CENTRAL AUSTRALIAN PHOSPHATE LTD
ABN: 91 120 787 859

EL 24724 JOHANNSSEN RANGE

2013 Relinquishment Report

2 December 2005 to 1 December 2013

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Date: 21 October, 2013

Map
1:100,000 Jinka 6052
1:100,000 Jervois Range 6152
1:250,000 Huckitta SF53-11
GDA94 Zone 53

Distribution
Department of Mines and Energy
Central Australian Phosphate Ltd Sydney office

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SUMMARY

EL 24724 was granted to Arafura Resources on 2 December 2005. It was transferred to NuPower Resources Ltd during the demerger by Arafura of certain uranium assets into the new company. In early 2013 NuPower changed its name to Central Australian Phosphate. The focus of Arafura exploration was uranium, Central Australian Phosphate (CEN) has concentrated mainly on the phosphate potential of the area. This tenement is part of the CEN Lucy Creek Project which comprises three Exploration Licences, EL24716, EL24724 and EL10215.

The only work done on the relinquished area has been reconnaissance and ground radiometric traversing in the area of an intense airborne radiometric uranium anomaly in the northwestern sub-blocks. No indications of a radiometric anomaly were found here, it was interpreted to be spurious.

INTRODUCTION

Previous exploration has identified a range of mineral commodities throughout the Jervois region. Base metals, hosted by the Palaeoproterozoic Bonya Schist, were mined at the Green Parrot, Reward, Attutra, Sykes, Cox, and Bellbird mines in the Jervois Mining District, southeast of the tenement. Further occurrences of base metals and tungsten hosted by the Bonya Schist and associated units, also occur in the Bonya Hills region, south of the tenement. Ti-V-rich magnetite occurrences, some with anomalous Cu-Pt-Pd-Au are known from the Attutra Metagabbro to the east.

Originally Arafura’s initial interest in these tenements, prior to the demerger of the uranium assets to NuPower stemmed from the potential for:

- Orthomagmatic Fe-Ti-V, Ni-Cu and Pt-Pd-Au and other types of mineralisation associated with mafic intrusions in the Arunta Region.
- Tungsten, molybdenum, other base metal and Au mineralisation in the Bonya Schist and equivalent rocks of Arunta Region.
- Various styles of uranium mineralisation including sandstone and unconformity related styles in the Georgina Basin.
- Mary Kathleen style or iron-oxide copper gold related mineralisation in the Arunta Region.
- Sediment-hosted MVT, base metal or phosphate mineralisation in the Georgina Basin.
- A range of other commodities associated with intrusives such as carbonatites, kimberlites and pegmatites.

When NuPower Resources took over the tenement the focus quickly changed to phosphate exploration when it was recognised that earlier CRA holes within the tenement had returned significant phosphate intersections.
Figure 1 - Location and Access to Lucy Creek Project
LOCATION AND ACCESS

Exploration License 24724 is located approximately 280 kilometres east north-east of Alice Springs (Figure 1) in the Jervois region covering parts of Arapunya, Jinka, Jervois and Lucy Creek pastoral stations (Figure 2). Access is via the well-formed but mostly unsealed Plenty Highway that turns off eastwards from the Stuart Highway 68 kilometres north of Alice Springs. This highway, that can be closed to all traffic or have weight provisions applied following heavy rain, passes to the south of the tenements approximately 300 km from the Stuart highway. Well-formed dirt roads from the Plenty Highway to Jinka, Jervois and Lucy Creek Stations and the Baikal Community provide good access to the areas. Further vehicular access across the low country is then via station tracks servicing bores and fence lines. Access into the hill country of the Jervois and Johanssen Ranges is difficult however through lack of any roads or tracks.

The nearest active unsealed airstrips are located near the Jinka, Jervois and Lucy Creek homesteads and near the MolyHill Mine and Baikal. An infrequently used airstrip is also located at the abandoned Jervois mine site.

TOPOGRAPHY AND DRAINAGE

The topography of the project area is dominated by the Jervois Range that runs northeast-southwest through the eastern part of the region. From an elevation of about 350m ASL in the vicinity of Arthur Creek the Range rises to over 500m ASL. Developed on the gentle dip slope of resistant sandstones of the Mt Baldwin Formation the Range consist of a parallel series of asymmetric ridges with gently sloping northern flanks marked by ephemeral gullies and deeply incised creeks and steeply dipping southern flanks. Johanssen Range, 20km west of Jervois Range, is similar to the Jervois Range, rises to a similar altitude, but is developed on more steeply dipping sediments of the Mt Baldwin Formation.

