GLASSHOUSE PROJECT

COMBINED ANNUAL TECHNICAL REPORT

for

EXPLORATION LICENCES

EL 26302, 26303, 26304, 26305, 26307, 26308, 26309, 26310,
    26311, 26312, 26314
and
EL 26701, 26702, 26703

GEORGINA BASIN

NORTHERN TERRITORY

For Year Ending 7 April 2009

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    July 2009
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Distribution

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1. SUMMARY

This report details exploration and project activities completed during 2008 on Exploration Licences EL 26302, 26303, 26304, 26305, 26307, 26308, 26309, 26310, 26311, 26312, 26314 and EL 26701, 26702, 26703 (the tenements), in the Barkly Tableland region of the Northern Territory. Australis Exploration Pty Ltd (“Australis”), a wholly owned subsidiary of Mineral Securities Operations Limited (“Minsec”), is the holder of the tenements.

The tenements cover the Georgina Basin, a large Late Proterozoic to Palaeozoic sedimentary intracratonic basin, covering a large part of eastern Northern Territory and extending into northwest Queensland. Basement consists of Mesoproterozoic sediments and minor Neoproterozoic sediments, succeeded by marine carbonate and clastic deposits, which accumulated in Cambrian and Ordovician times, overlain by non-marine Silurian to Early Carboniferous successions. The Georgina Basin is bounded by the South Nicholson and McArthur Basins on the north, Tennant Inlier on the west and Arunta Province on the south, and continues eastward into western Queensland to abut the Mt Isa Block. By Middle Cambrian (possibly extending into the Late Cambrian), marine conditions prevailed in the basin and phosphogenesis was widespread with deposits forming in restricted embayments. In the project area, the central Georgina Basin contains a relatively thin stratigraphic succession (up to 450m thick), deposited on a tectonically quiescent platform, subdivided by a NNE – SSW striking structural ridge known as the Alexandria-Wonarrah Basement High.

Economic phosphate deposits in Middle Cambrian Georgina Basin are being mined at Incitec’s (ex WMC) Phosphate Hill, Duchess Mine in Queensland. The Duchess Mine and DAP plant produces 648,000 t of di-ammonium phosphate and 236,000t of mono-ammonium phosphate (from 2 Mt of phosphate rock) annually from a deposit containing a total resource of 131 Mt @ 23.5% P₂O₅.

The company completed the following activities on the tenements during 2008:

- Compilation of historical Company Reports from past exploration activities;
- Compilation, merging and processing of public geophysical datasets to create magnetic, radiometric and gravity images to help map the regolith, surficial and basement geology, and basement structures;
- Field reconnaissance to ascertain road access and station community issues;
- Collection of one rock sample on the northern tenements for phosphate; and analysis for P and other elements;
• Rock Phosphate market research into sale and operating cost pricing.

Key results from the 2008 work include:

• Identification of basement magnetic and gravity linears that parallel the structural trend hosting the giant McArthur River, Century and Mt Isa base metals deposits;

• Identification of surficial uranium radiometric anomalies that map potential phosphorite horizons prospective for uranium and phosphate mineralisation;

• Access by station tracks is good and the tablelands terrain is generally flat and poorly vegetated;

• A single sample was collected within the tenements which recorded weak P values;

<table>
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<th>P ppm</th>
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<th>Pb ppm</th>
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<td>7876960</td>
<td>20</td>
<td>410</td>
<td>&lt;10</td>
<td>14</td>
<td>13</td>
<td>&lt;0.2</td>
<td>Anthill</td>
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• Support for a sustained rock phosphate sale price of US$150 per tonne for the next 4-5 years;

Recommendations for 2009 are:

• Research historical and current Company Reports, create a GIS database of basement and cover sequence geology, geophysical data, drilling and sampling, and undertake target generation for phosphates, uranium, base metals;

• Reconnaissance geological mapping and geochemical sampling for phosphate, uranium and pathfinder elements, especially in radiogenic terrains, structural targets, and areas of prospective Cambrian sediment stratigraphy;

• Further detailed processing of the geophysical datasets to better target uranium anomalies and structural features;

• Preliminary heritage survey and, where appropriate, complete discussions with any Native Title claimant on the nature of the exploration programmes;

• Possible RAB or Air Core drilling of anomalous areas; and

• Further market research into rock phosphate market and project economics.
2. LOCATION

The Glasshouse Project is located in the Barkly Tableland region within the Tennant Creek Mineral Field of the Northern Territory (Figure 2.1). It is part of a larger tenement package that extends to the east and south east into Queensland.

The tenements extend in a generally north west trending belt from the Northern Territory-Queensland border (150 km west of Mount Isa) to 300 km north west of Camoweal. The Avon Downs (SF53-04), Ranken (SE53-16), Alroy (SE-15), Mount Drummond (SE-12) and Brunette Downs (SE-11) 250K geological map sheets are partly covered.

The tenements can be accessed by the bitumen Barkly Highway from Camoweal (in Queensland) or Tennant Creek (in Northern Territory), which crosses the tenement group. Within the tenements, there is a network of dirt roads and station tracks. As some of the tracks traverse black soil plains they can become impassable in wet weather.

The tenements are located in the Barkly Tableland region that has low topographic relief (Figure 2.1). They cover the headwaters and a section of the watershed of the southwards flowing Georgina River. With the low relief and seasonal high rainfall, the drainages form broad braided channels that flow in a general southwards direction. Locally, the southern part of this region is referred to as ‘channel country’.

Vegetation in the Tableland region is dominated by open savannah woodland and grassland (Figure 2.2). Taller and more abundant trees are restricted to the banks of the major drainage systems which only flow for short periods after storms.

Figure 2.2: Photographs of the Barkly Tableland terrain and vegetation in the northern tenement group.
Figure 2.1: Map showing the location of Australis tenement package in the Northern Territory and Queensland. Tenements included in this report are numbered.
3. TENEMENTS

A total of 14 exploration licences covering 20,006 km² were granted to Australis Exploration Pty Ltd ("Australis") in the Northern Territory (Table 3.1; Figure 2.2). Australis is a wholly owned subsidiary of Mineral Securities Operations Limited ("Minsec"), which merged with CopperCo Limited in 2008.

Table 3.1 Tenement Schedule

<table>
<thead>
<tr>
<th>Tenement No.</th>
<th>Name</th>
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<td>423</td>
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<td>8/04/2008</td>
<td>7/04/2013</td>
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<td>8/04/2008</td>
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<td>294</td>
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The Glasshouse Project was acquired by Australis in 2007 and 2008 in a series of applications. Initially, applications EL26302, 26303, 26304, 26305, 26307, 26308, 26309, 26310, 26311, 26312, 26314 covered a series of north west trending magnetic linears that parallel the structural trend passing through the McArthur River, Century and Mt Isa base metal deposits; these tenements also covered extensive areas of the Georgina Basin cover sequence sediments prospective for phosphate and uranium. Exploration Licences EL26701, 26702 and 26703 were later applied for over areas marginal to the Alroy, Alexandria and Buchanan Dam phosphate occurrences. The final tenement application phase included ELA26928 (Tobermorey to the south of the Glasshouse Project) and several applications in Queensland, which were taken out over radiometric anomalies identified during the geophysical studies by Vector Research (see Memo by Bret Ferris, consulting geologist, in Appendix 1).

