HALE ENERGY LIMITED

Harts Range Group Report

Final Report

25 February 2011 – 27 April 2012

ILLOGWA 1:250,000 MAP SHEET

EL 24734, EL 24735 and EL 24736.

Distribution:  - NT Department of Resources/ NTGS, Darwin
              - Hale Energy Limited (Keswick SA)

Compiled & revised by D Adams April 2012
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SUMMARY
Hale Energy Limited, a wholly owned subsidiary of Thor Mining PLC, is the holder of four granted exploration licenses, EL24734, EL24735, EL24736, in the Harts Range area on the Illogwa 1:250,000 map sheet SF53-15 in the Northern Territory (figure 1).

Regional uranium exploration was conducted over the Harts Range uranium tenements in 1992 and 1995 by PNC Exploration (Australia) Pty Ltd. The implementation of regional reconnaissance sampling of the area by PNC, lead to the discovery of significant uranium mineralisation, which was later followed up by an extensive regional assessment program.

Harfort Nominees Pty Ltd, a wholly owned subsidiary of Batavia Mining Limited, acquired the Harts Range tenements in 2005. In January 25th 2006 Harfort Nominees Pty Ltd was transferred to Hale Energy Ltd and holds a 100% interest in all 3 tenements covered in this report.

Exploration activities during 2007 (Year 2) included detailed rock chip sampling, mapping and soil sampling at the Daicos, Haddock and Indiana prospects. All three prospects exhibit highly anomalous Uranium assays. The Daicos prospect also returned highly anomalous REE assays from pegmatites in the area.

Reconnaissance RC drilling was planned for 2008 (Year 3) on the Daicos, Haddock and Indiana prospects however delays with completing clearance work on the prospects combined with the Global Financial Crisis (GFC) of late 2008 resulted in the cancellation of drilling activities until further notice.

Discussions with a prospective JV partner are in progress with a view to advancing exploration activity on the EM anomalies/conductors indentified from the recent helicopter EM survey completed on the southern side of the ranges over EL24735. Numerous EM conductors have been identified from interpretation of the data by Montana GIS which are thought to represent base metal sulphide mineralisation associated with amphibolites etc at less than 100m vertical depth.
1.0 INTRODUCTION

This report covers the Year 4 exploration activities completed by Hale Energy Limited on the Harts Range Tenements including; EL24734, EL24735, EL24736, EL24765 for the period 25 February 2011 to surrender of the titles on 27 April 2012.

2.0 LOCATION AND ACCESS

The Harts Range tenements are located in the Harts Range area 150km east-northeast of Alice Springs and 50km east of the Harts Range settlement (Figure 1). The tenement group consists of four tenements with a total area of approximately 206 km$^2$. Access is gained by 4WD vehicles from either north along the Plenty Highway via station tracks or south along the Ross Highway via the Aritunga Tourist Drive (Figure 1).
Figure 1: Harts Range Tenements on 1:250,000 Topographical base.
3.0 HARTS RANGE GEOLOGY

The project area covers high grade metamorphic rocks of the Proterozoic Harts Range Complex, which are situated in the south-eastern zone of the central Australian Arunta block, in the Entia Domal Structure (Figure 2). The Entia Gneiss (Harts Range Group) forms the core of the Entia Dome, consisting of acid muscovite biotite gneiss overlain by tonalitic quartz/feldspathic gneiss. Granite intrusions form smaller domes within the central structure. Metamorphosed gabbroic and ultramafic bodies are also present within the gneisses. The stratigraphy has been dislocated by numerous faults and shear zones.

Figure 2: The Harts Range project showing the original tenement holding and the distinct styles of uranium mineralisation outlined by PNC Exploration.
4.0 PREVIOUS EXPLORATION

The tenement area has been covered by modern radiometric and magnetic airborne surveys. The first, in 1993, was over the southern portions of the area. It was flown for PNC Exploration (Australia) Pty Ltd (PNC) at a 200m line-spacing. The second, in 1997, was over the remaining northern portion. It was flown for the NTGS at a 400m line-spacing. The surveys identified three clusters of radiometric anomalies within the tenements. The largest clusters were located within the Entia Gneiss, in the southwest and south of the Entia Dome. The third cluster, marginal to the dome, is spatially associated with a zone of northwest orientated shears.

