HARMONY GOLD OPERATIONS LTD

ANNUAL EXPLORATION REPORT

MAUD CREEK PROJECT NT

YEAR ENDING DECEMBER 31st 2004

REPORT GROUP
MCN 4145-4146, MCN 4149-4152
MCN 4218-4225
MCN 4343-4345
MLN1978

KATHERINE 1:250,000 (SD 53-9)

KATHERINE 1:100,000 (5369)

Distribution:

DBIRD Darwin
Brocks Creek library NT
Harmony Gold Perth WA

Compiled by:
John Shaw
January 2005
LIST OF CONTENTS

SUMMARY PAGE 3

1.0 INTRODUCTION PAGE 4

2.0 TENEMENT DETAILS PAGE 4

3.0 LOCATION AND ACCESS PAGE 5

4.0 GEOLOGICAL SETTING MAUD CREEK PROJECT PAGE 5
   4.1 Regional Geology
   4.2 Local Geology
   4.3 Gold Mineralisation PAGE 7

5.0 PREVIOUS EXPLORATION PAGE 8

6.0 EXPLORATION DURING 2004 PAGE 13

7.0 FORWARD PROGRAM 2005 PAGE 14

8.0 LIST OF REFERENCES PAGE 15

LIST OF FIGURES

FIGURE 1 Project Location Plan A4 1:500,000
FIGURE 2 Tenement Layout and Access A4 1:50,000

LIST OF TABLES

TABLE 1 Tenement Listing

LIST OF APPENDICES

APPENDIX ONE DIGITAL COPY OF THIS REPORT
SUMMARY

The Maud Creek mining centre and Main Zone deposit are located 18km east of Katherine NT. The Main Zone deposit was discovered by Placer in 1989. Following resource development and further exploration the leases changed hands several times.

The rights to the oxide component of the Main Zone deposit were purchased by AngloGold Australasia Ltd. This ore was mined in 2000 by open pit, trucked and treated at their mill at Union Reefs.

During May 2001 Hill 50 Gold NL (Hill 50) acquired the Maud Creek project tenements from Phoenix Mining Limited. Hill 50 was subject to corporate takeover during 2002 and the tenements are now 100% owned by Harmony Gold Operations Ltd.

During 2001 the Maud Creek Group tenements were explored using diamond core and RC drilling that focused on the plunge extensions of the Main Zone (Gold Creek) deposit.

Exploration expenditure reported by Hill 50-Harmony for 2001 was $728,101.

During 2002, additional RC and diamond core drilling was commissioned by Harmony to further quantify the down plunge extent of Main Zone and Eastern Shear mineralisation.

Exploration expenditure reported by Harmony for 2002 was $567,066.

During 2003 exploration focused on reviewing and quantifying the results of the previous two years of drilling. A resource estimate supported by geostatistical treatment was commissioned that defined gold resources down plunge from the Main Zone pit. A total indicated and inferred resource of 5,686,308t @ 4.51g/t Au was estimated.

Exploration expenditure for the 2003 year was reported as $16,571.00

During 2004 a technical review of Harmony’s properties in the NT led to the decision to find a buyer for the Maud Creek Project tenements.

No field work was undertaken by Harmony, however, as part of its due diligence pending purchase, Terra Gold Mining Ltd commissioned a short diamond drilling program in MLN1978 for metallurgical/geological purposes. Bench testing of metallurgical samples was also undertaken. This work was still in progress at year’s end.

The estimated cost of the Terra Gold Mining Ltd metallurgical and drilling activity was $200,000.
1.0 INTRODUCTION

This report describes exploration work carried out on the Maud Creek Group tenements during the year ended December 31\textsuperscript{st} 2004.

The report includes a summary of historic exploration work that lead to the discovery and mining of the Main Zone gold deposit, plus work undertaken subsequently by Hill 50 and Harmony Gold (Australia) Limited.

2.0 TENEMENT DETAILS

The central Maud Creek Project area comprises a block of contiguous MCNs and one MLN surrounding the principal gold resource area. The tenements have group reporting status with a reporting due date of 31\textsuperscript{st} January.

Table 1.

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The area covered by these tenements totals 1106.6ha. See Fig 2.