Exploration Licence EL26304 was granted on 1st April 2008. Exploration Licences EL26302, 26303, 26305, 26307, 26308, 26309, 26310, 26311, 26312 and 26314 were granted on 8th April 2008. Exploration Licence EL26701 was granted on 7th January 2009, EL26702 on 14th December 2008, and EL26703 on 5th January 2009. All 14 tenements were granted for a term of 5 years.

The Department of Primary Industry, Fisheries and Mines has grouped the 14 Exploration Licences into one reporting group.
4. **EXPLORATION RATIONALE**

North-western Queensland extending into north-eastern Northern Territory is one of the major metalliferous regions of the World with the estimated metal endowment being 11% of the World’s zinc, 5% of the silver and 1% of the copper. In addition, the area is known to host major phosphate and uranium deposits. The known base metal (Zn-Pb-Ag-Cu) and uranium deposits are generally hosted by Proterozoic-age rocks of the basement which are assigned to the Mount Isa Block. The processes that formed these deposits were associated with tectonic events that developed and stabilised the North Australian Craton. In contrast, deposits of phosphate and some styles of uranium enrichment occur in younger sedimentary rocks that unconformably overlie the basement.

Historically, the large base-metal and uranium mines of the Mount Isa region developed at sites where mineralisation outcropped from Proterozoic rocks. However, more recently large deposits like Cannington (Ag+Pb), Century (Zn+Pb) and Osborne (Cu+Au) were discovered by integrated programmes of airborne geophysics, regional geochemistry, structural and geological interpretation and drilling of Proterozoic rocks beneath areas of younger cover. To assist companies using this approach to exploration, the Northern Territory Department of Primary Industry, Fisheries and Mines and the Queensland Department of Minerals and Energy have recently compiled all available geological and geophysical data for the Northern Territory and north-western Queensland. The dataset provides a new basis to better understand the distribution, geology, structure and depths to the highly prospective Proterozoic-age basement rocks of the North Australian craton, and better outlines the distribution of overlying younger cover sequences.

Based on an initial review of the recently released geological and geophysical data, Australis applied for 57 exploration licenses covering some 41,742 km² to the west and south of Mount Isa, and extending to the north-west into the Northern Territory. In this area, outcrop is dominated by Palaeozoic, Mesozoic and recent sediments of the Georgina Basin and Eromanga Basin. The geophysical data suggest there are parts of the tenement area where the prospective Proterozoic-age basement extends beneath the region at relatively shallow depths. Historically, this region has received little attention for mineral exploration due to the extensive Mesozoic and Palaeozoic cover. However, the new compilation of geophysical data for the region provides a useful guide to focus exploration onto targets with the potential to host large-scale base metal and uranium ore-deposits. In addition, the geophysical and historical database compilation has highlighted opportunities to explore for uranium and phosphate deposits in the younger overlying sediments.

In summary, the Australis tenements cover an area with extensive aeromagnetic, radiometric and gravity anomalies, where historical company reports and current exploration activities by other companies indicate potential for:
- Copper
- Zinc-Lead-Silver
- Uranium
- Phosphate

Proterozoic-age rocks of the Mount Isa Block in north western Queensland host one of the major Copper-Zinc-Lead-Silver and Uranium provinces of the world, including:

- Mt Isa Cu and Pb-Zn-Ag and George Fisher Pb-Zn-Ag mines
- Century Zn-Pb mine
- Ernest Henry Cu-Au mine
- Cannington Ag-Pb mine
- Valhalla and Westmoreland U deposits
- Duchess Phosphate mine

The company intends to explore the extensive tenement package for large mineralized systems of copper, lead, zinc and their associated metals (i.e. gold and silver) within the Proterozoic basement rocks beneath the superficial and Phanerozoic units, and the overlying superficial and Phanerozoic sediments for roll-front type and calcrete type uranium mineralization, phosphate deposits and possibly MVT base metals mineralization (Figure 4.1).

![Mineral Deposit Styles](Image)

**Figure 4.1:** Schematic 3D model of the potential mineral deposit styles within the Georgina and Eromanga basins and underlying Proterozoic basement.
5. REGIONAL GEOLOGY

The Georgina Basin, together with the Wiso, Daly, Amadeus and Ngaila basins, form remnant of the stratigraphically continuous Centralian Superbasin that extended over most of central Australia from the Neoproterozoic to Palaeozoic. Structural dismemberment of the Superbasin during Palaeozoic intraplate orogenic events (400–300 Ma Alice Springs Orogeny) has resulted in the exposure of Palaeoproterozoic to Mesoproterozoic basement between basin fragments in their current configuration (Khan, Ferenczi, Ahmad and Kruse, 2007).

The Georgina Basin is the largest of the intracratonic Neoproterozoic to Palaeozoic basins. It covers a large part of eastern Northern Territory and extending into northwest Queensland, for a total area of about 325,000 km², of which 185,000 km² lies within the Northern Territory. Downfaulted blocks and half-grabens typically contain up to 1.5 km of Neoproterozoic sedimentary rocks. Up to 2.2 km of overlying Palaeozoic succession is preserved in depocentres and synclines. Cambrian platform carbonate rocks dominate the basin fill. Accompanying sandstone and shale were deposited during relative uplift and subsidence, respectively. The Cambrian–Ordovician succession is most complete in the southern portion of the basin. In contrast, the central region contains only a relatively thin Middle Cambrian succession (Khan, Ferenczi, Ahmad and Kruse, 2007).

Basement rocks consist of Mesoproterozoic and minor Neoproterozoic sediments, characterised by shallow marine epicontinental successions of carbonate and marine clastic rocks, evaporite, and fluvial and lacustrine continental sandstone, glaciogenic sediments, shale and siltstone. These sediments were succeeded by marine carbonate and clastic deposits, which accumulated in Cambrian and Ordovician times. Younger, non-marine Silurian to Early Carboniferous successions are restricted in areal extent. In addition, extensive sub-aerial flood basalt (Peaker Piker Volcanics and Antrim Plateau Volcanics) of Early Cambrian age (540 Ma) floor these basins in much of the northern part of the Northern Territory. The volcanics are amygdaloidal and porphyritic tholeiitic basalts and have associated dolerites (McCrow, 2008; Gifford, 2006; Khan, Ferenczi, Ahmad and Kruse, 2007).

