NT46/1

FINAL REPORT

MARY RIVER NORTH EL6227

NORTHERN TERRITORY

DARWIN 1:250,000 SHEET

D.F. THOMSON
January, 1990

DISTRIBUTION:

DEPARTMENT OF MINES & ENERGY (1)
DARWIN (1)
BELMONT (1)
MELBOURNE (1)

SUMMARY

Exploration conducted on EL6227 during year 1 included broad spaced (1km) grid soil sampling reconnaissance geology and rock chip sampling.

These programmes failed to identify anomalies considered capable of hosting economic gold mineralisation.

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INTRODUCTION

General

Newmont Australia Limited was granted EL6227 on October 10, 1988 for a period of six years. The licence area is contiguous with EL4703 to the south which was granted on June 28, 1985 and EL6582 to the east which was granted on September 4, 1989 (Figure 1).

Location and Access

Exploration Licence 6227 comprised 15 blocks and covered an area of 48 square kilometres. The licence lies to the north of Mt Goyder, covering the flood plains on the Mary River and Hardies Creek.

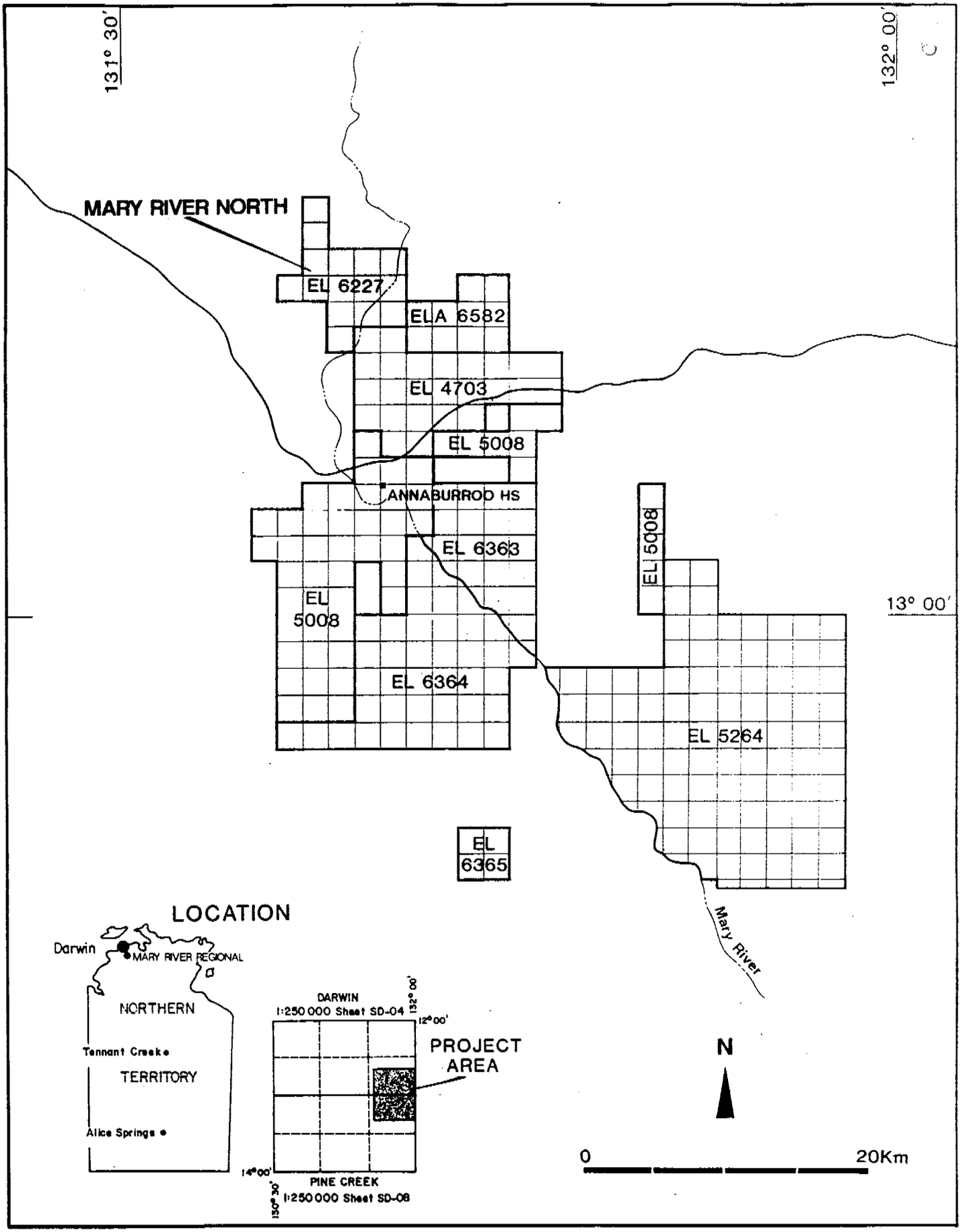
The maximum elevation in the licence area is 31 metres with the greater part of the licence subject to inundation during the wet season. Access and therefore field work are restricted to the period between May and November.

