Report ARU-06/007

ANNUAL REPORT FOR YEAR ENDING 21/07/06, AC 74 KURINELLI, NORTHERN TERRITORY, AUSTRALIA

by

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BSc(Hons)

1:100,000 – Hatches 5956
1:250,000 - Frew SF 53-3

AUGUST 2006
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INTRODUCTION

BACKGROUND
(Modified after McGilvray 2006, Partially from Drummond, 2001-2003)

The Kurinelli goldfield is situated in the northeast Davenport Province in the central part of Northern Territory, 140 kilometres southeast of Tennant Creek (Figures 1-3). Gold mineralisation was discovered in the area over 100 years ago in 1898 by prospector/explorer Davidson (Davidson, 1905) but the region has been subjected to only limited, spasmodic attention since that time. Current activity by local prospectors in the area is directed towards recovery of gold nuggets from shallow alluvial and colluvial deposits using metal detectors. Several hundred to several thousand ounces of gold are estimated to have been recovered in this way over the past 10-20 years.

Historical activity centred on gold mineralisation within quartz veins which characteristically occur within interbedded sandstone/siltstone (Rooneys Formation) and conformable gabbro/dolerite. The two main mines were the Kurinelli Mine (former MCC59) and the Dempsey’s Choice Mine (MCC191). Historical production was about 400 ounces of gold.

The central part of the field covers an area of 8 x 20 kilometres. More scattered mineralisation is recorded in similar host rocks over an area in excess of 20x30 kilometres. The units which host the mineralisation also occur elsewhere in the Davenport Province.

Despite the presence of outcropping gold mineralisation, the Kurinelli goldfield has never been subjected to systematic exploration using modern geophysical and geochemical exploration methods developed in the past 10-15 years. Of particular importance is the fact that the area received little attention in the BLEG ‘gold rush’ of the 1980’s though it may have been covered in Australia-wide open range exploration of this type by one multi-national group.

This lack of activity over the past two decades can be attributed to a combination of factors which included:

- the subdued nature of the topography, the arid climate and a widespread thin cover of aeolian sand;
- fragmented exploration title over the area prior to 1994;
- a Reserve From Exploration (RE) over the entire field between 1994 and 1996 where title could only be held as mineral claims and mining leases (which resulted in even more fragmentation of ownership);
- a Reserve from Occupation (RO) between 1996-2004, where no form of mining or exploration tenure could be applied for or granted; and
- uncertainty in mining and exploration tenure in the Northern Territory especially between 1996-2002 because of the ramifications of the Native Title Act.

Although many companies have held tenure in the Davenport Province in the past, most work has been superficial, and drilling is notable for its almost total absence away from the old mining centre at Hatches Creek, which is about 20-30 kilometres south of the Kurinelli field.

Current interest in the area stems from the discovery in mid-late 1996 of highly elevated levels of nickel, platinum, palladium and gold in magnetic ironstone boulders which had been recovered by local gold miners. The boulders, which were up to 200 millimetres in diameter, were located by the use of metal detectors being employed by the local miners to find nugget gold in surficial deposits.

After an initial burst of excitement when a multitude of mineral claims were pegged by the local operators and smaller exploration companies, a suggestion arose that the ironstone boulders, rather than being nickeliferous gossan as had first been thought, were fragments of an iron meteorite. This idea gained some support from semi-formal reports mainly from academics at tertiary institutions and curators at museums.
However, as acid-etching of specimens of Kurinelli ironstones revealed breccia and vein textures which seemed totally inconsistent with an extra-terrestrial origin for the ironstones, McCleary Investments Pty Ltd (MIPL, a predecessor of Arafura Resources NL) commissioned additional scientific studies to resolve the question of the origin of the boulders.

Investigations undertaken by MIPL were documented by Goulevitch (1997) and comprised:

- acid-etching of ironstones;
- conventional and ICP-MS/OES analyses of several ironstones;
- petrographic studies of polished sections from four ironstone boulders by reputable consultants;
- laser-ablation ICP-MS analyses on the polished sections;
- petrological review and description of doleritic and gabbroic rocks from the Kurinelli area;
- reconnaissance soil and lag sampling in the vicinity of the discovery, in particular within areas which had been pegged by MIPL and its associates;
- review of the regional geology and of aeromagnetic data from the region; and
- a search for relevant data in the open file company reports from previous exploration in the area.

Most of the investigations on the ironstones proved inclusive but finally, in 1999, acid etching of ironstones provided by local occupant, Mr Colin Wessels, revealed unmistakeable triangular (octahedral) widmanstatten texture which is a diagnostic indicator of massive iron of meteoritic origin.

Despite this set back, the Kurinelli ironstones drew attention to the under-explored gold potential in the area and this became the main focus of attention of Arafura Resources as early as 1997. At that time, the NT Government, having already imposed an RO over the area in response to the intensive pegging activity in late 1996, called for expressions of interest from parties interested in undertaking more systematic and professional exploration over the central Kurinelli area and its immediate surrounds. Arafura’s application was successful but it would be another 7 years before Native Title and other tenure issues were resolved and Authority C74 granted in mid-2004. Arafura immediately embarked on a programme of regional geochemical soil sampling.

Initial results from the programme confirmed gold potential in the area and follow-up sampling was required to confirm the nature of gold anomalism. The results from the first year of exploration activities were reported by Goulevitch (2005). The results of follow-up more detailed systematic soil sampling programmes are the subject of this report. In addition to this an RC drill testing programme of the anomalous zone occurred in May-June 2006. Final laboratory assays and repeat sampling to confirm the results were still in progress at the end of the licence period. Hence the detailed geochemical results of the 2006 RC drilling programme will be reported in the following annual report.

**LOCATION AND ACCESS**

Kurinelli is located in the northeast Davenport Ranges, about 140 kilometres southeast of Tennant Creek in the Northern Territory (Figure 2).

Access to the Kurinelli area is via the unsealed Davenport Loop Road (DLR) which leaves the Stuart Highway 87 kilometres south of Tennant Creek and 27 kilometres north of the Wauchope Roadhouse. The Davenport Loop Road returns to the Stuart Highway 36 kilometres south of the Wauchope Roadhouse.

The northern access passes through Kurundi and Epenarra Stations situated 52 and 121 kilometres respectively from the Stuart Highway. Access tracks to Kurinelli lead from the DLR at a point 45 kilometres east of Kurundi (23 kilometres to Kurinelli Bore) and at Rooney Yard, 15 kilometres south of Epenarra (20 kilometres to Kurinelli Bore). The southern access passes through Ali Curung and Murray Downs Station reaching the abandoned mining town of Hatches Creek 129 kilometres from the Stuart Highway. Rooney Yard is another 49 kilometres north from Hatches Creek.
Bush tracks and graded fence lines provide access across AC 74 and cross-country 4WD vehicle passage is possible to many areas.

The Kurinelli area is generally inaccessible between January to April each year as seasonal rainfall, scattered though it may be, regularly makes different sections of the DLR and local access tracks impassable.
TOPOGRAPHY AND DRAINAGE

The Kurinelli project area is located near the northeast margin Davenport Range in central Australia. Topography within AC 74 is largely subdued with most of the area at an elevation of 335-400 metres AHD (Figure 2).

The southern part of AC 74 borders the foothills that form the main spine of the Davenport Range and the proposed Davenport National Park. The land surface gradually slopes away from the Davenport Range, from about 380-420 metres AHD in the south to about 335 metres AHD adjacent to the Frew River which drains along the eastern side of the title. The Frew River drains to the north and is sourced in the Davenport Range south of the title. Lennee Creek, a major tributary of the Frew River, also drains the range country to the southwest and passes through the southern part of the title. The western and northwestern portion of the title is drained by Blackfellow Creek and then Whistleduck Creek which drains north across the title.

North trending lines of low hills, which parallel erosionally different basement rock units, occur in the west of AC 74 with peak heights to about 415 metres AHD NW of Kurinelli Bore (“Outstation”). Less extensive NNE trending ridges of similar height occur in the centre of the title to the SE of Kurinelli Bore and more isolated knolls of lesser height (peak 378 metres AHD) occur in the north and east of the tenement.

Numerous permanent and semi-permanent waterholes occur in the Frew River, Lennee Creek, Blackfellow Creek and Whistleduck Creek but the watercourses only flow for short periods after heavy summer rain.

CLIMATE AND VEGETATION

The Kurinelli area is relatively arid with an average annual rainfall of about 300 millimetres. Most of this falls in the period between December and March when the remnants of monsoonal tropical lows and cyclones can pass across the area and deposit several hundred millimetres of rain in a few days. Otherwise the area relies on intermittent summer storm rain. Peak average monthly rainfall is in February.

Maximum temperatures peak at over 40ºC in summer and minima below 10ºC are common in winter. Occasional frosts can occur.

