CASEY PROJECT

EL 24646

SECOND ANNUAL TECHNICAL REPORT
FOR THE PERIOD

16th December 2006 to 15th December 2007

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January 2007

MAP REFERENCE:
HALE RIVER 250K Sheet
SG53/3
SUMMARY

This report summarises the work completed on Exploration Licence 24646 for the period 16th December 2006 to 15th December 2007. During this period, a significant amount of work was completed, including:

- Ground magnetic surveys (69.6 line km) at Pipeline and Arthur Popes,
- Fixed loop ground EM survey (10 line) at Pipeline,
- Dipole-dipole IP surveys (6 lines) at Pipeline and Arthur Popes,
- Diamond drilling (3 holes for 590 m) at Pipeline,
- Prospect mapping and sampling at Pipeline and Arthur Popes, and
- Regional mapping and sampling.

This work has provided a better understanding of the copper mineralisation at Pipeline, though many questions are yet to be resolved. All of the drillcore samples are yet to be returned, but the copper mineralisation is now interpreted to be somehow related to the unconformity between the Loves Creek Member and the Areyonga Formation. Mineralisation may have formed at the unconformity because it is a major redox boundary with the mineralising fluids being exotic to the area. If so, this mineralisation is highly prospective (e.g., Kupferscheifer, African Copper Belt analogies). Alternatively, the mineralisation may be a local feature and of no economic importance.

The work during the second year also discovered that carbonatite veins are associated with copper mineralisation at Arthur Popes. These veins have not been reported previously. The carbonatite veins were discovered to be widespread and associated with elevated REE and Y. Some spectacular copper grades were returned, but the mineralisation thus far is small and discontinuous. Further mapping is required to completely delineate the extent of the veins and find a place where the copper mineralisation is more significant.

Regional work looking for exposed mafic-ultramafic Ni-Cu-PGE sulphide mineralisation was disappointing, with only one significant Cu anomaly returned. Although the work has uncovered more ultramafic rocks beneath silcrete caps, these returned poor base metal results. Further work for this style of mineralisation will need to focus on covered magmatic bodies.

Further work is required to determine whether the Cu mineralisation at Pipeline and Cu-REE-Y mineralisation associated with the carbonatite veins have regional significance. Further work on magmatic Ni-Cu-PGE mineralisation may flow from the regional gravity survey to be completed in the next year.
CONTENTS

1.0 Introduction........................................................................................................1
2.0 Location...............................................................................................................1
3.0 Tenure..................................................................................................................1
4.0 Geology..............................................................................................................2
5.0 Previous Exploration..........................................................................................3
6.0 Mithril Activities.................................................................................................4
   6.1 Year 1..............................................................................................................4
      6.1.1 Reconnaissance work..............................................................................4
      6.1.2 Pipeline Prospect.................................................................................5
      6.1.3 Central and Western Ultramafics.......................................................5
   6.2 Year 2..............................................................................................................5
      6.2.1 Outstanding Samples............................................................................5
      6.2.2 Pipeline..................................................................................................7
          Mapping/rockchip sampling.................................................................7
          Ground magnetics...............................................................................8
          Fixed-loop ground EM.......................................................................8
          Induced polarisation..........................................................................9
          Drilling.................................................................................................9
          Interpretation.......................................................................................11
      6.2.3 Arthur Popes Copper Prospect..........................................................12
          Mapping and sampling.....................................................................12
          Ground magnetics..........................................................................13
          Induced polarisation.......................................................................14
      6.2.4 Other Regional Sampling.................................................................14
   7.0 Expenditure.....................................................................................................15
      7.1 Year 2........................................................................................................15
      7.2 Year 3 (proposal)....................................................................................15
   8.0 References....................................................................................................16
FIGURES (follow text)

Figure 1: Location of EL 24646.

Figure 2: Location of greater Casey Inlier, plus Ringwood Cu prospect and Limbla Syncline. Background: total magnetic intensity draped over 1st vertical derivative.

Figure 3: Location of greater Casey Inlier, plus Ringwood Cu prospect and Limbla Syncline. Background: 250k published geology maps.

Figure 4: Geological domains of Casey Inlier based on work by NTGS. Background: total magnetic intensity draped over 1st vertical derivative.

Figure 5: Gross stratigraphy of northeastern Amadeus Basin (after Korsch & Kennard, 1991).

Figure 6: Distribution of stream sediment samples in EL 24646. Background: solid geology interpretation.

Figure 7: Distribution of rockchip samples in EL 24646. Background: solid geology interpretation.

Figure 8: Distribution of drillholes in EL 24646. Background: solid geology interpretation.

Figure 9: Pipeline outcrop geology with drillhole traces and rockchip localities. Background: colour airphoto.

Figure 10: Pipeline ground magnetics with drillhole traces and IP pit locations.

Figure 11: Pipeline ground electromagnetics – plan view showing conductance contrast.

Figure 12: Cross-section for CPDD001.

Figure 13: Cross-section for CPDD002.

Figure 14: Cross-section for CPDD003.

Figure 15: Arthur Popes area showing distribution of rockchip samples and carbonatite veins. IP survey location also shown. Background: colour airphoto.

Figure 16: Arthur Popes area showing distribution of rockchip samples and carbonatite veins. IP survey location also shown. Background: ground magnetics and colour airphoto.

APPENDICES

Appendix 1: Logging codes.
Appendix 2: Rockchip sample results.
Appendix 3: Stream sediment sample results.
Appendix 4: Geophysics report (magnetics, EM).
Appendix 5: Ground magnetics results.
Appendix 6: Ground EM results.
Appendix 7: Geophysics report (IP)
Appendix 8: IP results.
Appendix 9: Drill logs, samples and results.
Appendix 10: Drillcore and costean photos.
Appendix 11: Mineralogical Report – Pontifex & Associates
1.0 Introduction

This report summarises the work carried out by Mithril Resources Limited on Exploration Licence 24646, the Casey Project, for the period 16th December 2006 to 15th December 2007.

