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YEAR 3 ANNUAL REPORT FOR EL 9725 AND EL 10136 HAMMER HILL PROJECT, NORTHERN TERRITORY

by

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for

ARAFURA RESOURCES NL

1:100,000 – Quartz 5951, Dneiper 5952
1:250,000 - Huckitta SF53-11 & Illogwa Creek SF53-15

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List of Contents

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

Background

Exploration licences 9725 and 10136 are owned 100 percent by Arafura Resources NL. They lie in the eastern portion of the Arunta Block where previous investigations have identified a range of mineral commodities. The most notable of these are the nickel and chromium mineralisation located at Hammer Hill, and the Rare Earth Elements (REE) located at Holstein's.

Arafura's interest in the tenements stems from the potential of the area to host:

- Ni-Cu and Pt-Pd mineralisation associated with mafic intrusions;
- Broken Hill style base metal mineralisation in the metamorphosed Arunta sequence,
- Mary Kathleen style uranium mineralisation in the metamorphosed Arunta sequence and
- A range of other commodities associated with intrusives such as carbonatites, kimberlites and pegmatites.

Location and Access

Exploration licences 9725 and 10136 lie in the eastern Arunta province approximately 200 kilometres east north-east of Alice Springs (Figure 1). Access to the general area of the licences is reasonably good via the well formed but unsealed Plenty Highway which intersects the Stuart Highway 68 kilometres north of Alice Springs. The road distance from Alice Springs to the titles is about 300 kilometres. Following heavy rain the Plenty Highway can be closed to all traffic or have weight provisions applied.

Within the licences vehicular access is restricted to a few station tracks and fence lines. With the exception of the main station access tracks there has been little to no track maintenance undertaken for a long time. The widespread use of motorbikes has seen the need for established tracks diminish to the point where even the tracks marked on the regional maps are heavily overgrown, cut by erosion gullies or simply unrecognisable. Movement away from the tracks is difficult due to the rocky nature of the land, thick vegetation, erosion gullies and deeply incised creeks.

On the recent field visit no attempt was made to access the portion of EL 9725 located in the centre of the Huckitta Dome. However, based on the condition of the tracks on the flatter country and the comments made but the manager of Indiana Station four wheeled vehicle access to the tenement would be almost impossible.

Topography and Drainage

The exploration licences can be divided into two areas, the north eastern and south western. The northern and eastern parts which encompasses all of EL 10136 and most of EL 9725 is generally flat with some gentle hills. The elevation in the west area of the flatter country is about 400m (AHD) which gradually decreases to 350m in the east. The south western part, which contains an isolated segment of EL 9725, lies within Harts Range and is extremely rugged terrain (Figure 1). The eastern foot of the Harts Range has an elevation of approximately 450m but this rises rapidly to over 800m with Mt Mary, Mt Long and Mt Powell reaching 909m, 878m and 857m respectively. The elevation around Arafura's western portion of EL 9725 is about 800m with Mt Lionel reaching 818m.

Numerous ephemeral gullies and deeply incised creeks drain the area. The majority of the licence area drains to the south east through Huckitta Creek. The western hilly area drains to the north into the Plenty River via Entire Creek. There are no permanent rivers and only a few significant water holes in the region.

Climate

The climate prevalent in the licence area is best described as mainly dry all year round and either hot or cold depending on the season. Average annual rainfall (1967–1983) is 330 millimetres of which about two-thirds

falls in the period December to March. Average annual evaporation is approximately 2900 millimetres. Average minimum and maximum temperatures in summer are 22°C and 38°C degrees while corresponding winter average temperatures range at 4.7°C and 21.7°C with overnight frosts common.

SUMMARY

A detailed review of the past exploration in exploration licences 9725 and 10136 has been completed by Andrew Drummond and Associates. The review has indicated that there is the potential to find several types of mineral deposits in the licence area. Arafura's primary interest lies in nickel-chrome mineralisation associated with the Hammer Hill ultramafic intrusive or rare earth elements (REE) associated with barite-apatite veins at the Holstein's prospect.

A short field trip has been made to the two deposits and a limited number of samples were collected from each.

The visit to the Hammer Hill prospect has tended to down grade the immediate potential of the area. The rock chip samples collected contain anomalous amounts of nickel and chromium however the observations made on site suggest the distribution of ultramafic rock is fairly restricted. Two exploration models were considered, a lateritic accumulation and a primary sulphide deposit associated with a layered ultramafic intrusive.

The geochemical analysis and petrology completed on the Hammer Hill samples has confirmed the exposure is a highly weathered remanent of metamorphosed ultramafic rock which is anomalous in chromium and nickel. Microprobe analysis indicates that the elemental ratios are similar to those found in other ultramafic Ni-Cu deposits.

The visit to the Holstein's REE prospect has produced similar results as the visit to Hammer Hill. A series of fairly thin dykes containing elevated REE's were located and their compositions noted in the field have been confirmed by geochemical assay, microscopic mineral identification and electron microprobe analysis.

The samples from Holstein's are geochemically anomalous in Cerium, Lanthanum and Thorium. The petrology report describes a complex mineralogy containing primary, replacement and metamorphic mineral over prints. Barite and apatite appear to be the important primary host mineral phases.

A group of discrete magnetic lows were investigated at West Gimlet but no indication of economic mineralisation was observed. A foot traverse was completed over the anomalies which lie in a broad depression surrounded by hills made of felsic to mafic gneiss and very coarse grained pegmatitic granite.

CONCLUSIONS

- The rock chip samples collected at Hammer Hill contain anomalous amounts of nickel and chromium however the observations made on site suggest the distribution of ultramafic rock is fairly restricted

- The possibilities of finding a sizeable lateritic Ni deposit are slim given that Hammer Hill emerges from a sandy plain with widely spaced gneissic outcrops and Hammer Hill is not particularly lateritic. If a large lateritic deposit were present it would have to lie on the gneiss and the exposed hill should at least be lateritic.

- It is thought that if such a deposit had developed the current weathering regime would have destroyed it as it has done to most of the Tertiary land surface in the area.

- The airborne magnetic data shows that Hammer Hill lies on a magnetic ridge similar to several that occur in the region. The magnetic fabric is not suggestive of a large layer ultramafic intrusion. This and work completed by earlier explorers suggests the Hammer Hill ultramafic is more plug-like.

- Massive pods of Ni-Cr mineralisation associated with plug-like mafic intrusions are probably the only likely form of economic mineralisation at the prospect.

- The Holstein's prospect is a series of hydrothermally altered and weathered Ba-rich pegmatite reefs intruding a calc-silicate rock. The pegmatites contain primary REE minerals and not related to a carbonatite.

- The field visit has demonstrated the ease with which the mineralised veins can be located and mapped out using direct observation and a spectrometer.

- The width and spacing of the mineralised veins indicates that it is unlikely a body of economic size could be located.

- It appears the magnetic expression is related to the intrusion of subtly different phases of very coarsely crystalline pegmatite. The pegmatites appear to be largely unaltered although in places they have been sheared. One old mica mine was located but otherwise the pegmatites appear to have no economic interest.

