CONTENTS ENVELOPE 6781

TENEMENT: E.L. 1361 - Braemar.

TENEMENT HOLDER: Newmont Holdings Pty. Ltd.

NEWMONT HOLDINGS PTY. LTD.
(INCORPORATED IN VICTORIA)
18TH FLOOR, A.M.P. TOWER
535 BOURKE STREET
MELBOURNE, VICTORIA, 3000

S034/1

BRAEMAR EL 1361,
CHOWILLA 1:250,000 SHEET,
SOUTH AUSTRALIA:

FIRST QUARTERLY REPORT TO 15 JANUARY 1987

D.G. Jones

January 1987

Distribution:

S.A. Dept. of Mines and Energy (1)
Brisbane (1)
Melbourne (1)

TELEPHONE (03) 62 5191 TELEX AUSMONT 32026 FACSIMILE (03) 62 4440

INTRODUCTION

General

On 12 June 1986, Newmont made application for an Exploration Licence (EL) covering an area known as Braemar located about 60 km SSE of Yunta. The licence, EL 1361 was issued on 15 October 1986 for a period of one year. It covers an area of 719 sq km over gently folded Upper Proterozoic sediments of the Heysen Supergroup. The principal objective is to search for stratabound gold deposits, although it is recognised that the district also holds potential for base metal deposits.

Location and Access

The licence occupies most of Braemar pastoral station. A well--maintained gravelled road from Burra through Braemar to Lilydale homesteads bisects EL 1361, and a number of station tracks lead from this road. Fence lines often have cleared access tracks alongside, so that in general the area is readily accessible to four-wheel-drive vehicles during dry weather.

Regional Geology

Braemar lies within the Adelaide Geosyncline, on the northwestern margin of the Tertiary Murray Basin (Fig. 1). A northeast-trending Corridor, the Anabama-Redan Zones comprising a set of extensional faults and lineaments, passes through Lilydale, and marks a zone of crustal weakness which may have been active since the early Proterozoic. The Anabama Fault may extend west from Lilydale through Braemar, and the corridor bounded by the Florieton and Morgan Faults may extend north to intersect the Anabama-Redan Zone at Braemar. Possible rifting associated with these corridors on the edge of the adjacent Olary-Chowilla Shelf, gives the district some potential for mineral deposition. Major exhalative iron formations are found through the Yudnamutana Subgroup sediments in the southern half of the licence.

GEOLOGY

STRATIGRAPHY

Warrina Supergroup

The oldest rocks in the area belong to the Belair Subgroup at the top of the Lower Proterozoic Burra Group. They are exposed in the cores of major anticlines, and consist of the Saddleworth Formation and the overlying Mintaro Shale. The Saddleworth Formation is dominantly represented by greenish calcareous siltstones, passing upwards into dark grey laminated siltstones, containing disseminated and lensy pyrite, which are mapped as the Mintaro Shale.

Heysen Supergroup

A regional unconformity separates the Belair Subgroup for the basal Yudnamutana Subgroup of the Middle Proterozoic Umberatana Group. The unconformity is marked by an irregular sharp contact between dark grey well-cleaved Mintaro Shale and sandy siltstone containing sparse pebbles of quartz and green siltstone (Pualco Tillite). Higher in the Pualco Tillite unit, dolomitic siltstones become more common, and these in turn pass up into boulder tillite interbedded with massive quartzite, which forms dominant landforms such as Braemar Peak and Ironback Hill.

Dark grey banded siltstones overlying the tillite are mapped as the Benda Siltstone. Laminated ferruginous bands developed within this unit form the distinctive Braemar Iron Formation. It is likely that the Yudnamutana Subgroup rocks were deposited in deep, narrow northeast-trending troughs marginal to the Chowilla Shelf.

A sharp change to a persistent dolomite bed marks the break between the Yudnamutana and Willochra Subgroups. The basal dolomite passes up into laminated olive-green siltstones. Interbeds of feldspathic and lithic sandstone become more common towards the top of this unit, the Wilyerpa Formation.

STRUCTURE

The rocks have been affected by one major phase of regional deformation. Open folds along northeast-trending axes have a single associated axial plane slaty cleavage developed best in shale units.

EXPLORATION

GENERAL

The principal model for mineralization in the Braemar EL is a syngenetic stratabound gold deposit, 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.

TARGET

Field observations during exploration on the adjacent Iron Peak EL 1321 had suggested that the package of rocks represented by the Pualco Tillite and Benda Siltstone were somewhat similar to those comprising the Upper Yeneena Group sediments which host the Telfer gold deposit in Western Australia.

The late Proterozoic Yeneena Group sediments are considered to have been laid down less than 1,000 million years ago. The lower part is comprised of "a cyclical sandy sequence of fluviatile deltaic to shallow water marine sediments deposited on a relatively stable platform" (Royle, 1986). The Upper Yeneena Group of cyclically deposited sand, carbonate, silt and mud was deposited in a relatively small, restricted fault-controlled basin in an off-shore outer shelf setting. The gold bearing Malu Quartzite and overlying Telfer Formation units within the Upper Yeneena Group may represent submarine ramp deposits produced by storm sedimentation below wave base at water depths between 50-200m (Royle, 1986).

The Pualco Tillite unconformably overlies the Burra Group in the Iron Peak area, and is the lowest unit of the Umberatana Group. The latter has been tentatively dated at 680 $\pm$ 50 Ma (Preiss, 1979). The Umberatana Group sediments are believed to have been laid down in a complex series of symmetrical intracratonic relatively shallow basins.

The massive pebbly to bouldery siltstone comprising the Pualco Tillite is considered to be composed of material derived from a shield area to the west, possibly deposited from a grounded ice sheet under shallow marine conditions. It includes calcareous siltstones and interbedded dolomites throughout, and passes up into siltstone, sandstone, dolomite and martite beds of the Benda Siltstone (Forbes and Cooper, 1976).

A locally-deposited ferruginous facies variant which interfingers with both the upper Pualco Tillite and lower Benda Siltstone has been named the Braemar Iron Formation (Whitten, 1970). It consists of a series of individual iron formation lenses up to 45m thick containing over 30% Fe within a maximum stratigraphic thickness of 725m (Whitten, 1970). The iron oxides are considered to have been chemically precipitated in a cold shallow marine environment into which rock flour was being transported by glacial meltwater.

At Telfer, hot metalliferous brines may have migrated up growth faults and discharged along the margins of a small localised basin or graben. The rate at which clastic sediment was simultaneously contributed to this basin was critical, as rapid inflow and/or high-energy conditions would have prevented the accumulation of a distinct mineralized horizon.

