ANNUAL REPORT

Waterhouse West Project
EL24563

NORTHERN TERRITORY

FOR THE PERIOD
18 January 2012 to 17 January 2013

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AUTHOR: Ian Faris

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TENEMENT NO: EL24563

TENEMENT OWNER: Royal Resources Limited - Aldershot Resources Ltd (60:40)

TENEMENT OPERATOR: Royal Resources Limited

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AUTHOR: Ian Faris

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DATUM: GDA94_Zone 52

1:250,000 SHEET AREA: Pine Creek (SD52-08)

1:100,000 SHEET AREA: Reynolds River (5071)

MINERAL FIELD: Rum Jungle Mineral Field

COMMODITY: Uranium, Iron Ore
ABSTRACT

LOCATION: The Waterhouse West Project is centred approximately 10 kilometres southwest of the Batchelor township. The project is defined by a single Exploration Licence, EL24563, which covers an area of 128.4km² (48 sub-blocks) and is located on the Pine Creek 1:250 000 Sheet (SD52-08) and the Reynolds River 1:100 000 sheet (5071).

GEOLOGY: The Waterhouse West Project overlies the Archaean Waterhouse Dome, part of the Rum Jungle Mineral Field. The core of the Waterhouse Dome comprises schist, gneiss and granitic units and blocks of the Stanley Metamorphics. Exposures of the Early Proterozoic sedimentary units include the Manton Group, Mount Partridge Group, South Alligator and Tolmer Group sediments, which are folded around the margins of the granitic dome.

WORK DONE: A review of the iron potential was made through the use of remote sensing (Aster and Quickbird imagery). The areas of the 2011 drilling were rehabilitated.

CONCLUSIONS: The Waterhouse West Project is situated within the Rum Jungle Uranium Mineral Field. The area is prospective for unconformity-type uranium mineralisation and vein-hosted uranium mineralisation along the western and south-western margins of the Waterhouse Dome where a number of previously identified uranium prospects are situated. The imagery processing was not successful in delineating iron rich areas beyond highlighting areas of iron hydroxide and ferrous iron accumulations associated with low lying areas or identifying areas of vegetation clearing.
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1 INTRODUCTION AND TENURE
This report details exploration completed on the Waterhouse West Project for the sixth year of tenure during the period 17 January 2012 to 16 January 2013 by Royal Resources Limited (“Royal”). The reporting area comprises one granted Exploration Licence EL24563 of 48 graticular blocks, overlying the Waterhouse West Dome, part of the Pine Creek Orogen. Tenement details are listed in Table 1. Royal has applied for an extension of term. During 2012 Royal earned equity in the tenement by meeting conditions within an Agreement with Aldershot Resources Ltd (“Aldershot”). Ownership changed from Aldershot 100% to Royal (60%)-Aldershot (40%) on 27 August 2012.

The area is prospective for unconformity-type uranium mineralisation and vein-hosted uranium mineralisation along the western and south-western margins of the Waterhouse Dome and base metals, phosphate and iron and manganese oxides along the northern margin of the dome associated with the Geolsec Formation.

Field activities were restricted to brief reconnaissance visits in mid-May due to road closures preventing access with environmental monitoring and rehabilitation of the 2011 drill programs undertaken in November. Further drilling was planned as part of a multi-tenement program but was postponed as government approvals were only obtained after the wet season had commenced making access impossible.

Table 1: Tenement Details for the Waterhouse West Project

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2 LOCATION AND ACCESS
EL24563 is located 100 kilometres south of Darwin, approximately 10 kilometres southwest of the historic mining township of Batchelor in the Northern Territory (Figure 1). The tenement abuts the eastern boundary of the Litchfield National Park and covers an area of 128.4 km². It lies between longitude 130.93ºE and latitude -13.27º S, and longitude 131.0ºE and latitude -13.02º S on the Pine Creek 1:250 000 map sheet (SD52-08) and the Reynolds River 1:100 000 map sheet (5071).

The project area comprises savannah woodland with localised patches of tropical forest lining creeks, as well as areas of open black soil plains and experiences a wet season from November–April and a dry season from May–October. The average rainfall is 677mm with a mean temperature of approximately 34º C.