Access to the licence is afforded by station tracks off the Arnhem Highway. Accommodation in the area includes motel rooms and caravan sites at the Bark Hut Inn, 12km south of the licence area.

Regional Geology

The Mary River North licence is underlain by Early Proterozoic Fluviatile Mount Partridge Group Metasediments. These clastic Fluviatile sediments form part of the Pine Creek Geosyncline. The Mount Partridge Group rests unconformably on gneissic Archean basement rocks at Rum Jungle 70km west of the licence and at Woolner where the basement is not exposed (Pietsch and Stuart Smith 1987).

South of the Arnhem Highway at Annaburroo, rocks of the South Alligator Group (also early Proterozoic) unconformably overlie the Mount Partridge Group. Both groups have been intruded by the Mt Bundey Granite and the Mt Goyder syenite intrudes the Mt Partridge Group north of the Arnhem Highway.



NORTHERN TERRITORY

MARY RIVER REGIONAL

PROJECT AREA
LOCATION MAP

MARY RIVER NORTH

Newmont
Australia Limited

GEOLOGY

Stratigraphy

Mount Partridge Group

This sequence is best exposed in a tightly folded elongate dome (the Annaburroo Dome) centred about 12km northeast of the Bark Hut Inn. The oldest unit, the Mundogie Sandstone, consists of fine-grained, fissile, clayey sandstones interbedded with arkose and quartzite. Minor pebble conglomerate and gritstone occurs as graded beds within sandier units. The beds are generally less than one metre thick, and graded bedding is common, with less common cross-bedding and scour structures present. These sediments probably represent shallow-water continental alluvial fan deposits.

The Mundogie Sandstone grades up into the Wildman Siltstone, characterised by an abundance of mature laminated siltstone and the absence of arkose and conglomerate. Slaty cleavage is well developed, the cleavage faces commonly being coated with iron oxides.

In drill core, fresh Wildman Siltstone contains lenses up to 100m thick of dark grey to black pyritic and dolomitic carbonaceous shale. They may contain up to 20% finely bedded pyrite and pyrrhotite. The lenses are contained within light grey shale and siltstone.

The Wildman Siltstone represents a transgression of initially subtidal, platform facies sediments over the Mundogie Sandstone. The pyritic and carbonaceous intervals may indicate periods of deeper water deposition, the formation of the troughs being accompanied by local subaqueous volcanism.

South Alligator Group

Unconformably overlying the Wildman Siltstone south of the Arnhem Highway are carbonaceous mudstones of the Koolpin Formation, which forms the basal unit of the South Alligator Group. The Koolpin Formation passes up into tuffaceous and cherty acid volcanic rocks of the Gerowie Tuff which are transitional into more clastic siltstones, shales and greywackes of the Mt Bonnie Formation. The South Alligator Group is typical of a relatively deep water, trough environment with periods of basin instability promoting turbidite formation.

Intrusives

The Mount Goyder Syenite intrudes the Mount Partridge Group north of Bark Hut Inn, forming a small circular stock some 4km across. The contact is sharp and discordant, with hornblende hornfels facies contact metamorphic assemblage developed in the metasediments up to 200m away from the intrusion.

