Exploration Licence 7739 “Rover”

Northern Territory

Annual Report
For the period ending 4 June 2008

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Green Swamp Well SE5313

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Kelly 5658
Billiatt 5558

Compiled by: Chris Drown
Adelaide Resources Limited

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1. Summary
Exploration Licence 7739 “Rover” was granted on 5 June 2000 and reached the end of its six year term on 4 June 2006. Successful applications for a two, two-year extensions of term were lodged with DPIFM and the tenement will now expire on 4 June 2010.

The tenement is held by Adelaide Exploration Limited, a wholly owned subsidiary of Adelaide Resources Limited, a company listed on the Australian Securities Exchange.

EL 7739 is located to the southwest of Tennant Creek in the Rover Field. The area is considered to be highly prospective for Tennant Creek style gold-copper-bismuth deposits. EL 7739 is explored in conjunction with adjacent EL 8921.

Work completed on EL 7739 in its eighth year of title included:
- Drilling of three reverse circulation drill holes (totaling 684 metres) at the Rover 4 prospect in September 2007 before mechanical failure caused the program to be abandoned.
- Reading of 148 gravity stations on a nominal 100m x 100m grid at the Rover 4 prospect.
- Recomencement in late May 2008 of diamond drilling operations at Rover 4 prospect.

Completion of these programs was conducted under the authority of an Aboriginal site clearance survey completed in 2005.

The September 2007 drilling program, while prematurely halted due to the mechanical failure of the drill rig compressor, successfully intersected highly promising copper-gold mineralisation at the Rover 4 prospect. Vertical drillhole RV4ARD10 intersected 15 metres at 2.07% copper and 0.15 g/t gold from 221 metres downhole. The mineralisation setting is interpreted to be typical of Tennant Creek style copper-gold deposits.

At the end of the tenure year a planned 2000 metre drilling program at Rover 4 was in its early stages, however no data had been received from the field. The company therefore determined to delay the reporting of results from the May-June 2008 program until the 2009 annual report.

2. Introduction
The Tennant Creek goldfield has produced in excess of 5.5 million ounces of gold together with significant copper and bismuth from numerous mines the first of which was developed in 1930’s. Typically Tennant Creek deposits are hosted within magnetite-hematite ironstones and often deliver exceptionally high gold grades making them attractive exploration targets.

Due to the magnetite-rich nature of most known Tennant Creek deposits they are generally associated with “bulls eye” magnetic anomalies evident in airborne or ground based geophysical surveys. The collection and
careful interpretation and modeling of magnetic data has historically provided a direct and highly successful targeting tool in the exploration for further deposits in the field.

The Rover area, which includes EL 7739, was first recognised as potentially being prospective for Tennant Creek style deposits following a BMR airborne magnetic survey carried out in the region in the late 1950’s. This survey discovered a series of magnetic features of similar character to those associated with deposits at Tennant Creek.

Follow-up ground magnetic surveying and drill testing of a number of magnetic anomalies in the Rover Field, conducted by Peko Mines Limited in a period extending from about 1971 to 1981, confirmed the presence of typical Tennant Creek style ironstones exhibiting gold-copper-bismuth mineralisation and anomalism. The area became known as the Rover Field.

The advent of the Aboriginal Land Rights Act in 1976 prompted the Traditional Owners of the area to lodge a claim over the region including the Rover Field. This claim was successful and the area returned to aboriginal people in the late 1980’s. This changed land ownership situation, together with various changes in the corporate ownership of mineral tenements in the region are considered likely reasons that the early exploration effort effectively ceased in 1981. The only exploration known to have been completed at Rover since 1981 was the flying by Normandy Mining of a detailed airborne magnetic survey in March 1999.

Adelaide Resources Limited acquired EL 7739 and adjacent EL 8921 from Newmont Mining in 2005 and recommenced exploration in the Rover Field later that year. Adelaide Resources 2005 exploration program effectively ended a 23 year hiatus in exploration in the Rover Field.

3. Location and Access
Exploration Licence 7739 is located approximately 75 kilometres to the southwest of Tennant Creek township (Figure 1).

Access is via an east-west unsealed track which leaves the Stuart Highway several kilometres south of Tennant Creek and travels to the currently abandoned aboriginal community of Kunayungku. From Kunayungku the track heads generally south west to access the Rover Field tenements. This section of track was constructed during Peko Mines Rover Field exploration program conducted in the 1970’s and was re-cleared of vegetation in 2005.

An alternative access route was also established by Westgold Resources Limited, a company actively exploring tenements west of EL 7739. In 2006 Westgold recleared the old section of the Peko Rover base line track from the Rover 12 turnoff through to the Ngapamilarnu Outstation.
here a graded track heads back east and joins with the east west track accessing Kunayungku.

The track from Tennant Creek to Kunayungku (and on to Ngapamilarnu) is properly formed up with table drains and is navigable even after relatively heavy rain. The older Peko exploration track is more rudimentary in nature. It has no table drains causing water to pond in the track base following rain, occasionally causing access difficulties. Despite this the old Peko track has a remarkably firm base and provides excellent access in dry weather.

4. Climate and Landform
The Tennant Creek district is in the tropics however its distance from the ocean limits the amount of moisture available for the generation of “weather”. The climate is hot in summer and mild in winter. Yearly average rainfall at Tennant Creek is about 459mm falling predominantly in the summer months (December to February).

Prevailing winds at the surface are from the southeast. Mean daily temperature maxima range from about 24 C in July to over 37 C in December.

The area secured by EL 7739 is a flat and featureless plain covered by sand. Total relief across the tenement is less than 10m averaging about 290m (Australian Height Datum).
Vegetation in the area is governed by the semi-arid climate. Soft spinifex (*Triodia pungens*) is abundant and scattered ghost gums (*Eucalyptus papuana*) and snappy gum (*E. brevifolia*) are conspicuous. Mulga (*Acacia aneura*) may form thick scrub while numerous acacia species are present in sandy areas.

Other vegetation on EL 7739 tentatively identified by one of the field geologists present on the 2005 program (who has a strong interest in native vegetation) include desert walnut trees, beefwood, corkbark, bloodwood, melaleuca species, bush potato vine, camel bush, cockroach bush, conkerberry, desert bluegrass, butterfly bush, woollybutt, hopbush, jasmine vine, various grasses, turkeybush, lollybush, sandweed, mistletoe, myrtle, ragweed, indigo, sandalwood and limestone cassia.

5. Tenure

Exploration Licence 7739 was granted on 5 June 2000 to Anthappi Pty Ltd. The tenement was transferred to Santexco Pty Ltd on 7 June 2000 and further transferred to Newmont Gold Exploration Pty Ltd on 18 December 2001.

Following execution of a purchase and royalty agreement between Newmont Gold Exploration Pty Ltd and Adelaide Exploration Limited the title was transferred to Adelaide Exploration Limited on 29 April 2005.

The title falls wholly within Freehold Aboriginal Land (NT Por. 3556 – Karlantijpa Aboriginal Land Trust).

On 14 February 2006 Adelaide Exploration Limited lodged application for a two-year extension of term for EL 7739. This application was successful. A second two-year extension of term application was lodged on 15 February 2008. Adelaide Exploration Limited has been advised that this application has been successful and the tenement will expire on 4 June 2010.

An expenditure covenant of $100,000 was set for the period reported on herein. This covenant has been handsomely exceeded.

6. Regional Geology

The geological terrain of the Tennant Creek region consists of a deformed and complex Lower Proterozoic metasedimentary basement intruded by several generations of Proterozoic granite. This basement terrain is overlain by relatively undeformed and generally flat lying younger sediments of the Wiso Basin (Middle Cambrian to Devonian) to the west and Georgina Basin (Late Proterozoic to Devonian) to the east. There is also extensive shallow (< 30 metres) cover consisting of colluvial, alluvial and aeolian sediments belonging to the current Holocene landscape regime.
**Tennant Creek Field Geology**
The Tennant Creek mineralised district occupies an area of some 90 km x 50 km within the Proterozoic basement. The characteristic gold-copper-bismuth deposits of the district are all hosted by discordant ironstone (magnetite-haematite) bodies within Warramunga Formation metasediments, representing the basal section of the Proterozoic sequence. This is overlain by a deformed, largely volcanic sequence previously referred to as the Flynn Subgroup, but now denoted the Ooradidgee Group. This unit includes previously defined stratigraphic units such as the Whippet Sandstone, Bernborough Formation and Warrego Volcanics. The Warramunga Formation and Ooradidgee Group are unconformably overlain to the north by younger Proterozoic of the Tomkinson Creek Group, and to the south by younger Proterozoic of the Hatches Creek Group.

The Tennant Creek goldfield is therefore located within a well defined inlier of older Warramunga Formation rocks within a more extensive Proterozoic terrain. The dominant Warramunga lithologies consist of shales, siltstones, tuffs and greywackes accompanied by prominent argillaceous iron-rich units (‘banded iron formations’) referred to locally as haematitic shales.

At least three major episodes of granite emplacement and associated volcanic activity are currently recognised in the region, referred to as the Tennant Creek Supersuite, the Treasure Suite and the Devils Suite.

**Rover Field Geology**
The Proterozoic basement of the Rover Field is concealed by shallow Wiso Basin cover, and basement geology has been interpreted from available drilling and airborne magnetic surveys. An interpretation compiled by Normandy in 2001 suggests that the Warramunga Formation hosting the ironstone bodies of the Rover Field occupies a well defined inlier within younger Proterozoic assigned to the Ooradidgee Group (or Flynn Subgroup) and overlying Hatches Creek Group. The Warramunga Formation in the Rover Field is therefore contained within a basement inlier of very similar character to that at Tennant Creek, and is of a similar scale and orientation to the so-called ‘Central Field’ at Tennant Creek.

Lithologies interpreted to be Warramunga Group intersected in drill core at Rover are indistinguishable from Warramunga formation sediments at Tennant Creek. These include sequences of deformed and greenschist facies metamorphosed greywacke, shales, mudstones and minor tuff beds. “Hematite shales” are recorded in a number of Rover holes.

Several historic holes at Rover failed to intersect Warramunga sediments bit instead encountered sequences of felsic and mafic volcanics. These may represent possible correlates to the Flynn Subgroup/Ooradidgee Group. One possible difference of note between Tennant Creek and Rover basement sequences is an apparent lack (thus far) of intrusive porphyry bodies at Rover.
The flat lying Cambrian sediments of the Wiso Basin cover in the Rover Field comprise siltstones and carbonates (predominantly dolomite), while a thin basal conglomerate is observed in many drill holes completed in the Rover Field.

