TECHNICAL REPORT – PROJECTS

30th October 2006

Introduction

In accordance with the Share Acquisition Agreement described in Section 9 of the Prospectus, Argo Exploration Limited (“Argo” or “Company”) will acquire two Exploration Licences 3084 and 3156 located, respectively, within the Olympic iron oxide Cu-Au (-U) (“IOCG”) and Central Gawler Craton Gold (“CGCG”) Provinces of South Australia (Fig 1).

Figure 1: Interpreted basement geology of the Gawler Craton showing location of Argo’s Exploration Licences in relation to the Olympic Cu-Au (-U) and Central Gawler Craton Gold Provinces and to major mineral deposits. [Modified after Anonymous, (2004): The lowdown on Gawler copper & gold, in J. Wissmann (Ed.) AUSGEO News 74, June 2004, p.4]
Limited past exploration and extensive current research and modelling by Geoscience Australia ("GA") and Primary Industries and Resources South Australia ("PIRSA") over the past five years (Skirrow et al., 2006) has highlighted the mineral potential of these regions.

The exploration programmes planned by Argo are designed to thoroughly explore and evaluate known mineralised positions and defined geochemical anomalies within its tenements and to delineate and drill virgin positions to be identified by comprehensive geophysical surveying.

**South Australia – A Re-Emerging World-Class Mineral Province**

Metalliferous mining commenced in South Australia in 1841 and by the 1860’s the State had become one of the largest copper producing areas of the world (Anon., 2006a; 2006b; Anon., 2006). Copper mining eventually waned in the Twentieth Century, not to be rejuvenated until the discovery of the super giant Olympic Dam copper-gold-uranium-silver-rare earth element (REE) deposit in 1975. With more recent IOCG discoveries, and new mining developments, South Australia is re-emerging as the pre-eminent copper producing region of Australia and has become a significant contributor to global uranium, silver and rare earth inventories.

The history of gold mining in South Australia is broadly similar to that of copper. While alluvial gold was discovered in the central Gawler Craton in 1893 followed by the Source Reefs in 1900, further discoveries in the region were restricted, by extensive sand and soil cover, until the mid-1990’s when the application of new geochemical sampling techniques led to a number of lode-gold positions being identified. Recently developed IOCG and lode-gold mines are making a significant contribution to Australian gold production and will be further enhanced as planned new mines come on stream.

The Olympic IOCG and CGCG Provinces of South Australia continue to offer excellent opportunities for world-class mineral deposit discovery in highly prospective, under explored terrains (Newton et al., 2003).

**Olympic Iron Oxide Copper-Gold (-Uranium) Province**

The Olympic Cu-Au (-U) Province is a Palaeoproterozoic and Mesoproterozoic tectonic and lithostratigraphic domain (Ferris et al., 2002; Skirrow et al., 2002) that extends for some 700 km along the eastern margin of the Gawler Craton in South Australia. It is almost entirely concealed by Mesoproterozoic and younger Stuart Shelf cover sequences, as well as regolith.

Skirrow et al. (2002) believe the province represents the ‘footprint’ of crustal-scale thermal systems, where hydrothermal activity and magmatism of the Hiltaba Association granites-Gawler Range Volcanics have imprinted their effects on the mainly Palaeoproterozoic substrate.

The crustal architecture of the Province is dominated by regional north-west- and north-east-trending basement-piercing faults, the intersections of which have commonly acted as loci for IOCG mineralisation. There is a regional association of IOCG mineralisation with high-level Hiltaba Granite/Gawler Range Volcanic magmatic events and a proximal association with near-vent bi-modal volcanism and associated sedimentation, hydrothermal brecciation, intense iron metasomatism, sodium depletion and alteration vectors involving chlorite, silica, sericite and haematite (Belperio and Freeman, 2004).
The Province is of sufficient scale to host several giant to super giant IOCG deposits analogous to the Olympic Dam deposit – the world’s fourth largest copper deposit and largest single resource of uranium (total resource >3,810 Mt with ore reserves at 31 December 2004 of 761 Mt at 1.5% Cu, 0.6 kg/t U3O8 and 0.5 g/t Au (BHP Billiton, September 2006). The deposit also contains significant silver (67,000 t) and RRE’s (~10 Mt, mainly La and Ce) (Newton et al., 2003).