The syenite is a medium to coarse-grained massive pink rock containing potash feldspar phenocrysts. A syenite dyke with chilled margins and granophyric texture intrudes the Wildman Siltstone 1km north-north-west of the main stock.

The area is extensively intruded by dolerites, especially the red haematitic siltstones of the Wildman Siltstone Formation.

Structure

The metasediments of the Mount Partridge Group have been affected by one major phase of regional deformation. Tight asymmetrical isoclinal folding along shallow, south plunging axes characterise the folds, with the axial plane trending around 200^0 and dipping steeply. Local flexures have caused some fold axes to be doubly plunging giving rise to domed structures.

Fold axis zones are sometimes intensely reverse faulted. These faults also trend 200^0 and show oblique or dip-slip displacements. Large scale quartz veining is present in some of these faulted anticlinal closures. An arcuate system of normal faults associated with the discordant intrusion of the Mt Bundey and Mt Goyder granites post-date the major deformation phase. A subsequent generation of faults has affected both granite and sediment alike.

EXPLORATION

General

The principal model for mineralisation pursued in the Mary River North EL was that of strata-bound gold deposits, formed in basins during or soon after periods of basin subsidence and instability. Gold deposits of this type are typically very fine-grained and may escape detection by conventional prospecting methods. The deep weathering and extensive Cainozoic cover further complicate exploration. Chemical and mechanical dispersion is depressed by the climatic conditions and low topographic relief.

Gold mineralisation related to fracture zones and quartz stockworks in zones conducive to precipitation from epithermal solutions was also sought. Reverse faulted axial zones of doubly plunging anticlines are regarded as especially favourable structures.

Work Completed

Due to the large drainage basins feeding the Mary River and Hardies Creek systems with sediment from outside the licence area, it was decided to explore the area using grid based soil sampling on 1km centres, as opposed to stream sediment sampling. Geological reconnaissance (Figure 2) and rock chip sampling were carried out in conjunction with the broad spaced regional sampling.

A total of 85 soil samples were taken and analysed by the bulk cyanide leach method. The maximum result was 3.66ppb Au (AMG 830850 Figure 3) and the next highest 3.20ppb Au (AMG 910870). Both these samples are probably responding to contamination from the adjacent river systems as no likely source was sighted in the field. The majority of remaining results were less than 1ppb (Appendix 1).

Geological reconnaissance located a zone of weak quartz and sulphide stockwork, hosted by a gritty sandstone unit of the Wildman Siltstone. The stockworks occur in 2 zones trending north-east, from AMG 894828 (Figure 3). The two zones are separated by a summary area with no outcrop. The southern portion has a strike length of 600m and observations suggest that it is located in the hinge zone of an overturned anticline (Figure 4).

Analysis of 18 rock chip samples produced a maximum result of 0.12ppm Au and 2600ppm As from the same sample (Appendix 2). Bulk cyanide leach soil samples taken adjacent to the stockwork zone failed to produce any results above 0.93ppb Au (Figure 4).

In the absence of any apparent alteration and only minor structural preparation it was concluded that the stockwork zone represented low temperature quartz veining and syngenetic sulphide mineralisation.

Rock chip samples of quartz veins and lamprophyre dykes trending north form the northern extension of the stockwork zone failed to return any results above 0.10ppm Au (Appendix 2).

CONCLUSIONS AND RECOMMENDATIONS

One kilometre spaced soil sampling, reconnaissance geology and rock chip sampling has failed to identify anomalies considered capable of hosting economic gold mineralisation. Low order BLEG soil anomalies can be explained by contamination from sources outside the exploration licence area.

Outcropping quartz veins and stockwork zones failed to return results indicative of economic gold mineralisation

These results provide no encouragement for further exploration on the licence and hence Newmont should surrender EL6227.