Exploration for uranium was conducted over the area between 1992 and 1995 by PNC, which carried out regional reconnaissance sampling and discovered occurrences of uranium mineralisation in a number of locations, which were followed-up by prospect scale mapping and sampling. Although some of the occurrences contained high-grade mineralisation, none were of sufficient size to warrant drill-testing. PNC reported four separate types of uranium mineralisation, based on mineralogy:

- Uraninite-type: Uraninite occurring as mm to cm sized crystals, crystalline aggregates, or nodules. The mineralisation is associated with felsic phases in amphibolite and gneiss. At the Yambla Prospect the mineralisation is within quartz veining in an altered fault zone. At the Ryoma Prospect it is associated with haematite-altered fractures within gneiss. Grab samples from this prospect gave analyses of up to 8.5% U.

- Pegmatite Type: Uranium bearing rare earth oxide minerals within or immediately adjacent to a suite of pegmatites. At the SNAF Prospect, and the latest rock chip sample site for Mt Mary, on EL24734, grab samples from the contact zone between pegmatite and gneiss produced analyses to 0.26% U. At the Kelly Prospect parts of the contact between a 3km long pegmatite and surrounding altered amphibolite is anomalous in uranium.

- Epidosite Type: Sub-microscopic uraninite and uriniferous allanite grains occur in veinlets and vugs, on epidote grains, and in quartz-apatite-sulphide pockets. The mineralisation is associated with epidote and epidote-garnet metasomatic alteration in shear and fault zones.

- Retrogressed Type: Finely disseminated uranium mineralisation associated with clay-silica alteration along faults.

A total of 58 open file reports have been acquired and compiled covering all or part of the Harts Range tenements.
5.0 NATIVE TITLE AND SITE CLEARANCE

The Native Title Agreement for all tenements is based on the premise that Hale Energy Ltd is;

- Not to file and register a Native Title Application nor lodge objections in the National Native Title Tribunal to the use of the “expected procedures” in the grant of the six exploration licences; and;

- at the completion of any airborne and handheld radiometric surveys to seek your agreement that you will notify the Central Lands Council (CLC) of the specific areas where you intend to undertake onground disturbing exploration activities such as drilling, so that we can organise clearances of any cultural and heritage sites. This will ultimately provide you with the scared site clearances you will require under the Northern Territory Aboriginal Sacred Site Act.

The proposal effectively divides the exploration program into two phases. The first phase of work does not involve ground disturbing activities and does not involve native title holders and does not interfere with their legal rights. Further exploration work involving ground disturbing activities on the tenements will involve the Native Title holders seeking to protect their cultural interests in the relevant area. In this event The CLC will provide a simple agreement covering the work program clearance.

The CLC were contracted to commence clearance work during 2008 on EL24734 and EL24736 covering the Indiana, Daicos and Haddock prospects. The work involved field inspection of the sites with traditional owners to obtain clearance for reconnaissance drilling to commence. Numerous delays by the CLC to complete the clearance work with traditional owners resulted in only a third of the clearance work being completed. The area covering the proposed drilling at the Indiana Prospect is the only area to have clearance work completed on it to date. The GFC of late 2008 resulted in all drilling activities being suspended until further notice.

6.0 LOCATION AND ACCESS

Exploration Licence 24734 was reduced in size to 4 SBKS blocks with a total area of 12.72km\(^2\) at the end of year 6. It is situated 257km north east of Alice Springs, with access available by road via the Stuart Highway, and then the Plenty Highway (Figure 1).

7.0 GEOLOGY

Exploration License 24734 lies on the north-eastern margin of the Entia Domal Structure (Figure 3). The Entia Gneiss (Harts Range Group) forms the core of the Entia Dome, consisting of acid muscovite biotite gneiss overlain by tonalitic quartz/feldspathic gneiss. The Bruna Gneiss (porphyoblastic feldspar gneiss) and the Brandy Gneiss (calc-silicate rock) form the core of the exploration licence area which is orientated in a NW direction, wrapping around the Entia Dome.
8.0 PREVIOUS EXPLORATION

Previous exploration of EL24734 has identified a number of prospects, such as SNAF, which is located in the northern proportion of the tenement, and the Kelly prospect in the northwestern section (Figure 3). The SNAF prospect is hosted between biotite-garnet bearing pegmatite and well banded gneiss. The contact zones consist of high radiometric background in the range of 300-500 cps, with ‘hot spots’ of up to 10,000 cps. The Kelly prospect southeast of SNAF, occurs in the Harts Range pegmatite (felsic granitoid), with ‘hotspots’ ranging from 500-5000 cps.