The Georgina Basin is bounded by the South Nicholson and McArthur Basins on the north (Figure 5.1), Tennant Inlier on the west and Arunta Province on the south, and continues eastward into western Queensland to abut the Mt Isa Block (Figure 5.2). It has been subdivided into several sub-basins that primarily reflect the thickness of Cambrian deposition (Khan, Ferenczi, Ahmad and Kruse, 2007).
In the northern part of the project area, the central Georgina Basin contains a relatively thin stratigraphic succession, up to 450m thick, deposited on a tectonically quiescent platform. Deposition commenced with a marine transgression in the early Middle Cambrian and may have extended into the Late Cambrian (McCrow, 2008). This central platform has been subdivided into an eastern Undilla Sub-basin and a western Barkly Sub-basin, separated by a NNE – SSW striking structural ridge known as the Alexandria-Wonarah Basement High (Figure 5.3) (McCrow, 2008, Gifford, 2006). In the northern tenements, this structural ridge outcrops as two north-east trending Precambrian basement highs as inliers within Georgina Basin sediments, with the Buchanan-Alroy-Alexandria phosphate occurrences occurring nearby. The Mittiebah Range forms the northern Pre-Cambrian inlier, the western end extending into EL26701, while the southern Pre-Cambrian inlier, south of Alexandria homestead and phosphate occurrence, outcrops in the north-east part of EL26310.

By Middle Cambrian, marine conditions prevailed in the basin and phosphogenesis was widespread (McCrow, 2008). The Middle Cambrian succession has been subdivided into two depositional sequences with three discrete phosphogenic episodes. Sequence 1 (early Middle Cambrian) comprises terrigenous siliciclastic rocks, peritidal and shelf carbonate rocks, carbonaceous shale and phosphatic carbonate rocks; sequence 2 (remainder of Middle Cambrian) comprises siliciclastic and carbonate rocks, phosphorite and phosphatic limestone, and carbonaceous shale. Major phosphate deposits are apparently in sequence 2, including the Wonarah, Alexandria and Alroy deposits in the Northern Territory. All three appear to be hosted in the Wonarah Formation, although others have assigned the Wonarah deposit to the Gum Ridge Formation (sequence 1) (Khan, Ferenczi, Ahmad and Kruse, 2007). There have been efforts to correlate sedimentary horizons from one area to another but this has been difficult to achieve, other than in the broadest terms, due to rapid lateral facies changes (McCrow, 2008).
Figure 5.1. Geology map of the Proterozoic basement rocks to the north of the tenements interpreted to extend to the south below the cover sequences of the Georgina Basin. Source: Rawlings, DJ, Korsch, RJ, Goleby, BR, Gibson, GM, Johnstone, DW and Barlow, M (2004), Figure 3.
Figure 5.2. Simplified geology of the eastern part of the Northern Territory and north western Queensland showing the Georgina Basin and surrounding Pre-Cambrian rocks. Mineral occurrences also shown, including phosphate occurrences and deposits.
Figure 5.3. Simplified geology of the Georgina, Wiso and Daly basins showing the distribution of phosphorite facies depocentres and major phosphate deposits. Source: Khan, M, Ferenczi, PA, Ahmad, M and Kruse, PD (2007), Figure 4.

Figure 5.4. Stratigraphy of the Georgina and Wiso basins in the Northern Territory, showing the stratigraphic location of phosphate occurrences in Lower to Middle Cambrian sediments. Source: Khan, M, Ferenczi, PA, Ahmad, M and Kruse, PD (2007), Figure 5.
Regional Phosphate Prospectivity

Australia’s largest phosphate deposits (phosphorites) are the shallow marine siliciclastic and carbonate sediments of the Lower to Middle Cambrian Georgina Basin sequence in north-west Queensland and Northern Territory. These sedimentary phosphorite deposits occur where the phosphorus has been chemically and biologically precipitated as apatite group minerals (McCrow, 2008). An up-welling process of phosphogenesis of cold phosphate enriched water onto warm shallow marine shelves and embayments is the mechanism of favouring precipitation.

Exploration and phosphate resource development has largely focused on the well endowed Georgina Basin, which contains significant deposits in the Northern Territory (Wonarah, Highland Plains, Alexandria, Alroy and Buchanan Dam) and Queensland (Duchess, Lady Annie, D Tree, Lady Jane, Galah, Sherrin Creek and others) (McCrow, 2008). Previous studies have also outlined the presence of phosphorite in the Wiso and Daly basins (Figure 5.3) (Khan, Ferenczi and Ahmad, 2005a).

Economic phosphate deposits in Middle Cambrian Georgina Basin sediments are being mined at Duchess (Phosphate Hill) in Queensland (Figure 5.3). These phosphatic sediments were deposited in a restricted embayment that was bounded by land on its northern, western, and southern sides, and whose eastern connection with the Burke River Outlier, an appendage of the Georgina Basin, was restricted by shallow banks (McCrow, 2008). Incitec’s (ex WMC) Phosphate Hill, Duchess Mine and DAP plant produces 648,000 t of di-ammonium phosphate and 236,000t of mono-ammonium phosphate (from 2 Mt of phosphate rock) annually from a deposit containing a total resource of 131 Mt @ 23.5% P2O5 (McCrow, 2008; Ferenczi, Khan and Ahmad, 2005b). That facility commenced production in December 1999 (Gifford, 2006).

The host rocks for these deposits are typically recessive and often covered with surficial sediments. Previous exploration and discovery of known deposits involved shallow reconnaissance drilling programs (and phosphate testing of drill cuttings) in favourable stratigraphy in close proximity to palaeo-highs (Ferenczi, Khan and Ahmad, 2005b). Future targeting of phosphorite deposits would involve a structural interpretation which would include identifying possible embayments and structural palaeo-highs (McCrow, 2008).