Access to the tenement area is by the Stuart Highway and turning off toward Batchelor along the Litchfield Park road. The tenement is then accessed via gravel roads heading south and then west via various properties gates and tracks. The flat, relatively open country is generally accessible by 4WD. Access to the Giants Reef Prospect is other via Chin Road (dirt track) travelling west to the Litchfield National Park fenced boundary or southwards along the Litchfield Park boundary fenceline from the Litchfield Park road. A track marks the boundary on both sides of the fence and is used to access both Giants Reef Prospect and the Giants Reef South Prospect. The Riverside North-east Prospect is accessed through Camp Creek Station. Northern access to the tenement is possible off Litchfield Park Rd via fire breaks along fence line. Access to the southern areas is via Milton road and tracks within Florina Station.

3 REGIONAL GEOLOGY
The Waterhouse West project is situated around the Archaean Waterhouse Dome part of the historic Rum Jungle Mineral Field on the western side of the Pine Creek Orogen (Figure 2). The Archaean Rum Jungle and Waterhouse Complexes are domal structures containing mixed schist, gneiss, and granitic units and metasediments and Banded Iron Formations (BIF) assigned to the Stanley Metamorphics, upon which early Proterozoic sedimentation has taken place. The Proterozoic sedimentary sequences consist of repeated cycles which commence with the deposition of high energy conglomerate and sandstone, which fine upwards to shallow-water limestone.

In the western part of the Rum Jungle Mineral Field the oldest sedimentary rocks in the sequence are exposed against granitic contacts. These units belong to the basal Manton Group sediments which are overlain by the
Mount Partridge Group. The basal member of the Mount Partridge Group is the Crater Formation, overlain by the Coomalie Dolostone, Whites Formation and Wildman Siltstone.

The units of the Mount Partridge Group are unconformably overlain by rocks of the South Alligator Group. The Koolpin Formation lies along the eastern edge of the project area and isolated outcrops of Zamu Dolerite have been mapped along the north eastern edge overlying the Koolpin Formation.

Overlying the South Alligator Group are sediments of the Burrell Creek Formation of the Finniss River Group. The formation consists of siltstone, shale and greywacke and extends through the western sector of the project area. The Geolsec Formation unconformably overlies the Finniss River Group and marks a period of deformation, metamorphism and granitic intrusions, resulting in uplift and erosion. The basal member of the Geolsec is a haematitic quartzite breccia unit which in places unconformably overlies the Coomalie Dolostone. The Late Proterozoic sandstones of the Tolmer Group unconformably overlie the Early Proterozoic sediments at Rum Jungle and elsewhere. These sandstones are essentially flat lying and were deposited upon erosional surfaces of the older rocks, with siliceous iron-rich breccias developed in places.

The Rum Jungle area within the Pine Creek Orogen has undergone greenschist facies regional metamorphism associated with the Nimbuwah Event of the Barramundi Orogeny (1860-1840Ma). A slight increase in metamorphic grade occurs along the boundary of the granitic complexes. Geological mapping by the Northern Territory Geological Survey (NTGS) has identified in order of seven deformational events occurring pre-Manton Group and post-South Alligator Group. The major structural feature of the region is the Giants Reef Fault. The Giants Reef Fault is a north-northeast to northeast trending dextral strike-slip structure with up to 7km lateral offset and >600m vertical movement, northwest-side down. It laterally displaces the Early Proterozoic sediments where structural trends are generally striking north–south but also swing concentrically around the two granitic complexes.

4 LOCAL GEOLOGY AND MINERALISATION

EL24563 is situated on the central, southern and western regions of the Archaean Waterhouse Dome. The core of the Waterhouse Dome comprises schist, gneiss and granitic units and blocks of the Stanley Metamorphics. Exposures of the Early Proterozoic sedimentary units include the Manton Group, Mount Partridge Group, South Alligator and Tolmer Group sediments which are folded around the margins of the granite dome.

Exposures of outcrop within the Waterhouse Dome are poorer than those of the Rum Jungle Dome due to areas of extensive surficial cover. Along the south-western margin of the Waterhouse Dome the stratigraphic correlations can be difficult due to a number of the units missing in the sequence and due to a series of northeast trending fault structures. The Whites Formation and the Wildman Siltstone are absent and in general the sediments thin in this area compared to the northern margin of the Waterhouse Dome and to the Rum Jungle Dome.