“Spinifex with low trees and shrubs is the most abundant vegetation. Small patches of turpentine bush on rocky ridges and mulga and gidgea in depressions are common locally. Eucalypts line some of the larger watercourses, especially near waterholes. A variety of grasses grow on plains and valley floors”. (Blake et al., 1986)
SUMMARY

Four systematic -2 millimetres infill geochemical soil sampling programmes (Phases 2A, 2B, 2C and 2D), totalling 2723 samples from 2592 sites, were completed over parts of AC 74 in 2005-2006.

Programme Phase 2A consisted of 1658 samples collected from 1578 sites spaced 50 metres apart on lines spaced 250 metres apart; and an additional 28 samples spaced 500 metres apart on lines spaced 500 metres apart to complete Phase 1. Programme Phase 2B consisted of 618 samples collected from 587 sites and programme Phase 2C consisted of 235 samples collected from 223 sites. Sample sites in Phases 2B and 2C were spaced 25 metres apart on lines spaced 50 metres apart. Programme Phase 2D consisted of 212 samples collected from 202 sites across Colin Wessel’s leases, near the centre of the anomalous gold zone, spaced 50 metres apart on lines spaced 100 metres apart.

Numerous elevated gold values were obtained in Phases 2A-2D. Of the 2592 sites sampled:

- 2242 sites (86.5%) returned a value of 2 ppb Au or more;
- 1477 sites (57.0%) returned a value of 5 ppb or more;
- 785 sites (30.3%) returned a value of 10 ppb Au or more;
- 29 sites (1.1%) returned a value of 200 ppb Au or more;
- the highest value was 5020 ppb Au;
- the second highest value was 4020 ppb Au; and
- 221 samples returned values less than the detection level of 1 ppb, all of which were collected in Phase 2A.

Including Phase 1, the 2005-2006 Phase 2 soil sampling programmes bring the total number of sites sampled for low-level Au-in-soils in AC 74 to 3298, of which, 788 sites have returned an average value of 10 ppb or more gold. Sites of 10 ppb Au or more are considered ‘definitely anomalous’ according to the classification in Goulevitch (2005) and define an anomalous Au zone that is about 6 x 2.5 kilometres in size.

An area of approximately 25 square kilometres was covered in Phases 2A-2D. Areas of significant gold anomalism were defined from the results of Phases 2B and 2C and were targeted for further investigation and drill testing. The results from Phase 2D are consistent with other results at Kurinelli and although no extremely high values were encountered the results are comparable to the results in Phase 2B and 2C sampling areas. In contrast to the more closely-spaced surveys in Phases 2B, 2C and 2D, parts of Phase 1 and Phase 2A contain regions with no apparent Au-in-soils anomalism.

No samples were collected from within exclusion zones around Aboriginal sacred sites advised by the Central Land Council. No samples were collected from within granted mineral claims, and priority applications for mineral claims, held by unrelated parties without their permission.

A total of 57 slimline reverse-circulation percussion drill holes were targeted to test the extent of the Au anomalism identified by soil sampling programmes. The holes were completed just before the end of this reporting term however the geochemistry results and laboratory checks were still in progress. As a result all of the RC drilling data will be reported in its entirety in the next annual report.
CONCLUSIONS

RECOMMENDATIONS
TENURE

MINING/MINERAL RIGHTS

Authorisation C74 of 226 blocks (677 square kilometres), which encompasses Reserve from Occupation 24323, was granted to Arafura Resources NL in accordance with Section 178(2) of the Mining Act on 22 July, 2004, for a period of six years. Conditions specified in the grant document are essentially the same as those which apply to Exploration Licences with the exception that any subsequent mineral claims or authorisations granted to other parties will be restricted to a maximum depth of 5 metres to ensure that bona fide prospectors and local miners are not unduly prevented from carrying on activities directed at the recovery of gold nuggets. Such mineral claims or authorisations shall not exceed the size of an existing mineral claim or authorisation surrendered prior to the grant of a new claim or authorisation.

At the date of grant the area of AC 74 was effectively reduced by the area of 9 granted mineral claims held by third parties and 16 applications for mineral claims by third parties, all of which titles pre-dated Arafura’s expression of interest in the area. Should any of these be surrendered or cancelled their ground will become available to the holder of AC 74. The combined area of these titles and applications is less than 600 hectares.

Four granted mineral claims, (MCC 950-953; 68 hectares), and two options to purchase from B. Rayner, (MCC 22798-22799; 31 hectares), are also held by Arafura within the area of AC 74.

AC 74 was reduced to 113 blocks for the third year of grant.

LAND TENURE

Background land tenure under AC 74 is part of:

- Kurundi Station, Perpetual Pastoral Lease 1109 - NT portion 716, owned by Brenda Marie SAINT of Kurundi Station, PO Box 508, TENNANT CREEK 0861 (Ph: 89641516 Fax: 89641964)

The boundary between Kurundi Station and Epenarra Station (PPL 1206; Fax 89641552) is located within a few hundred metres of the northern boundary of AC 74.

The southern and southwestern boundaries of AC 74 follow the boundary between Kurundi Station and the proposed Davenport National Park (Crown Lease Perpetual 1117) (Figure 2).

NATIVE TITLE

A registered native title claim is in place over Kurundi Station:

- D6017/01 - DC01/017 Kurundi, C/- Central Land Council

Arafura Resources has negotiated and executed an Exploration Agreement with the Central Land Council (on behalf of registered Native Title Claimant Groups). AC 74, adjacent EL 9701 and MCCs 950-953 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.
In accordance with Condition 6 of the Second Schedule attached to the grant documents of AC 74, the registered native title claimants were invited to a meeting held in Hatches Creek on 18 August, 2004, to explain the exploration programme which is the subject of this report. 20-25 indigenous persons and several CLC representatives attended the meeting. This also constituted the “introductory meeting” required by the Exploration Agreement (see below).

Should mining eventuate within the area of AC 74, a mining compensation agreement will have to be negotiated both with the holder of the pastoral lease in accordance with the Mining Act, and also with the registered Native Title Claimants in accordance with the Right To Negotiate provisions of the Native Title Act. A mining tenement can only be granted where an appropriate Native Title agreement is emplaced. The terms of the Exploration Agreement provide for continuation of exploration on the area of the proposed mining tenement while the mining agreement is being negotiated with the registered Native Title Claimants.

ABORIGINAL SACRED SITE CLEARANCES

Prior to the commencement of soil sampling activities in 2004 an Aboriginal Sacred Sites survey was conducted over the area of intended activity by members of the relevant Native Title Group. The survey was coordinated by Anthropologist, Mr Phil Lancono, and Mining Officer, Ms Julie-Ann Stoll, of the Central Land Council. The CLC subsequently advised Arafura of the location of exclusion zones around identified sacred sites and these areas were avoided during the sampling programmes other than where they overlapped with existing roads and tracks. The exclusion zones also encompassed all sites listed on the Sacred Sites Register of the Aboriginal Areas Protection Authority (AAPA).

The sacred sites clearance issued by the CLC is effective for “Phases 1-3” of exploration at Kurinelli as defined in correspondence from Arafura to the CLC dated 22 June, 2004. Phase 1 (soil sampling) was completed in 2004. Phase 2 was completed in two stages in April-May and October-November, 2005. Phase 3 is RAB or RC drilling of identified targets. Prior to the commencement of Phase 3 detailed location plans and work programmes have to be submitted to the CLC in accordance with the provisions of the Exploration Agreement.

In accordance with the provisions of Arafura’s Exploration Agreement, the CLC and the relevant Native Title Group were invited to a meeting in March 2006 to explain and detail the proposed drilling programme planned as part of Phase 3 exploration activities in the Kurinelli project area. The proposed drill sites and the surrounding area were subjected to a further assessment by the CLC and Native Title claimants for the purpose of Sacred Site avoidance, the result of which were reported to Arafura in April 2006, prior to commencing earthworks for the 2006 RC drilling programme.
GEOLOGICAL SETTING

REGIONAL GEOLOGY

Prospective basement rocks in the Kurinelli Project Area belong to the Palaeoproterozoic Ooradidgee Group within the Davenport Province of the Tennant Creek Region in central Northern Territory. The geology of the Davenport Province was first described in detail by Blake et. al. (1987) but their description and maps have been modified since that time, most recently by Donnellan (2004) and Donnellan and Johnstone (2002, 2004) after close-spaced low level airborne geophysical surveys were completed over the region. The following summary is written mainly with reference with the 1:500 000 scale Tennant Creek Region maps of Donnellan (2002) and Donnellan and Johnstone, (2004) and to a lesser extent with the 1:250 000 scale Davenport Province map of Blake et al. (1988).