Following a twenty-six year hiatus, the discovery of the Prominent Hill IOCG deposit, 130 km north-west of Olympic Dam, in 2001, quelled the notion that the Olympic Dam deposit was unique within the Province. While clearly not of the same magnitude as Olympic Dam, Prominent Hill has been the stand-out green-fields discovery of this decade in Australia (Oxiana Ltd, 2006). Currently the Prominent Hill copper-gold breccia resource stands at 101 Mt at 1.5% Cu and 0.55 g/t Au, while the eastern ‘gold only’ zone contains 21 Mt at 1.2 g/t Au; the limits of the ore system have not been defined (Oxiana Ltd, 2006). The deposit was approved for development in August 2006 with first production expected in the second half of 2008. Contained metal stands at 1.5 Mt Cu and 2.6 Moz Au.

Subsequent to the Prominent Hill discovery, a new high-grade copper-gold intersection at the Carrapateena prospect, 100 km south of Olympic Dam (Vella and Cawood, 2006) was announced in mid-2005. The discovery hole intersected (finishing in mineralisation) 178.2 m at 1.83% Cu and 0.64 g/t Au, 0.21% Ce, 0.13% La and 59 ppm U from 476 m (Vella and Cawood, 2006). This new discovery confirmed the Stuart Shelf as the world’s foremost IOCG Province and caught the attention of leading mineral houses. In October 2005, TeckCominco assumed ownership with $18 million commitment to drilling out the property (Skirrow, 2006: Slide 21).

Because the prospective rocks hosting IOCG deposits are commonly covered by hundreds of metres of cover strata, exploration for them relies heavily on geophysical techniques to identify deep drilling targets. For example, Olympic Dam was discovered by drilling on coincident large gravity and magnetic anomalies. The gravity anomalies may be related to large concentrations of dense haematite (non-magnetic iron oxide) and/or magnetic (magnetic iron oxides); magnetic anomalies are attributed to magnetite.

Subsequent to the discovery of Olympic Dam, exploration by Western Mining Corporation (and others) targeted similar large geophysical features, each expressed by a strong analytic signal anomaly, resulting in discovery of copper occurrences, for example, Acropolis, Wirrda Well, Oak Dam, Winjabbie and Emmie Bluff/Canegrass (Vella and Cawood, 2006). However, based on information in the public domain, no further significant deposits were delineated until the Prominent Hill discovery in 2001 which was targeted on mildly offset gravity and magnetic anomalies (Hart and Freeman, 2003).

The Carrapateena prospect, by contrast, is indicated only by a very low order, broadly coincident gravity and magnetic anomaly (Vella and Cawood, 2006) but exhibiting slight offset between gravity and magnetic peaks interpreted as being a reflection of possible haematite-magnetite zoning (Fairclough, 2005).

This discovery showed that the geophysical expression of Stuart Shelf IOCG systems can range from bold to very subtle and opens up many new targets for exploration.
Quality Tenements

The Directors believe that Argo’s tenements represent under-explored, well positioned tenure within the Olympic IOCG and Central Gawler Craton Gold Provinces affording potential for mineral resource discovery.

**EL3084 Intercept Hill** (423 km²) is located within the Stuart Shelf Domain of the Olympic Province, an area identified as having ‘high potential’ for IOCG deposit occurrence (Skirrow et al., 2006). Over the past five years, the Gawler Mineral Promotion Project (GMPP), a joint effort of GA and PIRSA has shed considerable light on ~1590 Ma IOCG mineral systems of the eastern Gawler Craton and the coeval lode-gold systems of the central Gawler Craton (Skirrow et al., 2006). The work has led to the production of a map of IOCG potential of the Gawler Craton which emphasizes the ‘high potential’ of the Emmie Bluff-Olympic Dam metasomatic cell to host further world-class IOCG deposits (Skirrow et al., 2006); EL3084 is situated within this cell.