Along the southwest region of the Waterhouse Dome there are areas of outcropping, extensively brecciated, fault controlled Coomalie Dolostone. Previous mapping and drilling in this area has identified a major northwest trending thrust which repeats the Coomalie Dolostone South Alligator Group succession (Lally, 2002).

EL24563 also covers a portion of the north-western margin of the Waterhouse Dome. To the east outcropping Beestons Formation of the Manton Group sediments unconformably sits on top of the granites of the Waterhouse Dome and is overlain by the Crater Formation of the Mount Partridge Group. In this region the Whites Formation is preserved in conformable contact with the Coomalie Dolostone and both units show a thickening of stratigraphy compared to the southern margin.

Geology is steeply dipping to the southwest in the southern part of the tenement and towards the west in the north. The Giants Reef Fault cuts across the project area and offsets the northern tip of the Waterhouse Complex, exposed to the west is the Tolmer Group sediments.

Known uranium mineralisation in the Rum Jungle Mineral Field has a close spatial relationship with the Coomalie Dolostone and Whites Formation contact. The Whites Formation is host to the uranium ores of the previously mined Dysons and Whites mines of the Embayment Group deposits.
Base metal mineralisation is associated with these deposits and also exists separately in the field, e.g. at the Intermediate Mine (copper), and at the Brown’s Deposit (copper, cobalt, nickel, lead, silver), also of the Embayment Group deposits.

Previous uranium exploration in the area has separated the Coomalie Dolostone into four rock units: siliceous and quartzitic rocks (usually formed over dolomite); tremolitic schist; unsilicified dolomite; and undifferentiated dolomitic sediments. The overlying Whites Formation is a carbonaceous schist unit which acts as an ideal reductant for uraniferous fluids.

Mineralisation is generally in structurally controlled environments, vein-style uranium where the Coomalie Dolostone is juxtaposed with the Whites Formation. Structures are therefore a focus for exploration of uranium within the project area.

Uranium and uranium-copper mineralisation was identified by Uranerz at the Kylie, SE-Kylie and Riverside prospects on the south-western Waterhouse Dome margin. Mineralisation is reported as being associated with D7 reverse faults and breccia zones within the Coomalie Dolostone beneath the Geolsec Formation. The faulted breccia zone is reported to be traceable for more than 5 kilometres.

There are three prospective uraniferous zones in the project area which Royal is focused upon. The first is situated along the south-western margin of the Waterhouse Dome, along a fault controlled unconformity that separates the brecciated units of the Coomalie Dolostone and the chlorite-altered meta-siltstones and shales of the South Alligator Group. The second is located along the western margin of the Waterhouse Dome, possible demagnetisation of a regional dolerite dyke which is faulted and transects the Giants Reef Fault. The third is located along the north-western boundary, the prospect lies within the core of the nose of an upright, vertical syncline plunging 45-55° to the north-east which is coincident with a weak but evident, airborne radiometric anomaly, where the western limb of the fold is cut by the Giants Reef Fault, the prospect is referred to as the Giants Reef Prospect.

5 PREVIOUS EXPLORATION

Parts of the project area were subjected to extensive exploration for uranium by the Bureau of Mineral Resources (BMR) in conjunction with Territory Enterprises Pty Ltd (TEP) in the 1950s and 1960s. The relevant BMR records for the area are available and cover geological mapping and geophysical surveys. Some diamond drill holes were sunk within the project area and are referred to in the BMR data but drill logs have not been located.

In the period 1977–83 major exploration programmes were conducted in the region by Uranerz Australia Pty Ltd (UAL) and CRA Limited. This exploration was driven by the results of the BMR–TEP exploration data and concentrated on anomalies outlined in that work on adjoining areas. In 1980–81 a zone of anomalous radioactivity was discovered in an area west of the Camp Creek Homestead called Riverside. Six RAB holes were drilled and one hole returned 150 ppm U3O8 and 250 ppm Cu, but the remainder were barren (Open File Report CR81/176).