The Casey Project area was selected following mapping by the Northern Territory Geological Survey (NTGS), who identified previously unknown ultramafic rocks that were considered prospective for Ni-Cu-PGE sulphide mineralisation. During Mithril’s first year of exploration, Ni-Cu anomalism was found to be associated with these ultramafic bodies. Furthermore, reconnaissance sampling delineated Cu gossans (Pipeline Prospect) within Amadeus Basin sediments and the NTGS rediscovered the Arthur Pope’s Cu Prospect.

In the second year of exploration, detailed mapping, sampling and ground geophysics were undertaken at the Pipeline Cu Prospect. The geology was found to be very complicated with Cu mineralisation widespread and in various rock types. Three diamond drill holes were completed at the prospect. Assays are pending.

Elsewhere on EL 24646, more ultramafic rocks were identified and carbonatite veins associated with Cu-REE mineralisation were discovered. These carbonatite veins are associated with the mineralisation at Arthur Pope’s Cu Prospect, where ground geophysics was undertaken.

2.0 Location

EL 24646 is located 170 km east-southeast of Alice Springs along the northwestern margin of the Simpson Desert (Figure 1). Access from Alice Springs is via the Ross Hwy for 33 km and then 158 km along the Ringwood-Numery Road. There are few station tracks within the tenement, so field access is typically across country.

3.0 Tenure

EL 24646 was granted on 16 December 2005 to Minex (Aust) Ltd, a wholly owned subsidiary of Mithril Resources. The licence covers a total of 201 blocks. A waiver from relinquishment was lodged at the end of the second year.

Most of the tenement is within NT Portion 483, the Numery perpetual pastoral lease, except the westernmost part, which is within NT Portion 744, the Loves Creek PPL.

<table>
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<th>Blocks Relinquished</th>
<th>Blocks Retain</th>
<th>Grant Date</th>
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<td>201</td>
<td>0</td>
<td>201</td>
<td>16 Dec 2005</td>
<td>15 Dec 2011</td>
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</table>

Table 1: Details of EL 24646
4.0 Geology

The geology of Central Australia can be divided into two broad components: Paleo-
to Mesoproterozoic igneous-metamorphic rocks (Arunta-Musgraves regions) and
Neoproterozoic to Palaeozoic Centralian Superbasin sediments (Amadeus-
Georgina-Ngalia Basins). The Centralian Superbasin once covered the entire
southern Arunta (Walter et al., 1995), but uplift and erosion of the basin produced
domains where the sediments are now absent and Arunta basement is exposed.

The Casey project focuses on the Casey Inlier; a 17 km wide, northwest-trending
uplift block where the southeasternmost outcrops of Arunta basement are exposed.
Basement is exposed for about 50% of the inlier (Figure 2, 3). Where covered, the
preserved Amadeus sediments are relatively thin and only shallowly dipping. The
entire uplift block is obvious in the regional aeromagnetic data as the basement
rocks are more magnetic than the Amadeus sediments (Figure 2). The gross
structure of the uplift block is complicated, although it is probably bounded by
southwest-dipping thrust faults. The northwestern and southeastern margins of the
uplift block are poorly constrained.

The Casey Inlier is divided into five distinct domains: three basement domains and
two supracrustal domains. The domains are shown in Figure 4. Descriptions and
geochronology are taken from Close et al., 2006; 2007.

The Eastern Basement Domain comprises metasediments, biotite granite and mafic-
ultramafic intrusions, all of which have been pervasively deformed into a northwest-
trending, upper amphibolite-facies fabric. SHRIMP U-Pb dating of detrital zircon from
a metasediment suggests a maximum depositional age of 1845 ± 6 Ma, whereas a
felsic intrusive yielded an age of 1817 ± 3.9 Ma.

The Central Basement Domain comprises granulite-facies migmatitic psammite with
lesser pelite and mafic and felsic intrusives. SHRIMP U-Pb dating of detrital zircon from
a pelite suggests a maximum depositional age of 1865 ± 5 Ma, whereas dating
of zircon rims suggest peak metamorphic temperatures at 1768 ± 5 Ma. The
metamorphic age is within error of the interpreted magmatic age of a nearby
metagabbro (1770.6 ± 5 Ma). The granulite-facies mineral assemblage is overprinted
by the upper-amphibolite fabric found in the Eastern Basement Domain.

The Western Basement Domain is dominated by granite and mafic intrusives. Peak
metamorphic grade is amphibolite facies, which defines a northwest-trending fabric,
similar to that found in the other basement domains. Biotite granites have interpreted
magmatic ages of 1638 ± 4.2 Ma and 1642 ± 3.5 Ma. These ages are coeval with
magmatism in the Warumpi Province, best exposed west of Alice Springs, and the
Western Basement Domain may represent the easternmost exposure of this
province.

The Central Supracrustal Domain is an 8 x 1.5 km sliver of quartz conglomerate,
quartzite and porphyritic pelite adjacent to the fault separating the Eastern and
Central Basement Domains. Peak metamorphism was at upper greenschist facies
and was associated with northeast-directed thrusting to develop a northwest-trending
schistosity. SHRIMP U-Pb dating of these sediments yielded a maximum
depositional age of 1254 ± 75 Ma.
Amadeus Basin sediments thinly cover about half of the Casey Inlier. Cliffs of Heavitree Quartzite preserve the unconformity above all the basement domains. The Amadeus sediments overlying the inlier typically dip shallowly. A general stratigraphic column for the northeastern Amadeus Basin is presented in Figure 5.

