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EL 2143

MOUNT IRWIN

PARTIAL SURRENDER REPORT FOR THE PERIOD 8/1/96 TO 7/1/2001

Submitted by
S. Toteff and Expectation Pty Ltd
2001

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PRIMARY INDUSTRIES AND RESOURCES SA

EL 2143

South Australia

REPORT ON PARTIAL SURRENDER

INTRODUCTION

On 7th January 2001, EL 2143 expired. Being at the end of 5 years of tenure, an application for a replacement exploration licence was submitted, accompanied by an partial relinquishment of the tenement area. The retained area is approximately 50% of the previous tenement and is shown in Figure 1.

EXPLORATION DATA

An airborne magnetic and radiometric survey was completed in 1997 by former joint venture partner Expectation Pty Ltd (later Musgrave Block Holdings Pty Ltd). The digital data for the relinquished area, with survey specifications, accompany this report.

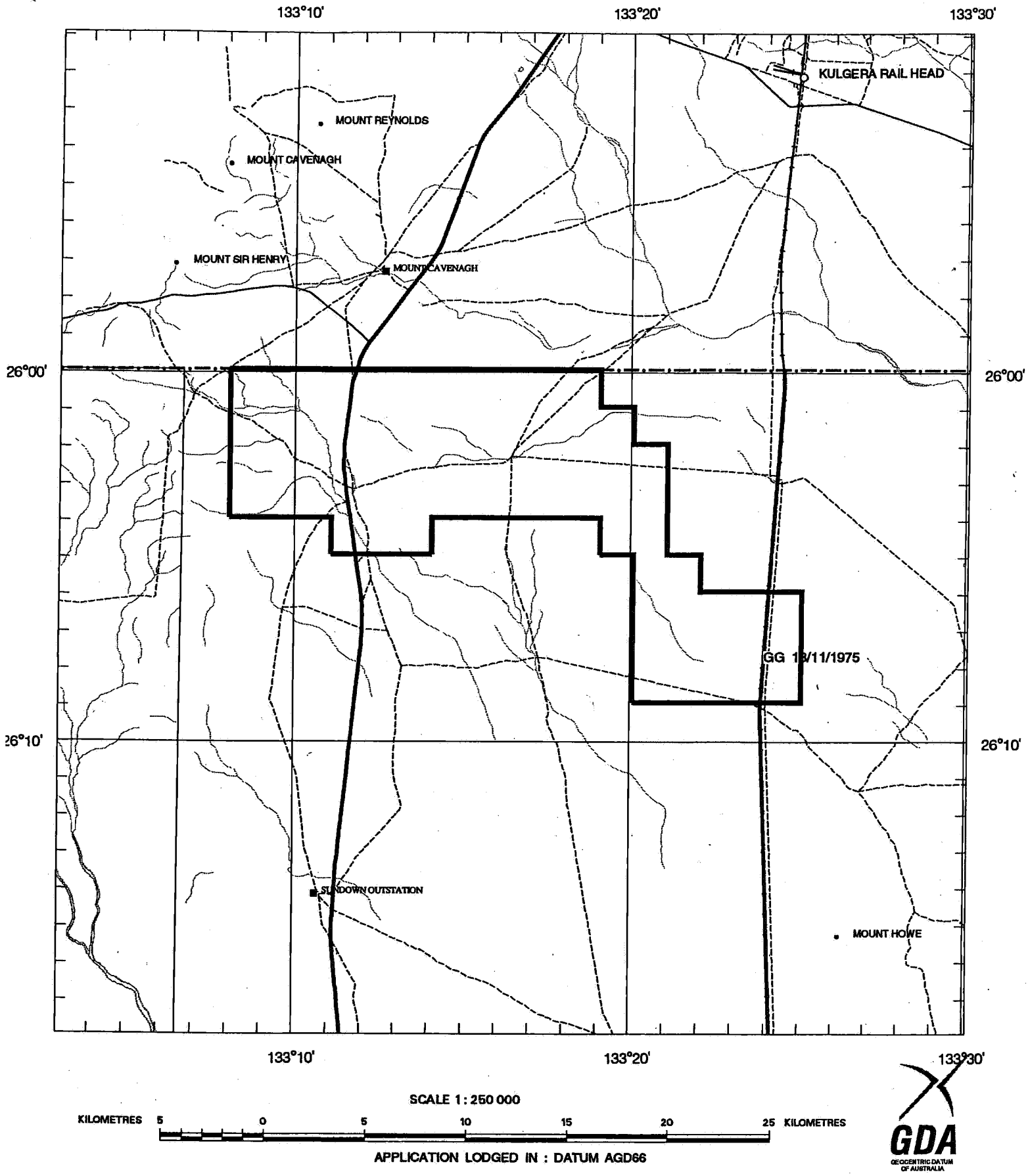
Interpretation of these surveys was carried out by consulting geophysicist Dr. D. Barrett. Five magnetic zones were identified in the tenement area and discussed in the geophysical report which is included as an Appendix. Only Zone 5 in not represented in the relinquished area, so the text fully covers comments on Zones 1-4. Certain anomalies referred to in the geophysical report are not shown on the accompanying interpretation plan, however, as they lie within the retained area. This plan was only produced as a hand-drawn overlay and is not available in digital form. No modeling of anomalies was undertaken within the relinquished area.