MLN 1978 has been granted and amalgamates late MCN 4134-MCN 4144 inclusive for the purposes of future mining operations. The tenements lie on Freehold title covering Maud Creek Pastoral Station that is owned by Harmony.
3.0 LOCATION AND ACCESS

The Maud Creek Project is situated 18km east of the town of Katherine NT and 275km south east of Darwin. It is centred on 8402000mN 225000mE. (AGD84 AMG Zone 53) See Fig. 1 and Fig.2.

The preferred access is via the Stuart Highway, 18km km ESE of Katherine, thence left onto Ross Road and travel past the RAAF radar dome, thence northerly for 8km past the present Maud Creek homestead along station firebreaks and fence lines, following the route of AngloGold's haul road.

Alternative but more difficult access is via the all weather bitumen Katherine Gorge Road north easterly from Katherine for 20km, thence SE 9km via a firebreak track that follows Maud Creek upstream to the old Maud Creek Goldfield and the Main Zone Deposit.

Off-track access is generally reasonable in the dry season except for rugged rocky areas underlain by Kombolgie Formation or limestone units of the Daly Basin sediments. Areas of black soil and several well-incised stream channels severely limit access during the wet season.

Due to heavy monsoonal rains in summer, strong vegetation regrowth makes access difficult in some areas for a month or so after the wet season.

4.0 GEOLOGICAL SETTING OF MAUD CREEK PROJECT

4.1 Regional Geology

The Maud Creek mining centre is situated in the extreme south eastern part of the Pine Creek Geosyncline that comprises Lower Proterozoic metasedimentary and volcaniclastic sequences up to 14km thick laid down in the interval 2.2-1.87Ga.

The geosynclinal package was strongly folded during the Nimbuwah Event, 1.87-1.85Ga, and intruded by batholithic granitoids of the Cullen Event in the period 1.84-1.80Ga.

Pre orogenic dolerite sills of the Zamu Event were intruded at ~1.87Ga and could be coeval with the Maud Dolerite. Swarms of NE striking mafic /lamprophyre dykes post date the above events.

The folding has induced greenschist facies metamorphism, locally upgraded to amphibolite in the thermal aureoles of the granitoids. A suite of base and precious metal deposits accompanied and post-dated the granitoid intrusive phase. These deposits including gold, tin, tungsten and copper, occupy favourable structurally prepared sites such as shears, splay faults and anticlinal hinge zones. With a few exceptions, gold was introduced well after orogeny and granite intrusion.

The Lower Proterozoic is unconformably overlain by mid Proterozoic arenites of the Kombolgie Sandstone. The latter has been subjected to gentle folding and faulting.
The Proterozoic rocks were subsequently onlapped by sediments and volcanics of the Daly River Basin. In the Maud Creek area this sequence is represented by the Antrim Plateau Volcanics, a shallow dipping Cambro-Ordovician assemblage of trachyandesite lava flows, minor clastic sediment and limestone. Outliers of horizontal Cretaceous sandstones occur as residuals of a continental shallow basin facies. Recent deposits of black and red soil obscure parts of the basement, particularly within the flood plains of major drainages. Superficial crusts of proto laterite cover the more ferruginous strata and may cement scree detritus on the flanks of ridges.

4.2 Local Geology

In the vicinity of Maud Creek the oldest exposed rocks are the Lower Proterozoic Tollis Formation. This comprises the uppermost unit of the Finniss River Group (El Sherana Group)

The Tollis Formation comprises greywacke, mudstone, fine grained thin bedded to laminated quartz arenite, minor conglomerate and thin banded ironstone. Toward the base is the 200m thick Dorothy Creek Member that includes mafic lava, tuff, agglomerate and minor chert.

At the Maud Creek Goldfield the Tollis Formation is intruded by thick sills of Maud Dolerite. The 'dolerite' is crudely zoned into a quartz dioritic to granophyric upper zone and a more mafic lower zone of microgabbro. It has been pervasively carbonated (siderite) and sericitised on fractures.

Tollis Formation has been subjected to both tight and open folding and shearing. Bedding strikes 300 to 350 degrees magnetic, is locally vertical, but more commonly dips easterly at 45 degrees. Metamorphic grade is greenschist facies.

The Tollis Formation is overlain with angular unconformity by Edith River Group. This comprises a lower sedimentary and upper volcanic rock suite.

Kombolgie Formation arenites unconformably overlie both of the above units.

Late stage, undeformed, magnetic lamprophyric/syenitic dyke swarms striking north easterly, cut all of the pre Cambrian stratigraphy in this area.