UAL farmed into a group of contiguous tenements held by Mines Administration Pty Limited and aimed their exploration primarily at the discovery of uranium mineralisation with the knowledge that there was likely to be associated base metal mineralisation. In the period 1978–83 UAL conducted geological mapping, RAB and auger drilling for bedrock geochemical sampling, and geophysical surveys. This work defined the Hoppy Anomaly, a combined geochemical–geophysical anomaly which coincides with the axis of a weak electromagnetic anomaly. This had been located by the BMR exploration of the 1960s and was tested by six TEP diamond drill holes prior to 1967. Drill logs for these holes have not been located. Anomalous nickel, cobalt, copper and zinc values in bedrock samples exist over a strike length of 2500 metres with widths of up to a maximum of 500 m. The anomalous zone is elongate north–south, trends parallel to the mapped position of the Coomalie Dolostone – Masson Creek Formation contact, and is open to the south.

Six TEP diamond drill holes tested a similar contact position within ex EL6988 and about 1600 m north of the Hoppy Anomaly: no drill logs have been located. UAL carried out RAB drilling in this area but reported no anomalous results.

Further exploration was conducted by the Wells Family Syndicate who took up EL5429 in 1988. Reconnaissance geological traversing and geochemical rock-chip sampling was undertaken in the western portion of the area. A maximum value of 13 ppm Au was recorded from more than 100 samples with most
samples below the limit of detection for gold (0.02 ppm). The 13 ppm Au value came from what is now known as the Ford Grid.

Exploration of the Hoppy Anomaly confirmed the earlier bedrock geochemical results. During 1991 Poseidon Exploration Limited explored the area for “Woodcutters” style mineralisation. A Sirotem survey was carried out to delineate conductors which were subsequently tested by two drill holes located approximately 500 m apart along strike. The holes confirmed that the source of the Sirotem response was foliated sheared graphitic sediments, and that the sequence contained sporadic, low-grade, base metal mineralisation (best intersection being 1.65 m at 11.9% copper, 1 g/t silver, with traces of nickel, cobalt and bismuth). Poseidon concluded there was little potential for “Woodcutters”-style deposits, but that the mineralisation was similar to that at Area 55.

The Central Electricity Generating Board (Australia) Pty Ltd (CEGBEA) conducted exploration for uranium within the general area from 1986–90. However, their major exploration effort concentrated to the east over the contact between the Rum Jungle Complex and the Lower Proterozoic sediments immediately west of Rum Jungle. CEGBEA conducted interpretation of the published aeromagnetic and radiometric data, commissioned colour aerial photography, flew an INPUT geophysical survey over 5 widely spaced lines, and carried out 4 regional ground magnetic and radiometric traverses. No major anomalies were delineated.

In 1989 prior to relinquishing the area, CEGBEA conducted helicopter-borne stream-sediment sampling for gold. A BLEG sample taken from a major tributary of the Finniss River west of Mount Fitch returned an anomalous value of 4.1 ppb gold. Re-sampling of the site was not undertaken due to a lack of trap sediment when revisited in 1990.

In 1990 Compass Resources N.L., in joint venture with CEGBEA, explored targets for base and precious metal mineralisation of the styles known at Whites and Dysons uranium deposits; and the intermediate copper deposit at Rum Jungle; deposits of the Brown’s lead–silver prospect type, the Mount Fitch and Mount Burton copper and uranium occurrences, and the Area 55 copper–lead occurrences.

In late November 1993 a discovery of copper–lead mineralisation hosted by a silicified dolomite was made. An outcrop zone measuring up to 10 m wide can be traced about 200 m along strike at this locality. Chalcopyrite, pyrite, galena, covellite and malachite are visible in the host rocks. Up to 15 volume % sulphides exist in hand specimen, but overall the proportion of sulphides is low. Out of 6 grab rock-chip samples collected from lines spaced 10 m apart at the northern end of the outcrop zone, 2 are reported to carry gold values above 0.5 ppm. Poor exposures of silicified dolomite have been recorded in 3 other localities.

