<tr>
<td>USIC006</td>
<td>MODERATE - HIGH</td>
<td>MODERATE - HIGH</td>
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<td>HIGH</td>
<td>HIGH</td>
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<td>LOW</td>
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<td>LOW</td>
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<td>USIC011</td>
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</tr>
<tr>
<td>USIC018</td>
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The lack of significant sedimentary massive manganese suggests that there is an alternate source for the chargeable anomalies. Disseminate sulphides are a good conductor, but no metal sulphides were observed in the rock chips. The widespread presence and high content of glauconite may have an influence on the electrical properties of the ground, although to what effect and scale is unknown.

Alternatively, the development of the laterite cap, its thickness and manganese content, may affect the electrical method. As we have observed a correlation between surface manganese and chargeability this is the most logical explanation, at this stage.

### 3.2.2.5 Assay Results

A total of 223 samples were collected from the drill program, including standards, duplicates and blanks. Standards used were OREAS 170a and 170b, both originating from Groote Eylandt. Samples were processed and assayed by ALS Alice Springs, by XRF.

Table 3 shows the highlights from assay results. USIC003, USIC005, USIC007 all show the highest assays at surface.

<table>
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<th>HOLE ID</th>
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<th>To, m</th>
<th>meters</th>
<th>XRF26 Mn %</th>
<th>ME-XRF26 MnO%</th>
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<td>USIC011</td>
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<td>4.95</td>
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<tr>
<td>USIC012</td>
<td>7</td>
<td>12</td>
<td>5</td>
<td>5.97</td>
<td>7.714</td>
</tr>
</tbody>
</table>

The maximum assay result was one meter at 12.9% MnO. Low grade manganese ore is characterised as <30% Mn. As a bulk commodity, this result is not sufficient to justify further drilling in the area.

Standards OREAS 170a and 170b report as >39% but the actual value is not provided. Without the actual value, it is not possible to compare to the known value and assess the accuracy of the laboratory result. The field duplicate data provides information on the precision of the laboratory, as well as confirming the sample homogeneity. See Appendix II for further information. We can say that the data is accurate, but the level of precision cannot be assessed from this data.

Mineralisation is associated with surface laterite in USIC003, USIC005 and USIC007. The remaining intercepts are associated with dolomite. This may indicate that the natural, and well documented, enrichment of manganese in dolomite may include thin interbedded zones of manganese. This would support the geochemical data in a sedimentary model, however the manganese does not appear to have been concentrated or remobilised sufficiently to create an economic deposit at the Interpreter, see Figure 14 for a revised diagrammatic model.
3.2.3 Discussion

Manganese was frequently observed at the unconformity between the Karns Dolomite and Echo Sandstone. The contact was observed at variable depths, indicating an undulose surface. The pink colouration of the sandstone indicates oxidised, iron-rich sand. The dolomite is generally green in colour and associated with high clay content. Glauconite is common in this unit. Glauconite is known to have a strong association with Mn-Fe oxides, although it tends to form deeper offshore than manganese, which precipitates in shallower waters, on the shelf. Glauconite fixes the iron in the clastic sediment, effectively enriching the waters in manganese (Pirajno, 2009).

At the boundary of the sandstone and dolomite a high proportion of clays were observed. This could be due to the contrast in porosity and permeability between the sandstone and dolomite. If the groundwater flow was being held at this contact weathering to clays would be increased at this contact.

Whilst the sedimentary model is supported by the field observations, initial geochemical results and presence of glauconite, the thickness and grade and extent of the manganese from drilling results do not support a laterally extensive precipitate model. The drilling identified manganese associated with laterite at surface, and manganese interbedded or enriched in dolomite. This indicates that although manganese is enriched locally, there has not been the necessary remobilisation and concentration of manganese into an economic deposit.

Site inspection proves significant surficial manganese – as massive replacement, lateritic gravel conglomerates, and patchy coating of boulders.

The maximum manganese content in any of the 223 drilling samples was 12.9% MnO from USCIC012 at 11m-12m. Manganese hosted in dolomite in USCIC011, from 11m-13m, may be a continuous extension of this interbedded zone, although if so the zone decreases in thickness and grade.
These results are disappointing compared to the assay results from surface grab samples, between 25-40% Mn with samples as high as 50%. The proximity to surface, as well as depressed values indicates that the mineralisation has not been remobilised or concentrated to economically significant levels.

The results of the previous geochemical and petrographic study concluded that the manganese was a sedimentary deposit. However, it should be noted that the study was completed on a small number of surface grab samples. The sampling and geochemical analysis was completed to be part of a larger genetic study.

For the purposes of exploration and ore genesis at the Interpreter prospect the geochemical data is not considered sufficient. For the geochemical data to be statistically reliable, a minimum of 100 samples should have been collected, with a systematic approach to minimise selective sample collection, i.e. collection of only massive manganese samples to the detriment of potentially more representative lateritic gravel or sparse manganese mineralisation. There is potential for this to be resolved with the recent drilling samples.

The Carpentaria project remains prospective for base metals, targeting SEDEX and breccia pipes along north-east and east trending faults, such as McArthur River mine, Rox Resource’s Myrtle and Teena projects, and Redbank Copper mine. Potential for manganese deposits remains positive, given the known regional enrichment. Targeting for manganese should focus on a model whereby further enrichment, concentration and trapping of enriched fluids might be located.
4 SUMMARY AND RECOMMENDATIONS

Only one short field visit was made to the Carpentaria project area. Geological investigation of EL 27960 and rehabilitation monitoring of EL 27304. Unfortunately no mineralisation was identified on EL 27960, but the rehabilitation of the previous drill sites on EL 27304 was very good and no further monitoring is expected.

Previous Exploration Summary:

The drill program in 2013 was a technical success, as the program was completed in a safe and responsible manner. A total of 19 RC drill holes were completed over three days with the collection of 223 samples. It is believed by International Geoscience that the Interpreter prospect has been sufficiently tested, proving that the manganese is dominantly a surficial expression of the natural enrichment within the dolomite.

The results from the drill program are disappointing considering the previous high grade grab samples from surface.

Recommendations for further work are as follows:

- Regional mapping to identify possible areas where economic amounts of supergene manganese would have formed and still be preserved.
- Investigation into other commodities such as copper.
5 REFERENCES


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