Howard (1990) examined the distribution of phosphatic facies in the Georgina, Wiso and Daly River Basins. He used lithological logs and analyses of cuttings from water bores and Bureau of Mineral Resources stratigraphic holes, together with aeromagnetic, gravity and elevation data, to define a carbonate-siltstone-chert phosphatic lithofacies of Middle Cambrian age within the basins. The deposition of these phosphatic lithofacies is related to the basement configuration and its depth. They occur as belts, peripheral to and within the basins, with an average width of 32 km,
a thickness of 10 to 190 metres, and have been traced over a distance of 2,100 km. Some phosphorite deposits (such as the Lady Judith in the Wiso Basin) rests on volcanic rocks and interdigitate with carbonates of the Montejinni Limestone, while other, such as the Ammaroo phosphatic belt in the southwestern portion of the Georgina Basin, is contained within a depression bounded by limestones of the Arthur Creek Formation (Figure 5.4). The phosphatic sediments are believed to have been deposited primarily as an Ordian Middle Cambrian event in the west with a ‘younging’ transition through Ordian and/or Early Templetonian to Late Templetonian in the southeast. The basins are extensional, exhibiting a series of broad downwarps crossed by peripheral aulacogens, grabens, half grabens formed in the Late Proterozoic and modified subsequently by the development of plateau, narrow horst blocks and adjacent deeps during the Middle Cambrian along basin-dividing arches. The basement to the shallow-water phosphatic lithofacies consists of Proterozoic sediment or Early Cambrian volcanic plateau or peripheral sloping platforms which in the Brunette Sub-basin have present elevations of 0-300 metres ASL (Howard, 1990).
6. LOCAL GEOLOGY

Alexandria-Alroy-Buchanan Dam Geology

In the Alexandria Region, the early Middle Cambrian sediments include the Wonarah Beds, Burton Beds and Anthony Lagoon Beds. They all consist predominantly of siltstone, sandstone, chert, limestone and dolomite. IMC reported that sequences of Middle Cambrian siltstone/sandstone deposition in close proximity to mapped Precambrian basement highs almost invariably overlie Peaker Piker volcanics of Lower Middle Cambrian age (northern Alexandria) or Precambrian Mittiebah Sandstone/ Mullera Formation (most of Alexandria) (McCrow, 2008).

In 1976 ICI reported no Pre-Cainozoic outcrops in the Alroy area which is totally covered by pedo-calcic black/grey soils, with alluvium in the seasonal swamps associated with the Playford and Buchanan Rivers. The underlying rocks were siltstones, shales, cherts, limestone and dolomite. These are probably the Lower Middle Cambrian Burton Beds, considered to be the stratigraphic equivalent of the Wonarah Beds to the south and the Beetle Creek Formation in Queensland, both of which are phosphatic in parts. No information is available about rocks below the Middle Cambrian (McCrow, 2008).

In the Alexandria area, geological mapping and drill hole logging by ICI identified the following sequence (McCrow, 2008):

<table>
<thead>
<tr>
<th>Era</th>
<th>Member</th>
<th>Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cainozoic</td>
<td>Czs</td>
<td>Sand</td>
</tr>
<tr>
<td></td>
<td>Czb</td>
<td>Black soil</td>
</tr>
<tr>
<td>Palaeozoic</td>
<td>Middle Cambrian</td>
<td>Burton Beds (phosphatic)</td>
</tr>
<tr>
<td></td>
<td>Emp</td>
<td>Peaker Piker Volcanics</td>
</tr>
<tr>
<td></td>
<td>Emp</td>
<td>Unconformity</td>
</tr>
<tr>
<td>Unconformity</td>
<td>Pu</td>
<td>Mittebah Sandstone</td>
</tr>
<tr>
<td>Proterozoic</td>
<td>Lower P 1</td>
<td>Undifferentiated</td>
</tr>
</tbody>
</table>

Wonarah Deposit Geology

The Wonarah deposits occur along the flanks of the Alexandria – Wonarah High. Onlapping dolomitic members equivalent to the Middle Cambrian Thorntonia Limestone are present on the lower flanks of this structural ridge and, when present, the phosphorus-bearing sediments (Upper Gum Ridge Formation) occur on the limestone and extend in thicker beds, lying directly on the Peaker Piker Volcanics, on the upper flanks of the ridge. This succession is then overlain by the Convolute Mudstone followed by the Hanging Wall Mudstone. Two basal sedimentary units that are not always present are the Transitional Sediments and the Potassium Marker Horizon. The
transitional sediments consist of mixed mudstone, siltstone, sandstone, and a possible palaeo soil. The overlying Potassium Marker Horizon is a clay rich mudstone (Gifford, 2006).

There are two mineralised rock types at Wonarah – Mudstone Phosphorite and the Chert Breccia Phosphorite (Gifford, 2006). The Mudstone Phosphorite contains most of the mineralisation, forming friable and fine grained beds 2 metres to 10 metres thick with grades up to 40% P₂O₅ but typically between 20% and 30% P2O5. The Chert Breccia Phosphorite occurs beneath the Mudstone Phosphorite with a gradational boundary and contains discrete clasts of chert breccia in a phosphorite matrix. The grade ranges from 5% to 20% P2O5 but is typically between 10% and 15% P2O5 (Gifford, 2006).

Area East of Wonarah EL26304 and 26702

Cambrian and Ordovician sediments, similar to the Wonarah area, outcrop on EL26702 and 26304, approximately 40 km east of Wonarah. The area is dissected by the south flowing Ranken River and is immediately north of the Barkly Highway. The area has a strong U2/Th ratio radiometric response (Figure 6.1).

Figure 6.1. Geology of the Ranken 1:250,000 mapsheet showing the location of the Wonarah phosphate deposit and Cambrian (pink and red) and Ordovician (green) outcrop geology. Inset: Radiometric U2/Th Linear2 ratio image.
7. **EXPLORATION HISTORY**

There are no recorded mineral occurrences within the tenements. Previous company exploration reports have been compiled but are yet to be researched comprehensively. Some preliminary findings are summarised below based on research completed by Phosphate Australia Limited and Minemakers Limited who hold ground nearby.

**Phosphate Exploration and Occurrences**

Regional scout drilling to define the extent and development of phosphate mineralisation in Cambrian sediments at the base of the Georgina Basin succession was conducted by several companies in the late 1960s (Gifford, 2006). Recorded phosphorite exploration began in 1967 on the Alexandria-Alroy-Buchanan Dam and Wonarah prospects when IMC Development Corporation (“IMC”) commenced a drilling program which intersected phosphorite horizons on the margins of the Precambrian (McCrow, 2008). In 1968 the Bureau of Mineral Resources also completed a drilling programme in the Alexandria/Wonarah area with results being presented in an unpublished report in 1970 (Gifford, 2006).

The Alexandria-Alroy-Buchanan Dam and Wonarah prospects are located close to the tenements.

**Alexandria-Alroy-Buchanan Dam Area**

This area lies between Exploration Licences 26310 and 26701 and is currently held by Phosphate Australia Limited.

IMC reported results on the Alexandria Authority that the main phosphorite horizon in one drill hole averaged 6.1 metres at 15.6% $P_2O_5$ from 48.8 metres, including up to 18% $P_2O_5$ in parts. While IMC’s reports indicated that further work was planned, there are no records of further exploration (McCrow, 2008).

In 1968, Pickands Mather and Co International (“PMI”) commenced reconnaissance drilling program in the Alroy area (Authority to Prospect 1874) and identified two prospects, Area No1 and Area No2 (since named Buchanan Dam). After limited follow-up drilling, PMI reported the following thickness and grade averages:

**Alroy Area No 1 (two holes):**

- Hole A2-2a: 6.1 metres at 10.0% $P_2O_5$ from 18.3 metres, including 1.8 metres at 14.5% $P_2O_5$ from 18.3 metres, in weakly calcareous to non-calcareous sediment.
• Hole A-10-70: 6.4 metres at 12.0% P₂O₅ from 16.2 metres, including 4.6 metres at 15.5% P₂O₅ from 17.4 metres, in weakly calcareous to non-calcareous sediment.