- No further work is warranted at West Gimlet.

- The recently announced assay results for some vein quartz material from Bruce's Prospect, approximately 10 km north of EL 10136 highlights the areas potential to host gold mineralisation. The amount and results of previous exploration for gold mineralisation needs to be assessed.

RECOMMENDATIONS

- Conduct a detailed ground magnetic survey over Hammer Hill to try to characterise the nature and extent of the ultramafic intrusion.

- Conduct a ground EM survey over Hammer Hill and its immediate surrounds to try to locate pods of massive sulphide mineralisation.

- Examine the airborne radiometric data along the eastern edge of the Huckitta Dome and over the Brady Gneiss to identify areas similar to Holstein's where more significant accumulations of REEs may be located.

- Conduct geological reconnaissance and ground spectrometer surveys over any targets identified to assess the mineral potential.

- Compile the gold exploration data, particularly the stream sediment data available for Arafura's tenements and see if there are anomalous drainages present.

TENURE

Exploration Licences

Exploration Licence (EL) 9725 was applied for by Star Money Lenders on the 14th October 1996. Later Star Money Lenders changed its name to McCleary Investments Pty Ltd. The licence, originally containing 285 blocks for 888.9 sq km, was granted for a period of six years on the 17th December 2001. On the 24th December 2001 the title was transferred in entirety to Arafura Resources NL. Since grant the licence has been through two compulsory reductions and now consists of 72 blocks.

Exploration Licence 10136 was applied for by Norman S McCleary on the 1st June 1998. The title was granted for a period of six years commencing on the 13th February 2002. Following grant the title was transferred 100 percent to Arafura Resources NL on 5 th March 2002. The licence initially contained 441 blocks and covered 1395 sq km. Now, after two compulsory reductions, the licence contains 111 blocks.

Land Tenure

Exploration licence 9725 and 10136 lie on parts of five perpetual pastoral leases (PPL). These are:

PPL 1061 Indiana Station
Bird, M.D, Indiana Station PO Box 8045, Alice Springs NT 0871

PPL 989 Mt Riddock Station
Harts Range Pty Ltd C/- Wardell Nominees Pty Ltd., 1st Floor, 19 the Mall, Darwin NT 0800

PPL 990 Alcoota Station
Huckitta Nominees Pty Ltd C/- Alcoota Station via Alice Springs NT 0870

PPL1124 Ambalindum
Newenhem Pty Ltd Flaxly road, Mt Barker SA 5251

PPL 1119 Jervois Station
Broad, M.J PMB 36, Alice Springs NT 0871

Native Title

There are no registered native title claims over the land which is the subject of the licences.

Arafura Resources has negotiated and executed an Exploration Agreement with the Central Land Council (on behalf of registered various Native Title Claimant Groups). EL 9725 and EL 10136 are subject to this agreement. As a result, there are no Native Title impediments to continued exploration on these titles other than holding appropriate consultations, avoiding sacred sites and, in due course, paying agreed amounts of financial compensation.

Aboriginal Sacred Sites

The Sacred Site register of the Aboriginal Areas Protection Authority was inspected prior to the Company undertaking reconnaissance in the area in 2004.

GEOLOGICAL SETTING

Regional Geology

The regional geology in the vicinity of the Hammer Hill licences is illustrated in Figure 2. Geological details in this diagram are drawn from digital copies of the HUCKITTA (SF53-11) and ILLOGWA CREEK (SF53-15) 1:250,000 Geological Series published by Geoscience Australia (GA - formerly the Bureau of Mineral Resources, BMR). Lithological labelling in Figure 2 is derived from the published maps. The relative stratigraphic positions of the various rock units shown on Figure 2 are as displayed on the published maps. The regional setting described below has been compiled from recently published abstracts and the significant changes in relative stratigraphic positions are the result of advances in understanding made by the NTGS and GA geologists (Pietsch, 2001; Scrimgeour, 2003; Hussey, 2004; Maidment *et al.* 2004; Scrimgeour,2004).

Prior to 1999 the Arunta Province (domain) was divided into three major subdivisions based on coarse structural, stratigraphic and metamorphic considerations, (NTGS Explanatory Notes SF53-11). The three structural provinces were referred to as the Northern, Central and Southern Domains which are separated by major east-west tectonic zones.

The stratigraphic division of the Arunta Province was also described as three groups which were referred to as Division 1, 2 and 3. Division 1 comprises felsic and mafic granulites distributed in the Southern Tectonic Domain. These rocks are thought to represent metamorphosed felsic and mafic volcanogenic rocks with minor pelitic and calcareous sediments. The Division 2 rocks are the most widely distributed and consist of schistose pelitic metasediments and quartzo-feldspathic gneisses. Division 3 is restricted to the northern and southern edge of the Arunta Province and consists of schistose, pelitic metasediments and metaquartzite.

The metamorphic grade in the three domains is also different. The Southern zone is mostly at amphibolite facies while the Central zone is predominantly granulite and the Northern zone is upper greenschist facies.

Since 1999, geologists and geochronologists working for the NTGS and GA have studied the Arunta "Region" and aided by advances in geochronology methods have recently revised the geological domains that comprise the region. Three formally named Provinces have been recognised which have unique and discrete geological histories. The provinces are referred to as the Aileron, Warumpi and Irindina. Exploration Licences 9725 and 10136 lie in the Irindina Province.

Table 4: Aileron Province Rock Descriptions.

Name and Age	Description
Lander Package 1865 – 1820 Ma	The most widely spread package consisting of interlayer pelites and psammites deposited as turbitites to shallow marine. Greenschist but locally up to granulite facies metamorphism. Considered to be the equivalent of the Killi Killi Fm in the Tanami Gp and the Ooradidgee Gp in the Davenport Province.
Ongeva Package 1810 – 1790 Ma	Comprises the Strangways Metamorphic Complex, Bonya Schist, Deep Bore and Cackelberry Metamorphics, and Kanandra and Bleechmore Granulites. Mostly pelites and psammites with lesser calc-silicates and felsic and mafic gneisses of an intrusive or extrusive origin. Granulite to amphibolite-grade metamorphism.
Reynolds Package ~ 1780 Ma	Reynolds Range Group comprising shallow marine to inter-tidal quartzite grading into pelite and minor calc-silicate.
Cadney Package 1780 – 1760 Ma	A carbonate dominated package with variable clastic input that lies at the top of the Strangways Metamorphic Complex rocks.
Ledan Package 1760 – 1740 Ma	Comprises the Ledan Schist, Mendip Metamorphics and Utopia Quartzite. Dominated by quartz-rich sediments, quartzite and pelites, minor calc-silicates. Metamorphosed to amphibolite facies or higher.

The Aileron Province is the oldest and most widely spread. It comprises greenschist to granulites facies metamorphic rocks with protolith ages in the range 1865-1710 Ma. It forms part of the North Australian Craton and is geologically continuous with the gold-bearing Tanami and Tennant Regions to the north. The rock packages associated with the Aileron Province are described in Table 4.