No other data has been obtained in the relinquished area.

Report by: S. Toteff, Ph D

S. Toteff 19/6/01

FIG. 1



SCALE 1 : 250 000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICATION LODGED IN : DATUM AGD66

GDA GEOCENTRIC DATUM OF AUSTRALIA

APPLICANT : **S TOTEFF**

FILE REF : **1/01** TYPE : **MINERAL ONLY** AREA : **219** km² (approx.)

1:250000 MAPSHEETS : **ALBERGA**

LOCALITY : **MT HOWE AREA - Approximately 130 km northwest of Marla**

DATE GRANTED DATE EXPIRED EL No :

Barrett
Geophysical
Exploration
Consultants
Pty Ltd
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EL 2143, MT. IRWIN AREA

MUSGRAVE BLOCK, SOUTH AUSTRALIA

INTERPRETATION OF AIRBORNE GEOPHYSICAL DATA

A Report for Expectation Pty. Ltd.

by

D. M. Barrett PhD AIG

Consulting Geophysicist
Perth, Australia

October 1997

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INTRODUCTION

During August 1997, Australian Geophysical Surveys of Perth carried out an airborne magnetic and radiometric survey over EL 2143 on behalf of Expectation Pty. Ltd. Processing of the data was done by Baigent Geosciences Pty. Ltd. The survey was flown along north to south lines with a flight line spacing of 100 m and a terrain clearance of 60 m. Further information regarding the survey specifications may be found in Appendix 2.

The Musgrave Block comprises mostly high grade, Mesoproterozoic, metamorphic rocks. The area within the tenement is largely covered by Quaternary soils and there is very little outcrop of the basement lithologies. In some recent mapping, S Toteff (private communication) has identified magnetite-bearing quartzites and basic dykes on the property.

At the request of Mr Paul Anthony of Aramont Pty. Ltd., an interpretation was made of the survey data. The results of this interpretation are presented in this report.

DATA PROCESSING

The airborne data was supplied by Baigent Geosciences as located and gridded digital data on CD-Rom. A number of pixel maps and contour maps of the data were prepared using Geosoft and ER-Mapper software. Three magnetic anomalies were modelled using the Potent inversion programme.

RESULTS

Overview of the Magnetic Data

The magnetic data shows an intricate pattern of short wavelength anomalies with a distinctive texture. The texture is due mainly to sets of intersecting faults, which break a variably magnetic basement into a tessellated pattern of blocks. The faults themselves are often loci of reduced magnetic response due to the destruction of magnetic minerals. Some of the faults, or possibly shear zones, cutting through the property are prominent magnetic lows with apparent widths of 100 to 200 m. Similar responses are often observed with granitoid rocks in many geological environments is Australia, including the Gawler Craton. The larger NE-trending faults form a parallel set to regional structures such as the Ferdinand and Intersection Faults.