Buchanan Dam (Alroy Area No 2 (one hole)):

• Hole A-12-70: 6.1 metres at 25% P₂O₅ from 12.2 metres, in carbonate rich sediment.

PMI also gave substantial bulk mineralisation estimates which would require far more drilling to meet JORC reporting standards. The higher grade phosphorites were hosted by calcic mudstones and claystones and minor limestone.

In 1971, Minoil Services Pty Ltd (“Minoil”) completed further broad spaced drilling in the Alroy area (Authority to Prospect 1874) Area No1 prospect mainly to investigate phosphatic horizons for sedimentary base metal mineralisation. One hole that had a 3 metre intersection in “dark shale” recorded the following maximum base metal values: Ag -5 ppm, As -700 ppm, Cd -50 ppm, Co -2000 ppm, Cu -1500 ppm, Mn -17.0%, Pb -8000 ppm and Zn -8000 ppm. No high grade phosphate was intersected in the hole but the interval with the high base metal mineralization also had a high radioactive count. In another hole 800m to the south, higher than average base metal levels were recorded in the phosphatic zone. Minoil concluded that the area had the potential for a sedimentary deposit of base metal mineralization but did not deem the phosphorites as requiring further exploration. From the open records, it appears that Minoil conducted no further exploration (McCrow, 2008).

In 1976, ICI Australia Limited (“ICI”) drilled nine rotary/percussion drill holes for a total of 219.5 metres at Alroy on EL 1081 which covered the old PMI Prospecting Authority 1874 (Areas No 1 and 2) (Figure 7.1). The drilling was broad spaced with a number of holes being drilled one kilometre away from PMI discovery holes. ICI had difficulty correlating the mineralised horizons and provided three possible explanations:

• The high grade material formed in very small depositional basins.
• The high grade material developed in narrow but presently undefined inter-reef channels 0.5-1 kilometre wide.
• Diagenetic concentration has led to local high grade patches, following general leaching from the surrounding siltstones.

From 1976 to 1977, ICI explored the Alexandria area for extensions to the low grade phosphorite deposits located by IMC in 1968-70. Seven rotary/percussion holes were drilled in this zone but only very low grade phosphate was intersected. ICI ceased exploration in 1977.
Figure 7.1. Drillhole locations and graphic logs in the Buchanan Dam and Alroy phosphate prospects, with reference to Australis tenements. Source: Hackett (1976), ICI Company Report 19770038, Plan No. 1081/2.

Wonarah Deposit

The Wonarah deposit held by Minemakers Limited is located 40km west of Exploration Licence 26702.

In 1967 drilling by IMC defined areas that had no potential, areas that contained minor low grade mineralisation, and areas that were considered to have potential to contain economic mineralisation and warranted further investigation. By 1970 IMC drilling at Wonarah returned drill sections with significant thicknesses of phosphate mineralisation in the south west of Prospecting Area PA2161. The phosphorite does not outcrop at this locality and was located at depths of 17m to 45m and reached a maximum thickness of 18 metres at the eastern end of the deposit. IMC made several pre-JORC estimates of the mineralisation present with the highest grade being 280Mt at 18.98% P2O5 (applying an 18% P2O5 cut off). Scoping studies were unfavourable and IMC relinquished the prospect in 1970 (Gifford, 2006).

In 1978 ICI drilled on the eastern side of the mineralisation identified by IMC where the overburden ratios were more favourable. This work outlined reasonable continuity of phosphorite over an area of 6 km² at an overburden ratio of less than 7:1. ICI then completed metallurgical testwork on the
phosphorite unit using Calweld drill samples. Weak to moderate grade phosphate was intersected from 33 to 39 metres, and from 39 to 46 metres strongly phosphatic tan coloured shale and siltstone was intersected, which then passed into a mixed mudstone, sandstone, siltstone lithology. The 7 metre thick high grade interval was sent to Australian Fertilizers Ltd (Port Kembla) for testing. The drilling defined the average thickness and showed the deposit had an undulating top that can only be accurately defined by close spaced production drilling. No metallurgical testing reports are available and the licences are believed to have been surrendered in 1980 (Gifford, 2006).

In 1983 CRAE took up the area to the south of the IMC ground and carried out an airborne magnetic survey with the main objective of determining depth to basement which generally correlates with depth to phosphate horizon in the better mineralised areas. The phosphate potential in this area was downgraded due to lack of local infrastructure and the project abandoned in 1985 without any drilling being completed.

In 1992-93 the area was explored for diamondiferous diatremes based on airborne magnetic and radiometric surveys. Follow up of anomalies included ground based and helicopter magnetic surveys, some loam sampling, and limited drilling (which intersected the phosphorite horizons over basalt basement anomalous in copper and zinc. No more phosphate exploration was undertaken at Wonarah until 2000 (Gifford, 2006).

In 1997 Rare Earths and Minerals Pty Ltd and Pilbara Chemical Corporation NL held tenements covering the Wonarah phosphate deposit and adjoining areas including the former CRAE ground.

In 1998 Australian Kimberley Diamonds NL (“AKD”) (name changed to Indo Mines Ltd (“Indo”) in 2006) took an option over the Wonarah project with REM/PCC. In 1998 Indo carried out a technical review of geological and metallurgical data on the project while at the same time REM/PCC undertook a scoping study of infrastructure and markets. These studies confirmed the technical data and indicated that the building of the railway to Darwin and availability of natural gas would greatly improve the viability of the project. Indo therefore approached a number of mining houses seeking a joint venture partner (Gifford, 2006).

In 1999 Rio Tinto Exploration Pty Ltd (“RTE”) (80%) entered into a joint venture with Indo (20%). In 2000 RTE conducted a Prefeasibility Study using available drilling data, which included an estimation by Duncan Hackman and Associates of the total inferred resource of 1,955Mt at 14.4% P₂O₅. The maximum assayed grade was 28.6% P₂O₅. Hackman considered that the estimated resource grade was too low and that infrastructure at that time was not adequate.
From 2000 to 2001 RTE carried out comprehensive exploration programmes, including drilling, mostly south of areas drilled by IMC. A gravity survey was carried out to help define basement highs but the technique was not successful. More closely spaced holes in the well mineralised areas enabled them to calculate a JORC compliant Inferred Resource of 115Mt at 22% P₂O₅ (at a cut off grade of 15%) within an area of 23 km². It is based on the mineralisation in the mudstone phosphorite and excludes the underlying lower grade chert breccia phosphorite which had poorer lateral continuity. After additional infill drilling in 2001, a new resource estimate was undertaken which reported an Inferred Mineral Resource of 72Mt at 23% P₂O₅ (at a cut off grade of 15%).