It was considered that the bedded magnetite horizons within the Braemar Iron Formation may represent periods of quiet chemical deposition. If small sub-basins could be identified that may have been bounded by growth faults providing channel-ways for mineralizing fluids, the possibility for the occurrence of a stratabound gold deposit would be enhanced. Hence attention was concentrated on the Braemar Iron Formation.

METHOD

Exploration in the adjacent Iron Peak EL 1321 had demonstrated that the Bulk Leach Extractable Gold (BLEG) technique was effective in searching for ultra fine-grained stratabound gold deposits in the physiographic and climatic domain covering the Braemar licence area. Fifteen BLEG samples were collected from sites selected as providing maximum likelihood of enhanced gold levels in the target formations. The sample sites are shown in Fig. 2.

THE BLEG TECHNIQUE

The Bulk Leach Extractable Gold (BLEG) technique is designed to upgrade low level of gold to detectable limits and is effective in a wide range of environments. A metallurgical procedure utilising cyanidation is employed, since cyanidation is extremely effective for accessible form of fine gold. A very large sample (5kg) is treated, resulting in a concentration factor which gives about 450 times the orthodox gold geochemical detection limit.

Orientation work around a wide variety of gold deposits shows that the BLEG technique can detect anomalies up to 7km from the source. A nominal sample interval of 1km is normally employed. Samples are screened to minus 5mm, the oversize discarded, and the sample weighed to 5kg dry weight in a suitable sized plastic bag. The analysis is then performed on the whole 5kg unpulverized sample.

The analytical technique involves the following steps:

1. accurate weighing and determination of moisture content

2. pre-oxidation with hypochlorite

3. the sample is brought to 50% solids by weight with cyanide solution, and any floating organic matter skimmed off. The suspension is leached for 24 hours, with agitation during the first 8 hours. Cyanide strength and PH are monitored to ensure optimum levels

4. de-aeration

5. the pregnant liquor is drawn off and the gold (and copper, silver, zinc, etc. if present) precipitated on to zinc powder under vacuum.

6. zinc powder is recovered by vacuum filtration

7. the zinc is digested in aqua regia and the resultant liquor sprayed on AAS for Ag, Cu determination and the Au extracted into MIBK and sprayed on AAS. Gold results are corrected for zinc losses.

If samples are carefully collected using the appropriate procedure, and the requisite precautions are taken by the analytical laboratory, the BLEG technique is extremely cost-effective and allows rapid reconnaissance coverage of large areas. Other advantages include:

(a) it uses gold to find gold without relying on pathfinder elements which can be non-specific

(b) laboratory sampling error is minimal since a large 5kg sample is used, and nugget effects are smoothed out

(c) detection limit is about 0.05ppb, and low ppb gold values are repeatable

(d) assay precision is $\pm$ 10%.

The following data is required to calculate the analytical results set out in Appendix 1:

1. dry weight of sample - calculated using sample moisture content

2. cyanide strength in solution approximately one hour after addition

3. weight of zinc powder recovered in step (6) above.

Gold content of the original 5kg sample is calculated using the formula:

Au (ppb) = $\frac{1}{2}$ (Au in ppm precipitated on zinc) x (weight of zinc)

(Copper and silver are reported in parts per million).

RESULTS

Only one of the fifteen samples was above background (0.3 ppb Au) as determined from extensive BLEG sampling in the adjacent Iron Peak EL 1321. Sample 54110, at 0.54 ppb Au, would not be considered as significantly anomalons, based on the Iron Peak results.

FORWARD PROGRAMME

A comparison of Braemar and Iron Peak results will be undertaken to determine whether further work is warranted in Braemar EL 1361.

REFERENCES

Forbes, B.G. and Cooper, R.S., 1976. The Pualco Tillite of the Olary Region, South Australia. Quart. Geol. Notes No. 60, Geol Surv. S.A.

Preiss, W.V., 1979. Adelaidean Sedimentation: The Adelaide Geosyncline and Stuart Shelf. Geol. Surv. S.A. Rept. Bk. 79/24.

Royle, D.Z., 1986. Gold Mineralization at Telfer and its Environment within the Proterozoic Paterson Range Province.

Whitten, G.F.T, 1970. The Investigation and Exploitation of the Razorback Ridge iron Deposit. Geol. Surv. S.A. Rept. Inv. No. 33.

TABLE 1

Jan 1987

Expenditure for period to ~~24 May, 1986~~.

	$
Labour and Overheads	3,276
Assaying	975
Consultants (petrology)	90
Field Living	190
Vehicle Operating	278
Travel and Accommodation	1,174
Rentals - S.A. Government	1,530
Plans and Drawings	93
Stationery	16
Telephone	108
Telex	73
General	4
	$7,807

Classic Laboratories Pty Ltd
A Wholly-Owned Subsidiary of Amdel
The Australian Mineral Development Laboratories
34 BUCKINGHAM DRIVE, WANGARA ESTATE, WANNEROO, WESTERN AUSTRALIA 6065
Phone: (09) 409 8898 Fax: (09) 409 6317 Telex: Clasab 95452

23rd December 1986

APPENDIX 1

Newmont Holdings Pty Ltd
18th Floor
535 Bourke Street
MELBOURNE Vic. 3000

Attn: Mr. D.G. Jones

Report - 20063/86

YOUR REFERENCE:	Order No. M.9214
IDENTIFICATION:	As listed
MATERIAL:	Zinc precipitate
WORK REQUIRED:	Au Ag Cu
DATE RECEIVED:	18th December 1986

