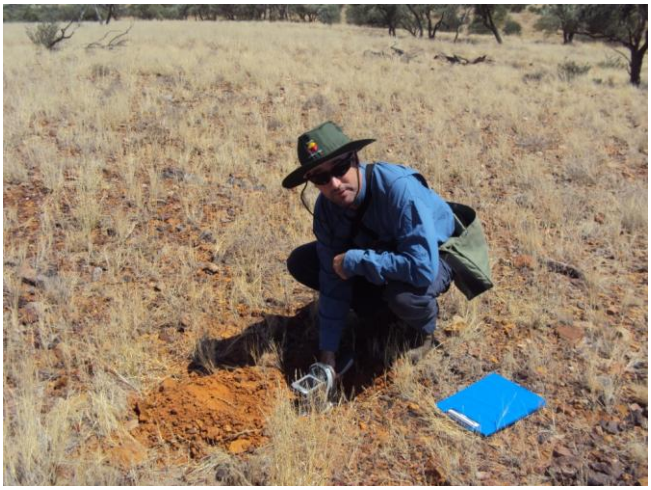
# EL28276

# MARQUA

## Northern Territory, Australia

## Annual Technical Report
## for the period 30 March 2011 to 29 March 2012

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Commodity: Phosphate, Base Metals, Uranium

1:250,000 Maps: SF53-12, Tobermorey, SF53-16 Hay River
1:100,000 Maps: 6352 Marqua, 6452 Toko, 6351 Mount Barrington, 6451 Adam

# SUMMARY

The Marqua Project in the Northern Territory is located 400km east of Alice Springs and 300km southwest of Mount Isa (Figure 1). The area is highly prospective for minerals, with high grade phosphate drill intersections encountered on adjacent ground, and also occurrences of base metals and uranium.

Rox Resources Limited holds four contiguous Exploration Licences in the area, EL28275, EL28276, EL28611 and EL28612. This report is for the first period of EL28276 from 30 March 2011 to 29 March 2012.

Previous exploration of the adjacent area (EL28275) has identified five phosphate prospects over a strike length of 30 km with outcrops grading up to 39.4% $P_2O_5$ along the phosphorus bearing Cambrian age Thorntonia Limestone. These prospects occur near the southern extent of the Georgina Basin, which is rapidly becoming Australia's major hard-rock phosphate province.

Familiarisation trips to all extents of the tenements were undertaken along existing station tracks, and a desktop review of the exploration potential of the area, which included a complete review of previous exploration and compilation of data from open file reports, was completed.

There is potential for extension of the phosphate mineralisation eastwards from EL28275 into EL28276 and at depth along the Toomba Fault zone, and there is also potential for MVT style Pb-Zn mineralisation.

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# 1 INTRODUCTION

Rox Resources Limited's ("Rox") Marqua Project consists of tenements EL28275, EL28276, EL28611 and EL28612. The tenement area covers an area of approximately 2,600 km² that is prospective for phosphate, base metals and uranium. Combined technical reporting has been applied for and granted, and will commence with the next Annual Technical Report.

This report summarises Rox's exploration activities for the first year of tenure on EL28276 for the period 30 March 2011 to 29 March 2012.

# 2 LOCATION AND ACCESS

The Marqua project area is located approximately 500 km by road east of Alice Springs, and is southeast of the Marqua Station homestead with good road access 40 km off the Plenty Highway and a network of established minor roads and station tracks (Figure 1).


*Figure 1: Marqua Project Location*

# 3 TENURE

The project consists of tenements EL28275, EL28276, EL28611, and EL28612 as shown in Table 1 and Figure 2. This report only describes exploration work carried out on EL28276 for the period 30 March 2011 to 29 March 2012.

*Table 1: Marqua Tenements*

| Tenement | Registered Holder | Interest | Grant Date | Expiry Date | Area (sub-blocks) | Current Annual Rent (incl. GST) | Current Annual Minimum Expenditure |
|---|---|---|---|---|---|---|---|
| EL 28275 | Rox Resources Limited | 100% | 30 March 2011 | 29 March 2017 | 418 | $4,598 | $80,000 |
| EL 28276 | Rox Resources Limited | 100% | 30 March 2011 | 29 March 2017 | 357 | $3,927 | $80,000 |
| EL 28611 | Rox Resources Limited | 100% | 1 September 2011 | 31 August 2017 | 2 | $22 | $6,000 |
| EL 28612 | Rox Resources Limited | 100% | 1 September 2011 | 31 August 2017 | 142 | $1,562 | $30,000 |

There are no Native Title Claims over the tenement area, which comprises the Marqua and Tobermorey pastoral stations. A meeting was convened for any interested Aboriginal parties on the tenements before exploration work commenced, but no parties attended. Previous heritage site locations were obtained by a search of the AAPA Register and were avoided during exploration.