EL 24646 covers the southeastern part of the Casey Inlier. About 25% of the tenement is Arunta basement, including the entire Eastern Basement Domain and a small sliver of the Central Basement Domain (Figure 4). About 25% of the tenement is covered by Amadeus Basin sediments and about half the tenement is thinly covered by the suprapediment alluvial floodout of the Hale River and aeolian sand of the Simpson Desert. Half of the Central Supracrustal Domain is within the tenement.

5.0 Previous Exploration

Historical exploration within the Casey Inlier has been for various styles of mineralisation. There had been no systematic exploration for Ni-Cu sulphides; the focus for Mithril. The main historic work is shown in Figures 6-8 and includes:

Sabminco (EL 5363; CR19890017) – Au exploration in the exposed Arunta basement of the Casey Inlier. Copper mineralisation at 3 localities reported, including Arthur Popes Prospect, but no evidence that any work was undertaken at these localities. Numerous stream sediment and soil samples taken, but mainly in Central and Western Basement Domains. However, their best stream sediment result of 6400 ppt Au (bulk cyanide leach) was collected from EL 24646 (northernwestern entrance to Casey pound).

Pancontinental (EL 6550; CR19900180) - zircon-monazite mineral sand exploration in Hale River alluvial fan. Ground magnetic and shallow drillhole traverses across the Hale River. A number of these traverses are within EL 24646. Heavy mineral concentrates averaged 7-8 %, but were predominantly garnet with little zircon or monazite.

Poseidon Exploration (EL 6997, 6998, 7392; CR1992007, 19930015, 19930784) - Cu, Pb, Zn and Ag exploration, including very detailed work on the Amadeus Basin sediments overlying the northern part of the Casey Inlier and flanking the inlier. Includes work at the Limbla and Ringwood Copper prospects, which are east and west of the Casey Inler, respectively (Figure 2, 3). Extensive lag, soil, stream sediment and rockchip sampling. 14 key areas identified for continued work. Ground geophysics and drilling undertaken at these key areas. None of this work was within EL 24646, but it is still relevant to the greater area.

CRAE/Rio Tinto Exploration (EL 9332, 9335, 9337, 9340; CR19970431, 19970543) - Very extensive landholding, including about half of the Arunta basement in the Casey Inlier. Proximity to the continental-scale Woolangi Lineament (bounding faults of Casey Inlier?) noted for kimberlitic diamonds potential. Regional airborne magnetic and radiometric survey completed over entire area delineated 64 discrete dipolar magnetic bodies. Follow-up bulk gravel samples collected from 34 of these anomalies yielded no kimberlitic mineral indicators. Other focus was the Amadeus Basin sediments, particularly the contact between the Heavitree Quartzite and Gillen
Member (Bitter Springs Formation) looking for stratabound, sediment-hosted copper (African Copper Belt, Kupferschiefer) and unconformity-related uranium mineralisation. Extensive stream sediment and rockchip sampling, followed by 150 percussion drillholes. The best drill results were all within EL 24646 (southernmost drillholes), and included:

RA97ML075 – 24-43 m: 1240 ppm Cu, includes 34-35 m: 2200ppm Cu. RC hole (RC97ML001) confirmed result.
RA97LV053 - 9-13 m: 1100 ppm Pb, 360 ppm Zn, 155 ppm Cu
  - 13-15 m: 900 ppm Pb, 800 ppm Zn
RA97LV026 – 7-8 m: 650 ppm Co, 165 ppm Cu, 115 ppm Zn

Since then, there has been no other exploration work. In 2004, the Northern Territory Geological Survey started mapping the Casey Inlier, only focussing on the Arunta basement. This work is ongoing and has included extensive rockchip sampling (Figure 7).

6.0 Mithril Activities

Mithril Resources implemented the Casey Project to look for Ni-Cu-PGE sulphide mineralisation associated with mafic-ultramafic intrusions in the exposed basement of the Casey Inlier. The prospectivity of the area was demonstrated when the Northern Territory Geological Survey identified some ultramafic intrusions, which yielded moderately elevated abundances of Ni and Cu.

6.1 Year 1

In the first year of tenure, Mithril Resources undertook reconnaissance surface sampling across the exposed Arunta basement. Three areas of interest were highlighted (Pipeline, Central Ultramafic, Western Ultramafic) and follow-up work was undertaken.

6.1.1 Reconnaissance work
A stream sediment survey was carried out at a density of approximately 1 sample per 5 km² over the exposed Arunta basement (Figure 6). A total of 71 stream sediment samples (~1 kg wet unscreened) were collected. Samples were submitted to Genalysis, where they were screened at -80# mesh. Both -80# and +80# fractions were analysed. No significantly elevated Ni results were recorded.

22 rockchip samples were also collected, predominantly from mafic-ultramafic intrusions. No Ni-Cu sulphide mineralisation was noted. However, a gossan was discovered in Amadeus Basin sediments and returned very elevated Cu (5137 ppm) and Zn (2909 ppm) values. This prospect became known as Pipeline.

Two 0.5 kg, -2 mm magnetic lag samples were collected close to an ultramafic body to test whether this method may be more effective than stream sediment sampling. Results were consistent between methods, so it was deemed that standard stream sediment sampling alone would be suitable.
6.1.2 Pipeline Prospect
The Pipeline gossan is located in the Bitter Springs Formation, stratigraphically near the volcanic part of the Loves Creek Member (Figure 9). Mapping revealed a structurally complex zone of polymict conglomerate, quartz sandstone, laminated carbonate, mafic volcanic and extensive silica-iron-manganese alteration (gossan). Abundant malachite was noted in several samples of gossan and adjacent units. A total of 75 rockchip and 14 stream sediment samples were collected from Pipeline. Preliminary results confirmed Cu-Zn mineralisation, with maximum values of 3.4 % Cu and 0.74 % Zn. Complete results were pending.