EXPLORATION LICENCE 6227 MARY RIVER NORTH

YEAR 1 EXPENDITURE SUMMARY

ITEM	EXPENDITURE
Salaries, Wages & Overheads	4,730
Contracted Services:-	
Assays	1,286
Helicopter Charter	43
Drafting	193
Administration and Support:-	
Supplies and Rentals	1,807
Travel, Accommodation & Freight	267
Vehicle Costs	367
Administration	169
Total	$8,862

REFERENCES

Pearson, D.F. 1987: Mary River EL4703 Darwin 1:250,000 Sheet Northern Territory: Second Annual Report to June 30, 1987. Newmont Australia Limited.

Pietsch, B.A. and Stuart-Smith, P.G. 1987: Explanatory Notes Darwin S52-4. 1:250,000 Geological Map Series, Bureau of Mineral Resources

APPENDIX 1

BLEG RESULTS

CLASSIC COMLABS LTD

Analytical Laboratories (INC. IN W.A.)

Report 9DN1090
Page 1

ANALYSIS

SAMPLE MARK	Au ppb
85570	0.33
85571	1.62
85572	1.27
85573	0.52
85574	1.68
85575	2.40
85592	3.66
85593	0.76
85594	0.46
85595	0.82
85596	0.69
85597	0.96
85598	0.89
85599	1.51
85600	1.39
85601	1.38
85602	0.55
85603	0.85
85604	1.55
85605	3.20
85606	0.85
85607	0.94
85608	1.00
85609	1.48
85610	1.47

METHOD : BLEG2

ANALYSIS

SAMPLE MARK	Au ppb
85611	3.31
85612	1.60
85613	2.21
85614	0.12
85615	1.84

METHOD : BLEG2

CLASSIC COMLABS LTD
Analytical Laboratories (INC. IN W.A.)

Report 9DN1132
Page 1

ANALYSIS

NT46 MARY RIVER NORTH REGIONAL

SAMPLE MARK	Au ppb
85616	1.87
85617	1.41
85618	1.52
85619	1.64
85620	0.92
85621	0.94
85622	0.83
85623	0.63
85624	1.00
85625	0.56
85626	0.15
85627	1.58
85628	2.03
85629	0.07
85630	0.11
85631	0.09
85632	0.19
85633	1.87
85634	1.63
85635	0.52
85636	1.61

METHOD : BLEG2

CLASSIC COMLABS LTD

Report : 9DN1309
Page 1

ANALYSIS

SAMPLE MARK	Au ppb
86487	0.12
86488	0.08
86489	0.09
86490	0.14
86491	0.15
86492	0.15
86493	0.27
86494	0.93
86495	0.26
86496	0.33
86497	0.06
86498	0.15
86499	<0.05
86500	0.06
86792	0.07

METHOD : BLEG 2

CLASSIC COMLABS LTD

ANALYSIS

SAMPLE MARK	Au ppb
85637	0.10
85638	<0.05
85639	0.28
85640	0.11
85641	0.80
85642	0.45
85643	<0.05
85644	0.45
85645	0.40
85646	0.09
85647	0.13
85648	0.17
85649	0.40
85650	0.71

METHOD : BLEG 2

APPENDIX 2

ROCKCHIP SAMPLE LEDGER AND RESULTS

PROJECT	
PROJECT NAME:	Maxy River Nth.
PROJECT No.	NT46

SAMPLING RECORD	
SAMPLED/LOGGED BY:	D.F.T.
MATERIAL:	Rockchip samples
DATE:	July-Aug 89 DEPTH: Surface
LABORATORY:	Analabs
LABORATORY REPORT No.	52.0.21.03786
N.A.L. ORDER No.	NT1250