Recent exploration by Hale Energy in Dec 2006 has lead to the discovery of an anomalous zone in a meandering gully, northeast of Mt Mary (Figure 3) termed the Indiana Prospect. The exposed section is a sheared contact zone between the Harts Range granite and the Brandy Biotite Gneiss filled with pegmatite veining, with a background radiometric level of 500-600 cps. Rock chip sampling of the contact zone was conducted; with the highest uranium value sampled returning a result of 107.5 ppm for sample number HR25.

Reconnaissance sampling during 2007 confirmed that anomalous uranium mineralisation associated with outcropping pegmatite in a shear zone extends in excess of 600 metres in strike length. Numerous anomalous rock chip assays were returned up to a maximum 781.3 ppm U.

Planned uranium exploration at the Indiana prospect including reconnaissance RC drilling was cancelled late 2008 was cancelled due to the GFC. Work included compilation and revue of all open file reports covering the area.
**9.0 YEAR 4 EXPLORATION**

A review of open file data, a lacklustre uranium market and competitor monitoring led to assessing the area for any prospective base metal mineralisation. An airborne EM survey was conducted over selected parts of the tenement group the results of which are not available at the time of writing this report.

**EL24735**

**10.0 LOCATION AND ACCESS**

Exploration Licence 24735 was reduced in size to 12 SBKS blocks with a total area of 37.8km$^2$ during Year 4. The EL is located 299km north east of Alice Springs, with access via Stuart highway and the Plenty highway (Figure 1).

**11.0 GEOLOGY**

The project lies to the south of the Entia Dome, with the Bruna Gneiss (Harts Range Group) being the dominant lithological unit within the area. The rock type consists of porphyroblastic feldspar gneiss (+/- biotite gneiss), mylonitic and biotite rich in part. The Riddock Amphibolite Member and the Entire Gneiss form the basics of the western margin of the EL area. On the central portion of the EL area, there is metamorphosed to partly metamorphosed norite and gabbro, containing relict igneous textures.

**Figure 4:** EL24735 original tenement map showing anomalous uranium prospects identified by PNC and more recent Hale Energy reconnaissance sampling.
12.0 PREVIOUS EXPLORATION

The anomalies found by PNC on tenement EL24735 include Ryoma, in the south western portion, and Casper, which is 600m northwest of Ryoma (Figure 4). Both prospects are within Irindina Gneiss. Within this zone there is numerous WNW trending fractures zones exhibiting weak hematitic alteration of feldspar along the margins. Weak hotspots in the range of 75-130 cps are present along the fractures with clusters of several hotspots, ranging between 400-3,000 cps. The strongly radioactive 3,000 cps anomaly is associated with centimeter size fragments of yellow stained uraninite mineralisation.

Geological mapping has delineated localised zones of re-crystallized shearing. The origin of this zone is obscure but it is likely that it has occurred during the development of several parallel orientated mylonite zones, one of which occurs about 10-15 m above the uraninite mineralisation. A one meter trench was excavated into a highly fractured system and associated hotspots.

Traces of uraninite mineralisation which occur as small (cm sized) crystals embedded in biotitic amphibolite were identified within the trench. The uraninite is spatially associated with the hematite altered fractures which range from 0-10 cm. Rock chip samples taken across altered fractures showed thin alteration halo of chlorite, which is typical of unconformity style uranium mineralisation.

Previous assays of uraninite mineralised grab samples gave 3.2% – 8.5% U, 900-3,100 ppm Y, 600-1,000 ppm P and approximately 0.4% Ti. The zone of altered fractures at Ryoma can be traced over an area of 250 x 100 m at various intensities.

To the NW of Ryoma lies the Casper prospect where PNC found small brown-black cubic uraninite crystals with strong radioactivity (4,000 cps) within a fractured zone. The assay results returned 5,090 ppm U and 480 ppm Th and resulted in the excavation of a shallow pit (1m deep).

Spotty uraninite-xenotime mineralisation was found within a vein-textured quartz-plagioclase pod, hosted in an east west shear zone. A sample of strong radioactive mineralisation was collected from the bottom of the pit, which assayed 2.6% U, 0.3% Th, 0.8% Y and 0.5% Ti.

A detailed ground spectrometer survey (5 x 5 m) was completed over infill areas at both Ryoma and Casper by Batavia, to try to identify a halo around the known mineralised sites. The survey did not show any recognisable low grade uranium halo. The ground magnetics showed weak WNW-ESE trends parallel to the structural grain as evidenced by a series of photo lineations that cut across the area of the two grids.