Six lines of conventional fixed-loop EM were collected from two loops near the gossan. The aim was to identify late-time responses near the gossan that may indicate massive sulphide mineralisation. No late-time responses were observed, though an early-time response was identified on the two easternmost lines. This response was not thought to be conductive enough to represent massive sulphide mineralisation, but the background signal strength at late-time was high and could mask a response from a small mineralised body.

6.1.3 Central and Western Ultramafics
Although initial sampling returned no significant Ni-Cu values, the full extent of the bodies had yet to be delineated. Follow-up mapping showed each ultramafic body to be about 1 km, northwest-trending and within folded and boudinaged mafic gneiss. 12 rockchip and 15 stream sediment samples were collected from the ultramafic bodies. No visible sulphides were noted. Results were pending.

6.2 Year 2
At the start of the second year, the outstanding results from year 1 were returned and the project was reviewed. The Pipeline Prospect was identified as a priority, with further mapping, surface sampling, ground geophysics and diamond drilling all completed by year’s end. In addition, the NTGS had recently discovered Arthur Popes Copper Prospect. Mithril completed extensive surface sampling and ground geophysics at Arthur Popes, which is interpreted to be related to carbonatite veins in the Arunta basement. Regional work was also undertaken to search for more carbonatite veins and ultramafic bodies not sampled during earlier reconnaissance work. A petrography report of three ultramafic samples collected during the first year of tenure was also received at the start of the second year (Appendix 11).

6.2.1 Outstanding results
A batch of rockchip and stream sediment results had not been returned when the 1st Annual Report was compiled. They are included in Appendix 2 & 3, respectively.

At Pipeline, 23 of the 75 rockchip samples returned >1000 ppm Cu, including 4 samples >2 % Cu (Table 2). Representative samples of the best mineralisation are shown in Table 2. The results show not only widespread Cu anomalism, but also elevated Ni, Zn, LREE (Ce) and U.

The stream sediment samples also show the immediate Pipeline area to be the most anomalous for Cu (Table 3). The highest absolute results were obtained from +80# mesh, though the relative anomalism was still detectable with -80# mesh. The
different size fractions clearly represent slightly different material, with the finer fraction probably diluted with exotic wind-blown material.

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<th>Ni ppm</th>
<th>Pb ppm</th>
<th>Zn ppm</th>
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<th>Pb ppb</th>
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Table 2: Results of 10 representative samples outstanding from previous year.

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Table 3: Stream sediment samples from Pipeline.

At the Central and Western Ultramafics, elevated Ni was found in many samples, but in only one sample did the anomalism correspond with elevated Cu (Table 4). Likewise, the stream sediment samples yielded elevated Ni, but also with low Cu. Comparison of the different mesh sizes shows that the elements typically associated with mafic-ultramafic rocks (Co, Cr, Cu, Fe, Mg, Mn, Na, Ni, V, Zn) are significantly more abundant in the +80# mesh, again suggesting that the -80# mesh is diluted with exotic (?windblown) material.

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Table 4: Central & Western Ultramafics results outstanding from previous year.
6.2.2 Pipeline
At Pipeline, the focus for the second year of tenure was to define drill targets to test whether the gossan continued at depth as a sulphide body. This was achieved with further mapping, sampling and ground geophysics. A local grid was established with the 50000 N baseline trending 330° and (50000, 10000) = MGA94(550186, 7341225). All geophysical surveys were tied into this grid. Two targets were identified and drilled.

Mapping/rockchip sampling
Mapping shows that the Pipeline area comprises the Loves Creek Member unconformably overlain by the Areyonga Formation (Figure 5, 9). The unconformity between the two packages is angular with the Loves Creek Member deformed prior to deposition of the Areyonga Formation. The Areyonga Formation is also folded.

At Pipeline, the Loves Creek Member comprises thinly bedded dolostone and dolomitic limestone with columnar and bulbous stromatolites underlying a coarsening upward package of red dolomitic siltstone and sandstone. Within the red dolomitic siltstone-sandstone unit is a package of variably altered (chlorite-carbonate), fine- to medium-grained, subophitic basaltic flows. Flow-top breccias, interbeds of red dolomitic sandstone and basalt clasts within the red dolomitic sandstone provide evidence that these were predominantly extrusive flows. Above these basalt flows, but separated by more red dolomitic siltstone, is a conglomerate unit comprising angular clasts of dolostone, silicified dolostone and stromatolitic limestone. These clasts were derived from within the Amadeus Basin. The Loves Creek Member at Pipeline is folded into a fish-hook geometry and truncated by the southwest-dipping thrust which defines the eastern margin of the Casey Inlier. North of this thrust, the Pertatataka Formation and Arumbera Sandstone are exposed (Figures 5-8).

The basal unit of the Areyonga Formation comprises a 1 to 5 m thick, medium- to coarse-grained, quartz-rich sandstone that was draped over the deformed Loves Creek Member. The unconformity angle varies from almost orthogonal near the discovery gossan to semi-conformable near the Hale River. The sandstone is overlain by sandy polymict conglomerate interbedded with graphitic-pyritic siltstone and laminated dolomitic siltstone. Conglomerate is less abundant up succession, but there are large dropstones within the siltstone. The conglomerate comprises clasts of granite, mica schist, quartz vein, pegmatite, sandstone and amphibolite, and was clearly sourced from outside the basin. The Areyonga Formation is folded into shallowly-northwest plunging (~30°), northeast-vergent, asymmetric folds.