NEWMONT AUSTRALIA LIMITED

PAGE No. 1/

SAMPLE REPORT

ANALYTICAL DATA

SAMPLE NUMBER	CO-ORDINATES		SAMPLE TYPE	DESCRIPTION	ELEMENT	Au	Ag	As	Cu	Pb	Zn
					METHOD	AAS	AAS	AAS	AAS	AAS	AAS
					DETECTION LIMIT	0.02	0.5	100	5	5	5
861211	791250	8584000	Grab	Qtz Vn in Psph - ?Wildman silt Goethite.		<	0.5	300	130	890	306
86123	789700	8583000	Grab	Qtz Vn and Associated stwk in Hem Pss - B/W Goethite - Pseu - ?Py		<	0.5	600	90	125	130
861249	789750	8583025	Grab	Qtz stwk in Pssh. B/W Py > Aspy > scorodite		<	0.5	100	10	10	5
861255	789800	8583050	Grab	Qtz Vn in Psi - Wildman silt min B/W		0.12	0.5	2600	145	130	110
861266	789400	8582800	Grab	Qtz Vns in Mass Psi - Wildman		0.02	<	200	25	55	475
861277			Grab	Qtz stwk in Pss B/W		0.04	0.5	700	50	110	35
861288			Grab	Gos Qtz stwk in Pss B/W Py - scorodite		0.04	<	800	125	145	45
861299			Grab	Gos Qtz & lim stwk in Porcs Pss B/W		0.02	0.5	800	25	60	20
861300	78850	8583120	Grab	Gos Qtz in Pss B/W - scorodite Py		0.02	0.5	800	40	30	15
861311	78875	8583160	Grab	Gos Qtz in Pss B/W		<	0.5	800	450	40	110
861322			Grab	Qtz stwk & Goethite in Pss B/W & lim Pseudomorphs		<	0.5	100	20	15	200
861333			Grab	Stwk of fine lim Vns in Pss + minor Qtz ± B/W		<	<	100	15	30	65
861344			Grab	Gos Qtz stwk & Lim Vns in SSt.		<	0.5	200	15	40	110

PROJECT	
PROJECT NAME:	Mary River North
PROJECT No.	NT 46

SAMPLING RECORD	
SAMPLED/LOGGED BY:	D.F.T
MATERIAL:	Rockchip
DATE: Aug 89	DEPTH: Surface.
LABORATORY:	Analabs
LABORATORY REPORT No.	
N.A.L. ORDER No.	

NEWMONT AUSTRALIA LIMITED

PAGE No. 2 /

SAMPLE REPORT

ANALYTICAL DATA

SAMPLE NUMBER	CO-ORDINATES		SAMPLE TYPE	DESCRIPTION	ELEMENT	Au	Ag	As	Cu	Pb	Zn
					METHOD	AAS	AAS	AAS	AAS	AAS	AAS
					DETECTION LIMIT	0.02	0.5	100	5	5	5
86135			Grab	Qtz and Psi in Pss. - Wildman		0.02 <	<	200	35	40	340
86136	791000	8584500	Grab	laminated Qtz and Psi ? bedded.		<	0.5	200	50	10	345
86137	791000	8584500	Grab	As above.		<	<	200	55	10	705
86138	791000	8584600	Grab	lam Psi č minor qtz in Psph č minor lamprophyre dyke		<	<	200	85	10	715
86139	791000	8584650	0.5m	lamprophyre dyke in Psph trend 040° Mag. dip = 30°E		<	<	100	135	35	630
86140	790950	8584625		Lam Psi č min qtz		<	<	200	135	30	690

780 785 790 795

es85

es80

Czs

Epw

Czlg

Hardies Creek

MARY RIVER

ARNHEM HIGHWAY

LEGEND

CAINOZOIC

Czlg Lateritic gravel

Czs Soil

PROTEROZOIC

Pgd Mt Goyder syenite

Epw Wildman siltstone

q Quartz vein

0 1 2km

NORTH

Newmont Australia Limited

COMPILED	D.F.T.	SCALE	1:50 000
DRAWN	C.S.D.S.	DRAWING No.	
DATE		FIGURE No.	2

MARY RIVER NORTH
GEOLOGY SKETCH MAP

MARY RIVER

85650
0·71

85649
0·40

85792
0·07

0·06
86500

86131
<

<0·05

0·15

86130
0·02

86497
0·06

86496
0·33

86125
0·12
As 2600

0·26

0·93

86124
<

0·27

86492
0·15

86449
0·15

0·14

86123
<

83 000N

0·09

0·08

86487
0·12

Psph

BARK HUT INN

79 000E

CLARKS CROSSING

86126
0·02

LEGEND

Sandstone Unit

Psph Haematite Shale

0·15 • BLEG Sample Au ppb

0·27 ■ Rockchip Au ppm

< Below Detection

0 100 200km

NORTH	Newmont Australia Limited		
	COMPILED D.F.T.	SCALE 1:2500	MARY RIVER NORTH - NT 46
	DRAWN C.S.D.S.	DRAWING No.	STOCKWORK ZONE
	DATE AUG 89	FIGURE No. 4	IN SANDSTONE