A number of ‘key essential ingredients’ of IOCG ore-forming systems have been recognized (Skirrow et al., 2006), including:

- rock units of the Gawler Ranges – Hiltaba –Volcano-Plutonic Association;
- deep basement-piercing faults/shear zones with first-order controls on fluid pathways being north-west-trending thrust faults;
- copper geochemistry (>200ppm) in Mesoproterozoic and older crystalline basement;
- hydrothermal alternation assemblages and zones, based on drill hole logging, potential-field interpretation, and 3-D inversion modelling of potential-field data; and
- host sequence units considered important in localizing IOCG alteration and mineralisation (e.g., Wallaroo Group and equivalents, Hutchison Group and equivalents, BIF).

Skirrow (2006) has used the above criteria to assign prospectivity rankings to areas of the Gawler Craton; the ranked areas are illustrated in the *Gawler Craton iron oxide Cu-Au (-U) potential map* (Skirrow et al., 2006). The ranks are based on an assessment of ‘essential ingredients’ for IOCG systems in the area – areas with the greatest number of ‘essential ingredients’ are considered to have the maximum potential for IOCG mineralisation (Skirrow et al., 2006). Four categories are recognized with “1” being ‘high potential’ and “4”, ‘moderate potential’.

The results of the GMPP are a coherent model of mineralisation of the eastern and central Gawler Craton that links IOCG’s with their coeval lode-gold deposits, providing valuable spatial guides to mineralisation in these deeply covered terranes. GA has demonstrated that the use of potential-field data is critical to understanding the geological makeup of the basement. 3-D inversion modelling of potential-field data has defined a number of localized areas having characteristics of magnetite and/or haematite + sulphide alteration, necessary prerequisites to the formation of IOCG deposits.

The 3-D inversion models differentiate volumes of magnetite- and haematite-bearing (and/or sulphide-mineralised) rock from least-altered host rock. These are really 3-D maps of hydrothermal alteration and a template for mineral exploration (AUSGEO News 74, p5).

GA has modelled virgin areas of haematite (+sulphide) alteration within EL3084 considered to be prospective for IOCG ore occurrence.
EL3156 Toondulya (390 km²), is located within the CGCG Province in an area ranked “3” for IOCG potential (Skirrow et al., 2006). GA and PIRSA note EL3156 occupies an area with corresponding potential for lode-gold deposit occurrence. Generally, the region has been targeted for its potential to host IOCG mineralisation and/or structurally controlled gold mineralisation. A number of companies selected areas for copper-gold exploration along, and/or including, segments of the major Craton-scale Yarlrinda Shear Zone (“YSZ”) which was active at the time of emplacement of Hiltaba Suite granites and, hence, potentially mineralised (Fig. 2).

Calcrete geochemical sampling of these areas delineated several gold anomalies leading to subsequent ore deposit discovery.

Having regard for possible dilatational zones, Homestake Gold of Australia Ltd specifically targeted an area of interaction of major splays to the YSZ with elements of the north-easterly trending Arcoona Horst and their work located the principal gold-in-calcrete anomalies within the area covered by Argo’s EL3156 (Fig. 3).
Recently discovered lode-gold deposits in the CGCG Province have a number of key features in common (Parker, 2003; Ferris and Wilson, 2004):

- they are blind deposits under generally <40 metres of Cenozoic cover - they were located by drilling gold-in-calcrete anomalies in pre-selected areas;
- calcrete anomalism is coincident with zones of intense demagnetization;
- mineralisation is confined within shear zones which may be several hundred metres to kilometres wide;
- gold is hosted in narrow, steeply dipping quartz veins and is associated with sulphides, dominantly pyrite and minor galena within an intense alteration zone mainly comprising sericite and chlorite;
- the mineralisation is most likely related to fluid influx associated with emplacement of Hiltaba Suite granites into the active YSZ; and
- structure appears to be the dominant control on mineralisation with the shear zone focusing fluids and with fault intersections acting as trap sites.
The Directors believe that most of these key features have been established at Toondulya, thereby emphasizing the potential for lode-gold deposit discovery within the Company’s Exploration License 3156.

