TANAMI JOINT VENTURE

ZAPOPAN NL
KUMAGAI GUMI CO LTD
KINTARO METALS PTY LTD

EXPLORATION LICENCE 5418

TANAMI REGION
NORTHERN TERRITORY

FIRST ANNUAL REPORT - 1990

TANAMI 1:250,000 SHEET SE 52-15
THE GRANITES 1:250,000 SHEET SF 52-3
MT SOLITAIRE 1:250,000 SHEET SF 52-4

MAY 1990

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1. SUMMARY

Exploration undertaken in the first year of the licence comprised data acquisition and interpretation. Airborne magnetic data suggest that Lower Proterozoic magnetic rocks form only a small portion of the licence area with granite forming most of the rest. Selected targets will be sampled with a helicopter-borne programme in the second year.

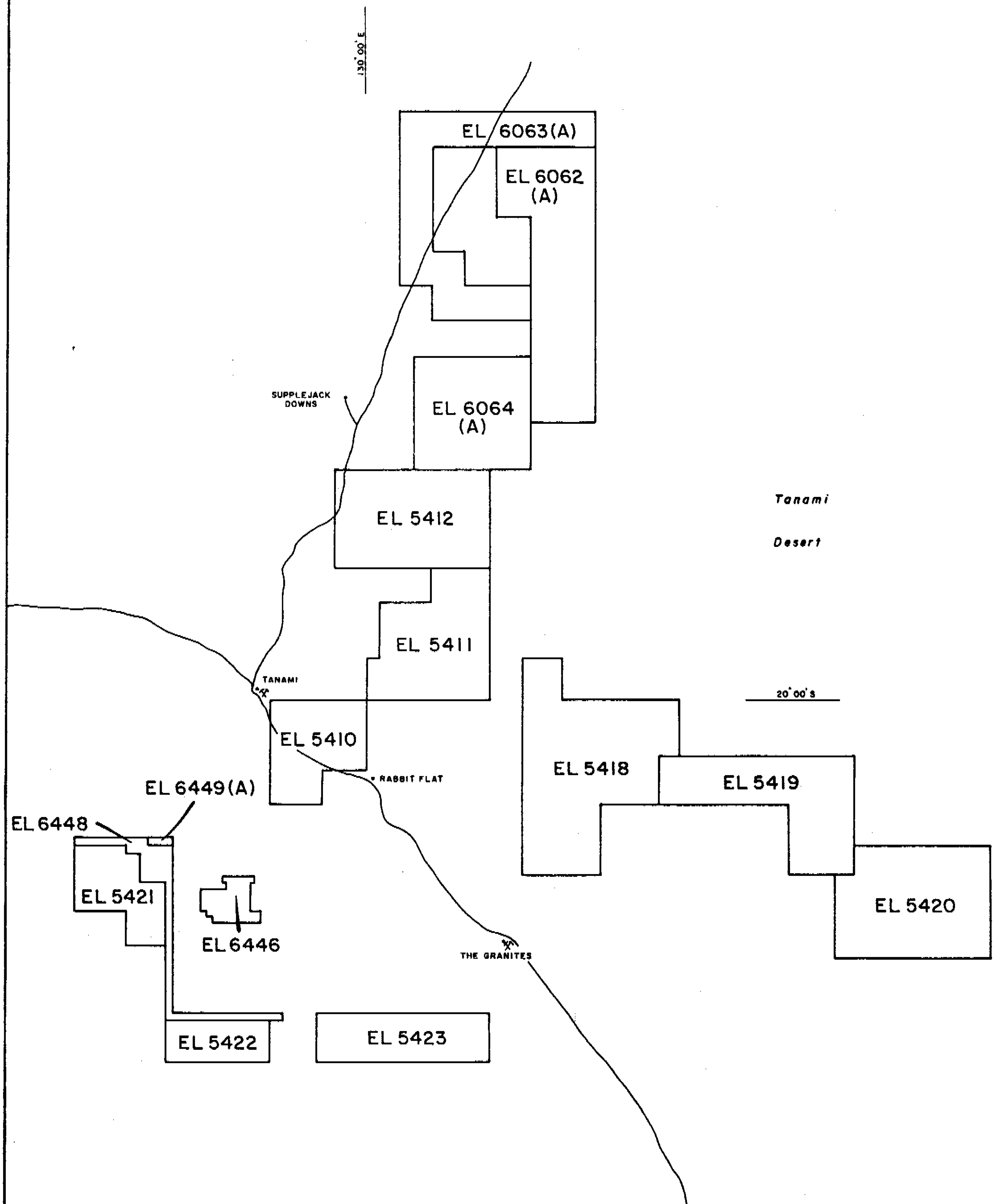

Figure 1

TANAMI JOINT VENTURE		
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TENEMENTS		

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2. INTRODUCTION

Exploration Licence 5418 was granted on 3 May 1989 to Harlock Pty Ltd. A 50% interest was subsequently transfered to Zapopan NL. Harlock holds its interest in trust on behalf of Kumagai Gumi Co Ltd (30%) "Kumagai" and Kintaro Metals Pty Ltd (20%) "Kintaro". Zapopan, Kumagai and Kintaro comprise the Tanami Joint Venture "TJV".

The EL is situated 40km - 80km east of Rabbit Flat and 20km-70km NNE of The Granites gold mine, and covers an area of 1594sq km, equivalent to 495 blocks.

There are no access roads into the area, the nearest access being the roads from The Granites to Rabbit Flat or The Granites to Mt Davidson Outstation.

The area is generally covered by sandplains, with a monotonous cover of spinifex and small shrubs, with a few low rises and pediments covered by iron-rich rubble and weathered rock. Red earth plains comprising recent alluvial and colluvial material are often covered with thick mulga scrub. A large west trending floodout occurs to the south of the licence area and few sanddunes are present along the northern boundary.

The EL lies totally on Aboriginal land within the Central Desert Land Trust area.

This report details work carried out in the first year of the licence.