A3

780000E 782000E 784000E 786000E 788000E 790000E 792000E 794000E 796000E

8591000N
8589000N
8587000N
8585000N
8583000N
8581000N

85636 (1·61)
85635 (0·52)
85600 (1·39)

85599 (1·51) 85598 (0·89) 85601 (1·38) 85602 (0·55) 85603 (0·85) 85604 (1·55) 85605 (3·20)

85597 (0·96) 85596 (0·69) 85606 (0·85) 85622 (0·83) 85621 (0·94) 85620 (0·92) 85627 (1·58)

85592 (3·66) 85595 (0·82) 85594 (0·46) 85593 (0·76) 85607 (0·94) 85623 (0·63) 85624 (1·00) 85619 (1·64) 85628 (2·03)

85643 (<0·05)
(0·45) 85644 85642 (0·45)
(0·40) 85645 85641 (0·80)
(0·09) 85646 85640 (0·11)
85618 (1·52) 85629 (0·07) 85639 (0·28)
85648 (0·17) 85638 (<0·05)
85637 (0·10)
85647 (0·13)

85575 (2·40) 85574 (1·68) 85573 (0·52) 85572 (1·27) 85608 (1·00) 85625 (0·56) 85617 (1·41)

85650 (0·71)
85649 (0·40)

85570 (0·33) 85609 (1·48) 85615 (1·84) 85616 (1·87) 85626 (0·15) 85630 (0·11)

85571 (1·62) 85610 (1·47) 85634 (1·63) 85633 (1·83) 85632 (0·19) 85631 (0·09)

85612 (1·60) 85611 (3·51)

(2·21) 85613 (0·12) 85614

ARNHEM HIGHWAY

0 1 2 3kms
SCALE 1:50000

NORTH

Newmont Australia Limited

COMPILED	D.T.	SCALE	1:50000
DRAWN	C.W.S.	DRAWING No	
DATE	8/1/90	FIGURE No.	3

MARY RIVER NORTH
BLEG SURVEY

NORTHERN TERRITORY GEOLOGICAL SURVEY - GEOSYSTEM DATA SHEET

Report No ..... Security .....
Report Title Final Report Mary River North E.L. 6227. Northern Territory. Darwin 1:250,000 sheet.
Author(s) D.F. Thomson
Publisher Unpublished
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Accompaniments Nil
Drill Core? Nil
Licence No E.L. 6227
Project Year(s) Year 1
Licensee(s) Newmont Australia Ltd
Joint Venture(s) Nil
Operator(s) Newmont Australia Ltd
1:1 000 000 .....
1: 250 000 Darwin
1: 100 000 Mary River
1: 50 000 Mount Bundey and Mary River
Prospect Name Mary River North
Site Location Lat: 12° 50' S Long: 131° 38' E
East: 786000 North: 8581000 N

Tectonic Unit Pine Creek Geosyncline

Petroleum Geol
/Metalliferous minerals
Nonmetalliferous minerals

??? Terms

Drilling	Geophysics	Geochemistry	General
	Aerial Surveys	Sampling	
Diamond	Magnetic	/Stream sediment	Geol mapping
Percussion	Radioactivity	/Soil	Photogeology
Auger	EM Surveys	/Rock chip	Gridding
Rotary	Ground	Water	Methods
	EM Survey method	Geochemistry	Regional geol
	IP Survey method	/Drainage testing	Local geology
	Seismic surveys	Drill core analysis	Stratigraphy
	Resistivity svys	Assaying	/Reconnaissance
	Geophysical anom	Geochemical anom	Logging
	Gravity		

Notes .....
Abstract attach .....
Indexed by/date ..... Checked by/date .....

JFB:DS:276