“The Tennant Creek Region is a composite term used for the pre Barramundi basement (Warramunga Province) and the unconformably overlying Palaeo- to Mesoproterozoic North Australian Platform Cover successions of the Davenport and Ashburton provinces to the south and north respectively. To the east and west the Palaeozoic Georgina and Wiso basins overlie the Tennant Creek Region.” (NTGS website, February, 2005)

In the central Tennant Creek Region, volcaniclastic/volcanic rocks and flysch sediments of the Warramunga Province were intruded by granites and deformed by the Tennant Orogeny at ~1850 Ma. These units and intrusives are unconformably overlain by relatively undeformed and predominantly sedimentary successions of the Ashburton Province to the north and mildly deformed and metamorphosed sedimentary and volcanic successions of the Davenport Province to the south. (after NTGS website, February, 2005)

The basal unit in the Davenport Province, the Ooradidgee Group, crops out predominantly in a discrete inlier (here termed the “Kurinelli Block”) some 85 x 50 kilometres in extent centered on the Kurinelli area. The Kurinelli Block, which is evident as a discrete magnetic/gravity domain in geophysical images (Donnellan, 2004; Donnellan and Johnstone, 2004), is bounded to the south by the overlying sequences of the Hatches Creek Group and to the north and east by Cambrian, Cainozoic and Recent sediments. An intrusive plug of “Devil’s Suite” granite (1710 Ma, Donnellan and Johnstone, 2002; here termed the “Hanlon Creek Granite”), some 10-15 x 25 kilometres in extent (obscured for the most part by a veneer of the younger sediment listed above), largely defines the eastern limit of the lower Oorididgee Group units in the Kurinelli Block but upper Oorididgee Group rocks have been mapped to the east of the granite. The presence of the Hanlon Creek Granite is clearly demonstrated on aeromagnetic images of the region by a domain of uniformly even magnetic character with coincident low Bougeur gravity response (Donnellan, 2004; Donnellan and Johnstone, 2004).

 lesser exposures of the Ooradidgee Group occur in major anticlinal domes near Kurundi and Wauchope in the Murchison and Davenport Ranges, 50-80 kilometres west of Kurinelli; at Hatches Creek, Skinner Pound and Murray Downs in the Davenport Range, 30-50 kilometres south of Kurinelli; and at Newlands Creek, 100 kilometres to the southeast of Kurinelli. However, it is only in the Kurinelli Block and at Newlands Creek that oldest sediments of the Ooradidgee Group, the Rooneys Formation, are exposed and, in the Kurinelli area, it is this unit, and dolerites which intrude this unit, that hosts the known gold mineralisation.

In the Kurinelli Block, the lowest exposed units of Ooradidgee Group are the Epenarra Volcanics and the Rooneys Formation. According to Blake et al. (1987), the Rooneys Formation is conformable on and interfingers with the Epenarra Volcanics but the relationship between these units is not clear on published maps of the area where they are shown to be separated by, and overlain by the Kurinelli Sandstone. Elsewhere in the Kurinelli Block the Epenarra Volcanics are separated from the Kurinelli Sandstone by the Edmirringer Volcanics, and the Kurinelli Sandstone is overlain by the Taragan Sandstone and the Treasure Volcanics. Map codes, thicknesses (Blake et al., 1987) and descriptions of rock components of these units are listed in Table 1.
The units of the Oorididgee Group are intruded by dolerite (Pdl) and dioritic to rhyolitic granophyre (Pgy). According to Blake et al. (1987) the mafic intrusions consist of fine grained dolerite ranging to coarse gabbro, they are generally altered, and they are not present any higher in the sequence that the lower part of the Wauchope Sub-Group (lower Hatches Creek Group) which unconformably overlies the Oorididgee Group. Outcrop and magnetic patterns suggest that some of the dolerites consist of folded stratiform sheets (Donnellan and Johnstone, 2002) and this is especially the case where the dolerite (?sills) intrude the Rooneyes Formation in the middle of the Kurinelli Block. It would seem from this that intrusion of dolerite sills in the Kurinelli Block preceded regional deformation and metamorphism of the Oorididgee Group and some may have been associated with “Treasure Suite” volcanism in late Oorididgee times (1820 Ma, Donnellan and Johnstone, 2002).

<table>
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<tr>
<th>OORIDIDGEE GROUP UNITS</th>
<th>THICKNESS (m)</th>
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<tr>
<td>Treasure Volcanics</td>
<td>0-&gt;1800</td>
<td>Pot</td>
<td>rhyolitic to dacitic lava and pyroclastics including ignimbrite, felsic intrusives, feldspathic/lithic arenite, quartz arenite, minor basaltic lava</td>
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<td>Taragan Sandstone</td>
<td>0-&gt;1000</td>
<td>Poa</td>
<td>felspathic/sublithic arenite, quartz arenite and conglomerate, minor siltstone, mudstone and altered felsic lava</td>
</tr>
<tr>
<td>Edmirringe Volcanics</td>
<td>0-2500</td>
<td>Pog</td>
<td>basaltic lava, minor volcaniclastic arenite and felsic lava</td>
</tr>
<tr>
<td>Kurinelli Sandstone</td>
<td>0-2600</td>
<td>Pok</td>
<td>subarkosic/lithic arenite, quartz arenite, siltstone and minor felsic and mafic lava and tuff</td>
</tr>
<tr>
<td>Epenarra Volcanics</td>
<td>0-&gt;3000</td>
<td>Por</td>
<td>felsic lava and pyroclastic rocks including ignimbrite and lapilli tuff, volcaniclastic arenite and conglomerate, minor mafic lava</td>
</tr>
<tr>
<td>Rooneyes Formation</td>
<td>0-&gt;1200</td>
<td>Pon</td>
<td>greywacke, siltstone, subarkosic/sublithic/lithic arenite, minor felsic porphyry; locally schistose</td>
</tr>
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**LOCAL GEOLOGY**

AC 74 largely occupies the central core of the Kurinelli Block. The published geology of AC 74 is illustrated in Figure 3. This shows that the Palaeoproterozoic basement rocks of the Kurinelli area are dominantly arenites and siltstones of the Rooneyes Formation with intrusive sills of dolerite and gabbro bordered to the northwest, west and southeast by Kurinelli Sandstone. To the south and northeast the basement rocks are obscured by surficial deposits of Cambrian, Cainozoic and Holocence ages.

Most economic interest in AC 74 derives from the area underlain by the Rooneyes Formation and associated intrusive dolerite sills which attain apparent thicknesses of up to 800-1000 metres. In discontinuous outcrops, the Rooneyes Formation and dolerites occupy an area that is some 20 kilometres long in a northeast-southwest direction tapering from 10 kilometres wide in the northeast to less than 2 kilometres in the southwest. On the basis of a distinctive aeromagnetic signature, this area is shown to be about 27 kilometres long and comprise an area of about 200 square kilometres. This area is referred to here as the “Kurinelli Zone” and it hosts all of the known gold mineralisation in the Kurinelli field.

The southeast limit of the Kurinelli Zone is defined by a major east-northeast trending fault structure along which discontinuous lenticular quartz ridges are developed. This has been mapped over a strike length of about 50 kilometres and, in aeromagnetic imagery, it coincides with a lineament which can be traced over a
distance of at least 75 kilometres and as much as 150 kilometres. Part of the structure where it traverses AC 74 is clearly evident in the magnetic image. Field observations suggest that the structure dips shallowly to the southeast and that the same structure forms the western boundary of the Kurinelli Zone where it dips shallowly to the west and northwest. One interpretation of the Kurinelli Zone is that it occurs as a domed klippe of older basement rocks bounded to the southeast, west and north by a single shallow outward dipping thrust fault. Alternatively the southeast and west boundaries can be interpreted to be arcuate splays from a semi-regional southwest-northeast trending fracture system.

Approximately 70% of the area in the Kurinelli Zone is obscured by Quaternary deposits (Figure 3). Some of these areas may be underlain by a thin veneer of flat lying Cambrian carbonate sediments of the Georgina Basin sequence, and probably also by Tertiary silcrete and ferricrete. Substantial calcrete development can be seen in the upper 3-5 metres of both dolerite and dolomitic/calcareous siltstone beds of the Rooneys Formation. Development is likely related to evaporation of groundwater during the Tertiary (Blake et al., 1986).

Gold mineralisation at Kurinelli is historically associated with quartz vein-swarms and reefs. Prospectors identified large nuggets near reefs that dwindled in size with distance away from the reef. Sampling of waste rock around old workings indicates gold is more intimately associated with alteration zones in dolerite and contact margins with Rooneys Formation sediments. Linear alteration trends, (020º and 120º), in dolerite are broadly similar to anomalism trends of gold in the area. The geological map used in Figure 3 is not accurate at a local scale and presents northwestern sample sites on dolerite which is incorrect. For accurate geological interpretation refer to McGilvray (2006). Hornfelsed sediments in the east are also anomalous in gold. Quartz reefs are coincident with minor gold anomalism.
PREVIOUS INVESTIGATIONS

PRIOR TO 1996

The following summary of exploration activity in the area prior to Arafura’s involvement was prepared by Drummond (2001-2003).