# 4 GEOLOGY

## 4.1 Regional Geology

The project area is part of the southern Georgina Basin, comprising Neoproterozoic to Cambro-Ordovician platform cover of sedimentary rocks (dominantly sandstone, shale, limestone, dolostone) overlying the Precambrian basement of the Northern Australian Craton. This Precambrian basement is exposed along major fault systems on the southern margin of the basin.

The Northern Territory Geological Survey (NTGS) has recognised the mineral potential of the southern Georgina Basin and recently prepared a comprehensive review of both government and private exploration undertaken, and has now developed applicable ore genesis models (Dunster et al., 2007).

Since the 1960's, the basin has been considered prospective mainly for Mississippi Valley Type (MVT) lead-zinc mineralisation. More recently, however, the potential for other commodities in a variety of geological settings has been investigated, and the basin is now regarded as having potential for several styles of base-metal mineralisation.

The area is considered to have potential for Cambrian limestone hosted phosphate. Prospective units within the Georgina Basin include the Middle Cambrian Beetle Creek Formation of the eastern basin, its stratigraphic equivalent in the south, the Arthur Creek Formation, and the underlying Thorntonia Limestone which is recognised basin-wide. Prospective ground for phosphate rock within these Middle Cambrian units occurs along the basin margins and adjacent to basement highs within the basin interior.

## 4.2 Local Geology

The Marqua project area is located in the structurally complex south-eastern portion of the Georgina Basin, which is comprised of basement granitoids, Neoproterozoic tillites and arkosic sedimentary rocks, overlain by Cambrian and Cambro-Ordovician limestone, dolostone, shale and clastic sedimentary rocks of the Toko Syncline.

These units have been disrupted by multiple folding and faulting events. Faulting in the project area generally trends northwest and individual faults have been locally offset by later northeast trending faults. Part of the regionally significant Toomba Fault Zone lies in the eastern portion of the tenements and segregates a structurally complex zone dominated by arkosic sediments to the southwest from limestone, dolostone and sandstone of the Toko Syncline to the north.

The Toomba Fault Zone is a reverse fault which dips ~45° towards the southwest and lies in close proximity to a number of parallel folds and faults including the Field River Anticline (Figure 2). A northwest trending fault zone in the Christmas Dam area represents a structural divide between gently north dipping sedimentary rocks to the west and steep to vertical dipping sediments to the east (Figure 2).