RTE carried out beneficiation tests to determine the potential to upgrade the Wonarah ore. These tests were limited to physical upgrading by washing and screening and while reducing the deleterious elements failed to give a major increase in grade. Previous studies employing flotation failed to give satisfactory recoveries when lifting the grade to 30% P₂O₅ which is considered to be optimum for the di-ammonium phosphate ("DAP") process. The reduced size of the resource and the inability to upgrade the mineralisation economically was considered to seriously lower the Wonarah project's potential. RTE carried out a reverse economic study, using di-ammonium phosphate ("DAP") fertiliser prices at that time, which indicated that the project was then NPV negative (Gifford, 2006). This deposit has a waste-to-ore ratio of 2:1 and is located about 200 km east of the nearest railhead at Tennant Creek. By contrast the existing mining operations at Phosphate Hill have similar grade and waste-to-ore ratios, but are serviced by a railhead at Duchess, close to the deposit (Khan, Ferenczi and Ahmad, 2005a).

RTE withdrew from the joint venture in 2002. Indo sold the project to Minemakers in 2006.

During 2001-02, RTE also completed field work on the outcropping Upper Gum Ridge Formation phosphorite beds at the Arruwurra prospect, located 16km southwest of the Wonarah deposit. The Wonarah Beds outcrop in the north central area, but are generally highly weathered and covered by Cainozoic aeolian sand sheets and longitudinal dunes. Silcrete and ferricrete duricrust has developed beneath the sand cover and can outcrop as low rises. Calcrete and black soil overlies dolostone in the south central area. At the Arruwurra outcrop sampling indicated the phosphorite is high grade but of unknown extent. It outcrops over a strike of about 2 km with grades up to 30% P₂O₅ with less than 5% Al₂O₃ + Fe₂O₃.
Base Metals Exploration

Between 1980 and 1997, Amoco Minerals Australia Company (“Amoco”), MIM Exploration Pty Ltd (“MIM”) and BHP Minerals Ltd (“BHP”) explored the northern part of the Georgina Basin for base metals (zinc, lead and copper) and in the Proterozoic basement below the basin cover sequences.

Amoco explored the Bowgan Creek prospect (E2232) from 1980 to 1981 for large lead, zinc and copper deposits similar to McArthur River 180 km to the north (Figure 7.2). The target was a regional gravity anomaly thought to be a local Proterozoic basin of pyritic shales associated with growth faults within the dolomitic sediments of the McArthur Group, in the basement beneath the Georgina Basin cover sequences. This interpretation was supported by ferruginous strike ridges of uncertain origin. A soil geochemical and mapping survey was completed over the gravity anomaly and ridges. No McArthur Group rocks were identified, the anomaly was caused by a basement block of marine metavolcanics probably belonging to the Murphy Metamorphics, and the ferruginous ridges lateritised iron formations or ultramafic lavas (Wilkins, 1981).

Figure 7.2. Location of the Bowgan Creek prospect north of EL26314 and south of McArthur River. Source: Wilkins (1981), Amoco Company Report 1981003, Drawing No. M80-1540.
From 1991 to 1993 MIM explored the Cresswell (EL7219), Coolibah (EL7222) and Barkly (EL7223) prospect, a contiguous group immediately north of Australis tenement EL26314 (Figure 7.3). It was taken out by MIM over the inferred southern extension of the Emu Fault within the Nicholson Sub-basin south of McArthur River. The three EL’s straddle the western end of the Murphy Tectonic Ridge, where the Early Proterozoic Nicholson Granite intrudes the older Murphy Metamorphics. To the north the Middle Proterozoic McArthur Basin sediments overlie the Early Proterozoic intrusives and metasediments of the tectonic ridge. The McArthur Group sediments of the McArthur Basin hosts the major HYC Pb-Zn deposit to the north of the tenements. Within the tenements, the Middle Proterozoic rocks are covered by relatively thin Cambrian and Cretaceous sediments and Cainozoic soils of the Georgina Basin. To the south of the tectonic ridge, the McArthur Basin sediments are replaced by the younger Middle Proterozoic South Nicholson Basin sediments, of which its youngest member the Mittiebah Sandstone outcrops in the south-eastern part of EL7223. MIM carried out the following exploration programmes for McArthur River type base metal mineralisation (Hitchman and Bruce 1993):

- Stream sediment survey where Middle Proterozoic rocks are exposed indicated several drainages anomalous for Au, Zn and Cu, which could not be confirmed on re-sampling.

- Re-processing aeromagnetic data (collected by Ashton Mining Limited) and re-evaluation of 60 previous drill holes lead to the interpretation that the Emu Fault extends as a southerly trending structure through the tenement group. Tawallah Group sediments (a package of sedimentary, volcanic and carbonate rocks that comprise the lowermost unit of the McArthur Basin sequence) were also interpreted to exist as fault blocks beneath the cover rocks.

- A GEOTEM survey over the extension of the Emu Fault Zone revealed an electromagnetic response related to the distribution of Cambrian and Cretaceous sedimentary rocks in the northern tenement (“Cresswell”). Aeromagnetic data collected with the GEOTEM confirmed the Fault expressed as a north-northwest magnetic grain.

- Re-processing Ashton’s INPUT survey data collected in 1985 over the central “Coolibah” and southern “Barkly” tenements revealed extensive shallow conductive cover coincident with black soil on the Murphy Tectonic Ridge. They concluded that several discrete conductors within this anomaly and along the inferred position of the Emu Fault required follow up (Figure 7.3).
In 1993 MIM explored the Boree Creek prospect (EL8122), located along the western flank of Australis EL26311 and 26701, for its prospectivity for stratiform lead zinc mineralisation. No Proterozoic geology is exposed in the area which is covered by Tertiary sediments and sporadic outcrops of Cambrian limestones. MIM reviewed all available data (aeromagnetics and water bore and stratigraphic hole logs), including exploration by Aberfoyle Exploration Pty Ltd, Ashton Mining Limited and AOG Minerals Pty Ltd for diamonds, and concluded that the prospective Proterozoic stratigraphy was too deep (>430 metres) to be economic (Busuttil, 1994).