The entire area is drained by Arthur Creek, that trends NE through the western part of the Project, and its tributaries. There are no permanent rivers and only a few significant water holes in the region.
CLIMATE
The climate is mainly dry all year round with hot summers and cool to cold winters. Average annual rainfall, based in records from the nearest Bureau of Meteorology weather station at Jervois, is 290mm of which about two-thirds falls in the December to March period. Average minimum and maximum temperatures in summer are 22°C and 38°C degrees while corresponding winter average minimum and maximum temperatures are 5°C and 22°C. Frosts are common some winters.

TENURE

Exploration license EL24724 Lucy Creek was applied for by Arafura Resources NL on 11th May 2005 (Figure 3). The title was granted on 2nd December 2005 for a period of six years. It comprised 96 blocks covering an area of 304.40 square kilometres.

Following a request to the Department regarding the statutory reduction of area at the end of Year 2 on 31st October 2007 NuPower was granted the waiver on 31st January 2008 to retain all 96 blocks until 1st December 2008.

The following request to waive partial relinquishment at the end of Year 3 on 30th October 2008 was deferred on 9th December 2008 and the request to relinquish 16 blocks on 11th December 2008 was accepted on 15th January 2009, reducing the license area to 80 blocks covering 253.68 square kilometers. A further request to partially waive the reduction for Year 5 of the license was accepted by the Department on 17th May 2010. A total of 11 blocks were relinquished leaving a retained area of 69 blocks.

Effective 2/12/211 the license was reduced to 33 sub-blocks of 104.65 km². The EL was renewed on 28/5/12 for a period of 2 years. The current boundary of the EL is shown on Figure 4.

The 2013 relinquishment involves 17 sub-blocks as per Figure 4 and in the table below;

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The exploration license covers parts of the following perpetual pastoral leases (PPL):

- Lucy Creek Station, NT Portion 686, PPL 1007
- Jervois Station, NT Portion 366, PPL 962
- Jinka Station, NT Portion 482, PPL 1119
- Arapunya Station, NT Portion 481, PPL 1118
Figure 3 - Exploration License Application ELA24724, Johannsen Range
Figure 4. EL24724, Johannsen Range, retained and relinquished sub-blocks
NATIVE TITLE
There are no registered native title claims over the land subject to this license.

In the absence of instructions to the Central land Council from potential native title claimants in the area, the exploration licenses are not subject to a Native Title Exploration Agreement between NuPower Resources Ltd and the CLC nor a pre-existing Exploration Agreement between Arafura Resources Ltd and the CLC to which NuPower may have access.

In the absence of any Exploration Agreements, Native Title issues are addressed in accordance with Item 18 of the Schedule 2 Conditions which attach to the grant documents of the licenses. This requires that NuPower convene a meeting with registered native title claimants before commencing exploration activities other than reconnaissance. As there are no registered native title claimants at present there is no compulsion to convene such a meeting.

Two ILUA’s cover the entire project area:

- Sandover Petroleum ILUA Tribunal No. D12006/006, registered on 31st January 2007 covers the eastern part of Lucy Creek,
- NT Oil EP 127 and 128 ILUA, Tribunal No. D12007/002, registered on 15th April 2008 covers the remainder of Lucy Creek and all of Johanssen Range.

ABORIGINAL SACRED SITES
Prior to undertaking reconnaissance activities in the area in 2005, Arafura Resources applied to the Aboriginal Areas Protection Authority on 15th May 2005 for an Inspection of the Register of Sacred Sites for the area of all of Arafura’s titles and applications on the Jervois 100,000 sheet. Although several sacred sites were identified, no exploration was conducted in their vicinity.
GEOLOGICAL SETTING

The regional and local geological discussion in this report largely comes from the extensive experience gained by K. Hussey in the Arunta Region while employed by the Northern Territory Geological Survey (NTGS) and during their collaborative programs with Geoscience Australia (GA).