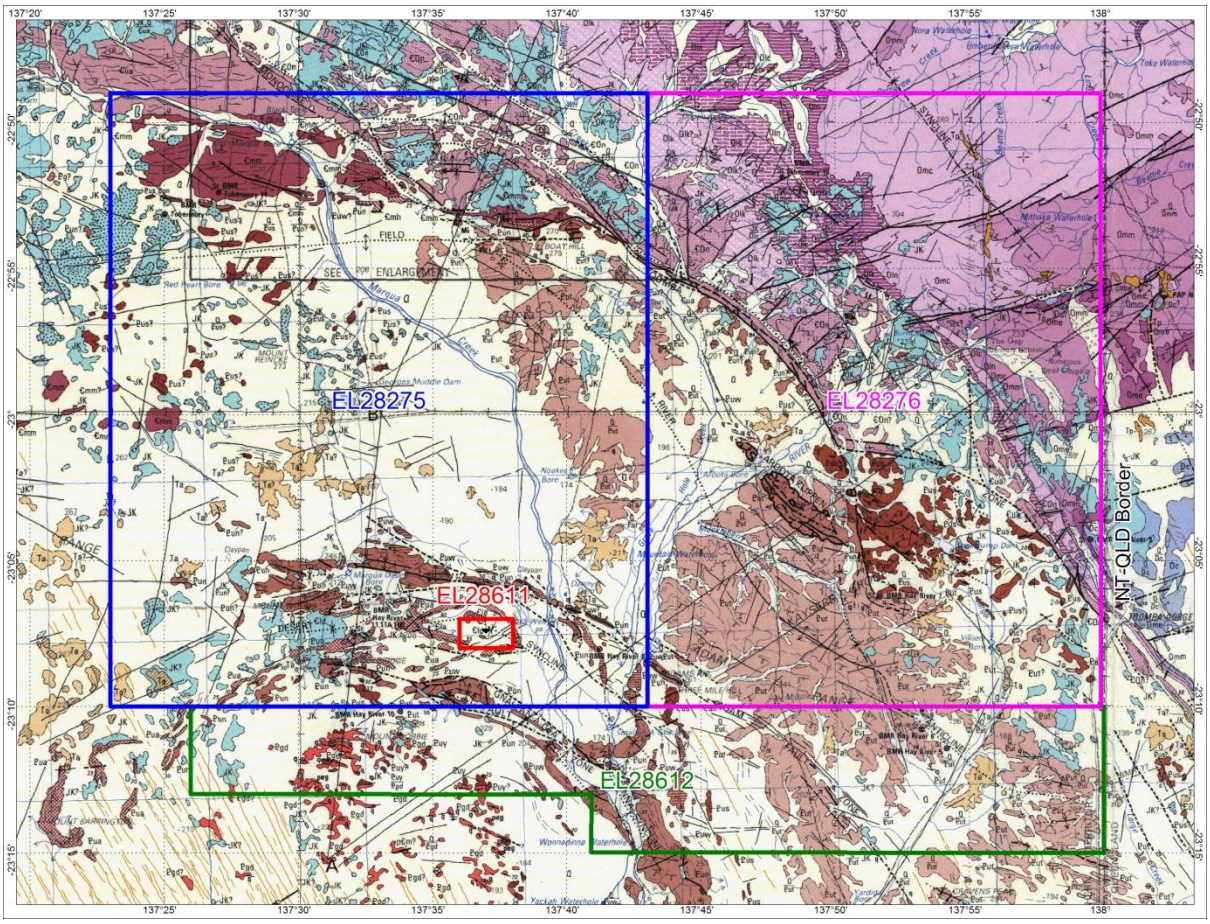


*Figure 2: NTGS Geological Map*

## 4.3 Geological Model For Phosphate

The processes responsible for the formation of high-grade marine phosphate rock deposits (known as phosphorite if it contains greater than 15% $P_2O_5$) are the subject of some uncertainty. It is recognized that regions favourable to large-scale phosphate deposition occur along ocean margins where deep upwelling currents rich in phosphate are trapped within relatively shallow lagoons and embayments.

The phosphate-rich waters lead to high levels of biological activity which results in the deposition of organic-rich sediments (black shales) within confined anoxic depositional centres. Phosphate liberated into interstitial and bottom waters, principally from the bacterial decay of organic matter, is believed to be responsible for the formation of phosphorites both by direct precipitation of phosphate minerals from solution and by replacement of siliceous and calcareous skeletal debris (forming coquinite phosphorites).

This process appears to occur near the water sediment interface at the transition between anoxic and oxic zones so that phosphorite deposits are typically laterally offset from black shale accumulations. Mechanical reworking of sediments may also play a significant role in the formation of some high-grade phosphorite deposits.

## 4.4 Geological Model For MVT Style Lead-Zinc

MVT (Mississippi Valley Type) style lead-zinc mineralisation is usually found in areas of platform carbonate rocks that have been subject to large deep seated crustal scale faulting where these structures may have penetrated to great depths in the Earth's crust. Within the carbonate units Pb and Zn ions are mobilised and circulated with meteoric waters through the sediment pile. At the same time S ions are derived from decaying/decayed organic matter present in the carbonate rocks and also circulated. The metal cations (Pb and Zn) and the S anion can precipitate to form galena (PbS) and sphalerite (ZnS) in zones of relatively low pressure afforded by the deep seated structures, which also form a conduit to other precipitation zones (e.g. certain porous rock units within the carbonate pile).

An example diagram for the Canning Basin in Western Australia is shown in Figure 3. The Georgina Baisn in the Northern Territory is believed to offer a similar geological environment.

Such favourable MVT deposition conditions exist in the Marqua area where potential host units the Arthur Creek Formation (with limestones and shales) and the Thorntonia Limestone exist, truncated by a number of major deep seated structures including the Toomba Fault. Indications of Pb-Zn mineralisation have been detected at the Boat Hill prospect which is located at the intersection of the Toomba Fault with the Thorntonia Limestone and Arthur Creek Formation.