In 1991 BHP explored the Mt Morgan prospect (EL7203) in the Mittiebah/Carrarra Ranges area over the eastern edge of the northern Australia tenements EL26311 and north of EL26309. Activities conducted were open file searches, ground magnetic surveys and SIROTEM soundings. Interpretation of the geophysical surveys indicted that depths to prospective Proterozoic basement were in excess of 320 metres, which was considered prohibitive (Stewart and Turner, 1992).
BHP explored the Bowgan Creek Project (EL8997, 8998 and 9163) between 1995 and 1997. They were exploring the area for sediment-hosted base metal deposits within the Mid-Proterozoic Fickling Group adjacent to the Fish River Fault (Figure 7.4). The following programmes were completed:

- Open file literature study, a structural interpretation using available geophysical datasets, a PROTEM sounding survey and limited geochemical sampling of existing drill core. This work outlined an area immediately south of the Fish River Fault and east of the Walhallow and Emu Faults interpreted to be underlain by South Nicholson Group and prospective Fickling Group rocks. PROTEM results in this area indicated low conductance overburden suggesting an airborne electrical survey would be effective (Smit, 1996).

- A follow-up regional GEOTEM survey together with ground EM and magnetics were completed. The GEOTEM data showed that the cover sequences were generally relatively resistive within the prospective corridor along the Fish River Fault Zone and the extension of the Emu and Wallhallow Fault Zones. It also showed that the prospective area did not contain any conductive sub-basins, downgrading the prospectivity. The lower order anomalies defined were interpreted to be hosted by thin South Nicholson Group overlying basement Murphy Metamorphics (Stephens, 1997).

Figure 7.4. Location of the Bowgan Creek Project north of EL26314 showing inferred basement geology. Source: Smit (1996), BHP Company Report 19960239, Plate 1.
Uranium Exploration

Between 1977 and 1980 Mines Administration Pty Ltd ("Mines Admin") explored the Bowgan Creek prospect (E1427) in the northern part of the Georgina Basin for uranium in the Proterozoic basement and basin cover sequences. This prospect is located immediately adjacent to the northern Australis tenements. Their targets were roll-front type uranium deposits in channels within the sediments west of the Benmara metamorphic block and primary uranium mineralisation in the Murphy Metamorphics. This work failed to find any significant uranium mineralisation (Mason, 1980).
8. EXPLORATION COMPLETED IN 2008

During 2008 the following activities were undertaken on the tenements:

- Compilation of historical Company Report of past exploration activities (Appendix 2).
- A preliminary review of the historical phosphate and base metal exploration in the northern part of the tenements (Section 7, this report).
- Compiled a register of public companies actively exploring the Georgina Basin in the Northern Territory and Queensland (Appendix 3).
- Compile public GIS datasets of cadastral data, satellite images, geophysical grids and images, geological maps, geochemical, mineral occurrences, and tenements.
- Compilation, merging and processing of public geophysical surveys to create single magnetic, radiometric and gravity grids and images (Appendix 4).
- Field reconnaissance to ascertain road access, station community issues, and terrain, surficial geology and regolith, to facilitate future exploration programme implementation (Appendix 5).
- Collection of one rock sample on the northern tenements for phosphate (Appendix 6).
- Rock Phosphate market research into sale and operating cost pricing (Appendix 7).

Each of these activities is described in detail below.

8.1 Compilation of Historical Company Reports

Historical Company Reports from past exploration activities have been compiled as a series of TIF files of reports and plans. The relevant reports were identified by selecting any report that covered a part of a 1:100,000 map sheet. These reports are located in Appendix 2.

A preliminary review was undertaken of the historical phosphate and base metal exploration, including work completed by ICI (phosphate) and BHP and MIM (base metals) adjacent to some of the northern tenements (EL26314, 26312, 26310 and 26701). Several of the maps and plans were registered to better locate historical drilling, geological maps, and geophysical surveys with reference to the tenements. These registered images are located in the Company Report CR file directories in Appendix 1. A register of these images has yet to be created.
8.2 Competitor Company Activity

A register of public companies actively exploring the Georgina Basin in the Northern Territory and Queensland was compiled (Appendix 3). The major tenement holders are:

- Phosphate Australia Limited holds tenements between the northern tenements (Exploration Licences EL26310 and 26701).

- Minemakers Limited owns the Wonarah deposit 40km west of Exploration Licence 26702 (Figure 8.2.1).

- South Boulder Mines Limited holds tenements to the west of the Buchanan Dam and Alroy occurrences, between Australis tenements EL26309 and 26310 in the north, south of Highlands Plain phosphate occurrence, and south west of the Wonarah deposit (Figure 8.2.1).

- Mantle Mining Corporation Limited holds the Barkly Project, exploring for phosphate and uranium, east of EL26701 and west of EL26703 (Figure 8.2.1).

Figure 8.2.1. South Boulder tenements (blue), Mantle Mining (red) and Australis (black). Source: South Boulder ASX announcement 28 May 2008.
8.3 Compilation of Public GIS Datasets

Compile a GIS database from Australia wide datasets in the public domain from Geoscience Australia and the Northern Territory and Queensland Mines Departments/Geological Surveys, including:

- geophysical datasets – magnetics, radiometrics, gravity, dtm (SRTM90/30)
- remote sensing datasets – Landsat TM7
- geological maps – 250K raster images, and vector datasets of geology, structure, regolith, basins
- geochemical
- mineral occurrences
- cadastral data – roads, rail, towns, rivers, etc
- tenements (current and dead)

Figure 8.3.1 is an image created from the public gravity dataset.

8.4 Compilation of Public Geophysical Surveys

Vector Research Pty Ltd (Stephen Mudge) was engaged to compile, merge and process publically available airborne geophysical (magne tic and radiometric) surveys completed over the Northern Territory and Queensland within an area defined by Longitude 136.0 degrees to 141.5 degrees and Latitude -17.0 degrees to -24.0 degrees.

Magnetic and radiometric located data were used from the numerous surveys and merged using Intrepid GridMerge software into single magnetic and radiometric latitude/longitude grids (at 80 metre grid matrix resolution) and breaking them up into UTM Zone 53 and 54 areas. The Intrepid software has superior ability to mathematically merge large datasets, and in addition can do the merge on multiple datasets (i.e., magnetics, K, Th and U) automatically.

From the merged and split grids, Vector Research produced a very large number of magnetic and radiometric images as high resolution bitmaps. This work was reviewed by Bret Ferris, consulting geologist, who summarised the Vector Research products in Appendix 4.

Australis used ER Mapper software to re-process the magnetic and radiometric merged grids to produce a series of standard images (TMI, RTP, VD1, VD2, U2/Th).

Preliminary assessment of these images has been helpful in identifying:

- regolith, surficial and basement geological features;
basement magnetic and gravity linears that parallel the structural trend hosting the giant McArthur River, Century and Mt Isa base metals deposits (Figures 8.4.1); and

surficial uranium radiometric anomalies that map potential phosphorite horizons prospective for uranium and phosphate mineralisation (Figure 8.4.2). Many of the more extensive uranium anomalies are probably implying greater excess mass rather than grade.

UTS Geophysics was approached to quote on completing a magnetic, radiometric and DTM survey over the entire tenement package in the Northern Territory and Queensland on 200 metre east-west line spacing.