REGIONAL GEOLOGY

The Arunta Region contains more than 200,000 square kilometres of metamorphic rocks in the southern parts of the NT and has been recently subdivided into three distinct geological regions by the NTGS, the Aileron, Warumpi and Irindina Provinces (Figure 5). The Aileron Province largely consists of Palaeoproterozoic (1865-1500Ma) sedimentary and igneous rocks that have undergone greenschist to granulite facies metamorphism. The majority of the preserved metasedimentary and igneous rock units in this region were deposited or emplaced prior to the 1740-1690 Ma Strangways Orogeny (e.g. Scrimgeour 2003, Hussey et al., 2005, Claué-Long et al., in prep, b). This event appears to have affected the entire Aileron Province to some degree, as opposed to the 1590-1570 Ma Chewings Event that appears to be localised within the central and southern(?) parts of Aileron Province (e.g. Hand and Buick, 2001, Fraser, 2004). The 1810-1800 Ma Stafford and 1790-1770 Ma Yambah Events also appear to be present throughout the Aileron Province, with extensive bimodal igneous activity, associated sedimentation and localised Low Pressure-High Temperature metamorphism.

Most of the eastern parts of the Aileron Province, including the Jervois district, have been metamorphosed at upper greenschist or lower amphibolite facies conditions in the Strangways Orogeny, with an apparent abundance of 1810-1700 Ma igneous activity and deformation. Regions of the Aileron Province have also been subject to younger (1640-1500 Ma) periods of magmatism.

Current views on the depositional and tectonic setting of the Aileron Province are based on recent geochemical, isotopic and igneous studies and the contained mineral systems. These favour a rifted continental crust or evolving backarc setting in the early parts of the depositional history [e.g. Hussey et al., 2005, Hoatson et al., 2005 Matthew Cobb (PhD student, Curtin University) pers. comm., 2005], with a prolonged tectonothermal convergent event in the Strangways Orogeny. Hussey et al. (2005) and Hoatson et al. (2005) argue for contiguous sedimentation and bimodal igneous activity during Stafford Event. This Event is thought to be responsible for the development of localised(?) deep-marine basins in the Arunta Region, as opposed to contemporaneous subaerial to shallow-water volcanism and sedimentation in the adjacent Davenport Province.

The Aileron Province contains contemporary equivalents of the gold-bearing Granites-Tanami and Tennant Creek Regions and regional aeromagnetic data indicate lateral continuity between these Regions. The Aileron Province is therefore regarded as part of the North Australian Craton, however, localised facies variations and differences in sedimentary environments are evident (e.g. Hussey et al., 2005).

The Warumpi Province in the south and southeast of the Arunta Region contains a younger package of metasedimentary and volcanic rock types with protoliths in the range 1690-1600 Ma (Scrimgeour et al., 2003). The Province was variably metamorphosed in the 1640 Ma Leibig Orogeny, 1570 Ma Chewings and the 1150 Ma Teapot Events.
Figure 5 - Geological Regions of the Northern Territory (Ahmad and Scrimgeour, 2004) with location of the Lucy Creek Project
Unmetamorphosed Neoproterozoic to Palaeozoic marine and terrestrial sedimentary rocks of the Georgina, Ngalia and Amadeus Basins surround and unconformably overly the Arunta Region. Contemporaneous Neoproterozoic to Cambrian strata of the Harts Range Group (Buick et al., 2001, Maidment et al., 2004, Buick et al., 2005) are also caught up within the eastern parts of the Arunta Region in the newly defined Irindina Province (Scrimgeour, 2003). This revision and reinterpretation of the Arunta Region has significant geological implications and has come about largely as a result of several extensive chronological, metamorphic and metallogenic studies in the eastern Arunta Region (e.g. Miller et al., 1998, Mawby et al., 1998, 1999, Hand et al., 1999a, b, Buick et al., 2001, Scrimgeour and Raith, 2001, Hussey 2003, Maidment et al., 2004, Buick et al., 2005, Claoué-Long and Hoatson, 2005, Close et al., 2005, Hussey et al., 2005).

Geochronological and metamorphic studies have shown that the rocks of the Harts Range Group in the Irindina Province are variably metamorphosed to transitional granulite facies in the (480-450 Ma) Ordovician Larapinta Event. This high-grade event is followed by lower-grade Devonian to Carboniferous deformation and granite and pegmatite intrusion. Interestingly, the high-grade Larapinta Event appears to have had little influence on the thermal history of the surrounding rocks of the Aileron Province, and apart from rare exceptions appears to be largely restricted to the Irindina Province (Maidment 2004, Close et al., 2005, Hussey et al., 2005, Claoué-Long and Hoatson, 2005). Many of the fault bounded contacts between the various units within the Arunta and surrounding regions are attributed to the (390-300 Ma) Devonian-Carboniferous Alice Springs Orogeny. Most of the fault movements within the Georgina Basin also appear to be related to the Ordovician Larapinta Event and Devonian-Carboniferous Alice Springs Orogeny.