Thin Quaternary cover at Rover is dominated by sand considered to be largely aeolian in origin.

Weathering is lateritic in nature with a prominent ferruginous layer comprised of pisoliths present just a few metres below surface. This ferruginous layer is the likely source to short wavelength low amplitude (~2 nT) “noise” observed in the ground magnetic data collected in the field. Weathering persists to approximately 100m below surface.

Ground water is present in the Wiso Basin sediments and significant flows can be obtained from relatively shallow depths (<30m). Narrow porous and permeable zones within carbonate below the base of weathering also contain ground water. Water quality is verging on potable in the Rover Field with old bores utilised by Peko for consumption as well as for domestic and drilling related purposes. A number of bores drilled by Peko are still serviceable and have been utilised during the company’s exploration and field programs.

7. Previous Exploration

**Initial Exploration**
Exploration activity in the area was triggered by release in the 1960s of a late 1950’s BMR flown survey that highlighted several strong magnetic anomalies beneath Cambrian cover to the WSW of Tennant Creek, later to become known as the Rover Field. The area was secured by Australian Ores and Minerals (AOM) as A. to P. 2451 in the mid 1960s to investigate four magnetic anomalies corresponding to prospects later named as Rover 1, 6, 11 and 12.

**The Geopeko – AOM Joint Venture**
An exploration joint venture formed by Geopeko and AOM in 1971 conducted follow up ground magnetic and gravity surveys and magnetic modelling of Rover targets. Efforts to re-locate the digital data from these historic geophysical surveys have proved fruitless with the exception of data from a semi-regional gravity survey.

Drill testing commenced in May 1972, initially focussing on Rover 1. The first hole (RV 001) intersected Warramunga Group metasediments at 124m downhole, Tennant Creek – style alteration from around 400m, and minor ironstone lode at around 500m downhole. Gold values were relatively low, up to a maximum in the range 1.3 – 1.4g/t. The second hole (RV 002 parent hole and 7 deflections) intersected high grade Au – Cu values, including 15m at 17.3g/t Au and 0.7% Cu in hole RV 002W2 at
around 525m below surface. Rover 1 was tested by 14 parent diamond drill holes (RV 001 to RV 014) and 17 deflections, returning several additional high grade gold intersections between around 400m and 550m below surface. This drilling campaign was the most intensive by far conducted on any of the ironstone targets in the Rover Field, and it also returned the best gold and copper intersections.

From 1978 to 1983 the original Rover EL (roughly corresponding to the current EL 7739) was explored by a joint venture between Geopeko, Shell, and AOM. It is understood that it was the intention of the joint venture that this original Rover EL contain all the numbered Rover magnetic targets (ie Rover 1 to Rover 23). It was then found that the Rover 1 target was located on the boundary of the Rover EL and an adjoining Desertex Joint Venture EL to the south, (currently ELA 24541, and under veto). It is now known that the main body of ironstone and contained mineralisation at Rover 1 is located just to the south of the Rover EL boundary in the adjoining ground.

The original Rover joint venture (Geopeko, Shell, AOM) was dissolved in 1983 and the original Rover EL relinquished due to access problems and a perceived lack of potential of the known prospects. In 1987, Geopeko re-applied for a new EL (EL 5547) over a portion of the original Rover joint venture ground in order to apply 'newly developed exploration techniques'. This area corresponds to current EL 7739 (Rover), and it is assumed that adjoining EL 8921 (Rover North) was added later. Both were granted without veto by Traditional Owners, but Geopeko was then unable to negotiate an acceptable access agreement. Ownership of the Rover tenements then passed to Normandy Mining as a result of the purchase of NBH-Peko’s Tennant Creek assets in 1991.

The surviving diamond drill core from Geopeko’s early Rover holes were stored at Warrego Mine for many years, and has been re-located to storage in the Davidson Street core yard in Tennant Creek. Core from the holes drilled within EL 7739 can be regarded as attached to the tenement, and was therefore acquired along with the tenement.

The Geopeko – Shell Desertex Joint Venture
The separate Desertex joint venture between Geopeko and Shell commenced on 15 March 1976, and applied to a large area surrounding the original Rover EL. It should be noted that the original Rover EL was not part of the Desertex joint venture, and was explored by a separate Rover joint venture. Shell farmed in to earn 40% by 30 June 1982 by sole funding an agreed level of expenditure. On 21 October 1982 Geopeko elected to dilute and on 31 Dec 1984 the two parties agreed to freeze their interests at Geopeko 51.42% and Shell 48.58%, and to share caretaking costs equally pending a decision on the future of the project. Subsequent mergers and acquisitions resulted in Newmont Australia holding 51.42% and Anglogold holding 48.58% at the time Adelaide Resources acquired the Rover Project.
Intensive exploration by the Desertex joint venture between 1976 and 1982 is reported to have identified 66 prospects representing discrete magnetic anomalies identified from airborne and ground magnetic surveying. Hydrothermally-altered Warramunga Formation sediments are reported to have been intersected at 10 of 18 prospects that were drill tested, and mineralisation at 3 prospects was tested by 6 or more drill holes, (Rover 1, Explorer 108, and Explorer 142).

It is understood that exploration was suspended in 1982 because Peko and the Central Land Council could not agree on access conditions. As a result, all EL applications by the Desertex joint venture from 1982 to 1995 were vetoed by the traditional owners.

**Normandy’s Exploration of the Babylon Field and Rover Field in the 1990s**

**Tennant Creek District Exploration**

Normandy Mining was active as both miner and explorer for a long period in the Tennant Creek District, originally through its interest in Australian Development NL. This provided a sound base for expanding its exploration interests in the region following acquisition of NBH-Peko’s tenement holdings in 1991.

Normandy used the term Babylon Field to refer to an extensive NW-SE trending belt of tenements located around 100 km of Tennant Creek, where several Warramunga Formation inliers were recognised in the Proterozoic basement. Normandy launched a new exploration phase in this belt in 1995, initially on 3 ELs granted on the Tennant Creek Station portion of the eastern Babylon Field. Negotiations were also ongoing from this time with other tenement holders and the Central Land Council to extend access to the remainder of the Babylon Field, (including Rover). Following depletion of reserves and closure of White Devil Mine in 1999, Normandy scaled back its investment in the Tennant Creek District, including exploration, and commenced the process of orderly disposal of its Tennant Creek assets.

These assets (including Rover) were described in considerable detail in an Information Memorandum of March 2000 offering them for sale. After some delay, disposal of Normandy’s Tennant Creek assets proceeded as planned, and in June 2001 ownership passed to Giants Reef Mining Ltd who proceeded to develop the small Chariot deposit and to continue district exploration. This transaction excluded Normandy’s interests in the Babylon Field exploration tenements, including Rover, which were retained by Normandy for potential farm out.

**Babylon Field Exploration**

This initiative by Normandy Mining included two new airborne magnetic surveys contracted by Normandy Mining to support anticipated future exploration. These were:
(1) A detailed survey of the Rover Field flown by Kevron in March 1999. Survey parameters were 40m terrain clearance and 100/200m line spacing using a Scintrex CS2 mounted in a Rockwell Aerocommander. Figure 2(i) consists of a high quality processed image of this survey of the Rover Field (RTP, 1st vertical derivative) showing the magnetic ironstones and magnetic stratigraphy within the Warramunga Formation inlier with exceptional clarity. Figure 2 (ii) is an image from the same survey (RTP, TMI) showing the location of the high priority magnetic targets selected by Adelaide Resources for further investigation.

(2) A detailed survey of the Billiatt area in the eastern portion of the Babylon Field flown by World Geoscience in July 1997. Survey parameters were 40m terrain clearance and 75m line spacing using a Scintrex CS2 mounted in a Cessna 206.
Much of the remainder of the Babylon Field is covered by the NTGS Bonney Well airborne survey flown in October 1999 using 60m terrain clearance and 200m line spacing.

The processed images from these three surveys were stitched together by Normandy Mining and included in the data acquired by Adelaide Resources. The composite image gives an exceptional synoptic view of basement geology below the concealing Wiso Basin sediments south of Tennant Creek.

Following the decision to withdraw from Tennant Creek, Normandy carried out a major compilation project to capture and evaluate all data from previous exploration work in the Babylon Field, including Rover. The resulting Information Memorandum was completed in April 2001, and is believed to have been compiled initially for internal purposes, but with an eventual objective of negotiating withdrawal via farm out or some other joint venture arrangement with, for example, Anglogold, the surviving Desertex Joint Venture partner at the time. No progress was achieved prior to Normandy being taken over by Newmont early in 2002.

In 2004 Newmont re-activated the process and sought expressions of interest in its 100% owned Rover tenements (ELs 7739 and 8921) from selected junior exploration companies with interests in the region. Adelaide Resources was invited to submit a tender to acquire the 100% owned tenements, and was selected by Newmont as the successful tenderer.

*Rover Field Exploration*

The Information Memorandum compiled by Normandy was included in the extensive database acquired by Adelaide Resources along with the Rover tenements. This Memorandum provides useful summaries of Geopeko’s previous exploration of the Rover Field targets, and was an essential starting point for the evaluation by Adelaide Resources of the prospectivity and potential of the Rover Field. The Memorandum also prioritised the known magnetic targets and prospects in the field, and mapped out a proposed exploration strategy to guide future exploration.

Normandy also carried out a substantial re-assay program of samples from Rover 1, Explorer 142 and Explorer 108 (none of which are located on EL 7739) to confirm the validity of the assay data reported previously by Geopeko. It was concluded that the accuracy of higher grade assays was adequate to define intersections of potential economic interest, but the reported low level gold and copper assays were found to be of variable quality, and were considered unreliable. No comment was offered on the extent to which this may have affected geological interpretation of exploration drill hole results.

Normandy’s ongoing negotiations with the Central Land Council and traditional owners were finally successful in 2000 when agreement was reached on further exploration of Rover Field ELs 7739 and 8921. By this
time Normandy had decided on divestment of its Tennant Creek interests, and did no ground based exploration in EL 7739 or any other of the Rover Field tenements prior to Adelaide Resources acquisition of the ground in early 2005.