The discovery gossan is developed near the unconformable contact between the Loves Creek Member and the Areyonga Formation with extensive Fe, Mn and Si alteration and malachite staining in the basal Areyonga sandstone and conglomerate. A thin, chalcopyrite-bearing carbonate vein was also discovered in the conglomerate. Besides the gossanous alteration around the unconformity, there is a corridor of silicified, brecciated, dolomitic limestone with ferruginous (?)gossanous) zones extending southeast from the discovery gossan. This corridor is within the Loves Creek Member.

34 rockchip samples were collected from around the Pipeline prospect to augment the previous samples (Table 5). Nine of these samples were collected from a costean cut across the discovery gossan. The samples confirm that Cu anomalism is
associated with elevated Co, Ni, Zn, LREE (Ce) and U, although the samples returning the two highest Cu abundances seem to have low concentrations of these elements. These two most Cu enriched samples are malachite-stained, polymict conglomerate from the Areyonga Formation.

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Table 5: 2007 rockchip samples from around Pipeline.

**Ground magnetics**

Sixteen lines of 100 m-spaced ground magnetics were collected at Pipeline along northeasterly lines for a total of 17.6 line km (Figure 10). The survey specifications are in Appendix 4 and the raw data are in Appendix 5.

The magnetic data for Pipeline reveal a curved, magnetic body in the centre of the survey that corresponds with exposed basalt. Combining the geological and magnetic data suggests that the curved body dips predominantly west beneath the Areyonga Formation. A small isolated magnetic body to the northeast of the curved body also corresponds with exposed basalt and is separated from the main body by north-trending (?demagnetised) faults. The magnetic data at Pipeline is only useful for identifying the position and geometry of the basalt as the other rock types have very low magnetic susceptibility. Hence, the basalt probably best describes the general geometry of the Loves Creek Formation at Pipeline.

**Fixed-loop ground EM**

To follow-up the early-time EM anomaly from the previous EM survey, a different fixed loop configuration was implemented. Ten lines of fixed-loop ground EM were conducted from two separate transmitting loop positions. A total of 5 line km of fixed loop EM were surveyed along lines oriented to 030°. The survey was not extended to the southeast due to a lack of late-time responses from loops 1 and 2, consistent with the previous survey. Survey specifications and further survey details can be found in Appendix 4. The raw data are in Appendix 6.

The results confirmed and extended the weakly conductive feature observed in the 2006 ground EM data. Inverse modelling suggests that these responses are probably edge affects of shallow, poorly conductive, relatively flat-lying plates dipping southwest, back toward the loop. The modelling suggests the plates to be about 30 m thick with a dip of 25° and a conductivity thickness product of 20 siemens. Given that the anomaly is subparallel to the alteration corridor within the Loves Creek Member (Figure 11), then the response is probably related to this feature,
whether it be stratigraphic or structural. Mid-time X component data show a second response in lines 10500 to 10700E that may indicate disseminated sulphide mineralisation. The responses are too small to indicate massive sulphides.

Importantly, the EM survey did not detect any conductive features beneath the discovery gossan, with the defined EM corridor about 50 m north of the discovery gossan and wholly within the Loves Creek Member (Figure 11).

**Induced polarisation**

Four lines of dipole-dipole induced polarisation were completed at Pipeline using a roll-along spread (Figure 9-11). The array was set up along northeast-trending lines with the transmitter to the northeast and the receivers trailing to the southwest at 50 m spacings. The entire array moved progressively northeast along each line. Lines surveyed were 10100, 10300, 10600 and 10900 E. A detailed report, results and pseudosections are presented in Appendices 7 and 8.

The IP survey identified chargeable bodies along lines 10100, 10300 and 10600, more than 100 m south of the discovery gossan. The surface projections of these chargeable bodies are shown in Figures 9-11. If the anomalies along each line are measuring the geometry of a single chargeable body, then the body dips west and becomes wider. The anomalies on lines 10300 and 10600 are present east of the Areyonga unconformity and hence the chargeable material must be within the Loves Creek Formation. This observation was very encouraging as the prior geological work was starting to link the copper anomalism with the unconformity.

**Drilling**

Three diamond drillholes were completed at Pipeline (Figures 9-14) to test two different targets (Table 6). Drilling information, geological logs and preliminary results are presented in Appendix 9. Photos of the drill core are presented in Appendix 10. 163 geochemical samples from CPDD002-003 are still outstanding.

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Table 6: Pipeline drillhole details.

**CPDD001**

The discovery gossan was originally interpreted to be the surface expression of a poorly constrained subvertical unit or structure. CPDD001 was the first of two proposed holes designed to test the subvertical extent of the gossan. The proposed partner hole was designed to drill from the opposite side of the gossan as CPDD001 (chopstick geometry) and thus constrain the subsurface geometry of gossan whichever way it dipped. The partner hole not drilled as planned, but was substituted with CPDD003.

CPDD001 did not intersect the subvertical extent of the discovery gossan (Figure 12). Although the drillhole was collared 5 m northeast of northeast-dipping outcrops of the Areyonga Formation (Figure 9), the drillhole failed to intersect either the Areyonga Formation or the underlying Loves Creek Member because it was drilled beneath and subparallel to a southwest-dipping fault. This fault is interpreted as a
thrust with northeast vergence and is probably associated with the northwest-plunging folds in the Areyonga Formation. CPDD001 intersected predominantly grey-green silty mudstone and minor silty sandstone of Pertatataka Formation. Fine-grained disseminated pyrite and marcasite are present within the muddier units, as are thin carbonate-pyrite veins. No samples were collected.