A prominent magnetic high with an amplitude of 2000 nT is located along the western margin of the survey. This anomaly is caused by a magnetic unit distinct from the remainder of those on the property.

Overview of the Radiometric data

The radiometric data are dominated by the response of the Quaternary cover. There is an elevation change of about 100 m across the property with a generally gentle downward slope from west to east. The broad drainage areas have radiometric responses that are elevated in potassium, probably reflecting higher concentrations of clay minerals.

The Bi 214 channel (uranium) shows a spotty pattern with a few isolated areas having an increased uranium response. The maximum uranium/background ratio for these areas varies between 3 to 5. While such ratios would not be considered large, they could be of potential interest.

Description of Specific Magnetic Zones and Anomalies

An interpretation overlay of the data is shown in Map 1

Zone 1

A zone of moderate magnetic response with typical anomaly amplitudes in the range of 400 to 500 nT. The basement is fairly uniformly magnetised, and the anomalies arise mainly from the presence of lineaments with reduced magnetic response interpreted to mark faults or shear zones. One prominent NE structure, F1, parallels the Intersection Fault.

The general uniformity of the magnetic response implies that the basement rocks, presumably Birksgate Complex, are fairly uniform in composition within this zone.

Zone 1 is terminated along the south west by the conspicuous, linear magnetic low, F2, trending 295 degrees. This slightly curved lineament is interpreted to be a fault or shear zone. The change of magnetic amplitude across it means that the rocks on either side are of different susceptibility, which signifies that the displacement is vertical as well as horizontal. This fault clearly offsets the NE structures and appears to be one of the youngest structures in the area.

Zone 2

This large zone extends southwards from interpreted fault F2, to near the southern limit of the survey. Its western boundary is marked by a subtle change in amplitude.

The magnetic amplitudes in this zone are generally lower than in Zone 1 suggesting that while the basement is also composed of Birkdale Complex, it may be more felsic in composition. The magnetic response is however variable pointing to the presence of several litho types. The relative uniformity of some of the magnetic anomalies such as D and E, indicate broad zones of similar rock type akin to the basement of Zone 1. In other areas are more isolated, small anomalies of higher amplitude such as Anomalies B and C. Groups of similar anomalies lie to the west and south of B and to the North of C.

Inversion models for Anomalies B and C may be found in Appendix 1. Vertical, cylindrical bodies, ellipsoidal in cross section were used to model both anomalies and induced magnetism only was assumed. The modelling results are summarised below:

Anom. No.	AMG E (m)	AMG N (m)	Amplitude (nT)	Depth (m)	A-axis (m)	B-axis (m)	Depth extent (m)	Suscep. (SI)
B	341485	7109518	400	50	150	97	150	0.18
C	331477	7116080	300	25	121	300	250	0.04

Both anomalies were effectively registered on only one flight line leading to the relatively small horizontal dimensions of the causative bodies. The bodies are both shallow, the depth being interpreted depth below ground surface. The apparent susceptibilities are moderate to high and are equivalent to about 1% to a few % magnetite by volume.

The anomalies may not all relate to similar rock types. Some are isolated and equi-dimensional, while others resemble a culmination in a linear trend.

Anomalies such as these are of potential interest as they may relate to base metal mineralisation containing magnetite or possibly kimberlites. Several companies including Caldera Resources are exploring for diamond-bearing diatremes in the north of South Australia, particularly on the Abminga sheet. Although some interesting magnetic anomalies (Robinson and Barrett 1995) are being followed up, information is still awaited regarding positive exploration results. The relatively large amplitudes of the anomalies considered here make it less likely that they are kimberlite-related.

The magnetic fabric of Zone 2 is dominated by linear lows interpreted to be faults and shear zones. The largest of these is F3 which trends 060 degrees and appears to be a continuation of F1 in Zone 1 which has been displaced across structure F2. F3 is a regional structure visible on regional magnetic data published by the Dept. of Mines and Energy, South Australia (MESA).