Located in the southwestern Arunta Region, the Warumpi Province consists of sedimentary and igneous protoliths with ages in the range 1690-1600 Ma, and is interpreted to be an exotic terrane that accreted to the southern margin of the North Australian Craton at 1640 Ma. Within the Province the metamorphic grade ranges from upper-greenschist to granulite facies. The recognized rock packages that occur within the Warumpi Province are described in Table 5

Table 5: Warumpi Province Rock Packages

Name and Age	Description
Madderns Package 1690 – 1670 Ma	Flow-banded rhyolites, Fe-Mn sediments and calc-silicates metamorphosed to lower amphibolite facies.
Yaya Package 1660 - 1650	Granulite to upper amphibolite facies pelite, psammite, quartzite, calc-silicate and massive cordierite granulite.
Iwupataka Package 850 – 500 Ma	Metapelites, quartz-rich sediments, calc-silicates and minor volcanics metamorphosed to upper greenschist – middle amphibolite facies.

The Irindina Province in the Harts Range region (eastern Arunta) comprises Neoproterozoic to Cambrian metasediments that formed in a major depocentre within the Centralian Super-basin. It underwent high-grade metamorphism and deformation during the Ordovician, Larapinta Event (480-450 Ma)". Rocks in the Irindina Province belong to the Irindina package which is described as:

> *"a succession of pelites, calc-silicate rocks and layered amphibolites that are interpreted to represent rift sediments containing variably reworked mafic volcanics… zircon ages suggest the units were deposited before the high-grade Larapinta Metamorphic Event."*

The tectonic and thermal history of the Arunta is very complex with several orogenic (temperature and pressure) and purely the thermal events recorded, (Table 6).

Exploration Licenses 9725 and 10136 lie in the Irindina Province in the eastern Arunta which has been effected by the Larapinta Event and the Alice Springs Orogeny. The larapinta Event resulted in upper amphibolite to granulite facies metamorphism of the Harts Range Group in the Irindina Province. The Event is considered to have been extensional and accompanied by the intrusion of mafic and ultra mafic dykes.

The Alice Springs Orogeny was a long-lived compression event that affected the entire Arunta Region. In the Irindina Province the effect was to invert the basin and juxtapose it against the Strangways Complex Rocks. Large scale fluid flow during the Alice Springs Orogeny is thought to be responsible for the development of Rare-Earth mineralization throughout the Arunta Region.

Table 6: Summarised Litho-Stratigraphic Distribution and Orogenic–Thermal Events

AGE (Ma)	WARUMPI PROVINCE	AILERON PROVENCE	IRINDINA PROVENCE
450 – 300	**Alice Springs Orogeny**	**Alice Springs Orogeny**	**Alice Springs Orogeny**
500 – 460			**Larapinta event**
850 – 500			Irindina Package
1150 – 1130	**Tea Pot Event**	**Tea Pot Event**	
1590 – 1570	**Chewings Orogeny**	**Chewings Orogeny**	
1610 – 1600	**Orimiston Event**		
1620 – 1610	Iwupataka Package		
1640 – 1630	**Liebig Orogeny**	**Liebig Orogeny**	
1660 – 1650	Yaya Package		
1680 – 1660	**Argilke Igneous Event**		
1690 - 1670	Madderns Package		
~1690		**Unnamed Event**	
1730 – 1710		**Strangways Orogeny**	
1760 – 1740		**Inkamulla Igneous Event**	
1780 – 1740		Ledan / Cadney Package	
1780 – 1770		**Yambah Event**	
~1780		Reynolds Package	
1810 – 1790		Ongeva Package	
1810 – 1800		**Stafford Event**	
1865 - 1820		Lander Package	

(Modified after Scrimgeour 2004)

Local Geology

Exploration licences 9725 and 10136 lie predominantly in the north western corner of the Illogwa Creek 1:250,000 map sheet and initially occupied most of the northern half of the Quartz 1:100,000 sheet. EL 10136 extends to the north onto the Huckitta 1:250,000 map sheet.

The published topographic and geological maps show that the area is divided into two regions (Figures 1 and 2). The western region extends into the Harts Range and is characterised by very rugged hills and mountains. Geologically, these are associated with the Huckitta and Inkamulla Domes, which are the southeastern and northwestern portions of the Entia Domal Structure. The eastern region is much flatter, containing gentle hills and broad outwash zones from the mountains to the west and north. Following the compulsory reductions in size the tenements now occur mostly the flat country with only a small isolated group of blocks in the centre of the Entia Domal Structure.

The oldest rocks exposed within the tenements are gneisses belonging to the Harts Range Group which were originally assigned to the Arunta Division 2 stratigraphic package but now have been placed in the Irindina Package within the Irindina Province. The Harts Range Group is made up of several named and un-named members. The named members are the Entia, Bruna, Stanovos, Irindina and Brady Gneisses. The Entia Gneiss, described as an

> "*Acid muscovite biotite gneiss, overlain by tonalitic quartzo-feldspathic gneiss, hornblende-bearing quartzo-feldspathic gneiss, layered amphibolite, biotite gneiss…*"

occupies the centre of the Entia Domal Structure where a portion of EL 9725 lies.

The largest block of tenement (Figure 2) lies along the eastern edge of the Huckitta Dome and extends out over the flatter country to the east. The Brady Gneiss described as a,

> *"calcsilicate rock containing clinozoisite, epidote, hornblende, clinopyroxene, scapolite, quartz and feldspar; garnet-muscovite-biotite schistose gneiss, biotite gneiss and schistose garnet-bearing muscovite-biotite gneiss…"*

lies along the western edge of the tenement.

The geological mapping in the flatter country shows large areas of undifferentiated gneiss which appear to range in composition from mafic (clinopyroxene, hornblende, microcline, quartz, plagioclase) to felsic (quartz, feldspar).

Overlying the Harts Range Group gneisses in this flatter area are Tertiary siltstone (Waite Formation) and Quaternary aeolian sands and alluvial sediments.

Intruding the gneisses are metamorphosed mafic and ultramafic rocks. These occur within the portion of EL 9725 that lies on the Inkamulla Dome. These units intruded during the extensional Larapinta Event and are considered to be prospective for nickel, copper and PGE mineralisation. The nickel mineralisation at the Hammer Hill prospect is interpreted to occur in the iron rich weathered material overlying an ultramafic intrusive indicating that the mafic-ultramafic intrusions are more widely spread than just occurring in the Inkamulla Dome (Figure 2).

The Holstein's rare earth prospect lies in an area mapped as pegmatite dykes intruding the Brady Gneiss. This mapping is consistent with one interpretation provided by Pontifex and Associates who describe the original mineralised lithology as,

> "… represent evolved phosphatic pegmatites with possibly elevated Ba in alkali feldspar…"

The pegmatite mapped at Holstein's and several like it have the potential to host rare earth and other mineral resources.

PREVIOUS INVESTIGATIONS

A detailed investigation of the previously completed exploration in EL's 9725 and 10136 has been compiled by Andrew Drummond and Associates as part of the Independent Geologist's Report included in the prospectus for Arafura Resources NL's initial public offering of shares in 2003. The relevant part of Drummond's original detailed report (Drummond, 2001) is reproduced here. An abbreviated version appeared in the final prospectus document.