**Adelaide Resources Limited Previous Exploration**

In 2005 and 2006 Adelaide Resources completed programs of exploration including:

- Magnetic susceptibility measurement of historic drill core housed in Tennant Creek
- Reading and modeling of ground magnetic surveys over the Rover 1North, Rover 4, Rover 2, Rover 6, Rover 11, Rover 16, Rover 14 and Rover 12 prospects.
- Drilling of eight precollared diamond drillholes at the Rover 12, Rover 4 and Rover 14 Prospects for a total advance of 4,085 metres.

All holes successfully intersected “ironstone” lode rocks, the typical iron metasomatites that host copper-gold mineralisation in the Tennant Creek field. Additionally, zones of anomalous copper and gold were intersected in each of these holes and while not of potentially economic grade, the results provided significant encouragement to continue exploration.

8. **Exploration Completed 5/6/07 to 4/6/08**

8.1 **Reverse Circulation Drilling**

The company drilled three reverse circulation holes at the Rover 4 prospect in September 2007 following encouraging low grade copper and gold intersection achieved in 2006 at the prospect.

A contract to complete the drilling was awarded to McKay Drilling. Drilling operations commenced on 17 September and concluded prematurely on 24 September following the mechanical failure of the rig compressor.

Three holes (RV4ARD9, RV4ARD10 and RV4ARD11) were drilled for a total advance of 684 metres. Collar locations were surveyed using a DGPS instrument. Down hole surveys were completed using a camera supplied by the drill contractor.

RV4ARD9 was abandoned at 120 metres depth, while RV4ARD11 was suspended at 216 metres depth when the compressor broke down. RV4ARD10 was successfully drilled to a total depth of 348 metres.

The three holes were drilled on a single north-south section. Figure 3 shows drill hole locations in plan, while figures 4 and 5 present a cross section containing the three holes.
Data collected for each hole appears in Appendix 1 of this report and includes:

- Drill hole collar and hole set-up information
- down hole surveys
- logged lithology
- summary geology
- logged alteration
- logged veining
- magnetic susceptibility data, and
- assay results
Basal "grit" unit

Unconformity

Unaltered host sediments

Chlorite alteration

Jasper-Hematite-Dolomite "Ironstone" interfingered with altered sediments

Mineralisation

Strongly Chlorite altered host sediments

Weakly altered host sediments

Figure 5
Brief summaries of each of the three holes appear below

**Rover 4 – RV4ARD9**
**Target:** Drilled to test the concept that thick but only weakly magnetite-bearing iron stones intersected in RV4AD5 (and old Peko holes RV015 and RV017 in the same vicinity) is continuous with a similar ironstone body intersected in old Peko hole RV018.

**Result:** Cambrian Wiso Basin sediments (including dolomites, siltstones and basal grits) to 91m downhole. Thereafter, siltstones and hematite siltstone of the basement (Warramunga Formation?) were encountered until end of hole at 120 metres.

It was planned to drill a 120 meter hole, ream it out, and case it with 6 inch PVC to contain water when drilling the basement, then to extend the hole to a total depth of approximately 350 metres. The 120 metre hole was successfully drilled and reamed out however efforts to case the hole with PVC failed with only about 60 metres of casing installed.

The drill hole was abandoned in a geological sequence interpreted to be similar to that which occurs in the hangingwall of the target ironstone in holes to the west. There was no sign of any mineralisation or alteration and therefore no drill samples were submitted for assay.

**Rover 4 – RV4ARD10**
**Target:** Drilled to test the concept that thick but only weakly magnetite-bearing iron stones intersected in RV4AD5 (and old Peko holes RV015 and RV017 in the same vicinity) is continuous with a similar ironstone body intersected in old Peko hole RV018.

**Result:** Following the failure of RV4ARD9, the plan to case the top of the holes with PVC was abandoned. Instead it was decided to drill the holes with only 12 metres of casing installed. This required the construction of very large sumps to contain ground water.

Cambrian Wiso Basin sediments were encountered to a depth of 95 metres. Basement sediments including siltstones and haematitic siltstones persisted until 149 metres down hole. Between 149 and 180 metres down hole the hole encountered numerous narrow units of jasper-hematite-dolomite ironstone interspersed with chlorite altered sediments.

From 180 to 221 metres a zone of continuous jasper-dolomite-hematite was encountered with sulphide (predominantly pyrite) increasing to wars the bottom of the interval.
From 221 to 236 metres down hole strong copper mineralisation was intersected. The principal mineralogy of the zone appears to be pyrite-hematite-jasper-dolomite-chalcopyrite. The zone assayed 15 metres at 2.07% Cu and 0.15 g/t Au. Anomalous levels of Ag (max 31.8ppm), Bi (max 340ppm), and Co (max 445ppm) are also associated with the mineralised zone.

As a check on laboratory accuracy, two duplicate sets of samples from the mineralised interval were submitted to two different laboratories (ALS and Genalysis). The results are in close agreement.

From 236 to 285 metres downhole strongly hydrothermally chlorite altered host sediments were intersected. The intensity of the hydrothermal alteration drops with depth and only weakly altered to possibly un-altered sediment then persists to the end of hole at 348 metres.

**Rover 4 – RV4ARD11**

*Target:* Test for continuation of copper mineralisation intersected in RV4ARD10 at a position being 80 metres south of RV4ARD10.

*Result:* The hole passed from weathered Cambrian Wiso Basin sediments into basement metasediments at 100 metres. Basement metasediments dominated by hematite siltstones persist to 169 metres down hole.

From 169 to 175 metres a jasper-dolomite-hematite ironstone was intersected prior to the hole passing into moderately to intensely chlorite altered sediment which persisted until the hole was prematurely halted at 216 metres.

An anomalous interval of 7 metres at 0.25% Cu was intersected between 202 and 209 metres, the depth at which the compressor failed. A second, smaller capacity, compressor was then employed but failed to hold back ground water and the hole was finally abandoned at 216 metres. Sulphides were observed floating on the water coming from the sample cyclone and it is possible that the drop in copper grade below the anomalous interval noted above is due to the poor and very wet sample quality.

Weakly anomalous gold (max 0.3 g/t) was also intersected in the altered sediment.

**Drill hole Rehabilitation**

Following the premature abandonment of the September 2007 drilling program, the company tried to secure another drilling contractor to continue the drilling program. Consequently, drill site rehabilitation was not completed in 2007 (rehab of sites has been partially completed as part of the 2008 drilling program underway at the time of reporting).
8.2 Gravity Survey

A trial ground based gravity survey was completed over the Rover 4 prospect with a total of 148 station read, including 4 repeat stations. The area covered by the survey was 800 metres east-west by 1500 metres north-south with the eastern margin of the survey being the tenement boundary of EL 7739. Stations were spaced 100 metres apart, a spacing considered appropriate for a body buried beneath at least 100 metres of cover sediment. Figure 6 presents a gravity image constructed from the data, and also indicates the area surveyed.
Two subtle (<0.5 mgal) but potentially significant gravity anomalies are evident in the survey, both on the eastern limit of the surveyed area. A southern feature is coincident with the known extent of the Rover 4 "ironstone", the jasper-hematite-dolomite body intersected in drilling. The anomaly is not closed to the east as the survey boundary was constrained by the tenement boundary.

The northern anomaly is sourced by an unknown body however appears to be connected to the southern anomaly. The northern anomaly remains open to both the east and also to the north and further surveying will be required before confident modelling can be completed.

The success of the method to “see” the Rover 4 ironstone is most significant. Rover 4 is a subtle magnetic anomaly not dissimilar in magnitude to several others which are located upon EL 7739. Drilling to date at Rover 4 has, however, shown it to be sourced by one of the most voluminous “ironstones" yet located in the Rover Field. Its low magnetic intensity is likely due to the fact that most of the iron oxide intersected at Rover 4 so far is hematite and not magnetite.

Gravity therefore may offer a valuable secondary targeting technique which can be used in conjunction with magnetics to assist in ranking targets prior to drill testing.

Appendix 2 comprises the final report and data received from the geophysical contractor for the Rover 4 gravity survey.

9. Results and Conclusions
Three reverse circulation drill holes and a ground gravity survey were completed at the Rover 4 prospect in 2007. Mechanical failure of the drill rig compressor caused the program to be delayed until late May 2008 and this report details only the work completed up until recommencement in late May.

The drill program intersected a highly encouraging interval of mineralisation assaying 15 metres at 2.07% Cu and 0.15g/t Au which warrants follow-up exploratory drilling (commenced late May 2008).

A trial ground gravity survey at Rover 4 resulted in the definition of two anomalies, one of which is confidently considered to be sourced by the Rover 4 ironstone. Gravity has the opportunity to play a future role in defining and ranking drill targets in the Rover Field.
10. Expenditure
Details of exploration expenditure appear in Appendix 3 in the preferred DPIFM format.

Expenditure for the year ending 31 May 2008 totaled $222,489. This figure substantially exceeds the expenditure covenant of $100,000 for the same period.

11. Keywords
Rover Field, Tennant Creek, Ironstone, Gold, Copper, Bismuth, gravity surveys, Warramunga Group, reverse circulation drilling.
Appendix 1

Drilling Data
(Files on CD)
Appendix 2

Gravity Survey Report
(Data Files on CD)
GEOPHYSICAL REPORT R2007017
Gravity Survey
P2007017 ADELAIDE RESOURCES Tennant Creek

Prepared For:

Attention: Mr Chris Drown

Completed by:

Leon Mathews, Director/Geophysicist
Mark Jecks, Director/Geophysicist

T 08 9471 1575
F 08 9471 1079
PO BOX 1049
MORLEY WA 6943
AUSTRALIA

ABN 68 123 110 243
9 November 2007
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Appendix D  Tilt Test Data
Appendix E  Longman’s Earth Tide Correction Formula
Appendix F  Data CD
1.0 Company Overview

Atlas Geophysics Pty Ltd is an Australian company based in Bayswater, Western Australia, whose mission is to provide the highest quality geophysical resource data to the mining, petroleum and exploration industry in a safe and timely manner. Through experience, innovation and excellence, the company will exceed its client’s expectations and will continually develop its technologies and methodologies to maintain its reputation for being the best in the business.