The Antrim Plateau Volcanics comprising trachyandesite flows, limestone and minor clastic sediments onlap and mask the Proterozoic basement units to the west and south of the Maud Creek Gold Field. This cover generally thickens in a southerly direction. Essentially the Maud Creek Goldfield occupies an erosion window in younger less prospective sequences.
4.3 Gold Mineralisation

Gold mineralisation at the Maud Creek Goldfield was first discovered and mined in fractured, veined Maud Dolerite and Tollis Formation 1km to the NE of the Main Zone discovery. Later work by Placer led to discoveries on the Western Shear, (Gold Creek Fault) at the faulted, brecciated and silicified contact of sandstone and mafic volcanics in Tollis Formation. Other veins are hosted by fractured Tollis Fm tuffaceous and carbonaceous chert lithologies.

Veins are generally of quartz with lesser carbonate and variable pyrite with minor chalcopryite and arsenopyrite, the latter particularly at Main Zone. The veins are with chloritic, haematitic and sericitic selvedges when in Maud Dolerite.

Main Zone (Gold Creek) Deposit

The deposit comprises the largest gold accumulation found to date in the Maud Creek field. The global resource pre mining was 995,000oz with a recoverable 250,000oz extractable by open pit and underground mining methods (N.Payne 2001) The recoverable oxide resource at the time of acquisition by AngloGold in February 2000 stood at 151,000t @ 5.02g Au/t for 24,441 ounces. The majority of the oxide ore was mined by AngloGold by open pit methods during 2000-01 and trucked to the Union Reefs mill for treatment.

In terms of structural setting the immediate Main Zone environment is best understood (see below). The rationale for the location of the Maud Creek Goldfield is less well understood, airborne magnetics only giving poor textural relief. The strongly linear northwest alignment of Maud Creek suggests to the author that it has followed some structural weakness, perhaps a ductile fault system that is poorly exposed. The north-south faulting hosting Main Zone is compatible with being a splay off such a system. The Red Queen/Chessman prospect could have similar origins.

Main Zone is focused on the Gold Creek Fault Zone that is a complex, multistage reverse fault set that strikes north-south and dips east commonly at 60 degrees. It separates a footwall of banded (Tollis Fm) arenite from a hangingwall of sheared and foliated mafic volcanic tuffs and fragmentals. (Dorothy Creek Member?) Only the southern sector of the Western Shear has proved to be of economic interest. The bulk of the deposit is hosted by the mafic fragmentals, while lesser mineralisation has been noted in the immediate arenite footwall.

Breccia veins developed by progressive fractal deformation and dilation characterise the deposit along with quartz veining, silicification, chloritisation, pyritisation, carbonation, hydrocarbon (graphite) introduction, arsenopyrite, gersdorrffite and fuchsite.

Along with gold there is anomalous silver, arsenic, antimony, copper, lead, molybdenum, tin and tungsten associated with the mineralising event. Carbon as graphite/bitumen has...
been introduced as part of a hydrothermal event that has been determined to comprise three distinct but progressive gold mineralising phases.

The deposit dimensions are 150m long by 10m-20m thick. The upper 50m appears to have been overturned to a very steep west dip. The gold-arsenic mineralisation appears to have post dated the majority of deformations.

Both north east and north west striking fractures and faults have offset and "shuffled" the mineralised zone, and assisted in progressive dilation of the setting. The mafic tuff sequence above Main Zone is extensively altered, veined and locally well mineralised for 100m above the deposit.

The deposit is highly oxidised to 15m-20m depth, then moderately oxidised (transition ore) to 25m-30m depth. This passes abruptly into primary mineralisation that has some refractory characteristics.

Maud Dolerite outcrops 250m to the east of Main Zone. Immediately to the west and south the sequence is blanketed by up to 40m of flow trachyandesite of the Antrim Plateau Volcanics. This has precluded all exploration methods except drilling. The effectiveness of airborne magnetics is downgraded over this Cambro-Ordovician cover.

5.0 PREVIOUS EXPLORATION

Historical Activity

The Maud Creek Goldfield was discovered in 1887 adjacent to Maud Creek some 1km NE of the outcropping Main Zone deposit that was not discovered until a hundred years later.