Kurinelli is an historical Au mining region, with the first activity undertaken in the 1890’s. In subsequent times a number of small shafts were sunk and a small stamp mill was operational in the 1950’s. The field has received scant attention by scientific exploration - possibly because its importance has only recently been emphasised by the significant Au production, from a large area, by prospectors using metal detectors. Discussion with them leads to the conclusion that about 150 kg have been recovered in the last few years.

Review of Historic Exploration

(a) Gold & Mineral Exploration N L (1972 - 74) EL633. CR75-123

This tenement was in the Kurinelli area. Work done was essentially of a prospecting nature, with bulldozer costeaning. In that time of low Au price and no effective geochemical or geophysical techniques available, their effort was unsuccessful. Evaluation of a small Cu show (locality uncertain) did not provide encouragement.


The original tenement covered some 1300 sq km, being the central part of the Davenport Ranges, including much of Arafura’s ELs 9710 and 9711. The first year's work consisted predominantly of prospecting and visiting known Au occurrences. Analogies to Telfer were drawn. In the second year reconnaissance surface sampling of various prospects and an introductory stream sampling programme was carried out - neither of which advanced matters much. By the third year, effort was being concentrated around Arafura's Kurinelli Project area in consequence of the returns from prospectors’ metal detecting. Mapping programmes, rock chip sampling and costeaning were initiated which emphasised that Au seemed to be preferentially associated with sediment and dolerite/gabbro contacts especially where brecciation is evident. There was additional work to the south of the field and out of the Kurinelli Zone around the Aztec and Great Davenport prospects.

Poorly ground-located rock chip sampling over basal Treasure Volcanics in the south west of EL9711 is viewed as most encouraging by Drummond. Twenty-metre composite rock chips returned values of 1.04 g/t and 0.41 g/t Au: an indication for potential for higher bulk Au deposits, rather than confinement to narrow quartz veins.


This small tenement (4 blocks) was centered around an Au show which is situated about 4 km south of the old Kurinelli battery. Sampling around it produced disappointing results, with only one of 10 samples returning better than 1.0 g/t. Trenching and bulk sampling were undertaken, but the latter was not processed. Interestingly, this is the first report which mentions carbonate cementation in the weathered zone and the observation of calcrete. Soil sampling was undertaken over a small prospect 7 km south of the battery with no real encouragement, but the sampling was over a small area, and utilised a technique possibly not sufficiently sensitive, in Drummond’s opinion.

This small tenement (12 blocks) occurred in the southern part of the Kurinelli zone. Most of the tenement has an alluvial cover and Wellington undertook no exploration designed to test the cover, or through it. It examined outcropping reef mineralisation elsewhere in the field and decided that the quartz reefs were narrow and lacked the structural setting and alteration associated with significant mineralisation.


The tenements occupied the northern 60% of Arafura’s AC74. The target was to discover new quartz veins in the poorly outcropping district by using ground magnetics and refraction seismic and mapping. Broadly spaced soil BLEG was undertaken and it indicated significant anomalism. Shields’ BLEG predominantly covered areas in the south-west corner of AC74, and to the north-east of it centred around 20°33’S, 135°08E: these areas did not return anomalous (i.e. >1.0 ppb Au BLEG) assays. However traverses which generally lie in the east of RE1345 were consistently anomalous. The more southerly traverse returned six consecutive anomalous values - averaging 5.5 ppb - over a traverse of almost 4 km. The traverse to the north-east returned six anomalous readings from eight sites over almost 6 km: the eight samples averaged 3.8 ppb. An outlying sample at 20°34’S, 135°05E returned 107 ppb. Drummond considers that this highlights the extent of mineralisation in the Kurinelli Zone beyond areas of known surface gold accumulation. It also demonstrates the usefulness of the soil BLEG survey technique in the area. The areas which did not return anomalous Au in Shields' programme may simply require sample collection below transported alluvium. Shields also noted that it may only be sub-sections of a quartz reef system that might be mineralised, citing examples such as Woods Point and Walhalla in Victoria.


This small EL was centred around an old Au show mapped 6 km south-east of the Great Davenport mine. Of 35 stream sediment samples panned or tested in a Au wheel some 16 returned either a trace or a colour. This indicates the general Au anomalism at the southern wedge-out of the Kurinelli zone.

(n) BHP Gold Ltd/Newcrest Operations Ltd 1991. Various EL Applications

In 1991, during a corporate and operational transitional change between Newcrest and BHP Gold, the former applied for Exploration Licences which covered almost all of the Davenport Ranges, and extended south-easterly sufficiently to cover Arafura’s Supplejack Project. Before the tenements were granted BHP Gold undertook an extensive stream sediment sampling programme and samples were assayed by BLEG techniques for precious metals, and by conventional techniques for base metals. Although BHP Gold defined anomalous areas for follow-up, the project was terminated before any of the Exploration Licences was granted and there were no reporting requirements to NTDME.

Newcrest kindly provided access to its report which does not include the raw assay data. Rather it mainly consists of plots, on a per element basis, of the assay results which BHP Gold considered to be anomalous. Accordingly Drummond has accepted, and considers it reasonable to do so, BHP Gold’s definitions of anomalism without being able to undertake any independent checking of the data or the statistical analysis.
General conclusions which can be drawn from a study of BHP Gold’s results are as follows,

1. **Gold**

The Kurinelli Sandstone, to the south-east of the Great Davenport mine, and beyond the Kurinelli Zone, is anomalous over about 20 sq km. Despite its evident Au mineralisation, the Kurinelli Zone generally did not provide much anomalism. But this is presumably due to the fact that its north-eastern part, i.e. beyond 1 km north-east from the old battery site, was not sampled. Additionally the south-western part is known to be covered by thicker alluvium.

**INVESTIGATIONS BY ARAFURA RESOURCES**

Initial activities undertaken by Arafura Resources and its associates in 1996 and 1997 have been described by Goulevitch (1997) as:

- acid-etching of ironstones;
- conventional and ICP-MS/OES analyses of several ironstones;
- petrographic studies of polished sections from four ironstone boulders by reputable consultants;
- laser-ablation ICP-MS analyses on the polished sections;
- petrological review and description of doleritic and gabbroic rocks from the Kurinelli area;
- reconnaissance soil and lag sampling in the vicinity of the discovery;
- review of the regional geology and of aeromagnetic data from the region; and
- a search for relevant data in the open file company reports from previous exploration in the area.

**Phase 1 (September – December 2004)**

Systematic regional and local geochemical soil sampling was completed over the Kurinelli Zone in September 2004 (Goulevitch 2005). A total of 821 samples were collected from 782 sites spaced 500 metres apart on lines also spaced 500 metres apart. An area of approximately 200 square kilometres was covered by the survey. No samples were collected from within exclusion zones around Aboriginal sacred sites advised by the Central Land Council or from within granted mineral claims, and priority applications for mineral claims, held by unrelated parties.

Two soil size fractions were collected at each site. A -80# fraction which was subsequently analysed for Cu, Pb, Zn, Co and Ni; and a -2 millimetres fraction which was analysed for low level Au, Pt and Pd.

Numerous elevated gold values were obtained. From the 782 sites sampled,

- 149 sites (19%) returned a value of 2 ppb Au or more;
- 39 sites (5%) returned a value of 5 ppb or more;
- 14 sites (1.8%) returned a value of 10 ppb Au or more;
- the highest value was 234.5 ppb Au at site 137180;
- the second highest value was 40.5 ppb Au; and
- 437 samples returned less than the detection level of 1 ppb.

Results of 10 ppb and more appear to be distinctly anomalous, and results of 3-10 ppb Au appear to be possibly anomalous. The results define a coherent zone of elevated gold-in-soil covering an area of about 25-35 square kilometres. Elevated levels of gold-in-soil surround all known areas of past gold mining activity and a halo of 1-2 ppb Au surrounds the bulk of the higher results.
The zone of elevated gold includes several areas which are considered anomalous. The largest of these is approximately 6 kilometres long and up to 2.5 kilometres wide. This anomalous zone envelops Arafura’s granted mineral claims in the area (MCNs 950-953).

Resampling in December, 2004, at and around the site of the highest value, returned results between 5-38 ppb Au and while this work has not reproduced the original result (291/178 ppb Au), the overall Au level around the site (average 13.5 ppb Au) fully supports the broad zone of gold anomalism defined in the initial sampling and it is entirely consistent with the adjacent results from that initial sampling.

Geological reconnaissance in the vicinity of sample site 137180 has located an array of ferruginous quartz veins, a chip sample from which returned gold assays of 0.36 and 0.44 g/t Au. This appears to represent the first demonstrated occurrence of hard-rock gold mineralisation at Kurinelli well removed from massive quartz reefs which are the source of nuggetty gold recovered over the past 15-20 years using metal detectors.