The company specialises in the acquisition, processing and interpretation of potential field datasets, with particular emphasis on gravity. The directors of the company, Leon Mathews B.Sc. Hons (Geophysics), and Mark Jecks B.Sc. (Geophysics) have a combined total of over 15 years experience in the field of gravity and bring to the company, a young, vibrant and motivated approach to project management and execution. Strategically, through development and research, the company aims to expand into other geophysical acquisition markets that encompass methods such electrical, electromagnetic, induced polarisation and reflection seismic. The company also has interests in developing an airborne platform capable of acquiring high quality magnetic and radiometric data so it can offer its clients a complete airborne and ground geophysical solution.

Atlas Geophysics Pty Ltd is committed to the values and principles of Occupational Health and Safety and Environment. To this end, the company aims to prevent injuries and occupational illness to its employees and minimise any adverse environmental impact its activities may have.
2.0 Project Brief

Project P2007017 required the acquisition and processing of 144 new gravity stations located on tenements held by Adelaide Resources. The survey area was located approximately 100km west of the township of Tennant Creek in the Northern Territory.

Atlas Geophysics Pty Ltd completed the acquisition of the dataset using foot-borne gravity methods. A single two person crew was utilised to carry out the acquisition.

 Acquisition was completed on the 1st of October 2007, with the final data and operations report delivered to the client on the 12th of October 2007.

2.1 Location and Access

The gravity survey was located approximately 100km west of the mining town Tennant Creek, Northern Territory (Figure 1). The survey area was located on the edge of the Tanami desert in the Northern Territory.

Access to the survey area from Tennant Creek was via an unsealed road which runs west from Tennant Creek. The road is in fairly good condition and a trip form Tennant to the survey area can be completed in one and a half hours.

2.2 Survey Configuration

The survey was conducted in several sections. The first was on a nominal station spacing of 50m, with stations located on north-south trending lines on a nominal line spacing of 400m. The second section was on a nominal spacing of 500m, with stations located on north-south trending lines on a nominal spacing of 1000m. The third section was on a nominal spacing of 50m and 25m, with stations located on 200m, and 50m spaced lines. A small number of stations were offset from their planned station location due to restrictions from the terrain conditions present in the survey area. Appendix A contains a station location plot of the acquired gravity stations.
3.0 Personnel

Atlas Geophysics Pty Ltd engages only fit, motivated and safe working professionals to deliver high quality gravity data to its clients. Acquisition staff members are from a range of backgrounds, usually from the geoscience or geotechnical fields, and all are trained in senior first aid, bush survival, and advanced four wheel driving. Overseeing the acquisition and processing is the company’s team of geophysicists – a team with a combined total of over 15 years experience in the acquisition, processing and quality analysis of gravity data.

3.1 Project Supervision

Supervising the project from the field was company director Mark Jecks, B.Sc. (Geophysics). Mark has been involved in the acquisition, processing and interpretation of potential field data for over 6 years and has directly overseen the acquisition and processing of over 100,000 gravity stations.

Mark was responsible for project supervision, as well as for conducting the acquisition, processing and quality analysis of the gravity data on a daily basis.

All final data processing, QA, reporting and delivery were performed by the directors.

3.2 Acquisition/Other Personnel

Other personnel participating in field acquisition of the gravity data on this project are as listed below:

Bryce Humphrey – Bryce is an experienced gravity operator, having worked for mainly mining companies undertaking regional spaced surveys by vehicle. Bryce has a strong mechanical background which is often useful when in a field environment where repairs to vehicles may be necessary.

Michael Ibbotson – Michael is an experienced gravity operator, having worked for mainly mining companies undertaking regional spaced surveys by vehicle and on foot.
4.0 Equipment and Instrumentation Utilised to Conduct the Survey

4.1 Glonass/GPS Receiver Equipment

Leading-edge dual-frequency GPS technologies from Leica Geosystems such as the GPS1200 and GPS500 have been utilised on the project to allow for real-time centimetre level accuracy 3D positions. System specifications for both the systems can be found in the attached brochures (Figure 2-3). Atlas Geophysics Pty Ltd is the first gravity acquisition company in Australia to utilise GNSS technology enabled receivers. Both the GPS1200 and Smartrover are equipped with future proof GNSS technology which is capable of tracking all available GNSS signals including the currently available GLONASS. These new generation receivers, in conjunction with full GNSS tracking and processing, offer a new level of unmatched solution accuracy and reliability, especially when compared to existing conventional L1L2 GPS technologies.

The use of Glonass technology in addition to GPS provides very significant advantages:

- Increased satellite signal observations
- Markedly increased spatial distribution of visible satellites
- Reduced Horizontal and Vertical Dilution of Precision (DOP) factors
- Improved post-processed-kinematic (PPK) performance
- Decreased occupation times means faster acquisition

One Leica GPS1200 and one Leica GPS500 geodetic grade receivers were utilised to conduct the survey. One receiver was used as a real time kinematic (RTK) rover, and the second receiver used as a real-time-kinematic (RTK) base station. This configuration allowed for precise position information to be gained in real time. Pacific Crest PDL UHF radios were utilised as a data link between the base station and rover.

4.2 Gravity Instrumentation

Complementing the company’s GNSS/GPS technologies is the latest in gravity instrumentation from Scintrex Ltd, the Scintrex CG-5 (Figure 4). The CG-5 digital automated gravity meter offers all of the features of the low noise industry standard CG-3M micro-gravity unit, but is smaller and lighter. It also offers improved noise rejection. By constantly monitoring tilt sensors electronically, the CG-5 automatically compensates for errors in gravity meter tilt. Due to a low mass and the excellent elastic properties of fused quartz, tares are virtually eliminated.

The CG-5 can be transported over very rough terrain, on quad bikes, foot, or vehicle without taring or drifting. In terms of repeatability, the CG-5 outperforms all existing gravity meter technologies, with a factory quoted repeatability of better than 0.005 mGals.

Table 1 overleaf lists the gravity meters used on the project.
<table>
<thead>
<tr>
<th>Gravity Meter Type</th>
<th>Gravity Meter Code*</th>
<th>Gravity Meter Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scintrex CG5</td>
<td>H2</td>
<td>135</td>
</tr>
</tbody>
</table>

*Table 1: Gravity meters used on the project.*

4.3 Other Equipment

The company utilised the following additional equipment to fully support the GPS-Gravity operations:

- Two HP Laptop computers for data download and processing
- Two Magellan FX324 autonomous GPS receivers for navigation
- One Iridium satellite phones for long distance communications
- Personal Protective Equipment for all personnel
- Batteries, battery chargers, solar cells, UPS System
- Survey consumables
- Tools, engineering and maintenance equipment for vehicle servicing
- First aid and survival kits
- Tyres and recovery equipment
Leica GPS1200
Fast, accurate, rugged and reliable

**GNSS technology**
GPS1200’s SmartTrack measurement engine now utilizes two global navigation satellite systems increasing the number of tracked satellites. The new SmartTrack measurement engine tracks all available GNSS signals (L1, L2 and GLONASS). More satellites mean higher productivity, accuracy and reliability. SmartTrack acquires satellites within seconds. It’s ideal in urban canyons and obstructed areas where other receivers often fail. GPS1200 with SmartTrack is designed to support the future signals GPS L5 and L6.

**SmartCheck**
Continuously checking provides the highest possible reliability. A unique, built-in integrity monitoring system checks all data immediately. SmartCheck—a new processing—processes L1 and GLONASS measurements simultaneous for centimeter accuracy. 20 Hz 11K at 30 km and more. Initialize within seconds and survey in obstructed areas with a GX1200/GTX1200 (UPD only) sensor or increase productivity with a GX3740 or GX1200 (UPD and GLONASS).

**GLONASS**
For many years the GLONASS system was not reliable enough in terms of satellite availability and system performance. With recent launches and commitment from the Russian government, reliability and availability are significantly improved. Under normal conditions there are 4 to 5 additional satellites compared to a GPS-only constellation—and even more satellites will be available over the next two years. Now is the time to invest in hybrid GNSS technology.

“...The GLONASS system should be created before 2008, as it was originally planned... We have the possibility. Let us see what can be done in 2008, 2007.”
—Russian President Vladimir Putin, December 20th, 2003.

**Exceptionally rugged**
Don’t worry about how you treat the unit...GPS1200. It’s built to MIL spec to withstand the roughest use.

With its strong, precision-machined magnesium housing, GPS1200 stands up to drops and falls and the Joys and vibrations of machines.

**High contrast touch screen**
The high quality 3.5" VGA (320x480) color resistive touch screen guarantees perfect clarity and contrast. Whether in failing light or bright sunshine, you can always read the display perfectly. Operate using the touch screen of the complete navigation, whichever you prefer.

**Weather resistant controller**
Connect the controller to the receiver when you need to input information and make full use of the on-board functions and programs.

**RTK/2G/3G communication**
Rugged modem, GPRS, GPS and CDMA modules make it in waterproof housings. Attach either one or two devices for RTK/2G/3G reference and rover applications.

With Altimetrix® Wireless Technology built into the GPS1200 you have complete hands free operation and connectivity to compatible wireless products is available.