A battery was set up for production between 1890-92 but was deserted soon after. The field re-opened during the Great Depression between 1932 and 1940. The recorded total production was 540oz gold. Production was affected by the fine grain size of the gold and high sulphide content of the primary ore.

Ore was produced from some 20 shallow shafts and potholes, with an average head grade of about 30-45 g/t Au. Shafts of 6 to 12 metres deep, with drives of 15 to 30 metres in length were the norm. The gold occurred in sulphidic quartz-carbonate reefs and silicified fault breccia cutting Maud Dolerite and tuffs of the Tollis Formation. The veins varied from a few centimetres to a metre in width, trending north-easterly and north-westerly. Minor chalcopyrite and pyrite are associated with the veins which have a selvedge of chlorite and/or haematite.

Modern Exploration

Between 1966 and 1973 several companies including Western Nuclear Australia and Magnum Exploration explored the area for copper, gold and uranium. IP surveys and drilling of siliceous and gossanous breccias intersected low, albeit anomalous,
concentrations of copper and molybdenum and numerous pyritic zones. The NT Geological Survey carried out IP surveys, soil sampling and petrographic investigations in the late 1970s as part of an assessment of an extension to Katherine Gorge National Park.

**C.S.R.Limited 1985-1986.** The company was granted several exploration licences covering the Maud Creek Goldfield and adjacent areas. (EL4716, Mt Gates: EL4914 Maud Creek:: EL 4669 Mt Shepherd: EL 4874 Peckham Hill) Their exploration objective was to locate gold in Lower Proterozoic. dolerites analogous to WA's Golden Mile.

**During 1985** work was carried out on Mt Shepherd EL and the Mt Gates workings near the old Homestead.

**The Mt Shepherd EL 4669** covered most of the western half of the Maud Goldfield including the present Main Zone pit. In 1985, following on from an airborne, 200m spaced magnetic and radiometric survey, ground work included stream sediment BLEG sampling over Maud Dolerite. Some 26 samples were taken and analysed for Au, Ag and Cu. Soil sampling was also carried out (158 samples As, Cu, Fe) Rock chip sampling was carried out on old mining pits (6 samples) Petrographic samples were also collected.

**In 1986** further soil sampling programs were completed totalling 630 samples sieved to -80 mesh, and analysed for As, Cu and Fe. The area covered included Maud Creek EL5914, that included the central and eastern Maud workings.

Ground magnetics were conducted over the soil grid.

A total of 25 trenches were dug in the vicinity of workings, and were channel sampled (Au, Ag, Cu, As, Pb, Zn and Fe)

Thirteen petrographic samples were submitted from the area.

Regional rock chip sampling was undertaken.

CSR withdrew following disappointing results in the Maud Dolerite.

**Placer Exploration Ltd 1988-1992**

Placer purchased all of C.S.R.’s Australian mineral assets in August 1988. No field work was carried out at Maud Creek until 1989-1990.

**Placer Exploration 1989-90** Placer conducted a program of detailed geological mapping and rock chip sampling (274) supported by 6.6 line/km of IP. Project total drilling, 26 holes for 2,830m were completed including the Chessman-Red Queen area.

Placer followed up a CSR BLEG stream anomaly (1.3ppb Au) and sampled the mineralised Main Zone breccia veins that gave strong gold values. These were drill tested (WP1-WP10, 1137m) along with the rest of the "Western Shear Zone" that hosts
the Main Zone gold deposit. The program met with significant widths and grades of gold mineralisation.

**Placer Exploration Ltd 1990-1991**
Most of the work carried out was on the Western Shear Zone (Main Zone) prospect and comprised systematic RC drilling, 36 holes for 2746.3m (incl. WP11 to WP42) and diamond core drilling, 726.84m, in 7 holes (WD1-7).
The drilling was supported by traverses of gradient array IP over the whole Western Shear Zone along with ground magnetics, detailed geological mapping at 1:500 scale and rock chip sampling.

**Placer Exploration Ltd 1991-1992**
Work continued on the Western Shear Zone, comprising 1,208m of precollar RC holes, and 12 diamond core hole tails totalling 941m, and deepening WD2. (WP43-WP53, WD8-WD20)
The Main Zone deposit was estimated at 1Mt @ 4.0g Au/t when Placer optioned the project to Kalmet Resources NL in December 1992.