Drummond (2001) reported as follows (edited):

> *Exploration programmes and results relevant to an appraisal of Arafura's Hammer Hill area are as follows*
>
> ***(a) Placer Prospecting (Australia) Pty Ltd (1968-1970) ATP 1991. CR70-16***
>
> *Within ELa9725, Placer's tenement covered the eastern part of the Huckitta Dome and easterly to the Hammer Hill prospect. They sought U, REE and tantalite in the known pegmatitic prospects, but without any success. A low density stream sediment survey for base metals did not encourage them.*
>
> ***(b) Placer Prospecting (Australia) Pty Ltd (1968-1969) ATP 2277. CR70-008***
>
> *In the Valley Bore area (NTGS Prospect 3) a band of calc-silicate rocks averaging almost 3 metres in width was traced for about 3 kms and REE were found in three places. As the evaluation methodology is not discussed, and no assays are given, it warrants follow-up by Arafura.*
>
> ***(c) Arcadia Minerals Ltd (1970-1971) ATP 2568. CR70-049***
>
> *The tenement covered the eastern part of ELa9725 and most of ELa10136 on the Illogwa Creek sheet. Arcadia discounted the potential of the Harts Range but undertook a reasonable reconnaissance programme on ultramafics east of (but excluding) Hammer Hill. It describes them as relatively large intrusions of olivine-rich variety, occurring in a zone of some 5 x 3 km, with individual outcrops ranging from a few metres to 1000 x 600 m. Serpentinite and carbonate mesh textures were noted. Ni assayed to 0.9%, with Cr averaging 2000 ppm and Nb only 2 ppm. Some appear plug-like, and some tabular; they are often siliceous at surface.*
>
> *The low iron content and weak magnetic signature were noted. Arcadia notes "… The plug-like circular structures and relict carbonate texture are vaguely suggestive of a kimberlite-carbonatite association although the distinctive kimberlite textures and mineral assemblages were not observed. ……. Carbonatites have been recorded in the Arunta Complex and this association cannot at this stage be discounted."*
>
> ***(d) Cogar and Felderhof (1971-1973) ATP 3193/EL374***
>
> *The tenement covered most of ELa9725 around the Hammer Hill area. Work along Entire Creek seems of little relevance to Arafura. Gridding and sampling of a hillock 4 km north-west from Hammer Hill, which was originally thought to be gossanous, did not return anomalous Pb, Zn or Cu values.*
>
> ***(e) VAM Limited (±1968) ATP 2042. CR68-066***
>
> *The small tenement covered the Quartz Hill, or Holstein's REE prospect, sited about 14 km west-south-west of Hammer Hill. VAM Limited's sampling of seven lodes returned an average of 1.4% combined REO, with individual assays to 3% Ce and 5% La. Lode sizes apparently attain 100 m length by 1-3 m in width. VAM pointed out that airborne reconnaissance highlighted numerous*

pegmatite reefs to the south of ATP 2042, and considered there should be good potential for discovery of more occurrences. Drummond considers that in this well outcropping and well drained area that scintillometer, rock chip and stream geochemistry surveys would be valid and rapid first pass exploration techniques.

(f) Otter Exploration N L (1977-1982) EL1581. CR78-114, 82-367, 80-123, 79-119

Otter's tenement slightly overlapped the northern margin of Arafura's ELa10136. It searched for U and for Molyhil and Jervois styles of base metal and tungsten mineralisation. Most of its work was centred along the Sainthill Fault Zone and the granite-emplaced terrane to its north. Nothing of relevance within ELa10136 was discovered. However its investigations of ultramafic intrusives about 8 km north of the ELa10136 boundary may be of interest. Its investigations do not discount an alternative model that the intrusives may be kimberlite related.

The geochemistry (Cu to 70 ppm, Co to 160 ppm, Ni to 860 and Cr to 1150 ppm) is consistent with Western Australian kimberlites and lamproites.

(g) Hillrise Properties Pty Ltd, CRA Exploration Pty Ltd (?-1983) EL1801 and EL2494. CR79-12, 81-064, 82-052, 82-061

Early work consisted of a data review and there is little of significance except mention of apatite in the "Princess Elizabeth Pegmatite" - whose position was not stated. Hillrise concentrated upon gemstone exploration and found the Harts Range Ruby Field in the western part of EL1801 and beyond the western boundary of ELa9725. REE were located in pegmatites near Valley Bore and elsewhere near the western margin of ELa9725. On the southern slope of Quartz Hill, Hillrise followed up radiometric anomalies and found them to be associated with a baritic, chalcedonic, silicified, monazite-rich carbonate rock. Drummond considers that this should be regarded as a prime target for follow-up to search for carbonatite-related REE.

CRA farmed in and undertook a low density stream sediment sampling programme (one sample per 8 sq km) over most of ELa9725 without returning any results worthy of follow-up. The area covered did not extend as far to the north-east as the Hammer Hill prospect, so has no bearing in that regard.

(h) Parks & Athanasiou and Western Mining Corporation (1982-1983) EL2657. CR84-15

The tenement was originally held for a ruby search, and then WMC farmed in to seek diamonds. The prospectors located two areas of blue corundum west and south of Quartz Hill, and a third area, about 4 km south of Quartz Hill, which contained pink corundum and was considered prospective for rubies. Three other corundum prospects were located near Inkamulla Bore in the west of ELa9725. Four of the six seem sufficiently large to warrant Arafura's attention. WMC's reconnaissance sampling in the catchment of Entire Creek in the west of ELa9725 followed up a reported recovery of a single diamond. It attained a micro diamond and "highly significant pyrope garnets". Fifty stream samples were taken: they were highly garnetiferous but not diagnostic of kimberlite.

(i) CRA Exploration Pty Ltd (1980-1981) EL2790. CR82-043

CRA carried out a reconnaissance geochemical drainage sampling programme over a sector of ELa10136 bounded roughly by the Plenty Highway and 23° 00S and extending from Hammer Hill in the south-west corner easterly for some 17 km. The topography is subdued and, as it pre-dated the invention of BLEG, conventional sampling was used - at an initial density of one per 13.5 sq km. Some weakly anomalous Au values were followed up, peaking at 25 ppb. However as this value compares favourably with the anomalous drainages emanating from the White Range deposit (see (l) below), it should provide some encouragement for Arafura to follow it up.

Of concern is that streams emanating from Hammer Hill itself are not anomalous in Ni or Co. The area covered by Arcadia's work lies just east of CRA's tenement and was not sampled.

(j) Petrocarb N L and Geopeko Pty Ltd (1982-1983) EL3013. CR83-326

The tenement was taken up to pursue the Hammer Hill lateritic nickel-cobalt prospect. However, no work was done on that aspect. Potential for Molyhil-style mineralisation was then reviewed without encouragement.

(k) Western Mining Corporation Limited (1981-1985) ELs 3115 and 3303. CR83-004, 83-332, 84-009, 85-045

WMC followed up the historic Entire Creek diamond discovery by a stream sampling programme which recovered a microdiamond and several kimberlitic pyrope garnets. A subsequent bulk sampling programme failed to recover any more. Nonetheless, Drummond considers that these results should be viewed as encouraging if Arafura can define targets during mapping and its aeromagnetic interpretation.