THE PROJECTS

INTERCEPT HILL EL3084

Geology

Intercept Hill is located within the Stuart Shelf domain of the Olympic Cu-Au Province. The region is considered to represent the ‘footprint’ of crustal-scale thermal systems where hydrothermal activity and magmatism of the Hiltaba Suite – Gawler Range Volcanics (“GRV”) have imprinted their effects on the mainly Palaeoproterozoic substrate comprising Wallaroo and Hutchison Group (and equivalents) metasedimentary and metavolcanic rocks, banded iron formation and felsic and mafic intrusive rocks (Fig. 4).
Figure 4: Map of Stuart Shelf basement architecture showing known distribution of principal alteration types, interpreted basement geology and major basement-piercing faults considered to be active during emplacement of IOCG deposits. Important north westerly- and north easterly-trending faults, two of which pass through, and intersect within, Argo’s EL3084, have been highlighted by GA and PISA. Key alteration assemblages occur within, and adjacent to, the EL which is underlain by rock types considered by GA to be receptive to IOCG mineralization. [Redrawn from Skirrow et al, (2006): Alteration and mineralization settings in the Olympic Cu-Au province, Gawler Craton, South Australia: Power Point Presentation, Geoscience Australia and Primary Industries and Resources South Australia.]

Hydrothermal fluid movement in basement to the Stuart Shelf is believed to have been controlled by networks of regional faults in dominantly northwest- and northeast-trending arrays. The intersections of these faults have commonly acted as loci for enhanced fluid flow and, hence, mineral deposition. Prominent northwest-trending faults have been identified by GA passing through, and intersecting within, the Company’s tenement (Fig. 4); the identified northwest-trending fault passes through Emmie Bluff/Canegrass and is, in part, straddled by a coincident gravity high-magnetic low anomaly and a 3-D inversion-modelled area of haematite (+sulphide) alteration (Fig.5).
Figure 5: Map of basement architecture in the Emmie Bluff – Olympic Dam region showing areas of magnetite, haematite (+sulphide) and sericite alteration derived from 3-D inversion modeling of potential-field data for a 500 metre depth slice by GA and PIRSA. Also shown is the position of Argo’s EL3084 relative to modeled areas of haematite (+sulphide) alteration in the Emmie Bluff environs, rocks considered receptive to emplacement of IOCG deposits, basement-piercing faults and region ranked 1 “high potential”. [Modified and redrawn from part of the 1:500 000 “Gawler Craton Iron Oxide Copper-Gold (-Uranium) Potential” map, Skirrow et al. (2006)].

The 3-D crustal architecture has been interpreted from potential-field modelling. Of further interest is the apparent association of the recently announced intersections of Monax Mining Ltd, at their Punt Hill tenement, with the same northwest-trending fault array passing through Emmie Bluff and EL3084.
Two key hydrothermal alteration assemblages (CAM and HSCC) are recognized in the Stuart Shelf ‘footprint’ region of the Olympic Cu-Au Province (Skirrow et al, 2006). The CAM assemblage (calcsilicate-alkali feldspar-magnetite) represents relatively high temperature alteration (~400-550°C), and is commonly rich in magnetite producing high-amplitude magnetic anomalies.

The HSCC alteration assemblage (haematite, sericite, chlorite, carbonate) is, in places, closely associated with Cu-Au mineralisation, with or without uranium (e.g. Olympic Dam, Prominent Hill, Emmie Bluff). Not all of the four key minerals are necessarily present at any particular occurrence of HSCC, but variations on this assemblage consistently are observed to overprint the CAM. HSCC represents the products of relatively low temperature (<300°C) oxidized fluids, and in places correlates with de-magnetization features in aeromagnetics. These essential alteration assemblages are known from Emmie Bluff/Canegrass (Fig. 4).

Conversion of CAM to HSCC via the passage of ‘low’ temperature, oxidized fluids appears to be a pre-requisite to the development of high-grade mineralisation (Fig. 6).

