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NUMBER 8979

EL 2020 MOUNT HOWE

ANNUAL AND FINAL REPORTS FOR THE PERIOD
26/9/94 TO 17/6/98

Submitted by

Rio Tinto Exploration Pty Ltd
1998

MINES and ENERGY RESOURCES SOUTH AUSTRALIA

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ENVELOPE 8979

TENEMENT: EL 2020, Mount Howe

TENEMENT HOLDER: Rio Tinto Exploration Pty Ltd (formerly CRA Exploration Pty Ltd)

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SEPARATELY HELD DATA

DRILLHOLE SAMPLES (held by MESA Core Library)

For up to date information on available drillhole samples, contact the Supervisor, MESA Core Library and quote the Exploration Licence and drillhole number/s you wish to query.

TYPE : AEROMAG./RAD. AIRBORNE TEM

NUMBER/S: AC95 MH 01-41

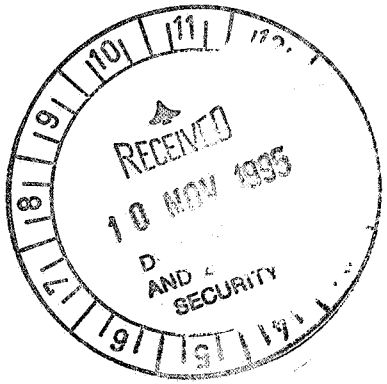
CRA EXPLORATION PTY. LIMITED

MT. HOWE EL 2020, SOUTH AUSTRALIA

ANNUAL REPORT FOR THE FIRST YEAR OF TENURE

ENDED 25TH SEPTEMBER, 1995

Alberga SG5309, South Australia



AUTHOR: A.R. HUGHES

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ET&I BOX HILL
CRAE ADELAIDE

DATE: OCTOBER, 1995

SUBMITTED BY:

ACCEPTED BY:

LIST OF PLANS

Plan No.	Title	Scale
SAa 6282	Mt. Howe EL 2020, S.A. - Location Plan	1:250 000
SAa 6520	Mt. Howe EL 2020, S.A. - Anomaly Locations	1:100 000
SAa 6518	Mt. Howe EL 2020, S.A. - Aeromagnetic Contours	1:100 000
SAa 6519	Mt. Howe EL 2020, S.A. - Aeromagnetic Stacked Profiles	1:100 000
SAa 6517	Mt. Howe EL 2020, S.A. - Airborne Survey Flight Path	1:100 000
SAa 6506	Mt. Howe EL 2020, S.A. - Bruce's Bore Ground Magnetic Profiles	1: 25 000
SAa 6427	Mt. Howe EL 2020, S.A. - Line 7099900N Ground Magnetic Profile	1: 5 000
SAa 6428	Mt. Howe EL 2020, S.A. - Line 7098200N Ground Magnetic Profile	1: 5 000
SAa 6429	Mt. Howe EL 2020, S.A. - Cavanagh Prospect Ground Magnetic Profiles	1: 10 000
SAa 6430	Mt. Howe EL 2020, S.A. - Line 7097900N Ground Magnetic Profile	1: 5 000

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Appendix I	Airborne Geophysical Survey Logistics Report
Appendix II	Rock Geochemical Sample Ledger
Appendix III	Soil Geochemical Sample Ledger

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1. SUMMARY

Exploration Licence 2020, Mt. Howe, was acquired to investigate 3 major magnetic features evident in regional scale aeromagnetic data. Investigations commenced with a detailed aeromagnetic and radiometric survey and this was followed up by ground magnetometry and soil sampling of a number of target areas including the 3 major magnetic anomalies at Bruce's Bore, Wallaby Rock and Mt. Howe. The airborne survey also located a small intense dipolar magnetic anomaly (Cavanagh prospect) and an elevated radiometric response to the east of Mt. Howe.

The Mt. Howe and Wallaby Rock anomalies were found to be caused by magnetic granite and the Mt. Howe East radiometric anomaly by a large outcrop of arkosic rock. The sources of the Bruce's Bore and Cavanagh magnetic anomalies do not outcrop and are yet to be identified.

2. INTRODUCTION

Exploration Licence 2020, comprising approximately 1121 km^2 as shown on attached plan SAa 6282, was granted to CRA Exploration Pty. Limited (CRAE) for a one year period from 26th September, 1994.

The licence area is situated approximately 10 km south of the SA-NT border straddling the Stuart Highway and the Tarcoola to Alice Springs railway line and covers parts of Mt. Cavanagh, De Rose Hill and Tieyon properties.

Title was acquired to permit investigation of the source of a number of aeromagnetic anomalies evident in regional BMR data, principally for nickel and precious metal targets.

This report documents investigations undertaken by CRAE during the first year of tenure of EL 2020, Mt. Howe.

3. CONCLUSIONS & RECOMMENDATIONS

From the data collected and geological observations made it is concluded that:

- the Mt. Howe and Wallaby Rock magnetic anomalies are due to magnetic granites
- the Mt. Howe East radiometric anomaly reflects the contrast between outcropping arkose and surrounding soil covered plain. Proximity of the aircraft to the hill during data collection would have accentuated the contrast thus producing the radiometric anomaly.
- the above anomalies are of no economic significance.

Investigations have been unable to determine the sources of the Bruce's Bore and Cavanagh anomalies and it is recommended that these be resolved by drilling at both sites.

4. INVESTIGATIONS

4.1 Airborne Geophysical Survey

An airborne magnetic and radiometric survey was flown over the entire licence area with a 200 metre line separation and 60 metre mean terrain clearance. Flight path recovery utilised Real time differential GPS. Full details of the survey are given in the logistics report which is included as Appendix I.

The flight path of the survey is included as plan SAa 6517 and magnetic data represented as contour plan SAa 6518. Digital magnetic and radiometric data were also used to produce image plans which are unsuitable for microfilm storage and are not included with this report.

The main features evident in the results of the magnetic survey are general N-S striking magnetic stratigraphy (probable Musgrave metamorphics) cut by:

- ESE trending magnetic dolerite dykes,
- 3 large positive magnetic feature in the Mt. Howe, Wallaby Rock and Bruce's Bore areas (attributed to intrusives)
- A number of areas of subdued magnetic response (non-outcropping intrusives or thicker overburden)
- A small, discrete inversely polarised dipolar feature (Cavanagh anomaly).

Elevated radiometric responses coincide with outcrops of granitic and arkosic rocks.

Follow up work has concentrated on the Mt. Howe, Wallaby Rock, Bruce's Bore and Cavanagh magnetic anomalies and the Mt. Howe East radiometric anomaly.

The locations of the prospect areas are shown on plan SAa 6520.

4.2 Mt. Howe East Radiometric Anomaly

An area of outcrop measuring 1500 x 300 metres projecting up to 80m above the plain coincides with the strongest radiometric response from the airborne survey. Field checking revealed foliated arkosic rocks which gave a reading of up to 500 counts per second on a Scintrex BGS4 scintillometer compared to a background level of 130 cps on the surrounding plain.

Two rock samples from areas of elevated radioactivity contained no economically significant concentrations of metals. Rock sample ledgers and assay results are included as Appendix II and sample locations are shown on plan SAa 6520.

4.3 Mt. Howe Magnetic Anomaly

Numerous outcrops of granite with coarse magnetite grains and magnetic susceptibilities between 2000 and 6000 x 10^{-5} SI units were located within the area of the aeromagnetic anomaly. A single 500m traverse of ground magnetometry numbered 7099900N and 6 x 100m spaced soil samples were collected across a linear magnetic feature to the northwest of the interpreted Mt. Howe intrusive body. No outcrop was present and results of the soil sampling were not considered to be significant. Soil sample ledgers are included as Appendix III and the traverse location is shown on plan SAa 6520. The magnetic data for the traverse are included as plan SAa 6427.

4.4 Wallaby Rock Magnetic Anomaly

Numerous outcrops of magnetic granite similar to those at Mt. Howe were observed over the area of the Wallaby Rock anomaly. Single lines of ground magnetic surveying were completed across linear anomalies to the NW and NE of the interpreted Wallaby Rock intrusive on lines 7097900N and 7098200N respectively. Soil samples at 100m spacings were also collected at line 8200N where no outcrop is present. Outcropping magnetic amphibolite was found to be the cause of the anomaly on line 7097900N. Magnetic data are shown on plans SAa 6430 and 6428 and soil results on ledgers in Appendix III.

4.5 Bruce's Bore Magnetic Anomaly

No outcrop occurs in the vicinity of the main magnetic high. Some magnetic dolerite was observed peripheral to the main anomaly.

These rocks have an ENE strike direction and may be unrelated to the more common dyke set which generally show an ESE orientation. Five lines of ground magnetometry and soil sampling were completed across the anomaly as shown on plan SAa 6520. Magnetic data are depicted on plan SAa 6506 and soil ledgers and results included in Appendix III. One soil sample reported a value of 220 ppm Zn against a background of 60 ppm.

4.6 Cavanagh Magnetic Anomaly

A small intense dipolar magnetic anomaly with reversed polarity is situated in an area of no outcrop approximately 6 km NW of Wallaby Rock. The position of the anomaly was confirmed by ground magnetometry. Five soil samples were collected from the area and a surface loam sample was processed and its heavy mineral concentrate examined. Three grains of chromite were noted in the 121 grams of concentrate which was dominated by hematite. The source of the magnetic anomaly could not be determined from the soil sample assays or the heavy mineral suite. Magnetic results are shown on plan SAa 6429 and soil results are included in Appendix III.

A.R. HUGHES

ARH/dt REPORTS#Mt. Howe 2020

KEYWORDS

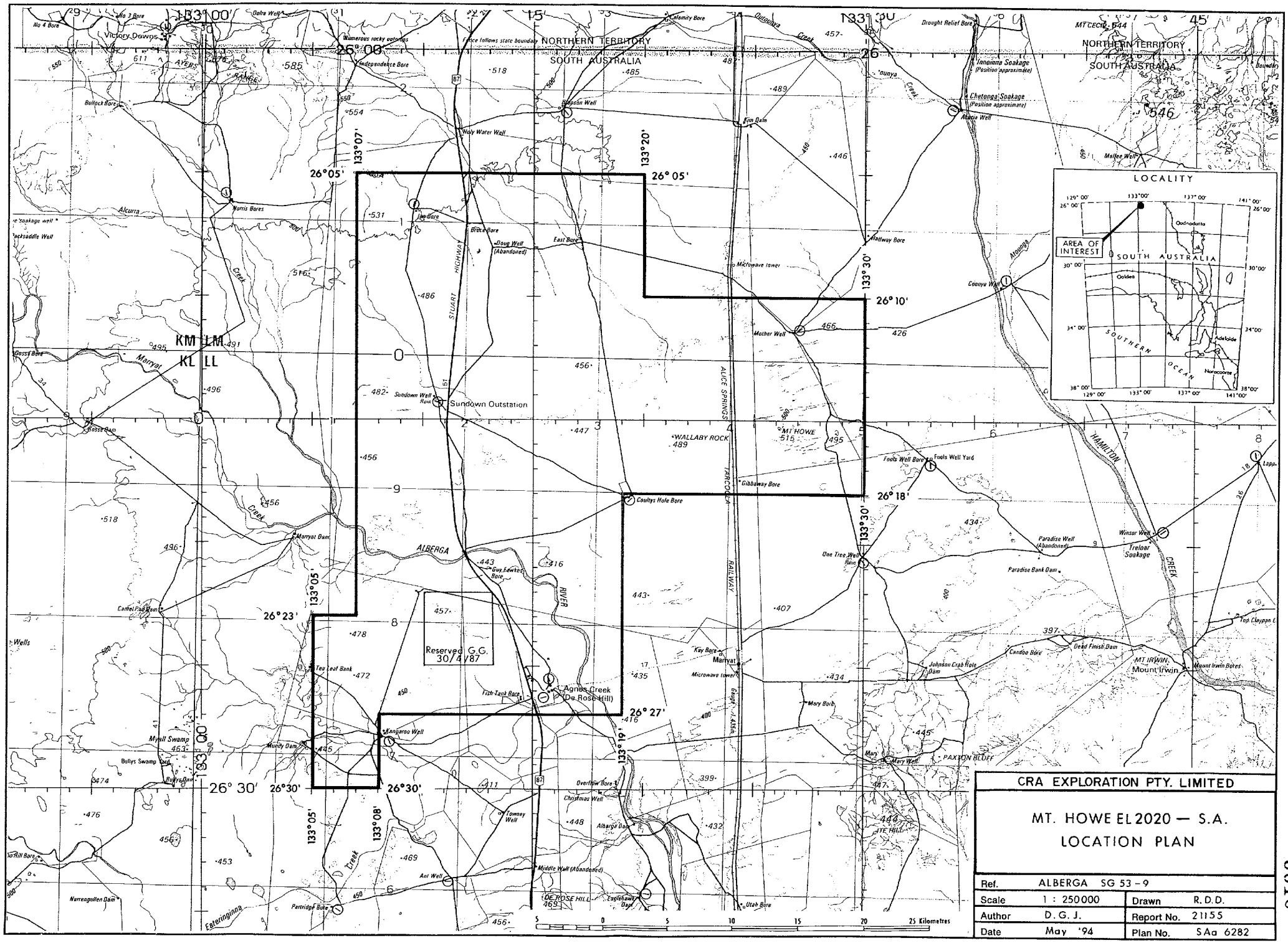
Airborne survey, Geophys-mag, Geophys-radiometrics, Geochem-soil, Bruce's Bore, Cavanagh

LOCATION

Alberga	SG53-09	1:250 000 sheet
Alcurra	5545	1:100 000 sheet

LIST OF DPO's

53146, 57701, 57703

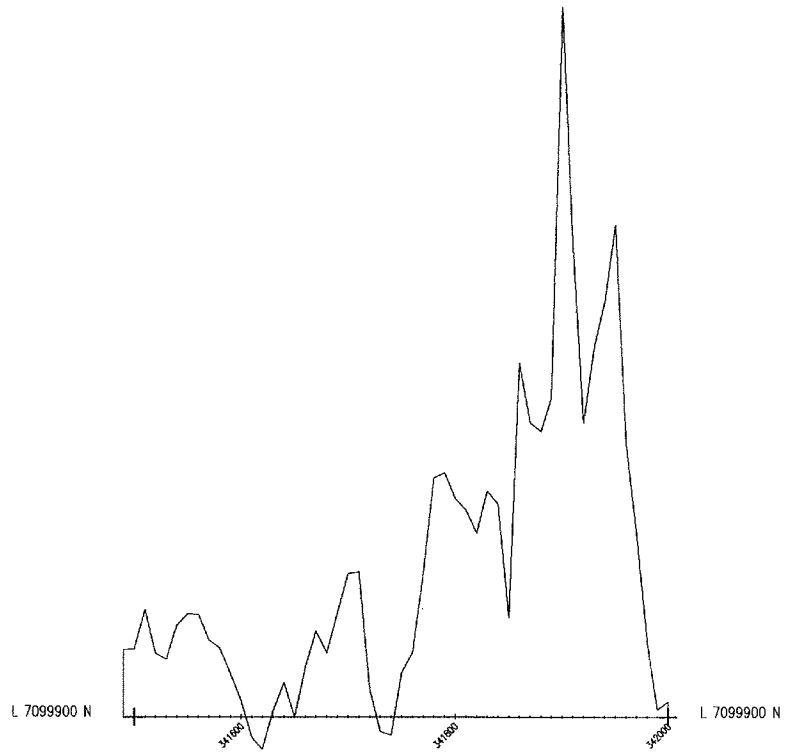


CRA EXPLORATION PTY. LIMITED

MT. HOWE EL 2020 — S.A.
LOCATION PLAN

Ref.	ALBERGA SG 53 - 9		
Scale	1 : 250000	Drawn	R.D.D.
Author	D.G.J.	Report No.	21155
Date	May '94	Plan No.	SAa 6282

0010



SPECIFICATIONS

Data:
Diurnal correction applied.
Data collected at 10 metre stations
using Scintrex MP-3 Magnetometer.

Profile:
Amplitude scale - 100 nT/cm
Base Scale - 55300 nT

Scale 1:5000

100 0 100 200

(meters)

CRA

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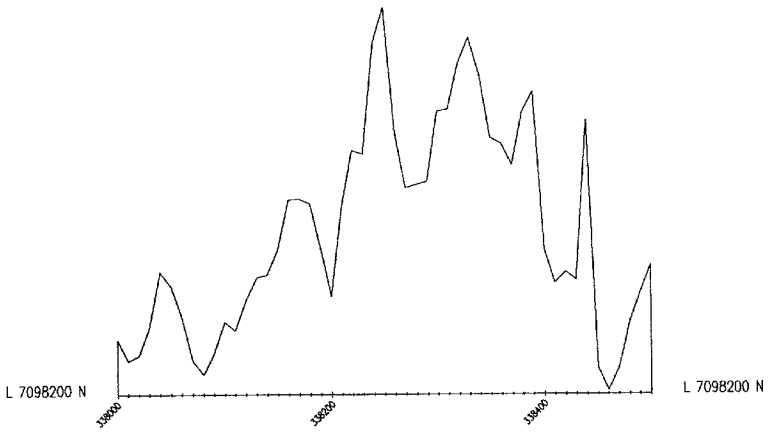
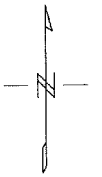
MT HOWE EL 2020 SA

MAG. TRAVERSE - GRID 01

GROUND MAGNETIC PROFILES

REF ALBERGA SG 53-09	
SCALE 1: 5000	DRAWN MP
AUTHOR MP	REPORT 21155
DATE April 95	PLAN No6427





SPECIFICATIONS

Data:
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Data collected at 10 metre stations
using Scintrex MP-3 Magnetometer.

Profile:
Amplitude scale - 100 nT/cm
Base Scale - 54900 nT

Scale 1:5000

100 0 100 200

(meters)

CRA

CRA EXPLORATION PTY LIMITED

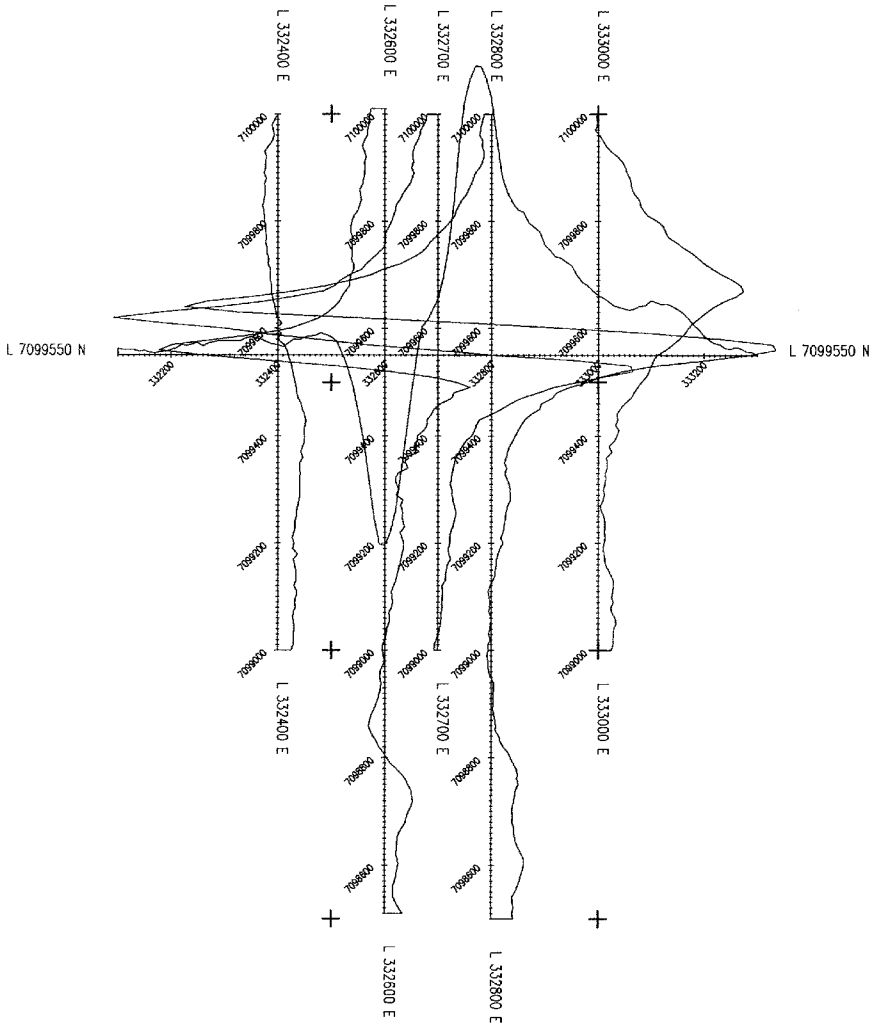
MT HOWE EL 2020 SA

MAG. TRAVERSE - GRID 02

GROUND MAGNETIC PROFILES

REF ALBERGA SG 53-09	
SCALE 1: 5000	DRAWN MP
AUTHOR MP	REPORT 21155
DATE April 95	PLAN No6428

0012



Scale 1:10000

100 0 100 200 300 400 500

(meters)

SPECIFICATIONS

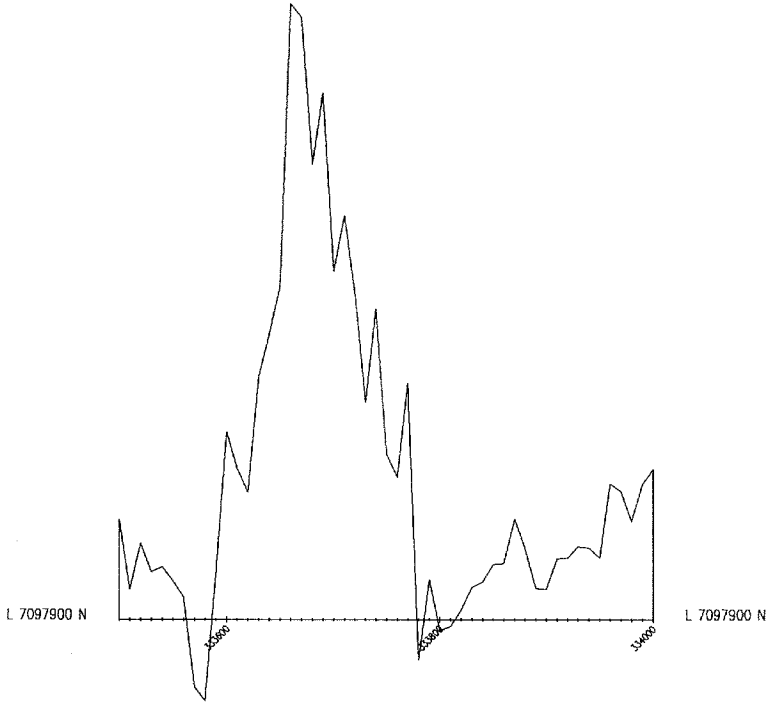
Data:
Diurnal correction applied.
Data collected at 10 metre stations using Scintrex MP-3 Magnetometer.

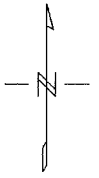
Profile:
Amplitude scale – 500 nT/cm
Base Scale – 55000 nT

CRA

CRA EXPLORATION PTY LIMITED	
MT HOWE EL 2020 SA	
MAG. TRAVERSE – GRID 03	
GROUND MAGNETIC PROFILES	
REF ALBERGA SG 53-09	
SCALE 1: 10000	DRAWN MP
AUTHOR MP	REPORT 21155
DATE April 95	PLAN No6429

0013





SPECIFICATIONS

Data:
No Diurnal correction applied.
Data collected at 10 metre stations
using Scintrex MP-3 Magnetometer.

Profile:
Amplitude scale - 100 nT/cm
Base Scale - 55400 nT

Scale 1:5000

100 0 100 200

(meters)

CRA

CRA EXPLORATION PTY LIMITED	
MT HOWE EL 2020 SA	
MAG. TRAVERSE - GRID 04	
GROUND MAGNETIC PROFILES	
REF ALBERGA SG 53-09	
SCALE 1: 5000	DRAWN MP
AUTHOR MP	REPORT 21155
DATE April 95	PLAN No6430

0014

133°00'
133°30'
26°00'
310 000mE
320 000mE
330 000mE
340 000mE
7120 000mN
7110 000mN
7100 000mN
7090 000mN
7080 000mN
7070 000mN
26°05'
26°10'
26°18'
26°23'
26°27'
26°30'
133°07'
133°20'
133°30'
133°05'
133°19'
133°08'

Independence Bore
Bransons W & Yd
Hollywater W & Yd
No.5 Bore(2) Yd.
Haven Well (HD)
Douys Well
East B & Yd
Mothers W & Yd
Coultys Hole Bore
Guy Fawkes Bore
Kangaroo Well
Yd
Dam
Strock Well (PD)
B Bore
Overflow Bore
Reserved G.G. 30/4/87

Line 15700 E
Line 17000 E
Line 19200E
Line 22000E
Line 22800E

BRUCES BORE ANOMALY

CAVANAGH ANOMALY
3335408
Line 32800 E
Line 7097900N
3330658
Line 7099000N
Line 7098200 N

MT. HOWE ANOMALY
MT. HOWE 1703'
MT. HOWE EAST
3330656
3330657

WALLABY ROCK ANOMALY

Numerous outcrops of magnetic granite

3330659
3330660

ALCURRA
CK.
STUART
HWY
Highway
SUNDOWN HS
L/G
MARRYAT
RIVER
DE ROSE HILL HS
W/T
PD
Strock

0 1 2 3 4 5 6 7 8 9 10Km

Reference

- Outline of magnetic anomaly
- Outline of radiometric anomlay
- Line 7097900N — Survey line - ground magnetics only
- Line 7099000N ..... Survey line - ground magnetics and soil samples
- 3335408 ● Loam sample and number
- 3330660 × Rock sample and number

8979-1

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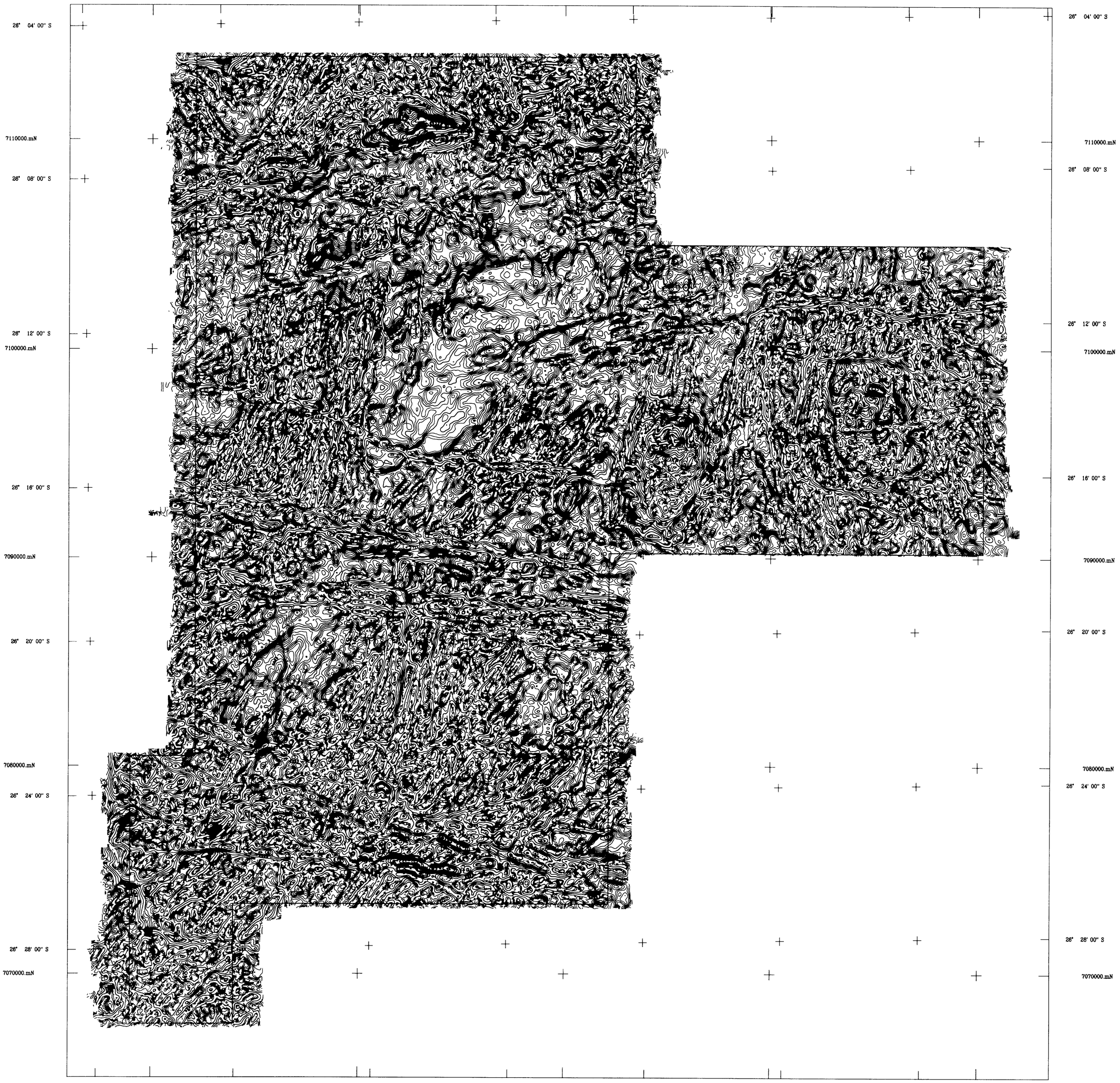
MOUNT HOWE EL 2020 - S.A.

PROSPECT LOCATION PLAN

REF. :	ALBERGA SG 53-09		
SCALE :	1:100 000	DRAWN	F.R.
AUTHOR :	A.R.H.	REPORT :	21155
DATE :	OCT. 95	PLAN NO. :	SAa 6520



AIRBORNE SURVEY EQUIPMENT

Aircraft	Rockwell Aerocommander 500S VH-WAM
Magnetometer	Scintrex VIW 2321-H6 Cesium 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	RMS DAS-8
Data Recording	DC300 data cartridges
Spectrometer	Geometrics GR820
Crystal Size	33.6lt downward, 4.2lt upward arrays
Spectrometer Sample Interval	1.0 Seconds (approx 70 metres)
Flight Path Record	VHS Colour Video System
GPS Navigation System	Ashtech XII GPS Receiver

AIRBORNE SURVEY SPECIFICATIONS

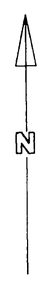
Flight Line Direction	090-270 degrees
Flight Line Separation	200 metres
Tie Line Direction	000-180 degrees
Tie Line Separation	2000 metres
Terrain Clearance	60 metres (MTC)
Kevron Geophysics job number	1280
Survey flown	November 1994

TOTAL MAGNETIC INTENSITY CONTOURS

Diurnal variations removed
IGRF(1990) updated to 1994.9 removed
Average survey base station value and a constant of 5000 nT added to datum

Grid mesh 50 x 50 metres

Contour Interval 20, 100, 500, 2500, 5000 nT



SCALE 1:100,000

2 0 2 4 6 8

Kilometres

MAP GRID ZONE 53

SPHEROID : Australian National
PROJECTION : Universal Transverse Mercator

CRA EXPLORATION Pty Ltd

Mount Howe

Airborne Geophysical Survey

TMI Contours

COMPILED : Kevron Geophysics Pty. Ltd.	REPORT : 21155
DATE : Jan 1995	PLAN NO. SAo 6518
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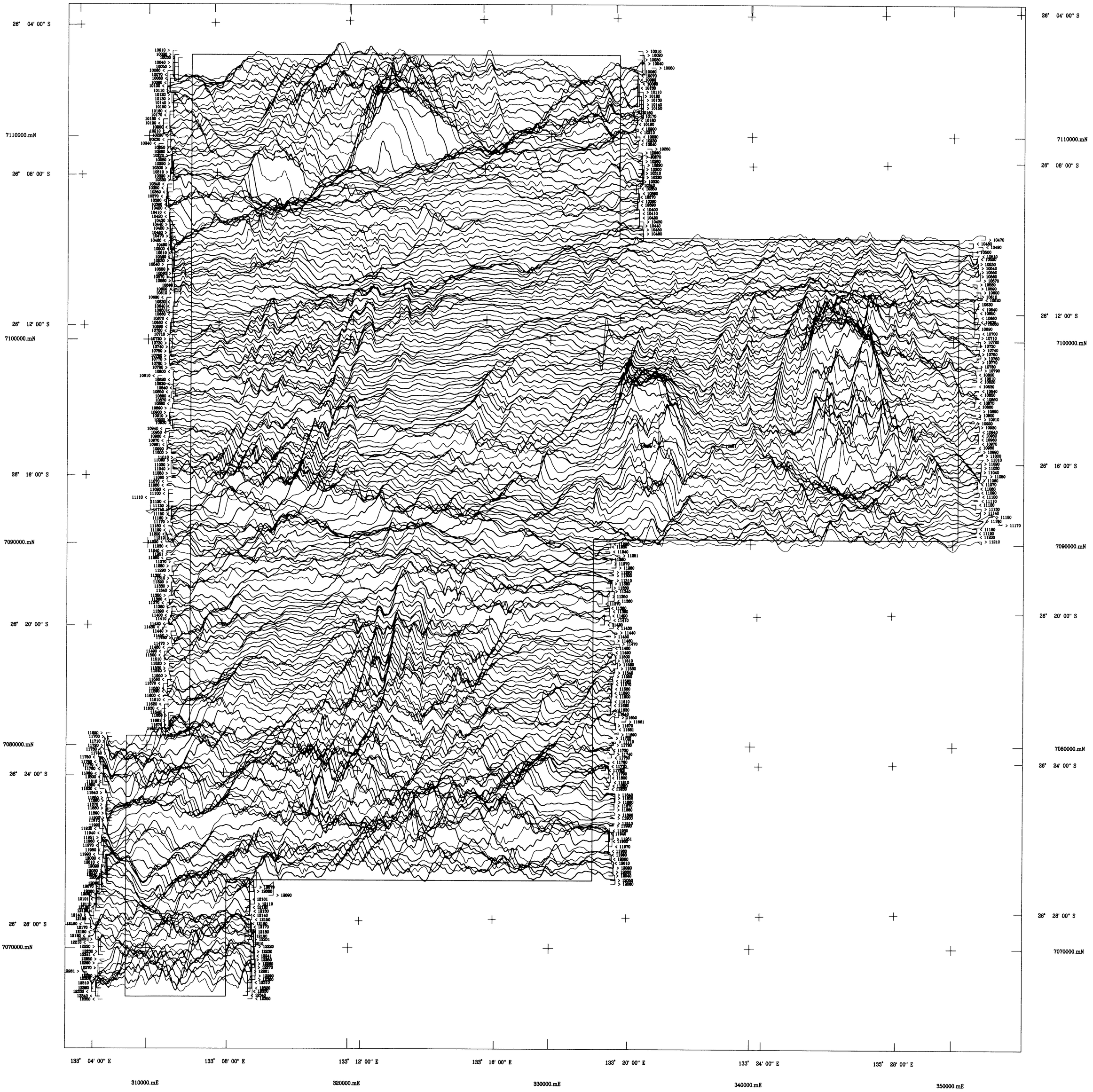

AIRBORNE SURVEY EQUIPMENT

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Magnetometer	Scintrex VIW 2321-H8 Cesium 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	RMS DAS-8
Data Recording	DC300 data cartridges
Spectrometer	Geometrics GR820
Crystal Size	33.6lt downward, 4.2lt upward arrays
Spectrometer Sample Interval	1.0 Seconds (approx 70 metres)
Flight Path Record	VHS Colour Video System
GPS Navigation System	Ashtech XII GPS Receiver

AIRBORNE SURVEY SPECIFICATIONS

Flight Line Direction	090-270 degrees
Flight Line Separation	200 metres
Tie Line Direction	000-180 degrees
Tie Line Separation	2000 metres
Terrain Clearance	80 metres (MTC)
Kevron Geophysics job number	1280
Survey flown	November 1994

TOTAL MAGNETIC INTENSITY STACKED PROFILES

Diurnal variations removed
IGRF(1990) updated to 1994.9 removed
Average survey base station value added to datum

Datum Base Value 4750 nT
Vertical Scale 500 nT / cm

SCALE 1:100,000

2 0 2 4 6 8

Kilometres

MAP GRID ZONE 53

SPHEROID : Australian National
PROJECTION : Universal Transverse Mercator

True North

CRA Exploration Pty Ltd

Mount Howe

Airborne Geophysical Survey

Stacked Profiles

COMPILED : Kevron Geophysics Pty. Ltd.	REPORT : 21155
DATE : Jan 1995	PLAN NO. SAa6519
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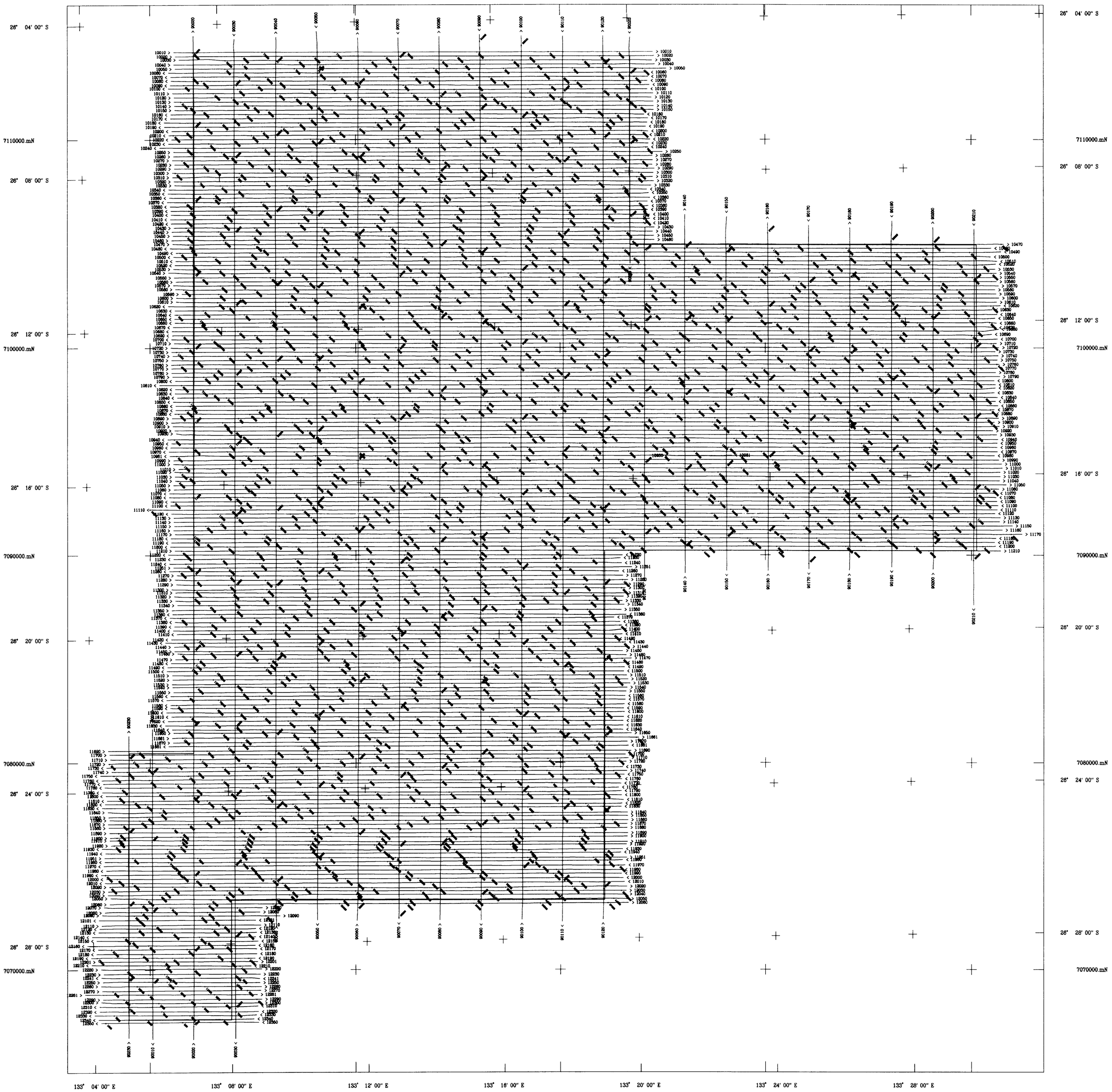


AIRBORNE SURVEY EQUIPMENT

Aircraft	Rockwell Aerocommander 500S VH-WAM
Magnetometer	Scintrex VIW 2321-H8 Cesium 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	RMS DAS-8
Data Recording	DC300 data cartridges
Spectrometer	Geometrics GR820
Crystal Size	33.6lt downward, 4.2lt upward arrays
Spectrometer Sample Interval	1.0 Seconds (approx 70 metres)
Flight Path Record	VHS Colour Video System
GPS Navigation System	Ashtech XII GPS Receiver

AIRBORNE SURVEY SPECIFICATIONS

Flight Line Direction	090-270 degrees
Flight Line Separation	200 metres
Tie Line Direction	000-180 degrees
Tie Line Separation	2000 metres
Terrain Clearance	60 metres (MTC)
Kevron Geophysics job number	1280
Survey flown	November 1994

FLIGHT PATH PROCESSING

Flight path calculated from differentially corrected GPS Data using an Ashtech Ranger XII.