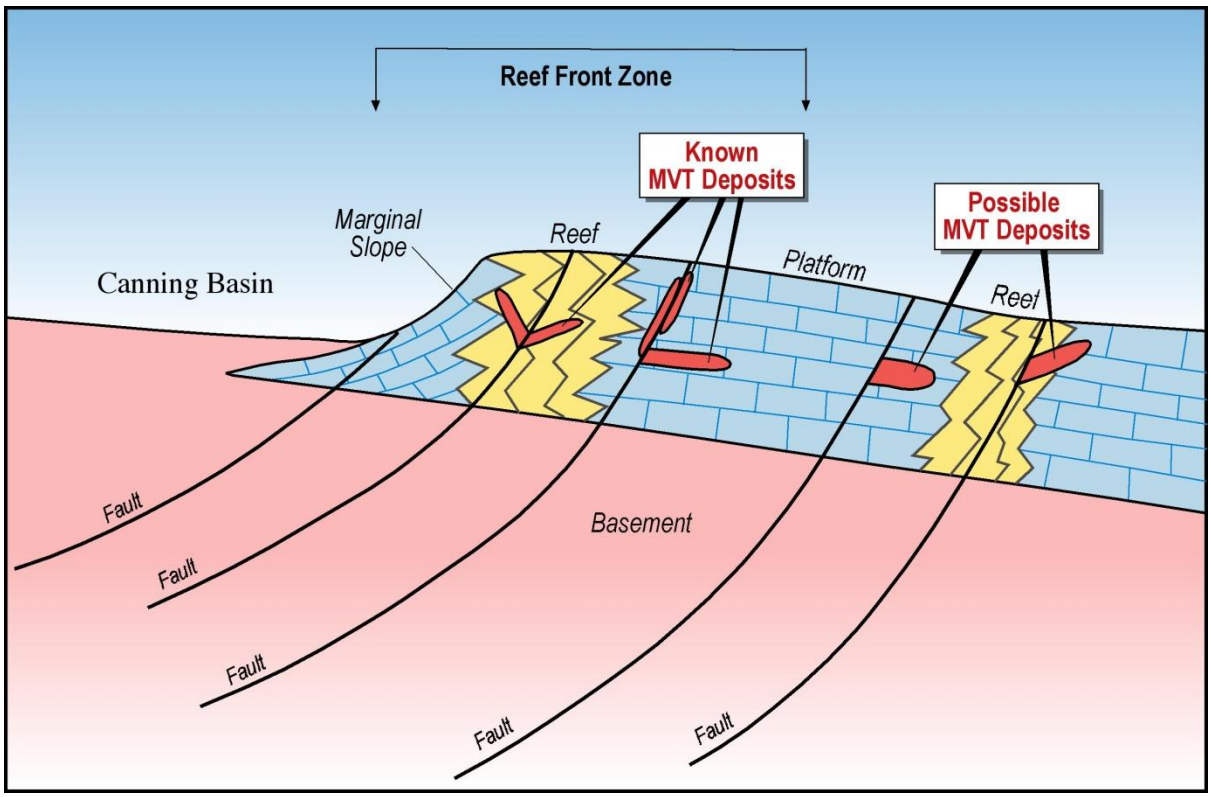


*Figure 3: MVT Deposit Model*

# 5 PREVIOUS EXPLORATION

The Marqua area has been subject to exploration for over 30 years. Mapping of the Marqua area (Tobermory 1:250,000 map sheet) was carried out by BMR 1959-1960 and subsequent remapping was done throughout the 1970's and 1980's. Exploration during that time was mainly focussed on base metals and involved rock chip and stream sampling. During 1977-1978 and 1983 the BMR drilled four cored stratigraphic holes in the area. Anomalous zinc levels were found in these holes (BMR 1976/36) (Dunster et. al., 2007).

Subsequently Agip undertook base metal exploration in 1981 over the tenement area (CR19830328). Reconnaissance rock chip sampling and mapping demonstrated that base metals are anomalous within the Late Proterozoic Wonnadinna Dolostone and Thorntonia Limestone. Sixteen holes were drilled during 1982 to test the zinc anomalies over a strike length of 8km.

Saracen Minerals drilled nineteen percussion holes in 1988 (CR19880057) with the aim of detecting possible platinum-group element mineralisation associated with the black shales. No platinum group elements were detected.

MIM explored the area in the early 1990's to test for MVT style Pb and Zn and Carlin-style Au and Pt (CR19920506). Re-assays of Saracen Minerals percussion drill holes and ten additional drill holes within the prospective units concluded that mineralisation is structurally controlled.

In conjunction with regional re-mapping of the Tobermorey map sheet, NTGS drilled cored stratigraphic hole NTGS99/1 within the current tenement area (Dunster et. al., 2007).