**Figure 6:** Computer modeling showing flushing of magnetite alteration, containing sub-economic copper and gold, by oxidized fluids produces haematite alteration and upgrades copper and gold. The characteristic suite of sulphides associated with IOCG mineralization is predicted. A consequence is that maxima of magnetic anomalies are not optimal drill targets for copper gold. A combination of mineralogical data with magnetic and gravity data is required to locate haematite alteration adjacent to magnetite alteration. [From: Skirrow et al. (2006): Gawler Project breaks cover, AUSGEO News, 83; September 2006, p.2].
Geophysics

Previously available gravity data for the tenement area was generally broad-spaced but sufficient to establish an elongated Bouguer gravity anomaly trending northwest through the tenement from Emmie Bluff. The gravity high is surrounded by an annulus of low gravity and is interpreted to reflect a resurgent dome central to a major caldera structure. However, this regional gravity lacked the definition required for detailed modelling and drill targeting.

Argo commissioned a detailed gravity survey over EL3084 Intercept Hill to acquire modern data suited to constrained 3-D inversion modelling of iron oxide (+sulphide) alteration assemblages to aid drill hole targeting. The survey, involving the collection of some 7,000 gravity stations on a 400 x 200 metre grid, confirmed the regional Bouguer gravity high which is broadly coincident with a modelled lozenge of haematite (+sulphide) alteration (Figs 7; 8).

**Figure 7:** Residual Bouguer gravity, based on ~7,000 gravity measurements on a 400 x 200 metre grid, with superimposed selected inferred north-west and north-east-trending fault traces. The positions of drill holes AD2 and AD8 at Canegrass within the EL are shown. The image is based on data collected for Argo by Haines Surveys Pty Ltd and processed by Southern Geoscience Consultants Pty Ltd. It represents north east shadowed residual gravity, linear stretch; GDA 94 MGA Zone 53S.
Figure 8: An oblique view of a 3-D inversion model of regional potential-field data interpreted as magnetite- and hematite- or sulphide-alteration, in the Olympic Cu-Au Province. The Olympic Dam copper-gold deposit and four other copper-gold-uranium occurrences are shown, as well as the outlines of basement units from a previous 2-D interpretation. The depth of the model volume is 10 kilometres. [From: Anonymous, (2004): The lowdown on Gawler copper & gold, in J. Wissmann (Ed.) AUSGEO News 74, June 2004, p.5].

(AUSGEO News 74, 2004, p5.) and with an interpreted regional northwest-trending fault array through the tenement. In addition, derived areas of residual gravity are coincident with Canegrass and with the area of haematite (+ sulphide) modelled by GA at 500 metres (Ref) (Fig. 5). Other additional areas of residual gravity, with footprints large enough to host large IOCG accumulations are also present in the image (Fig. 7).

As with the gravity data, available regional magnetic images have been constructed from generally wide-spaced aeromagnetic traverses. This data is considered to lack the resolution required for detailed constrained 3-D inversion modelling required to facilitate drill hole targeting.

Detailed data, complementary to Argo’s newly acquired gravity data, is clearly required and, to this end, Argo will commission a detailed aeromagnetic and radiometric survey of the tenement. The proposal is to fly the survey at 50 metre traverse spacing and 50 metre sensor height.
The existing regional aeromagnetic image (Fig. 9) illustrates a strong magnetic ridge, trending northwest from the position of drill hole AD8 towards drill hole ASD2 before kinking to the southwest to a circular magnetic element, the site of a strong untested analytic signal anomaly (Vella and Cawood, 2006) within EL3084. This northwest-trending magnetic ridge is bordered along its northeast flank by a broad magnetic trough which coincides with a residual gravity anomaly (Fig.7) and with the position of the constrained 3-D inversion-modelled anomaly generated by GA (Figs 5; 8) (Skirrow et al., 2006).

**Figure 9:** Total magnetic intensity image of the environs to EL3084 showing positions of mineralised drill holes near to the EL together with associated intersections and assay data. The area of 3-D interpreted hematite (+sulphide) alteration shown in Fig.5 at 500 metres depth, and the lozenge of similar alteration trending north-west from Emmie Bluff in Fig. 8, generally coincide with the magnetic valley between the magnetic ridge running from AD8 to ASD2 and the position of ASD1.