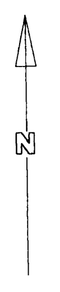
GPS navigation data differentially corrected in real time.

GPS Base Station Base at S 27 18' 17.26382", E 133 37' 24.86294"

Every 500 th fiducial annotated.

Grid notation refers to Australian Map Grid Zone 53

Kevron Geophysics



SCALE 1:100,000

2 0 2 4 6 8

Kilometres

MAP GRID ZONE 53

SPHEROID : Australian National

PROJECTION : Universal Transverse Mercator

CRA Exploration Pty Ltd

Mount Howe

Airborne Geophysical Survey

Flight Path

COMPILED : Kevron Geophysics Pty. Ltd.	REPORT : 21155
DATE : Jan 1995	PLAN NO. SAa 6517
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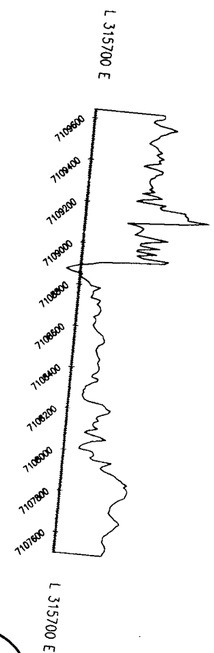

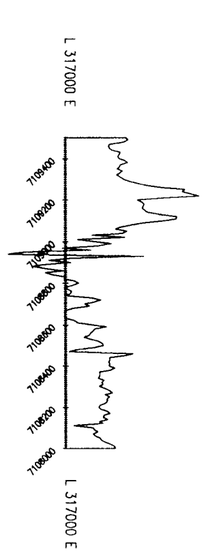

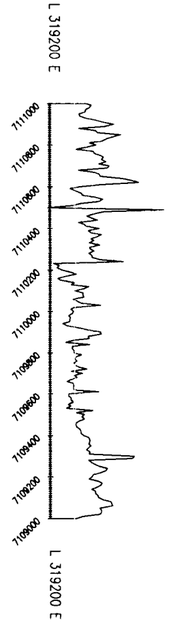

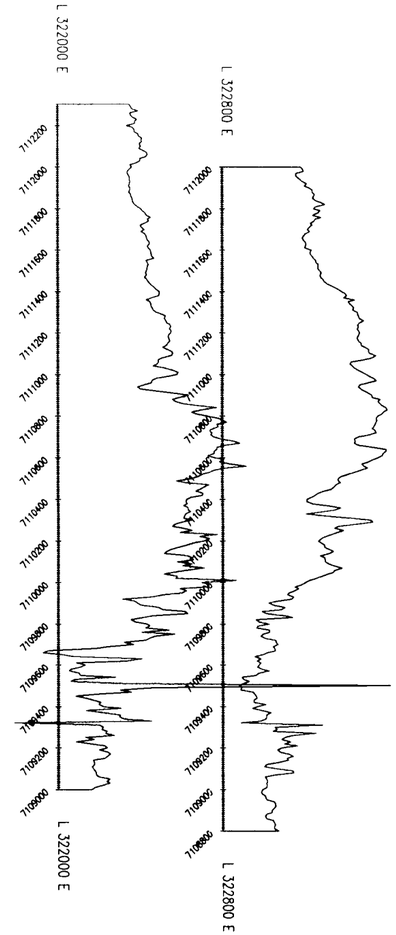

SPECIFICATIONS

Data:
Diurnal correction applied to lines:-
322000E & 322800E
No diurnal correction applied to lines:-
315700E, 317000E & 319200E
Data collected at 10 metre stations
using Scintrex MP-3 Magnetometer.

Profile:
Amplitude scale - 1000 nT/cm
Base Field - 53500 nT

Note:- Line 315700E lies 006 deg. AMG

Scale 1:25000

250 0 250 500 750 1000 1250 1500 1750
(meters)

8979-5

CRA

CRA EXPLORATION PTY LIMITED

MT HOWE EL 2020

GROUND MAGNETIC PROFILES

BRUCE'S BORE

REF. ALBERGA SG53-09 SA	
SCALE 1:25000	DRAWN MDP
AUTHOR MDP	REPORT 21155
DATE APRIL'95/SEPT'95	PLAN No 6506

APPENDIX I

Airborne Geophysical Survey Logistics Report

CRA Exploration Pty Limited

LOGISTICS REPORT

JOB 1280

Mt Howe

FLOWN AND PROCESSED

BY

Kevron
Geophysics Pty. Ltd.

November 1994

LOGISTICS REPORT

AIRBORNE GEOPHYSICAL SURVEY

KEVRON GEOPHYSICS JOB NUMBER 1280

FOR

CRA EXPLORATION PTY LIMITED

KEVRON GEOPHYSICS PTY LIMITED
Hangar 106, 10 Compass Road
JANDAKOT AIRPORT WA 6164
A.C.N. 009 190 925
Telephone: (09) 417 3188
Fax: (09) 417 3558

LOGISTICS REPORT

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5. HEADING/COMPENSATION CALIBRATIONS
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7. MAPS DELIVERED
8. DATA TAPE FORMAT

1. LOGISTICS

1.1 OPERATING BASE AND DATES OF FLYING

1.1.1 Operating Base

The crew and aircraft were based at Marla South Australia. The crew took accommodation at the Marla Hotel/Motel for the duration of the survey.

1.1.2 Dates of Flying

DATE	FLT	REMARKS	KMS FLOWN	ACCUM TOTAL
21/11	1	Operations Normal	1106.6	1106.6
22/11	2	OPerations Normal	899.8	2006.4
	3	Operations Normal	822.0	2828.4
23/11	4	Operations Normal	920.0	3748.4
	5	Operations Normal	807.3	4555.7
24/11	6	Operations Normal	999.8	5555.5
	7	Operations Normal	768.9	6324.4
25/11	8	Operations Normal	269.1	6593.5
Total Kilometres Flown				6593.5

1.2 AIRCRAFT DETAILS AND NAMES OF FIELD CREW

1.2.1 Aircraft

Twin engine Rockwell Commander 500S "Shrike", registration VH-WAM

1.2.2 Field Crew

Pilots G Wornes, M Howell

Operators B Gribble, J Keely

2. OPERATION MANAGEMENT

2.1 QUALITY MANAGEMENT

The normal procedure for collecting airborne geophysical data requires the operation of sophisticated electronic equipment on board the aircraft, and subsequent checking of the data

collected, both in the air and on the ground. The responsibility for collecting the data rests with the Navigator/Operator on board. He is trained to do this by the technical engineer who installs and maintains such equipment.

During a flight, the data is constantly being monitored by means of the analogue chart recorder and various digital displays. The monitoring techniques used are beyond the scope of this document but are the result of many years of research and practical experience. The Navigator/Operator has before him a visual display of the magnetometer signal and recorded data, altitude, off line distance, line number and direction, ground speed etc. This equipment has been designed so that unacceptable data is either very obvious or flagged to trigger an alarm.

At the end of each day's flying, the analogue charts are further inspected for data quality, and the recorded flight path is plotted in the field to ensure it meets the specifications laid down. Unacceptable flight paths can thus be re flown the next day.

Collected data is then sent to the Company's office where it is immediately loaded into the processing computers and its statistics are inspected. If all channels are considered satisfactory, processing is then commenced. If it is not, then instructions are sent to the field crew for re-flying of specific portions.

The Navigator/Operator keeps a running log of each flight known as the "flight log" on which is recorded details of all lines flown, flight number, date etc, and any comments which may be required.

The training of Navigator/Operator is carried out initially on the ground and then in the air. Operators are not permitted to work on their own until both the Senior Operator and the Technical Engineer are satisfied as to their competency. The Navigator/Operator is also responsible for the correct installation and operation of the ground base station magnetometer and for making the final decision as to whether the base station data is within specifications. Base station data is recorded in both digital and pseudo-analogue form and is closely re-examined after each days flying before being returned for processing. Many years of experience and several million line Km of survey have proved these methods adequate.

2.2 SAFETY MANAGEMENT

The overall responsibility for Safety and Health rests with the General Manager/Operations Manager.

Flying safety in general results from the conscientious application of the Air Navigation Regulations in regard to Rules of the Air and Maintenance requirements.

The Company is required by law to have an Operations Manual approved by the Civil Aviation Authority before any flying

operation can be carried out and this document is available for inspection at the Company's Office. Routine checks by the Civil Aviation Authority ensure that all operations and maintenance meet the requirements of the law.

Further, every pilot has been extensively trained in low level flying and instrument flying and pilots are only employed after assessment of experience and ability.

Vehicle usage and driving habits are constantly under review by the Management and particular attention paid to off-road 4WD work and remote area survival techniques. The Company believes there is no substitute for experience, and no inexperienced staff are used in any phase of the operations unless they are accompanied by an experienced equivalent.

Emergency procedures in regard to aircraft are according to the Operations Manual and would normally be under the direction of Civil Aviation Authority.

In regard to vehicles, these are equipped with adequate radio equipment to enable two way communication with any aircraft and/or the RFDS. Sartimes for vehicles in remote areas are a Company requirement.

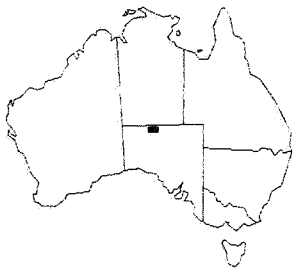
2.3 ENVIRONMENTAL MANAGEMENT

The aircraft operations are generally non-polluting. Ground operations are minor, as only two (2) vehicles are used. Commonsense rules apply to these tasks with particular reference to the use of camp sites, beacon sites, sacred sites etc. Any staff responsible for destroying property or land are liable for dismissal.

3. SURVEY DETAILS

3.1 DESCRIPTION OF AREA FLOWN

The Mt Howe Survey cover parts of the following 1:250,000 topographic map sheets.



Alberga SG 53-9

The exact survey boundary is shown in Appendix 1. The survey distance was approximately : **6556.2** Kms

3.2 SURVEY SPECIFICATIONS

Flight line direction	: 090-270 Degrees AMG
Flight line spacing	: 200 Metres
Tie line direction	: 000-180 Degrees AMG

Tie line spacing		: 2000 Metres
Mean Terrain Clearance		: 60 Metres
Time Base	Magnetics	: 0.10 Second
	Radiometrics	: 1.00 Second
Sample Interval (in still air)		
	Magnetics	: 6-8 metres or less
	Radiometrics	: 70 metres or less

3.3 NAVIGATION

The primary navigation method was by GPS Satellite Receiver (Ashtech). This equipment fixes the aircraft position every second and records the information on the acquisition tape. At the same time the on board navigation computer produces a steering signal for the pilot's guidance and this is also updated once per 0.5 seconds.

A second Ashtech receiver used as a base station, is located on a known position and this unit constantly records its satellites position once per second. The difference between this position and the known position produces a correction factor which is then transmitted to the aircraft by a radio link, in real time. The aircraft receiver uses this correction to adjust its own position prior to recording on the acquisition tape, as well as to produce an accurate steering signal to enable the aircraft to be flown on any pre-planned flight path . This technique is known as " Real Time Differential " GPS.

3.3.1 GPS Base Station Position

The raw GPS data were differentially corrected Real Time, to give corrected GPS positional data to an accuracy of 5 metres or less RMS. The base station was situated at the Marla Hotel/Motel.

For a full report of the GPS Base Station position refer to Appendix 2.

3.4 FLIGHT PATH RECOVERY

The flight path was plotted from the Real Time GPS data.

3.5 MAGNETOMETER

The magnetometer used was an optically pumped Caesium Vapour model VIW 2321 - H8 manufactured by Scintrex. The magnetometer sensor was mounted in a stinger on the aircraft. The magnetometer sensor is coupled to a RMS Instruments Automatic Aeromagnetic Digital Compensator (AADC) to produce a measurement of the earth's magnetic field. The AADC compensates the total magnetic field data in real time for the effects of the aircraft's motion, changes in attitude and heading. To do this the AADC uses a set of interference coefficients calculated from a compensation flight carried out

before the survey commenced.

The AADC outputs digital data with a resolution and sensitivity of 0.001 nT at a sampling rate of ten (10) times per second. This data was recorded digitally. This data was also recorded in analogue form.

Magnetometer summary:

Time base	0.100 seconds
Sample interval	7m approx.
Resolution	0.001 nT
Sensitivity	0.001 nT

Analogue chart full scale deflection:

Mag Fine	200 nT
Mag Coarse	200 nT
Mag Coarse	2000 nT

3.6 SPECTROMETER

A Geometrics GR-820D double buffered, multi-channel gamma ray spectrometer was used with a downward crystal array volume of 33.6 lt and upward array volume of 4.2 lt. A Geometrics GR-900 controlled the gains and temperature of the crystal packs. The GR-820D produced both digital and analogue data and was recorded every 1.0 seconds.

3.6.1 Digital Recording

Digital data from the GR-820D spectrometer are as follows:

1. Accumulation time
2. Total number of counts during Accumulation time for downward array

3. Total count	0.40 - 3.00 MeV
4. K40	1.37 - 1.57 MeV
5. BI - 214	1.67 - 1.89 MeV
6. TL - 208	2.42 - 2.82 MeV
7. Cosmic	3.00 - 6.00 MeV
8. Total number of counts for upward array	
9. Total count	0.40 - 3.00 MeV
10. BI-214	1.67 - 1.89 MeV

3.6.2. Analogue Recording

Four channels of data was recorded in analogue form. The analogue data was corrected for dead time and normalised and were stripped for compton scatter.

The channels recorded were:

Total count	5000 counts fsd
K 40	500 counts fsd

BI-214	500 counts fsd
TL-208	500 counts fsd

3.7 ALTIMETER

3.7.1 Radar Altimeter

A Sperry AA-210 Radar Altimeter system was used, this being a high resolution, short pulse radio altitude system designed for automatic continuous operation over a wide variation of terrain, target reflectivity, weather and aircraft altitude. The radar altimeter indicator provides an absolute altitude display from 0 - 750 metres (0 - 2,500 feet). The output of the equipment was 4 mV/ft.

3.7.2 Analogue Barometric Altimeter

A Rosemount 1241 m Barometer, a capacitive capsule device with high repeatability and accuracy, was used. The output of this equipment was 0.666 mV/ft.

Data from both altimeters were recorded on digital tape and recorded on the analogue chart.

3.8 BASE STATION MAGNETOMETER

The base station magnetometer, incorporating an Epson PX-8 Computer, P-40 Printer and Geometrics G-856 Magnetometer with analogue and digital recording was established 200 Metres west of runway 18 threshold on old strip in an area of low gradient. The base station was positioned away from man-made influences and run continuously throughout the survey flying period with a sampling interval of 6 seconds and a sensitivity of 0.1 nt.

3.9 DATA ACQUISITION

A RMS Instruments DAS-8 Data Acquisition System was used to record all data in digital format on DC-300 data cartridges in a RMS Instruments TCR-12 Tape Cartridge Recorder.

A RMS Instruments GR-33 printer-plotter was used to record the analogue information.

3.10 FLIGHT TRACK RECORDING SYSTEM

A VHS video tracking system with a wide angle lens was used to record the flight path of the aircraft. The system used a National ccd video camera and a video recorder. Recorded on the video image is the line number and fiducial number.

4. CALIBRATIONS

4.1 MAGNETICS

4.1.1 Magnetic Noise Envelope

The noise envelope was less than 0.1 nT standard deviation for the entire aircraft flight envelope. (Refer Appendix 5).

4.1.2 Heading Error Checks

The aircraft was compensated using the RMS AADC. This is achieved by flying a series of pitch, roll and yaw manoeuvres in each of the four cardinal headings. A mathematical model was used to calculate the effects due to permanent, induced and eddy currents on the magnetometer in real time. The heading error was less than 1.0 nT. (Refer Appendix 5)

4.1.3 Parallax

Parallax was resolved by flying over a suitable anomaly in opposite directions within each area. The parallax for the system was resolved to 8 fiducials or 70 m approximately.

4.2 RADIOMETRICS

4.2.1. Background Correction Plots and Equations

The following is the processing scheme for computing aircraft background and cosmic radiation: (Appendix 6)

A. Fly a stack of seven (7) lines over water, west of the Perth coast with the altitudes from 1,000 ft to 10,000 ft. with increments of 500 feet.

B. The radiometrics ie. Potassium, Uranium, Thorium, Total Count and Cosmic were corrected for dead time (8 x 10[- 6] seconds) and scaled to counts per second for all lines.

C. The mean value of each line, for each element, was used for computing the background and cosmic.

D. Each radiometric element (K. U, Th) and Total Count were independently processed through a curve fitting program, using cosmic versus each radiometric variable. Thus producing a best linear

(Y = mx + b) fit for Potassium, Uranium, Thorium and Total Count.

E. The curve-fitting program displays the parameters to produce the linear fit, where b is aircraft background and mx is the cosmic radiation correction.

4.2.2 Constants Derived From Background Tests

Channel	Background	Cosmic
Total Count	199.0	1.918
Potassium	18.0	0.108
Uranium	9.0	0.092
Thorium	5.0	0.112

4.2.3 Pre and Post Flight Checks

A statistical summary of the pre and post flight hand sample checks is enclosed at the rear of this report (see Appendix No: 4).

4.2.4 Hand Samples

The following sources were used:

Thorium sample
Uranium sample
Caesium 137 sample

4.2.5 Test Line

A test line was chosen to the south of the survey area. The start and end co-ordinates are as follows:

-27 20.3131 133 34.2051
-27 19.5978 133.36.7580

Some variation was noticeable in the total count and uranium levels due to daily radon variations. These variations showed some correlation with wind condition, windy days lower than calm days.

The day to day response from the test line was considered a satisfactory indication that the system was performing well.

4.2.6 Analogue Stripping Coefficients

These coefficients were obtained using point source Thorium and Uranium samples placed to give a uniform irradiation of the crystal pack, while the GR-820 subtraction switches were adjusted to give minimum observable contribution into the other channels.

The following stripping coefficients were used:

alpha	0.24	(Tl-208 from Bi-214)
beta	0.14	(Tl-208 from K-40)
gamma	0.78	(Bi-214 from K-40)

4.2.7 Data Reduction

The data reduction of the 256 channel spectrometry data is undertaken to 4 channels (raw data) in the GR-820D Spectrometer.

5. DATA PROCESSING

The following section summarises the techniques used for reduction and processing of airborne data.

5.1 Data Verification

The airborne data is recorded on DC300 XLP cartridges. These tapes are read into Kevron Geophysics "in-house" computing system using Sun computers at Jandakot, Perth. Australia.

These raw data file are then imported into a geophysical data base where these data can be easily manipulated and displayed. This initial procedure reports duplicate or missing data and a statistical analysis of each variable on a line by line basis. The data are then displayed on screen, each channel of data that is recorded in the aircraft is checked for consistency, spikes, steps, noise etc.
Data which appears to have errors can be zoomed in on, evaluated and then corrected by experienced data processing personnel. Editing of data for scrubed line and or duplicate line numbers are also done at this stage.

Upon completion of this phase, the data are ready for subsequent correction of the Radiometrics and reduction of the magnetics.

5.2 Flight Path Recovery

The differentially corrected GPS data are converted to Universal Transverse Mercator coordinates using the Australian National Spheroid.

The data are in grid UTM Zone 53 with a central meridian of 135 degrees East, with an x-bias of 500 kilometres and a y-bias of 10,000 kilometres.

Flight path maps are then generated to verify the offline tolerances and to make sure all necessary data has been loaded into the geophysical data base.

5.3 Magnetic Processing

The magnetic data reduction processes are:

1. Correction for diurnal variation.
2. Tie line levelling to a common datum.
3. Subtraction of the regional magnetic field as defined by the International Geomagnetic Reference Field (IGRF).

5.3.1 Diurnal Correction

During data acquisition, the magnetic field is monitored by a ground-based diurnal magnetometer that sample every five seconds at a sensitivity of 0.1 nT. These data are recorded along with the local time for later synchronisation with the airborne data. The diurnal data

are edited to keep only those readings taken during flight time. This data is visually checked on the computer screen for spikes, noise and any man-made magnetic event.

After editing, data are low pass filtered using a spatial domain filter with a cut-off at twenty (20) terms. This cuts off all data with periods of less than thirty (30) seconds. The data is again checked visually for integrity after the filtering process.

The filtered data are synchronised in time with the airborne data, interpolated and subtracted from the airborne data, one sample at a time. After subtraction, the mean diurnal value was added back to the airborne data for each line to produce diurnally corrected data.

5.3.2 Tie Line Levelling

The diurnally corrected data are then processed by a levelling program that compares the magnetic differences at intersections of the flight lines and tie lines. This program calculates individual magnetic field biases for each flight line based on the tie line intersection. This allows miss-ties to be minimised in a least- squares sense throughout the survey. These biases usually represent, after diurnal correction, systematic magnetic changes caused by such things as magnetic heading changes of the aircraft, changes in location of the ground-based magnetometer, or changes in the airborne equipment. The biases are manually evaluated and selectively applied. Further reduction of the miss-ties can be removed by fitting a polynomial to these. This final procedure produces levelled magnetic data.

5.3.3 Subtraction of the IGRF

The International Geomagnetic Reference Field (IGRF) is then subtracted from the levelled data. This is achieved by fitting a second order polynomial surface to thirteen coefficients computed from the IGRF model. This subtraction is on a sample by sample basis.

The IGRF 1990 model updated to 1994.91 was used. The IGRF model for the Mt Howe Survey are the following approximate values:

Magnetic Declination	-4.47 degrees
Magnetic Inclination	37.72 degrees
Total Field Strength	43409.54 gammas

These data are then gridded, with a mesh size 50 x 50 metres, the gridding is a minimum curvature algorith based on the Briggs 1974. These gridded data are displayed on an image processor to check data integrity and data levelling. If the gridded data shows line dependant problems, then further levelling adjustments are made and checked.

When all line dependencies are removed then final magnetic grids are produced. At this stage contour maps and profile maps can be generated.

5.4 Radiometric Processing

Processing of the data was performed using the window energies given below;

Total count	0.40	-	3.00 MeV
Potassium	1.37	-	1.57 MeV
Uranium	1.66	-	1.87 MeV
Thorium	2.41	-	2.81 MeV
Cosmic	3.00	-	6.00 Mev

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

VARIABLE	AIRCRAFT BACKGROUND	COSMIC BACKGROUND	HEIGHT ATTENUATION
TOTAL COUNT	108.00	1.800	0.00574
POTASSIUM	14.50	0.101	0.00713
URANIUM	3.70	0.079	0.00730
THORIUM	3.60	0.105	0.00581

Data were also corrected for airborne radon using upward detector readings and corrected for channel interaction to produce corrected radiometric data for the four channels.

The procedure for correcting data for airborne radon follows the method described by R.L. Grasty, et.al; 1988: Background Measurements in Gamma-Ray Surveys: Geological Survey of Canada Paper 88-11.

These data are then gridded and displayed on an image processor to check data integrity and levelling. If line or flight dependencies appear in the data these are removed and data regridded and imaged. When line or flight dependencies are removed then final contours and profiles are produced.

5.5 Deliverable Items

A total of three (3) maps were delivered on high quality materials they are as follows:

1 X 1:100,000 TMI Contour
1 X 1:100,000 Flight Path
1 X 1:100,000 Stacked Profile

Located data tape and ERM Grids were delivered on Exabyte Tape in TAR format.

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Mt Howe

DESCRIPTION OF SURVEY AREA

The survey area location is shown on the following map. The co-ordinates of the boundary lines, beginning at the North-West corner and proceeding clockwise, are as follows:

Coordinates are in AMG Zone 53

AMG mE	AMG m		AMG mE	AMG mN

Boundary co-ordinates used...

Mt Howe

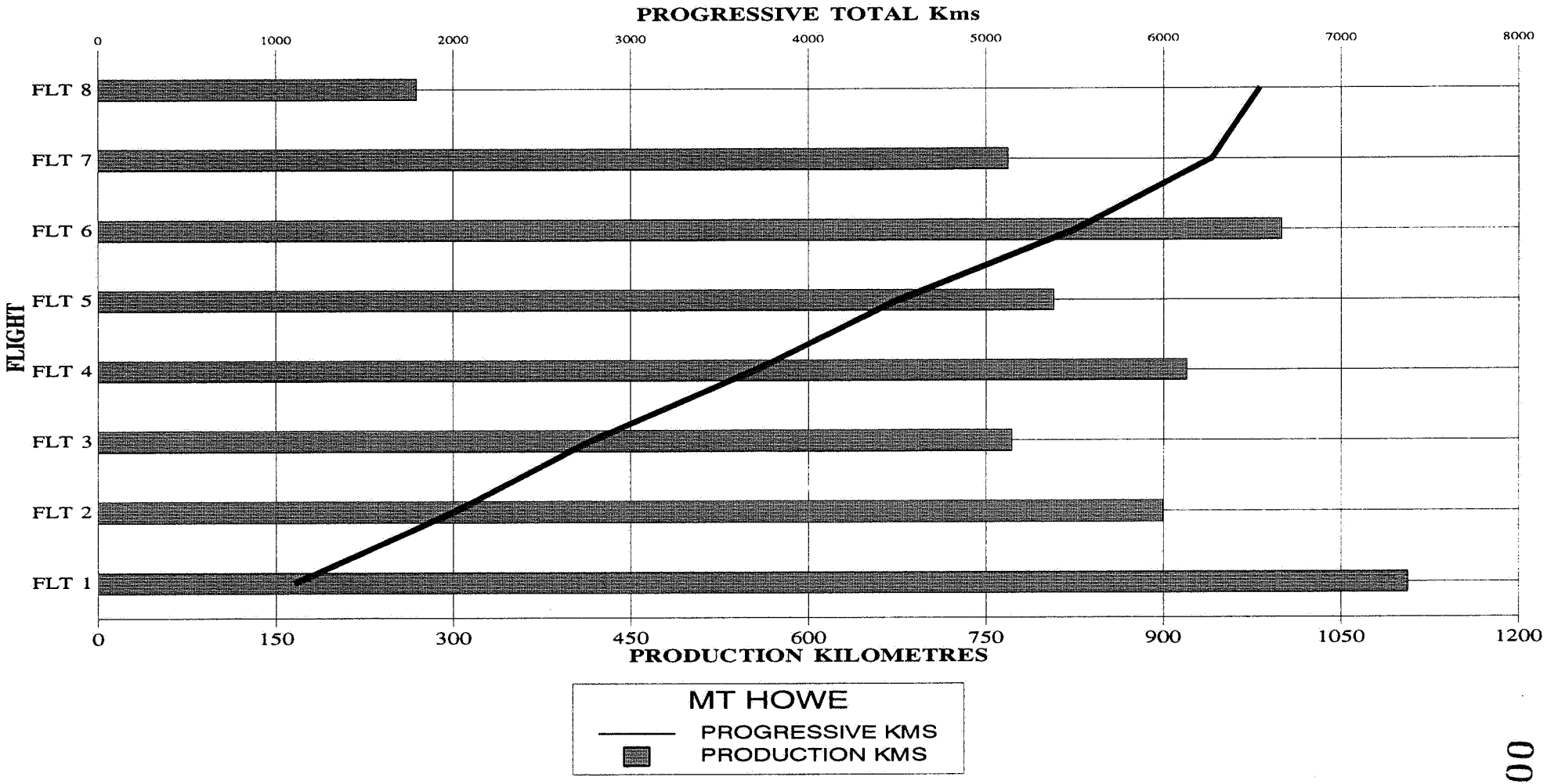
312115.0,	7080480.0	to	312115.0,	7114011.0
312115.0,	7114011.0	to	333424.0,	7114011.0
333424.0,	7114011.0	to	333424.0,	7104983.0
333424.0,	7104983.0	to	350255.0,	7104983.0
350255.0,	7104983.0	to	350255.0,	7090213.0
350255.0,	7090213.0	to	332167.0,	7090213.0
332167.0,	7090213.0	to	332167.0,	7073371.0
332167.0,	7073371.0	to	313965.0,	7073371.0
313965.0,	7073371.0	to	313965.0,	7067579.0
313965.0,	7067579.0	to	308981.0,	7067579.0
308981.0,	7067579.0	to	308981.0,	7080480.0
308981.0,	7080480.0	to	312115.0,	7080480.0

Type	Dir	Spc	Shortest	Longest	Lines	Tot. Dist
TRAVERSE	90.0	200.0 m	6.0 Km	38.5 Km	235	5920.6 Km
TIES	0.0	0.0 m	9.4 Km	46.8 Km	23	635.6 Km
TOTAL						6556.2 Km

Kevron

Geophysics Pty. Ltd.

	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5	FLT 6	FLT 7	FLT 8
PRODU	1106.6	899.8	772	920	807.3	999.8	768.9	269.1
PROGR	1106.6	2006.4	2778.4	3698.4	4505.7	5505.5	6274.4	6543.5



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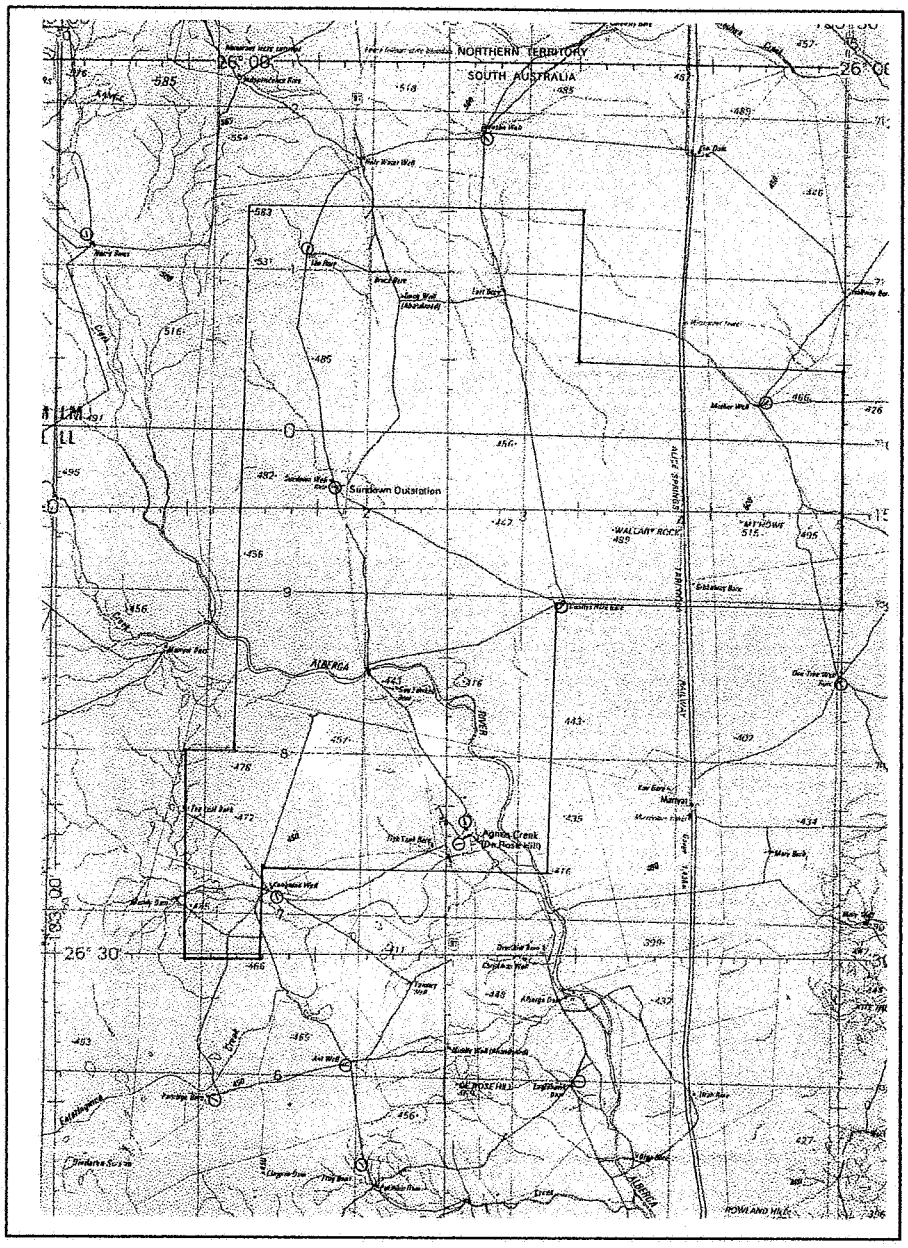
CRA EXPLORATION PTY LIMITED

MT HOWE SURVEY

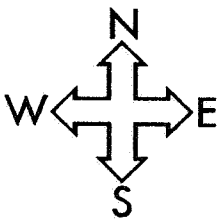


SURVEY SPECIFICATIONS

Line Direction: 090-270
Line Spacing: 200 Metres
Sensor Height: 60 Metres

1:250,000 Topographic Mapsheets

SG 53-9 Alberga



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APPENDIX 2
GPS Base Station

Mt Howe

GPS BASE STATION LOCATION REPORT

JOB NUMBER 1280 AREA MT HOWE DATE 19/11/94

LOCATION ROOM 5B MARLA HOTEL/MOTEL

START TIME FOR ACCUMULATION 19/11/94 13:50

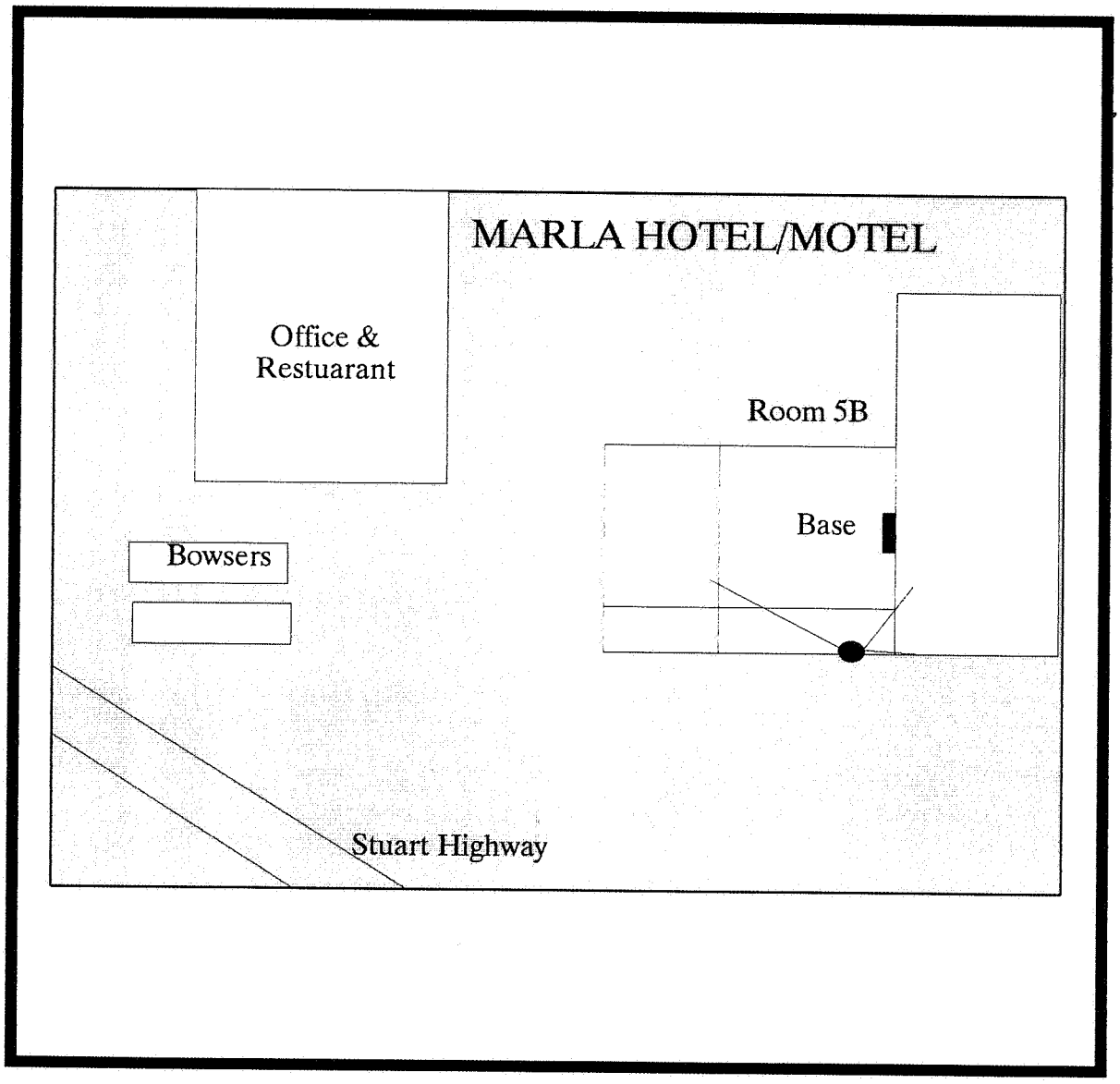
STOP TIME FOR ACCUMULATION 20/11/94 19:50

SAMPLE INTERVAL 10 secs. PDOP LIMIT SET AT < 4

NUMBER OF POINTS IN STATISTICS 10026

MEAN POSITIONS

WGS-84	AGD-84	AMG
LAT. 27°18'17.2638	LAT.27°18'22.4551	E.363671
LON.133°37'24.8629	LON.133°37'20.1354	N.6978882
ALT. 351.05M	ALT.353.969	Zone. 53



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APPENDIX 3
Flight Logs

Mt Howe

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS

DATE 21/11/94 Julian Day 325

FLIGHT No 1

JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT M HOWELL OPERATOR J KEELY AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
	0010.0								CS
	0011.0								U
	0012.0								TH
	0013.0								BACKGROUND
W	0001.0	0	999						TEST LINE
E	0001.0	1000	1599	12.34	12.55				
	0030.0	2230	3099	13.03	13.05				
N	9023.0	3100	5159	13.21	13.25				
S	9001.0	5160	7399	13.26	13.29				
N	9002.0	7400	14139	13.30	13.42				
S	9003.0	14140	21229	13.433	13.54				
N	9004.0	21230	27189	13.56	14.06				
S	9005.0	27190	33419	14.07	14.18				
N	9006.0	33420	39339	14.19	14.29				
S	9007.0	39340	45509	14.30	14.40				
N	9008.0	45510	51439	14.41	14.51				
S	9009.0	51440	57669	14.52	15.02				
N	9010.0	57670	63569	15.03	15.13				
S	9011.0	63570	69789	15.14	15.24				
N	9012.0	69790	75709	15.25	15.35				
S	9022.0	75710	77319	15.35	15.38				
S	9013.0	77320	79829	15.40	15.44				
N	9014.0	79830	82229	15.45	15.49				
S	9015.0	82230	84729	15.50	15.54				
N	9016.0	84730	87069	15.55	15.59				
S	9017.0	87070	89559	16.00	16.04				
N	9018.0	89560	91849	16.05	16.08				
S	9019.0	91850	94329	16.09	16.13				
N	9020.0	94330		16.14	16.18				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS — FLIGHT No 1
DATE 21/11/94 — Julian Day 325 — JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT M HOWELL OPERATOR J KEELY AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
S	9021.0	96620	99319	16.19	16.23				
W	1122.0	0	3119	16.29	16.34				
E	1127.0	3120	6289	16.34	16.40				
W	1123.0	6290	9329	16.40	16.45				
E	1128.0	9330	12539	16.46	16.52				
W	1124.0	12540	15609	16.52	16.57				
E	1129.0	15610	18799	16.58	17.03				
W	1125.0	18800	21819	17.04	17.09				
E	1130.0	21820	25029	17.10	17.15				
W	1126.0	25030	28079	17.15	17.21				
E	1131.0	28080	31239	17.21	17.26				
W	1136.0	31240	34339	17.27	17.32				
E	1132.0	34340	37479	17.33	17.38				
W	1137.0	37580	40569	17.39	17.44				
E	1133.0	40570	43739	17.44	17.50				
W	1138.0	43740	46739	17.44	17.50				
E	1134.0	46740	49969	17.56	18.01				
W	1139.0	49970	53009	18.02	18.07				
E	1135.0	53010	56249	18.08	18.13				
W	1140.0	56250	59239	18.14	18.19				
E	1145.0	59240	62419	18.19	18.25				
W	1141.0	62420	65459	18.25	18.30				
E	1146.0	65460	68649	18.31	18.36				
W	1142.0	68650	71679	18.37	18.42				
	0031.0	71680	72599	18.46	18.48				HIGH CAL
W	0002.0	72600							LOW CAL
	0014.0								BACKGROUND
	0015.0								TH
	0016.0 0017.0								U CS