The NTGS re-evaluated the area as part of the southern Georgina Basin Geology and Resource Potential Report in 2007 and concluded that the Marqua area remains prospective for base metals since the lithostratigraphy of the area was not fully understood until recently (Dunster et. al., 2007).

More recently Uramet explored the region for phosphate, engaging in field mapping, a VTEM survey, surface sampling and aircore drilling (CR20070662, CR20070663 CR20080424, CR20080427, CR20090583, CR20100557). VTEM (Versatile Time Domain Electromagnetic) was used to detect conductivity highs associated with the Thortonian black shale. The Uramet mapping has improved the accuracy of the existing maps, and confirmed known prospective Thorntonia and Red Heart Dolostone localities, as well as defining new prospects that are favourable drilling targets for phosphate (See Figure 4). Uramet drilled 77 aircore holes for a total of 1,962 metres within the prospective Thorntonian unit. Uramet also re-sampled some of the previous drill cuttings of Saracen (CR20080872).

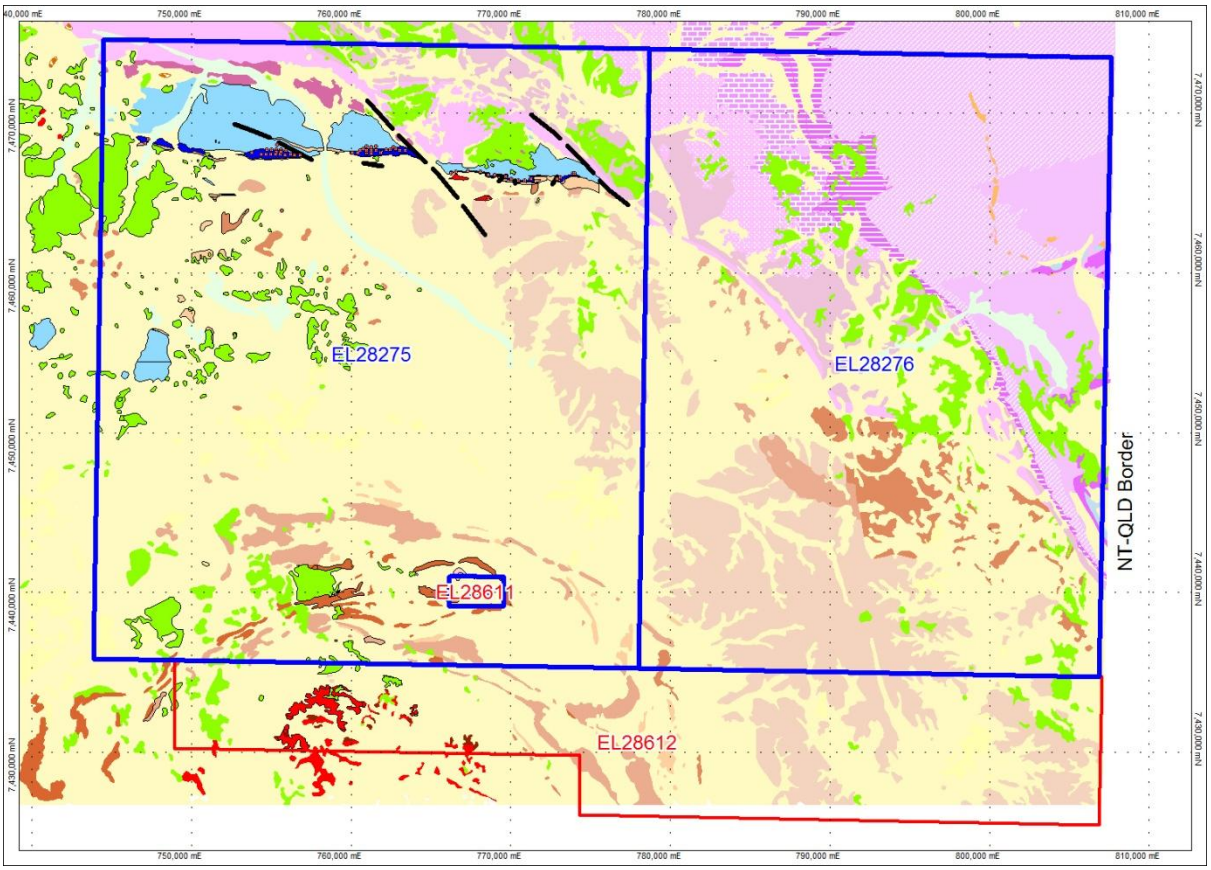


*Figure 4:* *Updated Geological Map. Stratigraphic units remapped by field work and satellite imagery interpretation. The light blue is the Arthur Creek Limestone, dark blue is the phosphate prospective Thorntonian Limestone, light green is Jurassic-Cretaceous cover, brown is Grant Bluff Formation and the red is Mount Dobbie Granite. Uramet drill holes shown in red.*