LOCAL GEOLOGY

Reference is made to Freeman (1986), Freeman et al. (1989), Zhao and Bennet (1995), Maidment (2004), Hoatson et al. (2005), Claoué-Long and Hoatson (2005), Dunster et al. (2006) for details on the geology and geochronology of the region, in the absence of more detailed recent publications, that provide an insight into the local geology and nomenclature. K. Hussey was part of an NTGS team working on revisions to the Jervois Range 1:100 000 and HUCKI TTA 1:250 000 map sheets and has provided previous mapping experience and unpublished data for this section.
The tenements are underlain mostly by sediments of the Georgina Basin with elements of the Arunta Aileron Province through the south, (Figure 6).

Previously, the Arunta Province (domain/inlier/block) was divided into three major subdivisions based on coarse structural and stratigraphic considerations (Stewart et al., 1984, Shaw et al., 1984). The three structural provinces were divided into the Northern, Central and Southern Domains, separated by major east-west tectonic zones. In the eastern parts of HUCKITTA near the license areas, the Delny-Mount Sainthill Fault Zone was used to separate the Northern from the Central Tectonic Domain (Freeman 1986). The Delny-Mount Sainthill Fault Zone is now used in part to separate the Aileron Province in the north from the Irindina Province in the south. The rocks of the Harts Range Group in the south have been metamorphosed to transitional granulite facies in the Ordovician Larapinta Event (Hand et al., 1999a, b, Buick et al., 2001, 2005, Maidment 2004)
while the contemporaneous units in the Georgina Basin that unconformably overlie greenschist to amphibolite facies rock units of the Aileron Province immediately north of this fault zone are essentially unmetamorphosed. Claoué-Long and Hoatson (2005) found localised thermal affects coeval with the Larapinta Event in the Attura Metagabbro region.

The Bonya Schist (-pCo) is preserved throughout southern parts of the area. It is a polydeformed composite unit that is consisting mostly of pelitic, psammopelitic and calcareous metasedimentary rocks, with subordinate psammitic and quartzite units, and felsic and mafic igneous rocks, metamorphosed to upper greenschist to lower amphibolite facies. Rare preserved sedimentary structures in the psammitic and quartzite units in the Bonya Hills indicate that at least parts of the Bonya Schist were deposited in high energy shallow-water environments. Sedimentary structures have been obliterated in the pelitic units that host the base metal occurrences in the Jervois Mining District.

Recent unpublished NTGS mapping (by the author and Max Frater) has found that some of the mafic and felsic igneous units within the Bonya Schist, as it is currently mapped (Freeman 1986 and Freeman et al., 1989), are clearly discordant intrusive units. Other igneous bodies are extrusive units. Large bodies of granite-granodiorite are also present throughout the region and represented here. They clearly intrude the Bonya Schist as plutons or as high level sills/laccoliths. Field and petrological evidence indicates that most if not all have been deformed and metamorphosed, probably in the Strangways Event. Minor bodies of Samarkand Pegmatite are also present.

The Bonya Schist has a variable magnetic character depending on the rock types. Most of the mafic igneous rocks in the Bonya Schist have a low magnetic response in comparison to the distinct highly magnetic package that hosts the deposits of Jervois Mining District. This essentially corresponds to a package of magnetite-bearing andalusite and muscovite-biotite schists, with subordinate calc-silicate rocks and localised magnetite bodies. The psammitic and calc-silicate-rich parts of the Bonya Schist in the Bonya Hill have a different geophysical expression to the others mentioned above. A similar geophysical expression is seen elsewhere within the license areas.

The Attutra Metagabbro (-Pda) occurs in outcrops to the east of the Jervois Mining District as a series of low hills. The unit is described as altered gabbro, dolerite, norite and magnetite rock. The mineral potential of this igneous body was highlighted by Hoatson et al. (2005) and is part of ongoing NTGS studies.