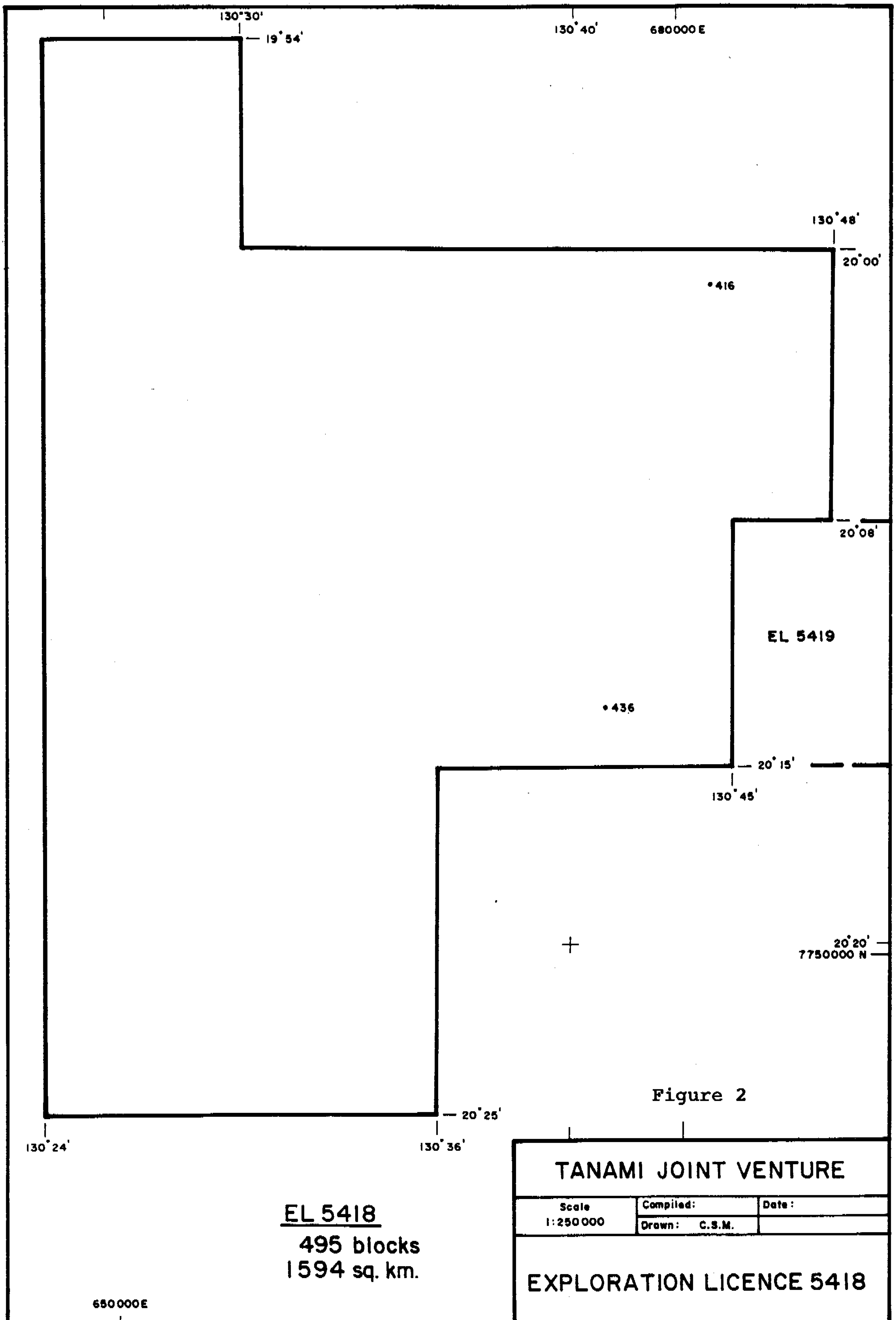
130°30'
19°54'
130°40'
680000 E
130°48'
20°00'
•416
20°08'
EL 5419
•436
20°15'
130°45'
20°20'
7750000 N
20°25'
130°24'
130°36'
TANAMI JOINT VENTURE
Scale
1:250000
Compiled:
Date:
Drawn: C.S.M.
EXPLORATION LICENCE 5418
EL 5418
495 blocks
1594 sq. km.
660000E

Figure 2

3. PREVIOUS WORK

EL5418 has had very little geological work completed on it and has no history of modern exploration. The following is a brief description of some of the previous work carried out in the region.

1900	A prospecting expedition led by Davidson (1905) discovered gold at Tanami and The Granites. The party crossed the Mt Solitaire Sheet area and recorded outcrops of metamorphosed sediments and granite. Traces of gold and pyrite were found in the western part of the Mt Solitaire sheet. The exact location is not known.
1962	BMR carried out an airborne magnetic and radiometric survey of The Granites and Tanami Sheet areas (Spence, 1964; BMR, 1965a, 1965b).
1965	BMR conducted a helicopter gravity survey of the Mt Solitaire Sheet (Flavelle, 1965). Photo-interpretation of the Sheet area by BMR (Rivereau and Perry, 1965) preceded a reconnaissance geological survey (Milligan et al, 1965).
1967	BMR carried out a reconnaissance gravity survey of The Granites Sheet (Whitworth, 1970).
1971 - 1979	BMR carried out several geological investigations in The Granites - Tanami area (Blake, 1974, 1975, 1978; Blake and Hodgson, 1976; Blake et al, 1973, 1975, 1979; Page et al, 1976).
1971	BMR geologically mapped the Tanami Sheet (Hodgson, 1975).
1975	BMR geologically mapped The Granites and Mt Solitaire Sheet areas (Hodgson, 1976; Offe and Kennewell, 1978).

4. GEOLOGY

The Lower Proterozoic Mt Charles Beds (Blake et al, 1975) crop out sporadically in EL5418 forming low rubbly mounds and ridges. This unit, where exposed, comprises ferruginous quartzite.

The majority of EL5418 is underlain by granite from interpretation of the airborne magnetic data.

Cambrian-age dolomite crops out in the northwest corners of the Mt Solitaire Sheet and is continuous with the Montejinni Limestone and Hooker Creek Formation of the adjoining Tanami East Sheet. Sandstone and claystone of the Lothari Hill Sandstone overlie the dolomites.

A veneer of Cainozoic sediments covers most of the area and reduces outcrop to small, low areas of generally weathered rock. These sediments include areas of silcrete, ferricrete, gravel, calcrete, lacustrine clays, alluvium, collivium and aeolian sand. The latter covers most of the EL and forms dunes to the north.

The area forms part of an old land surface in an advanced stage of planation known as the Tennant Creek surface (Hays, 1967).

The landforms in the area are typical of an arid environment with relics from a wetter tropical period.

Appendix I describes some of the landforms and regolith geology found in The Granites - Tanami region.

5. EXPLORATION COMPLETED

5.1 Data acquisition and interpretation

All relevant open-file, geological, geophysical and historical data for the region have been obtained. These data include the regional airborne magnetic survey compiled by the Northern Territory Geological Survey for the Ptilotus and Davidson 1:100,000 sheets. The portion of EL5418 falling on the Tanami 1:250,000 Sheet area was covered by an airborne magnetic survey completed by the TJV.

Colour aerial photography at 1:50,000 scale was flown by AiResearch Mapping Pty Ltd on behalf of the TJV over all their exploration areas including EL5418. These photographs are being used to interpret relevant landforms, outcrop extent, drainage, lineaments etc to assist in target selection for initial exploration sampling.

Landsat images at 1:250,000 scale and black and white NASA photography covering The Granites - Tanami region were purchased and used to assist in target selection.

All available data are thus being utilized to assist in preparation and target selection. The prospectivity of the area will be based on four parameters : aeromagnetics, geology, structure and landforms. Areas with a high priority for initial sampling will contain all four parameters.

5.2 Geophysics

The open-file airborne magnetic data for the Ptilotus and Davidson 1:100,000 Sheets have been purchased and interpreted to assist in target selection (see Figure 3 and 4).

The portion of EL5418 which falls on the Tanami 1:250,000 Sheet has been covered by an airborne magnetic survey flown by Geoterrex Pty Ltd on behalf of the TJV (see Figure 5).

Both data sets (NTGS and TJV) were merged and image processed by Geoimage Pty Ltd of Brisbane. A report by Geoimage is appended (Appendix II).

The specifications for the TJV airborne magnetic survey are as follows :-

AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER:	Cesium Vapour optical absorption. Sensitivity : 0.04 nT
READING INTERVAL:	0.2 sec (approx 13m sampling) at mean ground speed of 220km/hour
SPECTROMETER:	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW:	0.8 - 3.00 MeV
POTASSIUM WINDOW:	1.36 - 1.56 MeV
URANIUM WINDOW:	1.66 - 1.86 MeV
THORIUM WINDOW:	2.42 - 2.82 MeV
RECORDING INTERVAL:	1.0 sec (approx 60m sampling) at mean ground speed of 220km/hour
DATA RECORDING:	Geoterrex MADACS acquisition system. Digital to magnetic tape.