**CPDD002**
The chargeable IP anomaly along Line 10100 became the next drill target. The hole was positioned to drill orthogonal to the gross dip of the geology and intersect the most chargeable part of the anomaly between 50 and 100 m (Figure 13). Prior to drilling, the anomaly was interpreted to be in the Areyonga Formation and hence transgressive across the unconformity because the other IP lines suggested a chargeable anomaly beneath the unconformity.

CPDD002 intersects the Areyonga Formation and upper Loves Creek Member, ending in basalt flows (Figure 13). The Areyonga Formation comprises laminated black graphite-pyrite silty shale with thin dolomite interbeds (carbonate caps?; perhaps Aralka Formation) conformably overlying well-rounded, polymict cobble-pebble conglomerate in a black graphite-pyrite muddy matrix. The unconformity is at 65.9 m. The Loves Creek Member beneath the unconformity comprises a coarsening upwards (fining downhole) package of carbonate clastic rocks with a red bedded angular conglomerate of dolomite clasts in a sandy matrix (?breccia) immediately beneath the unconformity grading downhole into a red dolomitic sandstone and then a red dolomitic siltstone with abundant quartz-carbonate veinlets. The top of the basalt unit is at 176.85 m. The basalt unit comprises numerous green-grey fine-grained chlorite-carbonate-altered flows with flow top breccias and increasing amygdale size and abundance towards flow tops. At 222.2 m, there is a thin bed of red dolomitic siltstone that drapes the underlying flow.

The chargeable IP anomaly is readily explained by the abundant fine-grained disseminated pyrite-marcasite above and below the unconformity. The depth of the unconformity was shallower than estimated from the dip of the outcropping beds. In the Areyonga Formation, disseminated sulphide is present throughout, but is most abundant immediately above the unconformity where conglomerate clasts have been extensively replaced by sulphide. In the Loves Creek Member, disseminated sulphide is most abundant at the unconformity and persists for the top 10 m of the carbonates. Below this, sulphide is only present along fractures and in quartz-carbonate veins.

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**Table 7:** Best results from CPDD002 (first batch).
The entire hole was quarter cored and sampled. The first batch of 60 samples broadly tested the entire package above the basalt flows. The analyses show elevated Cu within laminated black graphite-pyrite siltstone within the upper part of the polymict conglomerate. The Cu values are significantly lower than the best rockchip samples, but also correlate with slightly elevated Ce, Co and Ni. Elevated Zn values do not correlate with the Cu anomalism. No elevated base metals are recorded in the carbonate units beneath the unconformity. The best results are presented in Table 7. Results of the second sample batch will complete the hole, but are still pending.

**CPDD003**

After the problems encountered to hit the proposed subvertical projection of the discovery gossan with CPDD001, it was decided to test the subvertical extent of the gossan from much nearer. Unfortunately this was only feasible by drilling obliquely to the stratigraphy.

CPDD003 was collared in the polymict conglomerate and was expected to penetrate the unconformity by 20 m and pass the vertical projection of the discovery gossan at 75 m. The unconformity was intersected between 12-15 m, but no core was recovered from this interval. Beneath the unconformity are amygdaloidal basalt flows to 50.7 m and then red dolomitic sanstone and siltstone. Within the dolomitic sandstone and siltstone are quartz-carbonate fault breccias up to 3.1 m wide. There is a polymict conglomerate between 153.1-172.0 m that is interpreted to be a thrust slice of Areyonga Formation. Within this thrust slice and beneath the conglomerate is red dolomitic sandstone indicating the slice is right-way-up. A sharp fault at 181.3 m separates these rocks from grey siltstone and sandstone of the Pertatataka Formation. This 181.3 m fault is interpreted to be the main thrust beneath which CPDD001 was drilled. The fault breccias within the red dolomitic sandstone-siltstone are interpreted as small thrusts and may be related to the folds mapped in the Areyonga Formation.

Very little sulphide was encountered in CPDD003, though the critical 3 m interval at the unconformity was missing. However, the gossan is clearly not related to a large, subvertical mineralised system. The entire hole was quarter cored and sampled. Results are pending.

**Interpretation**

In general, the best copper mineralisation at Pipeline is spatially associated with the basal Areyonga unconformity near the discovery gossan. However, it should be noted that there is mineralisation to the southeast of the discovery gossan within the Loves Creek Formation and well away from outcrops of the unconformity. How the Areyonga Formation draped this area is unknown, but it is not impossible for the current land surface to be similar to the paleosurface onto which Areyonga Formation was deposited. In this case, the southeastern gossans may be just below a now missing unconformity.

There are three possible scenarios for the mineralisation:

- The gossan is associated with a paleosol developed on the unconformable surface of the Loves Creek Member and prior to deposition of the Areyonga Formation. Post the deposition of the Areyonga Formation, fluids have locally remobilised the mineralisation around the unconformity.
• Primary mineralisation entered the system as detritus within the Areyonga Formation and subsequent fluids have remobilised the mineralisation around the redox boundary at the unconformity.

• Exotic mineralised fluids entered the system and were deposited around the redox boundary at the unconformity.

6.2.3 Arthur Popes Copper Prospect

During 2006, NTGS mapping rediscovered Arthur Popes copper prospect on EL 24646 (Figures 6-8). An NTGS sample of copper mineralisation returned 7.99 % Cu (HA06DFC183) and a sample of nearby chert returned 1.64 % REO + Y₂O₃ (HA06DFC183A). Follow-up work by Mithril uncovered a series of dolomite-quartz veins related to copper and rare earth mineralisation. These veins are interpreted to be related to carbonatite magmatism. Reconnaissance mapping and sampling, a ground magnetic survey and two IP lines were completed at Arthur Popes during the year.