Figure 2: Leica GPS1200 product brochure
Leica GPS1200

Technical specifications and system features

<table>
<thead>
<tr>
<th>GPS1200 receivers</th>
<th>CX1210 GG</th>
<th>CX1210 NG</th>
<th>CX1200/MTX1210</th>
<th>CX1200</th>
<th>CX1210</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNSS Technology</td>
<td>SmartTrack</td>
<td>SmartTrack</td>
<td>SmartTrack</td>
<td>SmartTrack</td>
<td></td>
</tr>
<tr>
<td>Channels</td>
<td>24 L1 + 15 L2 C/N0 2 S/N0 &lt; 4</td>
<td>24 L1 + 15 L2 C/N0 2 S/N0 &lt; 4</td>
<td>24 L1 + 15 L2 C/N0 2 S/N0 &lt; 4</td>
<td>24 L1 + 15 L2 C/N0 2 S/N0 &lt; 4</td>
<td>24 L1 + 15 L2 C/N0 2 S/N0 &lt; 4</td>
</tr>
<tr>
<td>PTK</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Status Indicators</td>
<td>3 LED indicators</td>
<td>for power, tracking, memory</td>
<td>3 LED indicators</td>
<td>for power, tracking, memory</td>
<td>3 LED indicators</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GPS1200 receivers</th>
<th>CX1210 GG</th>
<th>CX1210 NG</th>
<th>CX1200/MTX1210</th>
<th>CX1200</th>
<th>CX1210</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>1 power port, 1 control port, 1 antenna port</td>
<td>1 power port, 1 control port, 1 antenna port</td>
<td>1 power port, 1 control port, 1 antenna port</td>
<td>1 power port, 1 control port, 1 antenna port</td>
<td>1 power port, 1 control port, 1 antenna port</td>
</tr>
<tr>
<td>Supply voltage, Consumption</td>
<td>115/230 V, 50/60 Hz</td>
<td>115/230 V, 50/60 Hz</td>
<td>115/230 V, 50/60 Hz</td>
<td>115/230 V, 50/60 Hz</td>
<td>115/230 V, 50/60 Hz</td>
</tr>
<tr>
<td>ESS input and EPS</td>
<td>Optional: 1 PPS output port, 1 event input port, 2 control input ports</td>
<td>Optional: 1 PPS output port, 1 event input port, 2 control input ports</td>
<td>Optional: 1 PPS output port, 1 event input port, 2 control input ports</td>
<td>Optional: 1 PPS output port, 1 event input port, 2 control input ports</td>
<td>Optional: 1 PPS output port, 1 event input port, 2 control input ports</td>
</tr>
<tr>
<td>Standard antenna</td>
<td>SmartTrack</td>
<td>SmartTrack</td>
<td>SmartTrack</td>
<td>SmartTrack</td>
<td></td>
</tr>
<tr>
<td>Built-in groundplane</td>
<td>Built-in groundplane</td>
<td>Built-in groundplane</td>
<td>Built-in groundplane</td>
<td>Built-in groundplane</td>
<td>Built-in groundplane</td>
</tr>
</tbody>
</table>

The following apply to all receivers except where stated:

| Power supply | 115/230 V, 50/60 Hz for MTX1210 / 220 V, 50/60 Hz for GPS receivers |
| Plugin-lithium batteries | Same for GPS and MTX1210 |
| External power | For MTX1210, 12 V, 10 W; for GPS receivers, 12 V, 10 W |
| Weight | 13.8 kg, controller 4.4 kg (extended), 2.75 kg (extended), 6.4 kg (extended) |
| Temperature | Operation: 0°C to 40°C, Storage: -20°C to 60°C |
| Humidity | Relative humidity: 95% at 40°C, 45% at 60°C |
| Waterproofing and dust protection | IP67, MIL-STD 810F, IPX4 |
| Dust tight | 30 g, MIL-STD 810F |
| Vibration test | MIL-STD 810F, 2g, 5Hz, 3 axes, 5g, 1g, 3 axes |

Figure 3: Leica GPS1200 technical specifications
**SPECIFICATIONS**

**Sensor Type**
Fused Quartz using electrostatic nulling

**Reading Resolution**
1 microGal

**Standard Field Repeatability**
< 5 microGal

**Operating Range**
8,000 mGal without resetting

**Residual Long-Term Drift**
(Static) Less than 0.02 mGal/day

**Range of Automatic Tilt Compensation**
± 200 asec/sec

**Tares**
Typically less than 5 microGal for shocks up to 20 G

**Automated Corrections**
Tilt, Instrument Tilt, Temperature, Noisy Sample, Seismic Noise Filter

**Dimensions**
31 cm (H) x 22 cm x 21 cm
12 in (H) x 8.5 in x 8 in

**Weight (including batteries)**
8 kg, (17.5 lbs)

**Battery Capacity**
2 x 6AH (10.8V) rechargeable Lithium-Ion Smart Batteries. Full day operation in normal survey conditions with two fully charged batteries.

**Power Consumption**
4.5 Watts at 25°C

**Standard Operating Temperature Range**
-40°C to +65°C

**Ambient Temperature Coefficient**
0.2 microGal/°C (typical)

**Pressure Coefficient**
0.15 microGal/kPa (typical)

**Magnetic Field Coefficient**
1 microGal/Gauss (typical)

**Memory**
Flash Technology (data security)
Standard 12 MBytes

**Digital Data Output**
RS-232 C and USB interface
Is optimized for Win XP™

**Analog Data Output**
Stop-Chart Recorder

**Display Screen**
1/4 VGA 320 x 240 pixels

**Keypad**
27 key alphanumeric

**Standard System**
- CG-5 Console
- Tripod base
- 2 rechargeable batteries
- Battery Charger, 110/240 V
- External Power 110/240 V
- RS-232 and USB cables
- Carrying bag
- Data dump and utilities software
- Operating Manual (CD)
- Transit Case

**GPS**
Enables GPS station referencing from an external 12 channel smart GPS antenna being connected via the RS-232 port. Standard GPS accuracy: <15m DGPS (WAAS) < 3m. Client has the option to use other higher accuracy GPS receivers outputting NMEA data string through the serial port.

**OPTIONS**

**High Temperature Option**
For use in climates that may exceed the normal operating temperate of 45°C. Allows operating temperatures of up to 55°C. This option is intended to be used in climates above freezing and needs to be ordered at the time of purchase.

**Battery Belt**
Suggested for cold weather operation.

**COMPLETE GRAVITY SOLUTIONS**

**Special Applications**
Please contact LRS Scintrex or your local representative.

**Training Programs**
LRS Scintrex can provide training programs at our office in Canada or at your location.

**Application Software**
LRS Scintrex can provide software packages to support your data processing, interpretation and mapping needs.

An ISO 9001:2000 registered company

* All specifications are subject to change without notice.

---

**Figure 4: Scintrex CG-5 specifications**
5.0 Vehicle Transportation

Supporting the walking operations, was a Toyota Landcruiser Troop Carrier, this support vehicle was fitted with:

- Iridium satellite phone
- Magellan FX324 navigation grade GPS receiver
- Spare navigation grade GPS receiver with batteries
- First aid and survival kit
- Two spare tyres
- Recovery equipment for tyre repair
- Recovery equipment including winch for bogging, stranding’s.
- Comprehensive tool-kit to allow in field repairs
- 10L of drinking water
- Two hydraulic jacks

The vehicle used on the project was sourced from Thrifty Car Hire and was covered under Thrifty’s service and maintenance schedule.

Fuel and oil for the vehicle was obtained on site from Westgold.
6.0 Camping / Accommodation

No camping was required to conduct the survey. For the duration of the survey the field crews stayed at the Rover 1 exploration camp. The crews drove from the camp to and from the survey area each day. The drive took around 40 minutes to complete. All meals were provided at the camp.
7.0 Communications and Internet

The primary method of communication for the field crew was via Iridium satellite phone. The field crew made scheduled calls to the WA Operations Centre at prescribed interval as per the Field Operations Plan.

An internet connection for client contact and data server access was established using the existing facilities at Rover 1 camp.
8.0 Survey Methodology

All gravity data were acquired using Atlas Geophysics Pty Ltd foot-borne techniques. These techniques, which utilise concurrent GPS and gravity acquisition, allow for rapid acquisition of very high quality data.

8.1 Gravity and GPS Control Establishment

A GPS control station GPS0008 was established within the survey area. A permanent monument was erected to mark and witness the station. The monument consists of a short star picket driven into the ground with about 15cm protruding. The star picket marks the position of the GPS control station. A steel star picket of 1.25m length has been placed within 0.5m of the station and carries an Atlas Geophysics Pty Ltd witness plaque numbered with the unique station number identifier GPS0008 (Figure 5).

An existing gravity control station established by Daishsat in 2006 was used as the gravity base station for the entire survey. This base was given the station code GRV0007 by Atlas Geophysics. The base consisted of a small star picket driven into the ground to a height of 15cm and was witnessed by a Daishsat survey plaque attached to a steel star picket.

The details of this Atlas Geophysics Pty Ltd control station have been recorded on an Atlas Geophysics Pty Ltd control station summary sheet. This sheet includes the geodetic coordinates, observed gravity value, station description, locality sketch, locality map and digital photo of the station. This sheet is included at the end of this report as Appendix B.

![Figure 5: Atlas Geophysics Pty Ltd survey witness plaque](image-url)
8.1.1 GPS Control

A GPS control station GPS0008 was established at a central location within the survey area. This control station allowed all position and height information obtained from the RTK survey to be tied to the Geocentric Datum of Australia (GDA94) and Australian Height Datum (AHD).

Coordinates for the GPS control station were established using the 5 second static data logged at the control station during the survey. The static data has been submitted to Geoscience Australia’s AUSPOS processing system to produce first-order geodetic control station coordinates accurate to better than 5mm for the x, y and z observables. Multiple days of static GPS data, using different GPS antenna heights, have been submitted to ensure accuracy and reliability of the solution.

Initial surveying was conducted using adopted control station coordinates since the AUSPOS system requires approximately two weeks before a Final Ephemeris Solution can be delivered. The adopted coordinates were derived from an autonomous Ephemeris measurement at the control station giving an accuracy of better than 0.5m for x, y coordinates and better than 15m for the z coordinate. Once the final solution for control station coordinates was delivered by AUSPOS, all control and field GPS measurements had the necessary DC shift applied to give accurate, absolute positions for east, north and elevation. The details of the control process have been summarised in a table included at the end of this report as Appendix C.

8.1.2 Gravity Control

The primary gravity control station was already established in the survey area so no gravity base ties were required for this project.

8.2 GPS Data Acquisition, Processing and Quality Analysis

GPS data were collected using Leica GPS1200 base and rover receivers operating in real-time-kinematic (RTK) mode. The survey mode allowed for 3-D solution coordinate qualities better than 3cm for each of the gravity stations surveyed. Atlas Geophysics Pty Ltd quality analysis (QA) procedures have ensured the final GPS data has met and exceeded industry standards for gravity acquisition.

8.2.1 GPS/Glonass Acquisition

Each gravity station location (GSL) has been staked out using navigation grade GPS receivers. Stake-out accuracy was better than 5m and where possible, the gravity crew has placed the GSL’s as close to the programmed station locations as possible. Where it was impossible to locate a GSL at the programmed station location, the station has been offset from the programmed coordinate and this has been reported in the field-log. This was not necessary for any of the stations surveyed in this project.
For the surveying, the GPS/Glonass sensor was carried by the field crew using an antenna pole attached to a custom backpack, with the GPS receiver located in the backpack.