NOMINAL TERRAIN CLEARANCE:	Both detectors in aircraft at 90m
NOMINAL LINE SPACING:	Traverse lines at 500 metres Tie lines 5km
FLIGHT PATH NAVIGATION:	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD:	Real time calculation of AMG co-ordinates from the SYLEDIS STR4 navigation system.

<u>RESIDUAL MAGNETIC CONTOURS</u>

Grid notation refers to Australian Map Grid Zone 51

Magnetics	: Tie line levelled
IGRF (1985)	: Removed, Datum 2000 nT added
Grid mesh size	: 100 x 100 metres
Grid filter	: None
Contour interval	: 2, 20 and 100 nT

6. EXPENDITURE

	$
Aerial Photography	4500-00
Drafting etc	553-08
Geological consultants	7531-59
Geophysics	13583-52
Aircraft hire	1161-00
Land Councils	9361-89
Legal Costs	2325-67
Salaries and wages	1897-00
Travel and accommodation	619-65
Surveying	2116-34
Tenements - maintenance and rents	2815-00
Administration costs	4646-47
$	51111-21

7. FORWARD PROGRAMME

In 1990/91 it is proposed to carry out initial geochemical sampling programmes across targets derived from interpreting all the relevant data acquired in the first year of the licence. Prior to this, an aboriginal sacred site survey will be carried out.

Estimate costs are as follows:-

Helicopter hire	\$ 5000
Land Council costs	\$ 1000
Salaries and wages	\$ 4000
Consumables, messing, vehicles etc	\$ 3500
Geochemistry, assaying	\$ 1500
TOTAL	\$ 15000

An expenditure commitment of \$15000 is requested for 1990/91.

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A P P E N D I X   I

TANAMI-GRANITES REGION LANDFORMS

TANAMI - GRANITES AREA LANDFORMS

EROSIONAL LANDFORM

Unit 1. Low rises of outcrop and small rounded hills.
Low rises above the sand covered pediplain that are generally mottled zone or saprolite with a thin veneer of pisolitic/nodular laterite and/or quartz and ironstone lag after the degradation of lateritic duricrust.

Unit 2. Etched laterite plateau/uplands and breakaways.
Discontinuous pisolitic/nodular duricrust on mottled zone exposed by erosion. The duricrust can be cemented or loose. Surficial silicification is common. Commonly locally obscured by soil or aeolian sand.

Unit 3. Outcropping areas.
Areas where there is a >70% exposure of recognizable bedrock. Occurs as ranges of dissected hills with a well developed drainage pattern. Rare lateritic duricrust preserved. Local areas with a semi residual soil development.

Unit 4. Pediplains
Pediplains with semi residual red earthy soils and belts of thick vegetation. Sheet washed in places.

DEPOSITIONAL LANDFORMS

Unit 5. Alluvial and aeolian covered pedimented slopes and plains.
Gently sloping and flat plains covered by brown red aeolian sand and alluvial sandy soils with a lateritic debris lag. Abundant spinifex and low scrub vegetation. Cover generally attains a maximum thickness of 5m. Often overlays a residual laterite duricrust.

Unit 6. Colluvial outwash plains

Slopes away from outcrop with a sandy soil and often a well developed lag that decreases in size away from outcrop. Can cover a laterite duricrust.

Unit 7 Linear playa drainage lines

Linear areas commonly with playa lakes that are calcrete, silcrete, sand and sediment filled depressions that formed in paleodrainage channels. Often thick vegetation.

Unit 8 Clay filled drainage sumps

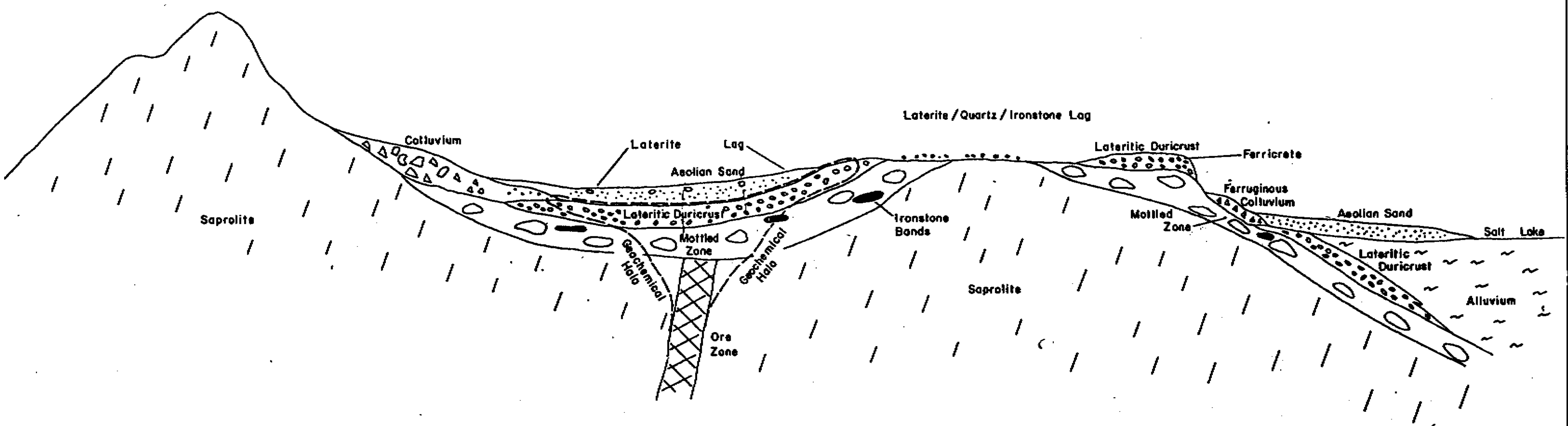
Grey brown cracking clays of the montmorillonite family and claypans.

Unit 9. (a) *Alluvium plain* - upper tributary

(b) *Alluvium plain* - lower tributary

(c) *Alluvium floor in valley tract* - braided wash areas

LANDFORM	UNIT 3	UNIT 6	UNIT 5	UNIT 1	UNIT 2	UNIT 7
	Outcropping areas	Colluvial outwash plains	Alluvial and aeolian covered pedimented slopes and plains	Low rises of outcrop and small rounded hills	Etched laterite plateau / uplands and breakaways	Linear playa drainage lines
REGIONAL GEOCHEMICAL EXPLORATION TECHNIQUE	B L E G stream and/or soil sampling	Drill to lateritic / duricrust / saprolite	(a) Surficial laterite sampling (b) Drilling through cover to lateritic duricrust	(a) Laterite lag sampling (b) Composite BLEG soil sampling	Laterite sampling	Drill to lateritic duricrust / saprolite



eupene exploration enterprises

Client :

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	Drawn: C.S.D.S.	