Mapping and sampling

Mapping at Arthur Popes has been limited to tracing out the carbonatite veins and sampling any obvious mineralisation and facies variations. In general, the veins are too small to see on the 1:50,000 colour airphotos or satellite imagery, and so they can only be mapped by ground traverses. This is time-consuming and, as yet, the area has not been adequately covered to detect all of the exposed veins. In addition, many veins are probably covered by scree and scree lobes of Heavitree Quartzite, which are common in the area.

At Arthur Popes, the carbonatite veins strike 220°, dip steeply to the south and cut the gross northwesterly trend of the Arunta basement rocks. The veins are up to 3 m wide, undeformed and discontinuously extend for >1000 m to the southwest and >2500 m to the northeast of Arthur Popes (Figure 15). In places, there are two or more subparallel veins. There are similar veins up to 2.5 km northwest and 3.5 km south of Arthur Popes (Figures 6-8). In general, these other veins also strike 220° and are associated with copper mineralisation and elevated REE. At a locality 1.7 km south of Arthur Popes (Figure 15), there are malachite-sulphide-bearing carbonate veins trending 220°, but there are also veins developed along the contacts of the host rocks oblique to 220°.

The veins have not been found to cut the Amadeus Basin sediments, though the vein trend correspond closely to the faults which bound blocks of Heavitree Quartzite (Figure 15). It is possible that the carbonatite veins are younger than Amadeus Basin sediments.

The carbonatite veins comprise brown, coarse-grained dolomite with discrete internal quartz veins. The siliceous facies overprints the coarse-grained dolomite and typically has geodes and other open-spaced textures. It is not known whether the dolomite is primary or has replaced an earlier mineral phase. Copper mineralisation comprises chalcocite-pyrite-chalcopyrite-malachite within the siliceous facies. Specular hematite is also present in some veins. Some veins are zoned; with a chalcedony carapace and quartz crystals radiating towards the core and a carbonate-sulphide-rich core. The contact with the hosting Arunta basement rocks is sharp, though there are small apophyses emanating from the main veins. Contact alteration, in particular fenitisation, has not been noted.
Forty-three rockchip samples of the carbonatite vein have been assayed (Figure 7, 15; Table 8; Appendix 2). The results show a lot of chemical variability due to the different facies sampled and the effect of weathering, particularly surface silicification. Most of the samples with copper mineralisation have low Ca and Mg because they are siliceous. In general, the carbonatite veins are enriched in Au, Cu, REE, Y and U. The REE mineralisation is not directly associated to the copper mineralisation, and may be hosted in the dolomite facies (eg, HAL07106). That said, the best REE result (NTGS sample HA06DFC183A) is from a silicified cap (perhaps developed on dolomite facies). The veins have low As, Co, Cr, Ni, Pb and Zn.

<table>
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<th>Ce (ppm)</th>
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<th>Mg (ppm)</th>
<th>Mn (ppm)</th>
<th>P (ppm)</th>
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**Table 8**: Summary of geochemical results from carbonatite veins.

**Ground magnetics**

A 100 m spaced ground magnetic survey was conducted at Arthur Popes for a total of 52 line-km of data along 21 north-south lines (Figure 16). The survey details are presented in Appendix 4 and the raw data in Appendix 5.

The magnetic image shows a very highly magnetic body (300 nT) in the middle of the survey, about 200 m east of the Arthur Popes mineralisation. The magnetic body strikes northwest, is about 300 m long and is contained by the valley defined by faulted Heavitree Quartzite. Inverse modelling suggests the body is shallow and southwest dipping, though it is not exposed. There are other northwest-trending, highly magnetic bodies to the southwest and northeast of Arthur Popes that correspond with mafic units within the Arunta basement. Given the general trend of the main magnetic body, it is probably also part of the basement, perhaps a pyroxenite plug like those exposed about 2.5 km northwest of Arthur Popes. Known carbonatite veins are not revealed in the magnetic data. It seems unlikely that the
main magnetic body is related to the carbonatite veins, although the idea cannot be excluded.

**Induced polarisation**

One line of dipole-dipole induced polarisation was set-up using a roll-along configuration to test for chargeable bodies beneath the carbonatite vein. The line was positioned to cross the carbonatite vein where there is malachite and sulphide in the vein (line 9950 E; sample HAL07115; Figures 15, 16). The survey details are presented in Appendix 7 and the raw data and pseudosections in Appendix 8. The survey reveals a broad moderately chargeable feature along the length of the line within a resistive background. The carbonatite vein is not detected, suggesting there is little, if any, associated sulphides.

Another line of IP was undertaken along the valley, and subparallel to the carbonatite vein, to test for chargeability around the high-amplitude magnetic anomaly detected in the magnetic survey (Figures 15, 16). A 9-spread array with the transmitter in the middle and the receivers either side was used because the eastern extent of the valley was considered inaccessible for the transmitter. The IP data show a moderate pants-leg anomaly centred at 10900 E. Inversion of these data reveals a constrained chargeable feature at 10800 E at a depth of 50 m. This anomaly sits immediately above the magnetic anomaly, and thus could be interpreted as alteration above a sulphide body. There is little supporting evidence in the outcrop to constrain the cause of the IP and magnetic responses. A drillhole was planned to test this feature, but was never attempted.