Until recently, there was little precise geochronological constraint in this region. A pelitic unit from a non-magnetic part of the Bonya Schist several kilometres northeast of the Jervois Mining District has a maximum SHRIMP U-Pb age of 1807 Ma (Claoué-Long and Hoatson, 2005). This unit was sampled near the margin of the 1786 Ma Attutra Meta gabbro which also contains 1775 Ma intrusive tonalite bodies (Claoué-Long and Hoatson, 2005). Similarly aged felsic magmas are present elsewhere; for example, Zhao and Bennett (1995) found that the Jervois Granite was about 1770 Ma and a rhyolitic intrusive unit in the Bonya Hills has also been recently dated at 1785 Ma (Jon Claoué-Long, pers comm., 2004).

The Neoproterozoic Mopunga Group unconformably overlies the metamorphic rocks of the Arunta Region throughout most of the Jervois region, forming the spine of the Jervois Range. It consists of the Elyuah Formation (-Pae, shale and silty sandstone), the Grant Bluff Formation (-Pag, quartz arenite and quartzwacke), and the Elkera Formation (-Pak, siltstone, sandstone and dolostone). Freeman (1986) indicates that the Neoproterozic Mopunga Group was deposited as relatively even-thickness sheet-like units following localised tectonic movements. The Oorabra Arkose (-Pao) also unconformably overlies the Arunta basement rocks in the Jervois region, and is preserved in localised half grabens beneath the Mopunga Group (Freeman 1986).

Dunster et al., (2006) indicates the Mopunga Group is unconformably overlain by the early Cambrian Shadow Group (Mount Baldwin Formation and Red Heart Dolostone) which is in turn
disconformably overlain by the middle Cambrian Narpa Group (Thorntonia Limestone, Arthur Creek Formation and Steamboat Sandstone).

The distribution of the Red Heart Dolostone, Thorntonia Limestone and Steamboat Sandstone are not indicated on existing published geological maps of this region (i.e., Freeman, 1986 or Freeman et al., 1989). However in a recent revision of the Georgina Basin stratigraphy, Dunster et al., (2006) recognised these units in a nearby cored drill hole (Huc 1). In contrast to the intense surface weathering in the Jervois Range outcrops, Huc 1 intersected fresh unweathered units. As such these new units are most probably exposed in the Jervois Range and elsewhere nearby, although their boundaries and distribution are yet to be fully delineated.

Based on limited reconnaissance mapping in the project area during 2006, the deeply weathered and silicified interval that contains phosphate-rich units (predominantly wavellite but also including minor turquoise) occurs above a red-brown mudstone/siltstone package is Red Heart Dolostone. Apart from one possible archaecyathid, no other fossils were identified within this unit. These units occur at the top of a fining upwards cycle above the Baldwin Formation. These units were mapped as Errarra Formation by Freeman (1986) and Freeman et al., (1989) but have since been assigned to the Red Heart Dolomite (Dunster et al., 2006). Some of the silicified laminated chert/mudstone/siltstone units that overlie this unit could be Thorntonia Limestone?, as defined by Dunster et al., (2006) in Huc 1, rather than Arthur Creek Formation (Freeman, 1986; Freeman et al., 1989).

A series of northeast trending monoclines are present throughout the Jervois Range in the Lucy Creek prospect area. A sub-vertical north trending fault zone is also present in the southern part of the Lucy Creek prospect. As indicated on existing geological maps, this fault appears to curve into a north-northwest trend in the central part of the Lucy Creek prospect near the western edge of the Range. The relative movement on this fault is west side up (i.e. reverse).
PREVIOUS EXPLORATION

This tenement overlapped the west of Johanssen Range and extended 31km to the northwest. Exploration was for lead-zinc and an IP survey was completed that identified several chargeable anomalies. These were tested with nine percussion holes but the results were not encouraging and the tenement was relinquished.

Central Pacific Minerals N L - EL603, 1972
This tenement lay to the south and southwest of the Johanssen Range tenement and slightly overlapped its southwest corner. Exploration was for tungsten, fluorite and copper and the region was mapped at a scale of 1:46,000. CPM also carried out stream sediment and rock chip sampling for copper, zinc and nickel and a low level aeromagnetic-radiometric survey. Selected areas were ten mapped at 1:9600, 1:1000 and 1:500 scales. They excavated several costeans and collected bulk samples. They drilled 67 air track holes totaling 5,561 feet to test scheelite bearing skarns and 7 diamond drill core holes totaling 2,182 feet to explore a fluorite prospect. Fluorite reserves at 10%CaF2 were estimated at 360,000 t.