# 6 ROX ACTIVITIES

## 6.1 Exploration Potential Review

Rox commissioned a review of the exploration potential of the Marqua tenement area by contract geologist Bronwyn Kimber (Kimber, 2011) and that report is presented as Appendix 1. The main work to have occurred over EL28276 comprised surface geochemical sampling by CRA Exploration in 1991, and drilling by Elkedra Diamonds in 2002-2006. Dunster et. al., 2007, comment that Irish-style and Manto sytle Pb-Zn deposits could be present in addition to MVT style Pb-Zn.

CRA Exploration prospected the Toomba Fault zone for gold and base metal mineralisation using a helicopter supported stream sediment survey (107 samples) where no drainage geochemical surveys had been undertaken previously. The stream sediment sampling effectiveness was severely hampered by poor drainage development and the presence of wide spread aeolian sand deposits in the drainages.

Elkedra Diamonds undertook rock chip and stream sediment sampling, RAB and RC drilling, primarily targeting diamond occurrences, although some examination of the manganese potential was also made. No significant results for Pb-Zn, U or $P_2O_5$ were reported from this drilling.

## 6.2 Regional Review

The tenement area of EL28276 seems to be primarily prospective for carbonate-hosted Pb-Zn mineralisation, although results to date have been inconclusive and not encouraging. The exploration model would involve remobilisation of basement and basin derived fluids along pathways associated with the Toomba and other faults into the carbonate sequences of the Nimaroo, Arrinthrunga, Marqua and Hay River Formations. Mineralisation would need to be detected by surface leakage of metals into soils, and would need to be identified through soil sampling using a variety of leaches, including aqua regia, MMI and other weak organic leaching agents.

There may also be some potential for the extension of the phosphate mineralisation present on the adjacent EL28275 to extend to the east onto EL28276. The phosphate bearing Thorntonia Limestone may occur at depth along the Toomba Fault zone as shown on the cross-section on the Hay River – Mt Whelan Special Geology map (1985). This would require prospecting along the Toomba Fault, and possibly stratigraphic drilling to establish the presence of Thorntonia Limestone and its depth.

Exploration for these target mineral groups would be aided by good resolution airborne magnetic and radiometric data, but the currently available 1km spaced NTGS magnetic and radiometric data is not suitable for mineral exploration.

# 7 CONCLUSIONS AND RECOMMENDATIONS

The area of EL28276 is prospective for MVT style Pb-Zn hosted by carbonate rocks, and also phosphate hosted by the Thorntonia Limestone.

The next focus of work should be directed towards prospecting along the Toomba Fault zone for signs of mineralisation at surface that could be potentially leaking from deeper, as an indication of either base-metals or phosphate. Regional scale geophysics would also assist. Unfortunately the existing 1km spaced airborne magnetic and radiometric data are not of sufficient resolution to be useful for mineral exploration.

With the remoteness of the project area, it is likely that initially only high grade DSO (Direct Shipping Ore) phosphate material (>30% $P_2O_5$) could be mined and transported to market economically. Longer term, if a processing plant was to be built on site, lower grade material could be treated, but the distance to market and lack of transport infrastructure would become a significant hurdle to overcome.

On the other hand, a base-metal deposit would be easier to construct and operate since the concentrated product (of significantly lesser tonnage than a phosphate product) could be trucked out over existing roads.

# 8 REFERENCES

Dunster, J.N., Kruse, P.D., Duffett, M.L. and Ambrose, G.J., 2007: Geology and Resource Potential of the Southern Georgina Basin, Northern Territory, NTGS.

Kimber, B., 2011: Exploration Potential of the Marqua Phosphate, Base Metals and Uranium Prospect, Georgina Basin, Northern Territory, Digirock Pty Ltd, Rox Technical Report TR415.

Numerous other references cited are listed in Kimber, 2011 (Appendix 7).

# 9 APPENDICES (Digital Files)

1. Exploration Potential of the Marqua Phosphate, Base Metals and Uranium Prospect, Georgina Basin, Northern Territory, by Bronwyn Kimber – File EL28276_2012_A_02_MarquaExplorationPotentialReport.pdf