Chief Chemist, Perth Laboratory: H.R. Firns

General Manager - W.A. Division: K.J. Renton

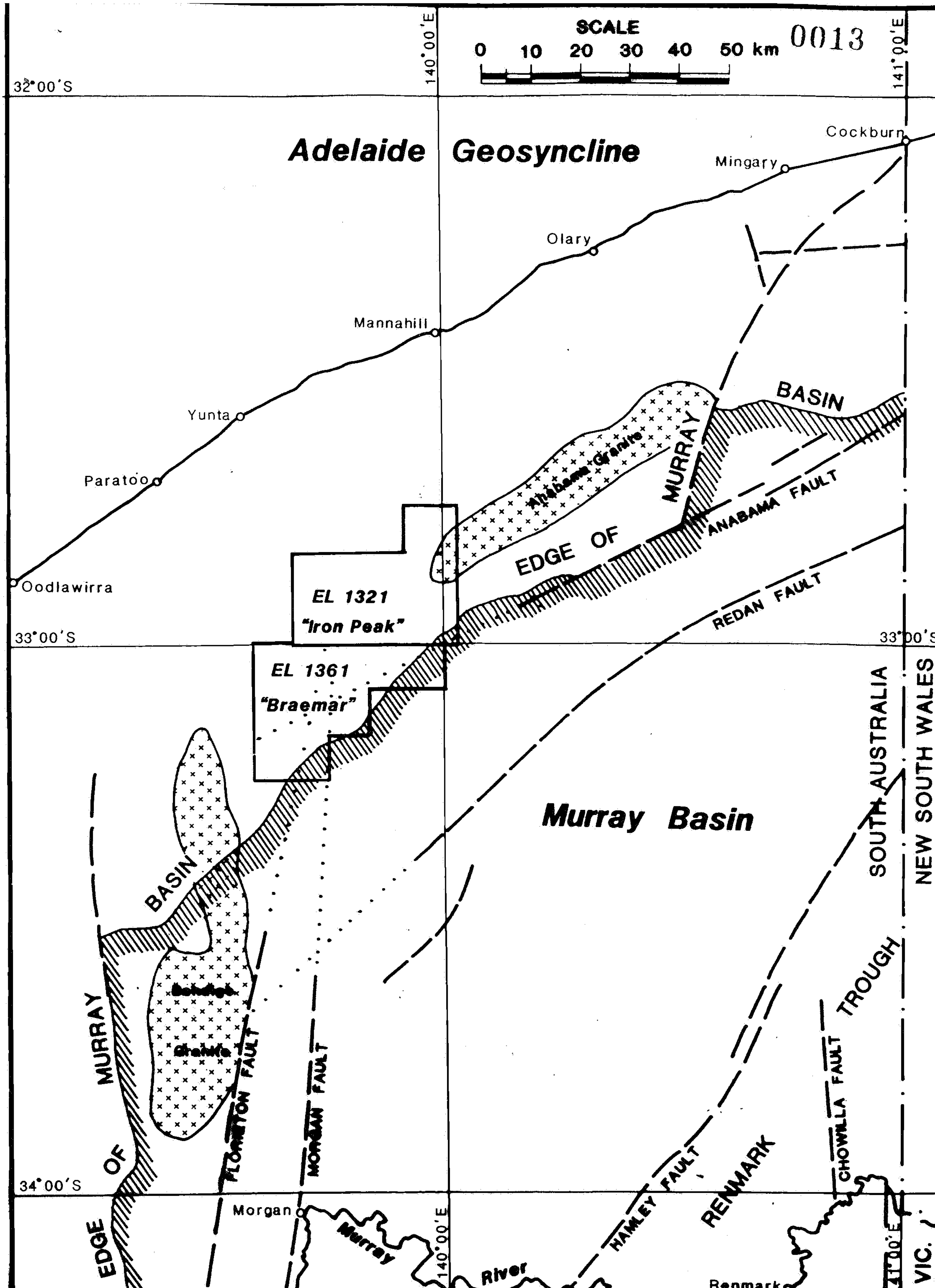
Classic Laboratories Pty. Ltd.

Analysis code ZINCON

Report AC 20310/87

Order No. 1214

Sample	Au	Cu	Ag
54104	0.13	0.12	4.75
54105	0.10	0.01	1.93
54106	0.30	0.03	11.1
54101	0.15	0.16	4.25
54102	0.08	0.12	1.25
54103	0.08	0.08	1.25
54107	<0.01	0.08	2.75
54108	0.30	0.18	4.75
54109	0.15	0.16	3.50
54110	0.58	0.62	31.3
54111	<0.01	0.10	1.75
54112	<0.01	0.08	2.00
54113	0.19	0.36	6.25
54114	0.28	0.20	2.25
54115	<0.01	0.18	4.00
Detn limit	(0.01)	(0.01)	(0.01)
Units	ppb	ppm	ppb



NORTH

NEWMONT HOLDINGS PTY. LTD.

COMPILED	DGJ	SCALE	1:1,000,000
DRAWN	DGJ	No.	SO 34
DATE	Jan 1987	FIGURE No.	