At each GSL, the GPS/Glonass receiver was used to occupy and record information relating to the GSL, including positional information, satellite availability and co-ordinate quality. The positional information data for each GSL were recorded to an accuracy of less than 0.05 metres for the x, y, and z observables. Individual GSL's were assigned a unique station code which coincided with that used for the gravity measurement to allow for later synchronisation during data processing. All data were recorded internally by the GPS/Glonass receiver onto a Compact Flash (CF) card. The CF card was then removed from the receiver at the end of each survey day so that all GSL information could be downloaded for processing and quality control analysis.

8.2.2 GPS/Glonass Processing

All GPS/Glonass data were recorded in real time so no further processing was required. The Leica Geo Office software suite was used to import the data, apply a geoid correction and transformations, and output the data into an Atlas Geophysics standard format. The formatted data were then imported into Atlas Geophysics data processing software AGRIS and combined with gravity data to produce a gravity database for the project. This process was carried out on a daily basis.

Transformations between GPS/Glonass derived WGS84/GDA94 coordinates to Map Grid of Australia (MGA) coordinates were conducted within the Leica Geo Office suite. For most practical applications where a horizontal accuracy of only a metre or greater is required, GDA94 coordinates can be considered the same as WGS84. MGA94 coordinates were obtained by projecting the GPS-derived WGS84 coordinates using a Universal Transverse Mercator (UTM) projection with zone 53S. For more information about WGS84, GDA94 and MGA coordinates, the reader is asked to visit the Geoscience Australia website: http://www.ga.gov.au/geodesy/datums/gda.jsp.

Elevations above the Australian Height Datum (AHD) were modelled using Leica Geo Office software and the latest geoid model for Australia, AUSGEOID98. Information about the geoid and the modelling process used to extract separations (N values) can be found at http://www.ga.gov.au/geodesy/ausgeoid/. To obtain AHD elevation, the modelled N value is subtracted from the GPS derived WGS84 ellipsoidal height (Figure 6).
8.2.3 GPS/Glonass Quality Analysis

Rigorous Quality Analysis procedures were applied to the acquired GPS data on a daily basis using the company’s in-house AGRIS (Atlas Geophysics Reduction and Information Software) software. The GPSQA module within AGRIS is used to analyse such factors as the recorded positional data, baseline distance, number of satellites, coordinate quality (CQ), standard deviation and dilution of precision (DOP) to ensure the final positional data used for gravity processing meets stringent quality specifications. In the event that GPS data recorded at a GSL did not conform to these specifications, the GSL was re-occupied. It was not necessary to re-occupy any of the GSL’s on this project.

8.3 Gravity Data Acquisition, Processing and Quality Analysis

Gravity data were acquired using the company’s foot-borne techniques with Scintrex CG5 digital automated gravity meters. The company’s in-house reduction and QA software AGRIS was used to process the data on a daily basis to ensure quality and integrity. Atlas Geophysics Pty Ltd quality analysis (QA) procedures have ensured the final GPS data has met and exceeded industry standards for gravity acquisition.

8.3.1 Calibration of the Gravity Meters

The gravity meter used on the project was calibrated post survey on the Mundaring Weir-Mt Gungin calibration range in Mundaring, Western Australia. The calibration process has validated the gravity meter’s scale factor (or GCAL1) to ensure reduction of the survey data produces correct Observed Gravities. The scale factor applied to the CG5 gravity data is shown overleaf.
<table>
<thead>
<tr>
<th>Gravity Meter</th>
<th>Gravity Meter Code*</th>
<th>Gravity Meter Serial Number</th>
<th>Scale Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scintrex CG5</td>
<td>H2</td>
<td>0135</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Table 2: Gravity meter scale factors

Weekly tilt-tests and cycles were conducted to ensure the meter’s drift and tilt correction factors were valid. Gravity meter drift rates were monitored on a day to day basis using the company’s AGRIS software. Gravity data from the tilt test performed before the commencement of acquisition have been included as Appendix D at the end of this report.

8.3.2 Acquisition of the Gravity Data

Gravity data were acquired concurrently with GPS/Glonass data by the gravity crew using a single Scintrex CG5 gravity meter (Photo 1). Data were acquired in a single shift of ten hours duration, with the shift consisting of a single gravity loop controlled by observations at the gravity control station GRV0007. Each loop contained a minimum of two repeated readings so that an interlocking network of closed loops was formed. A total of 5.0% repeats were acquired for quality control purposes. Where practical, repeat readings were evenly distributed on a time-basis throughout each of the gravity loops.

Photo 1: Gravity observation on foot.
For the walking work on this project, the crew stayed together and the GPS and gravity measurements were taken concurrently.

At each station, the gravity operator took a minimum of two gravity readings of 20 second duration so that any seismic or wind noise could be detected. Control station readings were set to 60 second duration. Before taking the reading, the operator ensured that the instrument tilt-reading was restricted to less than 5 arc-seconds and after the reading, not higher than 20 arc-seconds. Tilt-testing prior to project commencement showed that the meter performed well even at extreme tilts (better than 0.005 mGals at +150/-150 arc-seconds).

If two separate readings did not agree to better than 0.03 mGals (0.01 mGals for control station readings), then the operator continued taking readings until the tolerance between consecutive readings was achieved. At the conclusion of the gravity reading, the final data display on the gravity meter was analysed to ensure the instrument was performing to specification and that the station observation provided data conforming to the project specifications. The operator also checked that the temperature, standard deviation and rejection values were within required tolerance before recording the reading. At each station, the operator recorded the gravity data digitally in the gravity meter as well as in an Atlas Geophysics Pty Ltd field book so that instrument drift and reading repeatability could be analysed easily whilst in the field. Data recorded at each GSL was assigned a unique station code to coincide with that recorded by the GPS receiver for later data synchronisation.

Repeat stations were marked with a biodegradable pin flag and flagging tape for subsequent reoccupation.

8.3.3 Processing of the Gravity Data

The acquired gravity data were processed using the company’s in-house gravity pre-processing and reduction software, AGRIS (Atlas Geophysics Reduction and Information Software). This software has recently been developed by the company to allow for full data pre-processing, reduction to Bouguer Anomaly, repeatability and statistical analysis, as well as full quality analysis of the output dataset.

The software is capable of downloading and processing Scintrex CG3/CG5 and Lacoste Romberg gravity data. Once downloaded, the gravity data is analysed for consistency and preliminary QA is performed on the data to check that observations meet specification for standard deviation, reading rejection, temperate and tilt values. Once the data is verified, the software averages the multiple readings and performs a merge with the GPS data (which it has also previously verified) and performs a linear drift correction and earth tide correction. Calculation of Free Air and Bouguer Anomalies is then performed using industry standard Geoscience Australia formulae.

The following corrections were applied to the dataset to produce Bouguer Anomalies for each of the gravity stations. The formulae listed here produce values in milliGals. To convert values to SI gravity units (gu) or µms⁻², simply multiply by a factor of 10.
**Instrument scale factor:** This correction is used to correct a gravity reading (in dial units) to a relative gravity unit value based on the meter calibration (see Section 8.3.1).

\[ r_c = r \cdot S(r) \]

where,
- \( r_c \) corrected reading in milliGals
- \( r \) gravity meter reading in dial units
- \( S(r) \) scale factor (dial units/milliGal)

**Earth Tide Correction:** As the earth is not a homogeneous sphere, it is subject to variations in gravity due to the gravitational attraction of the Sun and Moon. These background variations can be corrected for using a predictive formula which utilises the gravity observation position and time of observation. The Scintrex CG5 gravity meter automatically calculates ETC but uses only an approximate position for the gravity observation so is not entirely accurate. For this reason, the Scintrex ETC is subtracted from the reading and a new correction calculated within AGRIS software. The full formula is too complex to list here so is contained in Appendix E.

\[ r_t = r_c + g_{tide} \]

where,
- \( r_t \) tide corrected reading in milliGals
- \( r_c \) scale factor corrected reading in milliGals
- \( g_{tide} \) Earth Tide Correction (ETC) in milliGals

**Instrument Drift Correction:** Since all gravity meters are mechanical they are all prone to instrument drift. Drift can be caused by mechanical stresses and strains in the spring mechanism as the meter is moved, knocked, reset, subjected to temperature extremes, subjected to vibration, unclamped etc. The most common cause of instrument drift is due to extension of the sensor spring with changes in temperature (obeying Hooke’s law). To calculate and correct for daily instrument drift, the difference between the gravity control station readings (closure error) is used to assume the drift and a linear correction is applied.

\[ ID = \frac{r_{cs2} - r_{cs1}}{t_{cs2} - t_{cs1}} \]

where,
- \( ID \) Instrument Drift in milliGals/hour
- \( r_{cs2} \) control station 2nd reading in milliGals
- \( r_{cs1} \) control station 1st reading in milliGals
- \( t_{cs2} \) control station 2 time
- \( t_{cs1} \) control station 1 time

**Observed Gravity:** The preceding corrections are applied to the raw gravity reading to calculate the earth’s absolute gravitational attraction at each of the GSL’s.

\[ G_o = g_{cs1} + (r_t - r_{cs1}) - (t - t_{cs1}) \cdot ID \]
where,

\[
G_0 \quad \text{Observed Gravity in milliGals}
\]
\[
g_{cs1} \quad \text{control station 1 known observed gravity in milliGals}
\]
\[
r_t \quad \text{tide corrected reading in milliGals}
\]
\[
r_{cs1} \quad \text{control station 1 reading in milliGals}
\]
\[
t \quad \text{reading time}
\]
\[
t_{cs1} \quad \text{control station 1 time}
\]
\[
ID \quad \text{instrument drift in milliGals/hour}
\]

**Theoretical Gravity:** The theoretical gravity value at each GSL is calculated based on the assumption that the Earth is a homogeneous ellipsoid. The 1967 variant of the International Gravity Formula is used to approximate the theoretical gravity at each station location and essentially produce a latitude correction. Gravity values vary with latitude as the earth is not a perfect sphere and the polar radius is much smaller than the equatorial radius. The effect of centrifugal acceleration is also different at the poles versus the equator.

\[
G_t = \left(9780318.456 \cdot (1 + 0.005278895 \cdot \sin^2(l) - 0.000023462 \cdot \sin^4(l))\right) / 10
\]

where,

\[
G_t \quad \text{Theoretical Gravity in milliGals}
\]
\[
l \quad \text{GDA94 latitude at the GSL in decimal degrees}
\]