Overall, the 2004 soil sampling programme at Kurinelli has been successful both in defining a broad area of basement gold anomalism, and thus significantly reducing the area of the Kurinelli Zone that can be considered prospective for basement gold mineralisation (from about 200 square kilometres down to 25-35 square kilometres); and also in identifying several specific targets within that reduced area for the next phase of follow-up investigation.

Peak Pt and Pd values of 3 and 4 ppb respectively were obtained from different samples and while these do not appear anomalous, limited follow-up sampling around the respective sites is probably justified.

Peak results for base metals were:

- Cu – 101 ppm - average 16 ppm excluding 14 samples below DL of 1 ppm;
- Pb – 31 ppm - average 10 ppm excluding 403 samples below DL of 5 ppm;
- Zn – 71 ppm - average 19 ppm excluding 5 samples below DL of 1 ppm;
- Ni – 76 ppm - average 25 ppm excluding 1 sample below DL of 2 ppm;
- Co – 49 ppm - average 11 ppm excluding 175 samples below DL of 2 ppm.

None of the base metal results appear anomalous.

**NORTHERN TERRITORY GEOLOGICAL SURVEY**

The whole of the Kurinelli Block was included in the NTGS’s Bonney Well airborne geophysical survey which covered the Bonney Well and Frew River 1:250 000 map sheets. The survey was flown in 1999 and involved low level acquisition of terrain, magnetic and radiometric data on lines spaced 400 metres apart.

Over AC 74, and more specifically, the Kurinelli Zone, Arafura Resources financed infill flying at 200 metres line spacing. This closer spaced information remains the proprietary information solely of Arafura at the date of this report.
WORK COMPLETED DURING APRIL 2005-July 2006

PHASE 2A – APRIL/MAY 2005

GEOLOGICAL RECONNAISSANCE

After initial investigations during exploration seasons 1996, 1997 (2), 1999 and 2004, (Goulevitch, 2005), a 1:10,000 basement geology map was required to systematically identify basement geology and correlate gold anomalism with geology and soil development. Previous mapping was carried out on too broad a scale to assess any local scale correlations.

In phase 2A of the Kurinelli Work Programme, during April-May, 2005, soil sample lines were traversed on foot, (KLP & TM), to gather information for compilation of a reliable 1:10,000 basement geology map (GDA ’94 Datum). Mapping was confined to an area of 20-25 square kilometres along variable-length traverses with 250m line spacings. All observations were restricted to the area of soil sampling in the Kurinelli Zone. Locations of observations were established by hand-held GPS (Appendix 5).

Essential elements of the geological compilation included outcropping, sub-cropping and soil-chip basement geology, geological boundaries/contacts, areas of continuous soil/alluvium cover if the basement geology was not readily identifiable, drainage/ridge lines, evident cultural data and reliable structural data. Relevant rock-grab samples were collected for a field record and for Au assay (Appendix 4).

SOIL SAMPLING

The survey area for Phase 2A was selected on the basis of consistent gold anomalism excluding areas with known thick alluvial overburden or aeolian sand. Soil sampling protocols were based on successful protocols devised for the Kurinelli Zone by Burlinson Geochemical Services (Goulevitch, 2005).

Programme Phase 2A consisted of 1658 samples collected from 1578 sites spaced 50 metres apart on lines spaced 250 metres apart; and 28 samples spaced 500 metres apart on lines spaced 500 metres apart to complete Phase 1. Samples were collected by experienced personnel supplied by Arnhem Exploration and Rural Services Pty. Ltd. based in Tennant Creek. An area of approximately 25 square kilometres was covered by the survey. No samples were collected from within exclusion zones around Aboriginal sacred sites advised by the Central Land Council or from within granted mineral claims, and priority applications for mineral claims, held by unrelated parties.

Other procedures followed by AERS are described below (see Appendix 6 for complete report):

The sample medium was the B/C horizon, recognised by either colour or texture change. Depth of hole was also recorded at each sample site. In some instances no change could be detected and this was noted in the sample sheets. No change in colour or texture was sometimes noted on hills: in these cases rocks were generally found in the hole and on the surface and were assumed to be in situ B/C horizon material.

At each location a 500g (-2mm) sample was collected with duplicates at about one in twenty. At each site an unsieved chip tray sample was taken from the bottom of the hole including rock fragments if available. All sample holes were backfilled. Log sheets were completed: there was some difficulty in recognising sand types and in the first part of the project laterite and pisolites were used interchangeably. Dolerite was easily recognised, the term “calcrete” was used to describe white rock where this did not appear to be siltstone. Disturbed areas were also noted.
The sampling method was mattock and shovel: a hole was dug to reach the colour or texture change, loose material removed, hole depth measured and a sample then taken from the bottom of the hole. Where no change was visible, the hole was excavated to about 50cm prior to sampling. Sieves were cleaned prior to sampling. Sample bag numbers and peg co-ordinates were checked against log sheets.

Sample sites were established by single unit GPS and fence droppers were placed at 500m intervals (on eastings divisible by 500m) along traverses and at line ends where these were more than 250m from the nearest fence dropper. Pin markers were used elsewhere to mark sample sites. Both fence droppers and pin markers have co-ordinates and sample numbers. Cattle and sun will probably destroy the pin markers over the next six months or so. The map datum is WGS84. Accuracy is expected to be within 5m.

Samples were collected into small calico bags. AERS’s field sample register is included as Appendix 3. AERS also provided digital files of located sample information.

ROCK GRAB SAMPLING

Fifteen rock grab samples (up to 3 kilograms each) were collected by the Todd McGilvray and Karl Lindsay-Park from numerous sites in the sample area. Chip sampling was focused on ferruginous quartz veins hosted in outcrops of siltstone. Samples were crushed and pulverised in a Keegor mill in their entirety by North Australian Laboratories and analysed for gold by fire assay with an AAS finish (50 gram charge). Locations and assay results are included in digital format Appendix 4.

GEOCHEMICAL ANALYSES

All of the samples collected were sent to NAL’s laboratory in Pine Creek for preparation and firing. Sample submission sheets for each phase of analysis are attached in Appendix 4.

After complete cleaning of sample preparation equipment, the entire -2mm samples were dried and pulverised by NAL to p80-100 microns in clean Keegor Mills after which blanks and standards were inserted as appropriate and fire assay prills prepared from 50g assay charges in new fusion pots. Prills were then freighted to Northern Territory Environmental Laboratories in Darwin who conducted Au, Pt and Pd determinations by ICP-MS (low level, 1 ppb detection level) after acid digestion.

Samples of high grade were repeated to check results. New prills were prepared, fire assayed and finished with Standard AAS after acid digestion and solvent extraction by NAL. NAL uses the Gannet Standards with a 10 gram sample ensuring the ‘nugget effect’ doesn’t occur during assay.
PHASE 2B – OCTOBER/NOVEMBER 2005

GEOLOGICAL RECONNAISSANCE

Phase 2B of the Kurinelli Work Programme, during October-November, 2005, comprised 1:1000 scale grid mapping. Mapping was confined to an area of 5 square kilometers. All observations were restricted to the area of contemporaneous soil sampling. Locations of observations were established by hand-held GPS and from marked sample sites. Data was plotted in the field onto gridded A3 sheets.

Essential elements of the geological compilation included outcropping, sub-cropping and overburden geology, geological boundaries/contacts, areas of continuous soil/alluvium cover if the basement geology was not readily identifiable, drainage/ridge lines, evident cultural data and reliable structural data. All mapping data was subsequently used to construct a geological interpretation of the area of Phase 2B investigations.

SOIL SAMPLING

Sampling protocols were consistent with Phase 1 and 2A. Phase 2B consisted of 618 samples collected from 587 sites spaced 25 metres apart on lines spaced 50 metres apart. Samples were collected by experienced personnel supplied by Arnhem Exploration and Rural Services Pty. Ltd. based in Tennant Creek. No samples were collected from within exclusion zones around Aboriginal sacred sites advised by the Central Land Council or from within granted mineral claims, and priority applications for mineral claims, held by unrelated parties. Previous sites were not resampled.

Other procedures followed by AERS are described below:

The sample medium was the B/C horizon, recognised by either colour or texture change. Depth of hole was also recorded at each sample site. In some instances no change could be detected and this was noted in the sample sheets. No change in colour or texture was sometimes noted on hills: in these cases rocks were generally found in the hole and on the surface and were assumed to be in situ B/C horizon material.

At each location a 500g (-2mm) sample was collected with duplicates at about one in twenty. The sampling method was mattock and shovel: a hole was dug to reach the colour or texture change, loose material removed, hole depth measured and a sample then taken from the bottom of the hole. Where no change was visible, the hole was excavated to about 50cm prior to sampling. Sieves were cleaned prior to sampling. Sample bag numbers and peg co-ordinates were checked against log sheets. All sample holes were backfilled.