EL 1361 BRAEMAR TECTONIC SETTING

FIG. 1

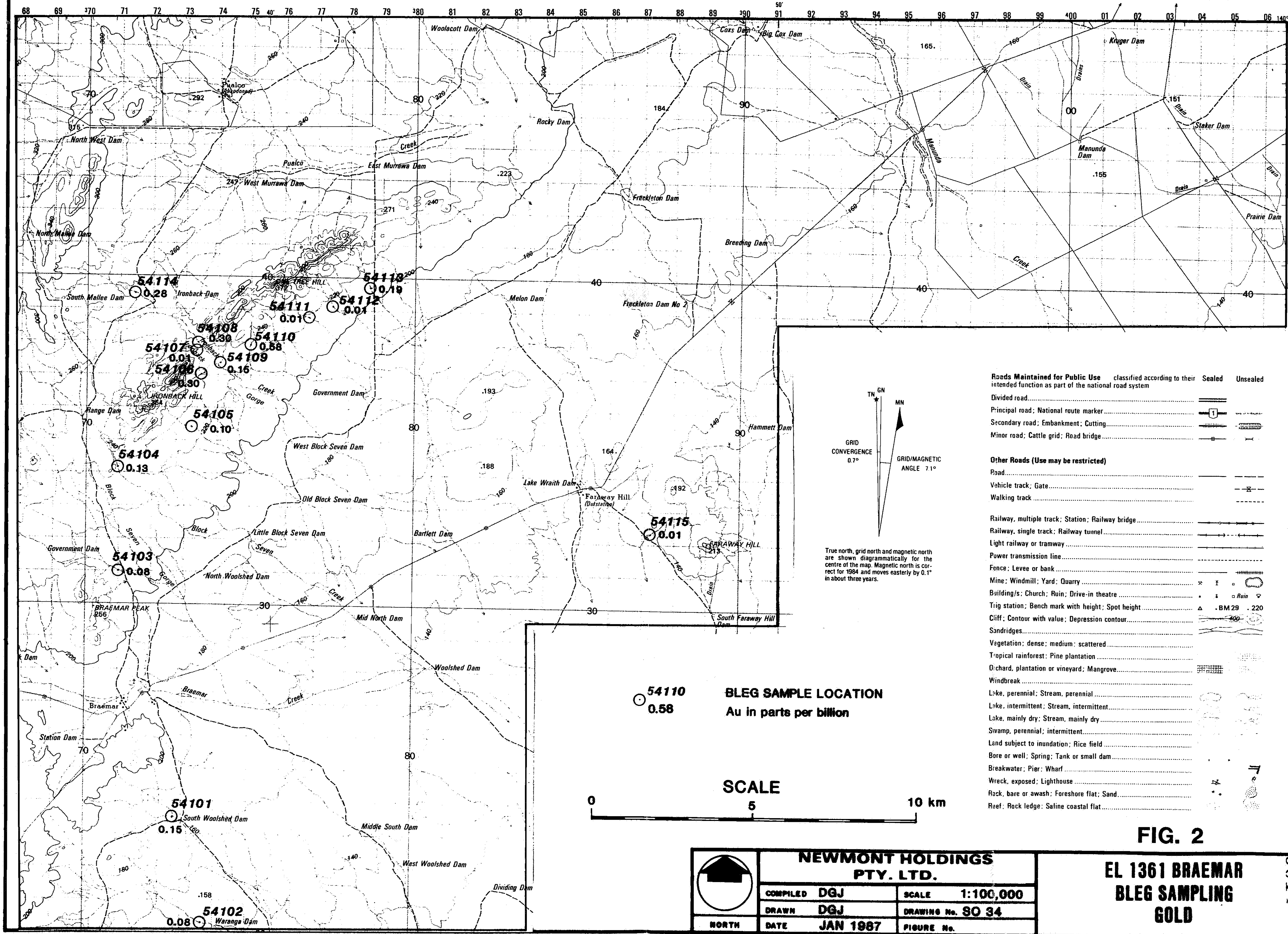

54114
0.28
54113
0.19
54112
0.01
54111
0.01
54110
0.58
54109
0.15
54108
0.30
54107
0.01
54106
0.30
54105
0.10
54104
0.13
54103
0.08
54115
0.01
54101
0.15
54102
0.08
Woolacott Dam
Coxs Dam
Big Cox Dam
Kruger Dam
Pualco (Abandoned)
North West Dam
Rocky Dam
Creek
Pualco
East Murrawa Dam
West Murrawa Dam
Freckleton Dam
Manunda
Manunda Dam
Staker Dam
Drain
Prairie Dam
North Mallee Dam
Breeding Dam
South Mallee Dam
Ironback Dam
Gum Tree Hill
Melon Dam
Freckleton Dam No 2
Government Dam
Ironback Hill
Range Dam
Gorge
Hammett Dam
West Block Seven Dam
Lake Wraith Dam
Faraway Hill (Outstation)
Old Block Seven Dam
Block
Seven
Little Block Seven Dam
Bartlett Dam
Faraway Hill
Government Dam
North Woolshed Dam
Braemar Peak
Mid North Dam
South Faraway Hill Dam
Woolshed Dam
Braemar
Station Dam
South Woolshed Dam
Middle South Dam
West Woolshed Dam
Dividing Dam
Waranga Dam
TN
GN
MN
GRID CONVERGENCE 0.7°
GRID/MAGNETIC ANGLE 7.1°
True north, grid north and magnetic north are shown diagrammatically for the centre of the map. Magnetic north is correct for 1984 and moves easterly by 0.1° in about three years.
Roads Maintained for Public Use classified according to their intended function as part of the national road system
Sealed
Unsealed
Divided road
Principal road; National route marker
Secondary road; Embankment; Cutting
Minor road; Cattle grid; Road bridge
Other Roads (Use may be restricted)
Road
Vehicle track; Gate
Walking track
Railway, multiple track; Station; Railway bridge
Railway, single track; Railway tunnel
Light railway or tramway
Power transmission line
Fence; Levee or bank
Mine; Windmill; Yard; Quarry
Building/s; Church; Ruin; Drive-in theatre
Trig station; Bench mark with height; Spot height
Cliff; Contour with value; Depression contour
Sandridges
Vegetation; dense; medium; scattered
Tropical rainforest; Pine plantation
Orchard, plantation or vineyard; Mangrove
Windbreak
Lake, perennial; Stream, perennial
Lake, intermittent; Stream, intermittent
Lake, mainly dry; Stream, mainly dry
Swamp, perennial; intermittent
Land subject to inundation; Rice field
Bore or well; Spring; Tank or small dam
Breakwater; Pier; Wharf
Wreck, exposed; Lighthouse
Rock, bare or awash; Foreshore flat; Sand
Reef; Rock ledge; Saline coastal flat
54110
0.58
BLEG SAMPLE LOCATION
Au in parts per billion
SCALE
0
5
10 km
NORTH
NEWMONT HOLDINGS PTY. LTD.
COMPILED DGJ
DRAWN DGJ
DATE JAN 1987
SCALE 1:100,000
DRAWING No. SO 34
FIGURE No.
EL 1361 BRAEMAR
BLEG SAMPLING
GOLD
0014