TANAMI — GRANITES AREA

Preliminary Diagrammatic Representation of Regolith Geology and Landform Relationships

A P P E N D I X   I I

Processing of Airborne Geophysics

of the

Granites - Tanami area

for the

Tanami Joint Venture

by

GEOIMAGE PTY LTD

GEOIMAGE
SPECIALISTS IN IMAGE PROCESSING AND REMOTE SENSING APPLICATIONS

PROCESSING

of

AIRBORNE GEOPHYSICS

of the

GRANITES-TANAMI AREA

for the

TANAMI JOINT VENTURE

....
R.N. Walker
SEPTEMBER 1989

GEOIMAGE PTY LTD
19 Carnaby Street, MacGregor, Qld. 4109 Australia, P.O. Box 395 Upper Mt Gravatt, Qld. 4122
Telephone: (07) 343 2194 Fax: (07) 343 7974

INTRODUCTION

Under instructions from Mr P. Nicholson of Eupene Exploration Enterprises, airborne geophysical surveys over the Granites-Tanami area covering exploration areas held by the Tanami Joint Venture have been processed. The work involved-

- reading data off a number of located data tapes
- gridding the data at 20 metres cell size over the Tanami mine area and 50 metres cell size over the full area for the following parameters
  - magnetics
  - vertical derivative
  - vertical derivative with automatic gain (mine area only)
  - radiometrics
- processing and photography of the above files

PROCESSING (ctd)

Tanami Regional Data

Flight line data from several surveys flown for various companies including the NT Geological Survey, BHP, North Flinders and the Tanami JV, were processed. Other than a constant flight line spacing of 500 metres, the specifications for these surveys varied. The North Flinders surveys on the Frankenia and Ptilotus 1:100 000 sheets were flown E-W whereas the remaining areas were flown N-S.

Two major problems were encountered with the gridding-

1. Individual surveys had completely different radiometric responses and this problem was overcome as much as possible by gridding the individual surveys and matching the statistics either over the overlap areas or over the full area.

2. In the case of the vertical derivative (VD), problems were encountered because the original flight lines were separated into individual 1:100 000 sheets. Because of the technique used to calculate VD's, the responses at the end of the lines differed and resulted in apparent E-W discontinuities where survey or line segments met.

The final grids for the area were

BLHC	498 000 E, 7 691 800 N
Samples	5492
Lines	3140
Sample size	50 metres

for magnetics, vertical derivative (VD) and radiometrics. The VD image file was then used to derive shade images at various sun azimuth angles.

PROCESSING (ctd)

Appendix 1 contains output from runs converting the real grid files to byte files.

The magnetics, VD and VDG data were gridded using a minimum curvature algorithm, whereas the radiometrics were gridded using a bicubic spline algorithm.

The VD and VDG were processed on the flight line data using an along line 31 point FFT derived filter. A description of the methodology is attached as Appendix 2.

LIST OF SLIDES

TANAMI REGIONAL DATA - FULL AREA

1. Greyscale magnetics.
2. Rainbow pseudocoloured magnetics multiplied by a vertical illumination.
3. Greyscale vertical derivative.
4. Rainbow pseudocoloured vertical derivative multiplied by a vertical illumination on the vertical derivative.
5. Greyscale 00 azimuth 26 degree altitude shade illumination on the magnetics.
6. Rainbow pseudocoloured magnetics multiplied by a 00 azimuth 26 degree altitude shade illumination on the vertical derivative.
7. Greyscale 45 azimuth 26 degree altitude shade illumination on the magnetics.
8. Rainbow pseudocoloured magnetics multiplied by a 45 azimuth 26 degree altitude shade illumination on the vertical derivative.
9. Greyscale 90 azimuth 26 degree altitude shade illumination on the magnetics.
10. Rainbow pseudocoloured magnetics multiplied by a 90 azimuth 26 degree altitude shade illumination on the vertical derivative.
11. Greyscale 135 azimuth 26 degree altitude shade illumination on the magnetics.
12. Rainbow pseudocoloured magnetics multiplied by a 135 azimuth 26 degree altitude shade illumination on the vertical derivative.
13. Radiometric colour composite. Potassium in red, thorium in green, uranium in blue.
14. Greyscale potassium / thorium ratio.

LIST OF SLIDES

TANAMI REGIONAL DATA - MOUNT SOLITAIRE

Subsampled 4007 521 1480 1024 2 2 (for magnetics)
Subsampled 2063 261 1480 1024 2 2 (for radiometrics)

MTS1.	Greyscale magnetics.
MTS2.	Rainbow pseudocoloured magnetics multiplied by a vertical illumination.
MTS3.	Greyscale vertical derivative.
MTS4.	Rainbow pseudocoloured vertical derivative multiplied by a vertical illumination on the vertical derivative.
MTS5.	Greyscale 00 azimuth 26 degree altitude shade illumination on the magnetics.
MTS6.	Rainbow pseudocoloured magnetics multiplied by a 00 azimuth 26 degree altitude shade illumination on the vertical derivative.
MTS7.	Greyscale 45 azimuth 26 degree altitude shade illumination on the magnetics.
MTS8.	Rainbow pseudocoloured magnetics multiplied by a 45 azimuth 26 degree altitude shade illumination on the vertical derivative.
MTS9.	Greyscale 90 azimuth 26 degree altitude shade illumination on the magnetics.
MTS10.	Rainbow pseudocoloured magnetics multiplied by a 90 azimuth 26 degree altitude shade illumination on the vertical derivative.
MTS11.	Greyscale 135 azimuth 26 degree altitude shade illumination on the magnetics.
MTS12.	Rainbow pseudocoloured magnetics multiplied by a 135 azimuth 26 degree altitude shade illumination on the vertical derivative.
MTS13.	Radiometric colour composite. Potassium in red, thorium in green, uranium in blue.
MTS14.	Radiometric colour composite with gradient defined by 0 azimuth 26 altitude shade on the magnetics.
MTS15.	Greyscale potassium / thorium ratio.

APPENDIX 1 - REAL TO BYTE CONVERSION RUNS (ctd)

Tanami Regional Data - Full Area
Magnetics

BYTE VALUE	REAL VALUES
1	723.69
16	1203.37
32	1357.29
48	1419.76
64	1457.71
80	1488.85
96	1523.53
112	1571.46
128	1625.21
144	1681.62
160	1743.96
176	1818.22
192	1915.36
208	2044.61
224	2261.82
240	2492.07
256	4183.97

Tanami Regional Data - Full Area
Radiometrics (TC, K, U, Th)

BYTE VALUE	REAL VALUES			
1	-19.26	-0.37	-0.51	12.57
16	217.55	12.78	7.21	22.08
32	352.87	19.68	10.77	26.89
48	445.75	25.70	13.56	31.03
64	513.73	31.54	16.27	35.04
80	597.03	37.07	18.85	39.05
96	763.31	42.78	21.41	43.06
112	1018.64	48.73	23.95	47.51
128	1175.35	55.19	26.55	52.74
144	1299.50	62.51	29.20	58.91
160	1454.61	70.96	32.03	66.71
176	1654.08	81.09	35.09	76.92
192	1891.86	93.20	38.40	90.29
208	2154.84	107.02	41.90	105.55
224	2426.77	122.12	45.55	122.86
240	2688.36	139.49	48.96	139.12
256	5795.80	229.87	75.86	302.07

APPENDIX 1 - REAL TO BYTE CONVERSION RUNS (ctd)

Tanami Regional Data - Full Area
Potassium / Thorium Ratio

BYTE VALUE	REAL VALUES
1	-0.13
16	1.43
32	3.09
48	4.75
64	6.41
80	8.08
96	9.74
112	11.40
128	13.06
144	14.73
160	16.39
176	18.05
192	19.71
208	21.38
224	23.04
240	31.66
256	1610.00