**Free Air Correction:** Since the gravity field varies inversely with the square of distance, it is necessary to correct for elevation changes from the reference geoid (AHD). Gravitational attraction decreases as the elevation above the reference geoid increases.

\[
FAC = \left(0.308768 - 0.00440 \sin^2(l)\right) \cdot h - 0.000001442 \cdot h^2
\]

where,

\[
FAC \quad \text{Free Air Correction in milliGals}
\]
\[
l \quad \text{GDA94 latitude at the GSL in decimal degrees}
\]
\[
h \quad \text{elevation above the reference geoid (AHD) in m}
\]

**Bouguer Correction:** If a gravity observation is made above the geoid, the effect of rock material between the observation and the geoid be taken into account. The slab of rock makes a positive contribution to the gravity value. A rock density of 2.67 gm/cc was used in the correction.

\[
BC = 0.04191 \cdot \rho \cdot h
\]

where,

\[
BC \quad \text{Bouguer Correction in milliGals}
\]
\[
\rho \quad \text{rock density (gm/cc)}
\]
\[
h \quad \text{elevation above the reference geoid (AHD) in m}
\]

**Free Air Anomaly:** The free air anomaly is the difference between the observed gravity and theoretical gravity that has been computed for latitude and corrected for the elevation of the GSL above or below the geoid.
where,

\[ FAA = G_0 - G_t + FAC \]

**Free Air Anomaly in milliGals**

**Observed Gravity in milliGals**

**Theoretical Gravity in milliGals**

**Free Air Correction in milliGals**

**Bouguer Anomaly:** The Bouguer anomaly is computed from the free air anomaly above by removing the attraction of the slab calculated by the Bouguer correction. The Bouguer anomaly is the most interpretable value derived from a gravity survey (in areas of low relief) as changes in the anomaly can be directly attributed to lateral density contrasts within the geology below the observation point.

\[ BA = G_0 - G_t + FAC - BC \]

where,

**Bouguer Anomaly in milliGals**

**Observed Gravity in milliGals**

**Theoretical Gravity in milliGals**

**Free Air Correction in milliGals**

**Bouguer Correction in milliGals**

### 8.3.4 Quality Analysis of the Processed Gravity data

Following processing of data to Bouguer Anomaly, repeatability and QA procedures were applied to both the GPS and gravity observations using AGRIS software. AGRIS checks the following as part of its QA processing:

- Easting Observation Repeatability and Histogram
- Northing Observation Repeatability and Histogram
- Elevation Observation Repeatability and Histogram
- Gravity Observation Repeatability and Histogram
- Gravity SD, Tilt XY, Temperature, Rejection, Reading Variance
- Gravity meter drift / closure
- Gravity meter loop time, drift per hour
- GPS Dilution of Precision, Coordinate Quality Factor, Standard Error
- Variation of surveyed station location from programmed location

All GPS and gravity data observations met Atlas Geophysics Pty Ltd QA specifications and no stations required reoccupation.
8.3.5 Additional Processing, Gridding and Plotting

Complementing the QA procedures is additional daily gridding, imaging and plotting of the elevation and gravity data. Once processed to Bouguer Anomaly and assessed for QA, data are imported into Geosoft Oasis Montaj or ChrisDBF software for gridding at 1/5th the station spacing to produce ERMapper compatible grid files. Resultant grids are contoured, filtered and interpreted using ERMapper and ArcMap software to check that data is smoothly varying and that no spurious anomalies are present. A first vertical and horizontal derivative filter are routinely applied to the data as these filters allow for excellent noise recognition. Once identified, any spurious stations can be field checked by the gravity crew the following day and repeated if required.

Plotting of the acquired stations on a daily basis allowed for identification of any missed stations which were then gained the following day.

8.3.6 Data Backup and Delivery

Data was backed up daily using the Atlas Geophysics Pty Ltd secure data storage facility. This storage facility was accessed remotely by the field crew using an internet link via the Secure File Transfer Protocol (SFTP).

Final data have been burnt to data CD and included at the end of this report as Appendix F.
9.0 Results

The survey was carried out with a minimum of fuss and there were no major hindrances to slow acquisition down. Final data have been delivered to a technically excellent standard and are presented both digitally and hardcopy as Appendices to this report.

9.1 Production Rates

The field crew completed the survey in a single day, on the 1st of October 2007, acquiring all 144 gravity stations by foot.
9.2 Data Formats

Final data for the project has been delivered in Atlas Geophysics Pty Ltd standard data format. Tables 3 and 4 below summarise details of the dataset.

<table>
<thead>
<tr>
<th>Final Delivered Data</th>
<th>Format</th>
<th>Data CD</th>
<th>Hardcopy</th>
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</thead>
<tbody>
<tr>
<td>Production Report</td>
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<td></td>
</tr>
<tr>
<td>Gravity Database</td>
<td>Comma Space Delimited .csv</td>
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<td></td>
</tr>
<tr>
<td>Raw Data</td>
<td>Text files .txt (CG5 Format)</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Final Grids</td>
<td>ERMapper Grids .ers</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Final Tiff’s</td>
<td>GeoTiff .tif</td>
<td>• •</td>
<td></td>
</tr>
<tr>
<td>Logistics report</td>
<td>PDF .pdf</td>
<td>• •</td>
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Table 3: Final Delivered data

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<td>station</td>
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<td>999999</td>
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</tr>
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<td>NA</td>
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<td>dX</td>
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<td>m</td>
</tr>
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<td>m</td>
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<td>dY</td>
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<td>fag_gu</td>
<td>Free air gravity measured in gravity units</td>
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<td>gu</td>
</tr>
<tr>
<td>fag_mgals</td>
<td>Free air gravity measured in mGigals</td>
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<td>mGals</td>
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<td>Bouguer Anomaly 2.67 gm/cc calculated in gu</td>
<td>99.99</td>
<td>gu</td>
</tr>
</tbody>
</table>
9.3 Data Repeatability

The repeatability of both the Gravity and GPS data was excellent. In total, 4 repeat stations were collected and analysed. Repeat stations were acquired so that an even distribution between gravity loops was established and that all loops were interlocked.

9.3.1 GPS Repeatability

The performance of the GPS receiver was exceptional with no lost production due to vegetation or poor dilution of precision (DOP).

9.3.2 GPS Repeatability

The performance of the Scintrex CG5 was exceptional. All gravity repeats were below 0.05 mGals.

9.4 Images

The grids produced from the Final Gravity Database have been imaged using Geosoft mapping and processing software. Four plots of these images have been included with this report to assist in data interpretation (Appendix A). The plots have been included digitally on the data CD in Mapinfo compatible Geotiff format.

**Station Location Plot**: The first plot displays the acquired gravity station locations overlayed on a 1:250,000 topographic map of the area and surrounds. As evident on the plot, some stations have been moved off the original programmed co-ordinates due to terrain considerations.

<table>
<thead>
<tr>
<th>bg240_gu</th>
<th>Bouguer Anomaly 2.40 gm/cc calculated in gu</th>
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<td>mGals</td>
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<td>bg240_mgals</td>
<td>Bouguer Anomaly 2.40 gm/cc calculated in milligals</td>
<td>99.999</td>
<td>mGals</td>
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<tr>
<td>bg220_mgals</td>
<td>Bouguer Anomaly 2.20 gm/cc calculated in milligals</td>
<td>99.999</td>
<td>mGals</td>
</tr>
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<td>closure_mgals</td>
<td>Loop closure measured in milligals</td>
<td>99.999</td>
<td>mGals</td>
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<td>Serial number of CG5</td>
<td>99999999</td>
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</tr>
<tr>
<td>base</td>
<td>Base station number</td>
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</tbody>
</table>

Table 4: Final Gravity Database Format
**GPS Derived Elevation**: This plot displays a pseudocoloured grid of the digital elevation data obtained from the gravity survey (AHD grid). A histogram equalisation colour stretch has been applied when pseudocolouring. Overlying the image data are contours created at an interval of 0.1m.

**Bouguer Anomaly 2.67**: This plot displays a pseudocoloured grid of Bouguer Anomaly calculated with a rock density of 2.67 gm/cc. A histogram equalisation stretch has been applied when pseudocolouring. Overlying the image data are contours created at an interval of 0.05mGals.

**Vertical Derivative Image**: This plot displays a pseudocoloured grid of the first vertical derivative of Bouguer Anomaly calculated with a rock density of 2.67 gm/cc. A histogram equalisation stretch has been applied when pseudocolouring, and sunshading from the NE has been applied. This image represents the rate of change of the Bouguer anomaly and is useful for detecting lineaments and body edges, especially where there are large regional gradients present.
APPENDIX A

Plots
AELADE RESOURCES
P2007017 Tennant Creek Gravity Survey
Elevation Image
Contour Interval 0.1m, Histogram Equalised

Survey Acquired By: Atlas Geophysics P/L
October 2007
www.atlasgeo.com.au

Produced by: MJJ
APPENDIX B

Control Station Descriptions
GPS0008 – TENNANT CREEK

**GDA 94** | **MGA Z53** | **AMG Z53**
---|---|---
**Latitude** | -19°59'59".4118 | **Easting** | 359,826.907 | **Easting** | 359,688.540
**Longitude** | 133°39'36".2723 | **Northing** | 7,787,976.116 | **Northing** | 7,787,820.620
**Ellipsoidal Height** | 325.528 | **Orthometric Height** | 295.115 | **Orthometric Height** | 295.115

**OBSERVED GRAVITY**

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<th>mGals</th>
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</tr>
</thead>
<tbody>
<tr>
<td>GU</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Occupation Method/Location Details**

GPS Control was established using AUSPOS. Three separate 10 hour sessions were submitted to AUSPOS’s online processing systems where returned coordinates were accurate to better than 0.01m.

The GPS Control Station consisted of a steel picket driven into the ground with approximately 15cm protruding. The Control Station was witnessed by an Atlas Geophysics Survey Plaque attached to a 1.5 metre steel picket placed within 0.5m of the Control Station.