The Directors believe the coincident signature of residual gravity and low magnetics to be compatible with a major area of haematite (+ sulphide) alteration and, as noted by GA, “any mass of haematite showing up in their modelling is regarded as being highly positive and indicative of something of interest in the vicinity that should be investigated” (Otterman, IGR).

The Company plans to engage consultants to carry out all geophysical data processing.


**Mineralisation**

Known mineralisation within, and near to, EL3084 is of two main types – basement-hosted IOCG and cover sequence-hosted Cu-Ag-Co.

At nearby Oak Dam, a U-Ag Intersection in Pandurra Formation supports the notion of unconformity- and fault-hosted uranium occurrences, while the extensive multi-element geochemical anomaly in the cover sequence Tapley Hill Formation allows the possibility of major distal base metal accumulations.

**Proposed Exploration Programme**

To ensure its exploration objective, the Company will follow an ordered programme leading to drill testing. Critical to this programme is the acquisition of detailed, high quality geophysical data as a prelude to sophisticated data analysis involving constrained 3-D inversion modelling. To this end, a detailed gravity survey over EL3084 was recently commissioned by Argo and has been completed.

Once airborne geophysical surveys have been flown, the full data sets will be integrated, exhaustively processed and the data modelled by third parties expert in the field. Based on the results obtained, a number of target positions may be further assessed using ground electrical/electromagnetic techniques prior to drilling. Once more, derivative data will be processed by third parties expert in the field.

Concurrently, all available geological and geophysical data will be synthesized, relevant drill holes sampled and analysed, both physically and chemically, and proprietary ‘forensic fingerprinting’ of IOCG sulphide minerals conducted and evaluated against an ‘in house’ database. The fingerprint data is expected to allow assessment of the equivalence of known mineralised positions, both within and near to the Company’s tenement to large IOCG ore systems such as Olympic Dam and Ernest Henry.

Using the model for Oak Dam (Fig. 10), the Company will systematically assemble data pertinent to the formation of distal base metal accumulations and will explore potentially mineralised cover sequence positions, particularly with the Tapley Hill Formation which hosts the Emmie Bluff inferred copper resource and a large multi-element base metal anomaly (Fig. 11). Potential unconformity- and/or fault-controlled uranium positions, where delineated, will be assessed.
**Figure 10:** Model of IOCG ore emplacement, developed for the nearby Oak Dam deposit, illustrating the potential continuum between IOCG and distal lead-zinc-silver mineralization. [From: Davidson, G. (1991): Chemical and physical controls on the development of Oak Dam East: A prodigious, uraniuym-bearing, massive oxide body. (Manuscript.).]

**Figure 11:** Location of Arcoona multi-element geochemical anomaly in basal Tapley Hill Formation and extent of regional geochemical study (other lower order anomalies not shown). [Modified from Figure 6, Tonkin, D. G. (2002) : Annual Report for EL2792 Intercept Hill, March 2002.]
Defined high priority targets will be drilled in a measured fashion. Where appropriate, down hole electrical surveys will be employed to evaluate the presence, strength and azimuth of potential conductive zones away from the drill hole intersection. These surveys are expected to assist in the location of further drill holes towards potentially more strongly mineralised terrain.

**TOONDULYA EL3156**

**Geology**

The Toondulya tenement is located within the CGCG Province on the south western flank of the GRV, a possible Proterozoic mega-caldera, proximate to the caldera margin. It is positioned at the point of interaction of the northern edge of the Arcoona Horst and the YSZ (Fig. 2).

The Arcoona Horst is a broad, northeast-trending structural corridor some 75 to 100 km wide that traverses the Gawler Craton between Streaky Bay and the northern end of Lake Torrens (Otterman, IGR). The northern and southern edges of the Horst are believed to reflect deep mantle-plumbing structures that provided pathways for mineralizing fluids believed to be involved in the formation of ore deposits such as Olympic Dam, Acropolis and Cattle Grid.