FIG. 2

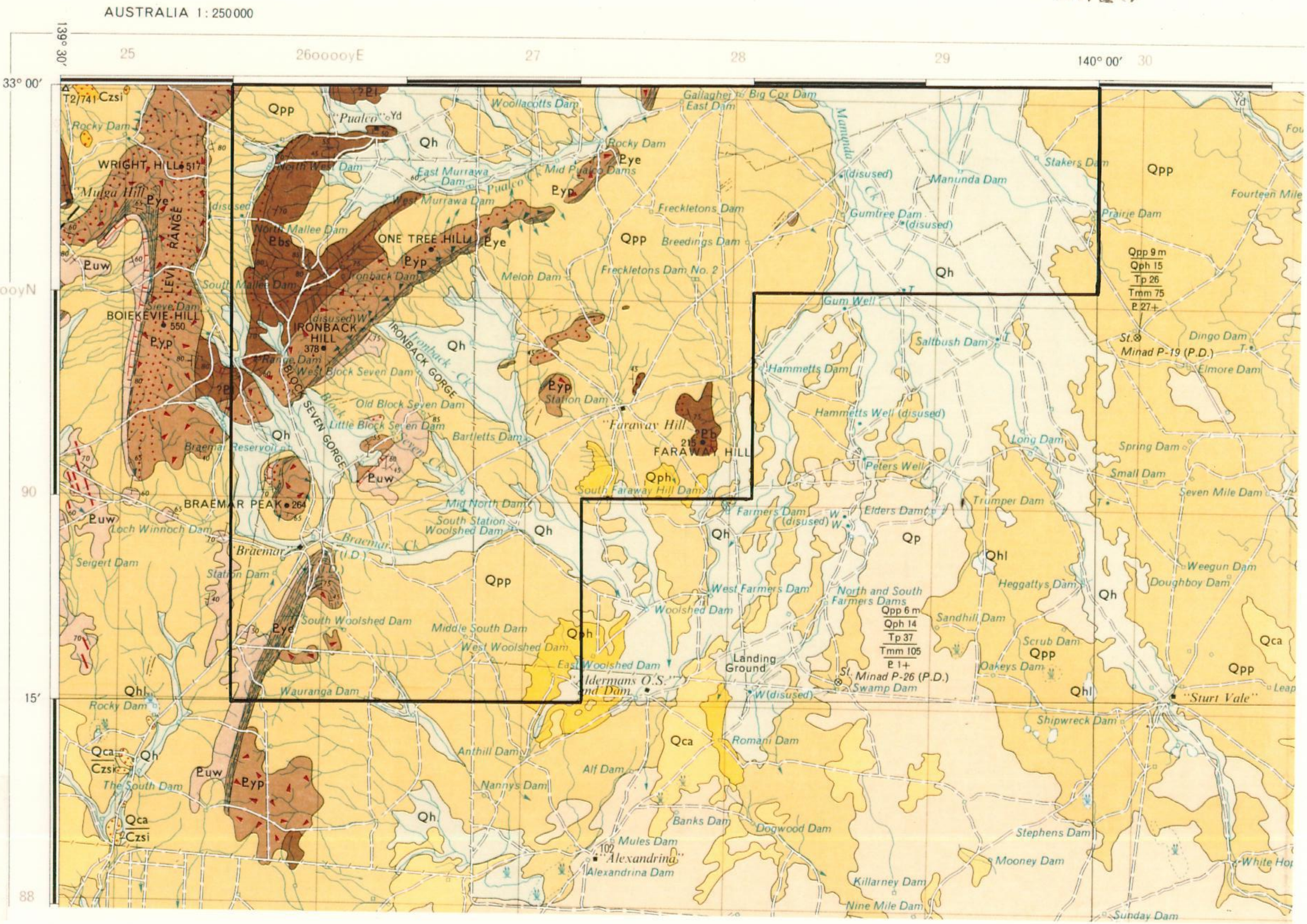

AUSTRALIA 1:250000
139° 30′
33° 00′
140° 00′
25
26oooo yE
27
28
29
30
91oooo yN
90
15′
88
WRIGHT HILL 517
Mulga Hill
LEVI RANGE
BOIEKEVIE HILL 550
ONE TREE HILL
IRONBACK HILL 378
IRONBACK GORGE
BLOCK SEVEN GORGE
BRAEMAR PEAK 264
"Braemar"
"Pualco"
"Faraway Hill"
FARAWAY HILL
"Alexandrina"
Alexandrina Dam
"Sturt Vale"
Aldermans O.S. and Dam
Landing Ground
Woollacotts Dam
Rocky Dam
Gallagher East Dam
Big Cox Dam
Manunda Dam
Stakers Dam
Prairie Dam
Fourteen Mile
Freckletons Dam
Breedings Dam
Freckletons Dam No. 2
Gumtree Dam
Melon Dam
North Mallee Dam
South Mallee Dam
Ironback Dam
West Murrawa Dam
East Murrawa Dam
Mid Pualco Dams
North Well Dam
Gum Well
Saltbush Dam
Hammetts Dam
Hammetts Well (disused)
Dingo Dam
Elmore Dam
Minad P-19 (P.D.)
Minad P-26 (P.D.)
Qpp 9 m
Qph 15
Tp 26
Tmm 75
Ꝑ 27+
Qpp 6 m
Qph 14
Tp 37
Tmm 105
Ꝑ 1+
West Block Seven Dam
Old Block Seven Dam
Little Block Seven Dam
Bartletts Dam
Station Dam
Braemar Reservoir
Long Dam
Peters Well
Spring Dam
Small Dam
Seven Mile Dam
Trumper Dam
Elders Dam
Farmers Dam
Mid North Dam
South Station Woolshed Dam
South Faraway Hill Dam
Loch Winnoch Dam
Seigert Dam
West Farmers Dam
North and South Farmers Dams
Heggattys Dam
Weegun Dam
Doughboy Dam
Sandhill Dam
Scrub Dam
Oakeys Dam
Swamp Dam
Woolshed Dam
South Woolshed Dam
Middle South Dam
West Woolshed Dam
East Woolshed Dam
Wauranga Dam
Rocky Dam
The South Dam
Anthill Dam
Nannys Dam
Alf Dam
Romani Dam
Shipwreck Dam
Banks Dam
Dogwood Dam
Mules Dam
Stephens Dam
Mooney Dam
Killarney Dam
Nine Mile Dam
Sunday Dam
White Hop
Qpp
Qh
Qp
Qhl
Qph
Qca
Czsi
Ꝑye
Ꝑyp
Ꝑuw
Ꝑbs
Ꝑb

FIG. 3

0016

NEWMONT AUSTRALIA LIMITED
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18TH FLOOR, A.M.P TOWER
535 BOURKE STREET,
MELBOURNE, VICTORIA, 3000

S034/2

BRAEMAR EL 1361,
CHOWILLA 1:250,000 SHEET,
SOUTH AUSTRALIA:

FINAL REPORT AND SECOND QUARTERLY REPORT
TO 15 APRIL, 1987

D.G. Jones
May, 1987

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GENERAL

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LOCATION AND ACCESS

The licence occupies most of Braemar pastoral station. A well-maintained gravelled road from Burra through Braemar to Lilydale homesteads bisects EL 1361, and a number of station tracks lead from this road. Fence lines often have cleared access tracks alongside, so that in general the area is readily accessible to four-wheel-drive vehicles during dry weather

REGIONAL GEOLOGY

Braemar lies within the late Proterozoic Adelaide Geosyncline, on the northwestern margin of the Tertiary Murray Basin (Fig. 1). The Geological Survey of South Australia has subdivided the deposits within the Adelaide Geosyncline into three major sedimentary successions, on the basis of separate distinctive tectonics and palaeogeography. Each succession terminates at a regional unconformity or disconformity.

The first deposition in the Adelaide Geosyncline is represented by the Warrina Supergroup, which includes the Callina and Burra Groups. Sedimentation was restricted to troughs. The sediments are overlain unconformably by rocks of the Heysen Supergroup, composed of the Umberatana and Wilpena Groups, which mark a major transgression onto the cratonic margins bounding the geosyncline. Finally, the Moralana Supergroup comprises all the Cambrian units in the geosyncline.

STRATIGRAPHY

WARRINA SUPERGROUP

The oldest rocks in the area belong to the Late Torrensian sediments at the top of the Burra Group. They are exposed in the cores of major anticlines, and consist of the Saddleworth Formation and overlying Mintaro Shale.

The Saddleworth Formation represents repeated cycles of marine transgression and regression. Fine muds deposited well off-shore are intertongued with lagoonal dolomites.

The dolomites pass up into dark grey laminated siltstones, containing disseminated and lensy pyrite, which are mapped as the Mintaro Shale. These sediments were probably deposited in an offshore pro-delta slope, as they contain some thin sandy lenses (e.g. 4 km south of Netley Gap homestead) exhibiting cross-bedding. Rare irregular fragments of sandstone and limestone within the uniform laminated silts probably indicate occasional slumping of up slope sediments. However, the slope was clearly not steep enough to trigger turbidity flows. The absence of turbidites which accompany rapid tectonism and instability is unfavourable for mineral deposition.

HEYSEN SUPERGROUP

A regional unconformity, marking a hiatus in deposition between the Late Torrensian and earliest Sturtian time, separates the Burra Group from the Umberatana Group. The Umberatana Group sediments are believed to have been laid down in a complex series of relatively shallow intracratonic basins, with material being derived from the Gawler Craton to the west.