**6.2.4 Other Regional Sampling**

Further reconnaissance work throughout EL 24646 included 126 rockchip samples (15 from carbonatite veins not at Arthur Popes as discussed above). Most of these regional samples were from Pipeline North, the main pound and the western and southwestern part of EL 24646 (Figure 7). Results are reported in Appendix 2.

At Pipeline North, copper mineralisation is best developed in the polymict conglomerate of the Areyonga Formation (sample 2086 = 4486 ppm Cu). Samples returned elevated Cu, REE and Zn, but not to the same extent as at Pipeline. Mineralisation is interpreted to be similar to that at Pipeline. Only limited work has been completed at Pipeline North.

Samples of various rock types were collected from the Arunta basement within the pound and along the western and southwestern part of EL 24646. Samples of silcrete caps from the eastern side of the pound (eg. CPH092) returned elevated Cr and Mg, and thus confirm the presence of more ultramafic bodies. No samples from the pound returned Ni-Cu values of great worth. Mafic-ultramafic units are also exposed beneath the basal Heavitree unconformity in the southwestern part of the tenement and correlate with a northwest-trending magnetic feature. Samples from these units do not have elevated base metals, except for a ferruginous sample (?gossan, HAL07318) which returned 4486 ppm Cu and elevated REE, Y and U. This metal association is remarkably similar to that of the carbonatite veins. Samples of small pyroxenite plugs 2.5 km northwest of Arthur Popes returned elevated Cr and Ni, but are not anomalous for their respective Mg contents. Widespread samples of various quartz veins, including veins with pyrite, goethite, tourmaline and magnetite, are not anomalous for gold or base metals.
7.0 Expenditure

7.1 Year 2
During the second year of tenure, $594,535 was spent on EL 24646. This satisfied the covenant of $50,000.

<table>
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<th>Expenditure</th>
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<td>Salary/wages (incl consultants)</td>
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<tr>
<td>Assays (rockchip, drilling, freight, storage)</td>
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<tr>
<td>Geophysics (magnetics, EM, IP)</td>
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<tr>
<td>Vehicle costs</td>
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<td>Field support</td>
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<td>Land access (Native Title)</td>
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<tr>
<td>Travel/communications</td>
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<tr>
<td>Administration (15%)</td>
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<td><strong>Total</strong></td>
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Table 9: Summary of expenditure on EL 24646 for second year of tenure.

7.2 Year 3 (proposal)
In the third year of tenure, further work will focus on unravelling whether the copper mineralisation associated with the unconformity at Pipeline has any regional economic potential. This will involve a comprehensive desktop review when the assays from the outstanding drillcore samples are returned. A research programme has also been initiated with James Cook University looking at this mineralised system.

Further work will also be undertaken on unravelling the economic significance of the carbonatite veins. This will involve further mapping and sampling, and then drilling of selected targets.

Work on exposed mafic-ultramafic Ni-Cu mineralisation has been nearly exhausted within EL 24646. Mithril will undertake a 1x1 km gravity survey in collaboration with NTGS to identify whether any of the buried magnetic bodies may be worth exploring for Ni-Cu sulphide mineralisation.

<table>
<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td>Surface sample assays (lag, soil, rockchip)</td>
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<td>Geophysical surveys (gravity)</td>
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<td>Field costs (includes vehicles)</td>
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<td><strong>Total</strong></td>
<td><strong>$77,000</strong></td>
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</table>

Table 10: Summary of proposed expenditure for third year of tenure.
8.0 References
Figure 1: Location of EL 24646.
Figure 2: Location of greater Casey Inlier, plus Ringwood Cu prospect and Limbla Syncline. Background: Total magnetic intensity draped over 1st vertical derivative.
Figure 4: Geological domains of Casey Inlier based on work by the NTGS. Background: Total magnetic intensity draped over 1st vertical derivative.

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Figure 4: Geological domains of Casey Inlier based on work by the NTGS. Background: Total magnetic intensity draped over 1st vertical derivative.

EL 24648

January 2008
Figure 5: Gross stratigraphy of northeastern Amadeus Basin (after Korsch & Kennard, 1991).
Stream sediments
- Mithril (2006)
- Pancontinental (1990)
- Sabminco (1988)
- Otter (1979)

Carbonatite veins

Arumbera Sandstone
Pertatataka unconformity
Loves Creek basalt
Loves Creek Member
Gillen Member
Heavitree Quartzite unconformity
Central Supracrustal unconformity
Pyroxenite
Dolerite
Gabbro
Granite
Granodiorite
Amphibolite
Metasediment

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Figure 6: Distribution of stream sediment samples in EL 24646. Background: solid geology interpretation

January 2008 1:160000
Figure 7: Distribution of rockchip samples in EL 24646.
Background: solid geology interpretation

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January 2008 1:160000
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Figure 8: Distribution of drillholes in EL 24646.
Background: solid geology interpretation

January 2008 1:160000
Figure 9: Pipeline outcrop geology with drillhole traces and rockchip localities. Background: Colour airphoto January 2008 1:7800
Figure 10: Pipeline ground magnetics with drillhole traces and IP pit locations.
Figure 11: Pipeline ground electromagnetics - plan view showing conductance contrast.
**Figure 12:** Cross-section for CPDD001.
Figure 13: Cross-section for CPDD002.
Figure 14: Cross-section for CPDD003.
Figure 15: Arthur Popes area showing distribution of rockchip samples and carbonatite veins. IP survey location also shown. Background: colour airphoto.

Remote Area GeoScience

January 2008 | 1:24000

western boundary
EL 24646

pyroxenite plugs

Heavitree Quartzite

Arthur Popes

western ultramafic
Figure 16: Arthur Popes area showing distribution of rockchip samples and carbonatite veins. IP survey location also shown. Background: ground magnetics and colour airphoto.