In association with the larger lineaments are a number of areas of low magnetic response such as F, G, H and I. In these areas the magnetism of the rocks has been noticeably reduced possibly by fluid introduction along the faults. Helix Resources and other companies exploring for gold in the Gawler Craton are targeting structures with geophysical signatures, in particular demagnetised portions of regional shear zones. These zones of demagnetisation apparently reflect the replacement of magnetite by haematite during brecciation and alteration processes in a mainly granitoid host rock. Although the gold potential of the Musgrave Block has yet to be established, these zones are of potential interest for gold and base metal deposits.

The western side of Zone 2 contains a number of narrow, curvi-linear anomalies trending ENE to WNW. These features are more numerous in Zone 4 and are thought to be basic dykes including the Alcurra dyke swarm. S. Toteff has also mapped magnetite-bearing quartzites in the area and some of

these magnetic features may relate to these. These features are probably more numerous than shown in Map I but they are not always easy to identify in a magnetic background of substantial amplitude. They can also be confused with faults and vice versa.

Zone 2 contains the largest uranium anomaly, J, recorded during the survey. Although not particularly large, this anomaly has a peak uranium count of 57 cps against a background count of about 10 cps and is associated with a topographic high recorded in the digital terrain model. The DTM topography at this location looks slightly suspicious and I asked the contractors to re-check their data. They state that the aircraft climbed rapidly at this location to avoid a radio mast. In itself this should not invalidate the DTM or radiometric data but it is possible that the altitude corrections applied to the radiometrics may not have been able to follow the rapid change in aircraft height. In summary, although there is some doubt about the validity of the uranium reading at location J, this small anomaly requires ground checking.

Zone 3

Lying along the southern limits of the survey area, this is a zone of moderate and flat response. The basement is considered to be composed of predominantly one litho type of the Birksgate Complex.

Zone 4

Covering the western half of the survey area, this zone is similar to Zone 2 with a variety of magnetic responses. A characteristic feature is the appearance of north and north east trending, positive, curvi-linear anomalies of moderate amplitude. These anomalies are disrupted by faulting and cut by the basic dyke systems. The are considered to represent extensive, more mafic units in the Birksgate Complex.

32 8400
711 2600

Zone 4 contains two areas of demagnetisation, K and L which may be of interest though they are not directly associated with regional structures as in the case of Zone 2.

A uranium anomaly at the position M is the second largest recorded during the survey. Located on flat ground, it has a uranium count of 56 cps on a background of 15 cps.

CONCLUSIONS AND RECOMMENDATIONS

The airborne geophysical survey over EL 2143 has provided a good base for initial exploration. Apart from one extensive anomaly considered to arise from an intrusive of the Giles Complex, the area is underlain mainly by rock units of the Birksgate Complex which have been intensely faulted and sheared.

The geophysical data reveals a number of features of interest that may provide exploration opportunities and include:

1) Regional faults and shear zones – conduits for mineralising fluids.
2) Zones of demagnetisation, often associated with large fault/shear zones – areas of alteration.
3) Isolated magnetic anomalies, and amplitude culminations along magnetic trends – possible base metal or kimberlite targets.

5) Two areas of elevated uranium response – possible uranium targets.

Although only a limited number of anomalies were modelled and these indicated shallow sources, inspection of the magnetic maps suggests that none of the basement in the survey area is very deep. The above areas provide a focus for initial exploration activities. The uranium anomalies should be ground checked with a scintillometer or gamma ray spectrometer. It is recommended that magnetic modelling should be undertaken over any magnetic features prior to more advanced follow up such as drilling. In specific cases, a limited ground magnetic survey should be carried out over the area of interest.

Doug Barrett

October 1997

REFERENCE

Robinson, S H and Barrett, D M (1995) Interpretation and field investigation of some aeromagnetic anomalies from the Abminga area, South Australia, Explor. Geophysics, vol. 26, pp269-275.

DATA RELINQUISHMENT ONLY

LOCATED DATA TAPE:

Area : EL 2143
Company Flown by: Australian Geophysical Surveys
Company Flown for: Expectation Pty Ltd.
Company Processed: Baigent Geosicences Pty. Ltd.