In the Iron Peak and Braemar areas, the unconformity is marked by an irregular sharp contact between dark grey well-cleaved Mintaro Shale and a sandy siltstone containing sparse pebbles of quartzite, green siltstone, brown dolomite and rare igneous rocks. Higher in this Pualco Tillite unit, dolomitic siltstones become more common, and these in turn pass up into massive boulder tillite interbedded with massive quartzite, which forms dominant landforms such as Oratan Rock, Braemar Peak and Ironback Hill.

Dark grey banded siltstones overlying the massive tillite are mapped as the Benda Siltstone. Laminated ferruginous bands developed within this unit form the distinctive Braemar Iron Formation. It is likely that the Yudnamutana Subgroup rocks were deposited in deep, narrow northeast-trending troughs marginal to the Chowilla Shelf.

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STRUCTURE

The rocks have been affected by one major phase of regional deformation. Open folds along northeast-trending axes have a single associated axial plane slaty cleavage developed best in shale units. Large dome and basin structures result from pitch changes, not a second period of folding.

A northeast-trending Corridor, the Anabama-Redan Zone, comprising a set of extensional faults and lineaments, passes through Lilydale (Fig. 1) and marks a zone of crustal weakness which may have been active since the early Proterozoic. Possible rifting associated with this corridor on the edge of the adjacent Olary-Chowilla Shelf, gives the district some potential for mineral deposition.

EXPLORATION

GENERAL

The principal model for mineralization in the Braemar area was a syngenetic stratabound gold deposit, 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, although elsewhere in the Adelaide Geosyncline many coarse gold occurrences have been recorded in the sandy units of the Umberatana Group. The deep weathering and extensive Cainozoic cover further complicate exploration. Chemical and mechanical dispersion is depressed by the climatic conditions and low topographic relief.

TARGET

Field observations during exploration of the adjacent Iron Peak EL 1321 had suggested that the package of rocks represented by the Pualco Tillite and Benda Siltstone were somewhat similar to those comprising the Upper Yeneena Group sediments which host the Telfer gold deposit in Western Australia. As a result, the Braemar EL 1361 was obtained in order to investigate extensions of those units from Iron Peak into the Braemar area.

The late Proterozoic Yeneena Group sediments are considered to have been laid down less than 1,000 million years ago. The lower part is comprised of "a cyclical sandy sequence of fluviatile deltaic to shallow water marine sediments deposited on a relatively stable platform" (Royle, 1986). The Upper Yeneena Group of cyclically deposited sand, carbonate, silt and mud was deposited in a relatively small, restricted fault-controlled basin in an off-shore outer shelf setting. The gold bearing Malu Quartzite and overlying Telfer Formation units within the Upper Yeneena Group may represent submarine ramp deposits produced by storm sedimentation below wave base at water depths between 50-200m (Royle, 1986).

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THE BLEG TECHNIQUE

The Bulk Leach Extractable Gold (BLEG) technique is designed to upgrade low level of gold to detectable limits and is effective in a wide range of environments. A metallurgical procedure utilising cyanidation is employed, since cyanidation is extremely effective for accessible forms of fine gold. A very large sample (5kg) is treated, resulting in a concentration factor which gives about 450 times the orthodox gold geochemical detection limit.

Orientation work around a wide variety of gold deposits shows that the BLEG technique can detect anomalies up to 7km from the source. A nominal sample interval of 1km is normally employed. Samples are screened to minus 5mm, the oversize discarded, and the sample weighed to 5kg dry weight in a suitable sized plastic bag. The analysis is then performed on the whole 5kg unpulverized sample.

The analytical technique involves the following steps:-

1. accurate weighing and determination of moisture content

2. pre-oxidation with hypochlorite

3. the sample is brought to 50% solids by weight with cyanide solution, and any floating organic matter skimmed off. The suspension is leached for 24 hours, with agitation during the first 8 hours. Cyanide strength and PH are monitored to ensure optimum levels

4. de-aeration

5. the pregnant liquor is drawn off and the gold (and copper, silver, zinc, etc. if present) precipitated on to zinc powder under vacuum.

6. zinc powder is recovered by vacuum filtration

7. the zinc is digested in aqua regia and the resultant liquor sprayed on AAS for Ag, Cu determination and the Au extracted into MIBK and sprayed on AAS. Gold results are corrected for zinc losses.

If samples are carefully collected using the appropriate procedure, and the requisite precautions are taken by the analytical laboratory, the BLEG technique is extremely cost-effective and allows rapid reconnaissance coverage of large areas. Other advantages include:-

(a) it uses gold to find gold without relying on pathfinder elements which can be non-specific

(b) laboratory sampling error is minimal since a large 5kg sample is used, and nugget effects are smoothed out

(c) detection limit is about 0.05ppb, and low ppb gold values are repeatable

(d) assay precision is ± 10%.

The following data is required to calculate the analytical results set out in Appendix 1:

1. dry weight of sample - calculated using sample moisture content

2. cyanide strength in solution approximately one hour after addition

3. weight of zinc powder recovered in step (6) above.

Gold content of the original 5kg sample is calculated using the formula:-

Au (ppb) = $\frac{1}{2}$ (Au in ppm precipitated on zinc) x (weight of zinc)

(Copper and silver are reported in parts per million).

SAMPLING

A reconnaissance spread of 15 BLEG samples were collected from the Braemar area. Sample sites were concentrated in the vicinity of the prospective Braemar Iron Formation. Results were uniformly low, with a maximum value of 0.58 ppb, which is not considered anomalous for this area.

In view of the subeconomic results obtained from following of much more anomalous values in the adjacent Iron Peak EL 1361, no further work on Braemar was justified.

REFERENCES

Brunt, D.A., 1985. EL 1279 Manunda, S.A.:Final Report S.A.D.M.E. Env. No. 6340.

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Royle, D.Z., 1986. Gold Mineralization at Telfer and its Environment within the Proterozoic Paterson Range Province.

Whitten, G.F.T, 1970. The Investigation and Exploitation of the Razorback Ridge iron Deposit. Geol. Surv. S.A. Rept. Inv. No. 33.