L A Johanssen - EL1865, 1978
This is a small tenement that overlapped the south of Johanssen Range and extended 8km to the south and 8km to the east. Johanssen prospected all outcrops and panned creek beds for tin, but could locate no interesting mineralization.

Unknown lease holder - EL3241, 1982
This EL slightly overlapped the southwest of Johanssen Range and extended 25km to the south. The lease holder believed that the area held potential for scheelite-molybdenite-magnetite associated gneiss outcrops. A program of exploration was recommended, but lack of a joint venture partner resulted in termination of the license.

Nircon Resources Ltd & Petrocarb Exploration N.L - EL3256, 1982
This tenement overlapped slightly on the west of Johanssen Range and extended 24km to the south. Exploration was for scheelite-molybdenite bearing skarn mineralisation. There was a geologic mapping program at 1:50,000 and an airborne magnetic survey was flown, but it revealed no anomalous features.

Broken Hill Proprietary Co Ltd - EL4189, 1983
This tenement slightly overlapped onto the northeast corner of the Johanssen Range tenement and the north of the Lucy Creek tenement and extended 15km to the north. The BMR 1:250,000 magnetic and Bouger anomaly maps for the Huckitta sheet showed a possible “bullseye” magnetic anomaly which was considered to be a target for an Olympic Dam type ore body. BHP had a combined aeromagnetic and radiometric survey flown over the EL during May, 1973 which confirmed the size and location of the anomaly. Subsequent computer modeling of the survey data gave a depth estimate to source of 1,200 to 1,500m which was considered too deep to warrant further work.

CRA Exploration Pty Ltd - EL4619, 1984
This tenement abutted the northeast corner of the Johanssen Range and the northwest of the Lucy Creek tenements and extended 56km to the north. Exploration was for kimberlite diamonds using a combination of drainage gravel sampling for indicator mineral observation, reconnaissance aeromagnetic-radiometric surveying and loam sampling of anomalous photo-features considered to be expressions of possible kimberlites. None of the anomalous photo-features proved to be prospective and the area was relinquished.
Saracen Minerals N L - EL5149, 1984
EL5149 overlay most of Lucy Creek and the center-east of the Johanssen Range tenement. Exploration was for platinum group mineralization using a model based on the basal black shale of the Zechstein deposit in Poland. Fourteen rotary-percussion holes were drilled along 6 short drill lines scattered across the tenement to test the base of the Hay River Formation and its equivalents. The analytical results of the drill cuttings for platinum, palladium and gold were all below the limits of detection and no additional work was recommended.

CRA Exploration Pty Ltd - EL5803, 1988
This tenement overlapped the west and north of the Johanssen Range tenement and extended 27km west. Exploration was for kimberlite diamonds and carbonate hosted base metals. A drainage sediment geochemical survey aimed at base metal sulfide mineralization was completed in conjunction with a drainage gravel sampling program intended to test for diamond indicators. No base metal anomalies were revealed, but a scattering of chromites and one micro-diamond were recovered but results were not sufficiently encouraging to retain the tenement.

Zapopan N L - EL6260, 1988
EL6260 overlapped part of the southeast of the Johanssen Range tenement and extended 9km to the south. Exploration was for gold and base metals and included geological reconnaissance, 37 rock chip samples, 61 bulk cyanide leach drainage samples and 61 duplicate drainage samples for base metal analysis. The results indicated that although the area is highly anomalous in copper and tungsten, economic values of tungsten were unlikely to be achieved. The copper anomalies were mainly associated with old workings fault traces and quartz-tourmaline rocks.

L Johanssen - EL6326, 1989
EL6326 was a small tenement and abutted the southeast of Johanssen Range and extends 9km to the south. Two deposits of apatite and a small occurrence of monazite were identified. Ground radiometric traverses across Apatite Hill and to the North East to Charlotte Fault indicated a low level anomaly.