APPENDIX 2 - VERTICAL DERIVATIVES

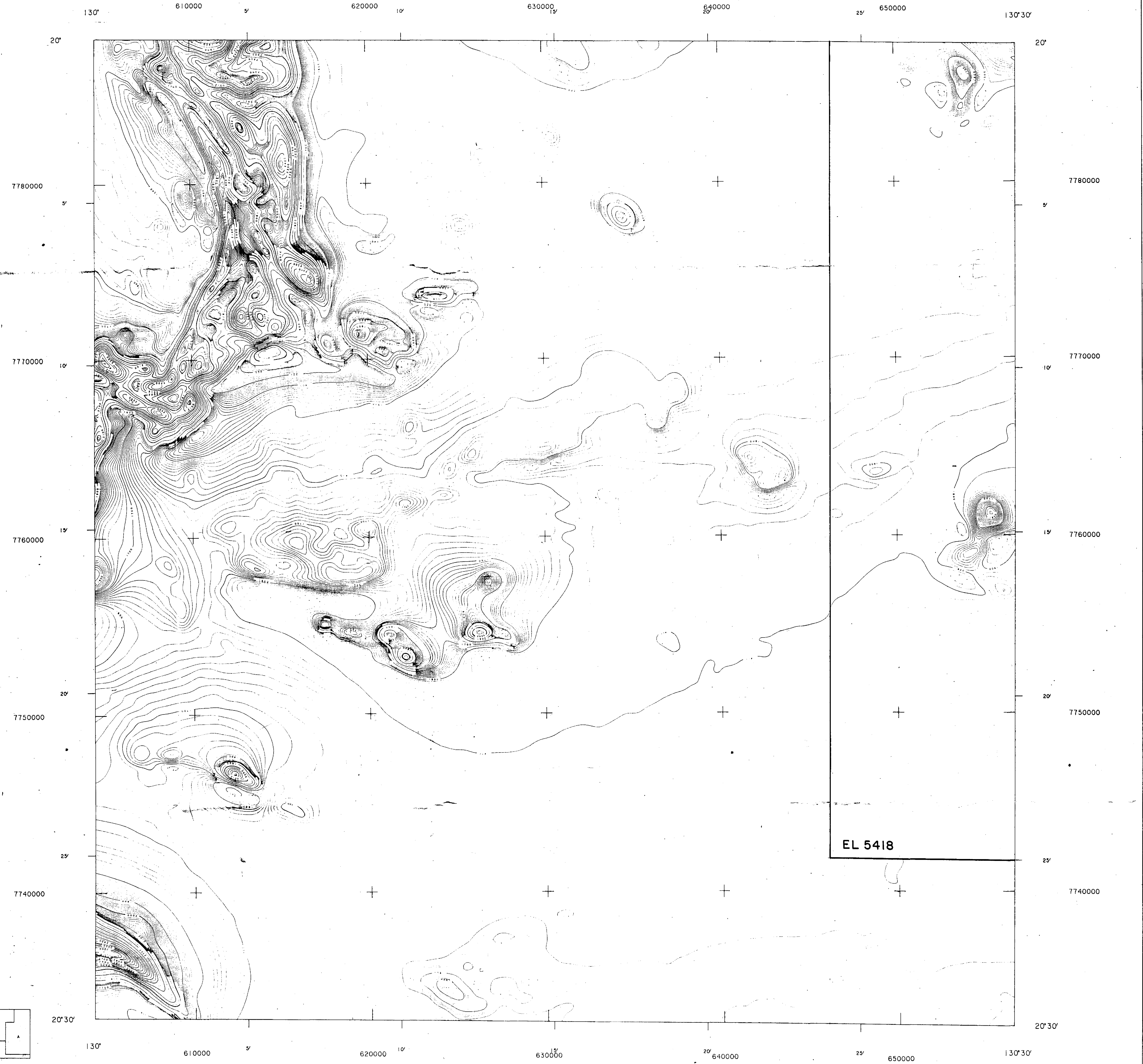
Vertical derivatives are used to improve the resolution of small scale anomalies caused by near surface magnetic sources, and to suppress the longer wavelength anomalies resulting from deeper sources. Derivatives can be calculated using a one dimensional operator and this is usually done on the original flight line data prior to gridding, or using a two dimensional operator on the grid file.

One dimensional operators tend to suppress local anomaly trends which parallel or near-parallel the flight line direction. This however can also be an advantage of the one-dimensional operator in that on poorly levelled data it will suppress or even remove artefacts caused by poor levelling.

In image products produced from vertical derivative grids, the usual distribution of data is such that the major anomalies will be very obvious however the weaker trends in the less magnetic units will tend to fall around a greyscale value of 127 and be difficult to see. This can be overcome using the technique of "Automatic Gain Control" (AGC) as suggested by S. Rajagoplan (Conference Volume, 5th ASEG Conference, 1987). In this technique, the vertical derivative is calculated along the flight line and the relative amplitude of each data point is adjusted by dividing by the gain in a window around the data point. The gain is defined as the inverse of the root mean square of the original data values in the window.

The result of the vertical derivative with AGC is to emphasise small anomalies in low gradient areas while suppressing high amplitude anomalies in high gradient areas.

Geoimage routinely carries out vertical derivative and vertical derivative with AGC operations on the original flight line data prior to gridding.



AIRBORNE SURVEY SPECIFICATIONS

AREA	AREA A (FLOWN FOR THE NTGS)	AREA B (FLOWN FOR NORTH FLINDERS EXPLORATION)	AREA C (FLOWN FOR NORTH FLINDERS EXPLORATION)	AREA D (FLOWN FOR BHP MINERALS LTD.)
COMPANY	GEOTERREX PTY. LTD. 1988	GEOTERREX PTY. LTD. 1986	GEOTERREX PTY. LTD. 1985	GEOMETRICS INT. CORP. 1982
AIRCRAFT	ROCKWELL SHRIKE COMMANDER	ROCKWELL SHRIKE COMMANDER	ROCKWELL SHRIKE COMMANDER	BRITTEN NORMAN ISLANDER
MAGNETOMETER	CESIUM VAPOUR OPTICAL ABSORPTION RESOLUTION 0.01 nanoTesla CYCLE RATE 0.5 second SAMPLE INTERVAL 30 metres	CESIUM VAPOUR OPTICAL ABSORPTION RESOLUTION 0.04 nanoTesla CYCLE RATE 0.2 second SAMPLE INTERVAL 13 metres	CESIUM VAPOUR OPTICAL ABSORPTION RESOLUTION 0.04 nanoTesla CYCLE RATE 0.2 second SAMPLE INTERVAL 13 metres	GEOMETRICS G813 RESOLUTION 0.50 nanoTesla CYCLE RATE 0.73 second (approx.) SAMPLE INTERVAL 45 metres (approx.)
SPECTROMETER	NUCLEAR DATA 256 CHANNEL ADC TOTAL COUNT 0.40 – 3.00 MeV K_{40} 1.36 – 1.56 MeV Bi_{214} 1.66 – 1.86 MeV Tl_{208} 2.42 – 2.82 MeV VOLUME 33.5 litres CYCLE RATE 1.0 second SAMPLE INTERVAL 60 metres	NUCLEAR DATA 256 CHANNEL ADC TOTAL COUNT 0.80 – 3.00 MeV K_{40} 1.36 – 1.56 MeV Bi_{214} 1.66 – 1.86 MeV Tl_{208} 2.42 – 2.82 MeV VOLUME 33.5 litres CYCLE RATE 1.0 second SAMPLE INTERVAL 60 metres	NUCLEAR DATA 256 CHANNEL ADC TOTAL COUNT 0.80 – 3.00 MeV K_{40} 1.36 – 1.56 MeV Bi_{214} 1.66 – 1.86 MeV Tl_{208} 2.42 – 2.82 MeV VOLUME 33.5 litres CYCLE RATE 1.0 second SAMPLE INTERVAL 60 metres	EXPLORANIUM GR800D TOTAL COUNT 0.20 – 3.00 MeV K_{40} 1.36 – 1.56 MeV Bi_{214} 1.66 – 1.86 MeV Tl_{208} 2.42 – 2.82 MeV VOLUME 16.8 litres CYCLE RATE 0.73 second (approx.) SAMPLE INTERVAL 45 metres (approx.)
DATA ACQUISITION	GEOTERREX MADACS ACQUISITION SYSTEM DIGITAL TO MAGNETIC TAPE	GEOTERREX MADACS ACQUISITION SYSTEM DIGITAL TO MAGNETIC TAPE	GEOTERREX MADACS ACQUISITION SYSTEM DIGITAL TO MAGNETIC TAPE	GEOMETRICS DIGITAL ACQUISITION SYSTEM DIGITAL TO MAGNETIC TAPE
FLIGHT LINE SPACING	TRAVERSE LINES 500 metres TIE LINES 5000 metres	TRAVERSE LINES 500 metres TIE LINES 5000 metres	TRAVERSE LINES 500 metres TIE LINES 5000 metres	TRAVERSE LINES 500 metres TIE LINES 5000 metres
FLIGHT LINE DIRECTION	TRAVERSE LINES 180–360 degrees TIE LINES 090–270 degrees	TRAVERSE LINES 180–360, 090–270 degrees TIE LINES 090–270, 180–360 degrees	TRAVERSE LINES 180–360 degrees TIE LINES 090–270 degrees	TRAVERSE LINES 180–360 degrees TIE LINES 090–270 degrees
SURVEY HEIGHT	90 metres MEAN TERRAIN CLEARANCE	90 metres MEAN TERRAIN CLEARANCE	90 metres MEAN TERRAIN CLEARANCE	100 metres MEAN TERRAIN CLEARANCE
FLIGHT PATH NAVIGATION	SYLEDIS STR4 RADIO NAVIGATION SYSTEM	VISUAL FROM 1:25000 BLACK AND WHITE PHOTOS	VISUAL FROM 1:25000 BLACK AND WHITE PHOTOS	COMBINED DOPPLER/VISUAL FROM 1:25000 PHOTOS
FLIGHT PATH RECORD	REAL TIME CALCULATION OF AMG COORDINATES FROM THE SYLEDIS STR4 NAVIGATION SYSTEM	GEOCAM 35mm CONTINUOUS TRACKING CAMERA	GEOCAM 35mm CONTINUOUS TRACKING CAMERA	35mm TRACKING CAMERA

GRID CELL SIZE 150 metres
CONTOUR INTERVAL 10 nanoTeslas
1000 nanoTeslas
100 nanTeslas
10 nanoTeslas

REGIONAL FIELD IGRF MODEL 1985 AND SECULAR VARIATION MODEL 1985–1990 REMOVED
BASE VALUE ADDED 2000 nanoTeslas

TOTAL FIELD 52233.90 nanoTeslas
INCLINATION – 53.11 degrees
DECLINATION 3.75 degrees

SHOWN FOR THE CENTRE OF MAP AND CORRECT FOR NOVEMBER 1988

ACKNOWLEDGEMENT CONTRIBUTION OF DATA BY NORTH FLINDERS EXPLORATION AND BHP MINERALS LTD. IS GRATEFULLY ACKNOWLEDGED

Scale 1:100 000

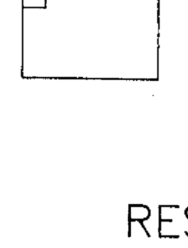
2 0 2 4 6 8 10 km

AUSTRALIAN MAP GRID

Project supervision by Northern Territory Geological Survey

Published by the Department of Mines and Energy
Issued under the authority of the Hon. B. Coulter
Minister for Mines and Energy

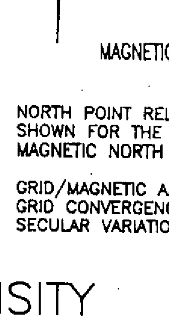
Surveyed and compiled by GEOTERREX PTY. LTD.
NOVEMBER 1988 – APRIL 1989



1:100,000 SHEET LOCATION

Part of 1:250,000 Sheet THE GRANITES SF 52–3

McFARLANE 4757	FRANKENIA 4857	PTILOTUS 4957	DAVIDSON 5057
4756 PEDESTAL HILLS	4856 INNINGARRA	4956 GRANITES	5056 GIBBES/MURRAY



NORTH POINT RELATIONSHIPS ARE SHOWN FOR THE CENTRE OF THE MAP. MAGNETIC NORTH IS TRUE FOR 1988

GRID/MAGNETIC ANGLE 4°19'04"
GRID CONVERGENCE 0°25'57.53"
SECULAR VARIATION 0°0'39"east/yr.

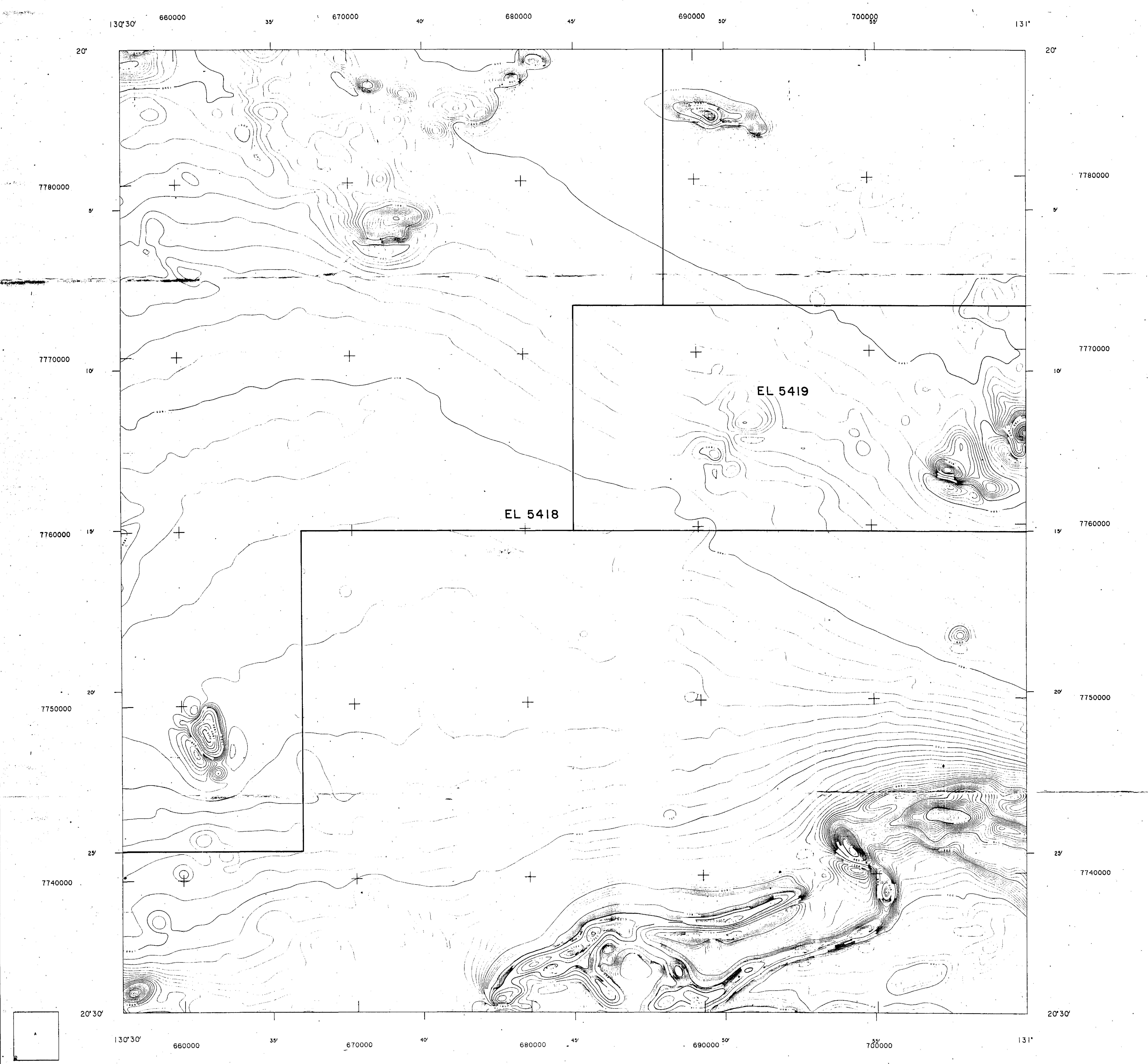
PTILOTUS
4957
RESIDUAL MAGNETIC INTENSITY

Figure 3

1:100,000 AIRBORNE GEOPHYSICAL SURVEY SERIES

DAVIDSON

NORTHERN TERRITORY DEPARTMENT OF MINES AND ENERGY



AIRBORNE SURVEY SPECIFICATIONS

AREA	AREA A (FLOWN FOR THE NTGS)	AREA B (FLOWN FOR NORTH FLINDERS EXPLORATION)	AREA C (FLOWN FOR NORTH FLINDERS EXPLORATION)	AREA D (FLOWN FOR BHP MINERALS LTD.)
COMPANY	GEOTERREX PTY. LTD. 1988	GEOTERREX PTY. LTD. 1986	GEOTERREX PTY. LTD. 1985	GEOMETRICS INT. CORP. 1982
AIRCRAFT	ROCKWELL SHRIKE COMMANDER	ROCKWELL SHRIKE COMMANDER	ROCKWELL SHRIKE COMMANDER	BRITTEN NORMAN ISLANDER
MAGNETOMETER	CESIUM VAPOUR OPTICAL ABSORPTION RESOLUTION 0.01 nanoTesla CYCLE RATE 0.5 second SAMPLE INTERVAL 30 metres	CESIUM VAPOUR OPTICAL ABSORPTION RESOLUTION 0.04 nanoTesla CYCLE RATE 0.2 second SAMPLE INTERVAL 13 metres	CESIUM VAPOUR OPTICAL ABSORPTION RESOLUTION 0.04 nanoTesla CYCLE RATE 0.2 second SAMPLE INTERVAL 13 metres	GEOMETRICS G813 RESOLUTION 0.50 nanoTesla CYCLE RATE 0.73 second (approx.) SAMPLE INTERVAL 45 metres (approx.)
SPECTROMETER	NUCLEAR DATA 256 CHANNEL ADC TOTAL COUNT 0.40 – 3.00 MeV K_{40} 1.36 – 1.56 MeV Bi_{214} 1.66 – 1.86 MeV Tl_{208} 2.42 – 2.82 MeV VOLUME 33.5 litres CYCLE RATE 1.0 second SAMPLE INTERVAL 60 metres	NUCLEAR DATA 256 CHANNEL ADC TOTAL COUNT 0.80 – 3.00 MeV K_{40} 1.36 – 1.56 MeV Bi_{214} 1.66 – 1.86 MeV Tl_{208} 2.42 – 2.82 MeV VOLUME 33.5 litres CYCLE RATE 1.0 second SAMPLE INTERVAL 60 metres	NUCLEAR DATA 256 CHANNEL ADC TOTAL COUNT 0.80 – 3.00 MeV K_{40} 1.36 – 1.56 MeV Bi_{214} 1.66 – 1.86 MeV Tl_{208} 2.42 – 2.82 MeV VOLUME 33.5 litres CYCLE RATE 1.0 second SAMPLE INTERVAL 60 metres	EXPLORANIUM GR800D TOTAL COUNT 0.20 – 3.00 MeV K_{40} 1.36 – 1.56 MeV Bi_{214} 1.66 – 1.86 MeV Tl_{208} 2.42 – 2.82 MeV VOLUME 16.8 litres CYCLE RATE 0.73 second (approx.) SAMPLE INTERVAL 45 metres (approx.)
DATA ACQUISITION	GEOTERREX MADACS ACQUISITION SYSTEM DIGITAL TO MAGNETIC TAPE	GEOTERREX MADACS ACQUISITION SYSTEM DIGITAL TO MAGNETIC TAPE	GEOTERREX MADACS ACQUISITION SYSTEM DIGITAL TO MAGNETIC TAPE	GEOMETRICS DIGITAL ACQUISITION SYSTEM DIGITAL TO MAGNETIC TAPE
FLIGHT LINE SPACING	TRAVERSE LINES 500 metres TIE LINES 5000 metres	TRAVERSE LINES 500 metres TIE LINES 5000 metres	TRAVERSE LINES 500 metres TIE LINES 5000 metres	TRAVERSE LINES 500 metres TIE LINES 5000 metres
FLIGHT LINE DIRECTION	TRAVERSE LINES 180–360 degrees TIE LINES 090–270 degrees	TRAVERSE LINES 180–360, 090–270 degrees TIE LINES 090–270, 180–360 degrees	TRAVERSE LINES 180–360 degrees TIE LINES 090–270 degrees	TRAVERSE LINES 180–360 degrees TIE LINES 090–270 degrees
SURVEY HEIGHT	90 metres MEAN TERRAIN CLEARANCE	90 metres MEAN TERRAIN CLEARANCE	90 metres MEAN TERRAIN CLEARANCE	100 metres MEAN TERRAIN CLEARANCE
FLIGHT PATH NAVIGATION	SYLEDIS STR4 RADIO NAVIGATION SYSTEM	VISUAL FROM 1:25000 BLACK AND WHITE PHOTOS	VISUAL FROM 1:25000 BLACK AND WHITE PHOTOS	COMBINED DOPPLER/VISUAL FROM 1:25000 PHOTOS
FLIGHT PATH RECORD	REAL TIME CALCULATION OF AMG COORDINATES FROM THE SYLEDIS STR4 NAVIGATION SYSTEM	GEOCAM 35mm CONTINUOUS TRACKING CAMERA	GEOCAM 35mm CONTINUOUS TRACKING CAMERA	35mm TRACKING CAMERA

GRID CELL SIZE 150 metres
CONTOUR INTERVAL 10 nanoTeslas
1000 nanoTeslas
100 nanTeslas
10 nanoTeslas

REGIONAL FIELD: IGRF MODEL 1985 AND SECULAR VARIATION MODEL 1985–1990 REMOVED
BASE VALUE ADDED: 2000 nanoTeslas

TOTAL FIELD 52233.90 nanoTeslas
INCLINATION – 53.11 degrees
DECLINATION 3.75 degrees

SHOWN FOR THE CENTRE OF MAP AND CORRECT FOR NOVEMBER 1988

ACKNOWLEDGEMENT CONTRIBUTION OF DATA BY NORTH FLINDERS EXPLORATION AND BHP MINERALS LTD. IS GRATEFULLY ACKNOWLEDGED

Scale 1:100 000

2 0 2 4 6 8 10 km

AUSTRALIAN MAP GRID

Project supervision by Northern Territory Geological Survey

Published by the Department of Mines and Energy
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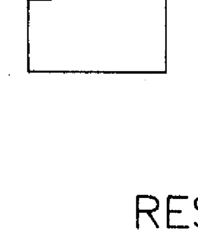
Minister for Mines and Energy

Surveyed and compiled by GEOTERREX PTY. LTD.
NOVEMBER 1988 – APRIL 1989



1:100,000 SHEET LOCATION

Part of 1:250,000 Sheet MT. SOLITAIRE SF 52-4

McFARLANE 4757	FRANKENIA 4857	PTILOTUS 4957	DAVIDSON 5057
4756 PEDESTAL HILLS	4856 INNINGARRA	4956 GRANITES	5056 GIBBES MURRAY

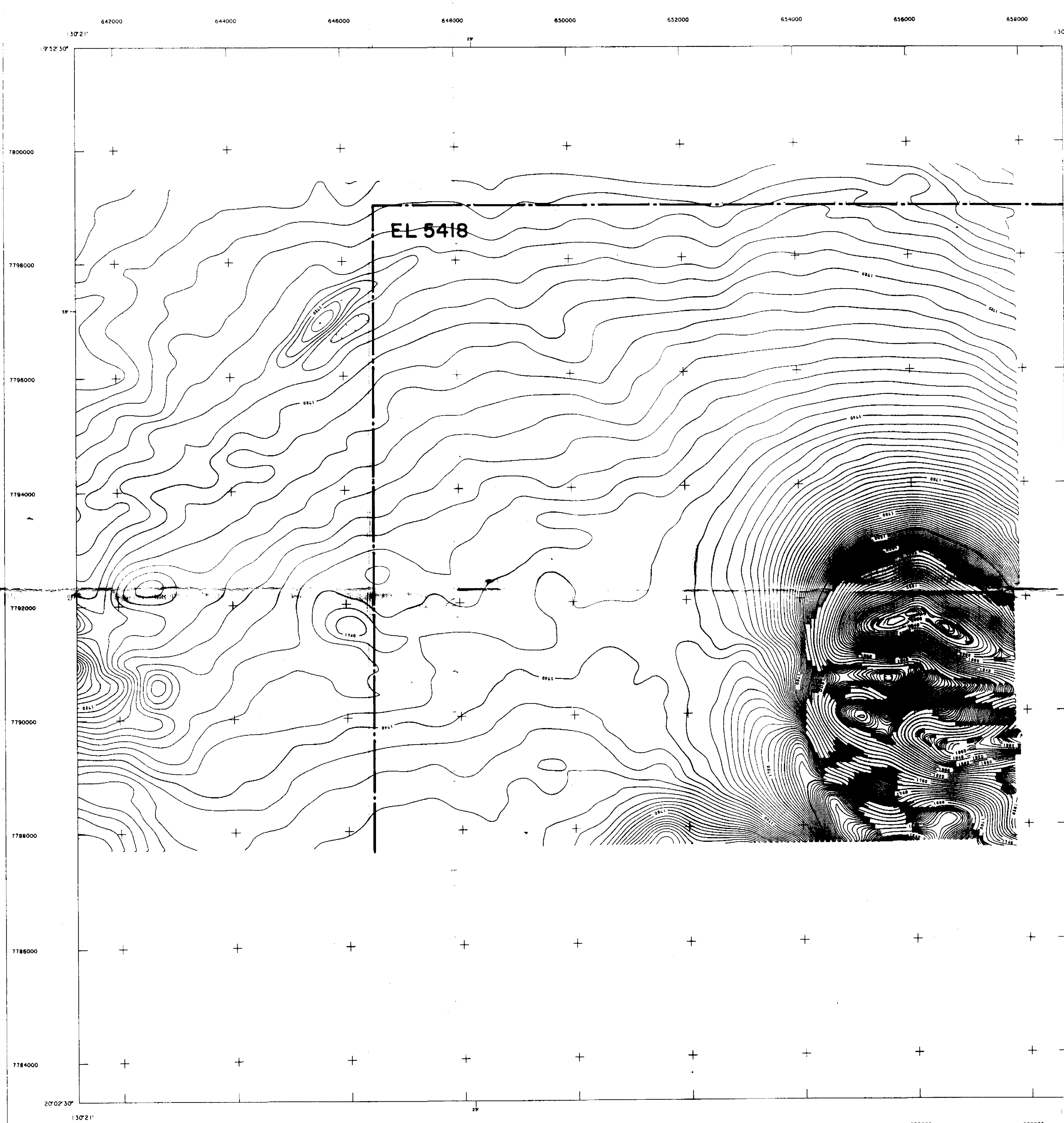
GRID NORTH
TRUE NORTH
MAGNETIC NORTH

NORTH POINT RELATIONSHIPS ARE SHOWN FOR THE CENTRE OF THE MAP. MAGNETIC NORTH IS TRUE FOR 1988

GRID/MAGNETIC ANGLE 4°38'13"
GRID CONVERGENCE 0°36'20.54"
SECULAR VARIATION 0°0'44"east/yr.

DAVIDSON
5057
RESIDUAL MAGNETIC INTENSITY

EL5418
Figure 4



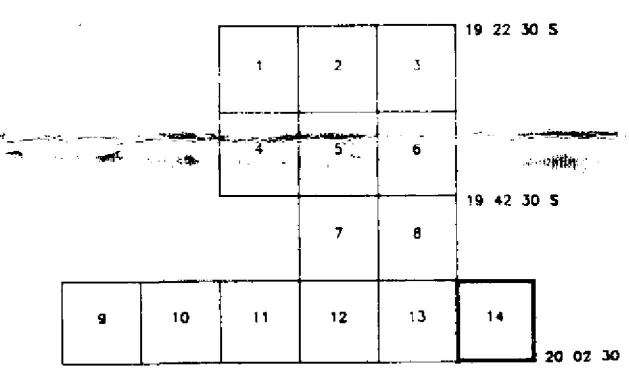
AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER:	Cesium Vapour optical absorption Sensitivity : 0.04 nT
RECORDING INTERVAL:	0.2 sec (approx. 13m sampling) at mean ground speed of 220 km/hour
SPECTROMETER:	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW:	0.8 – 3.00 MeV
POTASSIUM WINDOW:	1.36 – 1.56 MeV
URANIUM WINDOW:	1.66 – 1.86 MeV
THORIUM WINDOW:	2.42 – 2.82 MeV
RECORDING INTERVAL:	1.0 sec (approx. 60m sampling) at mean ground speed of 220 km/hour
DATA RECORDING:	Geoterrex MADACS acquisition system. Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE	Both detectors in aircraft at 90m
NOMINAL LINE SPACING:	Traverse lines at 500 metres Tie lines 5 km
FLIGHT PATH NAVIGATION:	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD:	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 51

Magnetics	: Tie line levelled
IGRF (1985)	: Removed, Datum 2000 nT added
Grid mesh size	: 100 x 100 metres
Grid filter	: None
Contour interval	: 2, 20 and 100 nT



N

0 1 2 Km

scale 1:25000

JOB NO. 1-394
Flown by GEOTERREX PTY LTD, DECEMBER 1988
Compiled by GEOTERREX PTY LTD, Sydney, NSW
Processed by GEOTERREX LTD, Ottawa, Canada

TANAMI JOINT VENTURE

TANAMI
RESIDUAL MAGNETIC CONTOURS
SHEET 14 OF 14

DATE: 10-APR-1989

Figure 5

NW CORNER OF EL5418