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS

DATE 22/11/94 Julian Day 326

FLIGHT No 2

JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT M HOWELL OPERATOR B GRIBBLE AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
	0010.0								CS
	0011.0								U
	0012.0								TH
	0013.0								BACKGROUND
W	0001.0	0	669	06.54	06.55				TEST LINE
NW	0030.0	670	1579	07.01	07.02				HI LEVEL
W	1235.0	0	1049	07.19	07.21				
E	1230.0	1050	2279	07.21	07.23				
W	1234.0	2280	3329	07.24	07.26				
E	1229.0	3330	4549	07.26	07.28				
W	1233.0	4550	5629	07.29	07.31				
E	1228.0	5630	6839	07.32	07.35				
W	1232.0	6810	7909	07.35	07.37				
E	1227.0	7910	9119	07.38	07.40				
W	1231.0	9120	10219	07.40	07.42				
E	1226.0	10220	11409	07.42	07.44				
W	1221.0	11410	12499	07.47	07.49				
E	1225.0	12500	13699	07.50	07.52				
W	1220.0	13700	14749	07.52	07.54				
E	1224.0	14750	15939	07.55	07.57				
W	1219.0	15940	17039	07.58	07.59				
E	1223.0	17040	18209	08.00	08.02				
W	1218.0	18210	19299	08.03	08.08				
E	1222.0	19300	20519	08.05	08.07				
W	1217.0	20520	21589	08.08	08.10				
E	1211.0	21590	22789	08.11	08.13				
W	1216.0	227890	23909	08.13	08.15				
E	1210.0	23910	25139	08.16	08.18				
W	1215.0	25140	26239	08.19	08.21				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS FLIGHT No 2

DATE 22/11/94 Julian Day 326 JOB No 120

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT M HOWELL OPERATOR J KEELY AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
E	1209.0	26240	27609	08.21	08.24				
W	1214.0	27610	28709	08.24	08.27				
E	1208.0	28710	29919	08.27	08.29				
W	1213.0	29920	30989	08.29	08.31				
E	1207.0	30990	32189	08.32	08.34				
W	1212.0	32190	33249	08.35	08.36				
E	1206.0	33250	27129	08.34	08.44				
W	1200.0	37130	40699	08.44	08.50				
E	1205.0	40700	44609	08.51	08.58				
W	1200.0	37130	40699	08.44	08.50				
E	1204.0	40780	44609	08.51	08.58				
W	1199.0	52040	55539	09.12	09.18				
E	1203.0	55540	59549	09.19	09.25				
W	1198.0	59550	62979	09.26	09.32				
E	1202.0	62980	66939	09.33	09.39				
W	1197.0	66940	78459	09.40	09.46				
E	1192.0	78460	74379	09.47	09.53				
W	1196.0	74380	77919	09.54	10.00				
E	1191.0	77920	81899	10.00	10.07				
W	1195.0	81900	85429	10.08	10.14				
E	1190.0	85430	89369	10.14	10.21				
W	1194.0	89370	92909	10.22	10.27				
E	1189.0	92910	96879	10.28	10.35				
W	1193.0	96880	100439	10.35	10.42				
E	1188.0	0	3869	10.43	10.56				
W	1183.0	3870	7389	10.56	10.58				
E	1187.0	7390	11239	10.57	11.03				
W	1182.0	11240	14759	11.04	11.10				
E	1186.0	14760	18619	11.11	11.17				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS

DATE 22/11/94 Julian Day 326 FLIGHT No 2 JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT M Howell OPERATOR B Gribble AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
W	1181.0	18620	22199	11.18	11.24				
E	1185.0	22200	26009	11.24	11.31				
W	1180.0	26010	29589	11.31	11.37				
E	1184.0	29590	33379	11.38	11.44				
W	1179.0	33380	36879	11.48	11.54				
E	1174.0	36880	40619	11.54	12.01				
W	1178.0	40620	44119	12.05	12.11				
E	1125.1	44120	47469	12.15	12.20				
W	1143.0	47470	50618	12.23	12.29				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS — FLIGHT No 3

DATE 22/11/94 — Julian Day 326 — JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT G WORNES OPERATOR B GRIBBLE AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
W	1177.0	0	3479	14.11	14.15				
E	1172.0	3480	7259	14.17	14.24				
W	1176.0	7260	10829	14.25	14.31				
E	1171.0	10830	14579	14.32	14.38				
W	1175.0	14580	18099	14.39	14.45				
E	1170.0	18100	21799	14.46	14.52				
W	1173.0	21800	25279	14.53	14.59				
E	1169.0	25280	29029	14.59	15.06				
W	1164.0	29030	32099	15.07	15.12				
E	1168.0	32100	35369	15.13	15.19				
W	1163.0	35370	38489	15.20	15.25				
E	1167.0	38490	41709	15.26	15.31				
W	1162.0	41710	44809	15.32	15.37				
E	1166.0	44810	48059	15.38	15.44				
W	1161.0	48060	51129	15.45	15.50				
E	1165.0	51130	54349	15.51	15.56				
W	1160.0	54350	57499	15.57	16.02				
E	1155.0	57500	60749	16.16	16.21				
W	1159.0	60750	63809	16.10	16.15				
E	1154.0	63810	67009	16.16	16.21				
W	1158.0	67010	70049	16.11	16.27				
E	1153.0	70050	73279	16.28	16.34				
W	1157.0	73280	76349	16.35	16.40				
E	1001.0	76350	79779	16.49	16.55				
W	1006.0	79780	83089	16.56	17.01				
E	1002.0	83090	86389	17.02	17.08				
W	1007.0	86390	89659	17.08	17.14				
E	1003.0	89660	92989	17.15	17.20				
W	1008.0	92990	96199	17.21	17.27				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS

DATE 21/11/94 Julian Day 325 FLIGHT No 1 JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT M HOWELL OPERATOR J KEELY AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
E	1004.0	0	3329	17.28	17.33				
W	1009.0	3330	6609	17.34	17.40				
E	1005.0	6610	10189	17.42	17.48				
W	1010.0	10190	13489	17.49	17.54				
E	1144.0	13490	16749	18.06	18.12				
W	1150.0	16750	19829	18.13	18.18				
E	1147.0	19830	23069	18.19	18.25				
S	0031.0	23070	23969	18.31	18.33				HIGH LEVEL
E	0002.0	23970	24699	18.52	18.53				TEST LINE
	0014.0								BACKGROUND
	0015.0								TH
	0016.0								U
	0017.0								CS

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS — FLIGHT No 4

DATE 23/11/94 — Julian Day 327 — JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT G WORNES OPERATOR B GRIBBLE AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
	0010.0								CS
	0011.0								U
	0012.0								TH
	0013.0								BACKGROUND
W	0001.0	0	659	07.21	07.23				TEST LINE
N	0030.0	660	1549	07.31	07.33				HIGH LEVEL
W	1156.0	1550	4619	07.54	07.59				
E	1151.0	4620	8099	08.00	08.06				
W	1148.0	8100	11169	08.06	08.11				
E	1152.0	11170	14609	08.12	08.18				
W	1149.0	14610	17659	08.19	08.24				
E	1011.0	17660	21289	08.33	08.39				
W	1016.0	21290	24509	08.39	08.45				
E	1012.0	24510	28209	08.46	08.52				
W	1017.0	28210	31429	08.53	08.58				
E	1013.0	31430	35199	08.59	09.06				
W	1018.0	35200	38369	09.06	09.12				
E	1014.0	38370	42109	09.13	09.19				
W	1019.0	42110	45269	09.20	09.25				
E	1015.0	45270	48939	09.26	09.32				
W	1020.0	48940	52099	09.33	09.38				
E	1025.0	52100	55879	09.39	09.45				
W	1021.0	55880	59039	09.46	09.51				
E	1026.0	59040	62769	09.53	09.59				
W	1022.0	62770	65909	10.00	10.05				
E	1027.0	65910	69609	10.06	10.12				
W	1023.0	69610	72769	10.13	10.18				
E	1028.0	72770	76469	10.19	10.25				
W	1024.0	76470	79669	10.27	10.33				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS

DATE 23/11/94 Julian Day 327

FLIGHT No 4
JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT G WORNES OPERATOR B GRIBBLE AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
E	1029.0	79670	83329	10.33	10.39				
W	1034.0	83330	86459	10.46					
E	1030.0	86460	90119	10.47	10.53				
W	1035.0	90120	93279	10.54	10.59				
E	1031.0	0	3619	11.01	11.07				
W	1036.0	3620	6799	11.08	11.13				
E	1032.0	6800	10419	11.14	11.20				
W	1137.0	10420	13639	11.21	11.25				
E	1033.0	13640	17229	11.28	11.34				
W	1038.0	17230	20399	11.35	11.40				
E	1043.0	20400	23949	11.41	11.47				
W	1039.0	23950	27129	11.48	11.53				
E	1044.0	27130	30709	11.54	12.00				
W	1040.0	30710	33809	12.01	12.06				
E	1045.0	33810	37449	12.07	12.13				
W	1041.0	37450	40599	12.14	12.19				
E	1046.0	40600	44169	12.20	12.26				
W	1042.0	44170	47369	12.27	12.32				
E	1047.0	47370	53519	12.33	12.43				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS — FLIGHT No 5

DATE 23/11/94 — Julian Day 327 — JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT M HOWELL OPERATOR J KEELY AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
E	1228.1	0	1349	14.20	14.23				
W	1224.1	1350	2499	14.24	14.26				
E	1220.1	2500	3709	14.26	14.29				
W	1210.0	3710	4769	14.30	14.31				
E	1195.1	4770	8759	14.33	14.39				
W	1168.1	8760	11899	14.42	14.47				
E	1166.1	11900	15519	14.47	14.54				
W	1048.0	15520	21139	15.02	15.12				
E	1053.0	21140	27279	15.13	15.23				
W	1049.0	27280	33029	15.24	15.33				
E	1054.0	33030	39039	15.34	15.44				
W	1050.0	39040	44789	15.45	15.54				
E	1055.0	44790	50689	15.55	16.05				
W	1051.0	50690	56519	16.06	16.15				
E	1056.0	56520	62399	16.16	16.26				
W	1052.0	62400	68159	16.27	16.37				
E	1057.0	68160	73919	16.37	16.47				
W	1062.0	73920	79929	16.47	16.57				
E	1058.0	79930	85779	16.58	17.08				
W	1063.0	85780	91729	17.08	17.18				
E	1059.0	91730	97439	17.19	17.29				
W	1064.0		6039	17.30	17.40				
E	1060.0	6040	11789	17.41	17.50				
W	1065.0	11790	17699	17.51	18.01				
E	1061.0	17700	23439	18.01	18.11				
W	1066.0	23440	29179	18.11	18.21				
E	1071.0	29180	35049	18.22	18.31				
W	1067.0	35050	40809	18.32	18.42				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS

DATE 24/11/94 Julian Day 328

FLIGHT No 6

JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT M HOWELL OPERATOR J KEELY AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
	0010.0								
	0011.0								
	0012.0								
	0013.0								
E	0001.0	0	679	06.58	06.59				LOW TEST
	0030.0	680	1859	07.07	07.09				HIGH CAL
E	1072.0	1860	7839	07.33	07.43				
W	1068.0	7840	13449	7.43	7.53				
E	1073.0	13450	19349	07.54	08.03				
W	1069.0	19350	25069	08.04	08.14				
E	1074.0	35070	31109	08.14	08.24				
W	1070.0	31110	36789	08.25	08.35				
E	1075.0	36790	42859	08.35	08.45				
W	1080.0	42860	48419	08.46	08.55				
E	1076.0	48420	54529	08.56	09.06				
W	1081.0	54530	60149	09.07	09.16				
E	1077.0	60150	66209	09.17	09.27				
W	1082.0	66210	71679	09.27	09.37				
E	1078.0	71680	77809	09.37	09.48				
W	1083.0	77810	83249	09.48	09.57				
E	1079.0	83250	89399	09.58	10.08				
W	1084.0	89400	94829	10.09	10.18				
E	1089.0	0	6099	10.20	10.30				
W	1085.0	6100	11619	10.31	10.40				
E	1090.0	11620	17539	10.41	10.51				
W	1086.0	17540	23109	10.51	11.01				
E	1091.0	23110	28959	11.01	11.11				
W	1087.0	28960	34579	11.11	11.21				
E	1092.0	34580	40269	11.21	11.31				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS — FLIGHT No 6

DATE 24/11/94 — Julian Day 328 — JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT M HOWELL OPERATOR J KEELY AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
W	1088.0	40270	46030	11.31	11.41				
E	1093.0	46030	51639	11.42	11.51				
W	1098.0	51640	57599	11.52	12.02				

OPERATORS FLIGHT REPORT

KEVRON GEOPHYSICS
DATE 24/11/94 Julian Day 328
FLIGHT No 7
JOB No 1280

AREA MT HOWE	MAGNETOMETER	SPECTROMETER
AIRCRAFT VH-WAM PILOT G WORNES OPERATOR B GRIBBLE AIRPORT MARLA TAKE OFF LAND	Sample rate 0.1 Mag F.S.D Fine 200 Mag F.S.D Coarse 2000	Sample Rate 1.0 Format 256 CHANNEL K40 500 B1214 500 T1208 500 Tot Count 500
GPS Navigation Method REAL TIME	Survey Alt 60 Radar Baro	

Hdg	Line	Fiducial		Time		Line Limits		Video No.	Comments
		Start	End	Start	End	Start	End		
W	1094.0	0	6049	13.43	13.53				
E	1099.0	6050	11509	13.55	14.04				
W	1095.0	11510	17429	14.07	14.17				
E	1100.0	17430	23009	14.18	14.28				
W	1096.0	23010	29189	14.29	14.39				
E	1101.0	29190	34759	14.40	14.50				
W	1097.0	34760	40949	14.50	15.01				
E	1102.0	40950	46339	15.02	15.11				
W	1107.0	46340	52399	15.12	15.22				
E	1103.0	52400	57829	15.23	15.32				
W	1108.0	57830	63969	15.33	15.44				
E	1104.0	63970	69389	15.45	15.54				
W	1109.0	69390	75519	15.55	16.05				
E	1105.0	75520	81149	16.06	16.15				
W	1110.0	81150	86989	16.17	16.26				
E	1106.0	86990	92569	16.27	16.37				
W	1111.0	92570	98549	16.38	16.48				
E	1116.0	0	5499	16.49	16.59				
W	1112.0	5500	11349	17.00	17.09				
E	1117.0	11350	17069	17.10	17.20				
	0031.0	17070	17979	17.26	17.27				HIGH LEVEL
	0002.0	17980	18639	17.53	17.54				TEST LINE
	0014.0								BACKGROUND
	0015.0								TH
	0016.0								U
	0017.0								CS

CRA Exploration Pty Limited

APPENDIX 4

Radiometric Calibrations

Mt Howe

PREFLIGHT & POSTFLIGHT CALIBRATIONS JOB 1280
MT HOWE

PREFLIGHT FLT: 1 DATE: 21/11/94					POSTFLIGHT			
SMPLE	K	U	TH	T/C	K	U	TH	T/C
CS	110	25	90	3900	120	25	85	3900
U	70	320	90	5600	75	330	90	5650
TH	100	30	400	6250	100	35	410	6250
BKGRD	130	30	90	2100	135	30	85	2100

PREFLIGHT FLT: 2&3 DATE: 22/11/94					POSTFLIGHT			
SMPLE	K	U	TH	T/C	K	U	TH	T/C
CS	110	25	90	3900	110	25	90	3900
U	80	320	90	5700	80	320	90	5700
TH	100	35	400	6300	100	40	400	6300
BKGRD	130	30	90	2100	130	30	90	2100

PREFLIGHT FLT: 4&5 DATE: 23/11/94					POSTFLIGHT			
SMPLE	K	U	TH	T/C	K	U	TH	T/C
CS	120	25	90	4000	120	25	85	4000
U	70	320	90	5600	80	320	90	5800
TH	100	40	400	6200	100	45	390	6300
BKGRD	130	30	90	2100	120	30	90	2100

PREFLIGHT FLT: 6&7 DATE: 24/11/94					POSTFLIGHT			
SMPLE	K	U	TH	T/C	K	U	TH	T/C
CS	110	40	90	3900	110	30	90	3900
U	70	320	90	5700	80	320	90	5700
TH	100	50	400	6300	100	50	400	6300
BKGRD	130	40	90	2400	130	35	90	2150

PREFLIGHT & POSTFLIGHT CALIBRATIONS JOB 1280
MT HOWE

PREFLIGHT FLT: 8 DATE: 25/11/94					POSTFLIGHT			
SMPLE	K	U	TH	T/C	K	U	TH	T/C
CS	120	30	90	4000	130	30	85	4000
U	80	320	90	5700	75	320	95	5700
TH	100	40	410	6200	110	40	410	6300
BKGRD	135	30	90	2100	130	30	90	2100

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APPENDIX 5

Magnetic Compensation Calibrations

Mt Howe

MAGNETOMETER HEADING CHECK

The accepted method is the "Figure of Merit" (FOM) which is the absolute sum after compensation of the magnetometer signal for pitches, rolls and yaws on the four (magnetic) cardinal headings. "Standard" FOM manoeuvres are +/- 5 degrees for pitches and yaws, and +/- 10 degrees for rolls.

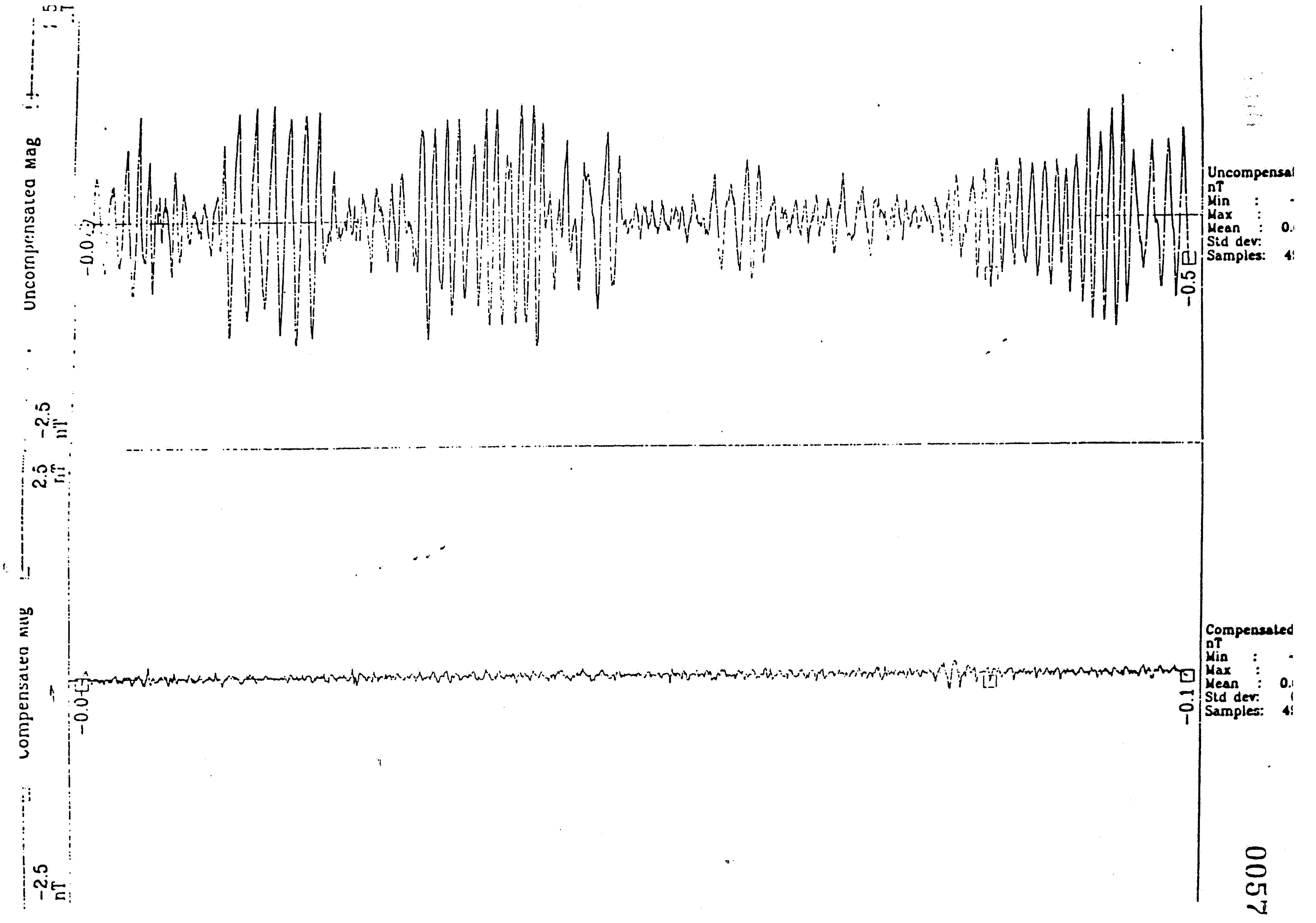
To evaluate wide-band compensation, the standard deviation (σ) of the residual magnetometer signal after compensation is measured. To assess the actual effectiveness of compensation, the ratio of σ before and after compensation termed the "Improvement Ratio" (IR) is calculated. Turns between headings are done at 30 degrees to 35 degrees angle of bank.

The σ criterion has an advantage over the FOM in that it is representative of the magnetic conditions over the entire normal manoeuvre envelope of the aircraft for the entire frequency band of interest, which includes DC. Two additional advantages are that the FOM must always be evaluated by hand from an analogue chart, whereas σ is automatically available in a digital solution, and that σ is much less dependent upon the accuracy of the short period manoeuvres, whereas the FOM is directly proportional to manoeuvre amplitudes.

The standard deviation of the uncompensated Magnetometer was	0.430
After compensation	0.033
Improvement Ratio	13.030

Kevron Geophysics Deem this to be an effective

Compensation



Uncompensated Mag
1.5
-2.5
nT
-0.0
-0.5
Uncompensa
nT
Min :
Max :
Mean : 0.
Std dev:
Samples: 4
Compensated Mag
2.5
nT
-2.5
nT
-0.0
-0.1
Compensated
nT
Min :
Max :
Mean : 0.
Std dev:
Samples: 4
0057

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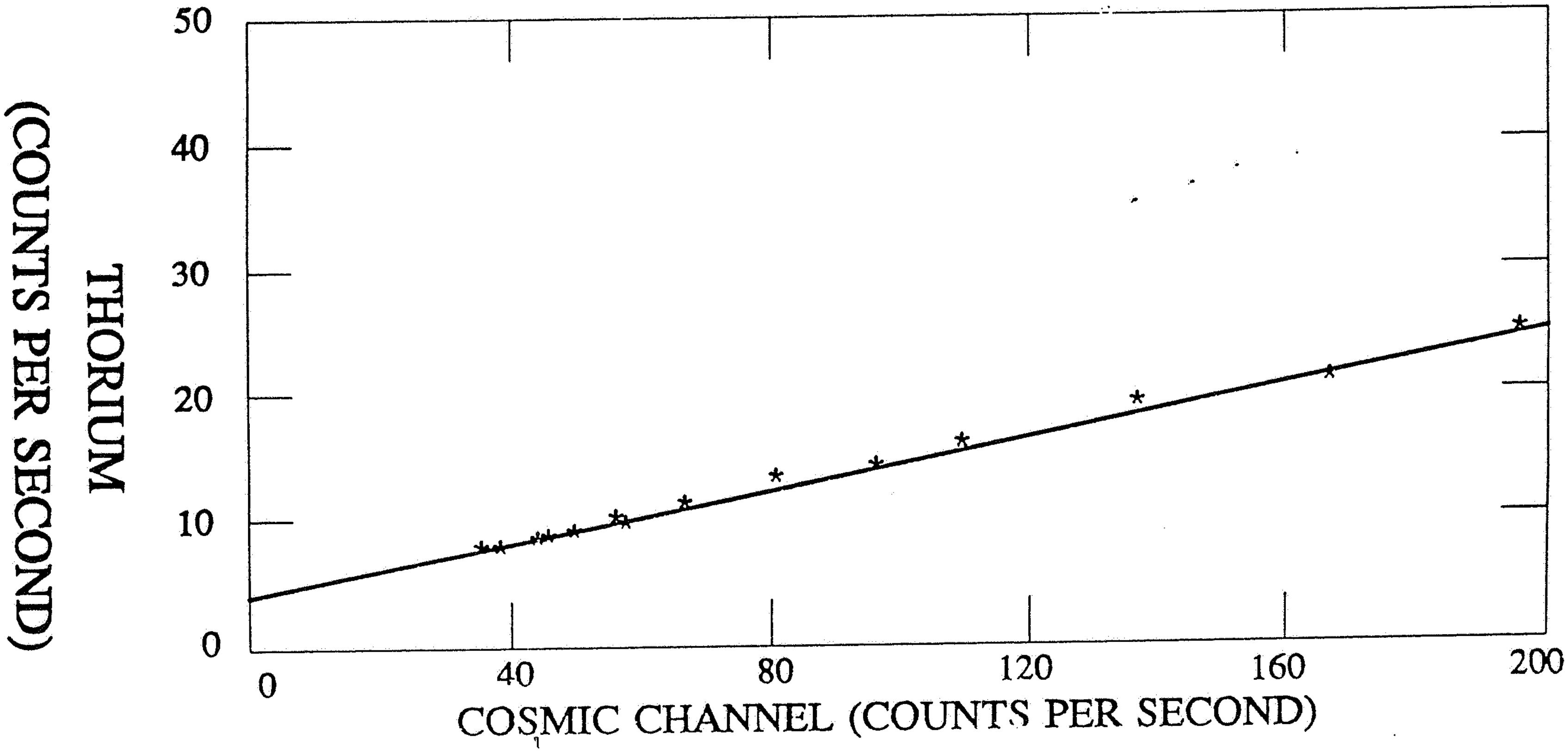
APPENDIX 6

Radiometric Background Plots

Mt Howe

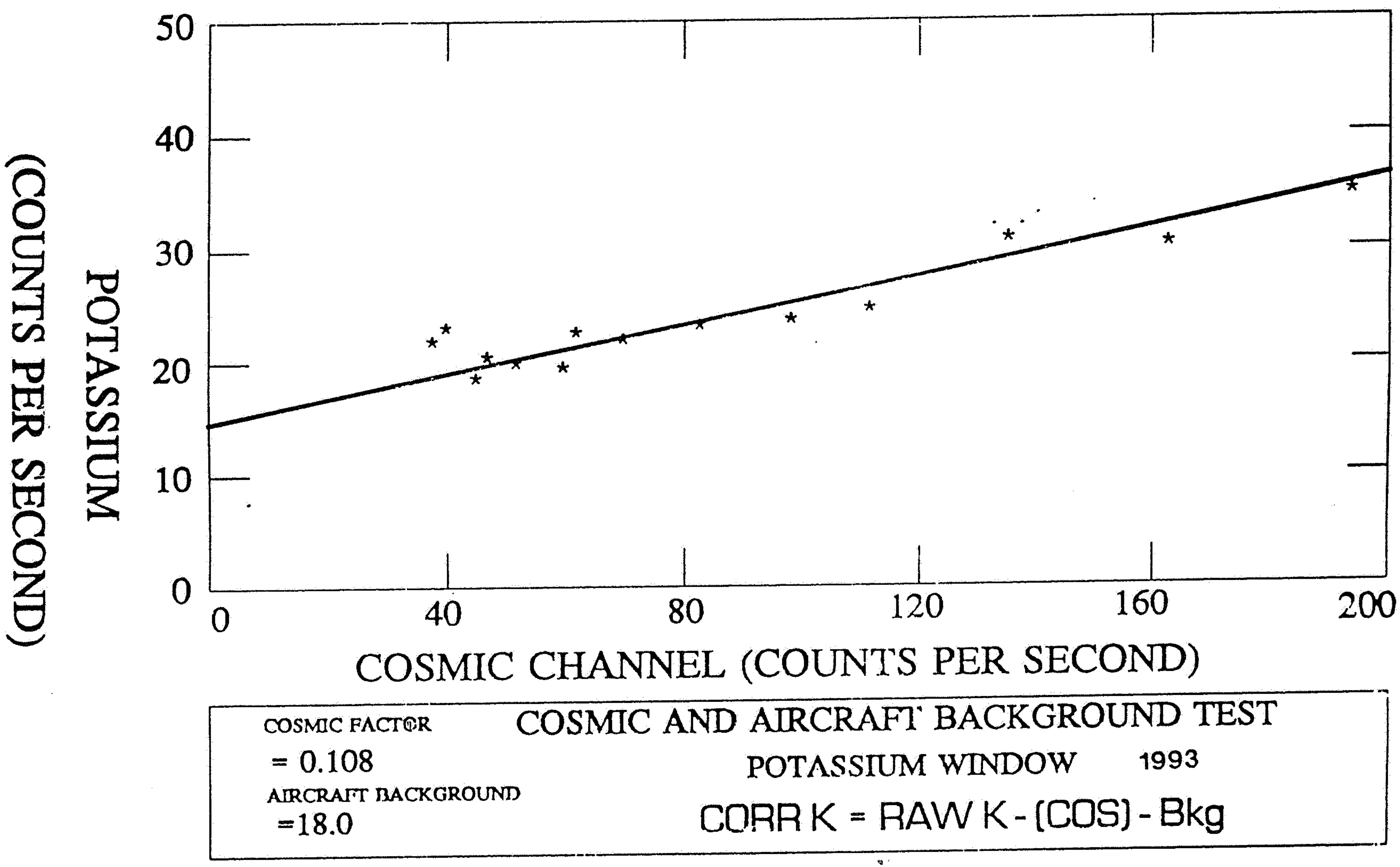


COSMIC FACTOR
= 0.112
AIRCRAFT BACKGROUND
= 5.0

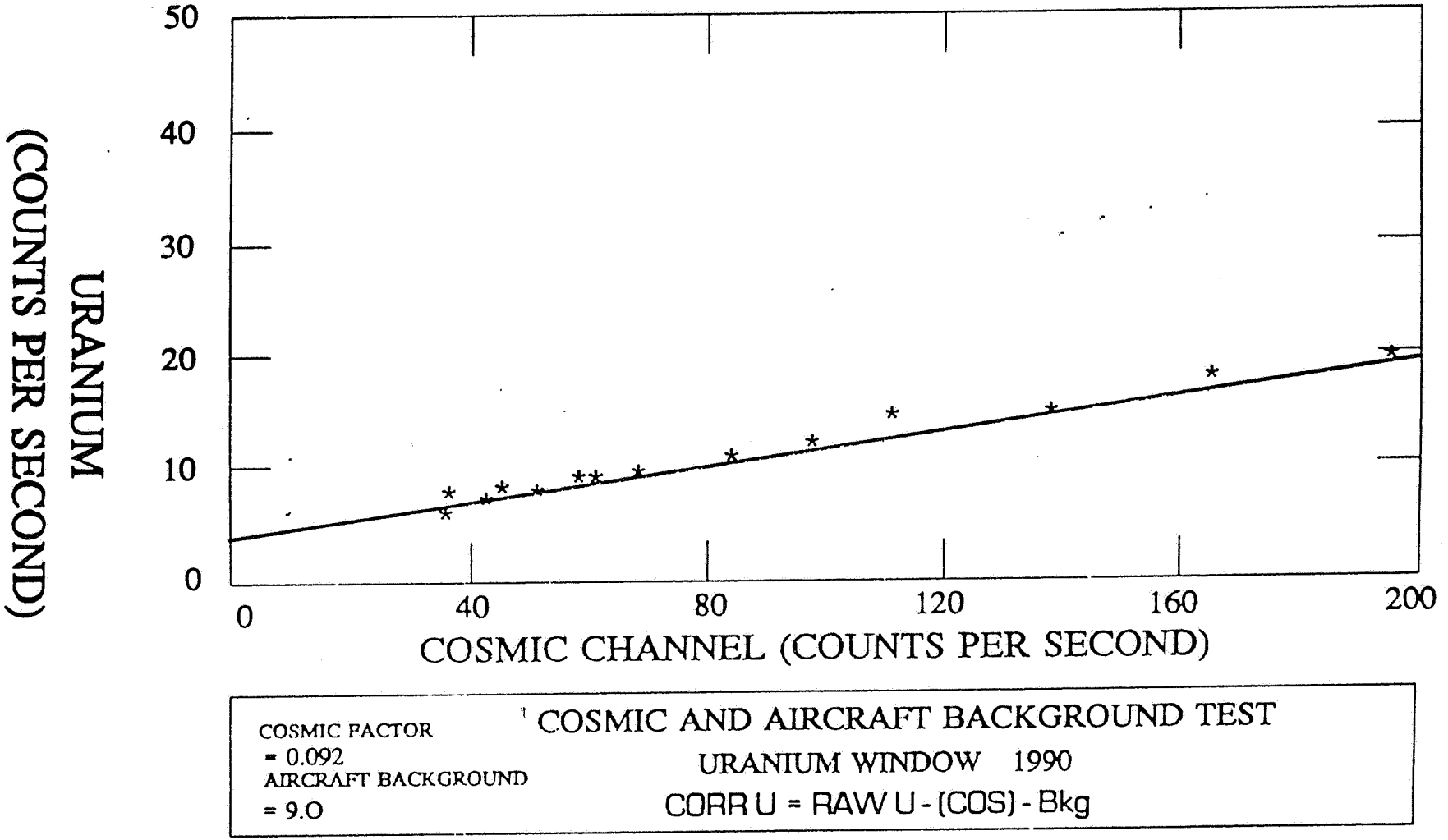
COSMIC AND AIRCRAFT BACKGROUND TEST

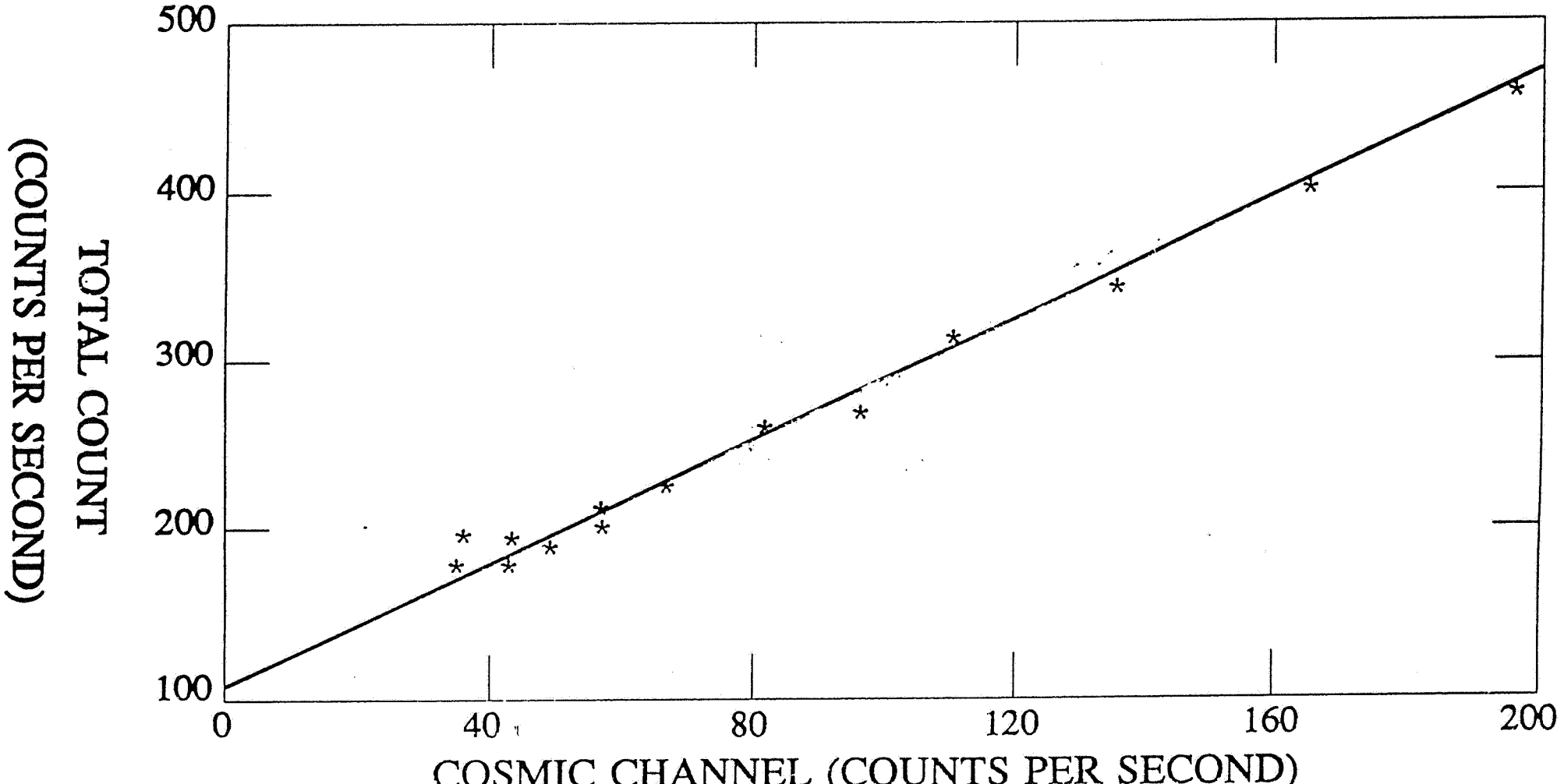
THORIUM WINDOW 1993

CORR Th = RAW Th - (COS) - Bkg


POTASSIUM
(COUNTS PER SECOND)
50
40
30
20
10
0
0
40
80
120
160
200
COSMIC CHANNEL (COUNTS PER SECOND)
COSMIC FACTOR
= 0.108
AIRCRAFT BACKGROUND
=18.0
COSMIC AND AIRCRAFT BACKGROUND TEST
POTASSIUM WINDOW 1993
CORR K = RAW K - (COS) - Bkg

0060


50
40
30
20
10
0
URANIUM (COUNTS PER SECOND)
0
40
80
120
160
200
COSMIC CHANNEL (COUNTS PER SECOND)
COSMIC FACTOR = 0.092
AIRCRAFT BACKGROUND = 9.0
COSMIC AND AIRCRAFT BACKGROUND TEST
URANIUM WINDOW 1990
CORR U = RAW U - (COS) - Bkg