**Kalmet Resources NL 1992-1993**
Kalmet took an option from Placer (exercised on 22/8/96) and conducted colour aerial photography, and photogrammetry to produce scale base maps. In addition, Placer's drilling data was entered into a Surpac database.
At Main Zone, 15 close-spaced costeans were dug over a 550m strike to gain bedrock information. A total of 845 samples were collected.

**Kalmet Resources NL 1993-1994**
The upper 60m of the deposit had not been drilled and an RC program comprising 36 holes for 2211m was completed. (MRC-1 to MRC-36)
Metallurgical testing of five high grade RC samples was completed and core samples were sent to AMDEL for further work.
A project manager was appointed with a view to mining.
An environmental impact study was commissioned.

**Mt Carrington Mines Ltd 1993-1994**
Mt Carrington independently carried out exploration on MCNs4218-4225 south and east of Main Zone.
They undertook gridding and RAB drilling comprising 588 holes for a total of 2451m on 200m line spacing and 25m separation. (RAB1-RAB588)
Follow up RC drilling comprising 25 holes for 933m (MC1-MC25)
A stream sediment BLEG survey determined gold and arsenic. 45 samples.
Mt Carrington Mines became Norminco and conducted reviews.
A further 991m in 73 RAB holes on airmag targets, and 95 soil samples taken by Norminco.

**Kalmet Resources NL 1994-1995**

Sterilisation RC drilling comprised 21 holes each to 99m depth, to the west of the Main Zone deposit. (MCP1-MCP21)
Exploratory RC drilling to detail the oxide zone, (MCP37-MCP50) totalled 595m.
Metallurgical tests showed the primary sulphide mineralisation was refractory (arsenopyrite)
Biox tests undertaken.
Feasibility showed project marginal.

**Kalmet Resources NL 1995-1996**

Geological detailed 1:500 mapping at Western Shear.
RC drilling MCP51-MCP301, for an advance of 25,548.2m
Diamond core drilling, 20 holes for 1,949.92m (MD14-MD33)
RAB drilling, 282 holes for 3,674m.
Gridding and surveying, petrography, database validation.

**Kalmet Resources NL 1996-1997**

Kilkenny Resources NL reviewed the Kalmet reports using a consultant, and conducted due diligence on underground and open pit mining scenarios with a view to acquiring the prospect.

Kalmet commissioned Resource Service Group to formulate a work program for the 1997 year.

Work implemented comprised surveying and gridding, Aerial photography, geological mapping, Soil sampling, stream sediment sampling, RC drilling, diamond drilling, resource estimations, metallurgical testwork, pre feasibility work and EIS document preparation. The Main Zone deposit was estimated at 415,000oz as a result of this work but the bulk of the deposit was determined to be refractory.

Kalmet Resources NL became a wholly owned subsidiary of Kilkenny Gold NL in September 1997.

**Kilkenny Gold NL 1997-1998**

Structural assessment, metallogeny, exploration review. (B.Hill)
Aerial magnetic interpretation and review
Rock chip sampling, 8 samples, gold, arsenic.

Soil sampling, 99 samples, 100/25m grid, -200 mesh, gold, arsenic.

RC drilling, 102 holes for 9,759m. Divided into Main Zone testing plus prospects O'Shea's, Maud Flats, Chlorite Hill, Surprise, Curlies and Roo Plains. (MCP, MCW, MCE, SRRC, SWM)

Diamond drilling, 8 holes for 1139.9m, MD047-MD054.

Resource estimation, measured, indicated and inferred, 9Mt @ 3.0g/t Au.
Optimised open pit, proved and probable reserve, 463,000t @ 6.79g/t Au.
Underground design study in progress.
O'Shea's, resource total, 19,000t @ 3.07g/t Au.

Biox met. Testing, Leachwell base of oxidation testing, SAG mill test work.

**Kilkenny Gold NL 1998-1999**

Consultant geological and magnetic interpretation around Main Zone deposit.

Geological mapping.

Main Zone oxide pit design commissioned. 151,000t @ 5.02g/t Au.

Metallurgical testwork, Albion process.

The Maud Creek feasibility study and environmental sciences, heritage and aboriginal artifact field surveys related to MLN 1978 application were completed.

**Phoenix Mining Ltd 1999-2000**

Kilkenny Gold NL became Phoenix Mining Ltd in 1999.

AngloGold Australasia Ltd acquired rights to mine the Main Zone deposit and treated the ore at the Union Reef operation in February 2000.