The base is located on an old airstrip, on the northern side of the air strip, approximately 100m from the end of the air strip. The base can be accessed by the track that runs east from the Rover 1 camp. There are no land marks or large trees in the area. Flagging tape was left there marking its position.
Location of Control Station GPS0008

Sketch of GPS0008

Sketch not to scale.
<table>
<thead>
<tr>
<th>GDA 94</th>
<th>MGA Z53</th>
<th>AMG Z53</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude</td>
<td>-19°51'19&quot;.8901</td>
<td>Easting</td>
</tr>
<tr>
<td>Longitude</td>
<td>133°16'59&quot;.3607</td>
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</tr>
<tr>
<td>Ellipsoidal Height</td>
<td>296.175</td>
<td>Orthometric Height</td>
</tr>
</tbody>
</table>

**Occupation Method/Location Details**

The Observed Gravity value for this station has been supplied by Daishsat. GRV – Daishsat tied to AFGN Station 9611.2543 with two loops and three meters. Expected accuracy better than 0.01mGals.

The co-ordinates for this station have been supplied by Daishsat. GPS- Daishsat, AUSPOS with multiple connections over three days. Expected accuracy better than 0.01m for x, y, z observations.

The Base is located 600m east of the Ngapamilranu Outstation. It consists of a small star picket driven into the ground to be level with the ground. An Atlas Geophysics survey plaque has been affixed to the steel star picket witnessing this base to denote it as GRV0007.

---

Photo of GRV0007
APPENDIX C

GPS Control Information
# GPS Control Station Information

**Project:** P2007010  
**Client:** WESTGOLD  
**Area:** Tennant Creek West  
**Zone:** 53

## CONTROL STATION  GRVGPS008

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</tr>
<tr>
<td>Antenna Type</td>
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<td>Antenna ARP Height</td>
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</table>

## Adopted / Supplied Coordinates

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<th>Sec</th>
<th>GDA94 Long Deg</th>
<th>Min</th>
<th>Sec</th>
<th>MGA East</th>
<th>MGA North</th>
<th>GDA94 Height</th>
<th>AHD Height</th>
<th>N</th>
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</thead>
<tbody>
<tr>
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## AUSPOS Rapid Coordinates

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<th>Min</th>
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## AUSPOS Final Coordinates

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### Have you double checked your data entry?

- [x] Yes  
- [ ] No

### SHIFTS REQUIRED (Add to GPS Field Files)

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--- CG-5 SURVEY ---

Survey name: P2007010
Instrument S/N: 135
Client: WESTGOLD
Operator: MJJ
Date: 2007/9/10
Time: 16:42:26

LONG: 133.4000000 E
LAT: 19.9000000 S
ZONE: 53
GMT DIFF.: -9.5

--- CG-5 SETUP PARAMETERS ---

Gref: 0.000
Gcal1: 8134.368
TiltxS: 634.843
TiltyS: 624.748
TiltxO: 11.271
TiltyO: 0.349
Tempco: -0.129
Drift: 0.800
DriftTime Start: 16:42:28
DriftDate Start: 2007/09/10

--- CG-5 OPTIONS ---

Tide Correction: YES
Cont. Tilt: NO
Auto Rejection: YES
Terrain Corr.: NO
Seismic Filter: YES
Raw Data: NO

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APPENDIX E

Longman’s Earth Tide Correction Formula
input dLat (latitude)
input dLon (longitude)
input dDate (date)
*Date broken down into year, month and date
input dTime (time)

array pClndr[12]={0,31,59,90,120,151,181,212,243,273,304,334}
lYr=year
lMo=month
lDa=day

ny=(lYr-1900)
days=(dTime/24.0+1da-1+pClndr[lMo-1])
1Leap=(ny/4)
if(1Leap/2=ny and lMo<3)then 1Leap=1Leap-1
1Day=(ny*365+1Leap+1Da+pClndr[lMo-1])
dcent = (ny*365.0+1Leap+days+0.5)/36525)
dhrs = (ny*365.0+1Leap+days+0.5)*24.0)
ds = (dcent*8399.709299+4.720023434+(dcent*dcent)*4.40696e-5)
dp=(dcent*71.01800936+5.835124713-(dcent*dcent)*1.80545e-4-dcent*2.1817e-7*(dcent*dcent)
dh=(dcent*628.3319509+4.88162792+(dcent*dcent)*5.27962e-6)
dln=(4.523588564-dcent*33.757153303+(dcent*dcent)*3.6749e-5)
dps=(dcent*0.0300526416+4.906229461+(dcent*dcent)*7.902463e-6)
des=(0.01675104-dcent*4.18e-5-(dcent*dcent)*1.26e-7)
dsoln=(sin(dln))
dci=(0.91369-cos(dln)*0.03569)
dsi=(sqrt(1.0-((dci*dci)))
dsn=(dsoln*0.08968/dsi)
dcn=(sqrt(1.0-(dsn*dsn))
dtit=(dsoln*0.39798/(dsi*cos(dln)+dcn+1.0dsoln*0.91739*dsn))
det=(atan(dtit)*2.0)
if (det<0.0)then det=det+6.2831852)
dolm1=(ds-doln+det+sin(ds-dp)*0.10979944)
dolm=(dolm1+sin((ds-dp)*2.0)*0.003767474+sin(ds-dh*2.0+dp)*0.0154002+sin((ds-dh)*2.0)*0.00769395)
dh=(dTime*15.0-180)*0.0174532925199+dLon/57.295779513)
dchi=(dha+dh-atan(dsn/dcn))
dal=(dLat/57.295779513)
dct=(sin(dal)*dci*sin(dolm)+cos(dal)*{(dci+1.0)*cos(dolm-dchi)+1.0-dci)*cos(dolm+dchi)}/2.0)
dda=(cos(ds-dp)*0.14325+2.60144+cos((ds-dp)*2.0)*0.0078644+cos(ds-dh*2.0)*0.0200918+cos((ds-dh)*2.0)*0.0146006)
ldr=(6.378388/sqrt((1.0-(cos(dal)*cos(dal)))*0.00676902+1.0)
r_1=(dda)
r_2=(dct)
r_3=(dr)
r_4=(dda)
r_5=(dda*dda)
r_6=(dct)
dgm=(dr*80.49049*dda*(r_1*r_1)*{(r_2*r_2)*3.0-1.0}+(r_3*r_3)*7.4e-4*{(r_5*r_5)*dct*{(r_6*r_6)*5.0-3.0}})
dols=(dh+des*2.0*sin(dh-dps))
dchis=(dha+dh)
dds=(cos(dh-dps)+1.0)*0.668811/(1.0-(des*des))
dcf=(sin(dal)*0.39798*sin(dols)+cos(dal)*{(cos(dols-dchis)*0.95869*cos(dols+dchis)*0.0413))
dgs=(dr*13.2916*{(dcf*dcf)*3.0-1.0})*dds*(dds*dds))
dTide = (dgm + dgs) * 0.00116
Appendix 3

Expenditure Statement
## NORTHERN TERRITORY EXPLORATION EXPENDITURE FOR MINERAL TENEMENT

### Section 1. Tenement type, number and operation name: (One licence only per form even if combined reporting has been approved)

<table>
<thead>
<tr>
<th>Type</th>
<th>EL</th>
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</thead>
<tbody>
<tr>
<td>Number</td>
<td>7739</td>
</tr>
<tr>
<td>Operation Name (optional)</td>
<td>Rover</td>
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</tbody>
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### Section 2. Period covered by this return:

<table>
<thead>
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<th>Twelve-month period:</th>
<th>If Final Report:</th>
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<tbody>
<tr>
<td>From 1 June 2007</td>
<td>From</td>
</tr>
<tr>
<td>To 31 May 2008</td>
<td>To</td>
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</table>

Covenant for the reporting period: $100,000

### Section 3. Give title of accompanying technical report:

<table>
<thead>
<tr>
<th>Title of Technical Report</th>
<th>EL 7739 Annual Report for the period ending 4 June 2008</th>
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<tbody>
<tr>
<td>Author</td>
<td>Chris Drown</td>
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### Section 4. Locality of operation:

<table>
<thead>
<tr>
<th>Geological Province</th>
<th>Tennant Creek Block/Wiso Basin</th>
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<td>Geographic Location</td>
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### Section 5. Work program for the next twelve months:

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<th>X Drilling and/or costeasing</th>
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<tr>
<td>Literature review</td>
<td>Airborne geophysics</td>
</tr>
<tr>
<td>Geological mapping</td>
<td>X Ground geophysics</td>
</tr>
<tr>
<td>Rock/soil/stream sediment sampling</td>
<td>Other:</td>
</tr>
</tbody>
</table>

Estimated Cost: $100,000

### Section 6. Summary of operations and expenditure:

Please include salaries, wages, consultants fees, field expenses, fuel and transport, administration and overheads under the appropriate headings below. Mark the work done for the appropriate subsections with an "X" or similar, except where indicated. Complete the right-hand columns to indicate the data supplied with the Technical Report.

Do not include the following as expenditure (if relevant, these may be discussed in Section 7):

- Insurance
- Company Prospectus
- Rent & Department Fees
- Bond
- Transfer costs
- Title Search
- Legal costs
- Advertising
- Land Access Compensation
- Meetings with Land Councils
- Payments to Traditional Owners
- Fines
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<th>Work Done (mark with an &quot;X&quot; or provide details)</th>
<th>Expenditure</th>
<th>Data and Format Supplied in the Technical Report</th>
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</table>

| TOTAL EXPENDITURE                                                                                     |   | $222,489.04 |
**Section 7. Comments on your exploration activities:**

Unallowable expenditures (listed at top of section 6) totaled $61,271.55 and related principally to compensation for Traditional Owners, and payment of tenement rental.

The figure of $16,290.19 which appears in the diamond drilling row of the sheet relates to costs incurred in the drilling program completed in 2006 but which were not paid until 2007.

The exploration drilling program undertaken in 2007 was cut short by the mechanical failure of the drill rig compressor. Before the rig break down, a drill hole intersected 15 metres at 2.07% copper and 0.15 g/t gold at the Rover 4 prospect, a most encouraging result.

The company was not able to secure another rig until late May 2008 when drilling activities recommenced. No data has been returned from the field at the time of reporting. The company is also considering conducting ground geophysical surveys in the coming months.

The re-commencement of drilling activities will see a substantial program of exploration and expenditure completed in the 2008/09 tenure year.

---

I certify that the information contained herein, is a true statement of the operations carried out and the monies expended on the above mentioned tenement during the period specified as required under the Northern Territory Mining Act and the Regulations thereunder.

[X] I have attached the Technical Report

1. Name: Chris Drown  
   Position: Managing Director  
   Signature: 
   Date: June 17, 2008

2. Name:  
   Position:  
   Signature:  
   Date: