

BILLITON AUSTRALIA  
THE METALS DIVISION OF  
THE SHELL COMPANY OF AUSTRALIA LIMITED

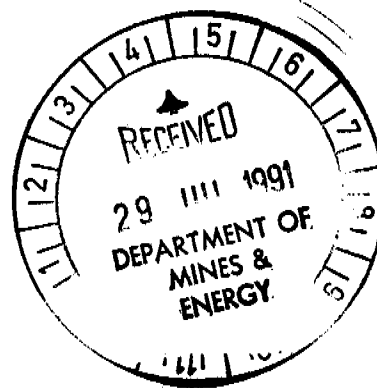
ANNUAL REPORT FOR EXPLORATION ON  
E.L. 6818 - RANFORD HILL

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## C O N T E N T S

### SUMMARY

1.0	INTRODUCTION
2.0	GEOLOGY
2.1	REGIONAL GEOLOGY
2.2	LOCAL GEOLOGY
2.2.1	Stratigraphy
3.0	MINING AND EXPLORATION HISTORY
4.0	WORK COMPLETED
4.1	Airborne Geophysics
4.1.1	Aeromagnetics
4.1.2	Airborne Radiometrics
4.2	Ground Magnetism
4.3	Stream Sediment Sample Geochemistry
4.4	Soil Sample Geochemistry
4.5	Rock Chip Sample Geochemistry
5.0	CONCLUSION
6.0	EXPENDITURE STATEMENT
7.0	PROPOSED EXPLORATION
8.0	PROPOSED EXPENDITURE

L I S T   O F   F I G U R E S

Figure 1	Tenement Location	1:1 000 000
Figure 2	Regional Geology	1:25 000
Figure 3	Ranford Hill Grid Geology	1:10 000
Figure 4	Aeromagnetics	1:50 000
Figure 5	Airborne Radiometrics	1:50 000
Figure 6	Ground Magnetic Contours - Ranford Hill Grid	1:25 000
Figure 7	Ground Magnetic Interpretation - Ranford Hill Grid	1:25 000
Figure 8	Stream Sediment & Rock Chip Sample Geochemistry Locations and Results, Au, Cu, Pb, Zn, Ag, As, Sn, W, Bi ppb and ppm.	1:25 000
Figure 9	Soil Sample Geochemistry Au ppb	1:10 000

### SUMMARY

Tenure of Exploration Licence (EL) 6818 - Ranford Hill was granted to The Shell Company of Australia Ltd for a period of six (6) years, on the 21st June 1990. The tenement comprises an area of 132 square kilometres which is located approximately 60 kms due north of Katherine, NT.

Early Proterozoic, turbiditic metasediments of the Burrell Creek Formation and turbiditic and tuffaceous metasediments of the Tollis Formation were previously mapped as predominating throughout the tenement area. Reconnaissance mapping during the first year of tenure has in addition delineated exposure of intermediate to mafic intrusives and strongly magnetic, barren, oxide facies banded iron formations. The metasediments appear to have been deformed by at least two generations of folding in which the first produced folds with north-south trending axis and the second produced east-west trending folds which accompanied development of a strong, pervasively developed, fracture cleavage.

Following regional greenschist facies metamorphism and synchronous deformation, the geosynclinal metasediments were intruded by syn to post orogenic granitoids of the Cullen Batholith. An isolated cupola, designated part of the Wolfram Hill Granite, is considered to belong to the Cullen Batholith and outcrops in the central southern portion of the tenement.

Upon intrusion of the granitic phases the adjacent metasediments were contact metamorphosed to hornblende hornfels facies.

Several relatively small mining prospects occur within and proximal to EL 6818 from which gold, copper, tungsten, lead and silver was produced.

Although several, low magnitude stream sediment anomalous areas are yet to have been ground checked, airborne and ground based geophysics, stream sediment, soil and rock chip sample exploration geochemistry and reconnaissance geological mapping has to date, failed to delineate significant, shallow, bulk tonnage gold mineralization within Exploration Licence 6818.

Upon checking of the abovementioned anomalous areas, reappraisal of the prospectivity of EL 6818 will be made to determine if further exploration is justified within the tenement.

## 1.0      INTRODUCTION

Tenure of Exploration Licence (E.L.) 6818 - Ranford Hill was granted to The Shell Company of Australia Limited for a period of six (6) years, on the 21st June 1990. In accordance with statutory requirements, this report documents all work conducted on the tenement up to the first anniversary, the 20th June 1991, and details proposed exploration within EL 6818 in the second year of tenure.

Exploration Licence 6818 is comprised of forty-one (41) graticular blocks which cover an area of 132 square kilometres. The tenement is located approximately 60 kms due north of Katherine, Northern Territory (Figure 1).

Access is gained via a vehicle track which turns off the Edith Falls Road, approximately 7km due east from the Edith Falls Road - Stuart Highway turn-off.

The tenement area describes a roughly reclined L-shape for which topography in the eastern portion is generally of moderate to high relief and the terrain is well incised. To the contrary, the topography of the south western extension of the licence is generally of low relief and hence terrain is generally poorly dissected.

## 2.0      GEOLOGY

### 2.1      Regional Geology

Exploration Licence 6818 is situated in the southern portion of the Pine Creek Geosyncline. The Burrell Creek Formation, which is the youngest unit of the Early Proterozoic geosynclinal sequence, is the most extensive unit outcropping in the licence area (Figure 2).

The unit represents a turbiditic sequence, predominantly comprising of greywacke, siltstone and minor conglomerate. Deformation and regional greenschist facies metamorphism of the geosynclinal sediments occurred which is reported to have been synchronous with unconformable deposition of the Tollis Formation. This formation predominantly consists of greywacke and siltstone with minor crystal tuff and tuffaceous chert which is reported to be exposed in the central southern portion of the licence area. The synorogenic strata was subsequently regional deformed and regionally metamorphosed to greenschist facies.

Following metamorphism and deformation, the geosynclinal metasediments were intruded by syn to post-orogenic granitoids of the Cullen Batholith. An isolated cupola, designated part of the Wolfram Hill Granite, is considered to belong to the Cullen Batholith and is exposed in the southern portion of the tenement. The granite is described as being a pink, coarse, equigranular biotite leucogranite.

Upon intrusion of the granitic phases the adjacent metasediments were contact metamorphosed to hornblende hornfels facies.

Minor epicontinental sediments of Mesozoic age are exposed along the eastern boundary of the licence area which, with exception to Quaternary alluvium and colluvium, are the youngest lithologies exposed in the tenement.

Limited BMR mapping conducted in 1986 documents dominantly north westerly striking lineaments, fold axis and stratigraphy throughout the eastern portion of the tenement. Predominantly, north to east - northeastern trending lineaments are interpreted for the southern portion of the licence area which may be an artifact of granitic intrusion or regional scale flexuring.

## 2.2 Local Geology

Reconnaissance mapping was conducted over a grid approximately 3.2 km long x 1.6km wide which was designed to allow ground followup of aeromagnetic anomalies (discussed in Section 4.1.1).

### 2.2.1 Stratigraphy

Rocks within the Ranford Hill grid area have previously been mapped by the BMR in 1986. The rocks were reported to belong to the Burrell Creek and Tollis Formations which predominantly comprise of meta-greywacke, siltstone and minor conglomerate.

Weakly silicified and strongly cleaved siltstone predominates throughout the grid area typically forming sharp, prominent, low ridges.

In addition to these metasediments, recent mapping has delineated numerous oxide facies, banded iron formations within the grid area (Figure 3).

These formations are generally 1-3m wide and are characterized by 0.5-10cm wide, alternating layers of magnetite, chert and haematite. Iron rich units comprising of disseminated magnetite within laminated siltstone, also occur in the grid area. In some cases these formations appear to be laterally extensive, given indicated strike extensions of over 600m.

Contact metamorphism of the metasediments is evident from a small outcrop of hornfels, on the southeastern edge of the grid.

Both intermediate and basic intrusives outcrop in the grid area and although not well defined, appear to have been emplaced as dykes. The former appears to be of fine grained, dioritic composition and is invariably weakly chloritized. The basic intrusive is of medium grained, doleritic composition and appears to have been pervasively, weakly, sericitized.

#### 2.2.2 Structure

At least two fold generations are apparent from recent mapping in the Ranford grid area, as portrayed from bedding contour stereoplots (see Figure 3). The first generation ( $F_1$ ) produced upright, horizontal to southerly plunging folds for which an axial plane cleavage ( $S_1$ ) is only weakly developed. These folds are largely interpreted from changes in bedding orientation from opposite sides of inferred fold axis and appear to have half wavelengths of approximately 200-300m in the grid area.

The second generation ( $F_2$ ) resulted in refolding of  $F_1$  axis so as to possibly result in dome and basin structure development. The deformation is characterized by east-west trending fold axis which, from cleavage - bedding relationships and changes in bedding orientation on opposite sides of inferred  $F_2$  folds, plunge to both the east and west. Minimum half wavelengths for  $F_2$  in the grid area appear to be in the order of 300-500m.

A strong, pervasively developed, fracture cleavage ( $S_2$ ) was produced during  $F_2$ .

### 3.0 MINING AND EXPLORATION HISTORY

Several, relatively small mining prospects occur within and proximal to EL 6818 from which gold, copper, tungsten, lead and silver was produced.

The Last Hope gold workings are located in the south western corner of the Ranford Hill grid, in the southern central portion of the licence area. Narrow, east-west trending quartz reefs were worked via a series of shallow shafts, for which recorded production is approximately 30 ounces. RGC Exploration Pty Ltd conducted a RC percussion drilling programme at the workings in 1989 which failed to intersect significant gold mineralization.

At the Silver Spray mine, in the southeastern portion of the licence area, a series of galena-sphalerite-silver ore bearing quartz lenses occur in a north-northwest zone over a total length of approximately 700m. The only recorded production is approximately 85 tons of galena, which was mined between 1905 and 1907.

### 4.0 WORK COMPLETED

Work completed on EL 6818, during the first year of tenure, included airborne geophysical and ground magnetic surveying, stream sediment, soil and rock chip sample exploration geochemistry and reconnaissance geological mapping.

#### 4.1 Airborne Geophysics

An airborne geophysical survey was completed over the Ranford Hill area, as part of a larger regional programme in April, 1990. Both aeromagnetic and radiometric data was acquired for which contoured plans at 1:50 000 scale are shown in Figures 4 & 5, respectively. The survey was conducted by Austirex for which the specifications are as follows:

- Flight line spacing 300 metres
- Survey height 80 metres
- Flight line directions EW NE
- Spectrometer 33.6 litres

Image processing was carried out by GeoImage, Brisbane and inhouse at Billiton, Melbourne.



#### 4.1.1 Aeromagnetics

Aeromagnetic anomalies outlined in the survey appear to characterize two different structural and/or lithological features in the licence area. The north eastern portion of the tenement is characterized by linear, northwest trending anomalies which parallel stratigraphic trends, fold axis and regional scale faults. It is probable that these anomalies reflect the shallow strike extension of magnetite rich lithological units of the Mount Bonnie Formation, which stratigraphically underlies the Burrell Creek Formation.

In contrast, the anomaly in the southern portion of EL 6818 defines a shallow, more erratically developed, northeastern trend which in part appears to envelope the northern exposure of the Wolfram Hill granite. Reconnaissance mapping has shown that this anomaly is coincident with exposure of magnetite-hematite-chert banded iron formations (refer to Section 2.2.1 and Section 4.2).

#### 4.1.2 Airborne Radiometrics

Total count contour plans, shown in Figure 5, clearly display the strong response given by the Wolfram Hill Granite, which is exposed near the central southern margin of the licence area. This response is probably generated from the reported U-rich nature of the granite and varied K and Th content.

A less intensive radiometric anomaly exists over the mapped extent of the Mesozoic and Cainozoic epicontinental and continental sediments, on the central eastern boundary of the tenement.

From observations of regional scale slides, which display individual K, Th and U channels, it appears the anomaly reflects slight enrichment of the latter element within the sediments.

Subtle, northwest striking radiometric trends occur in the northern portion of the tenement which appear to reflect the stratigraphic trends discussed in Section 2.1 and 4.1.1.

#### 4.2 Ground Magnetics

A ground magnetic survey was conducted over the Ranford Hill grid area in order to further define anomalies delineated from the aeromagnetic survey. Magnetic responses were recorded at 10m intervals along 200m spaced traverses, for which the filtered data is displayed as contours at 1:25,000 scale (Figure 6). A preliminary interpretation of the ground magnetics, with the aid of computer modelling is shown in Figure 7.

Reconnaissance mapping throughout the grid area has determined that the majority of the anomalies are due to the existence of magnetite-hematite-chert banded iron formations or minor occurrences of magnetite-quartz veining.

At anomalous areas for which no obvious source has been determined at surface, it appears likely that they are caused by continuation of the magnetite bearing lithologies at shallow depth. Given as yet the poorly understood, but obvious structural complexity of the area it is feasible that repetition of the magnetic stratigraphy due to folding, has occurred in the grid area.

Mapped exposures of hornfels, on the south eastern boundary of the grid, appear to have given an anomalous magnetic response. This suggests that transformation of synsedimentary pyrite to pyrrhotite may have occurred within the contact thermal aureole at the time of granitic intrusion.

Generally, mapped exposures of intermediate to basic intrusives (see Section 2.2.1) appear to give a relatively low magnetic response which also applies to the Last Hope gold workings, in the south western corner of the grid.

#### 4.3 Stream Sediment Sampling

Active stream sediment samples were collected from 52 locations within the southern two thirds of EL 6818 between May to August 1990 (Figure 8). From each site a 5kg sample of material sieved to -14 mesh was analysed for gold. The analysis was conducted by Australian Assay Laboratories at Pine Creek using the bottle roll bulk cyanide leach method. Additionally, a 200g sample of -80 mesh material was analysed for Ag, Zn, Pb, Cu, (AAS) and Sn, W, Bi and As (XRF).

Results from the central eastern portion of the tenement were low, ranging from <0.2 - 0.8 ppb Au. Highly anomalous results were received, for samples taken in the south eastern corner of the tenement, with results ranging from 27.4 - 2300 ppb Au. Due to the extremely high values received, both within EL 6818 and adjacent tenements during this sample program, AAL, Pine Creek, were asked to check the results by:

- 1) refiltering of the liquor and reassay
- 2) pulverising the residue of the sample not used in the original BLEG determination followed by low level FAS assay.

On checking the liquors, the pH of some samples was found to be below the desired level. This can theoretically lead to the retention of some  $\text{Fe}^{3+}$  ions in solution which then are concentrated in the ketone layer during a DIBK extraction. As Fe has a very similar band to Au in AAS determinations this can result in effectively an Fe + Au assay.

To check this AAL added additional lime to some liquors, refiltered and repeated the extraction and assays.

Additionally routine checks were conducted on field assistant sampling methods, jewellery and other likely causes of contamination. No methodology or contamination problems were uncovered.

Key points that evolved out of the investigation were:-

- 1) The repeat assays of the liquor and the increased pH liquors confirmed the original results. No evidence of Fe contamination.
- 2) The FAS values were substantially lower than the BLEG results.
- 3) No single field assistant took all of the anomalous samples.

Due to the discrepancy between BLEG and FAS results resampling of the anomalous stream sites was undertaken. This methodology was implemented as part of a regional check on highly anomalous sample results, taken in both EL 6818 and adjacent tenements, as part of an earlier regional sampling program.

Three repeat stream sediment samples were taken at each site; one sample was despatched to AAL, Pine Creek, a second was sent to ALS, Townsville, and a third was retained in Darwin in case any further assays were required.

The results for the repeat sample taken in EL 6818 from both labs was low (0.3 ppb Au), which confirmed laboratory errors were responsible for anomalous results received in the initial sampling programme.

Stream sediment sample results from the central southern and south western portions of EL 6818 were moderately to slightly anomalous with values typically ranging from 0.7 - 7.4 ppb Au.

Many of the anomalous results were evidently due to the close proximity of the sample location to old workings eg. Last Hope and Silver Spray.

The majority of the remaining anomalous areas defined from stream sediment sampling have undergone reconnaissance mapping and extensive rockchip sampling (see Section 4.5), however several remain unchecked and warrant further ground investigation.

#### 4.4 Soil Sample Geochemistry

Due to the flat topography and poor definition of streams in the region encompassing the aeromagnetic and ground magnetic anomalies (see Section 4.1.1 & 4.2) in EL 6818, soil sampling exploration geochemistry was implemented in preference to BLEG stream sediment sampling.

Soil sampling was conducted over the Ranford Hill grid in which 2kg, composite (4 into 100m) samples, sieved to -10 mesh, were taken along 0.2 - 0.4km spaced, 1.2 - 1.6km long traverses. The analysis was conducted by Australian Assay Laboratories at Pine Creek NT using the bottle roll bulk cyanide leach method. A contour plot of soil sample gold concentrations is shown in Figure 9.

From observation of Figure 9 it is evident that highly anomalous gold concentrations (98.3 ppb) recorded in the south western corner of the grid correspond to the position of the Last Hope gold workings (see Section 3.0).

IX

The small areal extent of this anomaly reflects the small discontinuous style of mineralisation at this location.

It appears that throughout the remainder of the grid the background / anomalous threshold level is approximately 1.0 ppb Au. Only marginally higher soil sample gold concentrations (1.0 - 8.4 ppb Au) were recorded over a small portion of the grid in which the areal extent of the anomaly is generally small and discontinuous. No definitive source of the anomalies is apparent from reconnaissance mapping, however the results overall downgrade the prospectivity of the area for hosting bulk tonnage, low grade gold mineralisation.

#### 4.5 Rock Chip Sample Geochemistry

During reconnaissance geological mapping throughout EL 6818 twenty three composite rock chip samples were taken and assayed for Au (FA), Ag, Zn, Pb, Cu (AAS) and Sn, W, Bi, and As (XRF) (refer to Figure 8).

The majority of samples anomalous in gold (0.32 - 0.43 ppm Au) were taken of quartz veins, at the site of old workings, approximately northeast of the Ranford Hill grid. These samples were also anomalous in base metals and silver with results ranging from 380 - 780ppm Cu, 1.48 - 1.74% Pb, 139 - 200 ppm Zn, and 141 - 200 ppm Ag. One sample, taken approximately 0.5km northwest of the Tableland gold workings, gave an anomalous result of 0.55 ppm Au, 680 ppm Cu, 360 ppm Pb, 152 ppm Zn and 1700 ppm As but failed to delineate any higher grade, strike extensive gold mineralisation.

Samples highly anomalous in arsenic (2250 - 6500 ppm As) were taken in the south western portion of EL 6818 but were only weakly anomalous in gold (0.02 - 0.05 ppm Au).

Oxide facies banded iron formations, quartz magnetite and anhedral, white quartz veining and sericitized mafic intrusives (refer to Section 2.2) were rock chip sampled within the Ranford Hill grid area, but all gave results below the detection level (0.01ppm).

## 5.0 CONCLUSION

Exploration involving airborne and ground based geophysics, stream sediment, soil and rock chip sample exploration geochemistry and reconnaissance geological mapping has been conducted within Exploration Licence 6818 - Ranford Hill, during the first year of tenure. Although several, low magnitude stream sediment anomalous areas have yet to have been ground checked the abovementioned techniques have to date failed to delineate significant, shallow, bulk tonnage gold mineralisation. These anomalous areas warrant sufficient ground followup in order to determine the source, and hence ascertain whether future exploration is justified within EL 6818.

## 6.0 EXPENDITURE STATEMENT

<u>EL 6818 - RANFORD HILL</u>	
<u>PERIOD FROM 21.6.90 TO 20.6.91</u>	
	\$
Staffing - Regional office	27,378
Support - Regional office	18,788
Geophysical Surveys	9,869
Analyses	4,329
Geological Engineering, Drafting, & Computer Costs	150
Overheads	<u>6,051</u>
<u>TOTAL</u>	\$66,565
	=====

## 7.0 PROPOSED EXPLORATION

In the second year of tenure, The Shell Company of Australia Ltd proposes to conduct scout geological mapping and regional rock chip sample exploration geochemistry over the remaining unchecked stream sediment anomalous areas.

If deemed warranted, further mapping, soil and rockchip exploration geochemistry and possibly costeaning and percussion drilling will be implemented into the programme.

8.0      PROPOSED EXPENDITURE

Staffing	\$2,500
Assays	\$ 300
Overheads	<u>\$ 280</u>
<u>TOTAL</u>	<u>\$3,080</u>

# SHELL METALS REPORT DATABASE

## DATA INPUT SHEET

CHAPTER

NAME: \_\_\_\_\_

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TITLE : Annual Report for Exploration on Exploration  
Licence 6818 - Ranford Hill.

DATE : June 1991

AUTHOR : Damien Koerber

SOURCE : N.A.

(If Non-SCOA)

DESCRIPTOR : N.A.

(Not indexed)

PROSPECT/PROJECT : Ranford Hill - Exploration Licence 6818

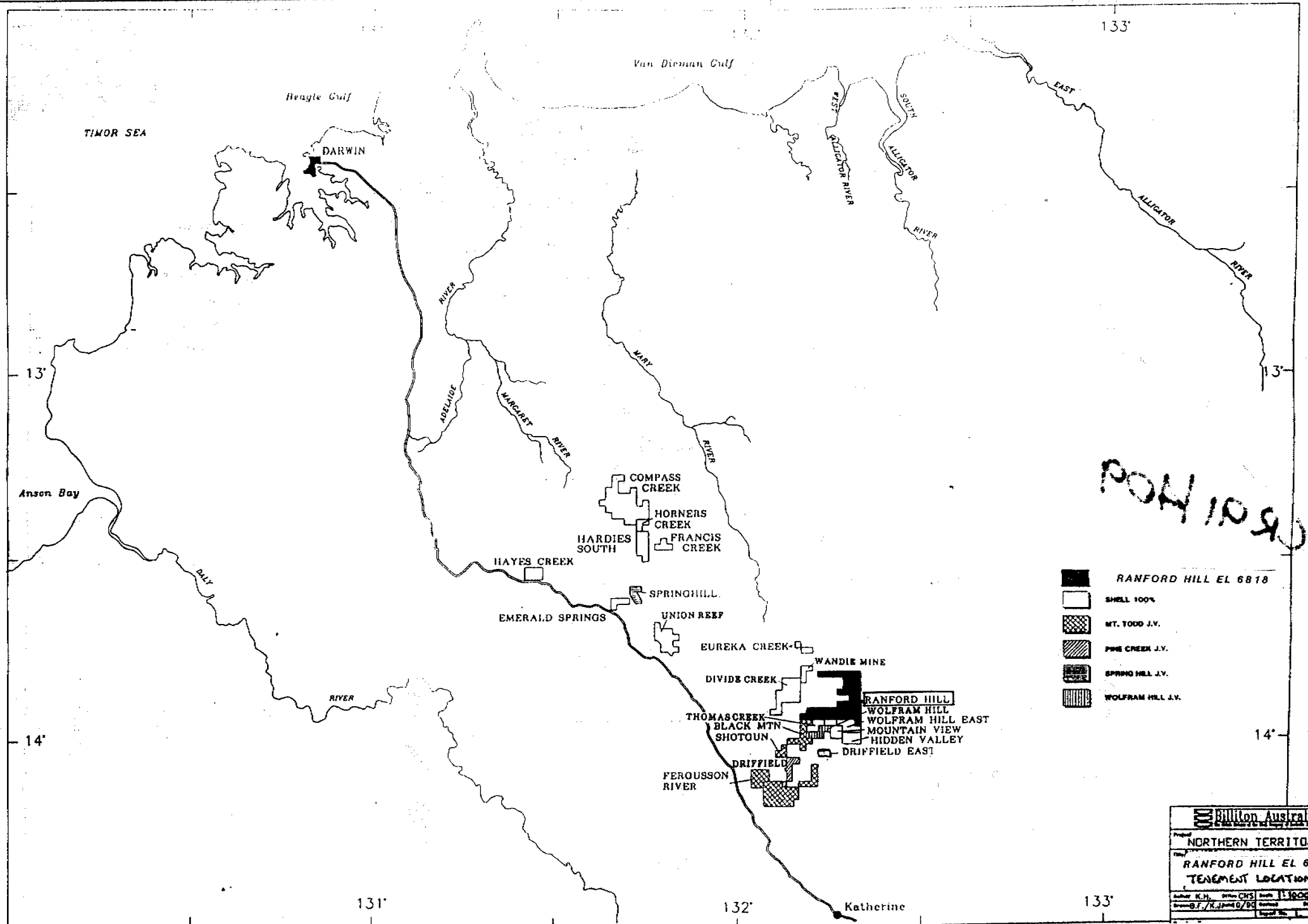
KEYWORDS : Stream sediment geochemistry, Banded iron formation,  
Aero and ground magnetic survey.

LOCATION : NORTHERN TERRITORY

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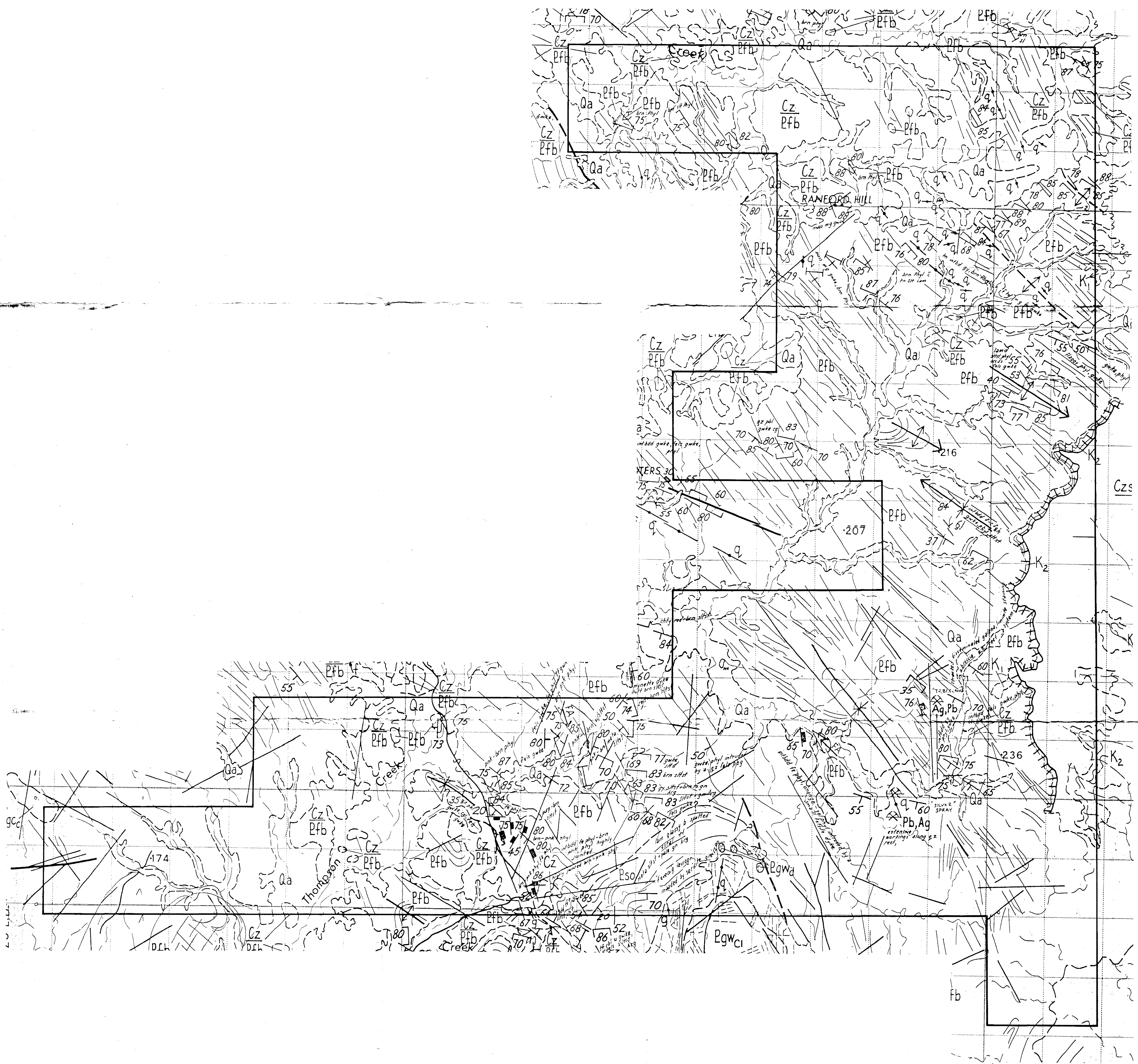
REPORT NO. : (Not Indexed) 08.5515





- RANFORD HILL EL 6818
- SHELL 100%
- MT. TODD J.V.
- PINE CREEK J.V.
- SPRING HILL J.V.
- WOLFRAM HILL J.V.

<b>Billion Australia</b>			
Project: NORTHERN TERRITORY			
Title: RANFORD HILL EL 6818 TENEMENT LOCATION			
Author: K.H.	Drawn: CHS	Scale: 1:100000	Date:
Drawn: 07/11/2004/04		Checked:	Date:



<p><b>CENOZOIC</b></p> <p>Qa Alluvium</p> <p>Cz Gradational soils</p>	<p><b>MESOZOIC</b></p> <p>K Quartz limonite sandstone</p> <p>Phk Quartz sandstone</p> <p>Egw<sub>1</sub> Equigranular granite</p> <p>Egw<sub>2</sub> Leucogranite</p> <p>Pfb Burrell Ck. Fm.</p> <p>Pso Mt. Bonnie Fm.</p>	<p>Geological boundary</p> <p>Anticline</p> <p>Syncline</p> <p>Fault</p> <p>Strike &amp; dip of strata</p> <p>Trend line</p> <p>Strike &amp; dip of joint</p> <p>Vertical joint</p>	<p>Strike &amp; dip of cleavage</p> <p>Vertical cleavage</p> <p>Quartz</p> <p>Abandoned mine</p>	<p>0 0.5 1.0 1.5 2.0 km</p>
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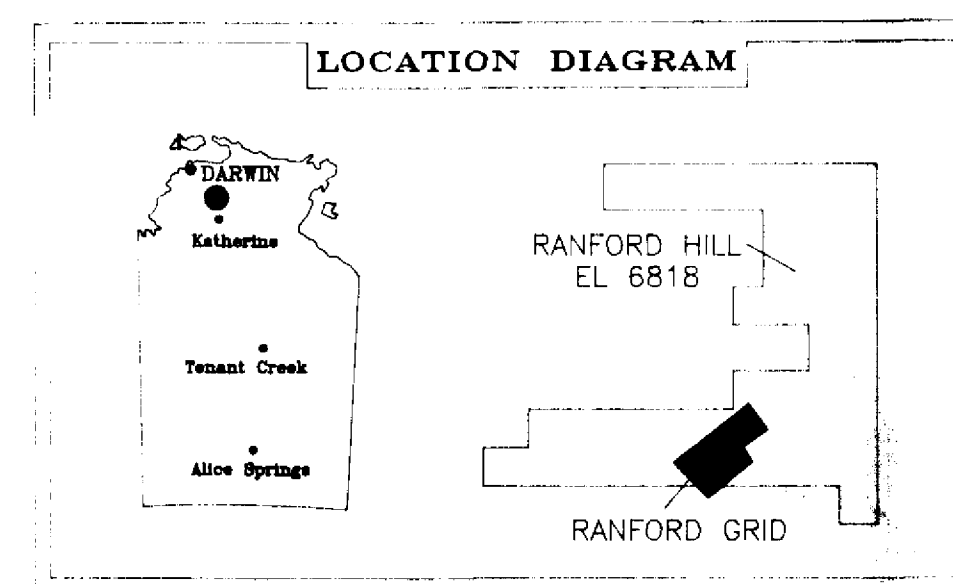
**Billion Australia**  
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Project: **RANFORD HILL EL 6818**  
NORTHERN TERRITORY

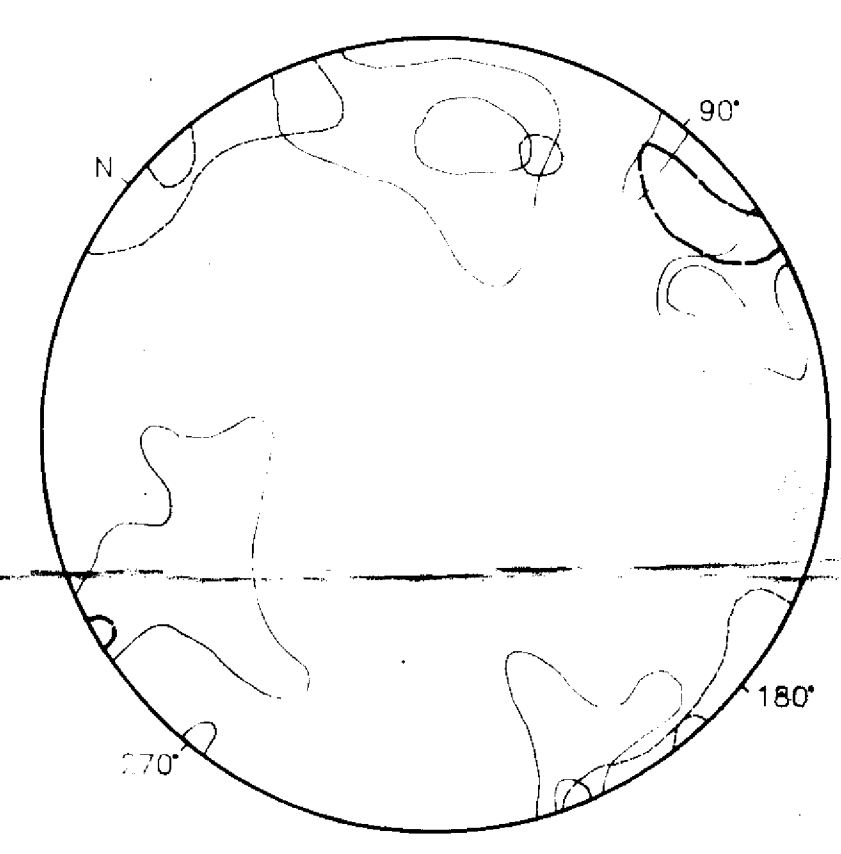
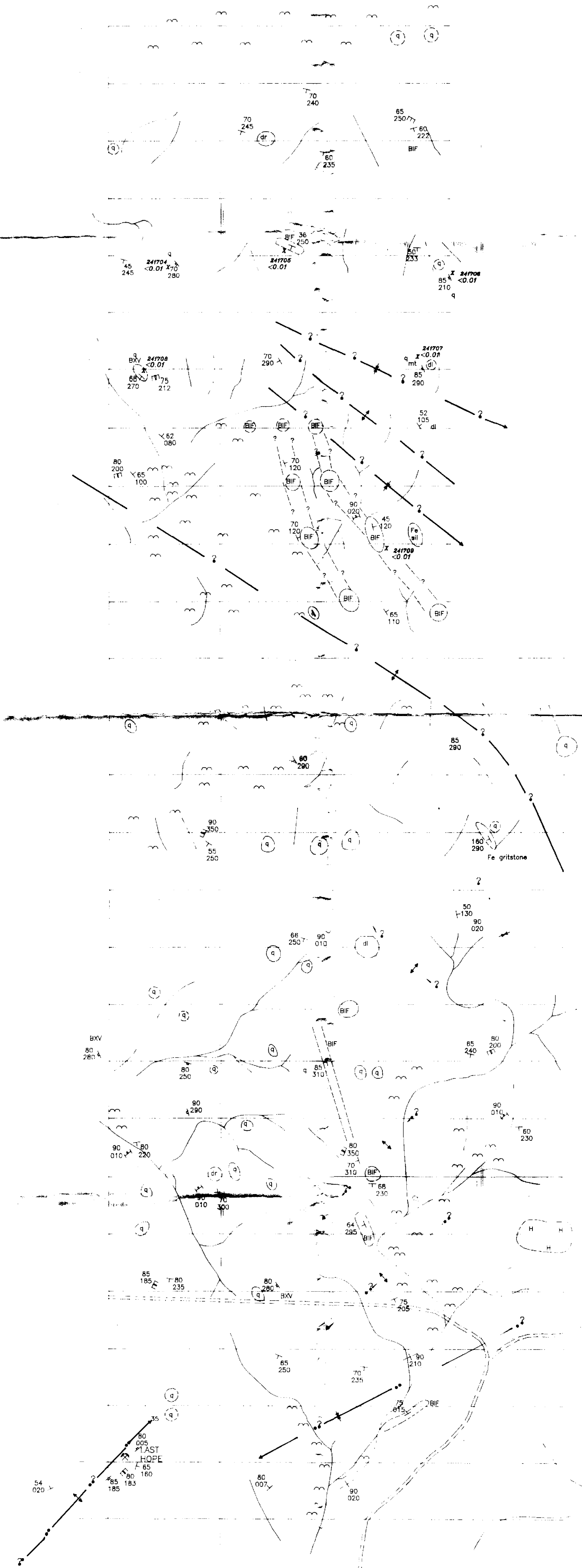
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(From BMR 1:25000 mapping)

Author: S.M.	Dept: CNS	Scale: 1:25000
Drawn: B.F.	Date: 6/90	Revised: Date
Checked: Date	Revised: Date	Date
Sheet No.	Drawing No.	

CR 911409



CONTOURED STEREO PLOT OF BEDDING, CLEAVAGE, AND VEINING IN THE RANFORD GRID

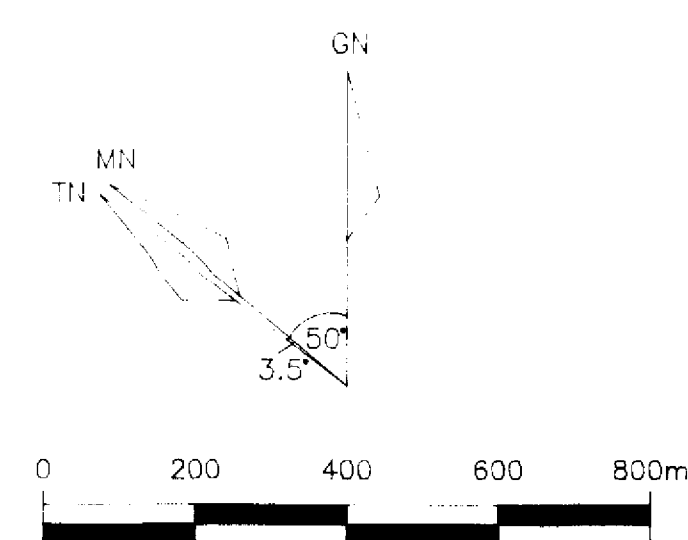


BEDDING n=52  
CLEAVAGE n=19  
VEINS n=6

BEDDING S<sub>0</sub> -----  
CLEAVAGE S<sub>1</sub> & S<sub>2</sub> -----  
VEINS V<sub>1</sub> -----

LEGEND

- ALLUVIUM
  - DOLERITE
  - DIORITE
  - MAGNETITE(mt)-HAEMATITE(He)-chert
  - HORNIFELS (Banded Iron Formation)
  - GOETHITE
  - MAGNETITE
  - BRECCIATED VEIN
  - GEOLOGICAL BOUNDARY (approximate)
  - ANTICLINE F<sub>1</sub> (inferred)
  - F<sub>2</sub> GENERATION PLUNGE & PLUNGE DIRECTION
  - SYNCLINE F<sub>1</sub> (inferred)
  - F<sub>2</sub> GENERATION
  - DIP & DIP DIRECTION OF BEDDING
  - TREND LINE
  - TREND LINE (inferred)
  - STRIKE & DIP OF CLEAVAGE
  - S<sub>1</sub> - first generation
  - S<sub>2</sub> - second generation
  - VERTICAL CLEAVAGE
  - STRIKE & DIP OF VEINING
  - STRIKE & DIP OF VEINING (moderate)
  - QUARTZ
  - ABANDONED MINE
  - DRAINAGE
  - TRACK
- Rockchip sample location, number & Au result (ppm)



Billiton Australia  
The Nickel Division of the Shell Company of Australia Limited

Project RANFORD HILL EL6818  
NORTHERN TERRITORY

Title RANFORD HILL GRID  
GEOLOGY

Author D.K. Office CNS Scale 1:10000  
Drawn B.F. Date 7/91 Revised Date  
Plotted date 19/7/91 Report No.  
Drawing No. C/HE10/2 Fig. No. 3

C901409



FIGURE 4 AEROMAGNETICS

132°07'30"

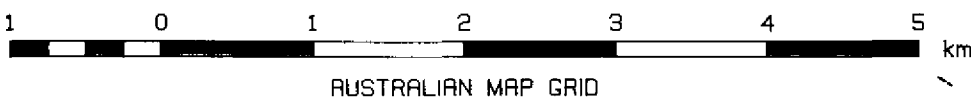
132°10'

RANFORD HILL  
AIRBORNE GEOPHYSICAL SURVEY  
BILLITON AUSTRALIA

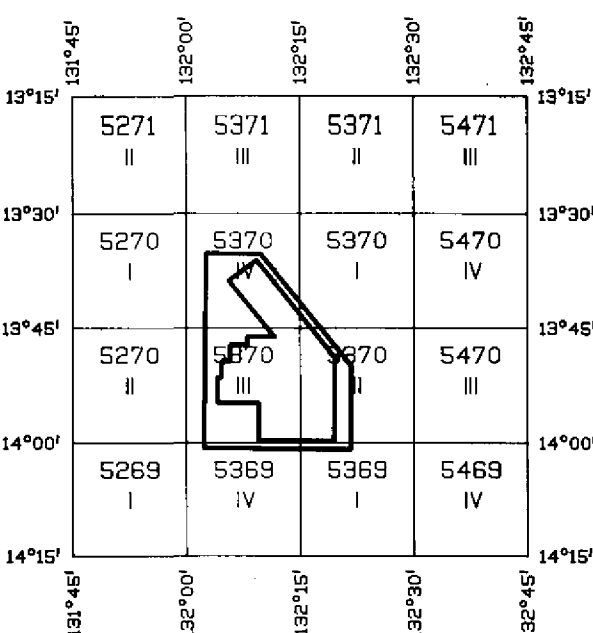
Surveyed and compiled by AUSTREX INTERNATIONAL LIMITED,  
MARCH - MAY 1990  
Job No. 2105

**austrex**

Scale 1:50 000



SHEET LAYOUT



- AIRCRAFT**  
VH-MEH ROCKWELL SHRIKE COMMANDER 500S
- MAGNETOMETER**  
SPLIT BEAM CESIUM SONTREX V201  
RESOLUTION 0.01 nanoTesla  
CYCLE RATE 0.2 seconds  
SAMPLE INTERVAL 13 metres
- SPECTROMETER**  
256 channel GEDMETRICS GR800B  
VOLUME 33.55 litres  
CYCLE RATE 1.0 seconds  
SAMPLE INTERVAL 65 metres
- DATA ACQUISITION**  
8 CHANNEL WATANABE MC 8700 CHART RECORDER  
HEWLETT PACKARD COMPUTER  
AUSTREX DIGITAL ACQUISITION SYSTEM
- FLIGHT LINE SPACING**  
TRAVERSE LINES 300 metres  
TIE LINES 3000 metres
- FLIGHT LINE DIRECTION**  
TRAVERSE LINES 090 - 270 050 - 230 degrees  
TIE LINES 180 - 360 140 - 320 degrees
- SURVEY HEIGHT**  
80 metres - MEAN TERRAIN CLEARANCE
- NAVIGATION**  
VISUAL FROM PLANNED FLIGHT STRIPS  
**FLIGHT PATH RECOVERY**  
ONTO A.M.G. CONTROLLED PHOTOGRAPHS



GRID NORTH

TRUE NORTH

MAGNETIC NORTH

North point relationships are shown for the centre of the map. Magnetic north is true for 1980.

GRID/MAGNETIC ANGLE 4°25'39"  
GRID CONVERGENCE -0°40'5.83"  
SECULAR VARIATION 0°018" west per year

TOTAL MAGNETIC INTENSITY

- DATA PROCESSING**  
REGIONAL FIELD IGRF MODEL 1985 REMOVED  
GRID CELL SIZE 80 metres  
CONTOUR INTERVAL 10 nanoTesla  
PARALLAX CORRECTION 9.88 fiducials  
BASE VALUE ADDED 47480 nanoTesla

132°15'

13°42'30"

132°17'30"

13°45'

132°20'

13°50'

13°52'30"

13°55'

132°07'30"

132°10'

RANFORD HILL  
AIRBORNE GEOPHYSICAL SURVEY  
BILLITON AUSTRALIA

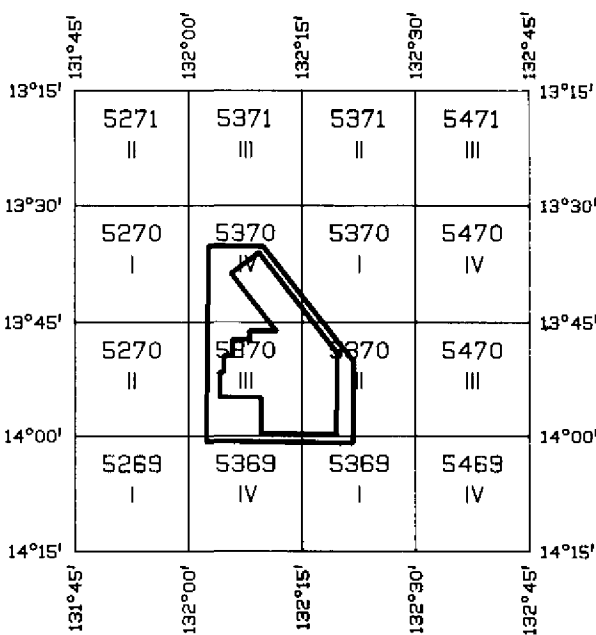
Surveyed and compiled by AUSTIREX INTERNATIONAL LIMITED  
MARCH - MAY 1980  
Job No. 2105

**austirex**

Scale 1:50 000



SHEET LAYOUT



**AIRCRAFT**  
VH-MEH ROCKWELL SHARKE COMMANDER 500S

**MAGNETOMETER**  
SPLIT BEAM CESIUM SCINTREX V201  
RESOLUTION 0.01 nanotesla  
CYCLE RATE 0.2 seconds  
SAMPLE INTERVAL 13 metres

**SPECTROMETER**  
256 channel GEOMETRICS GR800B  
VOLUME 33.56 litres  
CYCLE RATE 1.0 seconds  
SAMPLE INTERVAL 65 metres

**DATA ACQUISITION**  
8 CHANNEL WYATT-MEC MC 8700 CHART RECORDER  
HEWLETT PACKARD COMPUTER  
AUSTIREX DIGITAL ACQUISITION SYSTEM

**FLIGHT LINE SPACING**  
TRAVERSE LINES 300 metres  
TIE LINES 3000 metres

**FLIGHT LINE DIRECTION**  
TRAVERSE LINES 090 - 270 050 - 230 degrees  
TIE LINES 180 - 360 140 - 320 degrees

**SURVEY HEIGHT**  
80 metres - MEAN TERRAIN CLEARANCE

**NAVIGATION**  
VISUAL FROM PLANNED FLIGHT STRIPS  
**FLIGHT PATH RECOVERY**  
ONTO A.M.G. CONTROLLED PHOTOGRAPHS



GRID NORTH  
TRUE NORTH  
MAGNETIC NORTH

North point relationships are shown for the centre of the map.  
Magnetic north is True for 1980.

GRID/MAGNETIC ANGLE 4°25'39"  
GRID CONVERGENCE -0°40'5.83"  
SECULAR VARIATION 0°0'16" west per year

**TOTAL COUNT**

**DATA PROCESSING**  
GRID CELL SIZE 80 metres  
CONTOUR INTERVAL 250 counts  
PARALLAX CORRECTION 9.98

The total count data have been corrected for aircraft background, atmospheric background, altitude variation and micro levelled.

132°15'

132°17'30"

13°45'

132°20'

13°50'

13°52'30"

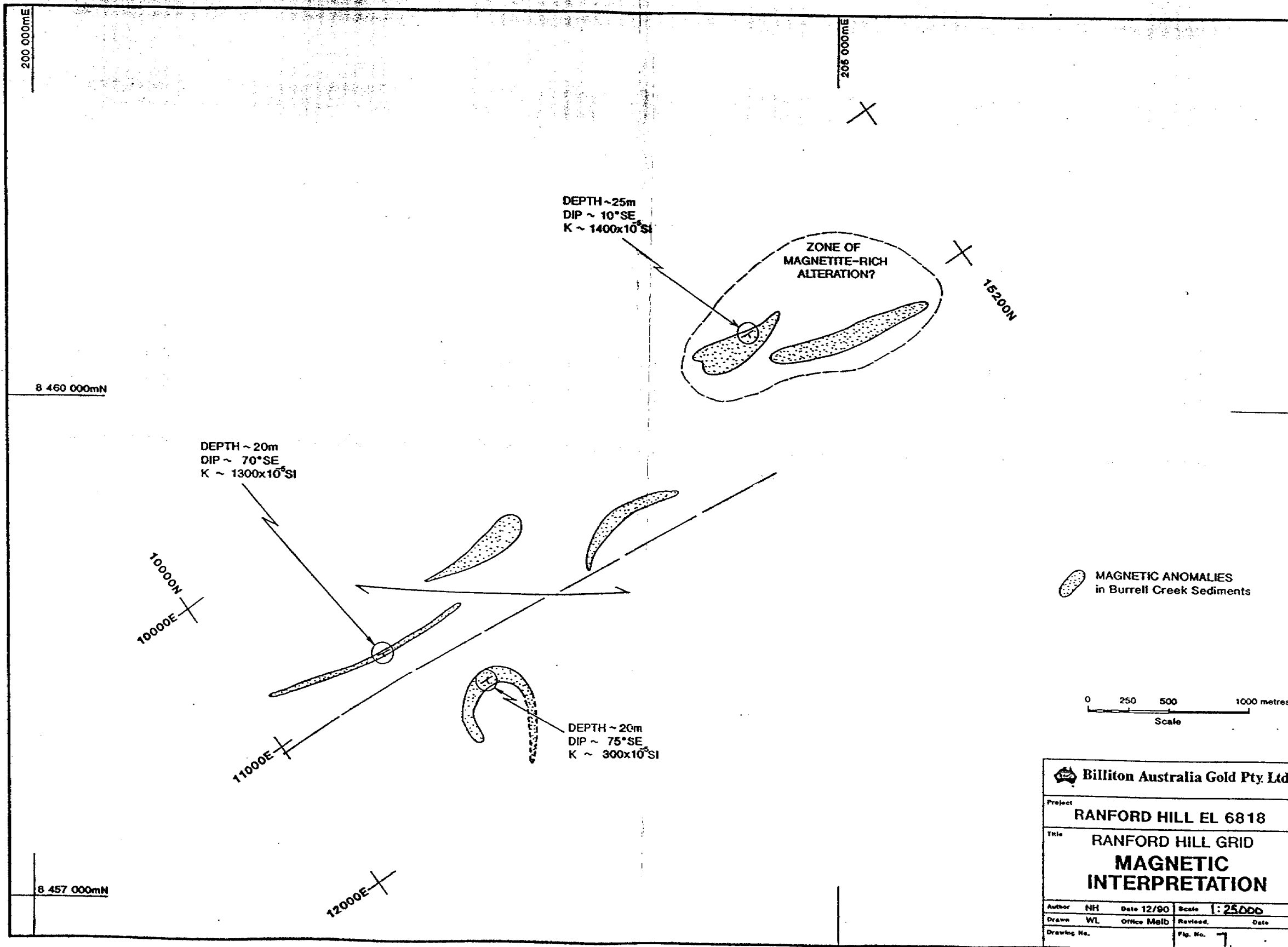
13°55'

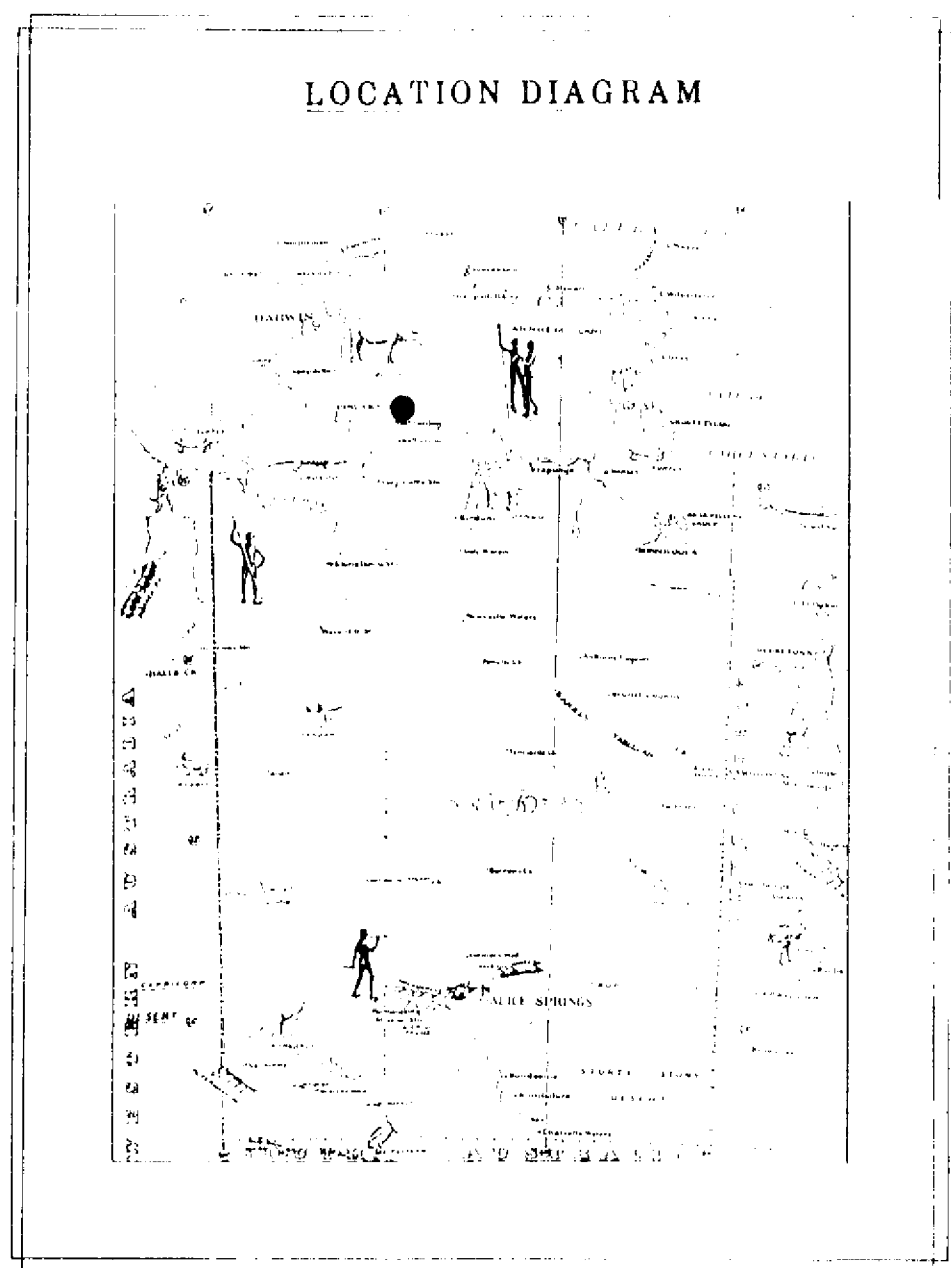






CR91/409





ROCK CHIP RESULTS										
Sample	Au	Cu	Pb	Zn	Ag	Sn	W	As	Bi	
22680	<0.01	70	117	47	-	362	7	800	15	
22681	<0.01	73	82	15	-	17	5	340	<10	
22682	<0.01	210	480	325	-	34	20	600	30	
22683	<0.01	211	1990	577	-	85	42	1040	16	
22684	<0.01	37	990	20	-	38	<8	<100	<10	
22685	<0.01	61	58	58	-	34	<5	380	<85	
22686	<0.01	885	468	1050	-	15	<8	700	<40	
22687	0.04	87	708	118	<1	4	<10	900	<10	
22688	<0.01	80	820	178	<1	44	10	210	<10	
22689	<0.01	48	840	27	<1	80	10	85	<10	
22690	0.02	91	80	38	<1	4	10	12	<10	
22691	<0.01	31	880	38	<1	40	<10	15	<10	
22692	<0.01	84	900	780	<1	6	<10	15	<10	
22693	<0.01	141	880	880	<1	830	10	4	<1	
22694	<0.01	200	890	780	<1	4	<1	-	-	
22695	0.04	800	320	200	-	370	<10	<2	21	
22696	0.06	75	120	78	<1	30	10	4400	84	
22697	0.03	80	320	200	<1	80	20	5500	17	
22698	0.02	147	280	118	<1	40	30	2700	<10	
22699	0.32	780	1740	200	800	10	30	<100	<10	
22700	0.43	740	1820	130	200	4	25	<100	<10	
22689	0.36	880	1680	200	181	44	80	<10	<10	
22690	0.01	30	960	48	1	18	10	80	<10	
22691	<0.01	84	1200	115	8	22	18	80	<10	
22692	0.04	30	400	52	<1	290	15	18	<10	
22693	<0.01	31	360	103	<1	84	30	120	<10	
22694	0.01	21	440	26	<1	44	15	85	<10	
22695	<0.01	31	360	103	<1	84	30	120	<10	
22696	0.01	17	220	36	<1	24	15	120	<10	
22697	0.01	31	220	36	<1	24	15	120	<10	
22698	0.55	680	360	132	1	85	15	1700	11	
22699	0.21	96	860	152	<1	430	80	<8	<10	
241704	<0.01	62	1820	105	<1	125	<8	<10	<10	
241705	<0.01	17	35	87	<1	-	22	<4	<4	
241706	<0.01	30	13	200	<1	-	13	5	5	
241707	<0.01	40	16	195	<1	-	24	8	8	
241708	<0.01	35	80	120	<1	-	11	58	58	
241709	<0.01	88	22	180	<1	-	45	6	6	

500µ-800µ STREAM SEDIMENT SAMPLE RESULTS										
Sample	Au	Cu	Pb	Zn	Ag	Sn	W	As	Bi	
241063	<0.2	3	8	8	<1	<100	87	8	<10	
240444	-	22	39	45	<1	180	38	7	14	
240445	-	17	163	70	<1	180	38	7	18	
240446	-	-	-	-	-	-	-	-	-	
240447	-	31	75	80	<1	270	21	<8	20	
240448	-	14	47	29	<1	290	30	<8	20	
240449	-	-	-	-	-	-	-	-	-	
240450	-	110	49	<1	280	27	11	18	-	
240451	-	-	-	-	-	-	-	-	-	
240452	-	77	73	<1	120	29	5	10	-	
240453	-	-	-	-	-	-	-	-	-	
240454	-	9	78	85	<1	250	21	<5	12	
240455	-	19	134	41	<1	180	38	7	14	
240456	-	36	26	88	<1	4	8	13	<10	
240457	-	16	10	31	<1	<2	13	9	<10	
241110	1.3	16	12	27	<1	<2	6	5	<10	
241111	0.8	2	18	43	<1	100	8	5	10	
241112	0.4	16	58	74	<1	180	69	5	27	
241113	0.2	16	56	36	<1	190	11	<5	32	
241114	0.4	16	80	77	<1	130	9	<5	32	
241115	0.9	12	65	41	<1	100	<5	10	21	
241116	0.5	44	29	16	<1	100	<5	10	21	
241117	0.5	53	42	22	<1	<100	<5	25	25	
241118	1.4	31	29	34	<1	110	19	5	27	
241119	0.4	30	290	44	<1	120	5	6	20	
241120	0.6	26	28	37	<1	110	10	<5	27	
241121	<0.2	31	47	58	<1	180	11	<5	28	
241122	0.2	44	22	31	<1	180	11	<5	28	
241123	0.4	38	110	114	<1	180	8	<5	33	
241124	0.7	46	82	83	<1	200	11	<5	30	
241125	1.1	46	82	83	<1	200	11	<5	30	
241126	1.4	46	80	80	<1	180	530	<5	41	
241127	0.8	79	80	103	<1	200	58	19	30	
241128	1.4	46	80	80	<1	180	530	<5	41	
241129	0.8	79	80	103	<1	200	58	19	30	
241130	0.2	36	33	9	<1	170	19	5	34	
241131	0.2	44	22	31	<1	180	11	<5	28	
241132	0.8	44	24	43	<1	210	9	<4	30	
241133	0.4	35	24	58	<1	220	9	<4	30	
241134	0.8	91	80	106	<1	240	30	<4	32	
222281	0.2	20	7	18	<1	<2	8	14	<1	
222282	0.4	21	5	18	<1	<2	8	14	<1	
222283	0.2	20	7	18	<1	<2	8	14	<1	
227590	<0.1	22	51	38	<1	8	14	<1	<1	
227591	<0.1	19	40	28	<1	12	10	-	-	

● 40000  
x 0.01

STREAM SEDIMENT SAMPLE  
LOCATION & RESULT (ppb Au)

ROCK CHIP SAMPLE  
LOCATION & RESULT (ppm Au)

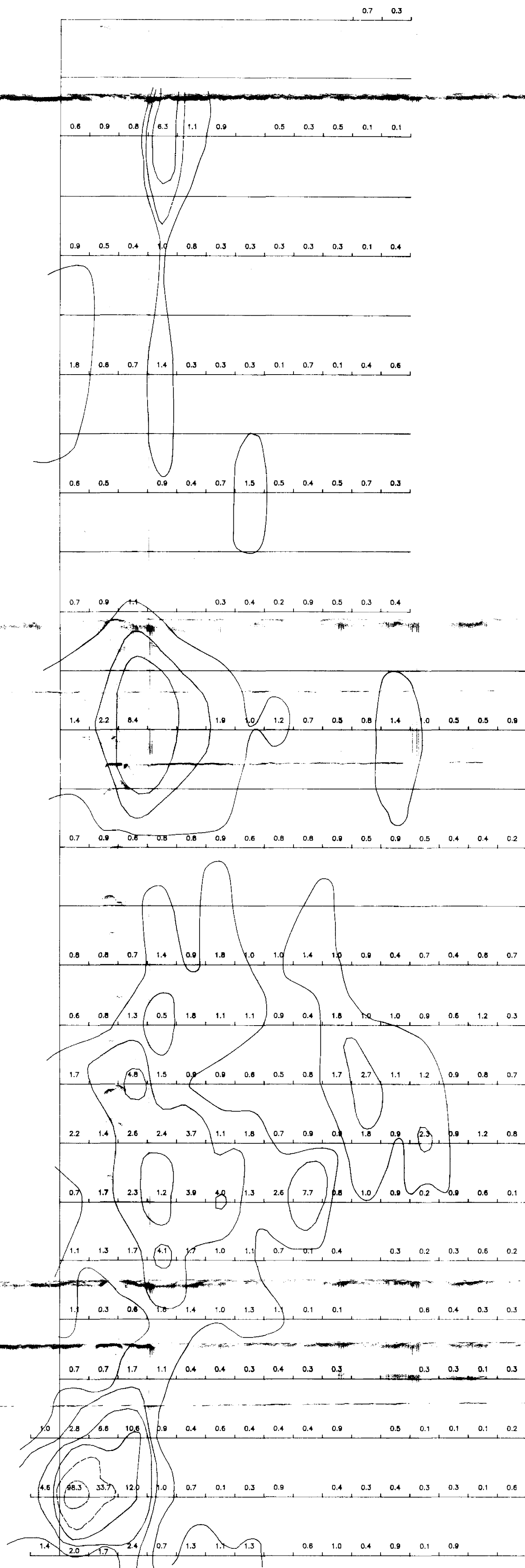
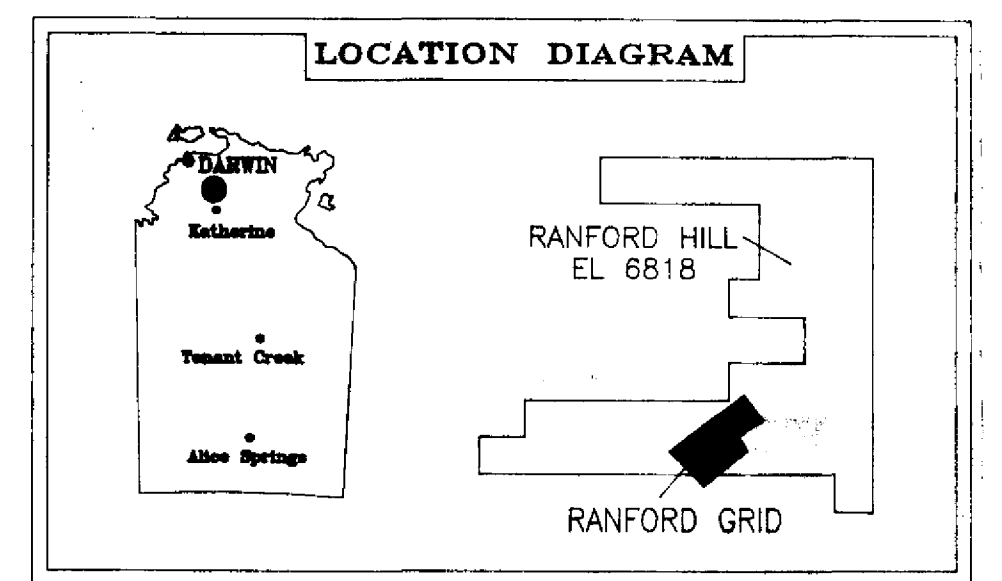
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Project: RANFORD HILL EL 6818  
NORTHERN TERRITORY

Title: STREAM SEDIMENT & ROCK CHIP SAMPLE LOCATIONS & RESULTS

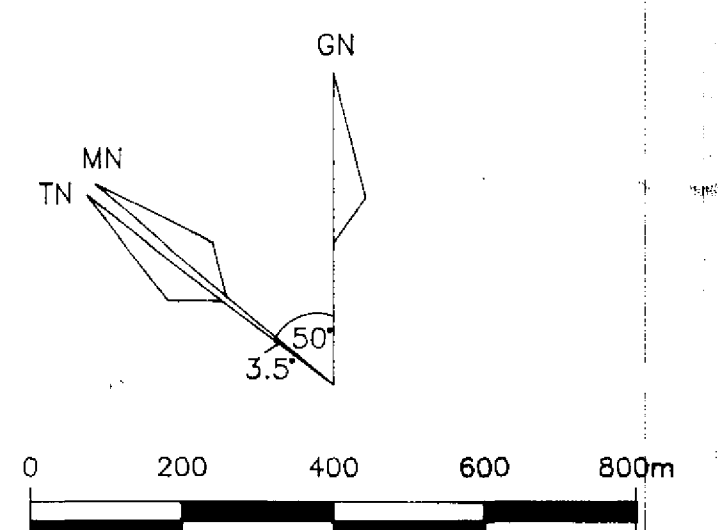
Author: S.M. Dept: CNS Scale: 1:25000  
Drawn: S.F. Date: 4/30  
Checked: Date: S'ced: Date: Sheet No: Drawing No:





**LEGEND**

- 1 ppb Au \_\_\_\_\_
- 2 ppb Au \_\_\_\_\_
- 4 ppb Au \_\_\_\_\_
- 10 ppb Au \_\_\_\_\_
- 30 ppb Au \_\_\_\_\_
- 60 ppb Au \_\_\_\_\_



<b>Project</b> RANFORD HILL EL6818 NORTHERN TERRITORY			
<b>Title</b> RANFORD HILL GRID BCL SOIL SAMPLE RESULTS			
Author D.K.	Office CNS	Scale 1:10000	
Drawn B.F.	Date 7/91	Revised	Date
Plotted date 5/7/91		Report No.	
Drawing No. C/HE10/3		Fig. No. 9	

005-1005