The YSZ, a north-south trending structure which pre-dates the GRV, was active during emplacement of Hiltaba Association granitoids. Toondulya is positioned where the shear zone bifurcates into a broad zone of southeast-trending splay faults. The YSZ marks the western edge of the GRV and contains a concentration of elliptical intrusions of the Mesoproterozoic Hiltaba Association granitoids.

Over most of the tenement area, Precambrian basement is covered by up to 60m of regolith, comprising weathered saprolite, silcrete, calcrete and surficial dune sand. In the southwest corner of the tenement, a Tertiary palaeo-drainage, the Narlaby channel, is incised into basement beneath the Quaternary cover.

Dacites, rhyodacites and rhyolites of the GRV, exposed in the northeast corner of the tenement, are intruded by felsic granitoids of the Hiltaba Association. Elsewhere, little is known of the basement rocks due to extensive cover over much of the tenement. However, at the Toondulya anomaly, air core drilling by Homestake provided a window to a basement of predominantly Hiltaba Association granite, altered granitoids, granite gneiss, gneiss and schist with minor dolerite and amphibolite dykes in the area (Fig. 12). The various rock types were variably sericite-chlorite altered, with areas of K-feldspar, haematite and epidote alteration being recorded.
Figure 12: Interpreted basement geology at Toondula prospect based on visual and petrographic assessment of drill cuttings. The interpretation illustrates two north westerly-trending faults parallel to the aircore drill traverse lines (dots), the general felsic nature of the basement units, fault displacement of the margin of Hiltaba Suite granite and lack of coincidence of the drill traverse lines with the interpreted fault positions. [Modified after Homestake].

Geophysics

Regional gravity and aeromagnetic images illustrate a prominent gravity high, coincident with a magnetic low, in the north western sector of the tenement proximate to a strongly magnetized triple point intersection, interpreted to reflect the magnetized margins of nested granite plutons and/or structural lineaments. In November 1999, having reviewed Homestake’s data, Anglo American Exploration (Australia) Pty Ltd (“AAE”) commissioned an ~800 metre centred gravity survey over the area of the regional gravity high. The resulting gravity anomaly is roughly circular in shape, has a diameter of about 8 km, gives rise to a significant residual gravity anomaly (Fig. 13) and has a strong coincident arsenic-in-calcrete geochemical anomaly (Fig. 14).
Figure 13: Residual gravity image based on an ~800 metre centred gravity program conducted on behalf of Minorco Ltd to confirm extent and shape of a gravity anomaly based on a single point in the regional gravity map. [Data re-processed and plotted by Southern Geoscience Consultants Pty Ltd.].
Figure 14: Plan showing arsenic-in-calcrete anomalies within Argo’s EL3156. Aircore drill traverse lines, resulting from an earlier period of exploration, are shown at the Toondulya anomaly. The main arsenic anomaly is coincident with the gravity anomaly (Fig. 13) and forms a general annulus about the gold-in-calcrete anomaly. The positions of aircore drill traverse lines from prior exploration are shown. [Plotted by Southern Geoscience Consultants Pty Ltd; based on data collected by Homestake Gold of Australia Ltd].

The southern flank of the gravity response had been drill tested by Homestake and petrographic analysis of some end of hold samples showed mafic rocks had been intersected. AAE concluded that the gravity anomaly was most likely related to a mafic intrusive and did not represent a typical iron oxide copper-gold deposit. However, it is evident from bedrock mapping that the only mafic rocks intersected consist of northeast trending dolerite dykes and minor amounts of amphibolite gneiss (Otterman, IGR). Furthermore, the gravity high is coincident with a magnetic low which would negate a mafic source unless it had been completely demagnetized. AAE also concluded that the anomalous geochemistry had been adequately evaluated by Homestake’s drilling without significant encouragement, failing to recognize the significance of values up to 0.98g/t Au and 0.17% Cu in regolith, and associated alteration zones in areas removed from the influence of shear/fault structures.