TABLE 1

Expenditure for period to 24 March, 1987

	$
Labour and Overheads	3,276
Assaying	975
Consultants (petrology)	90
Field Living	190
Vehicle Operating	278
Travel and Accommodation	1,174
Rentals - S.A. Government	1,530
Plans and Drawings	93
Stationery	16
Telephone	108
Telex	73
General	4
	$7,807

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23rd December 1986

APPENDIX 1

Newmont Holdings Pty Ltd
18th Floor
535 Bourke Street
MELBOURNE Vic. 3000

Attn: Mr. D.G. Jones

Report - 20063/86

YOUR REFERENCE:	Order No. M.9214
IDENTIFICATION:	As listed
MATERIAL:	Zinc precipitate
WORK REQUIRED:	Au Ag Cu
DATE RECEIVED:	18th December 1986

Chief Chemist, Perth Laboratory: H.R. Firns

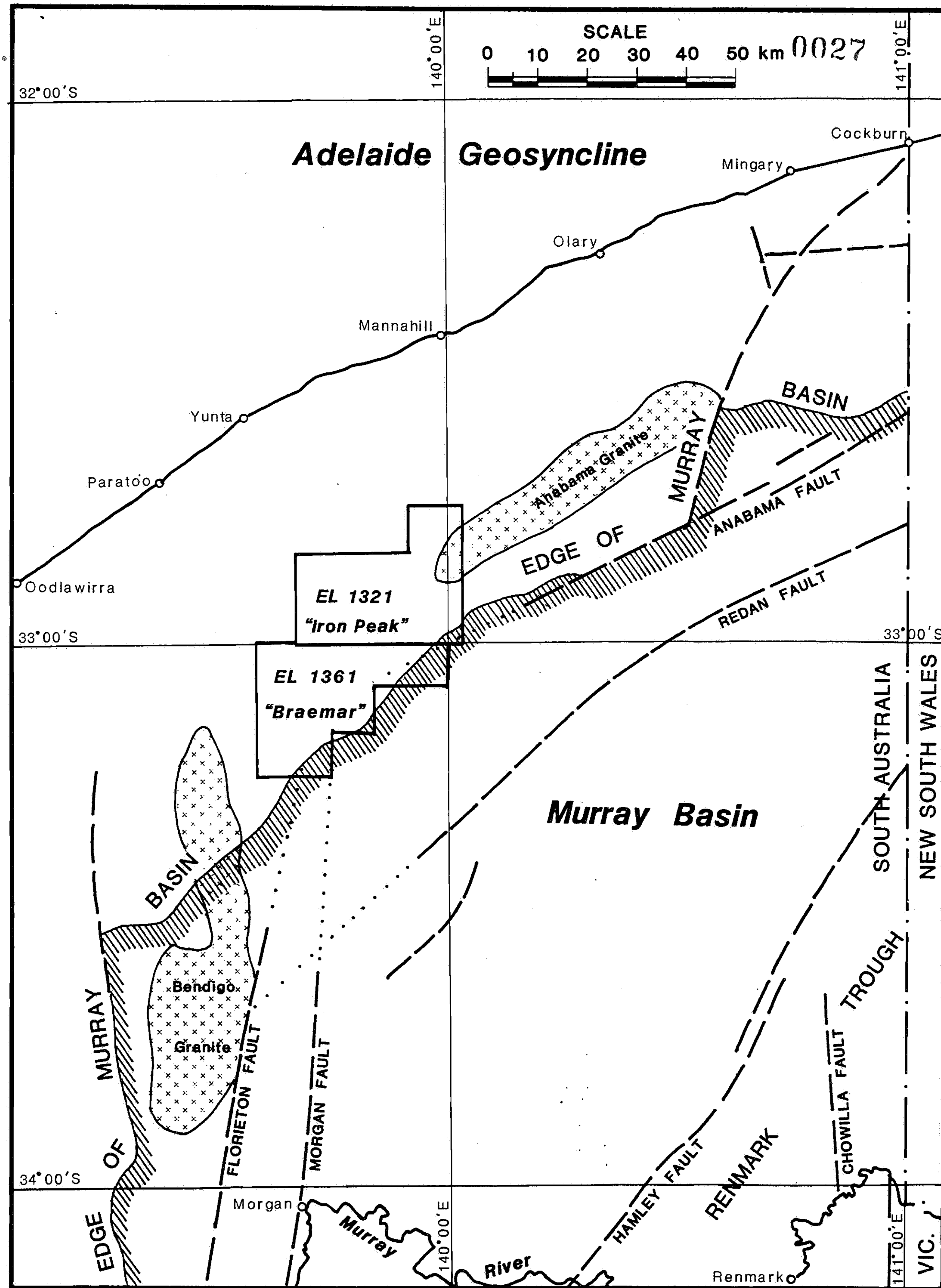
General Manager - W.A. Division: K.J. Renton

Classic Laboratories Pty Ltd

Analysis code ZINCON   Report AC 20310/87

Order No. 1214

Sample	Au	Cu	Ag
54104	0.13	0.12	4.75
54105	0.10	0.01	1.93
54106	0.30	0.03	11.1
54101	0.15	0.16	4.25
54102	0.08	0.12	1.25
54103	0.08	0.08	1.25
54107	<0.01	0.08	2.75
54108	0.30	0.18	4.75
54109	0.15	0.16	3.50
54110	0.58	0.62	31.3
54111	<0.01	0.10	1.75
54112	<0.01	0.08	2.00
54113	0.19	0.36	6.25
54114	0.28	0.20	2.25
54115	<0.01	0.18	4.00
Detn limit	(0.01)	(0.01)	(0.01)
Units	ppb	ppm	ppb



NORTH

NEWMONT HOLDINGS PTY. LTD.

COMPILED	DGJ	SCALE	1:1,000,000
DRAWN	DGJ	DRAWING No.	
DATE	June 1986	FIGURE No.	