Five samples were taken at Ryoma and Casper prospects by Tim Monks (Hale Energy) in October 2006, with results from 121ppm to 31.6%, confirming the known elevated uranium potential of the area. Results were also elevated in rare earth elements (REE) such as Yttrium and Zirconium. HR8 also returned up to 1.62% Pb.

The results above include a single product of 31.6% U, containing a significant portion of visible uraninite; however this is not a representative of the complete zone of shearing noted in mafic amphibolites, rather a hand picked sample. The sampling confirms the association with associated strong REE values, which are often associated with late stage intrusives, and a number of large pegmatite bodies. The result of 0.61% U from Casper confirms this with the sample also anomalous in Nb, Ta and Cs.

Compilation of all available open file data was carried out during year 2.
The year 3 exploration included additional compilation of all known open file reports and review of all previous data. Location of several open file prospects in the field has proved difficult and in some cases errors in excess of 200m have been noted.

13.0 YEAR 4 EXPLORATION

A review of open file data, a lackluster uranium market and competitor monitoring led to assessing the area for any prospective base metal mineralisation. An airborne helicopter EM survey was conducted over selected parts of the tenement group including the remaining area of EL24735.

The Helicopter TDEM survey was contracted to Geosolutions Pty Ltd to complete 314 line km of survey in conjunction with a larger survey in the area to reduce prohibitive mobilisation costs. The interpretation of the data was completed by Dave McInnes of Montana GIS. The raw data collected from the survey and the interpretation of the data have now been included as an Appendix to this report. The data was not available at the time of writing the original annual report due to the short lead time of 30 days from the anniversary date imposed by the NT DOR for lodgement of reports (WA allows 60 days for lodgement).

At least seven Electro magnetic (EM) anomalies with potential for future drilling have been identified by interpretation of results by Montana GIS received from the recent helicopter-borne Airborne Electromagnetic Survey over EL24735.

The survey consisted of 49 flight line traverses flown in a north south direction for a total of 314 line kilometres.

**Figure 5:** Helicopter AEM survey anomalies identified on EL24735 together with BMR 1:100,00 Quartz geology base map.
Modelling and interpretation of the survey data has identified one “Priority 1” anomaly and six “Priority 2” anomalies sourced by potential bedrock conductors and detected at depth of less than 100m below surface. The cluster of anomalies at the western end of the EL and in particular the Priority 1 anomaly indicated by the red star, are associated with layered amphibolitic rocks and are considered prospective for nickel, copper, gold and platinum group element mineralisation (Figure 5).

EL24736

14.0 LOCATION AND ACCESS

Exploration Licence 24736 was reduced in size to 17 SBKS blocks with a total area of 52.85km² at the end of year 6. It is situated approximately 270 km north east of Alice Springs, with access gained from the Stuart Highway and via the Plenty Highway (figure 1).

15.0 GEOLOGY

The project area lies on the southern margin of the Entia Dome (Figure 2). The Entia Gneiss (Harts Range Group) forms the core of the Entia Dome which is located on the central western part of the Exploration License area. These rocks consist of acid muscovite biotite gneiss overlain by tonalitic quartzfeldspathic gneiss. Other rocks include rare kyanite bearing schist, calc-silicate rocks and marble.

The NW trending Bruna Gneiss and the Brady Gneiss forms the west part of the Exploration License area which is originated in a NW direction (Figure 5). The Bruna Gneiss is classified as porphyroblastic feldspar gneiss, mylonitic and biotite rich in part. The Brady Gneiss comprises calc-silicate rock containing clinozoisite, epidote, hornblende, clinopyroxene, quartz and feldspar with minor garnet-biotite-muscovite schist.

In the central zone meta-hornblendite and meta-ultramafic rocks are orientated in an east-west direction, dipping 25 degrees to the SW.
16.0 PREVIOUS EXPLORATION

The Haddock prospect is located in the central portion of EL24736 (Figure 6). PNC Exploration has classified the prospect as a strata bound, sheet like, metasomatic uranium occurrence hosted by the Entia Dome basement rocks. The prospect coincides with a high amplitude uranium airborne anomaly and with semi continuous anomalism over a 20 x 200 m area within epidote altered banded gneiss.

Systematic assessment of Haddock comprised 1:1,000 scale mapping (500 x 200 m), ground spectrometer and magnetic surveys and four trenches; three of which were channel sampled.