(l) Central Rare Earths Corporation N L and Pancontinental Resources (Exploration) Pty Ltd (1988-1990) ELs 6154 and 6604. CR91-400

All field work was carried out to the south and west of the Arafura tenements. However, orientation BLEG sampling carried out downstream of the White Range gold mine is of value. Responses were 10.3 ppb Au at 1.5 km downstream, and 1.18 ppb Au at 4 km.

(m) BHP Minerals Ltd (1990-1992) EL 7178, 7179, 7180 and 7470. CR92-212

BHP sought a Broken Hill-style base metal deposit in an area covering the eastern and northern parts of Arafura's tenements. Hammer Hill itself lies about 4 km west and south of the BHP tenements. BHP's work programme was a strong one including reprocessing and interpretation of aeromagnetics; EM surveying, soil, rock chip and stream geochemical surveys; and RC drilling.

The majority of BHP's work was undertaken east of Arafura's Project area. Outcomes relevant to Arafura are as follows:

- *Hammer Hill lies in a zone which is weakly magnetic with few magnetic horizons.*
- *Overall, BHP found few bodies with a magnetic susceptibility similar to that of ultramafics.*
- *SIROTEM was carried out over the anomaly which BHP considered the most prospective in Arafura's ground, but no conductor was indicated.*
- *Four soil sampling traverses were undertaken in ELa10136. Of the 54 samples, there were two weak Ni values (25 ppm); one moderate Zn (72 ppm) and one weak Cu (21 ppm). In general, better values were recovered east of the Arafura tenement.*
- *Stream sediment samples did not return much encouragement from ELa10136 - however sampling density was low. Best encouragement is along the eastern boundary of it where sites variably anomalous in Ni, Cu, Zn and Pb occur. The anomalous zone extended easterly beyond Arafura's ground.*
- *Of its 40 RC drill holes, only four were drilled in Arafura's tenements. They were sited on magnetic features, but returned few assays of interest. Seven holes within 2-3 kms beyond the eastern boundary of ELa10136 did not return any values of interest either. Transported cover over weathered basement was found to be as much as 70 metres thick, but is usually only a few metres. Examination of the drilling logs did not indicate evidence for preservation of lateritic weathering profiles.*

In summary, Drummond considers that although BHP did not test the Hammer Hill prospect itself, its broad scale testing of the area to its north and east - in apparently similar geological terrane - does not lend much encouragement for an ultramafic hosted Ni-Co deposit - either sulphidic or lateritic.

(n) PNC Exploration (Australia) Pty Ltd (±1993-1995) ELs 8901, 8220, 8675, 7967 & 8036 CR95-298, 96-286.

PNC conducted extensive exploration, including detailed airborne radiometrics and magnetics, over all of the Harts Range which lies within ELa9725. Its primary exploration target was uranium, and all anomalies determined from its airborne surveys were followed up, as well as known prospects.

Its largest discovery was at Yambla, which lies 4 km south-west of the south-west corner of EL9725. While U is understood not to be a target for Arafura, PNC describes occurrences of other metallic mineralisation within Arafura's tenements which may be of interest as follows.

- *Quartz Hill: Pegmatite hosted mineralisation warrant Arafura follow-up. Assay ranges : U 4100 - 9300 ppm, Ta 1300 - 3600, Y 1.4 - 2.9%, Nb 1.8 - 4.0%.*
- *Quartz Hill: REE minerals were again noted at the Holstein's Prospect.*
- *A pegmatite zone gave U-Y-Nb-Ta assays in the order of 500-5000 ppm.*
- *Visible Au in a malachite stained, limonitic vein was noted at a prospect.*

At Holstein's, PNC reported the same swarm of veins that had been noted by VAM. PNC reported them as late stage and gossanous. They were principally Fe-Ba-REE-Th-S mineralised with minor to insignificant uranium. The first grab samples ranged between 0.1-10% REE, 0.2-0.5% P, 1.0-24% Ba and 0.03-3.3% Th. Follow-up revealed numerous additional veins and breccia masses of Ba-carbonate-haematite-REE minerals. Grab sample assays ranged over: 0.05-7.0% La, 0.07-12% Ce, 40-600 ppm Y, 0.3-3% P, 0.5-15% Ba and 0.07-3.9% Th. Unfortunately, detail on areal dimension is lacking.

Further REE-anomalous veins were found 2 km north-west and 0.5 km north-east of Holstein's.

1.1 *Government Investigations and Diamond Potential*

In addition to 1:250 000 scale geological mapping, the BMR and the NTDME have also undertaken:

- *drilling of the Hammer Hill lateritic Ni-Co project*
- *drilling of the Dneiper Middle Dam ultramafic prospect*
- *a detailed airborne magnetic and radiometric survey.*

At Dneiper Middle Dam (NTGS Report GS 79/20), the NTGS mapped, geochemically sampled and diamond drilled a serpentinite body which it thought might host lateritic Ni-Co mineralisation north-west of ELa10136). It found that the body is probably a plug or dyke; that it has a zone of altered country rock up to 10 metres wide around it, and that no secondary accumulations of Ni or Co occur in the sub-surface.

Upon review of the report, Drummond considers that there is a reasonable possibility that the intrusion may be of lamproitic or kimberlitic affinity. CRA Exploration Pty Ltd reported on diamond exploration on its EL2789: Middle Dam was in its south-east corner. Having found indicator chromites 20 kms north-west of Middle Dam, CRA defined possible kimberlitic targets from study of the ±1982 NTGS aeromagnetic data. Three targets lay between two and six kilometres north-west of Middle Dam. CRA's sampling apparently did not cover any drainages emanating from the Dam and geophysical anomaly areas. Ground surveys downgraded the magnetic anomalies elsewhere in the tenement and CRA relinquished it without any testing in the Middle Dam area. It considered that the tested anomalies were probably due to Alpine-type small ultramafic intrusions.

Apart from constituting a target in its own right, there is a tendency for these intrusives to cluster, and this would make Arafura's tenements prospective for diamonds. The long stable crust and the presence of major through-going structures such as the Mt Sainthill Fault lend encouragement. It leads to the possibility that Hammer Hill itself may also be a diamond target, as discussed in Section 5.5, and that two prominent aeromagnetic anomalies some 8 kms south-west of Hammer Hill should also be investigated.

EXPLORATION ACTIVITIES COMPLETED, 2004

Processing Geophysical Data

Southern Geoscience Consultants Pty Ltd were commissioned to subset, merge and reprocess NTGS aeromagnetic data from the Huckitta and Alice Springs/Alcoota surveys, over the Hammer Hill-Holstein's area (35 x 20 kilometres, 700 square kilometres).