The source of the gravity response remains to be determined. The residual gravity anomaly suggests an excess of dense non-magnetic mineral, potentially sulphide and/or haematite in the source.
Southern Geoscience believe that the gravity source is relatively shallow and not related to a mafic intrusion (WS Peters, pers. comm. 2006) and the strong coincident arsenic and flanking gold anomalies render the gravity anomaly a high priority target for evaluation.

**Geochemistry**

Homestake carried out a geochemical calcrete sampling programme over a 4,000 km² region which led to the definition of the three prominent gold-in-calcrete gold anomalies within the tenement area. Values up to 39 ppb Au were obtained from the broad spaced sampling programme at the largest of the anomalies, the Toondulya prospect, that covers an area >5 x 2 km.

As well as analyzing the samples for gold, full analysis of copper and arsenic was undertaken; only the early samples were analysed for other base metals. Plots of the arsenic and copper data (Figs 14; 15) illustrate well-developed anomalous positions with annular to coincident association of gold and arsenic and generally coincident copper and gold. While not plotted, incomplete data for lead and zinc returned values up to 10 ppm Pb and 25 ppm Zn, values considered quite anomalous in calcrete.

**Figure 15:** Plan showing copper-in-calcrete anomalies within Argo’s EL3156. Aircore drill traverse lines, resulting from an earlier period of exploration, are shown at the Toondulya anomaly. The main copper anomalies are not associated with the defined gravity high (Fig. 13) nor
with arsenic distribution. They occur in the eastern sector of the EL in an area of incomplete calcrete geochemical sampling. The positions of aircore drill traverse lines from prior exploration are shown. [Plotted by Southern Geoscience Consultants Pty Ltd; based on data collected by Homestake Gold of Australia Ltd].

Homestake tested the Toondulya prospect with aircore drill traverses at 1 and 1.6 km line spacing and holes at 50 metres and 25 metres along the lines. A total of 250 holes were drilled and penetrated a regolith of calcrete, silcrete and saprolitic clay averaging 46 metres thick. Several intersections anomalous in gold and/or copper, with maximum values to 0.98 g/t Au and 0.17% Cu were recorded.

The better gold values are associated with a broad zone of sericite-pyrite alteration flanked by areas of haematite and epidote alteration. This alteration assemblage, overlying an area of low magnetic susceptibility, along with the granite-gneiss-schist basement and mylonite development, is generally similar to the geology at Tunkillia and Nuckulla Hill. More importantly, Homestake’s drill traverse lines were oriented to the northwest, parallel to the trend of splay arrays of the YSZ. The example of Tunkillia and Nuckulla Hill deposits is that mineralisation is confined within shear zones.

A basement geology map at Toondulya prospect, constructed on the basis of drill cuttings analysis (Fig. 12) shows two prominent northwest-oriented basement faults, with horizontal displacements of 250 to 1,000 metres, offsetting the contact of a Hiltaba Association pluton. None of the drill traverse lines are positioned within 250 metres of these interpreted faults. These observations suggest that the Toondulya prospect, together with the satellite Hiltaba and Ilkina anomalies, remains essentially untested.

**Proposed Exploration Programme**

At Toondulya, the Company’s exploration objective is the ordered confirmation of existing calcrete geochemical anomalies along with their structural, geological and geophysical settings as a prelude to further drill testing.

The intention of the Company is to engage a contractor to fly the tenement with aeromagnetic and radiometrics at 50 metre line spacing and 50 metre sensor elevation. This survey will assist not only in the assessment of the base and precious metal potential of the tenement, but also the uranium potential of associated Tertiary palaeo-channels draining from the EL. The geophysical data will be fully processed and modelled.

Calcrete geochemical sampling of the tenement will be completed over the north western sector, an area potentially anomalous in gold, copper, arsenic and other base metals. Concurrently, orientation biogeochemical sampling will be undertaken at all three gold-in-calcrete anomalous positions and evaluated. Should the technique prove satisfactory, it will be employed to better define the size and orientation of elements of the calcrete anomalies.

Because of the generally ‘shallow’ overburden of <60 metres, RAB and/or aircore drilling is expected to be extensively used as a prelude to RC drilling.
REFERENCES