COSMIC FACTOR
= 1.918
AIRCRAFT BACKGROUND
= 199.0

COSMIC AND AIRCRAFT BACKGROUND TEST

TOTAL COUNT WINDOW 1993

CORR TC = RAW TC - (COS) - Bkg

0062

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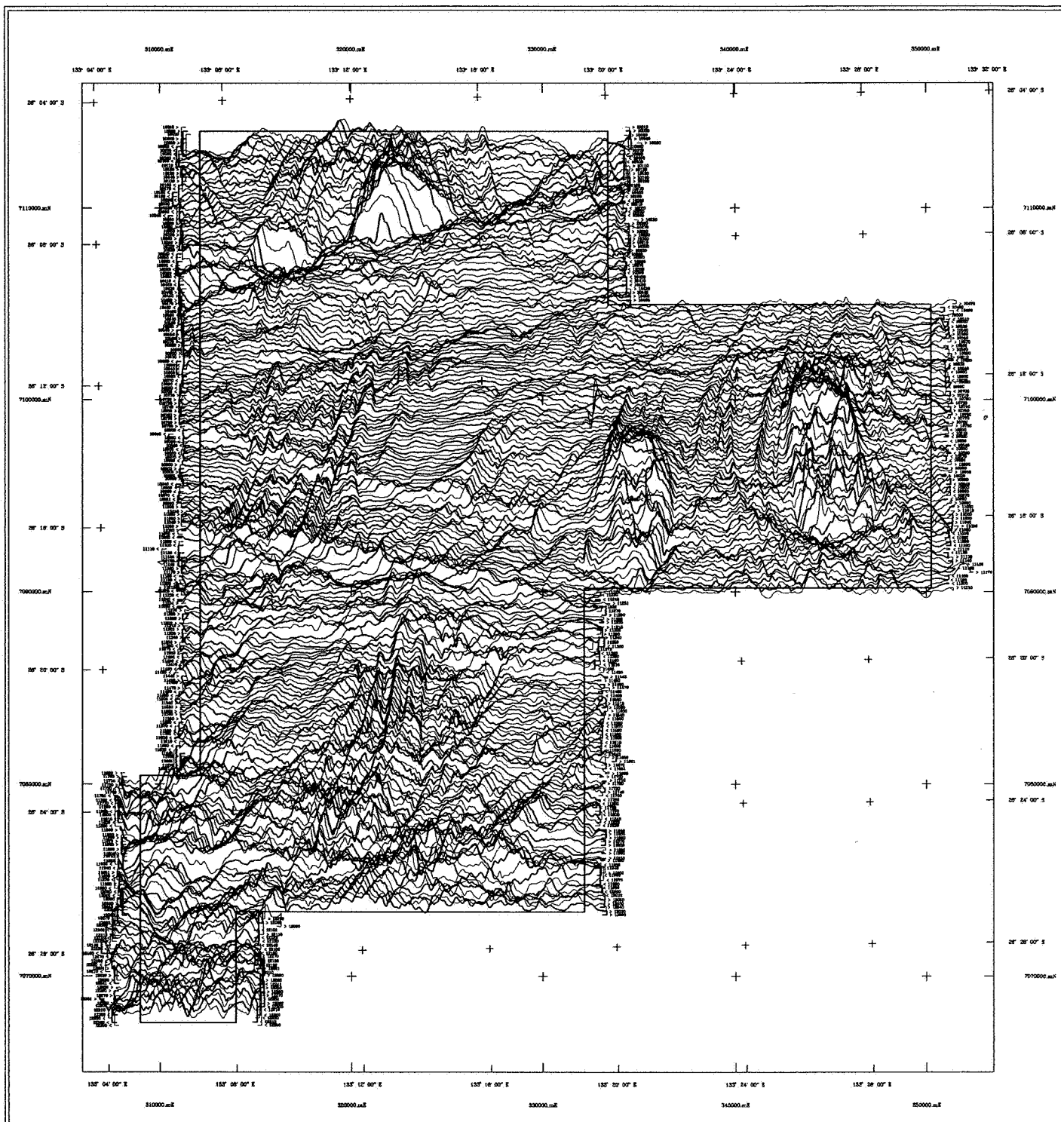
APPENDIX 7
Maps Delivered

Mt Howe



AIRBORNE SURVEY EQUIPMENT

Aircraft	Rockwell Aerocommander 500S VH-WAM
Magnetometer	Sonatrex VW ES21-SS Caesium Vapour
Magnetometer Resolution	0.001 nT
Magnetometer Compensation	RMS AADC (operating in real time
Magnetometer Sample Interval	0.1 seconds (approx 7.5 metres)
Data Acquisition	RMS DAS-6
Data Recording	DC300 data cartridge
Spectrometer	Geometrics GR820
Crystal Size	33.6lt downward, 4.2lt upward arrays
Spectrometer Sample Interval	1.0 Seconds (approx 75 metres)
Flight Path Record	VHS Colour Video System
GPS Navigation System	Ashtech Z12 GPS Receiver

AIRBORNE SURVEY SPECIFICATIONS

Flight Line Direction	090-270 degrees
Flight Line Separation	200 metres
Tie Line Direction	000-180 degrees
Tie Line Separation	2000 metres
Terrain Clearance	60 metres (NTC)
Kevron Geophysics job number	1260
Survey flown	November 1994

TOTAL MAGNETIC INTENSITY STACKED PROFILES

Diurnal variations removed
IGRF(1990) updated to 1994.9 removed
Average survey base station value added to datum

Datum Base Value 47SO nT
Vertical Scale 500 nT / cm

SCALE 1:100,000
2 0 2 4 6 8
Kilometres
MAP GRID ZONE 53
SPHEROID : Australian National
PROJECTION: Universal Transverse Mercator

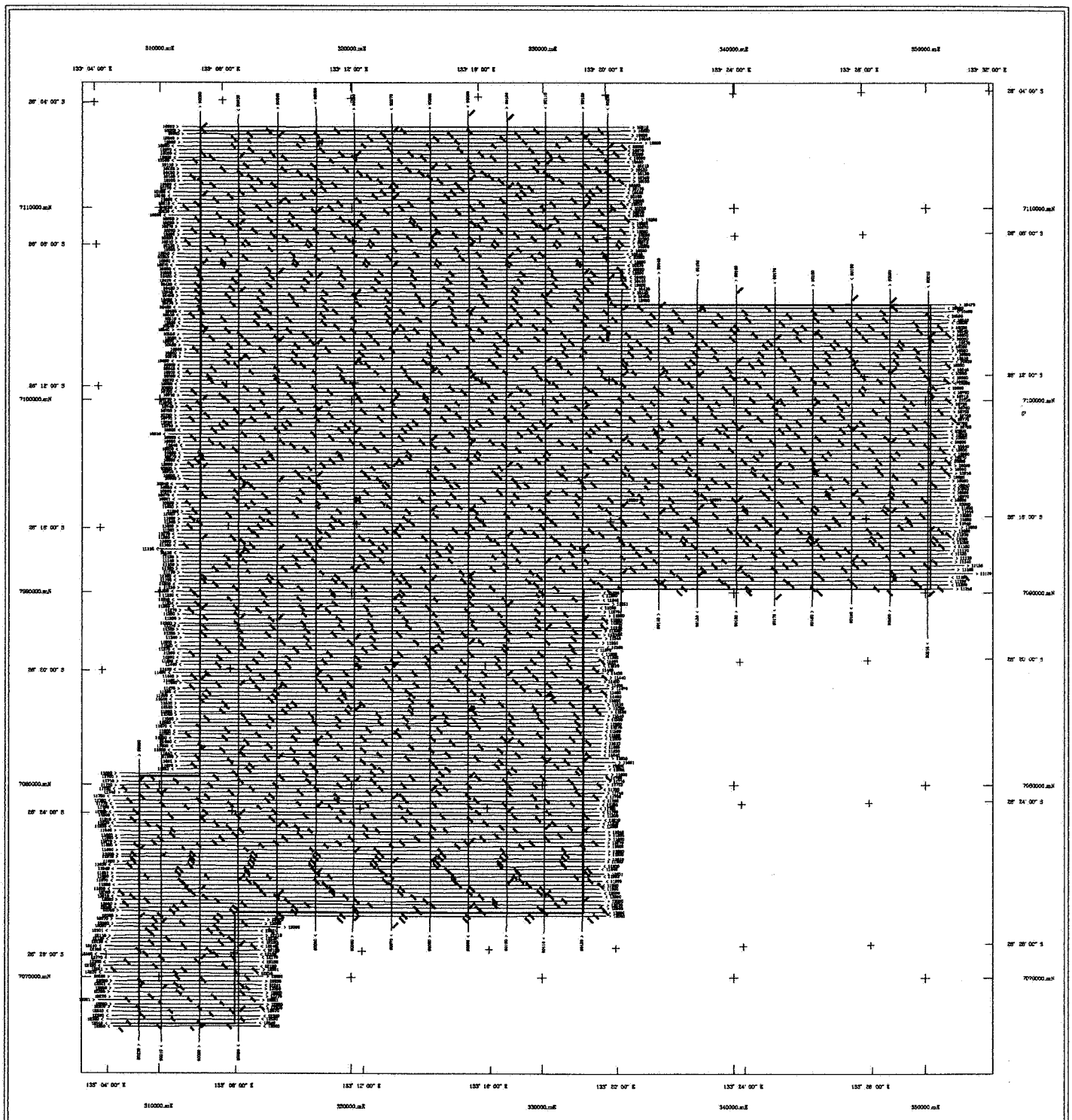
CRA Exploration Pty Ltd

Mount Howe

Aibourne Geophysical Survey

Stacked Profiles

COMPILED : Kevron Geophysics Pty. Ltd.	REPORT.
DATE Jan 1995	PLAN NO.
SCALE 1:100,000	



AIRBORNE SURVEY EQUIPMENT

Aircraft	Reciprocal Aerocommander 500S VH-WAN
Magnetometer	Scintrex VIW E321-HS Caesium Vapour
Magnetometer Resolution	0.001 nT
Magnetometer Compensation	RMS AADC operating in real time
Magnetometer Sample Interval	0.1 seconds (approx 7.5 metres)
Data Acquisition	RMS DAS-8
Data Recording	DC500 data cartridges
Spectrometer	Connaitre GR820
Crystal Size	33.6lt downward, 4.8lt upward arrays
Spectrometer Sample Interval	1.0 Seconds (approx 70 metres)
Flight Path Record	VHS Colour Video System
GPS Navigation System	Ashtech XII GPS Receiver

AIRBORNE SURVEY SPECIFICATIONS

Flight Line Direction	090 - 270 degrees
Flight Line Separation	200 metres
Tie Line Direction	000 - 180 degrees
Tie Line Separation	2000 metres
Terrain Clearance	60 metres (AVG)
Kevron Geophysics job number	1280
Survey Flown	November 1994

FLIGHT PATH PROCESSING

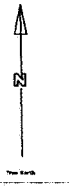
Flight path calculated from differentially corrected GPS Data using an Ashtech Eagle XII.

GPS navigation data differentially corrected in real time.

GPS Base Station Base at S 25 27 19' 17.36362", E 133 37' 34.86284"

Every 500 th fiducial annotated.

Grid notation refers to Australian Map Grid Zone 53



SCALE 1:100,000

2 0 2 4 6 8

Kilometres

MAP GRID ZONE 53

SPHEROID : Australian National
PROJECTION: Universal Transverse Mercator

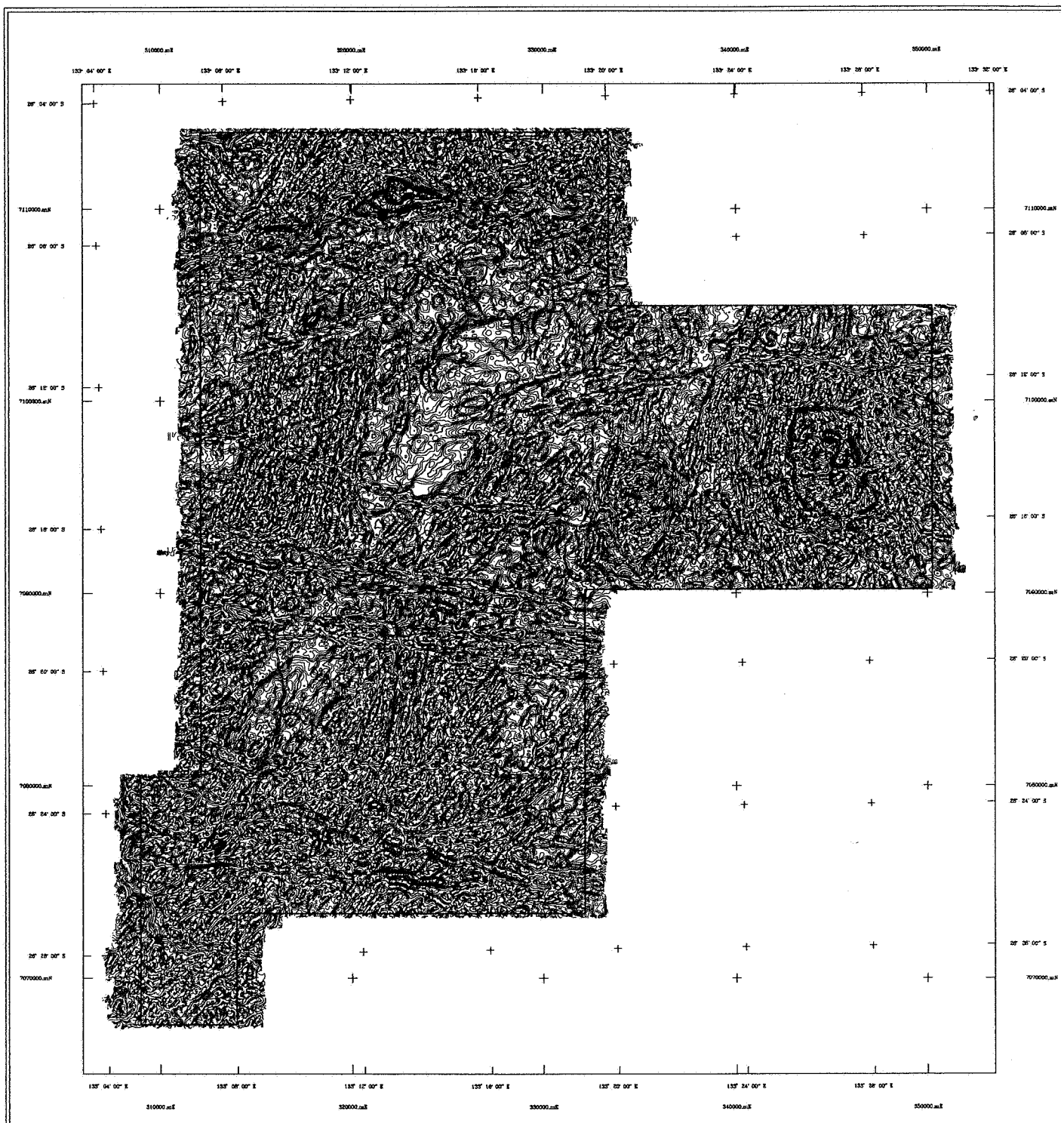
CRA Exploration Pty Ltd

Mount Howe

Aibourne Geophysical Survey

Flight Path

COMPILED : Kevron Geophysics Pty. Ltd.	REPORT :
DATE : Jan 1995	PLAN NO.
SCALE 1:100,000	



AIRBORNE SURVEY EQUIPMENT

Aircraft	Rockwell Aerocommander 6000 VH-NAM
Magnetometer	Scintrex VIW 2321-HS Cesium Vapour
Magnetometer Resolution	0.001 nT
Magnetometer Compensation	XNS AADC operating in real time
Magnetometer Sample Interval	0.1 seconds (approx 7.0 metres)
Data Acquisition	XNS DAS-6
Data Recording	DC300 data cartridges
Spectrometer	Geometrics GR820
Crystal Size	33.6lt downward, 4.2lt upward arrays
Spectrometer Sample Interval	1.0 Seconds (approx 70 metres)
Flight Path Record	VHS Colour Video System
GPS Navigation System	Ashtech XII GPS Receiver

AIRBORNE SURVEY SPECIFICATIONS

Flight Line Direction	090 - 270 degrees
Flight Line Separation	200 metres
Tie Line Direction	000 - 180 degrees
Tie Line Separation	2000 metres
Terrain Clearance	60 metres (MTC)
Kevron Geophysics job number	1280
Survey flown	November 1994

TOTAL MAGNETIC INTENSITY CONTOURS

Diurnal variations removed
IGRF(1990) updated to 1994.0 removed
Averaged survey base station value and a constant of 5000 nT added to datum

Grid mesh 50 x 50 metres

Contour Interval 20, 100, 500, 1000, 5000 nT

SCALE 1:100,000
2 0 2 4 6 8
Kilometres
MAP GRID ZONE 53
SPHEROID : Australian National
PROJECTION: Universal Transverse Mercator

CRA EXPLORATION Pty Ltd	
Mount Howe	
Airborne Geophysical Survey	
TMI Contours	
COMPILED : Kevron Geophysics Pty. Ltd.	REPORT :
DATE Jan 1995	PLAN NO.
SCALE 1:100,000	

CRA Exploration Pty Limited

APPENDIX 8

Data Tape Format

Mt Howe

LOCATED DATA TAPE FORMAT

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
BARO ALTIMETER	f6.1
RADAR ALTIMETER	f6.1
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
LOCAL TIME	f9.5

Logical record length of 144 Bytes

APPENDIX II

Rock Geochemical Sample Ledger

CRA EXPLORATION PTY LIMITED

EXPLORATION LICENCE 2020 - MT HOWE

Geochemical Rock Sampling Ledger

Geologist: A. Hughes	Date: April 1995	MUSGRAVE PROJECT	DPO Number 57701	Mapsheet: Alberga SG53-09 1:250,000

DESCRIPTION					RESULTS														
SAMPLE	AMG EAST	AMG NORTH	ZONE	DESCRIPTION	Ag	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Nb	Ni	Pb	Zn	Au	Pt	Pd	U
3330656	348100	7094880	53	Granitic gneiss with Mn stain from top of hill at location of radiometric anomaly. Scint counts ~ 300cps	#	<1	<2	18	4	7200	34700	160	260	14200	<5	3	35	12	1	10	1	<4
3330657	348150	7094830	53	Rock as above with counts up to 450cps. Some narrow biotitic veining.	#	<1	<2	13	8	6700	28000	90	1300	14900	15	<2	40	5	<1	<5	<1	11
3330658	333700	7096700	53	Feldspar amphibole pyroxene magnetite gneiss with susc to 0.7 SI units. O/c is ~ 200m S of mag anomaly on traverse (709)9700N.	#	<1	22	49	47	38700	5200	1900	600	12400	<5	32	5	58	<1	<5	6	7
3330659	320900	7084700	53	Rare fragment of greenish yellow highly weathered rock from eastern side of borrow pit. (Most other o/c is granitic gneiss)	#	<1	2	32	30	31300	380	2800	80	3300	<5	37	<5	10	9	<5	4	4
3330660	321850	7083750	53	Pisolites from ferruginous lag near old track adjacent to a survey mark.	#	<1	7	340	22	463000	165	600	115	6400	20	<2	45	7	<1	<5	1	<4
				SCHEME		IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	FA3	FA3	FA3	XRF1
				DL		1	2	2	2	100	10	10	5	10	5	2	5	2	1	5	1	4
				UNITS		PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPB	PPB	PPB	PPM

APPENDIX III

Soil Geochemical Sample Ledger

CRA EXPLORATION PTY LIMITED

Musgrave Project Mt Howe EL 2020

Geochemical Soil Sample Ledger -20#+40# fraction

Geologist: ARH		Date: April 1995		DPO Number 57701					Alberga 1:250,000 SG53-09									
Sample	East	North		Ag	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Nb	Ni	Pb	Zn	Au	Pt	Pd
Line 99000N - NW of Mt Howe																			
3336405	341500	7099000		<1	<2	51	9	26900	22600	220	175	1800	15	7	15	21	<1	<5	<1
3336406	341600	7099000		<1	<2	90	10	42100	22600	260	300	1800	25	8	15	32	<1	<5	<1
3336407	341700	7099000		<1	<2	65	7	39600	21400	340	300	1800	25	8	10	31	<1	<5	<1
3336408	341800	7099000		<1	<2	85	7	38300	22600	380	300	1900	25	8	10	31	<1	<5	<1
3336409	341900	7099000		<1	3	58	7	54000	22600	1700	380	2200	25	7	10	38	<1	<5	<1
3336410	342000	7099000		<1	<2	72	5	28800	19200	340	220	1800	15	6	10	25	<1	<5	<1
Line 8200N - West of railway line, NE of Wallaby Rock																			
3336411	338000	7098200		<1	<2	46	5	16600	28400	300	320	2300	15	6	20	29	<1	<5	<1
3336412	338100	7098200		<1	<2	45	4	11700	24200	220	220	2000	10	4	10	22	<1	<5	<1
3336413	338200	7098200		<1	<2	37	4	13700	25100	220	260	2100	10	4	10	18	<1	<5	<1
3336414	338300	7098200		<1	<2	57	5	17100	25800	300	280	2300	15	5	15	21	<1	<5	<1
3336415	338400	7098200		<1	<2	43	4	17400	26600	380	360	2300	15	5	10	20	<1	<5	<1
3336416	338500	7098200		<1	<2	57	5	16700	24500	260	280	2000	15	5	10	24	<1	<5	<1
Line 32800E - Across Cavanagh magnetic anomaly NW of Wallaby Rock																			
3336417	332800	7099300		<1	<2	44	4	19000	18900	260	480	1500	15	5	10	24	<1	<5	<1
3336418	332800	7099400		<1	<2	71	6	23000	22500	260	600	1700	20	5	10	28	1	<5	<1
3336419	332800	7099500		<1	<2	50	5	24300	22100	200	600	1700	20	5	15	33	<1	<5	<1
3336420	332800	7099600		<1	<2	70	6	23000	24000	240	560	1800	20	6	15	37	4	<5	<1
3336421	332800	7099700		<1	<2	49	5	27600	21700	220	740	1700	25	5	15	34	<1	<5	<1
Line 22800E - Across major magnetic anomaly near Bruce Bore																			
3336422	322800	7109000		<1	2	81	6	29100	33300	500	320	2800	10	10	15	27	<1	<5	<1
3336423	322800	7109100		<1	<2	54	6	24000	30100	440	220	2400	10	9	10	23	<1	<5	<1
3336424	322800	7109200		<1	2	85	8	36000	32000	780	420	2600	15	11	15	38	<1	<5	<1
3336425	322800	7109300		<1	<2	71	8	40300	32700	680	460	2600	15	12	15	38	<1	<5	<1
3336426	322800	7109400		<1	<2	90	8	44600	27900	740	500	2400	20	12	10	39	<1	<5	<1
3336427	322800	7109500		<1	<2	61	7	45300	28400	820	540	2600	20	10	15	46	<1	<5	<1
3336428	322800	7109600		<1	<2	83	9	65300	24900	760	660	2200	25	9	15	57	1	<5	<1
3336429	322800	7109700		<1	<2	50	9	76900	25000	620	740	2100	30	8	10	125	<1	<5	<1
3336430	322800	7109800		<1	<2	64	10	81500	26200	840	820	2300	35	9	15	79	<1	<5	<1
3336431	322800	7109900		<1	<2	51	7	57800	27600	560	600	2300	25	7	15	53	3	<5	<1
3336432	322800	7110000		<1	<2	70	8	76900	27300	580	860	2300	35	8	10	63	1	<5	1
3336433	322800	7110100		<1	<2	49	7	59500	30300	760	700	2800	30	8	15	50	1	<5	<1
3336434	322800	7110200		<1	<2	69	7	59900	30200	440	820	2500	30	8	15	58	1	<5	<1
3336435	322800	7110300		<1	<2	49	7	45900	32700	560	820	2800	25	9	25	42	<1	<5	<1
3336436	322800	7110400		<1	<2	57	6	45400	34000	480	1000	3000	30	8	25	45	1	<5	<1
3336437	322800	7110500		<1	<2	41	7	28900	34700	520	720	3100	20	7	20	37	1	<5	1
3336438	322800	7110600		<1	<2	51	5	21300	36300	420	520	3300	15	7	20	29	1	<5	<1
3336439	322800	7110700		<1	<2	47	8	27700	34700	520	620	3200	20	13	30	40	1	<5	<1
3336440	322800	7110800		<1	<2	55	5	24500	20200	360	640	3500	20	7	20	32	<1	<5	<1
3336441	322800	7110900		<1	<2	40	6	29500	34100	600	700	3200	20	8	20	36	<1	<5	<1
3336442	322800	7111000		<1	<2	70	7	31600	34400	540	780	3300	25	12	15	41	1	<5	<1
3336443	322800	7111100		<1	2	45	7	26800	30200	440	660	2800	20	8	25	36	<1	<5	1
3336444	322800	7111200		<1	3	61	7	27800	28800	760	720	2500	20	8	25	41	<1	<5	<1
3336445	322800	7111300		<1	3	58	9	23000	34600	480	640	2900	20	7	25	37	<1	<5	<1
3336446	322800	7111400		<1	<2	84	7	27200	35800	420	800	3300	25	10	30	44	1	<5	<1
3336447	322800	7111500		<1	3	56	8	36900	34000	540	980	3300	35	9	25	53	1	<5	<1
3336448	322800	7111600		<1	4	72	9	28700	45100	560	800	4200	25	11	55	51	1	<5	<1
3336449	322800	7111700		<1	4	46	8	28700	39600	500	800	3600	25	9	30	50	1	<5	<1
3336450	322800	7111800		<1	2	78	8	24400	38000	500	720	3600	25	8	25	38	1	<5	<1
3336451	322800	7111900		<1	<2	42	7	26300	34800	500	800	3300	25	8	25	38	<1	<5	<1
3336452	322800	7112000		<1	2	74	7	24900	11000	320	700	4300	25	9	20	40	1	<5	<1
Line 22000E - Across major magnetic anomaly near Bruce Bore																			
3336453	322000	7112300		<1	2	51	8	28000	15000	460	900	4100	30	7	25	50	1	<5	1
3336454	322000	7112200		<1	2	78	8	25900	38100	480	780	3500	25	8	30	46	<1	<5	<1
3336455	322000	7112100		<1	3	54	8	32600	38000	400	1000	3200	35	8	25	55	1	<5	<1
3336456	322000	7112000		<1	2	64	8	26100	36800	440	780	3300	25	8	30	45	<1	<5	<1
3336457	322000	7111900		<1	3	48	7	23800	11600	520	780	4700	25	8	25	46	1	<5	<1
3336458	322000	7111800		<1	4	72	8	34500	33700	400	1000	2900	35	9	25	54	1	<5	1
3336459	322000	7111700		<1	8	93	10	69100	31600	600	1700	2800	55	13	30	91	<1	<5	<1
3336460	322000	7111600		<1	3	86	8	28000	33400	520	520	2900	20	11	25	37	<1	<5	<1
3336461	322000	7111500		<1	4	66	7	28100	34400	400	520	3000	20	9	25	35	2	<5	<1
3336462	322000	7111400		<1	3	79	6	24000	34800	380	400	2800	15	9	25	27	<1	<5	<1
3336463	322000	7111300		<1	4	55	9	27900	33100	1200	460	2800	15	12	25	33	2	<5	<1
3336464	322000	7111200		<1	6	92	7	52700	32000	380	820	2400	30	13	25	48	<1	<5	<1
3336465	322000	7111100		<1	3	68	7	27500	18900	240	420	3400	15	11	25	32	2	<5	<1
3336466	322000	7111000		<1	4	76	6	32000	34200	340	420	2600	15	11	30	34	1	<5	<1
3336467	322000	7110900		<1	3	59	5	28100	33700	240	380	2500	15	9	25	28	1	<5	<1
3336468	322000	7110800		<1	4	73	8	43400	32700	380	540	2500	20	12	30	39	<1	<5	<1
3336469	322000	7110700		<1	4	54	7	38400	20000	400	460	2800	15	11	25	51	<1	<5	<1
3336470	322000	7110600		<1	4	74	8	44600	11600	340	480	3200	20	10	15	43	<1	<5	<1
3336471	322000	7110500		<1	5	62	8	54600	24300	400	620	2500	25	12	20	55	<1	<5	<1
3336472	322000	7110400		<1	5	73	8	66500	27100	500	640	2200	30	9	25	64	<1	<5	<1
3336473	322000	7110300		<1	7	57	9	79100	25000	540	680	2400	35	11	25	72	<1	<5	<1

CRA EXPLORATION PTY LIMITED

Musgrave Project Mt Howe EL 2020

Geochemical Soil Sample Ledger -20#+40# fraction

Geologist: ARH		Date: April 1995		DPO Number 57701					Alberga 1:250,000 SG53-09									
Sample	East	North		Ag	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Nb	Ni	Pb	Zn	Au	Pt	Pd
3336474	322000	7110200		<1	6	67	11	127000	22700	620	880	1900	45	13	25	100	2	<5	<1
3336475	322000	7110100		<1	8	52	11	167000	11500	800	940	3200	55	11	20	100	<1	<5	<1
3336476	322000	7110000		<1	8	65	15	131000	12400	1400	860	3500	45	14	20	96	8	<5	<1
3336477	322000	7109900		<1	9	51	14	124000	12200	1200	860	3100	45	13	25	105	<1	<5	<1
3336478	322000	7109800		<1	8	66	14	84900	16400	1200	840	2800	35	13	20	91	<1	<5	<1
3336479	322000	7109700		<1	7	76	10	77500	10700	1100	780	3300	30	17	20	92	<1	<5	<1
3336480	322000	7109600		<1	7	105	14	45400	22400	1400	480	2800	20	19	20	66	4	<5	<1
3336481	322000	7109500		<1	6	80	15	29700	14300	980	360	3200	15	16	20	42	<1	<5	<1
3336482	322000	7109400		<1	5	93	10	27500	25400	860	340	2700	10	14	20	47	<1	<5	<1
3336483	322000	7109300		<1	5	85	8	36700	12500	720	380	3000	10	15	20	41	<1	<5	<1
3336484	322000	7109200		<1	5	88	7	39100	30700	780	340	3300	15	13	20	31	<1	<5	<1
3336485	322000	7109100		<1	5	72	7	25700	9200	480	280	3100	10	11	15	28	<1	<5	<1
3336486	322000	7109000		<1	4	85	7	17500	24700	560	220	2300	10	10	20	28	<1	<5	<1
			SCHEME	IC3EA	IC3EA	IC3EA	IC3EA	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EA	IC3EA	IC3EA	IC3EA	FA3	FA3	FA3
Analytical Details: Amdel Laborat DL				1	2	2	2	100	10	10	5	10	5	2	5	2	1	5	1

Exploration licence 2020 MT. HOWE
-40#+80# Soil Sample Ledger

AMG Zone 53 Sampled by A Hughes 5th September 1995

Alberga 1:250000 SG53-09 DPO 57703

Sample	North	East	Comments	RESULTS Au	Pt	Pd	Ag	As	Co	Cr	Cu	Fe	Mn	Mg	Mo	Ni	Pb	Zn
LINE 15700E																		
3330661	7107500	315620		1.6	0.4	<0.2	<1	4	8	95	19	56300	440	1100	<3	17	20	68
3330662	7107600	315630		1.1	0.2	0.2	<1	<3	6	79	12	50400	400	800	<3	15	25	50
3330663	7107700	315640		0.9	0.2	<0.2	<1	<3	6	65	9	44200	340	720	<3	12	20	34
3330664	7107800	315650		1	0.6	1	<1	6	6	67	18	46400	360	1200	<3	17	20	55
3330665	7107900	315660		0.7	0.2	0.2	<1	4	7	72	21	47200	400	1100	<3	14	25	58
3330666	7108000	315670		0.9	0.4	0.4	<1	4	8	66	18	46200	440	1400	<3	18	25	58
3330667	7108100	315680		0.2	0.6	0.4	<1	4	7	70	16	50400	460	940	<3	14	25	53
3330668	7108200	315690		1.5	0.4	0.4	<1	4	5	48	12	35100	320	780	<3	11	25	36
3330669	7108300	315700		0.8	0.2	0.4	<1	<3	6	43	13	44700	440	1000	<3	12	20	42
3330670	7108400	315710		0.2	0.2	<0.2	<1	<3	6	61	11	43000	400	780	<3	10	25	42
3330671	7108500	315720		1	0.2	0.2	<1	4	7	63	17	45000	340	1300	<3	16	25	56
3330672	7108600	315730		1.4	0.4	0.2	<1	4	5	41	11	34100	300	840	<3	10	25	35
3330673	7108700	315740		1	0.4	0.6	<1	4	5	56	12	43000	420	800	<3	13	20	42
3330674	7108800	315750		1.3	0.4	0.4	<1	<3	7	66	17	53600	440	1100	<3	16	25	54
3330675	7108900	315760	Sheet wash containing magnetite common	0.8	0.4	0.4	<1	<3	11	66	20	58300	560	1600	<3	17	25	65
3330676	7109000	315770	Sheet wash containing magnetite common	0.9	0.6	0.6	<1	6	10	65	24	57300	500	2000	<3	23	20	61
3330677	7109100	315780		0.7	0.4	<0.2	<1	4	10	66	18	70100	720	1500	<3	14	25	68
3330678	7109200	315790		0.4	0.6	0.4	<1	6	10	77	19	45100	480	1600	<3	26	25	45
3330679	7109300	315800		0.6	0.4	0.2	<1	<3	7	61	18	49800	440	1300	<3	14	25	47
3330680	7109400	315810		0.1	0.2	<0.2	<1	<3	8	61	17	43300	420	1100	<3	15	25	41
3330681	7109500	315820		0.2	0.2	0.2	<1	<3	7	53	14	39600	400	1100	<3	9	20	38
3330682	7109600	315830		0.2	0.6	0.6	<1	<3	9	66	25	40700	480	2400	<3	22	25	50
LINE 17000E																		
3330683	7108000	317000		1.6	0.6	0.6	<1	<3	7	66	19	46100	360	1100	<3	18	20	60
3330684	7108100	317000	SCRUBBY	0.8	1.2	0.8	<1	<3	9	61	23	41900	360	1600	<3	19	25	59
3330685	7108200	317000	DRAINAGE	0.3	0.4	0.4	<1	6	10	85	20	67100	600	1100	<3	19	25	66
3330686	7108300	317000		0.5	0.4	0.4	<1	<3	9	52	19	47800	440	1400	<3	16	25	50
3330687	7108400	317000		0.6	0.6	0.6	<1	4	10	77	22	56000	560	1600	<3	21	25	60
3330688	7108500	317000		0.5	0.4	0.4	<1	6	9	69	18	51900	500	1500	<3	18	25	59
3330689	7108600	317000		1	0.4	0.6	<1	<3	<2	20	3	12900	140	1300	<3	3	10	8
3330690	7108700	317000		0.7	0.6	0.6	<1	6	13	84	21	62800	680	1700	<3	38	25	59
3330691	7108800	317000		0.5	0.4	0.4	<1	<3	12	70	20	58800	620	1700	<3	29	30	68
3330692	7108900	317000		1	0.6	0.6	<1	6	13	86	20	65800	680	2000	<3	38	25	76
3330693	7109000	317000		0.3	0.2	0.2	<1	4	13	63	16	83300	860	2600	<3	22	30	84
3330694	7109100	317000		0.2	<0.2	0.4	<1	<3	11	54	12	69700	660	2000	<3	18	30	72
3330695	7109200	317000		0.5	0.6	0.6	<1	<3	12	95	21	60700	500	2300	<3	41	30	60
3330696	7109300	317000		0.7	0.2	0.4	<1	<3	8	52	11	48400	440	1000	<3	17	30	50

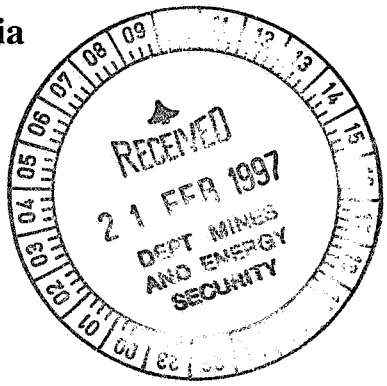
Exploration licence 2020 MT. HOWE
-40#+80# Soil Sample Ledger

AMG Zone 53 Sampled by A Hughes 5th September 1995
Alberga 1:250000 SG53-09 DPO 57703

Sample	North	East	Comments	RESULTS														
				Au	Pt	Pd	Ag	As	Co	Cr	Cu	Fe	Mn	Mg	Mo	Ni	Pb	Zn
3330697	7109400	317000		0.6	<0.2	0.2	<1	<3	6	57	12	54600	480	980	<3	18	30	52
3330698	7109500	317000		0.8	<0.2	0.2	<1	<3	7	52	10	47300	440	760	<3	16	25	45
			LINE 19200E															
3330699	7109000	319200		0.5	0.2	0.4	<1	<3	7	67	14	58900	620	1100	<3	18	35	57
3330700	7109100	319200		0.4	1.2	0.8	<1	<3	7	57	13	47700	540	960	<3	16	25	48
3330701	7109200	319200	Some sheet wash with magnetite	0.6	<0.2	<0.2	<1	<3	5	49	10	42200	480	860	<3	13	30	45
3330702	7109300	319200		0.6	0.4	0.4	<1	<3	8	70	17	59700	640	1200	<3	19	25	63
3330703	7109400	319200		0.3	<0.2	<0.2	<1	<3	7	61	13	48000	560	1100	<3	20	30	49
3330704	7109500	319200		0.3	0.2	0.2	<1	4	8	65	12	55000	640	1100	<3	18	30	58
3330705	7109600	319200		0.1	0.2	<0.2	<1	6	10	68	18	54600	640	1300	<3	25	25	220
3330706	7109700	319200		<0.1	<0.2	<0.2	<1	<3	8	61	16	53000	600	1000	<3	18	30	53
3330707	7109800	319200	Old Road	0.1	0.2	0.4	<1	4	10	62	19	52200	560	1500	<3	21	25	61
3330708	7109900	319200		0.4	0.4	0.4	<1	<3	10	59	14	51300	580	1200	<3	20	25	55
3330709	7110000	319200		0.2	0.8	0.4	<1	<3	8	58	17	46500	500	1300	<3	19	25	58
3330710	7110100	319200		0.2	0.4	0.4	<1	<3	12	76	22	59300	700	1800	<3	25	20	60
3330711	7110200	319200		<0.1	0.4	0.2	<1	6	10	69	17	53900	580	1400	<3	22	25	62
3330712	7110300	319200		0.5	0.6	0.6	<1	<3	11	66	22	53300	640	1800	<3	22	25	63
3330713	7110400	319200	Outcrop magnetic dolerite at 10440n 060/20s	0.1	<0.2	<0.2	<1	8	10	71	14	56500	640	1500	<3	21	25	63
3330714	7110500	319200	Outcrop magnetic dolerite at 10500n , 10530n 060/20s	0.1	0.4	0.4	<1	<3	10	90	14	69400	780	1600	<3	28	25	67
3330715	7110600	319200	Outcrop magnetic dolerite at 10610n 060/20s	0.6	1	0.8	<1	4	14	110	17	67100	740	2400	<3	38	25	72
3330716	7110700	319200	Outcrop magnetic dolerite at 10710n 060/20s	<0.1	0.4	0.4	<1	<3	12	94	18	65300	740	2400	<3	26	30	61
3330717	7110800	319200	Outcrop magnetic dolerite at 10800n 060/20s	0.1	0.6	0.2	<1	4	12	99	16	66500	680	2200	<3	32	25	61
3330718	7110900	319200	Outcrop magnetic dolerite at 10890n 060/20s	1	0.6	0.4	<1	<3	11	95	14	64400	680	2000	<3	25	20	57
3330719	7111000	319200		0.1	0.4	0.4	<1	<3	12	96	18	64600	720	2500	<3	27	20	68
Analytical Details: Amdel Laboratories, Adelaide				FA3M	FA3M	FA3M	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E
				0.1	0.2	0.2	1	3	2	2	2	100	5	10	3	2	5	2
				PPB	PPB	PPB	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM

CRA EXPLORATION PTY. LIMITED
ACN 000 057 125

Annual Report
For The Period Ending 25 September,1996
EL 2020 Mt. Howe, South Australia



Author: D.J. McInnes

Date: December, 1996

Licence Holder: CRA Exploration Pty. Limited

Submitted to: Chief Geologist, SE District

Copies to: Mines and Energy, South Australia (2)
CRAE - SE District (Adelaide)
CRAE - ETIG

Submitted by: FOR DJ. McINNES

Accepted by:

CRAE Report No. 22658

Abstract

Exploration Licence 2020, Mt. Howe was granted on 26 September 1994. The tenement is situated approximately 10 km south of the NT-SA Border straddling the Stuart Highway and the Tarcoola-Alice Springs railway line. The initiative for the title application was three positive magnetic features prominent in the 1969 BMR regional magnetic data that were possibly Giles Complex comparatives.

In late 1994 Kevron Geophysics Pty. Ltd. flew on behalf of CRAE a semi detailed magnetic/radiometric survey. The survey also located and delineated the three initial magnetic anomalies. The survey also delineated predominantly north-south striking stratigraphy with ESE trending dolerite dykes and another discrete negatively polarised magnetic body named Cavanagh. A radiometric anomaly attributed to an outcropping foliated arkosic rock was the only feature of note defined by radiometrics.

Two of the initial magnetic anomalies were found to be due to outcropping magnetic granite. Aircore drilling of the third intersected a magnetite rich granite-granodiorite. A drill hole (28 m) tested the Cavanagh magnetic anomaly and intersected fresh medium grained olivine cumulate, notably poor in magnetite. Petrology of a sample from 26-28 m revealed a number of features evident with the sample coming from a layered ultramafic body.

Three 1 km long surface TEM traverses over the Cavanagh prospect did not define any bedrock conductors. Unfortunately most of the data was dominated by Frequency Dependent Conductivity effects (FDC) previously referred to as IP effects. The magnitude and time decay of the early time data and the FDC effect is best in the profile over the geographic center of the Cavanagh magnetic anomaly. This indicates an increase in the conductivity/depth of the overburden coincident with the Cavanagh anomaly. (Note that the Earnest Henry TEM response was predominantly attributed to the increase in the conductivity/depth of the overburden.)