Three baselines were constructed and crosslines were gridded using fence droppers at 100m intervals (eastings divisible by 100m) and pin markers at intermediate sample sites. Closures were completed where required and a series of GPS readings taken at 50m intervals along the baselines and at the final fence dropper on longer lines. Although existing sample sites from previous work in July were not resampled on this programme, fence droppers were used at 100m intervals along existing sample lines. Fence droppers and pin markers have co-ordinates and sample numbers written by paint marker. The datum is WGS84.

Samples were collected into small calico bags. AERS’s field sample register is included as Appendix 3. AERS also provided digital files of located sample information.
ROCK GRAB SAMPLING

Thirteen rock grab samples (up to 3 kilograms each) were collected from various sites in the sample area (McGilvray 2006). Rock samples were taken from ferruginous quartz veins hosted in outcrops of siltstone and dolerite, and alteration zones in dolerite. Samples were crushed and pulverised in a Keegor mill in their entirety by NAL and analysed for gold by fire assay with an AAS finish (50g charge). Locations and assay results are included as Appendix 4.

ASSAYING

All of the samples collected were sent to NAL’s laboratory in Pine Creek for preparation, firing and analysis. Sample submission sheets for each phase of analysis are attached in Appendix 4.

After complete cleaning of sample preparation equipment, the entire -2mm samples were dried and pulverised by NAL to p80-100 microns in clean Keegor Mills after which blanks and standards were inserted as appropriate and fire assay prills prepared in new fusion pots from 50g assay charges. NAL conducted Au determinations using AAS (low level, 1 ppb detection limit) on the prills after acid digestion and solvent extraction. Numerous repeats were conducted on anomalous samples.

Samples taken during Phase 2A were not re-taken during Phase 2B. Where Phase 2A and 2B samples were collected on the same sample line, results for Phase 2B samples were, in most cases, lower than the results for adjacent Phase 2A samples. To allow further assessment of these differences all relevant Phase 2A and 2B samples were recovered and re-assayed by NAL using the procedure described above.
PHASE 2C – MARCH/APRIL 2006

SOIL SAMPLING

Sampling protocols were consistent with Phase 1 and Phases 2A and 2B. Phase 2C consisted of 235 samples collected from 223 sites spaced 25 metres apart on lines spaced 50 metres apart. Phase 2C area is adjacent to Phase 2B and was undertaken to assist in closing-off anomalies defined in Phase 2B and in defining areas for drill testing. Samples were collected by experienced personnel supplied by Arnhem Exploration and Rural Services Pty. Ltd. based in Tennant Creek. No samples were collected from within exclusion zones around Aboriginal sacred sites advised by the Central Land Council or from within granted mineral claims, and priority applications for mineral claims, held by unrelated parties. Previous sites were not resampled.

Other procedures followed by AERS are described below:

The sample medium was the B/C horizon, recognised by either colour or texture change. Depth of hole was also recorded at each sample site. In some instances no change could be detected and this was noted in the sample sheets. No change in colour or texture was sometimes noted on hills: in these cases rocks were generally found in the hole and on the surface and were assumed to be in situ B/C horizon material.

At each location a 500g (-2mm) sample was collected with duplicates at about one in twenty. The sampling method was mattock and shovel: a hole was dug to reach the colour or texture change, loose material removed, hole depth measured and a sample then taken from the bottom of the hole. Where no change was visible, the hole was excavated to about 50cm prior to sampling. Sieves were cleaned prior to sampling. Sample bag numbers and peg co-ordinates were checked against log sheets. All sample holes were backfilled.

Three baselines were constructed and crosslines were gridded using fence droppers at 100m intervals (eastings divisible by 100m) and pin markers at intermediate sample sites. Closures were completed where required and a series of GPS readings taken at 50m intervals along the baselines and at the final fence dropper on longer lines. Although existing sample sites from previous work in July were not resampled on this programme, fence droppers were used at 100m intervals along existing sample lines. Fence droppers and pin markers have co-ordinates and sample numbers written by paint marker. The datum is WGS84.

Samples were collected into small calico bags. AERS’s field sample register is included as Appendix 3. AERS also provided digital files of located sample information.
PHASE 2D – MAY/JUNE 2006

SOIL SAMPLING

Sampling protocols were consistent with Phase 1 and Phases 2A, 2B and 2C. Phase 2D consisted of 212 samples collected from 202 sites spaced 25 metres apart on lines spaced 50 metres apart. 213 samples were planned and indicated in Appendix 3, however the last sample (162013) seems to have been omitted by AERS as no sample arrived at the lab. Phase 2D concentrated on the area covered by Mr Colin Wessel’s leases within the broad anomalous zone identified by Phase 1 and Phase 2A sampling at Kurinelli. Sampling was done with the consent of the lease holder allowing Arafura to fill one of the gaps in our sampling programme. About one quarter of the soil samples collected in Phase 2D were moist due to heavy rains in late April. As a result, 58 samples were collected bulk for latter drying and sieving. Samples were collected by experienced personnel supplied by Arnhem Exploration and Rural Services Pty. Ltd. based in Tennant Creek. No samples were collected from within exclusion zones around Aboriginal sacred sites advised by the Central Land Council or from within granted mineral claims, and priority applications for mineral claims, held by unrelated parties. Previous sites were not resampled.

Other procedures followed by AERS are described below:

The sample medium was the B/C horizon, recognised by either colour or texture change. Depth of hole was also recorded at each sample site. In some instances no change could be detected and this was noted in the sample sheets. No change in colour or texture was sometimes noted on hills: in these cases rocks were generally found in the hole and on the surface and were assumed to be in situ B/C horizon material.

At each location a 500g (-2mm) sample was collected with duplicates at about one in twenty. The sampling method was mattock and shovel: a hole was dug to reach the colour or texture change, loose material removed, hole depth measured and a sample then taken from the bottom of the hole. Where no change was visible, the hole was excavated to about 50cm prior to sampling. Sieves were cleaned prior to sampling. Sample bag numbers and peg co-ordinates were checked against log sheets. All sample holes were backfilled.

Three baselines were constructed and crosslines were gridded using fence droppers at 100m intervals (eastings divisible by 100m) and pin markers at intermediate sample sites. Closures were completed where required and a series of GPS readings taken at 50m intervals along the baselines and at the final fence dropper on longer lines. Although existing sample sites from previous work in July were not resampled on this programme, fence droppers were used at 100m intervals along existing sample lines. Fence droppers and pin markers have co-ordinates and sample numbers written by paint marker. The datum is WGS84.

Samples were collected into small calico bags. AERS’s field sample register is included as Appendix 3. AERS also provided digital files of located sample information.
GEOLOGICAL RECONNAISSANCE APRIL/JUNE 2006

The author and Todd McGilvray undertook additional geological reconnaissance and mapping in the areas covered by Phase 2B, 2C and 2D of the Kurinelli Work Programme during April-June 2006. Observations were restricted to the area of Phase 2 sampling programmes or in the hills immediately to the west and north of Phase 2B and 2C. Locations of observations were established by hand-held GPS and from marked sample sites and data were plotted on gridded sheets. A number rock chip samples were collected but these are yet to be submitted for analysis. The recognised gold mineralisation within this area appears to be hosted by a series of near vertical quartz + carbonate ± sericite ± rare? sulfide ± Fe oxide ± epidote veins within the dolerite host. A series of narrow en-eclalon veins were recognised in the area targeted for drill testing. Some of these quartz veins have small-scale exploratory workings and costeans developed in them, suggesting they contained Au mineralisation. The prospectors also appear to have chased coarse Au with metal detectors in these zones as recent workings can be found along some of the north-northeast trending veins. Similar looking quartz veins also occur in the surrounding Rooneys Formation and are present as both sub-vertical cross-cutting veins and as near-bedding parallel veins. Both of these vein sets commonly show evidence for sericite ± sulfide wallrock alteration.

Essential elements of the geological compilation included outcropping, sub-cropping and overburden geology, geological boundaries/contacts, areas of continuous soil/alluvium cover if the basement geology was not readily identifiable, drainage/ridge lines, evident cultural data and reliable structural data. All mapping data was subsequently used to construct a geological interpretation of the area of current investigations.
RESULTS & DISCUSSION

PHASE 2A – MAY/JUNE 2005

GEOLOGICAL RECONNAISSANCE

Observations for Phase 2A were recorded in field notes listed in Appendix 5. Geological observations recorded prior to 2005 were enhanced by the line mapping programme carried out during April-May, 2005. When plotted at 1:10,000 scale the line mapping provided reasonable information on geological elements but it was apparent that larger scale mapping was essential to determine intimate geological associations with gold anomalism.