Field Reconnaissance

A short reconnaissance trip was made to the area in late March 2004 by the author and Arafura's Exploration Manager, John Goulevitch. The areas visited included Hammer Hill, Holstein's and West Gimlet. The purposes of the trip were:

- to meet with the local pastoralists and Aboriginal representatives,
- to gain an impression of the land forms, access and logistics prior to commencing any substantial field work,
- to collect a suite of rock samples suitable for providing background information from the Hammer Hill and Holstein's prospects;
- to investigate anomalous areas of distinctly low magnetic intensity to the west of Gimlet Dam to the southeast of Holstein's; and
- to inspect stream sediment and soil development in the region prior to commissioning any geochemical sampling programs.

During the field visit six rock chip samples were collected from Hammer Hill for geochemical analysis and three samples were collected for petrographic examination.

From the Holstein's group of mineralised lodes, eleven rock chip samples were collected for mineralogy and seven rock chip composite samples, one from each lode were collected and dispatched for geochemical analysis. At Holstein's and West Gimlet a spectrometer was used to measure the thorium-specific radioactivity. The presence of thorium is considered to be diagnostic of the presence of REE mineralisation.

RESULTS AND DISCUSSION

Geophysical Processing

Output from Southern Geoscience Consultants is included on the accompanying CD. Year 3 and year 4 boundaries for ELs 9725 and 10136 are shown over a combined aeromagnetic image in Figure 4.

Hammer Hill Prospect – Ni-Cr

Geological Observations

Hammer Hill is a small (10m high) hill rising out of a broad flat plain. The plain is covered by Aeolian sand with minor amounts of lag quartz. The hill runs at approximately 330º magnetic and extends for about 300m from north to south. The hill is surrounded by a scree slope containing quartz, calcrete, silcrete, iron-coated lateritic pebbles and schist. The schistose material is highly weathered and maybe metamorphosed and stressed mafic rock. The *in situ* outcrop consists largely of silicified calcrete with minor lateritic material possibly belong to the Tertiary Waite Formation. Emerging through the scree slope are outcrops (?) of extremely weathered material that maybe silicified mafic/ultramafic. Assay results suggest the material is mafic/ultramafic. On the southern flank of the hill is a small depression/excavation surrounded by calcrete, quartz, feldspar and mica suggests a pegmatite occurrence.

Geochemical Investigations

The analyses (Appendix 1) from the six rock chip samples collected from the suspected ultramafic material are interesting in that they contain elevated levels of chromium and nickel. The copper, gold and PGE results are low but this is to be expected given the highly weathered nature of the sample material. The assay results support the descriptions of the rocks as deeply weathered, metamorphosed ultramafic intrusions.

Petrological/Mineralogical Investigations

Three samples were sent to Charter Mathison, School of Earth and Geographical Sciences (UWA) for petrographic description (Appendix 2). The petrographic descriptions confirmed the nature of the outcrop as a high temperature(?) metamorphosed ultramafic intrusive as reported by previous workers. One sample, HH1 was found to contain possible chromite or chromium spinel and the polished thin section was sent for electron-beam microanalysis. The results of the microanalysis are contained in Appendix 3.

The microanalysis was undertaken to determine if the elemental ratios are similar to those from known nickel-copper deposits. Preliminary indications are that the ratios obtained are similar to those from known deposits although more work in this area is required.

Exploration Potential

The reconnaissance visit to Hammer Hill has indicated that while there are mafic/ultramafic rocks present their distribution is fairly limited and their "economic metal" content fairly low. Examination of the available airborne magnetic data shows that Hammer Hill sits on a north-west trending, low amplitude magnetic ridge approximately 5 km long. To the east and west of Hammer Hill are several magnetic features with a similar orientation and amplitude. The magnetic pattern suggests that Hammer Hill is small mafic/ultramafic plug intruding one of several more mafic (magnetic) gneissic units that are present in the area.

To explore for nickel and related mineralisation in the area around Hammer Hill it is necessary to have in mind geological and exploration models along one of the following lines - a laterite accumulation, a massive ultramafic plug or a large layered ultramafic intrusion.

There is little scope for the presence of a large laterite deposit given that deposits of this type are typically flat lying, cover a large area and they form at one weathering/erosion/accumulation level. That there is little laterite present at Hammer Hill and that it emerges from the plain by about 10m indicates that if a laterite accumulation had developed it has been eroded away.

The airborne magnetic signature of the area is not convincing as representing a buried layered ultramafic intrusive of the type that hosts nickel deposits. The work completed in the region by previous explorers has indicated the ultramafic intrusions are plug-like and fairly small. Drummond has suggested that the Hammer Hill area has the possibility of being a kimberlitic or lamproitic intrusion which in its self is a comment on the expected size of the intrusive.

To advance the exploration of the Hammer Hill area a small but detailed ground magnetic appears to be a cost effective way. The answer to the question, what size and shape is the intrusive, will determine whether the area has a future as a potential diamond or nickel play. A ground magnetic survey will also allow some conclusions regarding the shape of the intrusion to be made which will assist in planning future work, particularly if geophysical (EM) exploration methods are proposed to try to locate pods of primary Ni-sulphide mineralisation.

Holstein's Prospect – REE, Ba, U

Reconnaissance Mapping of Prospects

Figure 3 shows the distribution of the veins located during the brief visit to Holstein's. A hand held scintillometer measuring total count gamma emissions was used to trace the vein sets from outcrop to under thin cover. A GPS unit was used to provide location control.

Geological Observations

The Holstein's prospect is a series of fairly narrow (<2m) pegmatite and barite-rich veins that intrude grey-brown schists, gneisses and calc-silicates that lie at the eastern edge of the Huckitta Dome. The vein material is typically earthy (brown-red) coloured, massive and fine-grained, cellular and coarse-grained. The more coarsely crystalline veins contain barite crystals to 5cm and the pegmatites contain feldspar crystals to 2 cm.

The veins exposed in the hill are hosted by a brownish-green calc-silicate and grey quartz-feldspar-biotite gneiss. The host rocks on the flat country are not exposed, however, gneiss, biotite schist and quartz float are all common. The spectrometer was easily able to discriminate between mineralised and unmineralised rock.

The vein sets tend to strike in two directions, those being northwest and northeast. More detailed mapping over a larger area will be required to determine the total number of exposed lodes and to determine their orientation.

Geochemical Investigations

Seven grab samples were collected from the various lodes identified and sent to NT Environmental Laboratories Pty Ltd for geochemical analysis

The assay results for the samples collected at Holstein's are included in Appendix 5. The sample locations are shown on Figure 3 - the sample numbers relate to the lode identifiers as:

135001 Lode B
135002 Lode C
135003 Lode D
135004 Lode E
135005 Lode F
135006 Lode F
135007 Lode D

Analyses were determined by ICP-MS after both MA3 ($HCl/HNO_3/HClO_4$) and MA4 (MA3+HF) digestion.

Examination of the assay results shows that all of the samples contain elevated levels of the REE's cerium and lanthanum, along with elevated levels of barium, phosphorus, yttrium and thorium. The subdued calcium levels relative to phosphorus suggest monazite hosts the REE's and thorium. The differences between the MA3 and MA4 results demonstrate that a significant proportion of the REE's and Th are derived from "acid insoluble" (*ie.* MA3 soluble) minerals.