Four lines of Airborne Electromagnetic (AEM) traverses were flown as a trial over EL 2020. Three anomalies were identified and followed up with surface TEM. One displayed no feature of interest. The other two displayed early time anomalies attributed to an increase in the conductivity/depth of the overburden. A profile over the Area 1AEM anomaly has some features that could be attributed to a bedrock conductive source. Both these electromagnetic anomalies appear to be strike limited.

All prospects have had representative samples analytically tested and to date none have recorded any values of significance.

It is recommended to drill test the two electromagnetic anomalies and re-drill Cavanagh to test for magmatic sulphides. There are other features of interest in the test AEM traverses that could warrant further investigation. The use of AEM over areas of the tenement would also be planned in future exploration.

Contents

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List Of Plans

Plan No.	Title	Scale
SAa 6670	Mt. Howe EL 2020 - S.A., Location Plan Showing Prospects, Airborne TEM Traverses and Surface TEM Survey Areas	1:250 000

List Of Appendices

1. Conclusions and Recommendations

Three magnetic anomalies identified in the regional aeromagnetic data set and initially the focus for the Mt. Howe Exploration Licence application have been tested. The source of these anomalies was found to be magnetite rich granite and granodiorite-diorite. Rock, soil and drill chip samples failed to record any results of economic significance.

An inversely polarised magnetic anomaly (named Cavanagh) was identified by CRAE's airborne magnetic survey, and delimited by a small ground magnetic survey. A single aircore hole into the magnetic anomaly intersected weathered ultramafic from 8 metres, the hole was stopped at 28 m due to drilling difficulties. A bottom hole sample taken from the hole (26-28 m) recorded slightly elevated Ni, Pt, Pd, Mg, Cr, and Co. A petrological report suggests that it is from a layered ultramafic. Low amounts of magnetite in thin section and low magnetic susceptibilities recorded for the length of the drill hole indicate that rock type is not responsible for the magnetic anomaly.

The inverse magnetic signature of the Cavanagh anomaly is similar to a number of Giles complex ultramafics in the adjacent Musgrave Block. Unfortunately the surface TEM survey was dominated by the Frequency Dependent Conductivity effect (FDC. ref. IP effects). However where the FDC is greatest, coincidentally over the approximate center of the magnetic anomaly, there is a weak twin peak anomaly indicative of a dipping bedrock conductor.

Three anomalies were identified in the four Airborne Electromagnetic (AEM) test lines flown over the Exploration Licence. These anomalies are narrow and symmetrical, with medium to high amplitudes and moderate time constants in the mid to late time windows. Two of the AEM anomalies were investigated with a soil geochemistry traverses. These failed to record any significant assay results, although the areas are all predominantly under loose aeolian sand cover. Two to three 1 km long surface TEM traverses were undertaken over the three anomalies. Two of the areas displayed features of preferentially weathered zones with better conductivity/depth and possible bedrock conductors. In all three areas the mid to late time signal was dominated significantly by the Frequency Dependent Conductivity effect.

The Cavanagh inversely polarised magnetic anomaly and the two possible conductors defined in the surface TEM Surveys should be drilled with 150-200 m deep holes. Slotted casing should be made available to enable bore hole geophysical exploration. The drilling and any geophysical surveying could be undertaken whenever a rig or contractor becomes available in the area. Testing of the AEM technique showed promising results, by defining discrete conductors and not being dominated by overburden variations. AEM surveying should be considered in future exploration programs. Note that all current prospects are to the north of the De Rose Native Title claim.

2. Introduction

Exploration Licence 2020, Mt. Howe was initially acquired to test three large magnetic anomalies, identified in the regional 1968 magnetic data, as potential Giles complex layered intrusives. The anomalies were named Bruces Bore, Wallaby Rock and Mt. Howe. The locations of the three prospect areas are shown on plan SAa 6670

Exploration Licence 2020, is approximately 1121 km^2. CRA Exploration Pty. Limited (CRAE) was granted the EL on 26 September, 1994. The licence area is situated approximately 10 km south of the SA-NT border straddling the Stuart Highway and the Tarcoola to Alice Springs railway line. The exploration licence covers part of the Cavanagh, De Rose Hill and Tieyon properties.

The area is transported cover on the Eastern flank of the Musgrave Block and may contain equivalent Musgrave stratigraphy. This presents the potential for the occurrence of base metal, precious metal and diamond mineralisation associated with basement structures. The stratigraphy is generally north south striking with ESE trending magnetic dolerite dykes. There are three large positive magnetic features attributed to intrusives. There is also a discrete negatively polarised magnetic anomaly possibly related to Giles complex layered mafic intrusives.

This report documents the investigations undertaken by CRAE during the second year of tenure from the 26 September, 1995 to 25 September, 1996.

3. Review of Previous Work

3.1 Prior to Current Tenement

A review of previous exploration has not been completed. A listing of the historic Exploration Licences along with the SADME envelope number is included in Table 1.

3.2 During Current Tenement

3.2.1 Airborne and Radiometric Survey

An Airborne magnetic and radiometric survey was flown over the entire EL area. The survey was flown with 200 m flight line spacing and with a mean flight clearance of 60 m by Kevron Geophysics. The main features evident in the magnetic survey are the north-south striking stratigraphy and the ESE trending magnetic dolerite dykes. The three positive magnetic features, initially identified in the regional magnetics, were well defined and accurately located by the survey.

A number of other subdued magnetic responses were also defined by the magnetic survey and these maybe responses attributed to intrusives covered with varying amounts of overburden. A small, discrete inversely polarised dipole feature was also defined by the survey. This feature was named the Cavanagh prospect. Some elevated radiometric responses that correspond with outcrops of granitic or arkosic rocks were also recorded. The strongest radiometric response was named the Mt. Howe East prospect.

3.2.2 Mt. Howe Magnetic Anomaly

On the ground at the Mt. Howe prospect numerous outcrops of granite with coarse magnetite grains and magnetic susceptibilities between 2000 and 6000 by 10^{-5} SI units were located within the area defined by the aeromagnetic anomaly. Soil sampling in the area recorded no results considered to be significant.

3.2.3 Wallaby Rock Magnetic Anomaly

Numerous outcrops of granite similar to those at the Mt. Howe prospect were also observed at the Wallaby Rock prospect. Soil sampling at 100 m spacing failed to record any results considered to be significant.

3.2.4 Bruces Bore Magnetic Anomaly

No outcrop was located in the vicinity of the magnetic high associated with the Bruces Bore prospect. Soil sampling over the prospect recorded one sample (3330705) with a value of 220 ppm Zn against a background of 60 ppm.

3.2.5 Cavanagh Magnetic Anomaly

The Cavanagh prospect is a small intense bipolar magnetic anomaly with reverse polarity. It is situated in an area of no outcrop approximately 6 km NW of the Wallaby Rock prospect. Soil sampling in the area recorded no values of significance. Heavy mineral sampling revealed three grains of chromite. Six ground magnetic traverses summing to an approximate total of seven line kilometres were collected over the Cavanagh anomaly.

3.2.6 Mt. Howe East Radiometric Anomaly

The Mt. Howe East prospect was identified as the strongest radiometric response from the airborne survey completed over the EL. An outcrop of foliated arkosic rocks which gave a reading of 500 counts per second was recorded coincident with the area defined by the airborne survey. Two rock samples from the area were assayed and no significant results were recorded.

3.2.7 Soil Sampling

Fifty nine -40# +80# soil samples were collected over the EL. Of these only one sample (3330705) recorded any values of significance (220 ppm Zn). Eighty two -20# +40# soil samples were collected over the EL none of the samples recorded any values of significance.

3.2.8 Rock Sampling

Five rock samples were collected over the EL. None of the samples recorded any values of any significance.

4. Exploration Completed in 12 Months Ending 25th September 1996

4.1 Airborne Electromagnetic Survey

Four airborne electromagnetic (AEM) traverses, summing to approximately 100 line kilometres, were trialed over the Mt. Howe Exploration Licence (plan SAa 6670). The lines were flown in an East West direction with a mean flight clearance of 120 m. Details of the survey specifications are included in Appendix 1. The survey defined three anomalies (plan SAa 6670). The anomalies were named Area1, Area2 and Area3. Profiles of the four traverses with the three anomalies are included in the Appendix 1.

Line 40583

This was the most northern traverse flown during the test survey. The Area 3 anomaly was defined on this profile. The anomaly is a complex moderate amplitude twin peak anomaly. Initially the trailing peak has the higher amplitude, in later time the leading peak is the dominant component of the anomaly. The leading peak anomaly has a moderate time decay, no peak migration and no component of spheric noise. The anomaly is on the flank of a magnetic anomaly with a discrete source defined in the first vertical derivative.

A large portion of the profile is flat with a low signal response. This area must have an overburden with a low conductivity/depth variation. This is highly encouraging as it improves the possibility of defining a bedrock conductor. To the west of the flat zone of the profile is an area with a variable mildly conductive overburden. Most of the signal is depleted by the 9th window.

To the west of this conductive zone is a narrow, symmetrical response that should be followed up. The anomaly has a low to moderate response with some signal apparent in the very late time. There is no cultural or spheric noise associated with the anomaly. The anomaly has a corresponding subtle magnetic anomaly with a discrete source defined in the first vertical derivative.

Line 40590

Most of the profile is flat with no features of interest. There are four areas where the overburden has a variable conductivity/depth.

Line 40600

Once again most of the profile is flat. However a significant anomaly is defined as Area 1. The anomaly is very high in amplitude and narrow with a moderate mid to late time, time constant. There is a mild peak migration in the flight line direction. The small negative inflection on the leading edge of the anomaly is disconcerting as this can be associated with a flat lying source (i.e. increase in conductivity/depth of the overburden).

There is a small amount of spherical/cultural noise recorded coincident with the anomaly. The magnetic signature in the area is quite complex and the EM anomaly appears to be on the flank of a magnetic source.

The other two areas of interest on the profile are sourced by variations in the conductivity/ depth of the overburden.

Line 40610

The western end of the profile is dominated by region where the overburden has a highly variable conductivity/depth. The most interesting feature on the profile is the large amplitude defined as Area 2. The anomaly is similar in character to the anomaly defined as Area 1 on profile 40600.

Anomalies Area 1 and Area 2 were followed up with a soil geochemistry traverse. A surface TEM survey was designed to further investigate and accurately define the three AEM anomalies. In general the AEM technique would appear to be a successful and viable exploration tool in the Mt. Howe area. There are some areas defined on the profiles with conductivity/depth variations of the overburden, but most of the area would be amenable to the detection of bedrock conductors using AEM.

4.2 Bruces Bore Magnetic Anomaly

4.2.1 Drilling

The Bruces Bore prospect was one of the three magnetic anomalies first identified in the regional 1968 magnetic data. Initial ground checking revealed no outcrop in the area. Sixty nine samples from forty aircore holes for a total of 219 m were collected over the Bruces Bore magnetic anomaly. None of the samples recorded any assays of significance. The source of the anomaly was found to be a magnetic granite-granodiorite-diorite cross cut by dolerite dykes. The drill hole ledger and assay values for the samples collected are included in Appendix 2.

4.2.2 Petrological Analysis

Two samples (3336560 and 3336561) were sent to Pontifex and Associates Pty. Ltd. for petrological analysis. The deductions from the petrological work are that the two samples are from within a differentiated single felsic intrusive. A more detailed description of this work is included in Appendix 3.

4.3 Cavanagh Inverted Magnetic Anomaly

4.3.1 Drilling

One Aircore hole was drilled into the Cavanagh magnetic anomaly (AC95MH01). The hole intersected weathered ultramafic at a depth of 8 m. The ultramafic rock had a moderate to low magnetic susceptibility, but it is important to note that the anomaly is dominated by remnant magnetisation and not induced. The hole ended at a depth of 28 m, due to drilling difficulties, in fresh medium grained olivine cumulate with minor pyrite, chalcopyrite and magnetite. No significant assay results were recorded in any of the 14 samples submitted for analysis. As expected when intersecting the ultramafic there was an increase in Ni, Pt, Pd, Mg, Cr, and Co. The drill hole ledgers and assay results are included in Appendix 4.

4.3.2 Petrological Analysis

One sample was initially sent to Pontifex and Associates Pty. Ltd. for petrological analysis, this was then later sent to Martin Gole of Martin Gole and Associates. A number of features present in the sample tend to suggest that it is from a large layered intrusive body. R.J. Smith stated in his interpretation of magnetic and gravity data in the Musgraves block (1979) 'discrete negative anomalies are generally associated with remanently magnetised rocks of the Giles Complex (mafic and ultramafics)'. These two points suggest that the Cavanagh ultramafic may be analogous to the Giles complex ultramafics in the Musgrave Block. This is significant for the potential of magmatic sulphides. The results of the petrological work by both Pontifex and Martin Gole are included in Appendix 5. The lack of magnetite in the petrographical analysis indicates that the source of the magnetic anomaly has not been tested.

4.3.3 Surface TEM

Three surface TEM traverses were completed over the Cavanagh magnetic anomaly in the search for massive sulphide mineralisation. The survey used a twin turn 200 m by 200 m transmitter loop. Station spacing for the survey was 50 m and the spacing between lines was 400 m. A minimum of 4 soundings was completed at each station with a survey frequency of 2 Hz. A single component SIROTEM RVR was used to sense the secondary magnetic field (effective area is 10 000 m^2) with a ZONGE GGT25 and a ZONGE GDP16 used for transmitting the primary and recording the secondary signal respectively. Synchronization between the receiver and transmitter was achieved by the use of quartz clock. The response from the RVR antenna was jumped across two channels of the GDP16 and the second channel's gain setting was increased by two binary stages. The increased gain setting improves the late time signal but results in saturation of the early time signal. The use of two channels allows for a merger of the data from the two channels and thus good early time data and cleaner late time data. The traverses were completed in a North South direction.

Copies of the three profiles are in Appendix 6. A bedrock conductor response is not clearly defined in any of the three traverses. However the recorded signal is overprinted by a large amount of Frequency Dependent Conductivity (historically referred to as IP effect). The FDC effect results in a changing of the secondary signals polarity in the moderate to late times. This may result in the masking of a response from a bedrock conductor. The source of the FDC effect may be some form of current channel along preferentially weathered zones.

On profile 332800E where the FDC effect is most typical (i.e. has a negative decay) there is also a mild early time anomaly that is most like a response from an increase in the conductivity/depth of the overburdened (N.B. similar to source of Ernest Henry TEM anomaly). However in the early to moderate times there is a transferring of a low between stations 7099500 and 7099550. This allows for the interpretation of a twin peak anomaly typical of a dipping conductor. The first and smaller peak is between stations 7099400 and 7099550 the second peak is between stations 7099500 and 7099750. The top of such a source would be at approximately 7099550 and dipping to the North. The depth is more difficult to ascertain but from the mild wavelength of the anomaly along with early time signal response and the increase in the apparent conductivity/depth it would be between approximately 80 m. Note that the this traverse is over the approximate geographic centre of the negative magnetic anomaly.

4.4 Area 1

4.4.1 Soil Sampling

Area 1 was defined from the Trial AEM survey and is situated near the Stuart Highway. The area has some loose aeolian sand cover. Sixteen soil samples were collected along an east west traverse over the area where the source of the anomaly was located. The samples were sieved into three fractions (-80#,+80#-40# and +40#-20#). One +80#-40# sample (5243406) recorded an elevated Ni assay (61 ppm). Results area included in Appendix 7.

4.4.2 Rock Sampling

Three rock samples were collected from the area. One sample (524339) recorded an elevated gold (.0045 ppm in .0005 ppm background) and slightly elevated Zn and Pb (100 and 150 ppm respectively). Results area included in Appendix 7.

4.4.3 Surface TEM

Three East West surface TEM traverses were completed over Area 1. The survey specifications are as in the description of the Cavanagh surface TEM survey (above). Line 7083200N was shortened due to the Stuart Highway.

The three traverses all clearly display an anomaly due to an increase in the conductivity/depth of the overburden. A copy of the three profiles is included in Appendix 8. Further confirmation that the principal source of the anomaly is an increase

in overburden conductivity/depth is the direct correspondence and relationship of the Frequency Dependent Coupling effect (as in the Cavanagh surface TEM survey). The intensity and decay of the positive anomaly are quite similar for the two northern traverses. The southern traverse appears to have a lower amplitude, indicating a lower conductivity/depth of the overburden (less weathering ?). This implies that the source of the anomaly is possibly strike limited.

On Line 7083600N there is an interesting peak migration between stations 321850 and 321950. This gives the impression of a twin peaked anomaly with a null coupling point between 321900 and 321950. The anomaly source would be centred at approximately 329125 and dipping to the east.

4.5 Area 2

4.5.1 Soil Sampling

Area 2 was defined from the trial AEM survey and is also located in close proximity to the Stuart Highway. The area has predominantly loose aeolian sand cover. Seventeen soil samples were collected from an East West traverse over the area where the source of the anomaly was located. The samples were sieved into three fractions (-80#, +80#-40# and +40#-20#). No significant assay results were recorded in the samples. Assay results are in Appendix 7.

4.5.2 Rock Sampling

Three rock samples were collected from the area. No significant assay results were recorded in the samples. Results area included in Appendix 7.

4.5.3 Surface TEM

Three East West surface TEM traverses were completed over the area. The survey specifications are as in the description of the Cavanagh surface TEM survey (above). Profiles of the three traverses are included in Appendix 8.

Line 7085900N has little or no features of interest. The source of the negative inflection at point 330250E is most likely due to a localised cultural/surficial feature. The profile has a change in sign of the signal between windows 16 and 17. This is due to the Frequency Dependent Conductivity effect (FDC).

Traverses 7086300N and 7086700N clearly display a positive anomaly due to the increase in the conductivity/depth of the overburden. Further confirmation that the principle source of the anomaly is surficial is the direct correspondence of the FDC effect (as in the Cavanagh surface TEM survey). The intensity and decay of the anomalies are quite similar for the two traverses. The difference between profiles 7086300/6700 and 7085900N indicates that the source of the positive anomaly is strike limited.

4.6 Area 3

4.6.1 Surface TEM

Area 3 was identified from the AEM survey it is in a very remote position to the east of the Alice Springs, Tarcoola railway. The area is covered by loose aeolian sand with patches of thick vegetation. Due to the sand and vegetation cover only two traverses were completed over the anomaly. The two profiles are included in Appendix 8.

Traverse 7098600N was terminated early due to the scrub making the rest of the traverse inaccessible. The profile shows a broad increase in all early time channels from west to east. This is due to an increase in the conductivity/depth of the cover sequence. The single station inflection at 489100 is unexplained.

Traverse 7098800N shows a broad low amplitude anomaly. The source of such an anomaly is an increase in the conductivity/depth of the overburden. Once again there is a strong FDC effect recorded in the data.

5. Rehabilitation

Drill Site MH01 has been rehabilitated, but further work could be done to remove rig wheel marks on the access track. The country is flat, scrubby and sandy and these are more a cosmetic problem than environmental and do not pose an erosion hazard.

All flagging used in the TEM survey was removed whilst the survey was in progress. Grid pegs were used every 200 m to mark out the traverses and these still remain at the four areas where surface TEM was undertaken.

6. References

Hughes A.R. Mt. Howe EL 2020, South Australia, Annual Report For The First Year Of Tenure Ended 25 September, 1995. (CRAE Report # 21155)

7. Location

Alberga SG53-09 1:250 000 sheet

8. Keywords

Airborne Electromagnetic, TEM, Magnetic, Radiometric, Bruces Bore, Cavanagh, Mt. Howe, Mt Howe East

9. DPO Register

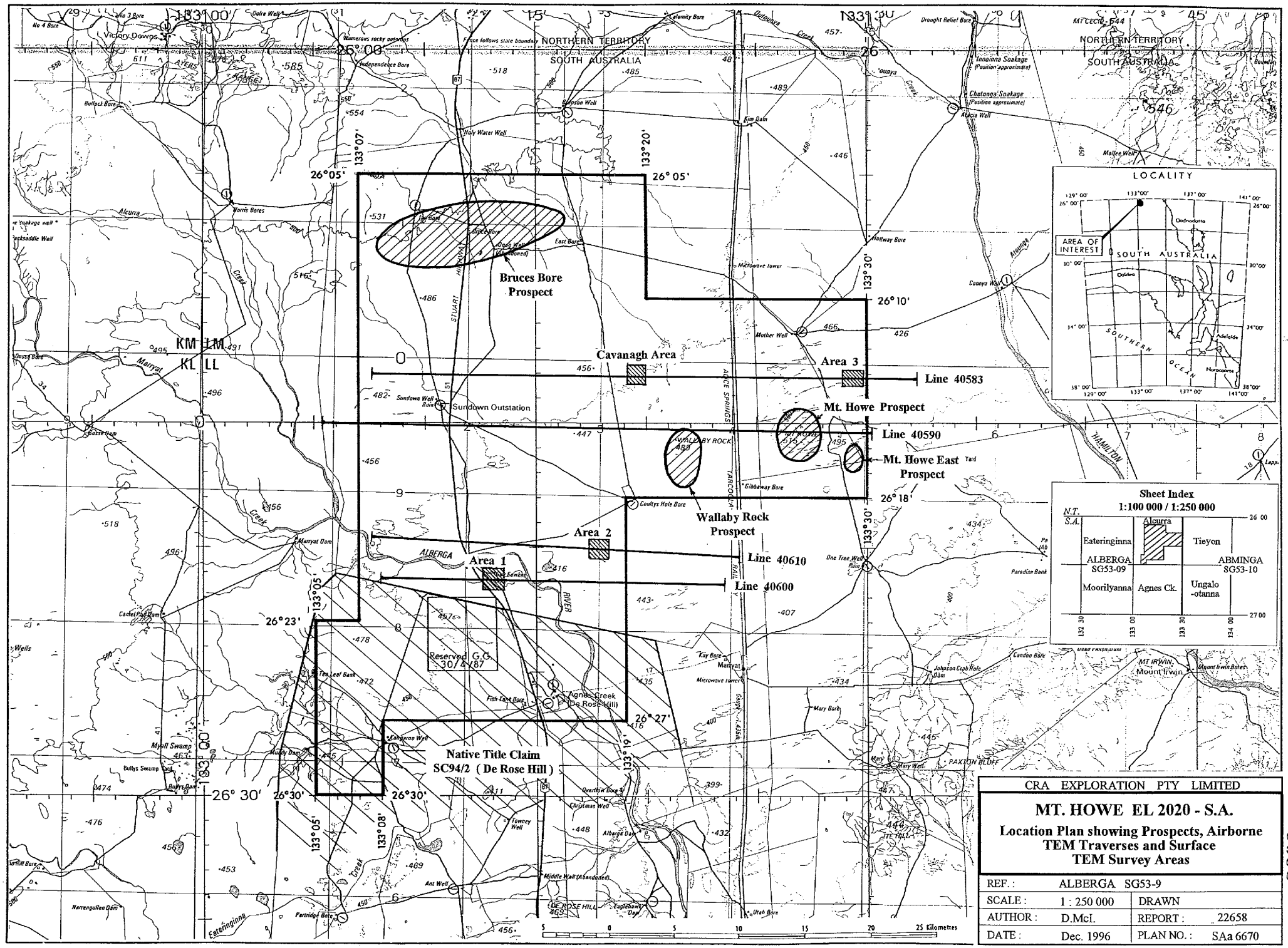
DPO Number	LAB	LAB Location	DPO Date	Office	Geologist	Tenement Name	Tenement Number	Sample Type	Number of Samples	250 000 Mapsheet
57701	AMDEL	ADL	19-Apr-95	ADL	A. Hughes	Mt. Howe	EL 2020	-20#+40#SL / Rock	82 / 5	Alberga SG53-09
57703	AMDEL	ADL	11-Sep-95	ADL	A. Hughes	Mt. Howe	EL 2020	-40#+80#SL	59	Alberga SG53-09
57704	AMDEL	ADL	13-Nov-95	ADL	A. Hughes	Mt. Howe	EL 2020	AC	83	Alberga SG53-09
57705	AMDEL	ADL	27-Nov-95	ADL	A. Hughes	Mt. Howe	EL 2020	AC	1	Alberga SG53-09
57706	Pontifex	ADL	27-Nov-95	ADL	A. Hughes	Mt. Howe	EL 2020	Petrological - AC	3	Alberga SG53-09
54326	AMDEL	ADL	07-Apr-96	ADL	D. Jackson	Mt. Howe	EL 2020	Soil / Rock	99 / 6	Alberga SG53-09
54327	Pontifex	ADL	07-May-96	ADL	D. Jackson	Mt. Howe	EL 2020	Petrological - AC	2	Alberga SG53-09

Table 1

Listing of Historic Exploration Licences

(with MESA Env. No.)

Special No. (SML)	Company	Local Name	Exp. Date	Env. No.
332	Aust Aquitaine Petroleum Pty Ltd	Granite Downs	23/10/69	1215
342	Aust Aquitaine Petroleum Pty Ltd	Granite Downs	22/10/70	1215
357	Kennecott Expln (Aust) Pty Ltd	Sundown	26/08/70	1281
358	Kennecott Expln (Aust) Pty Ltd	Everard Ranges	26/08/70	1292
417	Kennecott Expln (Aust) Pty Ltd	Agnes Creek	06/11/70	1476
418	Kennecott Expln (Aust) Pty Ltd	Artoonanna Hill	06/11/70	1477
490	Aust Aquitaine Petroleum Pty Ltd	Granite Downs	28/10/71	1729
510	Kennecott Expln (Aust) Pty Ltd	Artoonanna Hill-Marble Hill	18/11/71	1579
571	RMC Minerals Pty Ltd	Sundown	28/10/71	1648
(EL)				
3	Savage Exploration Pty Ltd	De Rosa Hill	08/09/72	—
4	Savage Exploration Pty Ltd	Moorilyanna Granite Downs	08/09/72	—
93	Director of Mines	Pine Ridge	12/07/74	2363
97	Dampier Mining Company Ltd	Granite Downs	23/12/74	2380



CRA EXPLORATION PTY LIMITED

MT. HOWE EL 2020 - S.A.

Location Plan showing Prospects, Airborne TEM Traverses and Surface TEM Survey Areas

REF. :	ALBERGA SG53-9		
SCALE :	1 : 250 000	DRAWN	
AUTHOR :	D.McI.	REPORT :	22658
DATE :	Dec. 1996	PLAN NO. :	SAa 6670

0093

Appendix 1

AEM Survey Details and The Four Traverses

MT. HOWE
SOUTH AUSTRALIA

QUESTEM AIRBORNE GEOPHYSICAL SURVEY
LOGISTICS REPORT
JOB : 1143

Data acquired and processed by:

WORLD GEOSCIENCE CORPORATION LIMITED
65 Brockway Road
FLOREAT WA 6014

Tel: (61 9) 273 6400
Fax: (61 9) 273 6466

MT. HOWE
SOUTH AUSTRALIA
QUESTEM AIRBORNE GEOPHYSICAL SURVEY
LOGISTICS REPORT
JOB : 1143

CONTENTS

1. LOGISTICS

1.1 Operating Base

The main operating base was from Marla for the Mt. Howe area.

1.2 Flight Summary

The MT. Howe survey was flown between the 20th and 24th January 1996 at 75 Hz.

1.3 Aircraft Details

Survey Aircraft	-	Britten Norman Trislander
Registration	-	VH-NKW

1.4 Field Crew

Ian Payne	-	Pilot
Chris Harrison	-	Engineer / Operator
Mark Cowen	-	Operator
Matt Owers	-	Geophysicist

2. SURVEY DETAILS

AREA 4 (VERNON HILL) : *75 Hz* Total line kilometres - 996 km.

	Line Numbers	*Orientation*	*Line Spacing*
Reconnaissance lines	40583 - 40610	090° - 270°	n/a

2.2 Navigation

Navigation was by Novatel GPS satellite positioning incorporating real-time differential corrections via the Omnistar system. An Ashtech receiver collected base station information for post flight differential corrections.

2.3 Flight Path Recovery

Flight path recovery was confirmed on-site using Aerodata post flight processing software.

2.4 Altimeters

(i) King KRA-405 radar altimeter.
(ii) Barometric altitude using a Digiquartz 215A-101 transducer - operating range 0-15 psi.

2.5 Aircraft Magnetometer

Type	-	Scintrex Cs-2 split-beam cesium vapour
Resolution	-	0.01 nT
Operating Range	-	17,000 - 95,000 nT

Mounting	-	Nose Stinger
Sampling Rate	-	0.5 second
Sample Separation Along Line	-	30 m

2.6 QUESTEM Airborne Time Domain EM System

QUESTEM is an airborne electromagnetic mapping system designed and operated by World Geoscience Corporation Limited. Half-sine waveforms of electric current with alternating polarity are pulsed through the transmitter loop slung around the aircraft. The electromagnetic field generated by the loop penetrates the ground below the aircraft and induces secondary, decaying currents from any conductive material. These are sensed by a receiver towed behind the aircraft. The secondary current amplitude and decay rate depends on the three dimensional distribution of the electrical conductivity in the ground.

Frequency of Transmitter Operation	-	75 Hz
Channels Recorded	-	64
Transmitter Waveform	-	Half-sine wave pulse
Transmitter On-Time	-	2.0 msec
Transmitter Off-Time	-	4.67 msec (75 Hz)
Bird Height	-	50 m
Flying Height	-	120 m
Peak Transmitter Loop Current	-	240A
Transmitter Loop Turns	-	6
Transmitter Loop Moment	-	267,840 ATm^2
Number of Digital Samples per Waveform	-	128 (75 Hz)
Sample Size	-	52.08 microsec
Sensor	-	Horizontal coil in towed bird
EM Reading Duration	-	200 msec
EM Readings Per Second	-	4
Sample Separation Along Line	-	15 m

75 Hz Window Times

Window	Start (µsecs)	End (µsecs)
1	272	428
2	376	533
3	481	637
4	585	741
5	689	949
6	897	1,157
7	1,105	1,366
8	1,314	1,678
9	1,522	1,887
10	1,730	2,199
11	2,043	2,512
12	2,460	3,032
13	2,980	3,553
14	3,501	4,074
15	3,918	4,491

2.7 Acquisition System

The airborne data acquisition system used was the Picodas PDAS 1000 system and Aerodata navigation software.

2.7.1 Digital Recording

Line Number
Flight
Year
Date
Time
Barometric Pressure
Radar Altimeter
Raw Magnetic Intensity
Navigation String (latitude, longitude, quality, age etc.)
AC Time
+64 Channel EM Data

2.7.2 RMS Graphic Recorder

Channel 0 EM1	FS	10000 ppm
Channel 1 EM2	FS	10000 ppm
Channel 2 EM3	FS	10000 ppm
Channel 3 EM4	FS	10000 ppm
Channel 4 EM5	FS	10000 ppm
Channel 5 EM6	FS	10000 ppm
Channel 6 EM7	FS	10000 ppm
Channel 7 EM8	FS	10000 ppm
Channel 8 EM9	FS	10000 ppm
Channel 9 EM10	FS	10000 ppm
Channel 10 EM11	FS	10000 ppm
Channel 11 EM12	FS	10000 ppm
Channel 12 EM13	FS	10000 ppm
Channel 13 EM14	FS	10000 ppm
Channel 14 EM15	FS	10000 ppm
Channel 15 Radar Altimeter	FS	1000 ft
Channel 16 Spherics Monitor	FS	1000 ppm
Channel 17 Power Line Monitor	FS	1000 ppm
Channel 18 Raw Mag	FS	100 nT
Channel 19 Latitude	FS	0.010 deg
Channel 20 Longitude	FS	0.010 deg
Channel 21 Barometric Altimeter	FS	1000 ft

2.8 Magnetic Base Station

Type	-	Geometrics G-856AX
Resolution	-	0.1 nT
Sampling Rate	-	5 seconds
Locations	-	Marla Airstrip
Recorder	-	Internal

3. CALIBRATIONS

3.1 Magnetics

3.1.1 Noise Envelope

The noise envelope matched or bettered the required specification of $\pm$0.2 nT.

3.2 Electromagnetics

3.2.1 Reference File

The primary waveform is measured at a great height prior to the flight. This is used in converting the data to ppm.

3.2.2 Drift Correction

A zero file is recorded at a great height prior to the flight, and a drift file is collected at the end of the flight to enable a correction for transmitter drift due to warming.

4. PROCESSING

4.1 Infield Verification

Magnetic and electromagnetic data quality was checked daily using a Sun SparcStation and aircraft analogs. Flight path was also checked against survey specifications.

4.2 Magnetic Data Processing

The airborne magnetic data were corrected for diurnal adjustments. The IGRF (1990 epoch extrapolated to 1996) was then removed at calculated intervals along each flight line. The data were also corrected for system parallax and heading differences. The data were then gridded at a cell size of 50 metres and imaged.

4.3 Electromagnetic Data Processing

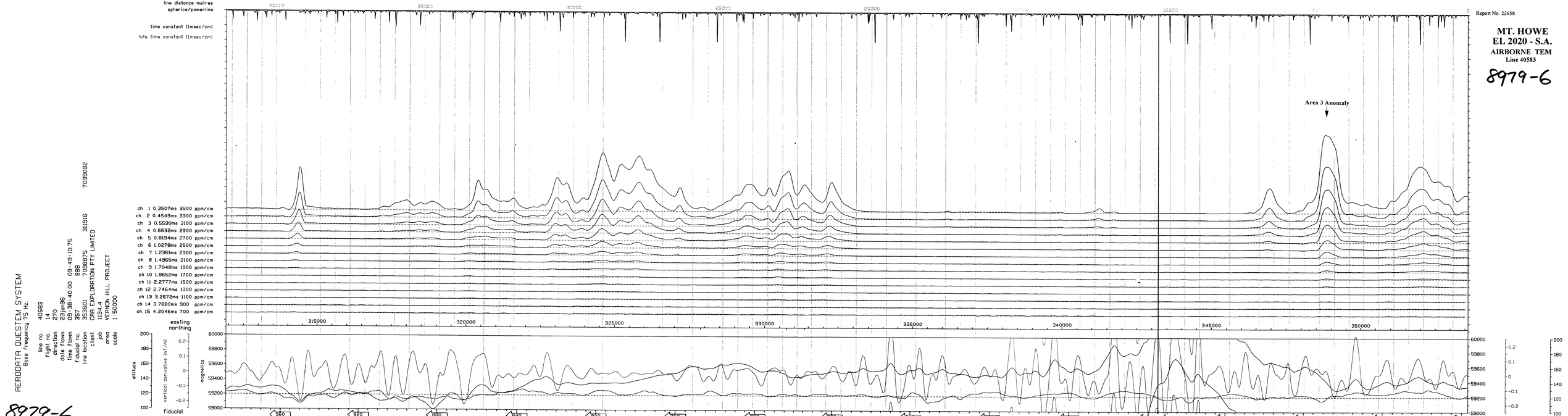
The airborne electromagnetic data was corrected for transmitter drift. Algorithms were also applied to the data to compensate for varying bird-plane geometry. Stages of processing of the digital data included:

- binning of the 64 channels into 15 windows
- parallax correction based on vertical conductors (eg. test lines flown over a railway line)
- spatial filtering to remove noise but conserve geological information

- gridding of selected channels and calculation of apparent conductance grids
- two time constants each calculated over 5 channels : one centred on channel 9, the other centred on channel 12

Apparent conductance grids were derived for a range of delay times from early time (approximately 100 µsec) through to mid and late times (4 milliseconds). An apparent conductance grid is superior to raw EM amplitude as it can solve two major problems in gridding airborne electromagnetic data. The first is the variation in signal caused by variations in flying height. The second occurs in terrain where conductivity is higher than the conductive limit (the level at which responses at a particular delay time start to fall with increasing conductivity), resulting in ambiguous EM amplitudes. The apparent conductance calculation process accounts for these problems. Further subtle adjustments of parallax are also applied to these grids.