AIRBORNE SURVEY EQUIPMENT:

Aircraft	Beechcraft Baron VH-WDE
Magnetometer	Scintrex CS-2 Caesium Vapour
Magnetometer Resolution	0.001 nT
Magnetometer Compensation	RMS AADC operating in real time
Magnetometer Sample Interval	0.1 seconds (approx 7.0 metres)
Data Acquisition	PICODAS
Data Recording	1 Gbyte Hard Disk
Spectrometer	Exploranium GR820
Crystal Size	33.6lt downward array
Spectrometer Sample Interval	1.0 Seconds (approx 70 metres)
Flight Path Record	VHS Colour Video System
GPS Navigation System	NovAtel

with Racal real time differential correction

AIRBORNE SURVEY SPECIFICATIONS:

Flight Line Direction	000 - 180 degrees
Flight Line Separation	100 metres
Tie Line Direction	090 - 270 degrees
Tie Line Separation	1000 metres
Terrain Clearance	60 metres (MTC)

Survey flown	August 1997
Australian Geophysical Surveys job number	1064

Data are in UTM Grid Zone 53

MAGNETIC DATA CORRECTIONS:

Diurnal variations removed
IGRF(1995) updated to 1997.66 removed
Average survey base station value of 5000 nT added to datum

RADIOMETRIC CORRECTIONS AND COEFFICIENTS:

Data has been corrected for aircraft and cosmic backgrounds.
Height corrected to a constant datum of 60 metres,
minimum height of 20 and a maximum of 300 metres.
Data has also been corrected for channel interaction and radon minimized.

	Tot.Count	Potassium	Uranium	Thorium
Arcft Bkg	92.2	9.68	3.75	5.96
Cosmic Bkg	0.6415	0.0355	0.0281	0.0371
Height Attn	-0.0087	-0.00111	-0.00630	-0.0091

STRIPPING RATIOS:

Alpha = 0.3243, Beta = 0.4299, Gamma = 0.8264, a = 0.234

MAGNETIC DATA FORMAT: - *mag.asc

---

line number	a8
date	a8
fiducial	f10.0
easting	f11.1
northing	f11.1
raw magnetics	f9.2
diurnal	f9.2
levelled magnetics	f9.2
radar altimeter	f7.2
gps height	f7.2
flight number	f4.0
local time	f9.5
linefeed character	