The most significant gold prospect within the tenements is the Ford Grid: an arsenic anomaly 800 m long and up to 110 m wide, well-defined by auger soil samples greater than 1000 ppm As. The original gold rubble sample that ran 13 ppm Au found by the Wells Syndicate work has not been duplicated.
Figure 1: Waterhouse West Project Location
Figure 2: Waterhouse West Project Regional Geology
6 EXPLORATION AND RESULTS

During 2012, an assessment of the phosphate, manganese and iron oxide potential was initiated, particularly iron mineralisation associated with the Geolsec Formation through literature surveys and image processing. Ground checking and reconnaissance mapping of potential iron oxide targets was postponed as wet weather and road closures prevented access to the target areas.

The drilling planned for 2012 was postponed, as Royal’s three tenements in this area (EL24550, EL24563 and EL27354) are operated logistically as a single project and drilling authorisation had not been received for EL24550 and EL27354 at the start of the wet season.

However, the areas where drilling was undertaken in 2011 and prepared for drilling in 2012, were rehabilitated.

6.1 Assessment of iron potential

6.1.1 Models

There are two models applicable for the deposits in this area, namely enrichment of ferruginous stratigraphic horizons within the Whites Formation (>2026 m.y.) or enrichment of the Geolsec Formation (<1800 m.y.).

The Geolsec Formation is a haematite-quartz breccia (HQB), haematitic sandstone, siltstone, mudstone and rare shale breccia (paleo-regolith) overlying the Coomalie Dolostone and less commonly, the Whites Formation. HQB is the dominant rock type within the Geolsec Formation and contains laterally discontinuous interbeds of haematitic sandstone, siltstone and mudstone. The breccias are thought to be the product of in situ weathering and collapse of Coomalie Dolostone due to karst processes or reworked talus slope breccias deposited in fault-bounded blocks of Coomalie Dolostone. Structure is considered to play a key role for the enrichment, hence the hydrothermal tag.

There are no recorded iron ore prospects or occurrences of the Geolsec Fm. within the Waterhouse project area.

6.1.2 Deposits (Figure 3)

The Yarram Deposit is the extended/renamed old Rum Jungle iron ore prospect and has been described as four massive hematite lenses. It is hosted within a purple siltstone bed, which is thought to be interbedded with the Coomalie Dolostone, but may represent a variant of siltstone within the Geolsec Formation, which hosts the phosphate deposits. Geological mapping, costeaming, geochemical sampling and shallow drilling identified four massive haematite lenses (Ally 1968, Burban and Svenson 1970, Ferenczi 2001). The largest (Lode B) is about 6 m thick and has a strike length of 100 m. The lenses trend northeast, are stratabound and are hosted within purple haematitic siltstone and shale of the Whites Formation. Lodes A, B and C contain an inferred resource of 101,600 t grading 61.8% Fe with phosphorous averaging 0.07% at the surface and 0.14% at depth (Burban and Svenson 1970). Limited geochemical assays indicate that the massive hematite ore contains <0.01% S, 4.1% SiO₂, 2.7% Al₂O₃, <0.05% Cu and <0.01% Ni (Burban and Svenson 1970).

Lateritic ore developed over the Coomalie Dolostone, about 0.5 km to the west, contains an additional inferred resource of 8.8 Mt, grading 40–50% Fe and 0.16% P₂O₅. Thiess Exploration Pty Ltd conducted the geological mapping, costeaming, geochemical sampling and drilling programs on this prospect (Ally 1968, Burban and Svenson 1970). In 2005, Territory Iron conducted a RAB/D drilling program which indicated that outcropping goethite/haematite mineralisation is also present at depth (Territory Iron 2005).