The time constant included on the line profiles was calculated from channels 7 to 11 and centred on channel 9.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job 1134.4
area VERNON HILL PROJECT
scale 1:50000
line distance metres
spherics/powerline
time constant (1msec/cm)
late time constant (1msec/cm)
ch 1 0.3507ms 3500 ppm/cm
ch 2 0.4543ms 3300 ppm/cm
ch 3 0.5590ms 3100 ppm/cm
ch 4 0.6632ms 2900 ppm/cm
ch 5 0.8194ms 2700 ppm/cm
ch 6 1.0278ms 2500 ppm/cm
ch 7 1.2361ms 2300 ppm/cm
ch 8 1.4965ms 2100 ppm/cm
ch 9 1.7048ms 1900 ppm/cm
ch 10 1.9652ms 1700 ppm/cm
ch 11 2.2777ms 1500 ppm/cm
ch 12 2.7464ms 1300 ppm/cm
ch 13 3.2672ms 1100 ppm/cm
ch 14 3.7880ms 900 ppm/cm
ch 15 4.2046ms 700 ppm/cm
Area 3 Anomaly
easting
northing
altitude
vertical derivative (nT/m)
magnetics
fiducial
Report No. 22658
MT. HOWE
EL 2020 - S.A.
AIRBORNE TEM
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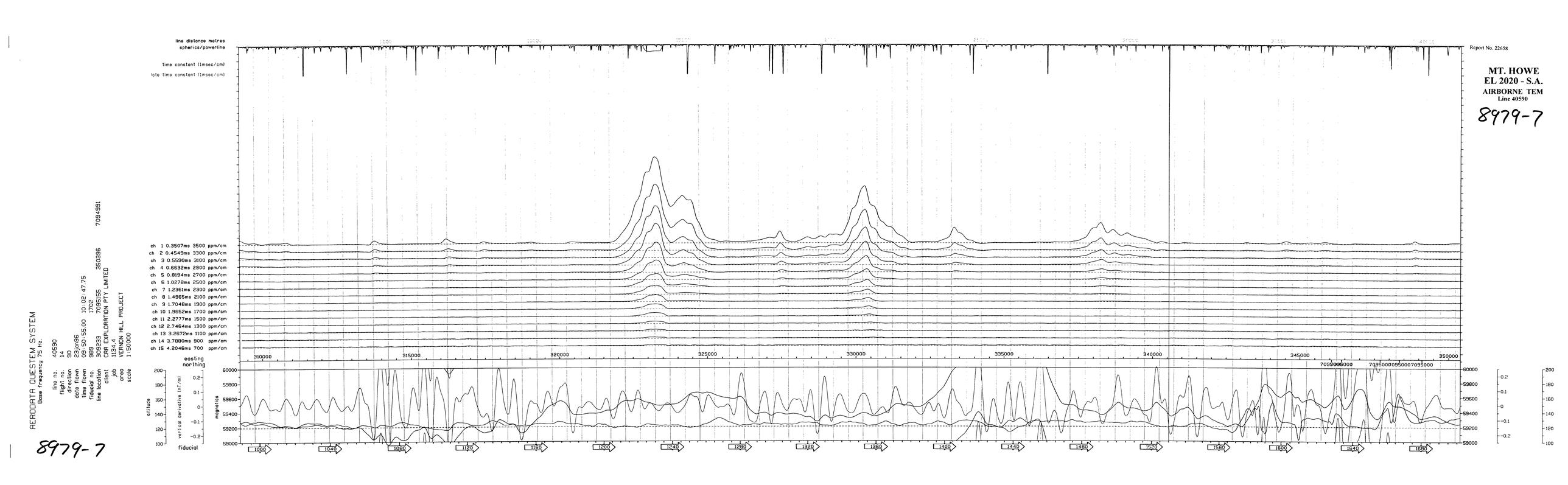
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8979-7
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late time constant (1msec/cm)
ch 1 0.3507ms 3500 ppm/cm
ch 2 0.4549ms 3300 ppm/cm
ch 3 0.5590ms 3100 ppm/cm
ch 4 0.6632ms 2900 ppm/cm
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ch 14 3.7880ms 900 ppm/cm
ch 15 4.2046ms 700 ppm/cm
easting
northing
310000
315000
320000
325000
330000
335000
340000
345000
350000
7095000
7095000
7095000
7095000
altitude
vertical derivative (nT/m)
magnetics
fiducial
1000
1040
1080
1120
1160
1200
1240
1280
1320
1360
1400
1440
1480
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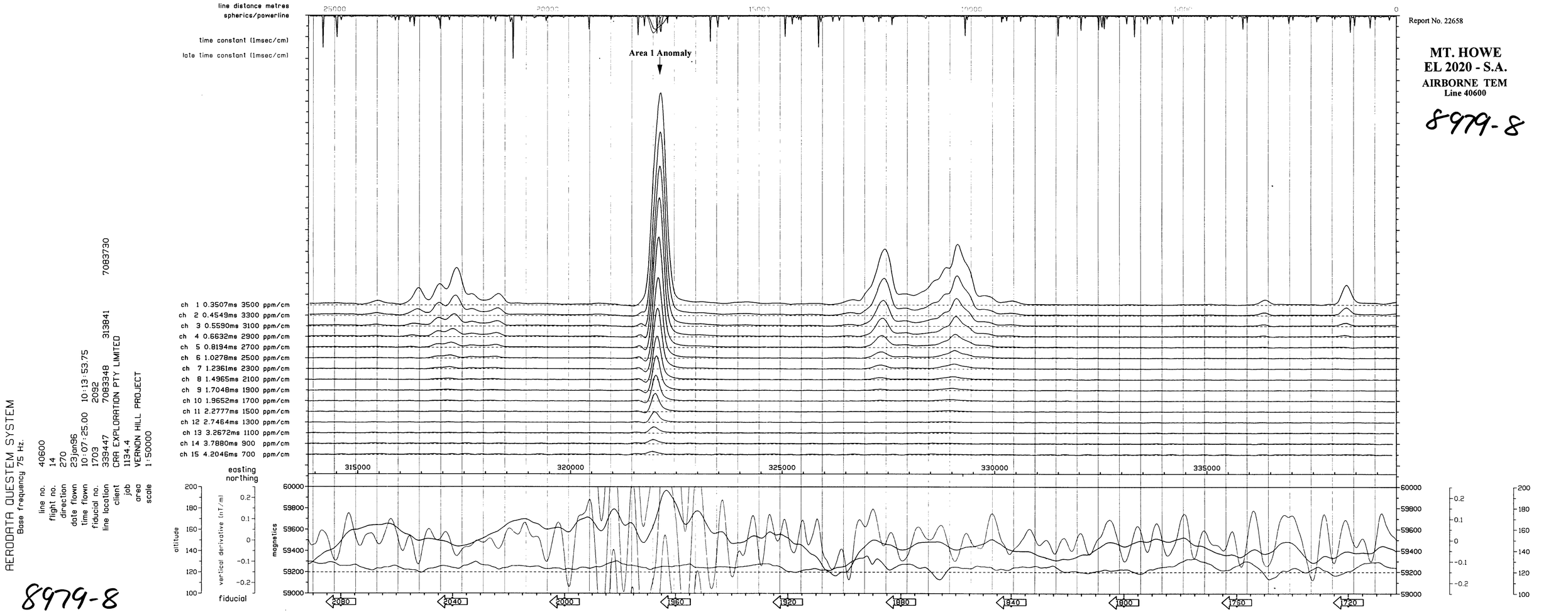
Report No. 22658
MT. HOWE
EL 2020 - S.A.
AIRBORNE TEM
Line 40590
8979-7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spherics/powerline
time constant (1msec/cm)
late time constant (1msec/cm)
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20000
15000
10000
5000
0
Area 1 Anomaly
Report No. 22658
MT. HOWE
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8979-8
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ch 2 0.4549ms 3300 ppm/cm
ch 3 0.5590ms 3100 ppm/cm
ch 4 0.6632ms 2900 ppm/cm
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ch 6 1.0278ms 2500 ppm/cm
ch 7 1.2361ms 2300 ppm/cm
ch 8 1.4965ms 2100 ppm/cm
ch 9 1.7048ms 1900 ppm/cm
ch 10 1.9652ms 1700 ppm/cm
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ch 12 2.7464ms 1300 ppm/cm
ch 13 3.2672ms 1100 ppm/cm
ch 14 3.7880ms 900 ppm/cm
ch 15 4.2046ms 700 ppm/cm
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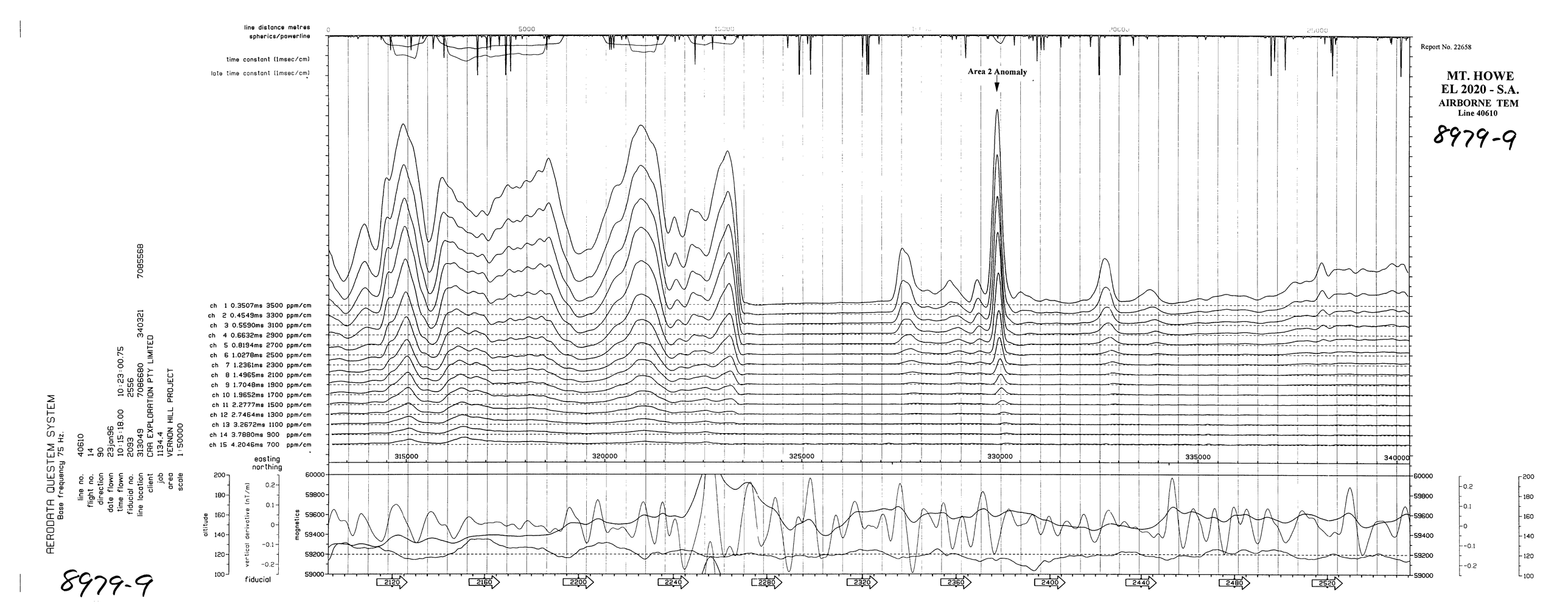
flight no. 14
direction 270
date flown 23jan96
time flown 10:07:25.00 10:13:53.75
fiducial no. 1703 2092
line location 339447 7083348 313841 7083730
client CRA EXPLORATION PTY LIMTED
job 1134.4
area VERNON HILL PROJECT
scale 1:50000
8979-8
easting
northing
315000
320000
325000
330000
335000
altitude
vertical derivative (nT/m)
magnetics
fiducial
2060
2040
2000
1960
1920
1880
1840
1800
1760
1720


AERODATA QUESTEM SYSTEM
Base frequency 75 Hz.
line no. 40610
flight no. 14
direction 90
date flown 23jan96
time flown 10:15:18.00 10:23:00.75
fiducial no. 2093 2556
line location 313049 7086680 340321 7085568
client CRA EXPLORATION PTY LIMITED
job 1134.4
area VERNON HILL PROJECT
scale 1:50000
line distance metres
spherics/powerline
time constant (1msec/cm)
late time constant (1msec/cm)
Area 2 Anomaly
ch 1 0.3507ms 3500 ppm/cm
ch 2 0.4549ms 3300 ppm/cm
ch 3 0.5590ms 3100 ppm/cm
ch 4 0.6632ms 2900 ppm/cm
ch 5 0.8194ms 2700 ppm/cm
ch 6 1.0278ms 2500 ppm/cm
ch 7 1.2361ms 2300 ppm/cm
ch 8 1.4965ms 2100 ppm/cm
ch 9 1.7048ms 1900 ppm/cm
ch 10 1.9652ms 1700 ppm/cm
ch 11 2.2777ms 1500 ppm/cm
ch 12 2.7464ms 1300 ppm/cm
ch 13 3.2672ms 1100 ppm/cm
ch 14 3.7880ms 900 ppm/cm
ch 15 4.2046ms 700 ppm/cm
easting
northing
altitude
vertical derivative (nT/m)
magnetics
fiducial
Report No. 22658
MT. HOWE
EL 2020 - S.A.
AIRBORNE TEM
Line 40610
8979-9
8979-9

Appendix 2

Bruces Bore Aircore Holes

CRA EXPLORATION PTY LIMITED

Aircore/Reverse circulation/Diamond drill log

EL 2020 MT HOWE

22000 EAST

CONTRACTOR Budd Drilling		Date: 6th November 1995	DRILLING RIG UDR 600
DRILLERS	Craig Burgess, Rob Budd	Geologist Alan Hughes	PROSPECT Bruces Bore magnetic anomaly
LOCATION	Alberga 1:250000 Sheet	DPO 57704, 57705, 57706	

HOLE	Local EAST	Local NORTH	DESCRIPTION	SAMPLE	FROM	TO	INT	Mag Susc SI/100000	cps
AC95MH02	22000	10000	Red sandy soil with calcrete nodules		0	2	2		120
			Diorite		2	4	2	1570	120
			Diorite	3330734	4	6	2	2420	120
AC95MH03	22000	10100	Red sandy soil with calcrete nodules	3330735	0	3	3	1800	120
			Diorite	3330736	3	6	3		120
AC95MH04	22000	10200	Red sandy soil with calcrete nodules	3330737	0	3	3	1200	120
			Diorite	3330738	3	6	3	1800	120
AC95MH05	22000	10300	Red sandy soil with calcrete nodules	3330739	0	3	3	1200	120
			Diorite with some foliation evident	3330740	3	6	3	4100	120
AC95MH06	22000	10400	Red sandy soil with calcrete nodules		0	1	1		
			Red sandy soil with calcrete nodules	3330741	1	3	2	800	120
			Diorite with some foliation evident, some quartz	NO SAMPLE	3	6	3	2200	120
AC95MH07	22000	10500	Red sandy soil		0	1	1	1340	120
			Red sandy soil with calcrete nodules	3330742	1	3	2	700	120
			Granodioritic to dioritic felds,quartz, magnetite	3330743	3	6	3	900	120
			Diorite with ferruginous veining	3330744	6	9	3	3200	120
		PETROGRAPHIC SAMPLE 3336560 ON AIR CORE FROM THIS INTERVAL							
AC95MH08	22000	10600	Red sandy soil		0	1	1	1000	120
			Red sandy soil with calcrete nodules	3330745	1	3	2	700	120
			Diorite and calcrete	3330746	3	6	3	500	
AC95MH09	22000	10700	Red sandy soil		0	2	2	700	120
			Red sandy soil with calcrete nodules	3330747	2	4	2	1100	120
			Diorite	3330748	4	6	2	700	120
AC95MH10	22000	10800	Red sandy soil		0	2	2	0	120
			Red sandy soil with calcrete and minor opaline fine veins	3330749	2	3	1	40	120
			Diorite	3330750	3	6	3	300	120
AC95MH11	22000	10900	Red sandy soil		0	2	2	15	120
			Red sandy soil with calcrete nodules	3330751	2	5	3	400	120

CRA EXPLORATION PTY LIMITED

Aircore/Reverse circulation/Diamond drill log

EL 2020 MT HOWE

22000 EAST

CONTRACTOR Budd Drilling			Date: 6th November 1995	DRILLING RIG UDR 600					
DRILLERS	Craig Burgess, Rob Budd		Geologist Alan Hughes	PROSPECT Bruces Bore magnetic anomaly					
LOCATION	Alberga 1:250000 Sheet		DPO 57704, 57705, 57706						
HOLE	Local EAST	Local NORTH	DESCRIPTION	SAMPLE	FROM	TO	INT	Mag Susc SI/100000	cps
			Diorite and calcrete	3330752	5	6	1	400	120
AC95MH12	22000	11000	Red sandy soil		0	2	2	30	120
			Red sandy soil, calcrete and fine grained mafic and quartz	3330753	2	3	1	600	120
			probably as detrital material in soil		3	4	1	600	120
			Biotite rich diorite to granodiorite	3330754	4	6	2	600	120
		PETROGRAPHIC SAMPLE 3336561 ON AIRCORE							
AC95MH13	22000	11100	Red sandy soil		0	2	2	6	120
			Red sandy soil with calcrete and minor quartz	3330755	2	5	3	300	120
			Clay and granodiorite	3330756	5	6	1	200	120
	NOTE: Local grid is converted to AMG grid, Zone 53 by adding 300000m to eastings and 7100000m to northings								
	These AMG coordinates best fit to WGS84 datum.								

LINE 22000 E

HOLE	SAMPLE	FROM	TO	INT	Au	Pt	Pd	Ag	S	Co	Cr	Cu	Fe	Mn	Mg	Mo	Ni	Pb	Zn
AC95MH02		0	2	2															
		2	4	2															
	3330734	4	6	2	0.3	<0.2	0.6	<1	<500	33	60	55	132000	1700	17500	<3	51	20	190
AC95MH03	3330735	0	3	3	0.8	1	1	<1	<500	9	92	14	63600	460	30100	<3	47	10	51
	3330736	3	6	3	0.8	0.4	1	<1	<500	23	35	34	85800	1300	37400	<3	28	15	135
AC95MH04	3330737	0	3	3	0.5	0.4	0.6	<1	<500	8	110	14	52700	620	7000	<3	30	20	60
	3330738	3	6	3	0.4	<0.2	0.6	<1	<500	24	36	31	67300	1300	24400	<3	21	20	140
AC95MH05	3330739	0	3	3	1	0.8	0.8	<1	<500	8	100	16	49200	640	7000	<3	32	15	61
	3330740	3	6	3	0.8	<0.2	0.8	<1	<500	24	34	22	87300	1400	22700	<3	20	25	175
AC95MH06		0	1	1															
	3330741	1	3	2	0.6	0.6	1	<1	<500	9	75	13	38100	540	12100	<3	26	20	49
	NO SAMPLE	3	6	3															
AC95MH07		0	1	1															
	3330742	1	3	2	1	0.6	0.8	<1	<500	9	66	14	32300	400	10100	<3	34	15	43
	3330743	3	6	3	0.4	0.4	1	<1	<500	19	81	17	49600	1100	20100	<3	29	25	100
	3330744	6	9	3	0.6	<0.2	1.4	<1	<500	27	37	26	91200	1500	14400	<3	25	20	130
AC95MH08		0	1	1															
	3330745	1	3	2	0.9	0.8	1.4	<1	<500	12	55	18	47300	540	14000	<3	32	10	50
	3330746	3	6	3	0.8	0.4	1.6	<1	<500	26	24	21	93200	1500	15100	<3	22	10	155
AC95MH09		0	2	2															
	3330747	2	4	2	1.1	0.6	1.2	<1	<500	8	66	15	35300	380	9200	<3	26	10	40
	3330748	4	6	2	0.8	0.2	1.6	<1	<500	35	34	47	89200	1100	16000	<3	47	<5	91
AC95MH10		0	2	2															
	3330749	2	3	1	1.4	0.8	1.2	<1	<500	11	105	18	44400	440	10400	<3	35	20	48
	3330750	3	6	3	0.9	0.6	1.6	<1	<500	9	68	13	27800	360	10300	<3	19	10	26
AC95MH11		0	2	2															
	3330751	2	5	3	1.4	0.6	1	<1	<500	7	91	16	35900	380	6400	<3	25	20	40

LINE 22000 E

HOLE	SAMPLE	FROM	TO	INT	Au	Pt	Pd	Ag	S	Co	Cr	Cu	Fe	Mn	Mg	Mo	Ni	Pb	Zn
	3330752	5	6	1	0.4	0.8	1.4	<1	<500	9	78	15	27400	480	9600	<3	22	15	34
AC95MH12		0	2	2															
	3330753	2	3	1	0.7	0.6	0.8	1	<500	8	110	16	37900	460	6300	<3	20	20	44
		3	4	1															
	3330754	4	6	2	<0.1	2	2.2	1	<500	23	200	73	60900	980	21500	<3	43	15	67
AC95MH13		0	2	2															
	3330755	2	5	3	0.4	1	0.8	<1	<500	6	105	15	35600	420	8600	<3	19	15	44
	3330756	5	6	1	0.7	1.2	2.2	<1	<500	10	91	25	44100	440	9000	<3	20	20	55
	SCHEME				FA3M	FA3M	FA3M	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E
	DL				0.1	0.2	0.2	1	500	2	2	2	100	5	10	3	2	5	2
	UNITS				PPB	PPB	PPB	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM

CRA EXPLORATION PTY LIMITED

Aircore/Reverse circulation/Diamond drill log

EL 2020 MT HOWE

19200 EAST

CONTRACTOR Budd Drilling			Date: 6th November 1995	DRILLING RIG UDR 600					
DRILLERS	Craig Burgess, Rob Budd		Geologist Alan Hughes	PROSPECT Bruces Bore magnetic anomaly					
LOCATION	Alberga 1:250000 Sheet		DPO 57704, 57705, 57706						
HOLE	Local EAST	Local NORTH	DESCRIPTION	SAMPLE	FROM	TO	INT	Mag Susc SI/100000	cps
AC95MH14	19200	9400	Red sandy soil		0	1	1	700	70
			Weathered dolerite and calcrete	3330757	1	3	2	200	70
AC95MH15	19200	9500	Red sandy soil		0	1	1	700	70
			Qtz and weathered rock fragments		1	2	1	500	70
			Granodiorite	3330758	2	3	1	500	70
AC95MH16	19200	9600	Soil and weathered dolerite		0	2	2	600	70
			Dolerite	3330759	2	3	1	400	70
AC95MH17	19200	9700	Diorite	3330760	2	3	1	100	70
AC95MH18	19200	9800	Red sandy soil		0	2	2	700	70
			Granodiorite	3330761	2	5	3	1800	70
AC95MH19	19200	9900	Red sandy soil		0	2	2	1100	70
			Granodiorite	3330762	2	3	1	2400	70
AC95MH20	19200	10000	Red sandy soil		0	1.5	1.5	3	70
			Granodiorite	3330763	1.5	3	1.5	2000	70
AC95MH21	19200	10100	Red sandy soil		0	2	2	7	70
			Granodiorite	3330764	2	3	1	1800	70
AC95MH22	19200	10200	Red sandy soil and weathered dolerite		0	1	1	900	70
			Granodiorite	3330765	1	3	2	1300	70
AC95MH23	19200	10300	Red sandy soil		0	1	1	1000	70
			Granodiorite	3330766	1	3	2	2000	70
AC95MH24	19200	10400	Red sandy soil		0	1	1	1100	70
			Granodiorite	3330767	1	3	2	1400	70
	NOTE: Local grid is converted to AMG grid, Zone 53 by adding 300000m to eastings and 7100000m to northings								
	These AMG coordinates best fit to WGS84 datum.								

LINE 19200 E

HOLE	SAMPLE	FROM	TO	INT	Au	Pt	Pd	Ag	S	Co	Cr	Cu	Fe	Mn	Mg	Mo	Ni	Pb	Zn
AC95MH14		0	1	1															
	3330757	1	3	2	1.1	1.4	2.4	<1	<500	15	62	41	28100	660	11900	<3	20	<5	52
AC95MH15		0	1	1															
		1	2	1															
	3330758	2	3	1	0.4	<0.2	0.4	<1	<500	4	89	29	25200	280	4700	<3	6	35	27
AC95MH16		0	2	2															
	3330759	2	3	1	0.5	1	1.6	<1	<500	13	82	53	30500	740	9300	<3	13	15	52
AC95MH17	3330760	2	3	1	0.5	0.8	1.6	<1	<500	12	82	36	28500	660	7700	<3	12	15	44
AC95MH18		0	2	2															
	3330761	2	5	3	0.3	0.6	0.8	<1	<500	13	99	53	34400	800	8800	<3	11	15	80
AC95MH19		0	2	2															
	3330762	2	3	1	0.3	0.6	0.6	<1	<500	15	64	85	41200	700	8300	<3	9	10	59
AC95MH20		0	1.5	1.5															
	3330763	1.5	3	1.5	0.8	0.8	1.2	<1	<500	12	100	43	31200	680	7800	<3	10	10	61
AC95MH21		0	2	2															
	3330764	2	3	1	0.4	0.8	1.2	<1	<500	14	28	57	34800	760	9000	<3	11	10	54
AC95MH22		0	1	1															
	3330765	1	3	2	0.8	0.8	1.2	<1	<500	9	33	70	24400	420	4400	4	8	15	34
AC95MH23		0	1	1															
	3330766	1	3	2	0.8	0.8	1.8	<1	<500	12	25	105	28000	760	8900	<3	11	10	44
AC95MH24		0	1	1															
	3330767	1	3	2	0.8	0.4	0.6	<1	<500	9	41	56	26400	420	3200	4	11	20	36
	SCHEME				FA3M	FA3M	FA3M	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E
	DL				0.1	0.2	0.2	1	500	2	2	2	100	5	10	3	2	5	2
	UNITS				PPB	PPB	PPB	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM

CRA EXPLORATION PTY LIMITED

Aircore/Reverse circulation/Diamond drill log

EL 2020 MT HOWE

15700 EAST

CONTRACTOR Budd Drilling		Date: 6th November 1995	DRILLING RIG UDR 600		
DRILLERS	Craig Burgess, Rob Budd	Geologist Alan Hughes	PROSPECT Bruces Bore magnetic anomaly		
LOCATION	Alberga 1:250000 Sheet	DPO 57704			

HOLE	EAST	NORTH	DESCRIPTION	SAMPLE	FROM	TO	INT	Mag Susc SI/100000	cps
AC95MH25	315620	7107500	Red sandy soil		0	3	3	1000	70
			Red sandy soil and calcrete	3330768	3	4	1	1000	70
			Fresh Dolerite	3330769	4	5	1	S	70
AC95MH26	315630	7107600	Red sandy soil		0	1	1	400	70
			Red sandy soil and calcrete	3330770	1	4	3	150	70
			Fresh Dolerite	3330771	4	6	2		
AC95MH27	315640	7107700	Red sandy soil		0	2	2	50	70
			Red sandy soil and calcrete	3330772	2	6	4	100	70
			Fresh Dolerite	3330773	6	9	3	10	70
AC95MH28	315650	7107800	Red sandy soil		0	1	1	400	70
			Red sandy soil and calcrete	3330774	1	6	5	150	70
			Fresh Dolerite	3330775	6	9	3	5	70
AC95MH29	315660	7107900	Red sandy soil		0	1	1	0	70
			Red sandy soil and calcrete	3330776	1	2	1	100	70
			Paler calcrete	3330777	2	3	1	300	70
			Brown calcrete	3330778	3	6	3	5	70
			Dolerite and granodiorite	3330779	6	9	3	1800	70
AC95MH30	315670	7108000	Red sandy soil					100	70
			Red sandy soil and calcrete	3330780	1	4	3	100	70
			Granodiorite	3330781	4	6	2	200	70
AC95MH31	315680	7108100	Red sandy soil		0	1	1	500	70
			Red sandy soil and calcrete	3330782	1	3	2	500	70
			Granodiorite	3330783	3	6	3	100	70
AC95MH32	315690	7108200	Red sandy soil		0	1	1	150	70
			Red sandy soil and calcrete	3330784	1	3	2	30	70
			Granite	3330785	3	6	3	0	70
AC95MH33	315700	7108300	Red sandy soil		0	1	1	20	70
			Red sandy soil and calcrete	3330786	1	3	2	20	70

CRA EXPLORATION PTY LIMITED

Aircore/Reverse circulation/Diamond drill log

EL 2020 MT HOWE

15700 EAST

CONTRACTOR Budd Drilling			Date: 6th November 1995	DRILLING RIG UDR 600					
DRILLERS	Craig Burgess, Rob Budd		Geologist Alan Hughes	PROSPECT Bruces Bore magnetic anomaly					
LOCATION	Alberga 1:250000 Sheet		DPO 57704						
HOLE	EAST	NORTH	DESCRIPTION	SAMPLE	FROM	TO	INT	Mag Susc SI/100000	cps
			Granite	3330787	3	6	3	30	70
AC95MH34	315710	7108400	Red sandy soil		0	1	1	600	70
			Red sandy soil and calcrete	3330788	1	4	3	300	70
			Calcrete clay and gravel	3330789	4	9	5	200	70
			Granodiorite and dolerite	3330790	9	12	3	500	70
AC95MH35	315720	7108500	Red sandy soil		0	1	1	700	70
			Red sandy soil and calcrete	3330791	1	5	4	300	70
			Calcrete clay and gravel	3330792	5	9	4	400	70
			Granodiorite and dolerite	3330793	9	12	3	200	70
AC95MH36	315730	7108600	Red sandy soil		0	1	1	600	70
			Red sandy soil and calcrete	3330794	1	5	4	400	70
			Granodiorite	3330795	5	6	1	1500	70
AC95MH37	315740	7108700	Red sandy soil		0	1	1	50	70
			Red sandy soil and calcrete	3330796	1	3	2	500	70
			Granodiorite	3330797	5	6	1	500	70
AC95MH38	315750	7108800	Red sandy soil		0	1	1	700	70
			Red sandy soil and calcrete	3330798	1	3	2	600	70
			Granodiorite	3330799	3	4	1	600	70
AC95MH39	315760	7108900	Red sandy soil		0	1	1	100	70
			Granodiorite	3330800	1	3	2	200	70
AC95MH40	315770	7109000	Red sandy soil		0	1	1	800	70
			Dolerite	3330801	1	2	1	1500	70
AC95MH41	315780	7109100	Red sandy soil		0	1	1	10	70
			Diorite	3330802	1	3	2	50	70

LINE 15700 E

SAMPLE	From	To	Int	Au	Pt	Pd	Ag	S	Co	Cr	Cu	Fe	Mn	Mg	Mo	Ni	Pb	Zn
	0	3	3															
3330768	3	4	1	0.7	0.8	1.2	<1	<500	16	63	23	31800	420	7400	6	15	25	29
3330769	4	5	1	0.7	2.2	3.4	3	<500	20	92	57	60800	440	11100	6	48	25	37
	0	1	1															
3330770	1	4	3	0.4	0.6	1	<1	<500	11	46	20	27400	320	11000	4	15	15	38
3330771	4	6	2	0.9	5.2	6.2	<1	600	39	640	77	44700	800	31900	<3	170	10	59
	0	2	2															
3330772	2	6	4	0.2	0.8	1.2	<1	<500	9	55	25	30700	320	8300	4	13	10	33
3330773	6	9	3	<0.1	0.6	1.4	<1	<500	10	49	39	27400	360	8300	<3	15	10	35
	0	1	1															
3330774	1	6	5	0.2	0.6	1	<1	<500	8	63	23	35500	300	7900	4	14	15	31
3330775	6	9	3	1.2	2.6	5.6	<1	<500	26	87	61	45600	780	22700	<3	65	<5	58
	0	1	1															
3330776	1	2	1	0.7	0.4	0.6	<1	<500	5	40	12	24000	200	8200	4	10	10	25
3330777	2	3	1	<0.1	0.8	1.2	<1	<500	12	54	22	33700	480	18400	<3	14	10	38
3330778	3	6	3	0.8	0.8	1.2	<1	<500	11	65	30	38000	380	12000	4	15	10	40
3330779	6	9	3	0.7	1.2	1.6	2	<500	12	55	62	32300	540	8800	<3	22	20	45
3330780	1	4	3	0.2	0.8	1.6	<1	<500	9	45	22	24300	360	7400	4	9	10	26
3330781	4	6	2	0.2	0.8	2	<1	<500	10	33	29	30300	360	16600	4	9	10	30
	0	1	1															
3330782	1	3	2	0.4	0.4	0.4	<1	<500	5	33	29	19400	300	5600	4	6	15	28
3330783	3	6	3	<0.1	0.8	2	<1	<500	10	33	99	28700	420	6700	4	9	10	40
	0	1	1															
3330784	1	3	2	0.3	0.6	1	<1	<500	9	35	18	19100	380	7300	4	15	15	43
3330785	3	6	3	0.3	0.2	1.2	<1	<500	9	22	33	25800	500	6600	4	6	20	60
	0	1	1															
3330786	1	3	2	0.3	0.6	1	<1	<500	9	39	20	26300	360	13200	4	15	15	38

LINE 15700 E

SAMPLE	From	To	Int	Au	Pt	Pd	Ag	S	Co	Cr	Cu	Fe	Mn	Mg	Mo	Ni	Pb	Zn
3330787	3	6	3	0.3	0.6	1.2	<1	<500	6	19	52	14200	240	3500	4	4	20	27
	0	1	1															
3330788	1	4	3	0.7	0.6	1.2	<1	<500	8	36	18	21600	240	12100	4	15	15	32
3330789	4	9	5	<0.1	1	1.6	<1	<500	15	65	35	51500	340	7900	6	24	20	52
3330790	9	12	3	<0.1	1	1.4	<1	<500	18	69	93	53300	780	10200	6	31	20	50
	0	1	1															
3330791	1	5	4	0.8	1.8	2.4	<1	<500	9	47	21	29500	320	9800	6	18	20	42
3330792	5	9	4	0.3	0.4	0.8	<1	<500	14	57	35	37000	540	8900	8	26	20	52
3330793	9	12	3	0.3	1	1.4	<1	<500	16	19	55	40400	1100	15400	4	18	15	105
	0	1	1															
3330794	1	5	4	2	0.6	2	<1	<500	14	34	20	40400	600	9300	4	27	15	57
3330795	5	6	1	1.3	0.8	1.4	<1	<500	15	15	22	37200	920	11000	4	15	15	100
	0	1	1															
3330796	1	3	2	0.8	1	1.4	<1	<500	9	49	19	33100	280	6400	4	25	15	43
3330797	5	6	1	0.3	0.4	0.8	<1	<500	9	24	20	22700	200	3000	4	8	25	32
	0	1	1															
3330798	1	3	2	0.8	0.6	1	<1	<500	11	41	21	33800	400	5300	4	19	15	47
3330799	3	4	1	0.3	<0.2	0.6	<1	<500	9	31	24	21200	280	2800	6	7	20	30
	0	1	1															
3330800	1	3	2	1	<0.2	1.2	<1	<500	25	32	79	87600	960	14600	4	20	10	105
	0	1	1															
3330801	1	2	1	1.3	5.2	5	<1	<500	47	115	84	77300	1400	29600	<3	180	<5	240
	0	1	1															
3330802	1	3	2	0.5	<0.2	0.4	<1	<500	19	24	120	68700	1000	11300	4	30	15	94
SCHEME				FA3M	FA3M	FA3M	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E
DL				0.1	0.2	0.2	1	500	2	2	2	100	5	10	3	2	5	2
UNITS				PPB	PPB	PPB	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM

Appendix 3

Petrological Report

Pontifex & Associates Pty. Ltd.

TELEPHONE (08) 332 6744
FAX (08) 332 5062

26 KENSINGTON ROAD, ROSE PARK
SOUTH AUSTRALIA 5067
A.C.N. 007 521 084

P.O. BOX 91, KENT TOWN
SOUTH AUSTRALIA 5071

MINERALOGICAL REPORT NO. 7020

by I.R. Pontifex

December 19, 1995

TO :

Mr Alan Hughes
CRA Exploration Pty Ltd
PO Box 254
KENT TOWN SA 5071

COPY TO :
(with invoice)

CRAE Information Resources Group
Private Bag
BUNDOORA MDC VIC 3083

Attention : Kerry Richardson

YOUR REFERENCE :

Order No. P57706

MATERIAL :

Core samples

IDENTIFICATION :

3336559, 560, 561

WORK REQUESTED :

Polished thin section preparation, petrographic/mineragraphic descriptions.

SAMPLES & SECTIONS :

Returned to you with this report.

PONTIFEX & ASSOCIATES PTY. LTD.

INTRODUCTION

Three core samples 3336559, 560, 516 are described in this report from polished thin section as requested.

Sample 3336559 is distinctive, as a fresh, undeformed cumulus troctolite, with abundant euhedral (cumulate) crystals of olivine and rarer hypersthene, enclosed in coarse post-cumulus labradorite. Accessory scattered grains include magnetite and ilmenite. Spinel is also an accessory phase, probably hercynite and commonly as composite intricate (exsolution) intergrowths with magnetite and/or ilmenite but the exact identity of this phase requires probe analysis. Rarer, much finer pyrite > chalcopyrite (and trace possible pentlandite) loosely accompany the accessory oxide minerals.

Sample 3336560 is a stressed, locally microfractured plagioclase-rich rock of essentially dioritic (to possibly anorthositic composition), with minor altered pyroxene, biotite, magnetite, lesser quartz and kspar.

Sample 3336561 has a mixed dioritic composition, similar to 560 (with minor quartz k-spar, altered magnetite, pyroxene and biotite), to a granitoid composition with more quartz and k-spar, lesser magnetite, altered pyroxene and biotite than in the dioritic area. These areas may represent a gradational contact, within a differentiated single felsic intrusive. They are both moderately tectonised but to a lesser extent than in 3336560.

3336559

Fresh, cumulate-textured-troctolite, with cumulus crystals of olivine >> (later) hypersthene within coarse post-cumulus labradorite. Accessory complex oxide grains of mixed spinel (?hercynite)-magnetite-ilmenite composition; rarer finer pyrite chalcopyrite, trace ?pentlandite.

This completely fresh rock has a homogeneous composition and cumulus texture. Abundant subhedral to euhedral crystals of olivine 2mm to 5mm size, are crowded with minute inclusions, including microscopic dendrites of opaque oxide. These crystals are randomly very loose packed to form about 45% of the rock. They are locally accompanied by scattered, smaller, subhedral to euhedral crystals of clearer hypersthene/orthopyroxene, which form about 15% of the rock. This orthopyroxene crystallised after the earlier olivine crystals.

Extensive intergranular areas, as a later stage post-cumulus matrix, to the olivine and pyroxene crystals, consist of plagioclase (labradorite) crystals (35% of the rock), commonly optically continuous for up to 5mm.

Minor small flakes of brown phlogopite (5%) have a random distribution, mainly through the plagioclase, but some in pyroxene.

Grains of opaque oxide (5%), 0.1mm to rarely 0.3mm, are disseminated mainly as inclusions in olivine and these are seen in reflected light to have a fairly complex and variable composition as :

(1) grains of (optically pale grey) magnetite with ultrafine exsolved ilmenite and/or spinel (see below)

(2) as for (1) above but rarely composite with 'solid' ilmenite

(3) grains of optically darker grey and incipiently "translucent-looking" apparent spinel (?hercynite) intricately composite with the paler magnetite-ilmenite of (1) above, including partial rims of these oxides in some grains. This ?hercynite is basically opaque apparently due to exsolved, submicron magnetite. Very minor amounts of these oxides also occur as ultrafine myrmekitic intergrowths within some pyroxene.

It is noted that a detailed identification of these intricately intergrown opaque oxides/spinel minerals requires electron probe analysis.

In addition to these oxides, there are minor amounts of sulphide in this rock (?1%), as extremely small grains (1 micron to 50 microns) with a similar mode of occurrence to, and locally accompanying, the oxides. These sulphides appear to be mostly pyrite (although at this extremely fine size, this is difficult to optically distinguish from pentlandite), with subordinate chalcopyrite, and rare-trace pyrrhotite.

3336560

Massive, inequigranular (quartz, k-spar, biotite) magnetite and pyroxene-bearing plagioclase rock; (dioritic to possibly anorthositic). Stressed, microfissured with minor comminution and shear zones; with late-stage carbonate micro-stockwork. Mafic minerals altered/oxidised.

About 60% of this sample consists of a fairly compact, irregularly granulose aggregate of subhedral to anhedral plagioclase crystals, 1mm to 5mm in size. Other primary minerals are k-spar (5-7%), quartz (3-5%), pyroxene (10-15%), biotite (10%), opaque oxides (10%), all randomly disposed, more or less intergranular. The opaque oxides and the pyroxenes are commonly composite.

This aggregate has been effected by tectonism, manifest as very stressed plagioclase grains accompanied by kinked twinning, numerous microfractures and fissures in discontinuous fine stockworks, and local narrow tracts of shear/comminution.

The microstockworks are largely occupied by carbonate which also permeates intergranular areas and the carbonate stringers are post-shear comminution. The disruption has facilitated (supergene) alteration manifest as :

* pyroxene, advanced alteration to clouded brownish clays ± carbonate
* biotite, less extensively altered to limonitic clays
* opaque oxide, very predominantly magnetite, which shows variably very minor to advanced (to complete) oxidation in different crystals to martite ± apparent maghemite. These oxide crystals are commonly microfractured.

There are accessory small crystals of apatite and rutile. The gross rock mineralogy indicates a dioritic composition (with minor k-spar and quart) but possibly transitional to anorthositic due to the "high" plagioclase content together with pyroxene.

3336561

Rather heterogeneous granitic to dioritic plagioclase-rich rock, with minor variably altered pyroxene, biotite, also magnetite. Moderately tectonised. (Dioritic domains cf. 3336560).

Macroscopically, this rock compares with 3336560 but in thin section, it is seen to contain more quartz and more k-spar (albeit irregularly distributed).

The greater bulk of the thin section consists of a massive inequigranular aggregate of plagioclase (40%) together with irregularly distributed perthitic k-spar, grain size range 0.5 to 3mm. This aggregate is stressed but somewhat less microfractured than 560, with less veinlets and less comminution. Irregular grains of quartz (10%) rarely to 3mm, are composite with these felspars mostly with the kspar to suggest a relatively granitoid composition.

Smaller patches of finer plagioclase mosaic, together with quartz and locally micro-myrmekitic, are mostly intergranular to the main coarser plagioclase-rich (dioritic).

Small crystals of pyroxene (10-15%) and of biotite (10-12%) occur in irregular local clusters and as scattered individuals, and these show variably minor to advanced alteration to brownish-clouded (including limonitic) clays.

Irregular, commonly amoeboidal, grains of opaque oxide (total about 10%) are also scattered and loosely clustered, commonly accompanying the pyroxene and biotite, mostly within the plagioclase-rich (dioritic) areas. These consist of original magnetite, showing variable minor to advanced alteration to martite some with minor, associated, apparent maghemite. Accessory, small crystals of apatite, rutile and apparent monazite are also present.

Most of the microfissures are permeated by brownish clays, and/or late stage veinlets of carbonate (as in 333660 but less abundant).

This rock appears to have a mixed 'granitic' to dioritic composition, with at least the latter comparing with 333560.