logical record length of 102 bytes

RADIOMETRIC DATA FORMAT: - *rad.asc

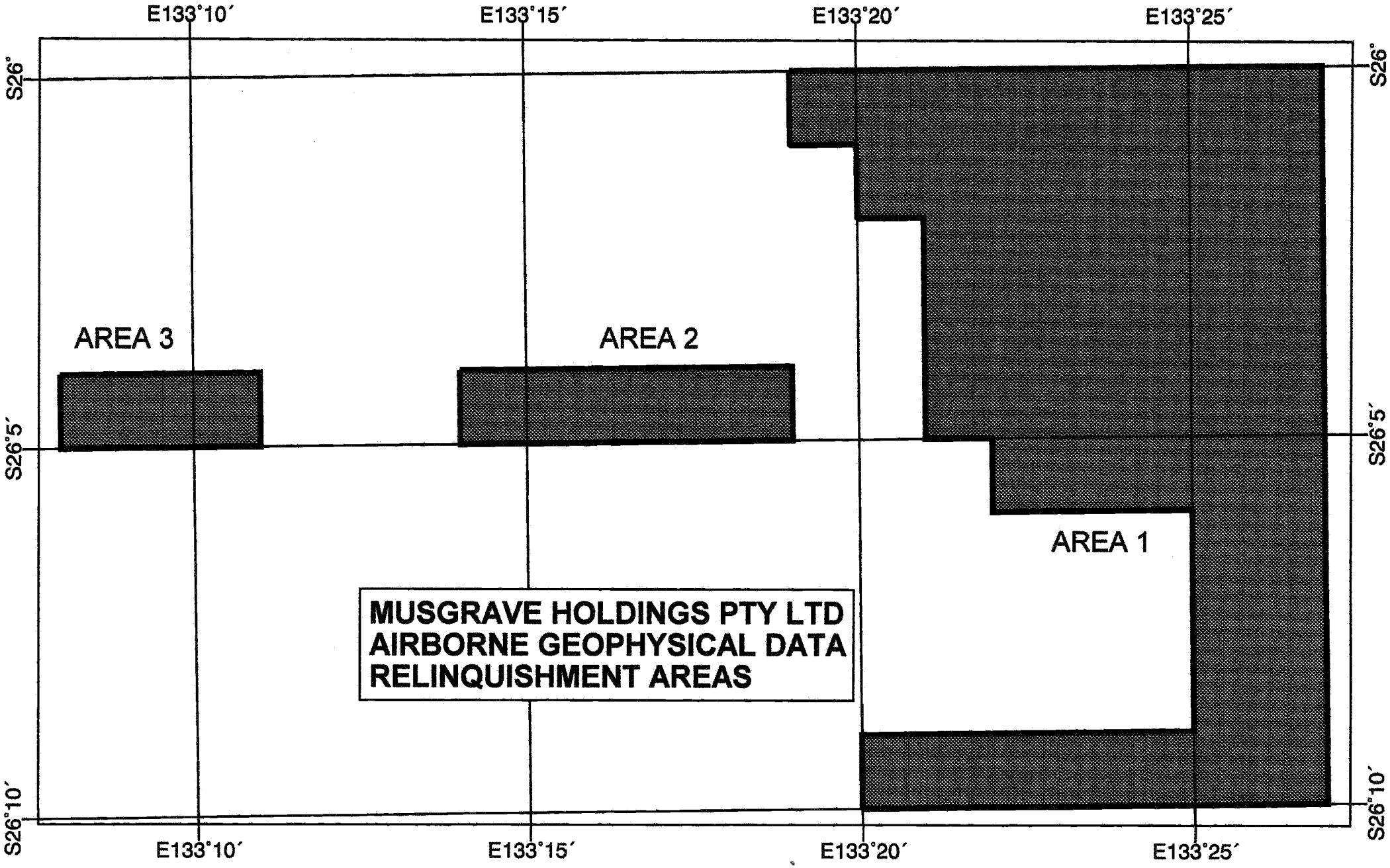
---

line number	a8
date	a8
fiducial	f10.0
easting	f11.1
northing	f11.1
radar altimeter	f7.2
gps height	f7.2
dtm	f7.2
raw total count	f6.0
raw potassium	f5.0
raw uranium	f5.0
raw thorium	f5.0
corrected total count	f6.0
corrected potassium	f5.0
corrected uranium	f5.0
corrected thorium	f5.0
cosmic	f5.0
temperature	f7.2
flight number	f4.0
linefeed character	

logical record length of 123 bytes

*** Note ***
Null records are padded out with the line number followed by a string of numeric 9 ie.

1034199999999999999999999999999999999999999999999999999999999999999


E133°10′
E133°15′
E133°20′
E133°25′
S26°
S26°5′
S26°10′
AREA 3
AREA 2
AREA 1
MUSGRAVE HOLDINGS PTY LTD
AIRBORNE GEOPHYSICAL DATA
RELINQUISHMENT AREAS

320 000E

330 000E

340 000E

7120 000N

7110 000N

ZONE 1

ZONE 2

ZONE 3

EXPECTATION PTY. LTD.

EL 2143

MT IRWIN AREA, SOUTH AUSTRALIA

ENTERPRETATION OF AIRBORNE GEOPHYSICAL SURVEY

N

SCALE 1:50,000

MAP 1

BARRETT GEOPHYSICAL EXPLORATION CONSULTANTS

LEGEND

- ZONE 2 — MAGNETIC ZONES
- MAGNETIC ANOMALIES
- FAULTS AND SHEAR ZONES
- BASIC DYKES
- C — DISCRETE MAGNETIC ANOMALIES
- (A) — FEATURES REFERRED TO IN TEXT