Poseidon Exploration Ltd - EL7505, 1991
This tenement, referred to as Twins Bore, overlapped the south of Johanssen Range and the southeast of Lucy Creek. It extended 12km to the south and slightly to the west. The tenement included the Johanssen Range and Bonya Hills, consisting of schist and gneiss and was taken up to explore for copper, lead, zinc and silver. There are numerous copper and tungsten mineral occurrences and old mines and the majority of the mineralisation is hosted within or near the Kings Legend Amphibolite Member of the Bonya Schist and in the Samarkand Pegmatites. Following an in-house study of selected Australian Proterozoic terrains, the region was identified as prospective for Broken Hill type deposits. Exploration carried out on these licenses included reprocessing and interpretation of airborne magnetic data, reconnaissance and orientation geochemical sampling, ground magnetics, geological mapping and auger sampling, stream sediment sampling (250 samples), soil and rock chip sampling and airborne EM surveys. The EM surveys over the East Jervois Twins Bore EL 75 05 areas produced two anomalies that were tested by a traverse of vacuum drilling. The results were disappointing and there was no follow up.

CRA Exploration Pty Ltd - EL7596, 1992
EL7596 overlapped most of the north of the Johanssen Range tenement and the northwest of the Lucy Creek tenement, overlaying a southern portion of the Late Proterozoic to Early Palaeozoic Georgina Basin. Reconnaissance sampling, consisting of 53 rock chip samples, studies of historic geochemical data, analysis of seismic shot holes and geological mapping identified two stratigraphic horizons, the sabkha facies of the Chabalowe Formation and the basal, organic-rich contact in the lower Arthur Creek Formation, as potential metal hosts and exploration was directed towards the potential for MVT styles of base metal mineralisation. Two diamond drill holes targeted the two prospective horizons adjacent to major structures. Drill hole DD92EC1 was
drilled within EL7596 and DD92TC1 was drill within EL7597 (EL7597 was adjacent and north of EL7596 but outside the current Lucy Creek EL). DD92EC1 adjacent to the Putta Putta Fault and targeting basal shoals of the Arthur Creek Formation encountered no significant base metal values. DD92TC1 failed to reach its target as the sabkha facies of the Chabalowe Formation was not present and the next stratigraphic target occurs at some 800m depth.

EXPLORATION BY NUPOWER RESOURCES/ CENTRAL AUSTRALIAN PHOSPHATE IN RELINQUISHED AREA

The sub-blocks relinquished are in three distinct areas of the tenement – northwest, northeast and southeast. The southeastern area is underlain by sandstone and conglomerate of the Mount Baldwin Formation and older Proterozoic rocks. These lithologies are not prospective for phosphate or uranium and no work has been done on them. The northeastern area is mapped as underlain by Cambrian Arthur Creek Formation rocks. Lithologies of this unit have been found to be phosphatic at their base, however there is no evidence of phosphate higher up in the stratigraphy. No work has been done here.

The northwestern sub-blocks include an intense airborne radiometric uranium anomaly – Huckitta 1:250,000 sheet (Figure 7). This was thought to be possibly spurious. The area is mapped as underlain by Arrinthunga Formation carbonates, with some Eurowie Sandstone Member sediments. A one day traverse was made through the area of the anomaly, this was difficult as there is no vehicle access to the area. Within the airborne anomaly area only minor outcrop of purple siltstone and limestone was seen. Similar lithologies, as well as sandstone, are common as float in streams in the area. Radiation, as measured by scintillo meter, within the airborne radiometric anomaly varied between 93 and 137 cps – background levels. By comparison airborne radiometric anomalies of similar intensity 30km to the east (in a different EL) gave up to 970cps with the same scintillo meter. Just southeast of the anomaly thin patches of ferricrete lag gave to 160cps. Elsewhere in the region ferricrete is commonly radiometrically anomalous.

This anomaly was interpreted to be spurious. Sediments of the Arrinthunga Formation are not known to be phosphatic in this area, which is remote and difficult to access.

CONCLUSIONS

Three distinct areas of the tenement have been relinquished. The northeastern sub-blocks are underlain by sediments which are far from the prospective base of the Georgina Basin. No work has been done here. The southeastern part of the area covers rocks which are not prospective for phosphate and underlie those of the Georgina Basin. Again no work has been done here. Reconnaissance mapping and radiometric traversing failed to confirm the airborne radiometric uranium anomaly in the northwestern sub-blocks. This area is also far from the phosphate-prospective basal sediments of the Georgina Basin.

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Figure 7. Johannsen Range airborne uranium radiometrics – Huckitta Sheet
REFERENCES