Appendix 4

Drill Ledger & Assays for Cavanagh

CRA EXPLORATION PTY LIMITED

Aircore/Reverse circulation/Diamond drill log

EL 2020 MT HOWE

AC95MH01

AMG East	332650	Contractor BUDD DRILLING	TOTAL DEPTH	27m	PROSPECT	Cavanagh mag anomaly	
AMG North	7099450	Drillers Rob Budd, Craig Burgess	Casing left	1m pvc	Geologist	Alan Hughes	
AMG Zone	53	Rig UDR 600	Water table	damp 18m	Inclination	Vertical	
1:250,000 sheet	ALBERGA	Commenced 5/11/95	Hole diameter	75mm	Azimuth		
1:100,000 sheet	Alcurra	Completed 5/11/95	mag and scint on chips			DPO 57704, 57705, 57706	

FROM	TO	SUMMARY	DETAIL		SAMPLE	From	To	INT	Mag sus SI/10000	cps
0	2		Red sand with granitic and ironstone chips		3330720	0	2	2	500	120
2	4	soil	Coarse red sand		3330721	2	4	2	350	120
4	6		Coarse red sand		3330722	4	6	2	130	120
6	8		Coarse red sand and white clays		3330723	6	8	2	90	120
8	10		Soft green epidote rock and calcrete		3330724	8	10	2	100	120
10	12		Weathered green clayey rock with some carbonate		3330725	10	12	2	150	120
12	14	weathered	Weathered green clayey rock with some carbonate		3330726	12	14	2	700	120
14	16	bedrock	Brown weathered rock with pale and green clay		3330727	14	16	2	0	120
16	18		Brown weathered rock with pale and green clay	DAMP	3330728	16	18	2	200	120
18	20		Brown weathered rock with pale and green clay		3330729	18	20	2	400	120
20	22		Brown weathered rock with pale and green clay		3330730	20	22	2	400	120
22	24		Greenish brown clay.		3330731	22	24	2	400	120
24	26		Weathered ultramafic rock with epidote and carbonate		3330732	24	26	2	400	120
26	27		Fresh med grained olivine cumulate in plag groundmass	▼	3330733	26	27	1	>500	120
			contains minor pyrite, chalcopyrite and magnetite.							
			Petrographic sample of aircore submitted on dpo 57706		3336559		Petrographic sample			
			Petrographic sample - rock identified as Troctolite							
			NOTE: Location of hole based on GPS average using AUS66							
			datum. Cavanagh prospect grid location 32800E 9600N							

0121

AC95MH01

SAMPLE	From	To	INT	Au	Pt	Pd	Ag	S	Co	Cr	Cu	Fe	Mn	Mg	Mo	Ni	Pb	Zn
3330720	0	2	2	0.7	0.4	<0.2	<1	<500	4	165	15	32500	480	1400	<3	24	25	40
3330721	2	4	2	1.1	0.6	0.4	<1	<500	5	110	22	33700	440	4400	<3	24	20	39
3330722	4	6	2	0.5	0.8	1.2	<1	600	9	77	26	37200	420	9100	<3	38	30	47
3330723	6	8	2	0.5	0.8	1.6	<1	<500	12	94	24	29900	280	14700	<3	74	15	39
3330724	8	10	2	2.2	3	11	<1	<500	300	1300	71	59800	1200	47000	<3	1700	<5	125
3330725	10	12	2	3	2.6	6.6	<1	<500	340	1800	61	57900	2300	37600	<3	2000	<5	145
3330726	12	14	2	2.3	4.4	5.6	<1	<500	280	2800	61	112000	1500	38300	<3	3300	<5	300
3330727	14	16	2	3.2	3.6	5.4	<1	<500	195	3000	44	132000	1600	45600	<3	2300	<5	200
3330728	16	18	2	2.5	4.2	5.6	<1	<500	220	2900	49	143000	2100	40500	<3	2200	<5	170
3330729	18	20	2	0.8	4	4.6	<1	<500	200	3100	48	152000	1900	42400	<3	2100	<5	125
3330730	20	22	2	3.3	4.8	6	<1	<500	185	3300	51	130000	2100	45000	<3	2200	<5	125
3330731	22	24	2	3.2	2.4	4	<1	<500	140	2300	38	92300	1400	74900	<3	1500	<5	84
3330732	24	26	2	2.3	2.4	4.6	<1	<500	115	1700	30	71000	1300	76800	<3	1200	<5	59
3330733	26	27	1	2.6	3.4	4.2	<1	<500	145	2200	38	106000	1400	178000	<3	1500	<5	71
SCHEME				FA3M	FA3M	FA3M	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E
DL				0.1	0.2	0.2	1	500	2	2	2	100	5	10	3	2	5	2
UNITS				PPB	PPB	PPB	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM

SAMPLE	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	Na2O	P2O5	SiO2	TiO2	LOI
3330733	5.59	4.32	13.9	0.15	30.7	0.2	0.63	0.03	41.7	0.2	1.41
SCHEME	IC4	IC4	IC4	IC4	IC4	IC4	IC4	IC4	IC4	IC4	IC4
DL	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
UNITS	%	%	%	%	%	%	%	%	%	%	%

Appendix 5

Petrological Report Cavanagh

Martin Gole and Associates
Geological and Petrological Services

8 Landor Road
Gooseberry Hill W.A. 6076
Telephone (09) 293 4958

MEMORANDUM

TO :Dave Jackson **DATE:9/2/96**

FROM :Martin Gole

SUBJECT :Petrography of the Mt Howe Ultramafic. Sample 3336559 from Hole AC95MH01

The rock is a very fresh, almost pristine, medium-grained igneous rock. The igneous mineralogy consists of cumulus olivine (50 mode %) and minor orthopyroxene (15%) with oikocrystic plagioclase (30%) and minor biotite and spinel (5%). Olivine grains range up to 5 mm across and the plagioclase oikocrystic grains are up to 10 mm long. Olivine grains are crowded with minute symplectic intergrowths of opaque (probably chromite) and a silicate (probably pyroxene). The oxide minerals show complex exsolution textures and intergrowths. Most biotite appears to be igneous although some has been partly recrystallised where grains are cut by fine retrograde veinlets.

Pontifex call the rock a troctolite. However based on cumulate terminology (Irvine, 1982) the rock is a harzburgite or, more completely an olivine-orthopyroxene cumulate with oikocrystic plagioclase (oeC/p*, e=enstatite).

The overall texture is clearly igneous. Here is no apparent metamorphic overprint except for trace amounts of alteration associated with uncommon fine veinlets. The relatively coarse grain size certainly suggests that the rock is from a large igneous body. The symplectic oxide/silicate intergrowths within olivine also suggest slow cooling. Such intergrowths are a relatively common feature within large layered intrusions but not within other igneous rocks.

The presence of coarse-grained plagioclase oikocrysts is probably even more suggestive of a large igneous body. Such textures form in igneous bodies undergoing fractionation. The fact that these are plagioclase oikocrysts suggests that rock is from a fairly evolved,

upper part of an Ultramafic Zone within an intrusion and that it is probable that a relative thick, more primative ultramafic sequence may lie stratigraphically below this rock.

Because the olivine in this rock is so fresh the magnetic susceptibility of the rock would be expected to be low. If the remainder of a probable associated Ultramafic Zone is equally as fresh then it would not form obvious patterns and anomalies on aeromagnetic maps.

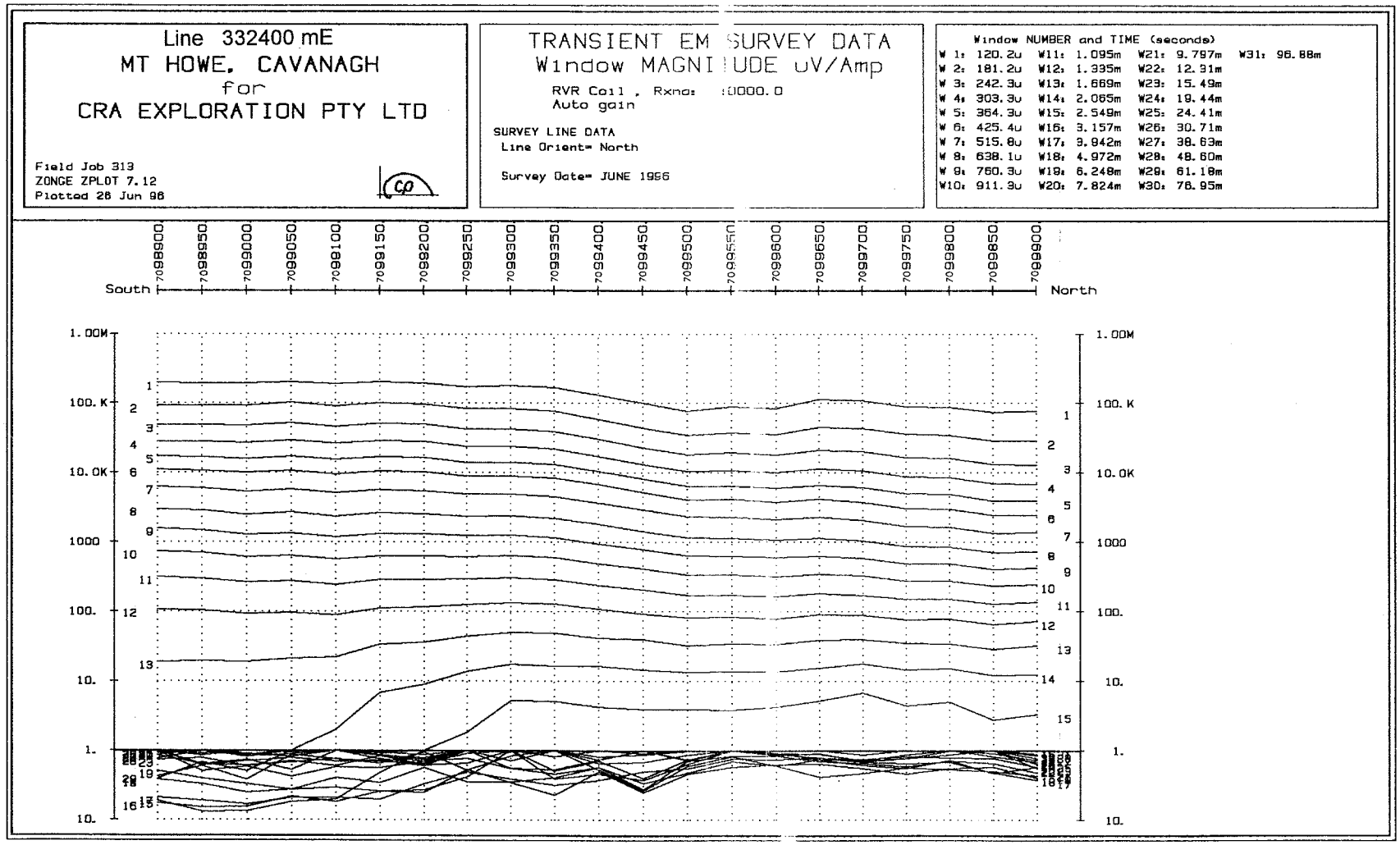
The rock is highly unlikely to come from a late stage dyke and is almost definitely from a large layered igneous intrusion. The rock retains igneous textures and mineralogy but it may have been protected from effects of metamorphism by surrounding rocks, ie. it may be part of the Musgraves Sequence.

Regardless of its stratigraphic/structural position the igneous body from which this rock comes may have significant potential for magmatic sulphides. Further work in defining the size of the body and layering within it is very firmly warrented. Such data will allow a better assessment of the likely economic potential of the rocks.

Martin Gole

Appendix 6

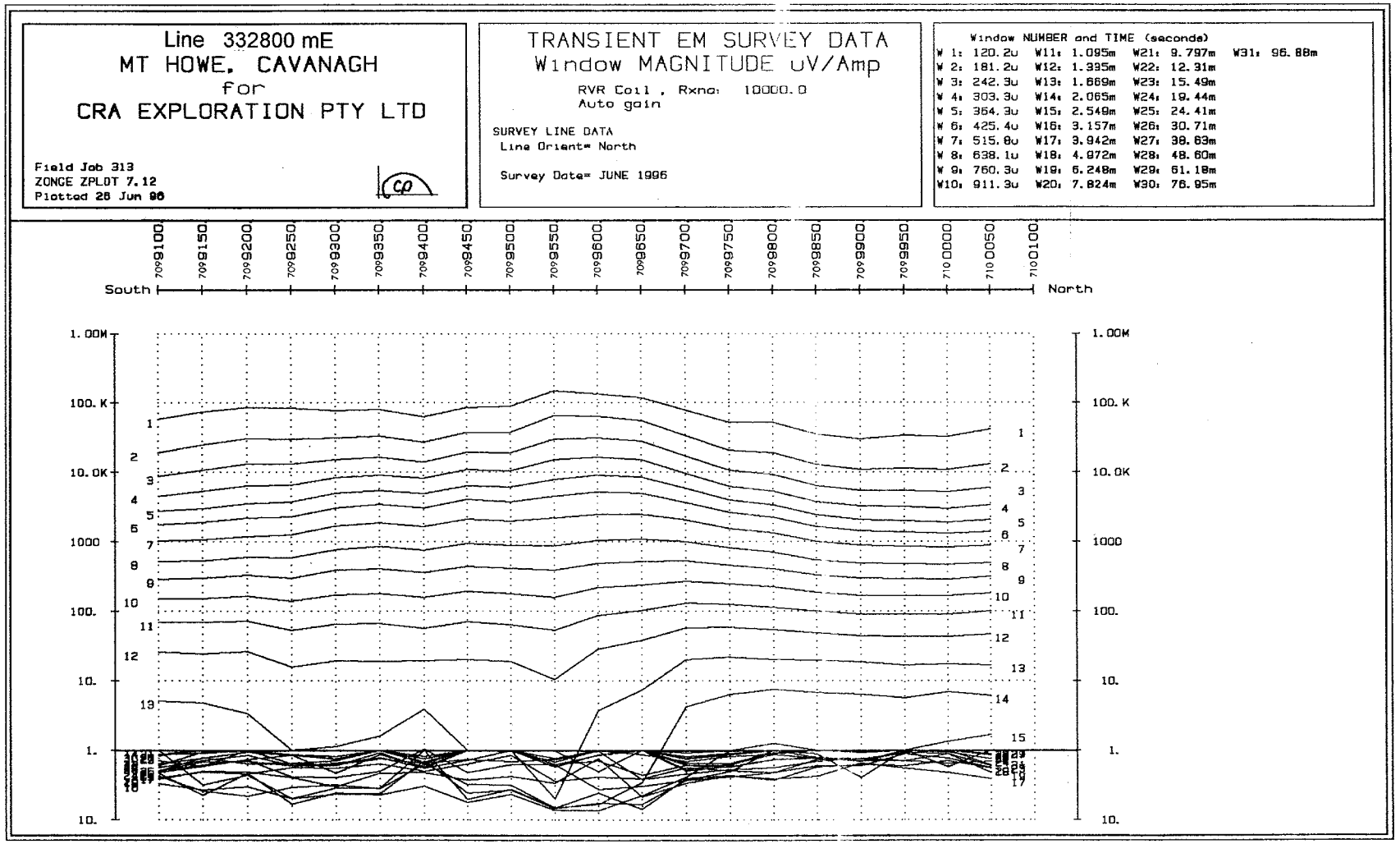
Cavanagh EM Traverses



Report No. 22658

* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 332400 mE
Cavanagh Area

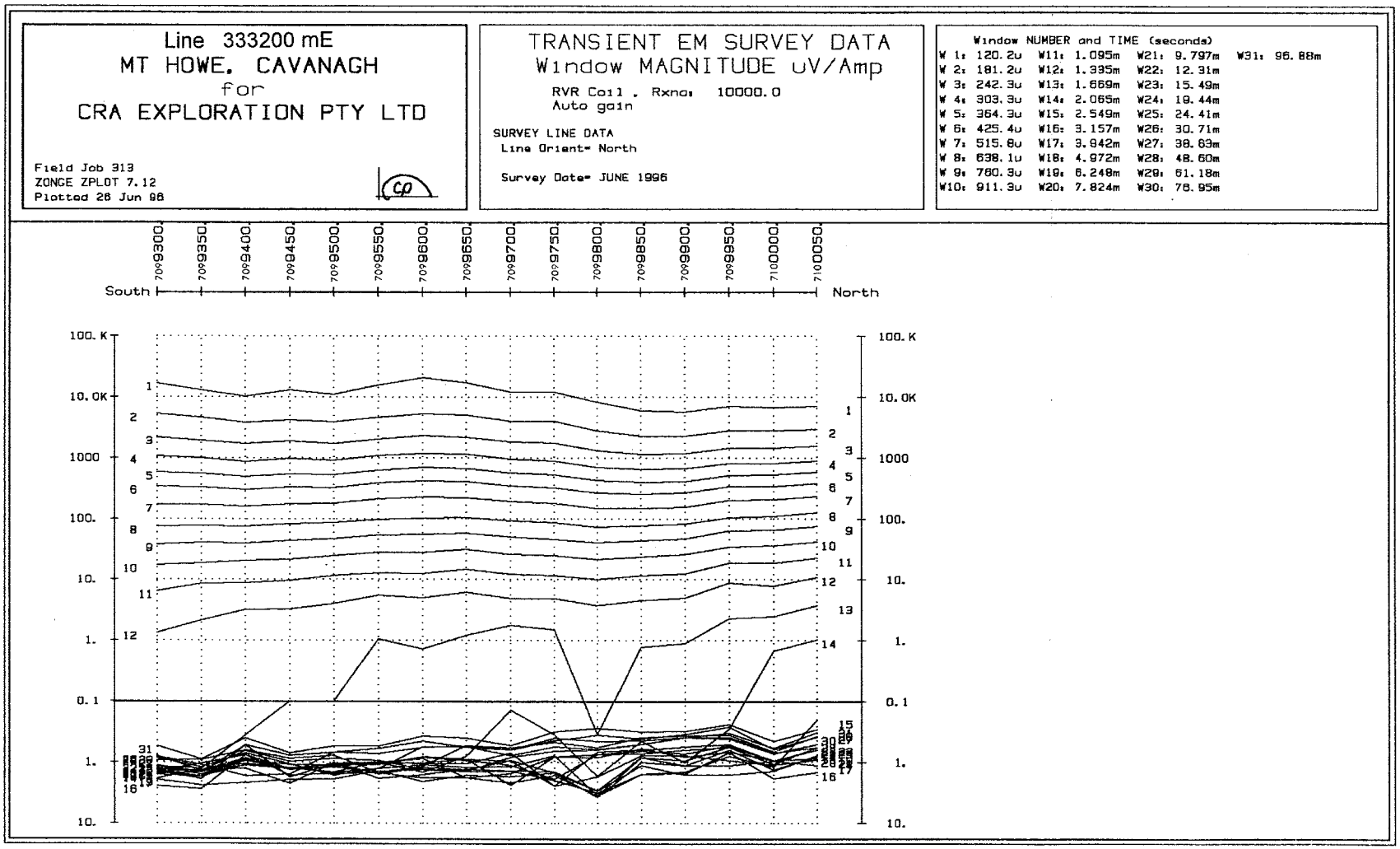


Report No. 22658

* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 332800mE
Cavanagh Area

0128



Report No. 22658

* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 333200 mE
Cavanagh Area

0129

Appendix 7

Soil & Rock Sample Assays

DPO	Sample	Sample Type	East	North	Zone	EL Number	Comments	Ag	As	Au	Bi	Ca	Co	Cr	Cu	Fe
54326	5243401	-20+40#	321950	7083600	53	2020	Dep, rb Soil	1.1	1.5	0.0007	0.2	1000	3	25	8	25200
54326	5243402	-20+40#	321900	7083600	53	2020	Dep, rb Soil	0.1	1.5	0.0003	-0.1	1300	5	28	8	38700
54326	5243403	-20+40#	321850	7083600	53	2020	Dep, rb Soil	-0.1	1.5	0.0003	-0.1	1300	4	25	8	27000
54326	5243404	-20+40#	321800	7083600	53	2020	Dep, rb Soil	0.1	1.5	0.0003	-0.1	1150	5	25	7	34300
54326	5243405	-20+40#	321750	7083600	53	2020	Dep, rb Soil	0.1	-0.5	0.0002	-0.1	1900	5	26	8	34300
54326	5243406	-20+40#	321700	7083600	53	2020	Dep, rb Soil	0.1	-0.5	1E-04	-0.1	1750	5	31	8	39200
54326	5243407	-20+40#	321650	7083600	53	2020	Dep, rb Soil	-0.1	-0.5	0.0002	-0.1	2100	5	26	9	29800
54326	5243408	-20+40#	321600	7083600	53	2020	Dep, rb Soil	-0.1	-0.5	-1E-04	-0.1	2900	5	30	9	30800
54326	5243409	-20+40#	322000	7083600	53	2020	Dep, rb Soil	-0.1	2.5	0.0002	-0.1	980	5	32	7	35000
54326	5243410	-20+40#	322050	7083600	53	2020	Dep, rb Soil	0.3	13.5	0.0005	0.1	3250	5	33	51	31200
54326	5243411	-20+40#	322100	7083600	53	2020	Dep, rb Soil	0.1	1	0.0003	-0.1	1000	4	30	8	29300
54326	5243412	-20+40#	322150	7083600	53	2020	Dep, rb Soil	0.4	-0.5	1E-04	-0.1	1000	4	26	7	38400
54326	5243413	-20+40#	322200	7083600	53	2020	Dep, rb Soil	0.2	1.5	0.0002	-0.1	1250	4	33	9	42700
54326	5243414	-20+40#	322250	7083600	53	2020	Dep, loose sand	0.1	-0.5	0.0003	-0.1	1300	4	30	8	37100
54326	5243415	-20+40#	322300	7083600	53	2020	Dep, loose sand	-0.1	-0.5	0.0002	-0.1	760	-2	16	6	21300
54326	5243416	-20+40#	322350	7083600	53	2020	Dep, rb Soil	0.1	2.5	0.0003	-0.1	880	5	24	8	27100
54326	5243417	-20+40#	330100	7086300	53	2020	Dep, loose sand	0.1	-0.5	-1E-04	-0.1	300	-2	11	5	12800
54326	5243418	-20+40#	330050	7086300	53	2020	Dep, loose sand	0.1	2.5	0.0008	-0.1	240	-2	14	5	15100
54326	5243419	-20+40#	330000	7086300	53	2020	Dep, rb Soil	0.1	2.5	1E-04	-0.1	290	2	19	7	20800
54326	5243420	-20+40#	329950	7086300	53	2020	Dep, rb Soil	0.1	3	-1E-04	-0.1	560	4	20	9	20700
54326	5243421	-20+40#	329900	7086300	53	2020	Dep, rb Soil	-0.1	2	0.0006	-0.1	500	3	26	9	23400
54326	5243422	-20+40#	329850	7086300	53	2020	Dep, rb Soil	-0.1	1	0.0003	-0.1	960	4	21	11	20500
54326	5243423	-20+40#	329800	7086300	53	2020	Dep, rb Soil	0.2	1	0.0002	-0.1	1150	5	17	11	22800
54326	5243424	-20+40#	329750	7086300	53	2020	Dep, rb Soil	0.1	-0.5	0.0002	-0.1	1450	7	23	11	25000
54326	5243425	-20+40#	329700	7086300	53	2020	Dep, rb Soil	0.1	-0.5	0.0004	-0.1	1950	6	23	11	21700
54326	5243426	-20+40#	330150	7086300	53	2020	Dep, loose sand	0.1	1	0.0003	-0.1	380	4	12	6	16300
54326	5243427	-20+40#	330200	7086300	53	2020	Dep, loose sand	-0.1	0.5	-1E-04	-0.1	350	3	8	4	13000
54326	5243428	-20+40#	330250	7086300	53	2020	Dep, loose sand	0.2	4	-1E-04	-0.1	450	2	10	4	12900
54326	5243429	-20+40#	330300	7086300	53	2020	Dep, loose sand	-0.1	1.5	-1E-04	-0.1	210	2	8	5	10000
54326	5243430	-20+40#	330350	7086300	53	2020	Dep, loose sand	0.1	1	-1E-04	-0.1	360	3	15	4	11300
54326	5243431	-20+40#	330400	7086300	53	2020	Dep, loose sand	0.2	1.5	-1E-04	-0.1	340	2	11	4	14100
54326	5243432	-20+40#	330450	7086300	53	2020	Dep, loose sand	-0.1	1	-1E-04	-0.1	320	3	15	5	11600
54326	5243433	-20+40#	330500	7086300	53	2020	Dep, loose sand	0.2	2	-1E-04	-0.1	350	3	17	6	13000
54326	5243401	-40+80#	321950	7083600	53	2020	Dep, rb Soil	0.3	2.5	0.0006	0.1	2050	8	60	14	58600
54326	5243402	-40+80#	321900	7083600	53	2020	Dep, rb Soil	0.2	1.5	0.0003	-0.1	3000	9	64	12	64500
54326	5243403	-40+80#	321850	7083600	53	2020	Dep, rb Soil	0.2	2.5	0.0005	0.1	3100	9	54	16	53200
54326	5243404	-40+80#	321800	7083600	53	2020	Dep, rb Soil	0.1	4.5	0.0003	-0.1	2550	9	54	10	57300

DPO	Sample	Sample Type	East	North	Zone	EL Number	Comments	Ag	As	Au	Bi	Ca	Co	Cr	Cu	Fe
54326	5243405	-40+80#	321750	7083600	53	2020	Dep, rb Soil	0.2	-0.5	0.0004	-0.1	3250	9	58	12	53700
54326	5243406	-40+80#	321700	7083600	53	2020	Dep, rb Soil	0.1	1.5	0.0004	-0.1	3350	10	67	32	65200
54326	5243407	-40+80#	321650	7083600	53	2020	Dep, rb Soil	0.2	1	1E-04	-0.1	3900	10	65	13	62500
54326	5243408	-40+80#	321600	7083600	53	2020	Dep, rb Soil	0.2	2	0.0002	-0.1	4400	10	70	16	55400
54326	5243409	-40+80#	322000	7083600	53	2020	Dep, rb Soil	-0.1	1.5	0.0003	-0.1	540	-2	10	-2	8700
54326	5243410	-40+80#	322050	7083600	53	2020	Dep, rb Soil	0.2	3	0.0009	-0.1	5900	7	50	11	48200
54326	5243411	-40+80#	322100	7083600	53	2020	Dep, rb Soil	0.2	3.5	0.0004	0.1	2150	9	63	13	57600
54326	5243412	-40+80#	322150	7083600	53	2020	Dep, rb Soil	0.3	4	0.0002	-0.1	2350	10	86	13	77800
54326	5243413	-40+80#	322200	7083600	53	2020	Dep, rb Soil	0.3	4.5	0.0003	-0.1	2400	8	70	13	72200
54326	5243414	-40+80#	322250	7083600	53	2020	Dep, loose sand	0.3	4.5	0.0004	0.2	2500	9	67	13	67800
54326	5243415	-40+80#	322300	7083600	53	2020	Dep, loose sand	0.2	-0.5	0.0004	-0.1	2250	8	53	10	51400
54326	5243416	-40+80#	322350	7083600	53	2020	Dep, rb Soil	0.2	3	0.0003	-0.1	2150	8	49	14	53900
54326	5243417	-40+80#	330100	7086300	53	2020	Dep, loose sand	0.2	-0.5	0.0003	-0.1	680	6	45	10	46900
54326	5243418	-40+80#	330050	7086300	53	2020	Dep, loose sand	0.3	1	0.0003	-0.1	460	5	51	11	52800
54326	5243419	-40+80#	330000	7086300	53	2020	Dep, rb Soil	0.2	-0.5	0.0004	-0.1	580	6	53	12	48600
54326	5243420	-40+80#	329950	7086300	53	2020	Dep, rb Soil	0.2	4.5	0.0002	-0.1	1150	6	41	14	44000
54326	5243421	-40+80#	329900	7086300	53	2020	Dep, rb Soil	0.2	1.5	0.0003	-0.1	920	6	37	14	40400
54326	5243422	-40+80#	329850	7086300	53	2020	Dep, rb Soil	0.2	1	0.0005	0.1	1850	10	44	19	49300
54326	5243423	-40+80#	329800	7086300	53	2020	Dep, rb Soil	0.3	1.5	1E-04	-0.1	2100	8	33	19	44800
54326	5243424	-40+80#	329750	7086300	53	2020	Dep, rb Soil	0.2	2	0.0002	-0.1	2400	10	41	18	49200
54326	5243425	-40+80#	329700	7086300	53	2020	Dep, rb Soil	0.2	4.5	0.0002	-0.1	3200	12	64	23	49000
54326	5243426	-40+80#	330150	7086300	53	2020	Dep, loose sand	0.3	-0.5	-1E-04	-0.1	800	8	43	12	57400
54326	5243427	-40+80#	330200	7086300	53	2020	Dep, loose sand	0.3	1.5	-1E-04	-0.1	680	7	35	8	47600
54326	5243428	-40+80#	330250	7086300	53	2020	Dep, loose sand	0.3	1	0.0008	-0.1	860	6	40	8	49500
54326	5243429	-40+80#	330300	7086300	53	2020	Dep, loose sand	0.3	0.5	-1E-04	-0.1	490	5	33	8	40600
54326	5243430	-40+80#	330350	7086300	53	2020	Dep, loose sand	0.3	2	0.0002	-0.1	720	7	45	8	43500
54326	5243431	-40+80#	330400	7086300	53	2020	Dep, loose sand	0.6	2	1E-04	-0.1	700	5	47	9	46600
54326	5243432	-40+80#	330450	7086300	53	2020	Dep, loose sand	0.3	4	-1E-04	0.1	660	6	46	9	46100
54326	5243433	-40+80#	330500	7086300	53	2020	Dep, loose sand	0.2	3	-1E-04	-0.1	620	7	37	10	49500
54326	5243401	-80#	321950	7083600	53	2020	Dep, rb Soil	0.2	2.5	0.0009	0.1	1850	6	50	16	44700
54326	5243402	-80#	321900	7083600	53	2020	Dep, rb Soil	0.3	2	0.0004	0.1	2500	9	57	17	43300
54326	5243403	-80#	321850	7083600	53	2020	Dep, rb Soil	0.1	2	0.0005	0.2	2800	10	51	26	45200
54326	5243404	-80#	321800	7083600	53	2020	Dep, rb Soil	0.2	1	0.0005	0.1	2200	8	52	16	46400
54326	5243405	-80#	321750	7083600	53	2020	Dep, rb Soil	0.1	2	0.0006	0.1	2800	8	47	20	44900
54326	5243406	-80#	321700	7083600	53	2020	Dep, rb Soil	0.2	-0.5	0.0002	0.1	2950	9	57	18	47000
54326	5243407	-80#	321650	7083600	53	2020	Dep, rb Soil	0.2	3	0.0003	0.1	2750	9	55	19	45600
54326	5243408	-80#	321600	7083600	53	2020	Dep, rb Soil	0.2	4.5	0.0004	0.1	2600	9	56	22	41300

DPO	Sample	Sample Type	East	North	Zone	EL Number	Comments	Ag	As	Au	Bi	Ca	Co	Cr	Cu	Fe
54326	5243409	-80#	322000	7083600	53	2020	Dep, rb Soil	0.2	3	0.0004	0.1	2300	6	45	16	43700
54326	5243410	-80#	322050	7083600	53	2020	Dep, rb Soil	0.4	4	0.0006	1.2	13800	8	43	20	40400
54326	5243411	-80#	322100	7083600	53	2020	Dep, rb Soil	0.3	1.5	0.0002	0.1	680	6	53	15	40000
54326	5243412	-80#	322150	7083600	53	2020	Dep, rb Soil	0.2	1.5	0.0003	0.1	1950	8	54	14	49900
54326	5243413	-80#	322200	7083600	53	2020	Dep, rb Soil	0.2	0.5	0.0003	0.1	2000	7	48	16	49400
54326	5243414	-80#	322250	7083600	53	2020	Dep, loose sand	0.3	9	0.0004	0.2	1900	7	61	15	49600
54326	5243415	-80#	322300	7083600	53	2020	Dep, loose sand	0.2	-0.5	0.0003	0.1	2400	7	53	17	52700
54326	5243416	-80#	322350	7083600	53	2020	Dep, rb Soil	0.2	4.5	0.0004	0.2	1600	6	50	17	40400
54326	5243417	-80#	330100	7086300	53	2020	Dep, loose sand	0.2	0.5	0.0002	0.1	920	7	44	14	40400
54326	5243418	-80#	330050	7086300	53	2020	Dep, loose sand	0.2	3	0.0004	0.1	540	6	41	14	43100
54326	5243419	-80#	330000	7086300	53	2020	Dep, rb Soil	0.2	7	0.0002	0.1	720	4	46	17	35600
54326	5243420	-80#	329950	7086300	53	2020	Dep, rb Soil	0.2	6.5	0.0003	0.2	1450	6	41	20	35300
54326	5243421	-80#	329900	7086300	53	2020	Dep, rb Soil	0.1	-0.5	0.0004	0.1	1050	6	39	20	36600
54326	5243422	-80#	329850	7086300	53	2020	Dep, rb Soil	0.3	5	0.0006	0.2	2300	9	42	28	43100
54326	5243423	-80#	329800	7086300	53	2020	Dep, rb Soil	0.3	1	0.0005	0.2	2550	10	41	30	41100
54326	5243424	-80#	329750	7086300	53	2020	Dep, rb Soil	0.3	8.5	0.0002	0.2	2550	14	64	33	49400
54326	5243425	-80#	329700	7086300	53	2020	Dep, rb Soil	0.2	5.5	0.0006	0.2	2800	19	78	41	51100
54326	5243426	-80#	330150	7086300	53	2020	Dep, loose sand	0.2	0.5	1E-04	0.1	1000	6	41	13	45000
54326	5243427	-80#	330200	7086300	53	2020	Dep, loose sand	0.4	4	-1E-04	0.2	1150	7	51	14	52000
54326	5243428	-80#	330250	7086300	53	2020	Dep, loose sand	0.3	4.5	-1E-04	0.2	1450	7	44	14	47100
54326	5243429	-80#	330300	7086300	53	2020	Dep, loose sand	0.3	2.5	0.0003	0.2	860	7	62	16	51800
54326	5243430	-80#	330350	7086300	53	2020	Dep, loose sand	0.4	4.5	0.0003	0.1	1200	7	46	13	43600
54326	5243431	-80#	330400	7086300	53	2020	Dep, loose sand	0.5	2.5	-1E-04	0.1	1100	8	48	14	47700
54326	5243432	-80#	330450	7086300	53	2020	Dep, loose sand	0.3	3	0.0003	0.2	1150	7	50	17	46400
54326	5243433	-80#	330500	7086300	53	2020	Dep, loose sand	0.3	3.5	-1E-04	0.1	940	6	46	15	48200
54326	5243434	RKCHIP	330230	7086320	53	2020	Fe Lag (Lat Silcrete)	0.3	23.5	0.0002	0.2	1000	-2	460	58	315000
54326	5243435	RKCHIP	329960	7086920	53	2020	Fe Lag (Lat Silcrete)	0.2	12.5	0.0008	-0.1	1850	-2	580	115	473000
54326	5243436	RKCHIP	326060	7087025	53	2020	Fresh cg Mafic O/C	0.1	3	0.0012	-0.1	79600	60	620	100	76300
54326	5243437	RKCHIP	322065	7083850	53	2020	Fe Silcrete O/C	0.3	16	0.0005	0.2	1150	-2	100	38	267000
54326	5243438	RKCHIP	322200	7083685	53	2020	Mafic/ Felsic Gniess	0.2	1	0.0006	-0.1	20400	17	12	16	43400
54326	5243439	RKCHIP	322200	7083685	53	2020	Fe As Above	0.3	23.5	0.0045	-0.1	6200	19	70	360	289000

DPO	Sample	Sample Type	Mg	Mn	Mo	Ni	Pb	Pd	Pt	Th	Ti	U	Zn
54326	5243401	-20+40#	490	165	0.4	6	20	-0.0002	0.0002	4.2	5250	0.15	32
54326	5243402	-20+40#	640	290	0.3	10	23.5	-0.0002	-0.0002	2.5	7950	0.16	27
54326	5243403	-20+40#	800	230	0.3	9	16	-0.0002	-0.0002	3.2	5800	0.21	26
54326	5243404	-20+40#	520	240	0.4	10	14	-0.0002	-0.0002	2.3	6500	0.15	25
54326	5243405	-20+40#	720	270	0.3	11	14	-0.0002	-0.0002	2.1	7300	0.17	26
54326	5243406	-20+40#	680	290	0.4	10	14.5	-0.0002	-0.0002	2.5	8000	0.16	29
54326	5243407	-20+40#	780	250	0.2	9	15.5	-0.0002	-0.0002	1.95	5950	0.17	26
54326	5243408	-20+40#	1150	270	0.2	11	16	-0.0002	-0.0002	2.4	6050	0.17	28
54326	5243409	-20+40#	520	220	0.5	10	13.5	-0.0002	-0.0002	2.4	7650	0.16	27
54326	5243410	-20+40#	1300	270	1.1	13	21	-0.0002	-0.0002	4.7	5150	0.66	36
54326	5243411	-20+40#	500	220	0.4	10	19.5	-0.0002	-0.0002	11.5	6700	0.6	24
54326	5243412	-20+40#	480	280	0.3	9	17	-0.0002	-0.0002	3.2	8850	0.17	29
54326	5243413	-20+40#	640	330	0.5	12	16.5	-0.0002	-0.0002	3.3	9900	0.19	39
54326	5243414	-20+40#	540	290	0.3	10	17.5	-0.0002	-0.0002	2.9	8450	0.19	31
54326	5243415	-20+40#	400	170	0.4	6	16	-0.0002	-0.0002	1.7	4500	0.14	17
54326	5243416	-20+40#	580	200	0.4	9	17	-0.0002	-0.0002	2.6	5650	0.23	23
54326	5243417	-20+40#	250	170	-0.1	6	10.5	-0.0002	-0.0002	1.15	3000	0.12	13
54326	5243418	-20+40#	240	175	0.2	5	10	-0.0002	-0.0002	1.55	3400	0.13	19
54326	5243419	-20+40#	330	260	0.2	7	12.5	-0.0002	-0.0002	2.1	5400	0.13	21
54326	5243420	-20+40#	440	280	0.2	8	14	0.0002	-0.0002	3.5	4800	0.19	21
54326	5243421	-20+40#	460	280	-0.1	9	16	0.0002	0.0002	2.7	5300	0.21	23
54326	5243422	-20+40#	900	280	-0.1	10	12	-0.0002	-0.0002	2.8	4400	0.18	23
54326	5243423	-20+40#	680	320	0.2	9	16	0.0002	0.0002	4	5100	0.28	25
54326	5243424	-20+40#	700	390	0.2	11	13	0.0002	0.0002	3.1	5600	0.25	26
54326	5243425	-20+40#	1200	340	0.1	13	11	0.0004	0.0004	2.1	4800	0.18	21
54326	5243426	-20+40#	320	210	-0.1	5	12	0.0002	-0.0002	1.65	3550	0.14	15
54326	5243427	-20+40#	280	175	-0.1	4	18.5	-0.0002	-0.0002	1.85	2850	0.11	13
54326	5243428	-20+40#	280	165	0.1	5	16	-0.0002	-0.0002	2.2	2850	0.14	12
54326	5243429	-20+40#	250	90	-0.1	6	8	-0.0002	-0.0002	1.25	1750	0.1	9
54326	5243430	-20+40#	290	140	0.1	6	11.5	-0.0002	-0.0002	1.45	2200	0.12	10
54326	5243431	-20+40#	270	175	-0.1	8	11	-0.0002	-0.0002	1.4	3000	0.12	16
54326	5243432	-20+40#	270	155	-0.1	5	17	-0.0002	-0.0002	1.45	2350	0.11	11
54326	5243433	-20+40#	320	175	-0.1	5	14.5	-0.0002	-0.0002	2	2750	0.13	21
54326	5243401	-40+80#	900	450	0.5	15	19	-0.0002	0.0002	11	12700	0.29	59
54326	5243402	-40+80#	1200	580	0.4	17	21	-0.0002	0.0002	6.5	14100	0.29	57
54326	5243403	-40+80#	1800	500	0.4	18	21	0.0004	0.0004	10.5	10700	0.45	57
54326	5243404	-40+80#	880	480	0.3	16	15	-0.0002	-0.0002	6	11500	0.2	50

DPO	Sample	Sample Type	Mg	Mn	Mo	Ni	Pb	Pd	Pt	Th	Ti	U	Zn
54326	5243405	-40+80#	1150	490	0.3	16	19.5	0.0002	0.0002	4.6	11400	0.27	48
54326	5243406	-40+80#	1100	540	0.4	61	16.5	-0.0002	0.0002	4	13300	0.2	52
54326	5243407	-40+80#	1350	540	0.4	21	21	-0.0002	-0.0002	6	12600	0.23	56
54326	5243408	-40+80#	1750	560	0.3	19	34.5	0.0002	0.0002	5	12100	0.28	55
54326	5243409	-40+80#	190	70	-0.1	2	2	-0.0002	-0.0002	2.4	1900	0.05	4
54326	5243410	-40+80#	1700	430	0.5	13	19	-0.0002	0.0002	6	11800	0.26	48
54326	5243411	-40+80#	840	520	0.6	16	18	-0.0002	-0.0002	5	13200	0.29	51
54326	5243412	-40+80#	880	660	0.6	19	24	-0.0002	-0.0002	6.5	18100	0.27	66
54326	5243413	-40+80#	960	640	0.8	19	21	-0.0002	-0.0002	7.5	16900	0.38	68
54326	5243414	-40+80#	880	620	0.7	18	31	-0.0002	0.0002	7.5	16000	0.75	67
54326	5243415	-40+80#	760	480	0.5	15	19	-0.0002	-0.0002	3.7	12300	0.25	48
54326	5243416	-40+80#	1050	500	0.6	17	20	-0.0002	-0.0002	5	11900	0.29	51
54326	5243417	-40+80#	520	800	0.4	11	22	-0.0002	-0.0002	4.3	14700	0.23	47
54326	5243418	-40+80#	500	860	0.5	13	19	-0.0002	-0.0002	5.5	16000	0.24	50
54326	5243419	-40+80#	600	780	0.5	12	18.5	0.0002	0.0002	6.5	14700	0.27	49
54326	5243420	-40+80#	800	740	0.4	15	19	0.0006	0.0004	7.5	12100	0.37	46
54326	5243421	-40+80#	720	660	0.3	14	18.5	0.0006	0.0004	7	11400	0.44	44
54326	5243422	-40+80#	1650	700	0.4	17	37.5	0.0006	0.0004	10.5	11900	0.49	53
54326	5243423	-40+80#	1300	680	0.2	15	21.5	0.0006	0.0004	7	10200	0.45	50
54326	5243424	-40+80#	1200	820	0.5	17	19	0.0004	0.0004	9	12600	0.42	54
54326	5243425	-40+80#	2250	800	0.4	26	16	0.0008	0.0008	7	12100	0.41	54
54326	5243426	-40+80#	600	920	0.4	14	43	0.0004	-0.0002	6.5	14600	0.31	57
54326	5243427	-40+80#	540	800	0.4	11	21	-0.0002	-0.0002	7	14300	0.2	46
54326	5243428	-40+80#	540	800	0.3	11	17.5	0.0002	0.0002	6	15000	0.25	47
54326	5243429	-40+80#	480	660	0.3	10	19.5	-0.0002	-0.0002	4.8	12100	0.24	38
54326	5243430	-40+80#	560	760	0.3	11	20	-0.0002	-0.0002	7	13200	0.23	42
54326	5243431	-40+80#	520	860	0.4	13	22.5	-0.0002	-0.0002	5.5	13800	0.21	46
54326	5243432	-40+80#	540	840	0.4	11	24.5	-0.0002	-0.0002	4.5	14200	0.38	48
54326	5243433	-40+80#	560	800	0.2	13	19.5	-0.0002	-0.0002	6	9600	0.22	51
54326	5243401	-80#	1550	430	0.9	17	15.5	0.0004	0.0004	11.5	9000	0.62	49
54326	5243402	-80#	1700	560	0.3	17	43.5	0.0004	0.0004	17	9800	0.83	49
54326	5243403	-80#	3050	540	0.5	22	23.5	0.0006	0.0006	11	8250	0.91	68
54326	5243404	-80#	1400	540	0.5	18	18	0.0004	0.0004	13.5	9750	0.63	52
54326	5243405	-80#	1850	560	0.5	21	18	0.0004	0.0004	11.5	8950	0.73	50
54326	5243406	-80#	1550	600	0.3	18	22	0.0002	0.0004	15	10100	0.75	51
54326	5243407	-80#	1800	580	0.5	20	16.5	0.0004	0.0004	19	9900	0.72	56
54326	5243408	-80#	2150	540	0.4	21	17	0.0004	0.0004	16.5	8850	0.68	58