AngloGold conducted a thorough investigation of the resource and collected 14 rock chips for multielement analysis plus petrographic study.

Mining of oxide and transition ore from the deposit occurred during 2000.

Total production comprised 173,581t @ estimated* 3.32g Au/t.

**Hill 50 Gold NL 2000-2001** (Hill 50 Limited)
Hill 50 acquired the tenements in May 2001 and Drillcorp was commissioned in August 2001 to carry out pre collar and diamond core drilling positioned south of the existing pit. During that year a total of 204m of RC precollar and 2,712.1m of diamond core drilling was completed from four surface collar positions and daughter wedges.

At ‘Chlorite Hill’, 1km to the NE, an RC drilling program comprising 12 holes for 691m tested the old workings. All holes were drilled in dolerite, and some met with narrow intercepts at moderate grade.

Rock chip sampling comprising 11 samples plus reconnaissance geological work was also carried out. Expenditure for the year totalled $728,101.

**Harmony Gold Operations Ltd 2001-2002**

The 2002 program was an extension of the drilling initiated in 2001. The primary objective was to further evaluate the down plunge component of the Main Zone deposit and the Eastern Shear hanging wall mineralisation.

Stanley Drilling was commissioned to drill 25, deep RC holes, including 5 RC precollars and 6 diamond core holes. The coring component totalled 1,010m while RC drilling totalled 6,233m.

S.Snodin was commissioned to conduct an air photo and geophysical interpretation of the Maud Creek project area at photoscale (1:25,000) which included the area subject to this report. Expenditure for the year was $567,066.

**Harmony Gold Operations Ltd 2002-2003**

During 2003 Harmony focused on reviewing the extensive drilling data from its previous two years of work, plus the drilling data that pre-dated open pit mining.

A consultant was commissioned to apply geostatistical treatments to Harmony’s sectional grade interpretation so as to arrive at an updated gold resource figure for the deposit.

The consultant concluded that the Main Zone gold deposit contained a global indicated plus inferred resource totalling **5,686,308t averaging 4.51g Au/t with over 800,000oz gold contained**. Expenditure for the year totalled $16,571.00.

**6.0  EXPLORATION DURING 2004**

Following completion of the above estimates Harmony conducted a review of its gold resources in the Northern Territory. It was concluded that the Maud Creek project was distal from its main focus of activity at Brocks Creek and the Burnside Joint Venture with Northern Gold NL. It was also recognised that the Main Zone deposit, despite being of
significant size, required special treatment routes to optimise an economic return on the contained gold.

The outcome of this review was that the Maud Creek Project tenements were offered for sale early in 2004.

The company was successful in attracting several interested parties. Towards the end of the year Terra Gold Mining Ltd signed an option to purchase agreement subject to a favourable outcome to their due diligence studies. As part of the due diligence Terra has undertaken a short diamond core drilling program at the Main Zone deposit. This, along with metallurgical bench testing of pre-existing material, was still in progress at the end of 2004.

Available information on the Terra Gold core-drilling program is that two holes were drilled. The first hole, TMCD-04-001 was collared east of the pit and abandoned at 18.3m due to bogged rods in fractured ground. The second hole, TMCD-04-002, was precollared vertically to 132m using a water bore rig (Hughes Drilling). Coring to 210m using HQ3 gear was due to commence in early January (Underdale Drillers) and is expected to provide structural information and further material for metallurgical testing.

The coordinates of the holes are as follows:

TMCD-04-001 (9200N-19330E, -60/270 local grid).
TMCD-04-002 (9100N-19300E, vertical, local grid).

The estimated cost of the diamond drilling program is $100,000 and the metallurgical test program of Terra Gold is estimated at $100,000.

7.0 FORWARD PROGRAM 2005

It is anticipated that a change of ownership of the Maud Creek tenements will take place in 2005. Any incoming party will establish its own priorities and expenditure level within the project region. It is likely that intensive data reviews will be followed by surveying, drilling and further metallurgical studies. Geophysical methods may be applied to locating extensions to the controlling structures under Cambro-Ordovician cover.

In the event that the project fails to sell in 2005, Harmony expects to continue to seek interested parties with a view to sale. It will also review the economic impact of its recently acquired Union Reefs mill and the adjacent Darwin-Adelaide railway on the resource.
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