The following summary of soil development in the area is by Burlinson, (in Goulevitch, 2005):

*The topography is predominantly flat with isolated ridges formed by resistant rock units, often quartz ridges. Much of the flat areas is comprised of brown clayey, compact soil with a covering of abundant coarse (3-6 cm) pebbles and extremely sparse grass vegetation with almost no trees or shrubs. The soil in these areas is residual. The remaining flat areas are a similar brown clayey soil lacking rock fragments at the surface and these areas are probably of transported soil. The thickness of transported overburden was observed in several places to be as little as 10 cm, but up to 1m thick in places such as some of the metal detector scraped areas.*

Phase 2A observations were recorded consistently with Burlinson, (in Goulevitch 2005), during the mapping programme.

GEOCHEMICAL RESULTS

Primary Soil Samples

Analytical results sheets from NAL and NTEL are attached as Appendix 1 and included on the attached CD as located data. Sample locations are displayed in Figures 2-4. Most of the collected samples were of residual material and rarely of transported cover.

Numerous elevated gold values were obtained. Of the 1578 sites sampled:

- 1232 sites (78%) returned a value of 2 ppb Au or more;
- 609 sites (39%) returned a value of 5 ppb or more;
- 300 sites (19%) returned a values of 10 ppb or more;
- 13 sites (0.8%) returned a value of 200 ppb Au or more;
- the highest value was 2340 ppb Au;
- 221 samples returned less than the detection level of 1 ppb.

Four distinct anomalous zones can be identified in Phase 2A soil sample data (Figure 5).

The largest zone, Anomaly 1, is 6km long and 2.5km wide in the east of the sample area. Results ranged between 10 ppb and 100 ppb and the highest return was 223 ppb (Appendix 1). The zone is truncated in the north by a thick alluvial pile and another anomaly exists along strike beyond the alluvium to the north. It is possible Anomaly 1 continues beneath the alluvium but drilling or costeaneing are required to test this.
Anomaly 1 is parallel with a magnetic lineament to the east. Quartz reefs in the area generally trend NNE and appear upright. Reefs in the north of the anomaly trend ESE and are fractured along a NNE trend.

An anomalous zone 2.5km long and 1km wide, Anomaly 2, trends perpendicular to Anomaly 1 (Figure 5). Anomaly 2 could be grouped with Anomalies 1 & 4 but occurs at a different strike, (~120°). The area of Anomaly 2 is mainly siltstone and quartz float/gravel with low relief. Samples were consistent between 10 ppb and 40 ppb and returned as high as 517 ppb.

Anomalies 3a and 3b occur in the west of the sample area (Figure 5). Anomaly 3a is 1.5km long and 1km wide and Anomaly 3b is 1km long and 1km wide. Both are coincident with quartz reefs trending NNE. These reefs are composed of massive quartz and silicified wallrock clasts of jasperoid. Both anomalies are along strike with NNE regional structural trends. Samples returned 121 ppb maximum averaging 50 ppb for Anomaly 3a and 442 ppb maximum averaging 60 ppb for Anomaly 3b.

The most attractive target for follow-up investigation, Anomaly 4, was the subject for the Phase 2B soil sampling programme (Figures 4 and 5). Anomaly 4 is a 2km wide and 1.5 km long anomaly in the south of the sampled area. A large, 3km wide, fold in the Rooneys Formation with an intrusive dolerite core dominates the area. Quartz reefs transgress the dolerite and sediments in a NNE-SSW direction. Alteration bands in dolerite occur at a macro- to meso-scale and are mineralogically similar to regional alteration trending NNE & ESE. Assays returned anomalous Au determinations and infill sampling was deemed necessary as part of Phase 2B.

**Duplicate Soil Samples**

Results for 80 duplicate soil samples and originals are presented in Appendix 1 and on the accompanying CD along with correlation diagrams.

Duplicates which showed significant variation from the original analysed by NTEL were re-analysed by NAL using low level fire assay/AAS. Results are plotted on graphs on the accompanying CD. Scatterplot A includes all duplicate data and is appropriately scaled to include the single determination from 152016 and duplicate 152017, (213 ppb/797 ppb). The particulate nature of Au at Kurinelli probably explains the inconsistent assays.

Graph B is scaled to clearly show low level originals and duplicates, using a low pass filter. Values show broad linearity with minor excursions from the trend line. Irregular determinations have been produced by both NTEL and NAL. The irregularity is interpreted to indicate the effect of particulate gold in the samples as opposed to flaws in sampling or sample preparation procedures. The results are a true indicator of gold content although the variability should be taken into account.

**PHASE 2B – OCTOBER/NOVEMBER 2005**

**GEOLOGICAL RECONNAISSANCE**

Geological interpretation of the Phase 2B sampling area is after McGilvray (2006) and is reproduced electronically as Plate 1.

Field observations from Burlinson, *(in Goulevitch, 2005)*, are appropriate for Phase 2A but Phase 2B is far more limited in scope. The topography of the Phase 2B area is generally flat with ridges and low foothills to the north, west and east. A dolerite hill in the centre of the area has focussed drainage along the contact zone between the dolerite and sediments in the north and west. An isolated sediment ridge in the south forces drainage from the central plain and west/north hills to the south. Transported alluvium occurs along drainage lines in the elevated areas in the west opening to clay pans on the plains in the east.
The densest vegetation in the area is over clay pans. This is composed of a mixture of grasses and trees. Clay pans are consistently 1cm-4cm lower than the surrounding ground level indicating dessication and/or scour and refill of a thick sediment pile.

Aeolian sand deposits are characterised by a moderate cover of grasses. These grasses generally have exposed upper root systems which indicate significant scouring by wind.

Elluvial/colluvial gravel deposits are bare to sparsely vegetated regardless of whether the ground has been overturned or not. Gravel fragments are consistently sub-angular to sub-rounded with obvious provenance from local sources. Sedimentary colluvium and outcrops are consistently vegetated with spinifex.

Au anomalies in Phase 2B samples are generally associated with dolerite outcrop or subcrop. Of those anomalies, most are coincident with alteration zones in dolerite (Plate 1), located at:

- 506500E/7718500N
- 506750E/7718500N
- 506100E/7718250N
- 507400E/7718200N

Au anomalies also occur in fresh/hornfelsed Rooneys Formation sediments up to 40 metres from dolerite, (Plate 1), at:

- 506150E/7718650N
- 507100E/7718250N
- 506900E/7718250N

Davidson, (1905), reported the majority of Au exploration on quartz reefs, most were barren, but he did not cite dolerite-hosted Au mineralisation. The location of Davidson’s shaft, (13m deep), is in altered dolerite with sheeted quartz veins. This site is now covered by an aboriginal sacred site exclusion zone so non-invasive activity was conducted. Mullock piles around the shaft contain fresh dolerite, altered dolerite with Ca-Si assemblages and a pink, quartz-monzonite. A sample of potassic-altered quartz-monzonite which contained thin sheeted quartz veins and visible gold was collected in 1997 by ARNL. The sample assayed 5.9 g/t Au, (J. Goulevitch, pers. comm.).

Geological units mapped during Phase 2B can be generally correlated with ‘Total Count’ radiometrics. Radiometric data provides outcrop basement information and, to a lesser degree, provenance of quaternary sediments and locations of potassic alteration? zones. The arcuate radiometric high in the west and north of the area coincide with folded Rooneys’ Formation sediments that dip to the northwest and north respectively. Radiometric lows in the centre and south coincide with large dolerite masses. A weaker radiometric low in the east correlates with dolerite exposure. A weak radiometric high in the SSE coincides with fresh/hornfelsed Rooneys Formation and an adjacent, weak low further east correlates with dolerite exposure.

Higher amplitude radiometric responses are generally coincident with exposed Rooneys Formation because the sediments contain higher concentrations of K and greater U and Th than dolerites and quaternary sediments. Low amplitude responses are coincident with dolerite exposure. Contact zones are located along margins of adjacent high and low responses whereas contacts concealed by quaternary sediments are indistinguishable.

GEOCHEMICAL RESULTS

Primary Soil Samples
Analytical results sheets from NAL are attached as Appendix 1 and are included on the attached CD as located data. Sample locations are displayed in Figures 2-4. Most samples collected were of residual material and rarely of transported cover.

From the 589 (Phase 2B) sites sampled:

- 587 sites (99.6%) returned a value of 2 ppb Au or more;
- 474 sites (80%) returned a value of 5 ppb or more;
- 217 sites (37%) returned a value of 10 ppb or more;
- 10 sites (%) returned a value of 200 ppb or more;
- The highest value was 5020 ppb Au at site 152873;
- 0 samples returned less than the detection level of 1 ppb.

Phase 2B soil sampling supported previous investigations from May, 2005. Previous structural observations at a regional scale are generally consistent with those at a local scale for quartz reefs and alteration zones (NNE & ESE). The western section of the sampling area has two anomalies trending NNE and possibly a cross-cutting zone ESE. Au anomalies are generally proximal to contact zones in dolerite and sediments. Quartz reefs have generally been emplaced along and adjacent to the dolerite margin. The highest results, (>2000 ppb), are in Rooneys Formation sediments proximal to dolerite contact.

A large proportion of the Phase 2B sampled area has been turned by local claim holders using earth moving equipment (Plate 1). Personal communication by the author and other Arafura associates with claim holders revealed the focus of nugget prospecting was on a colluvial/elluvial gravel layer generally found from the surface to the C horizon and only rarely to solid basement rocks. Gold recovery was achieved by shaving off layers of gravel into piles and detecting over the freshly exposed layer. Piles of a grader blade’s width were shuffled around during working and flattened out for remediation purposes. Overburden was probably transported 10-15m in the scraped areas and, although recirculated, is believed to be representative of the basement geology. Hard rock mineralisation beyond the C horizon occurred in small vein leaders, some of which were excavated to practical depth and the pits infilled with the excavated material.

Phase 2A and 2B samples collected on line N7718250 at alternate sites spaced 25 metres apart revealed oscillatory determinations (Appendix 1). The field crew supervisor was present during both programmes and did not note irregularities in the sampling procedure. Sample batches from both phases were pulped using Keegor Mills and fired at NAL. Phase 2A samples were assayed by NTEL using ICP-MS with repeats on higher results by NAL using AAS on new firings. Phase 2B samples were pulped and fired by NAL and assayed using AAS. Sampling, milling and assaying techniques have been consistent throughout so results are believed to be indicative of the geology and distribution of gold mineralisation in the basement rocks.

**Duplicate Soil Samples**

Results for 31 duplicate soil samples and originals are presented in Appendix 2 along with correlation diagrams.

Results have been averaged and plotted on graphs A and B in Appendix 1. Scatterplot A includes all duplicate data and is appropriately scaled to include a single determination, 152016, and duplicate 153299, (122 ppb/1207 ppb). The particulate nature of Au at Kurinelli would explain the assay inconsistency observed in that sample and is not considered valid. Three repeats are sufficient enough to determine NAL procedures are not at fault.

Graph B is scaled to clearly show low level originals and duplicates, using a low pass filter. The bulk of determinations show broad linearity however a significant number of values are elevated in the originals and reduced in the duplicates. One determination is reduced in the original and elevated in the duplicate. Further communication with NAL determined the assay procedure was consistent and the laboratory and equipment...
Assay results from lines 7718250N and 7718500N showed consistently lower Phase 2B determinations. Relevant samples from Phase 2A and 2B were reassayed by NAL. Results were generally consistent with previous analyses. Differences seen in some samples are interpreted to be the result of coarse gold and its...
PHASE 2C – MARCH/APRIL 2006

GEOCHEMICAL RESULTS

Primary Soil Samples

Analytical results sheets from NAL are attached as Appendix 1 and are included on the attached CD as located data. Sample locations are displayed in Figures 2-4. Most samples collected were of residual material and rarely of transported cover.

From the 223 (Phase 2C) sites sampled:

- 223 sites (100%) returned a value of 2 ppb Au or more;
- 214 sites (96.0%) returned a value of 5 ppb or more;
- 140 sites (62.8%) returned a value of 10 ppb or more;
- 5 sites (2.2%) returned a value of 200 ppb or more;
- The highest value was 1560 ppb Au at site 160004;
- 0 samples returned less than the detection level of 1 ppb.

Phase 2C soil sampling supported previous investigations from the adjacent Phase 2B areas. A large proportion of the area sampled in Phase 2C has been turned by local claim holders using earth moving equipment. Personal communication by the author and other Arafura associates with claim holders revealed the focus of nugget prospecting was on a colluvial/elluvial gravel layer generally found from the surface to the C horizon and only rarely to solid basement rocks. Gold recovery was achieved by shaving off layers of gravel into piles and detecting over the freshly exposed layer. Piles of a grader blade’s width were shuffled around during working and flattened out for remediation purposes. Overburden was probably transported 10-15m in the scraped areas and, although recirculated, is believed to be representative of the basement geology. Hard rock mineralisation beyond the C horizon occurred in small vein leaders, some of which were excavated to practical depth and the pits infilled with the excavated material.

Duplicate Soil Samples

Results for 12 duplicate and original soil samples collected as part of Phase 2C are presented in Appendix 1 on the accompanying CD. Results have been averaged and plotted on a graph included on the accompanying CD. The scatterplot showing all original and duplicate data indicates the low-level Au results are repeatable within an acceptable error for all but one duplicate sample. As in previous soil sampling programmes, the particulate nature of Au at Kurinelli would explain the assay inconsistency observed in that sample.
PHASE 2D – MAY 2006

GEOCHEMICAL RESULTS

Primary Soil Samples

Analytical results sheets from NAL are attached as Appendix 1 and are included on the attached CD as located data. Sample locations are displayed in Figures 2-4. Most samples collected were of residual material and rarely of transported cover. Workings by Colin Wessel indicate thicker soil profiles in the southern parts of his leases.

From the 202 (Phase 2C) sites sampled:

- 200 sites (99%) returned a value of 2 ppb Au or more;
- 180 sites (89.1%) returned a value of 5 ppb or more;
- 128 sites (63.4%) returned a value of 10 ppb or more;
- 1 site (0.5%) returned a value of 200 ppb or more;
- The highest value was 223 ppb Au at site 161867;
- 0 samples returned less than the detection level of 1 ppb.

Phase 2D soil sampling supported previous investigations from Phase 2A and nearby Phase 2B and 2C which suggested the area covered by Phase 2D may have anomalous Au-in-soils results. A large proportion of the area sampled in Phase 2D has been turned by local claim holders using earth moving equipment. Personal communication by the author and other Arafura associates with claim holders revealed the focus of nugget prospecting was on a colluvial/elluvial gravel layer generally found from the surface to the C horizon and only rarely to solid basement rocks. Gold recovery was achieved by shaving off layers of gravel into piles and detecting over the freshly exposed layer. Piles of a grader blade’s width were shuffled around during working and flattened out for remediation purposes. Overburden was probably transported 10-15m in the scraped areas and, although recirculated, is believed to be representative of the basement geology. Hard rock mineralisation beyond the C horizon occurred in small vein leaders, some of which were excavated to practical depth and the pits infilled with the excavated material.

Duplicate Soil Samples

Results for 12 duplicate soil samples and originals collected as part of Phase 2D are presented in Appendix 1 and on the accompanying CD. Results have been averaged and plotted on a graph included on the accompanying CD. The scatterplot showing all original and duplicate data indicates the anomalous low-level Au results are repeatable to a first approximation. Results indicate that some of duplicate samples are only repeatable to within about 50% of the original. Despite the differences most values are definitely anomalous using the scheme of Goulevitch (2005). The particulate nature of Au at Kurinelli would explain the assay inconsistency observed in these samples.

SUMMARY OF PHASE 2 RESULTS

Results of Phases 2A-2D soil sampling confirm the presence of a significant gold-in-soils anomaly at Kurinelli, with the main anomalous zone being 2.5 x 6 kilometres (Figure 5). This zone corresponds to basement areas of historic mining and colluvial/elluvial zones worked by prospectors with metal detectors in
the past 20 or so years. The results also appear to support the validity of the sampling protocols employed at Kurinelli by Arafura and allow us to better define the anomalous gold zone in areas at Kurinelli.

Numerous elevated gold values were obtained in Phases 2A-2D. Of the 2592 sites sampled:

- 2242 sites (86.5%) returned a value of 2 ppb Au or more;
- 1477 sites (57.0%) returned a value of 5 ppb or more;
- 785 sites (30.3%) returned a value of 10 ppb Au or more;
- 29 sites (1.1%) returned a value of 200 ppb Au or more;
- the highest value was 5020 ppb Au;
- the second highest value was 4020 ppb Au; and
- 221 samples returned values less than the detection level of 1 ppb, all of which were collected in Phase 2A.

These results of Phase 2B, 2C and 2D are encouraging and additional soil sampling and testing is recommended across the remainder of the anomalous zone.
2006 DRILLING PROPOSAL

Phase 3 – Stage 1

A significant number of highly anomalous Au values have been obtained from Phase 2B and 2C sample sites demonstrating that drill testing of anomalous zones is justified. The aims of drilling programme are to firstly, identify areas of economic gold mineralisation in basement rocks; and secondly, to establish the relationship between gold mineralisation in the basement rocks and gold levels in the soil medium which has been sampled over the past two years.

A total of 57 RC percussion drill holes were completed 28 June 2006 in the area soil sampled by Phase 2B and 2C. The location, azimuth and total depths of all holes are shown in Table 2. The geochemical results of on composite samples in this programme and mandatory follow-up geochemical testing of this data to validate the integrity of this data were still in progress at the end of the reporting period. As a result all details of the 2006 RC drilling programme will be documented in full in the next annual report.

Table 2: Phase 3 – Stage 1 2006 RC Percussion Drill Hole Programme.

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