Petrological Investigations

From the Holstein's rare earth element prospect eleven samples were sent to Pontifex and Associates for mineralogical examination and electron microprobe analysis (Appendix 4).

The optical mineralogy has identified the major minerals present in the samples as quartz, barite and iron as either limonite or haematite. The main accessory minerals are apatite, monazite and xenotime with minor biotite and kaolinite. Pontifex's descriptions are consistent with the field observations (red-brown barite-pegmatite) and supported by the geochemical assay results.

The electron microprobe analysis was undertaken to gain a better understanding of the composition of the minerals present and some clues to their possible genesis. The results of the analysis indicate that the rocks are dominated by cryptocrystalline silica derived from supergene or low temperature hydrothermal processes along with clays and limonite. The primary minerals identified are monazite, apatite and some haematite. The origin of the barite and some of the quartz is unclear however, Pontifex suggest the primary rock was a phosphatic pegmatite with a high Ba content in the feldspar. Subsequent hydrothermal alteration and weathering has seen the feldspar altered to barite and quartz.

The microprobe analysis of the apatite crystals has demonstrated that they are low in strontium which indicates that they are not related to carbonatite. Pontifex quotes a strontium content of over 1% is more common for apatite associated with carbonatite.

In the Pontifex report the sample number identifies the lode from which the sample came. For example, sample H/B means Holstein's lode B as shown on Figure 3.

Exploration Potential.

The short field visit to the prospect has shown that the mineralisation is associated with several fairly narrow veins or dykes. As such it is difficult to see a substantial mineral resource being identified from the area already examined. The microprobe analysis has suggested the apatite has a pegmatite and not a carbonatite origin which also restricts the potential size of the mineralised bodies.

However, given the ease with which the narrow veins were mapped out using the spectrometer and direct observation a survey over a much larger area may identify targets worthy of additional work. The airborne radiometric data and mapped geology (Brady Gneiss) along the eastern edge of the Huckitta Dome could be used to constrain the survey.

West Gimlet Magnetic Anomalies

The west Gimlet magnetic anomalies are a group of four intense magnetic lows that form a group approximately 8km south-west of Hammer Hill and 7km south-east of Holstein's. The anomalies are either round, as if caused by a pipe-like body, or elongate east-west. The magnetic fabric in the area runs north-west and appears to be a normal response caused by variable lithologies.

Geological Observations

The West Gimlet anomalies lie in a very broad (~5km) shallow depression that is completely surrounded by low hills composed of coarse pegmatite and coarsely crystalline quartz-feldspar± sillimanite-muscovite gneiss. The depression is flat-floored and covered with orange aeolian sand and lag quartz and feldspar. The only topography in the depression is the occasional shallow erosion gully and even rarer rocky outcrop.

Examination of the area about each of the magnetic anomalies showed them to be associated with very coarsely crystalline pegmatite veins/dykes intruding into felsic to mafic(?) gneisses. The pegmatites are composed of quartz, feldspar crystals to over 30cm in size and muscovite and rarely biotite. In one area the mica content and size was of interest to early miners. The gneisses ranged from white, quartz-feldspar with minor muscovite through to dark grey quartz-feldspar-biotite-pyroxene/hornblende-garnet. In places the fabric of both the pegmatite and gneiss has been destroyed and replaced with a strongly developed shear fabric. In these places sillimanite(?) and garnet appear to be more common.

Exploration Potential

The field visit to the West Gimlet magnetic anomalies has revealed them to be associated with pegmatite intruding variably felsic to mafic gneisses. A spectrometer carried during the field traverse indicated there is a radiometric signature associated with the dykes but this is fairly weak and not considered significant. Thus, the West Gimlet magnetic anomalies are very distinctive on the airborne magnetic data image however, there is little scope of them hosting any significant mineralisation.

It is interesting to note Pontifex's comments regarding the origin of the Holstein's mineralisation as associated with a Ba-rich feldspar pegmatite. It is possible that the West Gimlet pegmatites represent the unaltered equivalent of those at Holstein's which intruded calc-silicate rocks containing primary REE minerals and have been altered to their present mineralogy.

Recent Developments

The NTGS has recently released the assay results for some grab samples of quartz vein material collected to the north of Arafura's tenements (Wygralak and Mernagh, 2005). The samples were taken from Bruce's Prospect which lies approximately 10 km north of EL10136. The interesting results are 0.07, 53, 1.9 and .0027 ppm gold. However the announcement does not say if these are all the samples collected.

Bruce's Prospect occurs in the Irindina Gneiss which is part of the Harts Range Group in the Irindina Province. Drummond (2001) reported that CRAE achieved some pre-BLEG stream sediment results of up to 25ppb in an area covering the north eastern part of EL 10136. The exact location of these anomalous responses is not recorded by Drummond though he does report that the White Range gold mine gives a response of 10.3 ppb Au at 1.5 km and 1.18 ppb at 4 km down stream.

EXPENDITURE STATEMENT, YEAR 3

Table 1: Expenditure Statement Year 3 – ELs 9725, 10136

ACTIVITY*	**$**
Period 1/12/03-31/03/04	
Exploration – Geological Consultant	1196.62
Exploration – Geophysical Interpretation of NTGS Data	1215.00
Exploration – Geological Reconnaissance	2232.07
Exploration – Tenement Management	1849.90
Exploration – Tenement Expenses	7280.00
Period 1/04/04-30/11/04	
Exploration – Geological Consultant	1270.08
Exploration – Geochemistry	374.80
Exploration – Petrology	2502.90
Sub-Total	**17921.37**
ADMINISTRATION COSTS (15%)	2688.21
TOTAL	**20609.58**

* Computerised accounting introduced 1 April, 2004

Of this total **$5,152.39 is attributable to EL 10136**, and **$15,457.18 is attributable to EL 9725.**

The Expenditure Covenant for Year 3 for EL 9725 of $55,000 was not satisfied.

The Expenditure Covenant for Year 3 for EL 10136 of $35,000 was not satisfied.

PROPOSED EXPLORATION AND EXPENDITURE, YEAR 4

Table 2 : Proposed Exploration Programmes and Expenditure, Year 4, EL 9725

ACTIVITY	**$**
Geological Services	10,000
Ground EM Survey – Hammer Hill Ni Prospect	12,000
Geophysical Interpretation of EM Data	3,000
RAB Drilling EM Targets	12,000
Field Services	5,000
Analytical Services	3,000
Tenement Maintenance and Preliminary Native Title Meeting	5,000
Reporting	3,000
Sub-Total	**53,000**
ADMINISTRATION COSTS (approx 15%)	7,000
TOTAL (Year 4)	**60,000**

Table 3 : Proposed Exploration Programmes and Expenditure, Year 4, EL 10136

ACTIVITY	**$**
Geological Reconnaissance	7,000
Systematic Reconnaissance Soil Sampling (0.5x0.5 km spacing)	15,000
Analytical Services	5,000
Tenement Maintenance and Preliminary Native Title Meeting	5,000
Reporting	3,000
Sub-Total	**35,000**
ADMINISTRATION COSTS (approx 15%)	5,000
TOTAL (Year 4)	**40,000**

The proposed expenditure covenant for Year 4 for **EL 9725 is $60,000**.