The Beetson’s Iron Ore Prospect is located about 18 km to the north-northwest of Batchelor on the western side of the Rum Jungle Inlier. The northerly-trending, stratabound gossanous lode has a strike length of 300m and averages 20m in width. Ironstone is contained within an interval of shale and ferruginous sandstone (Crohn 1970). Angular, up to 3 cm- sized fragments of quartz were reported to be present in the host rock (Dunn 1962a). The stratigraphic position of this interval is unclear and, as is the case with the Rum Jungle prospect, it may belong to the Geolsec Formation. The surrounding rocks are silicified Coomalie Dolostone. Two exploratory shafts were sunk near the southern end of the prospect (Pritchard, 1969). Sampling of the shafts returned 63% Fe and 0.14% P over 7 m (shaft 1) and 55.2% Fe and 0.08% P over 4.6 m (Shaft 2). Based on these results, Pritchard (1969) estimated a resource of 1.5 Mt grading 52-66% Fe to 60 m depth, plus 100 000 t (grading 52% Fe) of iron ore rubble around the gossan outcrop. A single line of drillholes, across the ridge and about 60 m north of the shafts, indicated that only minor amounts of iron ore material containing >50% Fe is present in this area (Crohn, 1970).
The **BW Iron Claim** is a small iron ore prospect located about 16 km to the west-northwest of Adelaide River Township and ~800m south of the Kylie uranium prospect and in a rebate surrounded EL24563. Investigations by the BMR (Dunn, 1962b) suggested that the stratabound massive hematite- and specularite-bearing lenses and pods are hosted in pyritic slate of the Whites Formation. However, investigations by BMR (Dunn 1962b) suggested that a stratabound massive haematite lens is within ferruginous shale and breccia of what is now the Geolsec Formation. The Mount Mable prospect, located about 3 km to the north, is also within the Geolsec Formation. It is considered to have been formed by superficial enrichment of ferruginous sandstone of the Geolsec Formation. The area also contains a few outcrops of magnetite schist containing 10–30% magnetite (Crohn 1968). A possible 15 000 t of ore grading 60% Fe was estimated for a single ironstone lens, 36x20x6 m in size. There is also about 70,000 t of loose hematite rubble present (Pritchard 1969).

Within the Waterhouse West project area, the Whites Formation is best developed at the northern end where it is shown to be 200m x 1600m and truncated against the Giants Reef Fault. Magnetic imagery (Figure 4) suggest it extends ~3km further southwest but is absent along the southern and western margins of the Waterhouse Dome or is represented by pelitic beds within the Coomalie Dolostone. Any development on the western margin development would be beneath outcrop of the Depot Creek Sandstone. Except for the sandstone, outcrop is rare in the area. Magnetic imagery also suggests magnetic units exist beneath the Depot Creek Sandstone.

The Geolsec Formation occurs along the southern margin of the Waterhouse Dome but is not shown to extend into the project area. Magnetic imagery does not indicate a magnetic signature for the mapped outcrop of the Geolsec but magnetic units beneath the Depot Creek may indicate buried Geolsec.

The most prospective area would be the northern margin of the tenement where southward extensions of the Geolsec Fm. may occur, particularly near the Giants Reef Fault area, if fluids are critical for the development of deposits.

### 6.1.3 Image processing

As part of an assessment of the iron potential a reconnaissance trip was made to the project area in May but wet weather and road closures associated with the end of the wet season prevented access for ground checking.

Subsequently, the area was assessed by obtaining and reprocessing satellite imagery. Two datasets were used; the Aster dataset available from the NTGS and orthorectified Quickbird Archive Imagery sourced by GeoImage, Brisbane.

**Aster Imagery**

The ASTER Geoscience map of the Northern Territory was obtained from the NTGS and the five false colour composite iron specific VNIR-SWIR images was subset over the Rum Jungle area. Namely:-

- FeOH group content
- Ferric oxide composition
- Ferric iron content
- Ferrous iron content
- Ferrous iron index

The images are shown below in Figures 5 to 9.
Figure 3: Geology & Iron Ore Prospects
Figure 4: Magnetic Imagery (TMI_1VD) over geology
Figure 5: Aster Imagery - FeOH group content
Figure 6: Aster Imagery - Ferric oxide composition
Figure 7: Aster Imagery - Ferric Oxide Content
Figure 8: Aster Imagery - Ferrous oxide content
Figure 9: Aster Imagery - Ferrous Iron Index
**Quickbird Imagery**

Geoimage Brisbane, were contracted to examine the iron ore potential through the processing of QuickBird Archive (captured 20 May 2005) imagery. The dataset was systematically orthorectified to GDA94/MGA52 using PCI OrthoEngine with cubic convolution methodology. XY control for the orthorectification was satellite ephemeris data used within a DigitalGlobe modelling module. Z control for the orthorectification was from the Shuttle Radar Topography Mission (SRTM) 90 metre DEM.

Quickbird imagery contains the necessary visible blue and visible red, critical for mapping iron oxide outcrops on landscape surfaces. Quickbird imagery also contains the near-infrared band which is valuable for separating tree and non-tree surfaces. By applying specialised algorithms, information about the landscape surfaces can be separated and highlighted. This project aimed to highlight areas of iron oxide outcrops.