EL 1361 BRAEMAR S034

TECTONIC SETTING

FIG. 1

3087

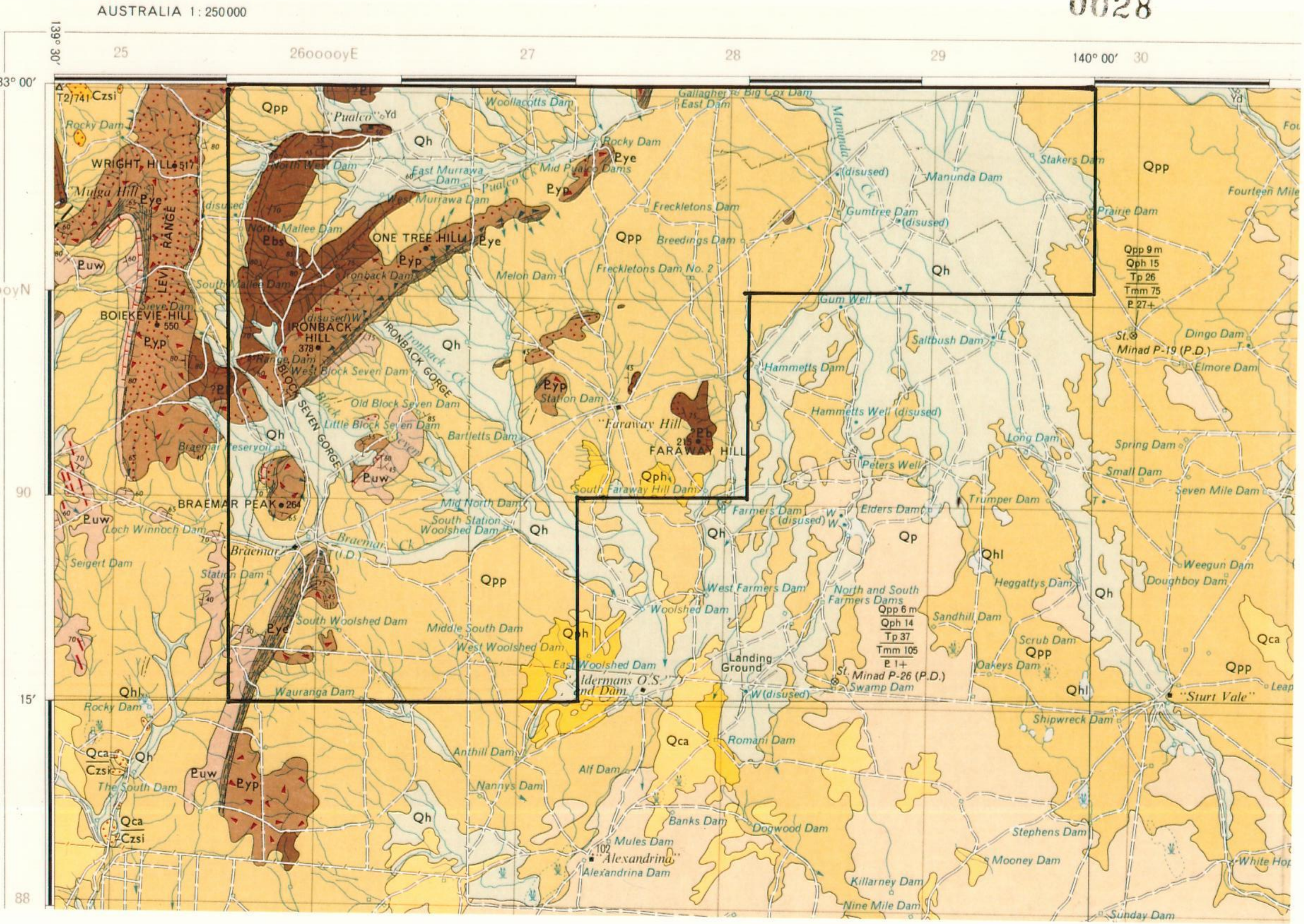
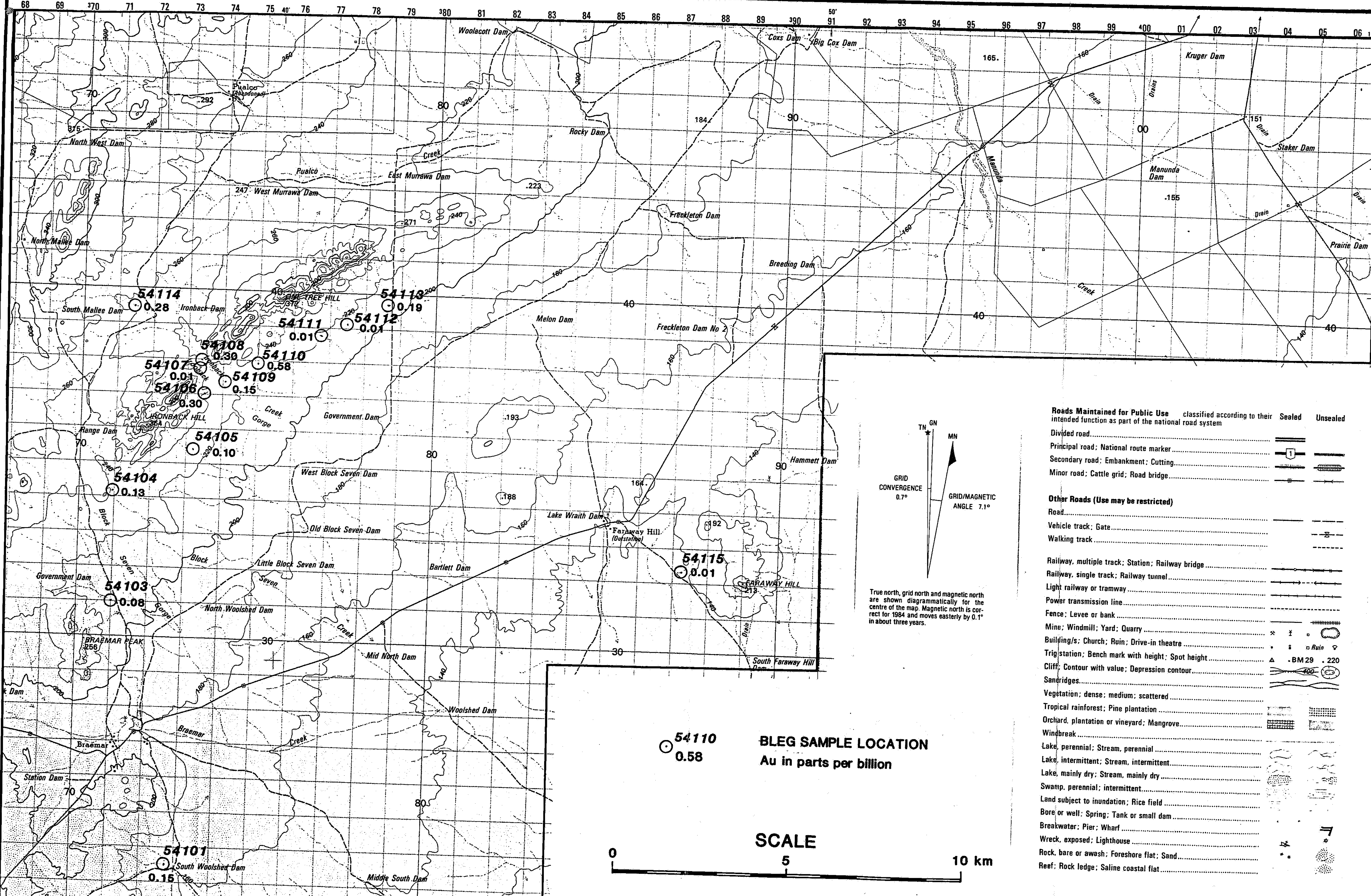


FIG. 2
Geology



NORTH

NEWMONT HOLDINGS PTY. LTD.

COMPILED	DGJ	SCALE	1:100,000
DRAWN	DGJ	DRAWING No.	SO 34
DATE	JAN 1987	FIGURE No.	

EL 1361 BRAEMAR BLEG SAMPLING GOLD

FIG. 3

0029