The proposed expenditure covenant for Year 4 for **EL 10136 is $40,000**.

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APPENDIX 1

Assay Results Hammer Hill Prospect

APPENDIX 2

Petrology Report – Charter Mathison

DESCRIPTIONS OF POLISHED THIN SECTIONS ARAFURA RESOURCES

Note: information is presented under the following headings:-
Sample no, composition, fabric (texture/microstructure), rock name, origin

HH 1

60% limonite, ?clay, ?chalcedony etc
20% quartz (mainly in vein)
15% talc?
3% chlorite
2% magnetite, hematite etc
tr chromite or Cr spinel

relict mesh texture or box work pattern of fractured and serpentinised olivine preserved in limonitic material, with aligned patches or lenses of talc, cut at a high angle by a 7mm wide low temperature quartz vein showing crystals with growth zoning growing normal to the vein walls
relict, rounded cores of relict chromite or Cr spinel probably occur in about four or five magnetite grains (submitted for electron beam analysis)

silicified serpentinised metaperidotite

olivine-rich ultramafic intrusion (perhaps part of a layered intrusion) that has been altered and metamorphosed (serpentinised), and subsequently deeply weathered and silicified)

HH 6

90% chalcedony + quartz
10% ?talc, yellow phyllosilicate, ?vermiculite, limonite etc

mostly very fine grained cherty quartz and chalcedony (less than 0.01mm grainsize) containing some relict phyllosilicates and related textures, multiply and irregularly veined by more crystalline quartz; relatively homogeneous compositionally but variable texturally

silicified weathered ?ultramafic rock

originally an ultramafic rock – probably olivine-rich and similar to HH 1, and subsequently deeply weathered and strongly leached and metasomatised with silica
at low temperature

HH 7

90% hornblende (mostly pale brownish)
7% plagioclase
3% rutile

relatively homogeneous at cm scale, massive/structureless – no preferred orientation, coarse grained 1-5mm ragged granoblastic hornblende, localized 3-8mm patches of fine granular hornblende and plagioclase

hornblendite or hornblende-rich amphibolite

parent rock uncertain – possibly an ultramafic rock (?pyroxenite), perhaps in a layered ultramafic +/- mafic layered intrusion that has been regionally metamorphosed (possibly at relatively high pressure)

SUMMARY

The 19 samples in this batch fall roughly into the following broad categories, listed in approximate possible order of relative geological ages:

4 ultramafic intrusives HH1 HH6 (highly weathered metaperidotites) HH7?

Assuming these rocks come from a similar regional area and are broadly related (may not apply as two batches of samples), the following tentative ideas can be suggested about their possible relationships.

The oldest rocks probably represent older metamorphic basement composed of felsic gneisses (possibly originally granodioritic intrusions into unknown country rocks) and mafic granulites (precursors uncertain), the latter probably including JS1. CHD2 may represent part of an anorthositic intrusion, older than the metagabbroids. All these rocks experienced high grade regional metamorphism (amphibolite to granulite facies). The relationship of the lower grade calcsilicate rocks JS1 and JN2 is uncertain – they may not belong to this older metamorphic group.

The metagabbroids may be younger than the high grade metamorphic rocks discussed above, and may intrude them and be associated with the ultramafic rocks in a composite ?layered ultramafic/mafic intrusion. Dolerite dykes may have intruded some or all of the previous rocks, followed by a low to medium grade ?regional metamorphism and alteration affecting most of the rocks in groups 4,5, and 6, and perhaps also some of the older rocks.

Obviously, this is only one possible interpretation, and takes no account of actual field relationships.

Charter Mathison
29 June 2004

APPENDIX 3

Microanalysis Results, Sample HH1
Dr Greg Pooley
Nea Kameni Pty Ltd
ACN 009 282 875

Sample	**HH1**	**HH1**	**HH1**	**HH1**	**HH1**	**HH1**	**HH1**	**HH1**
Description	1	1r	2	3	4	5	6	6r
Mineral	SP	SP	SP	SP	SP	SP	SP	SP
Ox no	4	4	4	4	4	4	4	4
TiO2	0	0.99	0.29	0.71	0	0	0	0.9
Al2O3	19.81	1.15	10.2	2.34	22.45	17.95	16.16	3.69
Cr2O3	49.97	47.42	47.49	47	46.08	50.68	47.48	43.94
Fe2O3	0	0	0	0	0	0	0	0
V2O3	0.15	0.26	0.26	0.22	0.18	0.19	0.34	0.31
FeO	21.33	46	35.96	44.56	22.93	23.85	29.43	46.34
MnO	0	0.66	0.35	0.31	0	0.54	0.36	0.48
MgO	7.13	1.65	3.07	1.83	6.57	5.41	4.59	1.72
ZnO	1.28	0.56	0.76	0.67	1.18	0.87	1.39	0.77
NiO	0	0	0	0	0	0	0	0.42
CoO	0	0	0	0	0.3	0	0	0
Oxide total	99.67	98.69	98.38	97.64	99.69	99.49	99.75	98.57
Fe2O3*	0	18.5	9.02	17.39	0	0	3.86	19.14
FeO*	21.33	29.35	27.84	28.91	22.93	23.85	25.96	29.12
Total*	99.67	100.54	99.28	99.38	99.69	99.49	100.14	100.49
Ti	0	0.027	0.008	0.02	0	0	0	0.025
Al	0.754	0.05	0.422	0.102	0.849	0.699	0.638	0.158
Cr	1.276	1.377	1.317	1.37	1.169	1.323	1.256	1.261
Fe3+	0	0.511	0.238	0.483	0	0	0.097	0.523
V	0.004	0.008	0.007	0.007	0.005	0.005	0.009	0.009
Fe2+	0.576	0.901	0.817	0.891	0.615	0.658	0.727	0.884
Mn	0	0.021	0.01	0.01	0	0.015	0.01	0.015
Mg	0.343	0.09	0.161	0.101	0.314	0.266	0.229	0.093
Zn	0.031	0.015	0.02	0.018	0.028	0.021	0.034	0.021
Ni	0	0	0	0	0	0	0	0.012
Co	0	0	0	0	0.008	0	0	0
Cation total	2.983	3	3	3	2.988	2.987	3	3
Mg No	37.33	9.11	16.42	10.14	33.8	28.79	23.96	9.52
Ulvospinel	0	2.73	0.77	1.97	0	0	0	2.46
Spinel	37.08	2.49	21.1	5.08	41.98	34.48	31.88	7.9
Chromite	62.73	68.83	65.87	68.49	57.79	65.28	62.81	63.05
Magnetite	0.19	25.95	12.27	24.45	0.23	0.25	5.31	26.6
100Cr/(Cr+Al)	62.8	96.5	75.7	93.1	57.9	65.4	66.3	88.9
100Fe/(Fe+Mg)	62.7	90.9	83.6	89.9	66.2	71.2	76	90.5

APPENDIX 4

Petrology Report, Holstein's Prospect

APPENDIX 5

Assay Results, Holstein's Samples