A two-step process was used to enhance areas with a spectral response indicating high levels of iron oxide.

In the first step of the analysis, a binary spectral classification was used to create a mask corresponding to the extent of woody vegetation (trees) within the imagery. This was carried out to remove the dominant tree signal from the analysis to enable enhancement of the iron oxide response on ground surfaces only. Vegetation biophysical variables can be modelled using remotely sensed data through the application of vegetation indices. The Normalized Difference Vegetation Index (NDVI), which varies in response to vegetation parameters and chlorophyll content, is commonly used to detect vegetation. The NDVI utilises the visible red and near-infrared bands within the Quickbird satellite imagery. A threshold was applied to the NDVI to generate a mask layer indicating the extent of woody vegetation (trees).

Following application of the tree mask, further spectral processing was carried out to estimate the relative presence of iron oxide across the image. An iron oxide ratio of visible red values divided by visible blue values was applied in the regions outside the tree mask. The iron oxide ratio exaggerates the sharp rise in the iron oxide spectral signature in the visible bands. The changes in spectral signature of iron oxide across the electromagnetic spectrum are illustrated in brown below. Any outcrop of iron oxide will be detected including man-made infrastructure surfaces, which have been formed using iron rich compounds. Ground cover signals can influence the response where the surface response is a combination of both ground cover and soil signals. Overall, relative iron oxide variability can be inferred from the iron oxide product calculated from the satellite imagery signals.
Figure 10: Quickbird Imagery - Iron Oxide ratio
7 DISCUSSION OF RESULTS
In summary, neither the Aster nor Quickbird imagery defined areas of significant iron enrichment within EL24563.

7.1 Aster Imagery
As can be seen Figure 5 areas of elevated response in the FeOH response to the west of the BW iron prospect coincide with low-lying area (black soil plains) with less vegetation rather than lithological anomalies. Figures 6-8 show no significant variation across the tenement that could be used for delineating iron oxide rich units. Figure 9, the ferrous iron index image, shows area of enrichment to the west of the Rum Jungle Iron Ore Prospect that coincides with an area cleared of vegetation and similar areas as Figure 5 to the west of the BW iron prospect.

However, as a comparison, the iron deposits around the Francis Creek were not highlighted in any of the images.

7.2 Quickbird Imagery
The processing of the Quickbird imagery (Figure 10) shows a good correlation with cleared areas, particularly gravel roads indicating there are issues with the vegetation filter.

8 CONCLUSIONS AND RECOMMENDATIONS
The Waterhouse West Project is situated within the Rum Jungle Uranium Mineral Field. The area is prospective for unconformity-type uranium mineralisation and vein-hosted uranium mineralisation along the western and south-western margins of the Waterhouse Dome where a number of previously identified uranium prospects are situated.

The imagery processing was not successful in delineating iron rich areas beyond highlighting areas of iron hydroxide and ferrous iron accumulations associated with low lying areas or identifying areas of vegetation clearing.

Further work recommended for the Waterhouse West Project includes:

- Completion of drill lines to the south (Target area C).
- Completion of drill lines to the north (Target area A).
- Possible follow-up drilling of tourmaline-bearing pegmatite unit.
- Assessment of the phosphate, base metal and gold potential within the tenement.
## 9 VERIFICATION LIST

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10 REFERENCES


RUM JUNGLE WEST – HOPPY ANOMALY

Anon, 1979, Annual Report on Exploration over EL 1296, Rum Jungle Area, Northern Territory, Uranerz Australia Limited, Perth. CR79/100


Central Electricity Generating Board Exploration (Australia) Pty Ltd, 1989, EL 4879, Report to NTDME. CR 89/565


Uranerz Australia Limited, Various company reports submitted to the NTDME between 1978 and 1985 namely:

CR 78/93 - EL 1295
CR 79/100 - EL 1618, EL 1296
CR 80/136 - EL 1296
CR 81/175 - EL 1296
CR 82/238 - EL 1296
CR 83/189 - EL 1297
CR 83/188 - EL 1296
CR 85/211 - EL 1901