Locally the Haddock geologic succession comprises a basal felsic and mafic paragneiss intruded by a sill-like felsic orthogneiss. This sequence dips southward at moderate angles. The uranium is contained within a sheet-like moderately folded metasomatic layer. This layer is best described as a hybrid epidosite pegmatoid rock, with lateral and basal contacts against felsic gneiss.

Four backhoe trenches were excavated and mapped, radiometrically profiled and three of these trenches were channel sampled. Channel sampling of trenches produced consistent low to moderate uranium values. The best result was 2 m at 460 ppm uranium and 230 ppm yttrium. A total of 57 channel samples were taken over composite lengths of 0.5 to 1 m. The anomalous host rock was exposed in trenches 1, 3 and 4, consisting of very hard and compact hybrid mixes of epidosite and pegmatoid described above and is two meters thick.

Ground magnetic traversing revealed no significant signature associated with the uraniferous layer, but did show the footwall granitic orthogneiss layer to have a moderate magnetic signature.
Over the Starlight prospect several uranium dominated hotspots (500-2,000 cps) were located in long (several hundreds meters) but narrow (varying from 1-3 meters) pegmatite veins cross-cutting a calc-silicate/felsic gneiss sequence of the Entia Gneiss, close to the contact of the Entia with Bruna Gneiss. The pegmatites are close to and some parallel to the Horse Fault. Assays range between 830-1,860 ppm U, 230-1,280 ppm Nb, and 180-220 ppm Th from the pegmatite chips and soil.

Hale Energy sampled a horizon at the edge of a pegmatite outcrop at the Daicos prospect in Nov 2006. Some of the samples contained visible columbite crystals found near surface along the contact margin of the granitic pegmatite and the Entia Gneiss country rock. Rock chip sample HR13 returned a high U value of 8.87%, 15.2% Nb, 0.22% Sm, 19.20% Ta and 3.2%Y, again showing the relationship with REE's in late stage intrusives in the area (Table 4).

81 rock chip samples were collected from EL 24736 during year 2 exploration. One sample A105657 was collected from the Luke prospect.

**Haddock prospect**

Detailed mapping and sampling was conducted over the Haddock prospect during year 2. A total of 47 rock chip samples were collected from the Haddock prospect in year 2 including sample numbers HK001-013 & A105717-750. Numerous anomalous rock chip sample assays were returned from two phases of reconnaissance sampling over the base of the hill in epidote altered metamorphosed sediments. A best result of 1658.37ppm U was returned from the sampling.

**Daicos**

Detailed mapping and sampling was conducted over the Daicos prospect during year 2. A total of 33 rock chip samples were collected from the prospect including sample numbers DR001-011, A105658-678 and A105755.

Initial reconnaissance sampling returned extraordinarily high uranium and REE assays from very radioactive samples. The best initial assay was returned from DR007 on a pegmatite contact with books of muscovite and visible columbite. The sample returned assays of 19.37% U, 26.52% Nb, 6.25% Ta and 2.68% Y and numerous other highly anomalous elements.

A further 24 additional rock chip samples were collected from pegmatite veining in the area and confirmed earlier high grade assays with a best of 7.7% U, 13.8% Ta and 8.54% Nb. Other anomalous elements included Dy, Er, Gd, Hf, Ho, Nd, Tb, Th, Y and Zr.

A total of 374 -80 mesh soil samples were collected over a 100m x 50m panel covering the Daicos prospect area during the reporting period. Nb+Ta (Niobium plus Tantalum) assays were gridded using Micromine. The resultant image indicates that other pegmatite veins are present in the area under surficial cover parallel to outcropping veins mapped earlier in 2007 (the yellow and orange areas on the gridded image). Red to purple highs are adjacent to mapped outcropping pegmatite veins at the base of the ranges (Figure 7).
Figure 7: Nb+Ta (Niobium plus Tantalum) gridded soil data for the Daicos prospect EL 24736

Planned reconnaissance drilling covering the base of the hill at the Daicos prospect was not completed during Year 3. Numerous delays in the CLC clearance work and the GFC of late 2008 resulted in drilling activities being cancelled until further notice.

17.0 YEAR 4 EXPLORATION

A review of open file data, a lacklustre uranium market and competitor monitoring led to assessing the area for any prospective base metal mineralisation. An airborne EM survey was conducted over selected parts of the tenement group the results of which are not available at the time of writing this report.

18.0 YEAR 6 EXPLORATION

No work has been undertaken during the period.