8.5 Field Reconnaissance

Mr Bret Ferris, consulting geologist, completed an initial field reconnaissance of the tenements north of the Barkly Highway, on Barkly, Alroy, Alexandria, Brunette Downs and Gallipoli stations (Appendix 5). The objective of the survey was to ascertain road access, station community issues, and the terrain, surficial geology and regolith, so as to facilitate future exploration programme implementation.

Generally, access by station tracks is good and the tablelands terrain is generally flat and poorly vegetated. As some of the tracks traverse black soil plains they can become impassable in wet weather.

8.6 Rock Chip Sampling and Analyses

During the field reconnaissance survey, one surface sample was collected from an anthill and some shallow scapings on a northern tenement EL26310. It provided some geochemical baseline data for phosphate from surface sampling. The collection site was overlying inferred Cambrian sediments within a radiometric uranium anomaly along the southern flank of a north-east linear trending inlier of Precambrian basement rocks (Figure 8.6.1). A multi-element suite was analysed (Table 8.6.1), including ore type elements (Cu, Pb, Zn, Ag, U, P) and pathfinder elements (Cd, Fe, P, W, Bi, V).

<table>
<thead>
<tr>
<th>Rock Sample No.</th>
<th>GDA94_E</th>
<th>GDA94_N</th>
<th>Cu ppm</th>
<th>P ppm</th>
<th>U ppm</th>
<th>Pb ppm</th>
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<tr>
<td>AX003</td>
<td>688926</td>
<td>7876960</td>
<td>20</td>
<td>410</td>
<td>&lt;10</td>
<td>14</td>
<td>13</td>
<td>&lt;0.2</td>
<td>Anthill</td>
</tr>
</tbody>
</table>
A full list of the elements can be found in Appendix 6.

This result of 410 ppm P compares with values of 1000-3000 ppm P found over known phosphate occurrences and deposits.

8.7 Rock Phosphate Market Research

Rock Phosphate market research into global demand and production, sale prices for the different grades, and operating cost pricing was undertaken by Keren Paterson (Appendix 7). This investigation involved studying open file research reports and discussions with research analysts in the phosphate and sulphur industry.

While prices for high grade rock phosphate were at an all-time high in 2008, peaking to US$400 per tonne, there is general support that the prices will remain high for the next 4-5 years, and for a sustained rock phosphate sale price of US$150 per tonne (worst case US$100, best case US$200 per tonne).

Operating costs are in the range of US$50-100 per tonne.
Figure 8.3.1. Gravity image showing outline of Georgina Basin, mineral occurrences, magnetic linears and Australis tenement outline in the Northern Territory and Queensland.
Figure 8.4.1. TMI image showing outline of Georgina Basin, mineral occurrences, magnetic linears and Australis tenement outline in the Northern Territory and Queensland.
Figure 8.4.2. Radiometric U2/Th image highlighting strong uranium anomalies, showing outline of Georgina Basin, mineral occurrences, magnetic linears and Australis tenement outline in the Northern Territory and Queensland.
Figure 8.6.1. Geology map (above), radiometric U2/Th ratio image (below) highlighting basement geology and strong uranium anomalies and Australis tenements.
9. RECOMMENDATIONS FOR 2009

Work completed in 2008 has resulted in the following recommendations for 2009-2010:

- Follow up analysis of Mines Department historical company reports on previous exploration, and Company Reports/ASX releases (websites) including neighbours and previous holders, for:
  - compilation of a GIS database of maps, geophysical data and drilling.
  - target generation to define regions for detailed investigation from databases and geophysical studies – phosphates, uranium, base metals.

- Follow-up geophysical studies, using standard methods, on the merged magnetic, radiometric and gravity databases, covering the entire tenement area, including:
  - Further processing of radiometrics to enhance uranium anomalies and possible phosphorite beds.
  - Further processing of radiometrics to help map the regolith and identify possible phosphorite bed outcrops.

- Detailed geophysical studies of selected areas using proprietary algorithms/methods (e.g. TargetMap by Vector Research Pty Ltd).

- Reconnaissance geological mapping and geochemical sampling (rock chip and soil) within the tenements, concentrating on structural targets, areas of prospective Cambrian sediment stratigraphy, particularly areas that may outcrop or sub-crop. Assaying for ore type elements (Cu, Au, Pb, Zn, Ag, U, P) and pathfinder elements (Cd, Fe, P, Sn, W, Bi, V).

- Preliminary heritage survey to identify native title interests, registered sites, and any other significant ethnographical and archaeological issues.

- Possible shallow (<50 metre) RAB/Air Core drilling of identified anomalies to obtain stratigraphic and geochemical data in the sub-surface.

- Where appropriate, prior to any proposed drilling activity, complete on site discussions with any Native Title claimant on the nature of the exploration, and if necessary, negotiate and implement a Native Title Access Agreement, including meeting costs including payments to consultants, legal fees, attendance money, site inspections and program reviews.

- Further market research into rock phosphate market and project economics.
10. REFERENCES


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<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Report Title</th>
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APPENDICES

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Appendix 6  Rock Sampling Database
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APPENDIX 1

Progress Report - Tenement Update Notes

Hardcopy
(no data)

Digital

PDF File:
AX_TENEMENT_NOTES_080801.pdf
APPENDIX 2

Historical Company Reports Database

Hardcopy

(no data)

Digital

PDF Files:
NT Mines Company Reports 100K.pdf
NT Mines Company Reports 250K.pdf
Report Table.pdf
Report Table 2.pdf

TIFF Files:
Open File CR directory
APPENDIX 3

Competitor Company Activity

Hardcopy

(no data)

Digital

PDF Files:

GEORGINA_COMPANY_Activity_081212.pdf
GEORGINA_Company_Checklist_081127.pdf
APPENDIX 4

Geophysical Database and Images

Hardcopy
(no data)

Digital

ER Mapper Grids, Bitmap Images and Mapinfo Files:
  Georgina_aeromagnetics directory
  Georgina_radiometrics directory

PDF Files:
Australis_Update_080702_BF.pdf
AX_Mudge_ImageTable_080731.pdf
kr_minsec2202.pdf
APPENDIX 5

Field Reconnaissance Report Bret Ferris 2008

Hardcopy

(no data)

Digital

PDF file:

AX_081015_Update5_Field_Reconnaissance.pdf
APPENDIX 6

Rock Sampling Database

Hardcopy

(no data)

Digital

Text file:

BG_Assays_RockSample-AX003_0810.txt
APPENDIX 7

Phosphate Exploration and Market Research

Hardcopy

(no data)

Digital

PDF files:

Phosphate Exploration Programme Final.pdf

AX 080917 Update 4 Notes on Review Meeting.pdf

200809 Market Overview Phosphate Rock V2.pdf