DPO	Sample	Sample Type	Mg	Mn	Mo	Ni	Pb	Pd	Pt	Th	Ti	U	Zn
54326	5243409	-80#	1350	460	0.7	17	16.5	0.0004	0.0002	15	9650	0.66	49
54326	5243410	-80#	3850	480	0.9	18	29	0.0004	0.0004	14.5	8550	0.72	53
54326	5243411	-80#	1050	450	0.6	15	19	-0.0002	0.0002	4.8	10200	0.57	49
54326	5243412	-80#	1100	620	0.5	15	19	-0.0002	0.0002	15	11800	0.67	56
54326	5243413	-80#	1250	620	0.7	18	20.5	0.0002	0.0002	15	11600	0.72	57
54326	5243414	-80#	1100	620	0.8	18	23.5	-0.0002	0.0002	20.5	11800	0.8	56
54326	5243415	-80#	1400	680	0.8	18	19	-0.0002	-0.0002	12.5	12100	0.66	57
54326	5243416	-80#	1350	490	0.9	17	20	0.0004	0.0004	12.5	8900	0.77	49
54326	5243417	-80#	820	600	0.4	16	18	0.0004	0.0002	14	10600	0.61	48
54326	5243418	-80#	800	560	0.3	14	16	0.0002	0.0002	13.5	11500	0.61	49
54326	5243419	-80#	960	420	0.4	14	23.5	0.0006	0.0004	15.5	9100	0.69	45
54326	5243420	-80#	1200	480	0.2	19	16.5	0.0012	0.0004	11	8100	0.64	47
54326	5243421	-80#	1100	400	0.4	16	18	0.001	0.0006	9.5	7550	0.69	42
54326	5243422	-80#	2600	500	0.4	23	24.5	0.0008	0.0006	15	8100	0.81	57
54326	5243423	-80#	2150	540	0.4	23	19.5	0.001	0.0006	13	8050	0.97	54
54326	5243424	-80#	2050	780	0.5	26	23.5	0.001	0.0006	17.5	9650	0.9	61
54326	5243425	-80#	3200	840	0.5	41	19.5	0.0016	0.0014	13	8850	0.81	65
54326	5243426	-80#	860	600	0.3	15	17.5	0.0006	0.0002	11	10800	0.65	48
54326	5243427	-80#	900	740	0.7	15	22.5	0.0004	-0.0002	19	13300	0.84	55
54326	5243428	-80#	920	640	0.4	14	20	0.0004	0.0002	19	12400	0.8	55
54326	5243429	-80#	1000	700	0.4	18	19.5	0.0004	0.0002	15.5	13100	0.74	59
54326	5243430	-80#	980	600	0.5	14	21.5	0.0004	0.0002	16.5	11000	0.64	48
54326	5243431	-80#	900	660	0.5	16	19.5	0.0002	0.0002	16.5	11700	0.62	57
54326	5243432	-80#	900	640	0.4	16	29	0.0002	0.0002	14.5	11500	0.73	76
54326	5243433	-80#	960	660	0.3	16	18.5	0.0002	-0.0002	15.5	11300	0.71	53
54326	5243434	RKCHIP	520	330	1	26	35.5	0.0026	0.0058	11.5	7300	0.51	21
54326	5243435	RKCHIP	620	270	1	19	25	0.0078	0.0056	10	3400	0.8	33
54326	5243436	RKCHIP	66000	1400	3.3	290	2.5	0.0048	0.006	0.24	5100	0.03	69
54326	5243437	RKCHIP	860	170	3.4	11	15	0.0008	0.0016	7.5	8750	0.59	14
54326	5243438	RKCHIP	13700	660	0.3	12	94	-0.0002	-0.0002	22	4950	1.75	79
54326	5243439	RKCHIP	5150	1600	3.8	65	100	0.0046	0.012	21	3150	6	150

Appendix 8

Surface TEM Traverses

Line 7083200 N
MT HOWE, AREA 1
for
CRA EXPLORATION PTY LTD

Field Job 313
ZONGE ZPLOT 7.12
Plotted 28 Jun 96

TRANSIENT EM SURVEY DATA
Window MAGNITUDE uV/amp

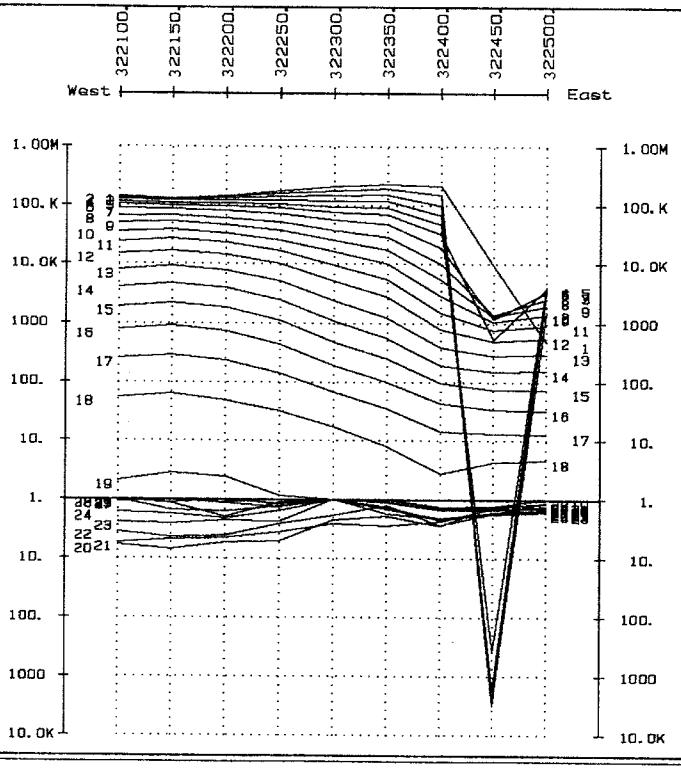
RVR Coil . Rxno: 10000.0
Auto gain

SURVEY LINE DATA
Line Orient= East

Survey Date= JUNE 1996

Window NUMBER and TIME (seconds)

W 1:	120.2u	W11:	1.095m	W21:	9.797m	W31:	96.88m	
W 2:	181.2u	W12:	1.335m	W22:	12.31m			
W 3:	242.3u	W13:	1.669m	W23:	15.49m			
W 4:	303.3u	W14:	2.065m	W24:	19.44m			
W 5:	364.3u	W15:	2.549m	W25:	24.41m			
W 6:	425.4u	W16:	3.157m	W26:	30.71m			
W 7:	515.8u	W17:	3.942m	W27:	38.63m			
W 8:	638.1u	W18:	4.972m	W28:	48.60m			
W 9:	760.3u	W19:	6.248m	W29:	61.18m			
W10:	911.3u	W20:	7.824m	W30:	76.95m			



* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

Report No. 22658

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 7083200mN
Area 1

0138

Line 7083600 N
MT HOWE, AREA 1
for
CRA EXPLORATION PTY LTD

Field Job 313
ZONGE ZPLOT 7.12
Plotted 05 Jul 98

TRANSIENT EM SURVEY DATA
Window MAGNITUDE uV/Amp

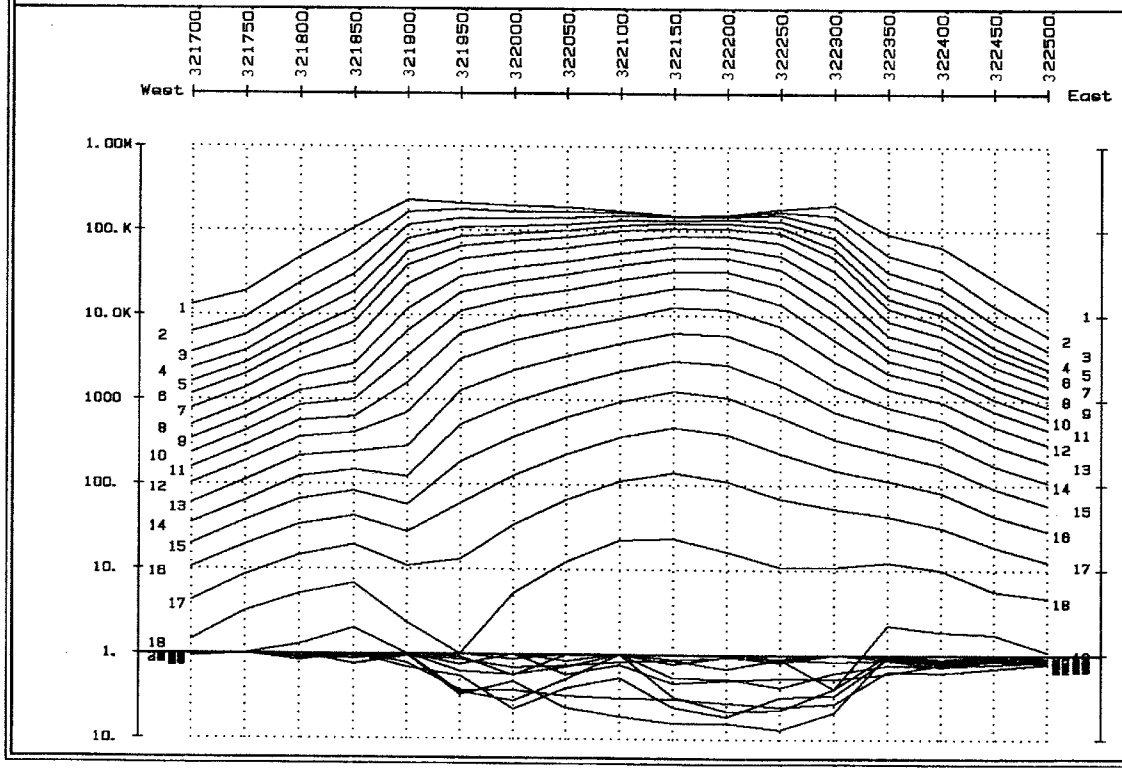
RVR Coil, Rxno: 10000.0
Auto gain

SURVEY LINE DATA
Line Orient= East

Survey Date= JUNE 1998

Window NUMBER and TIME (seconds)

W 1:	120.2u	W11:	1.095m	W21:	9.787m	W31:	96.88m		
W 2:	181.2u	W12:	1.395m	W22:	12.31m				
W 3:	242.3u	W13:	1.669m	W23:	15.49m				
W 4:	303.3u	W14:	2.085m	W24:	19.44m				
W 5:	364.3u	W15:	2.549m	W25:	24.41m				
W 6:	425.4u	W16:	3.157m	W26:	30.71m				
W 7:	515.8u	W17:	3.842m	W27:	38.83m				
W 8:	638.1u	W18:	4.872m	W28:	48.60m				
W 9:	760.3u	W19:	6.248m	W29:	61.18m				
W10:	911.3u	W20:	7.824m	W30:	78.95m				



* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

Report No. 22658

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 7083600mN
Area 1

0139

Line 7084000
Mt Howe, AREA 1
for
CRA EXPLORATION PTY LTD

Field Job 313
ZONGE ZPLOT 7.12
Plotted 26 Jun 96

TRANSIENT EM SURVEY DATA
Window MAGNITUDE uV/Amp

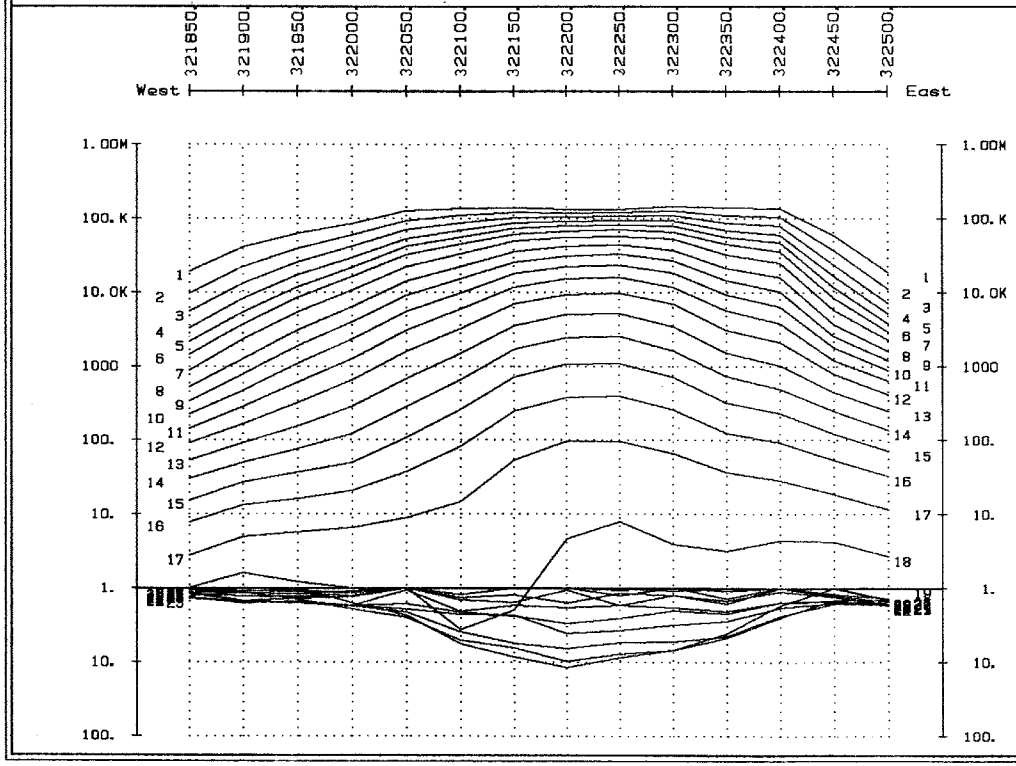
RVR Coil , Rxno: 10000.0
Auto gain

SURVEY LINE DATA
Line Orient= East

Survey Date= 06/1996

Window NUMBER and TIME (seconds)

W 1:	92.30u	W11:	1.067m	W21:	9.769m	W31:	96.85m		
W 2:	153.3u	W12:	1.307m	W22:	12.28m				
W 3:	214.4u	W13:	1.641m	W23:	15.47m				
W 4:	275.4u	W14:	2.037m	W24:	19.41m				
W 5:	336.4u	W15:	2.521m	W25:	24.38m				
W 6:	397.5u	W16:	3.129m	W26:	30.68m				
W 7:	467.9u	W17:	3.914m	W27:	38.60m				
W 8:	610.2u	W18:	4.944m	W28:	48.57m				
W 9:	732.4u	W19:	6.220m	W29:	61.15m				
W10:	883.4u	W20:	7.797m	W30:	78.92m				

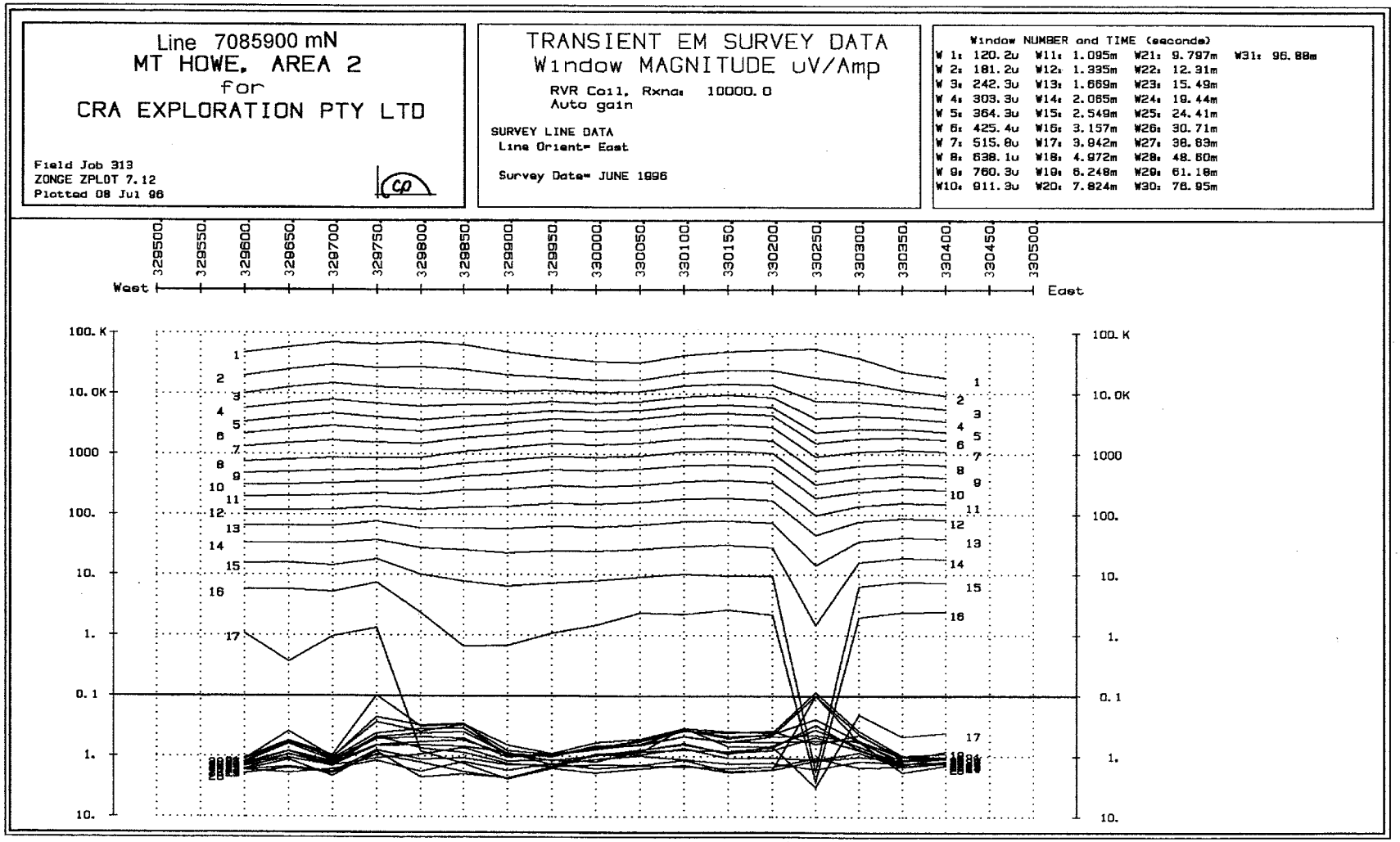


* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

Report No. 22658

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 7084000mN
Area 1

0140

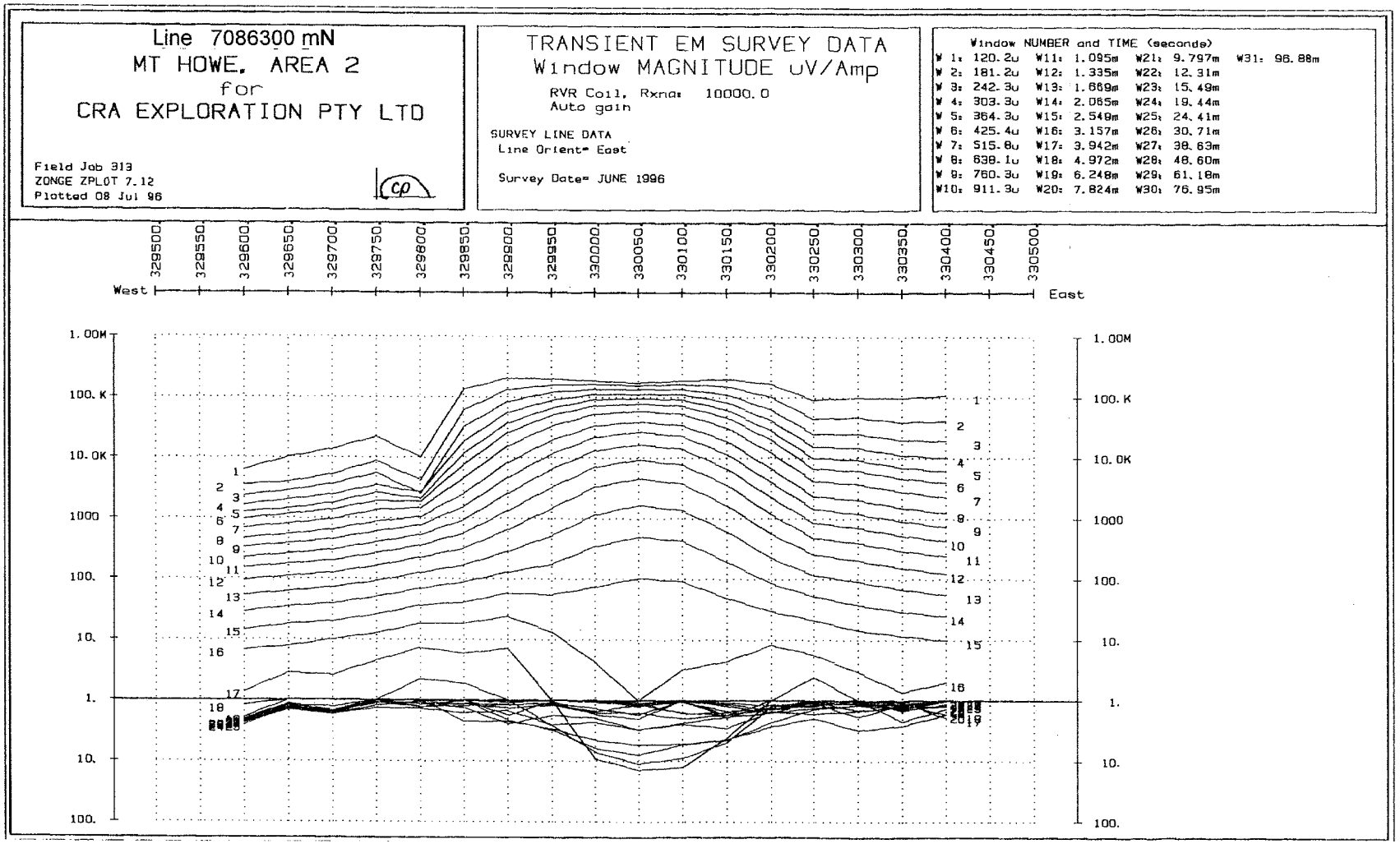


* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

Report No. 22658

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 7085900 mN
Area 2

0141

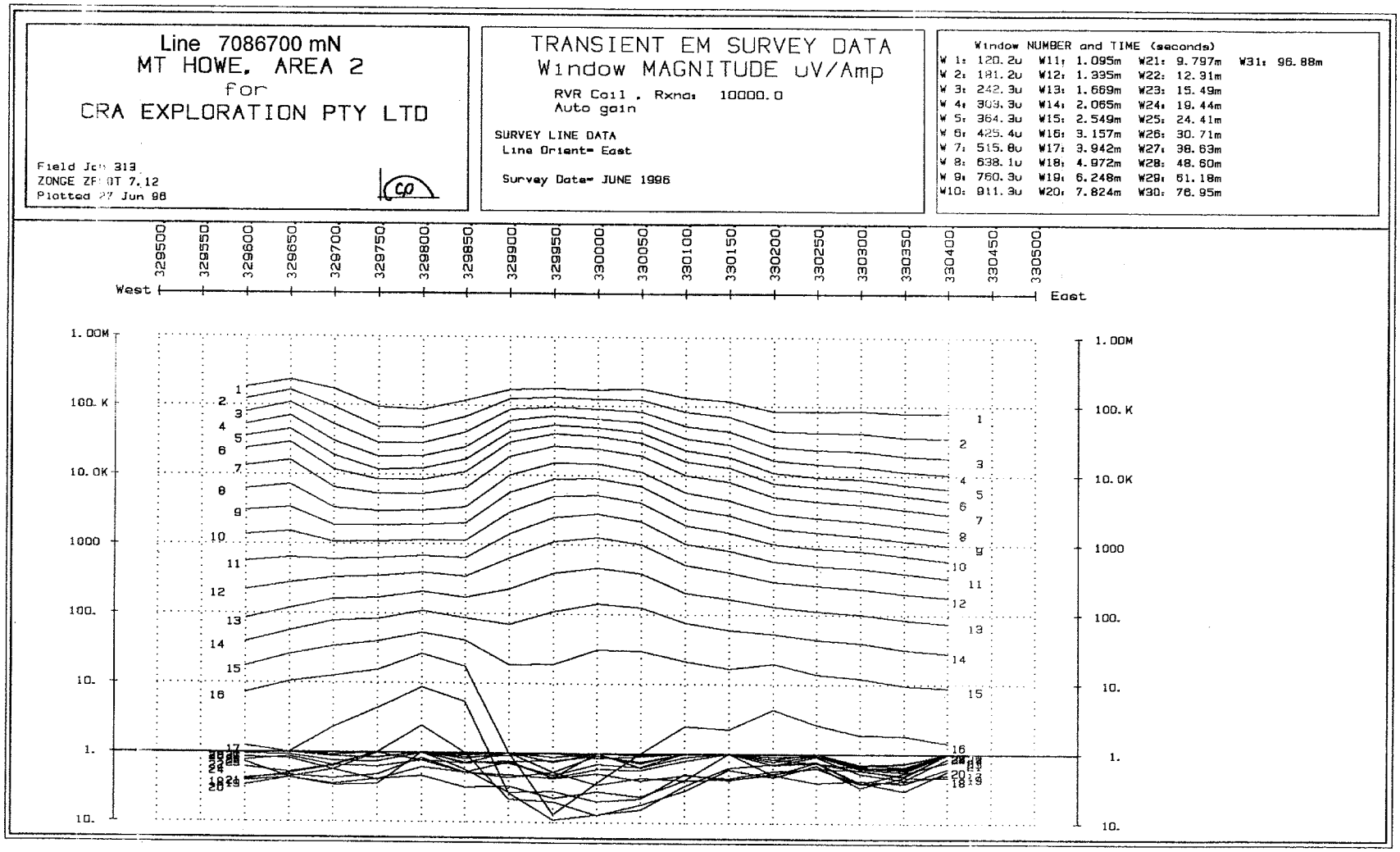


Report No. 22658

* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 7086300 mN
Area 2

0142



* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

Report No. 22658

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 7086700 mN
Area 2

0143

Line 7098600 mN
MT HOWE. AREA 3
for
CRA EXPLORATION PTY LTD

Field Job 313
ZONGE ZPLOT 7.12
Plotted 27 Jun 96

TRANSIENT EM SURVEY DATA
Window MAGNITUDE uV/Amp

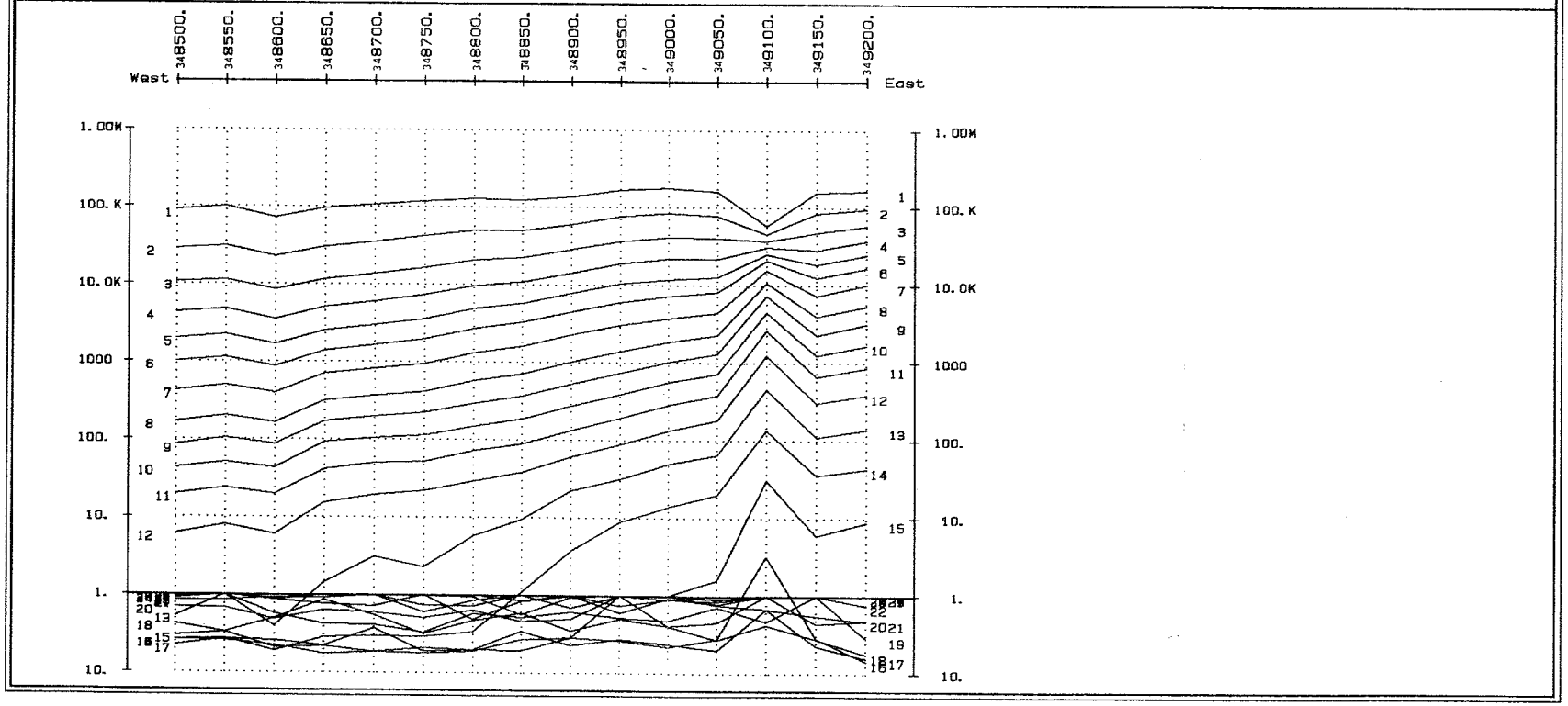
RVR Coil , Rxno: 10000.0
Auto gain

SURVEY LINE DATA
Line Orient= East

Survey Date= JUNE 1996

Window NUMBER and TIME (seconds)

W 1:	120.2u	W11:	1.095m	W21:	9.797m	W31:	96.88m
W 2:	181.2u	W12:	1.335m	W22:	12.31m		
W 3:	242.3u	W13:	1.669m	W23:	15.49m		
W 4:	303.3u	W14:	2.065m	W24:	19.44m		
W 5:	364.3u	W15:	2.549m	W25:	24.41m		
W 6:	425.4u	W16:	3.157m	W26:	30.71m		
W 7:	515.8u	W17:	3.942m	W27:	38.63m		
W 8:	638.1u	W18:	4.972m	W28:	48.60m		
W 9:	760.3u	W19:	6.248m	W29:	61.18m		
W10:	911.3u	W20:	7.824m	W30:	76.95m		

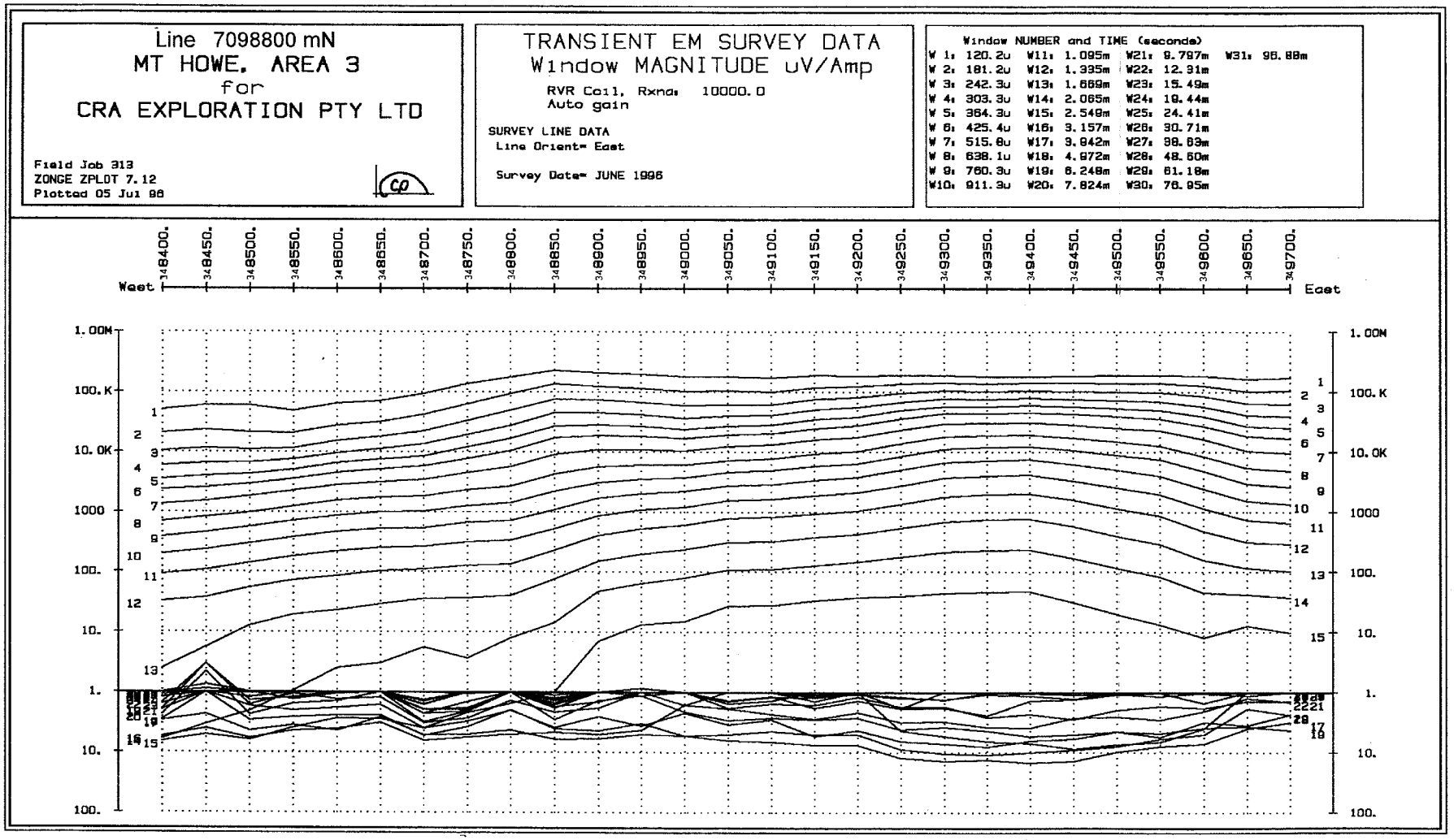


* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

Report No. 22658

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 7098600 mN
Area 3

0144



Report No. 22658

* Twin Turn 200m x 200m Transmitter Loop
* 50m Stations
* Tx = ZONGE GGT25
* Rx = ZONGE GDP16
* Antenna = Sirotem RVR
* 2 Hz. Survey Frequency

MT. HOWE EL 2020 - S.A.
SURFACE TEM
Line 7098800 mN
Area 3

0145

Rio Tinto Exploration Pty. Limited

A.C.N. 000 057 125

A member of the Rio Tinto Group

EL 2020 "Mount Howe", South Australia. Third Annual Report for the Period Ending 26th September 1997.

Author: R.G. Parkinson

Date: September 1998

Submitted to: Chief Geologist - Southwest District

Copies to: Primary Industries and Resources SA (x2)
Rio Tinto Exploration, Australia Region, Perth

Submitted by: _____

Accepted by: _____

Exploration Report No. 24052

Abstract

Exploration Licence 2020 Mt Howe was granted on 26th September 1994 over an area of 1121 sq km. The tenement is situated approximately 10km south of the SA-NT border straddling the Stuart Highway and the Tarcoola-Alice Springs railway line. Tenement was applied for to test three positive magnetic features prominent in the 1969 BMR regional magnetic data that were possibly Giles Complex equivalents. In March 1997 the licence was partially surrendered, retaining 100 sqkm.

No field work on the tenement was conducted during the year.

List of Contents

List of Plans

Plan No.	Title	Scale
SAa 6282	Mt. Howe EL 2020 - S.A. Tenement Location Plan Showing Areas Relinquished and Retained	1:250 000

1. Conclusions and Recommendations

No additional work on the tenement is warranted.

2. Introduction

Exploration Licence 2020, "Mount Howe" was initially acquired to test three large magnetic anomalies, identified in the BMR 1968 magnetic survey, as potential Giles Complex layered intrusives.

"Mount Howe", originally covering 1121 sqkm was granted to CRA Exploration Pty. Limited (CRAE) on 26th September, 1994. (On 4th July 1997 CRAE changed its name to Rio Tinto Exploration Pty. Limited). In March 1997 the licence area was reduced to 100 sqkm. The licence area is situated approximately 10 km south of the SA-NT border straddling the Stuart Highway and the Tarcoola to Alice Springs railway line.

This report details exploration activities undertaken by Rio Tinto Exploration Pty. Limited (Rio Tinto) during the third year of tenure, to 26th September 1997.

3. Review of Previous Work

3.1 Prior to Current Tenement

A review of previous exploration has not been completed.

3.2 During Current Tenement

Year 1: (Hughes 1995)

- Airborne magnetic and radiometric survey
- Soil sampling (four prospects) 59 -40# +80# and 82 -20# +40# samples
- rock sampling (5 samples)
- ground magnetic traverses (seven line km)

A magnetic/radiometric survey flown in 1994 delineated the three magnetic anomalies from the BMR survey plus another discrete negatively polarised magnetic anomaly, named Cavanagh. Ground follow up attributed the three initial anomalies to magnetite rich granite-granodiorite.

Year 2: (McInnes 1996)

- trial airborne electromagnetic survey (100 line km)
- aircore drilling (41 holes for 247m)
- petrological analysis 3 samples
- ground TEM (5 traverses)

Drilling of one magnetic target confirmed the anomaly as magnetite rich granite-granodiorite. Drilling at Cavanagh intersected olivine cumulate, but Ni-PGE chemistry was insignificant. Three surface TEM traverses at Cavanagh did not define any bedrock conductors.

Four trial Airborne Electromagnetic (AEM) traverses resulted in the identification of three anomalies. Follow-up with surface TEM resolved the anomalies as early time responses attributed to an increase in the conductivity/depth of the overburden. Rock and soil samples collected did not return significantly anomalous geochemical results.

4. Exploration Completed for the Period 27th September 1996 to 26th September 1997

No field work was undertaken.

Previous work on the tenement was carefully reassessed. A decision was made to relinquish all but a 100 sqkm area of the tenement (Terrill 1997).

5. Rehabilitation

No activities requiring rehabilitation.

References

Hughes, A.R. 1995 Mt. Howe EL 2020, South Australia, Annual Report For The First Year of Tenure Ended September 25, 1995 (CRAE Report No. 21155)

McInnes, D.J. 1996 Mt. Howe EL 2020, South Australia, Annual Report For The Second Year of Tenure Ended September 25, 1996 (CRAE Report No. 22658)

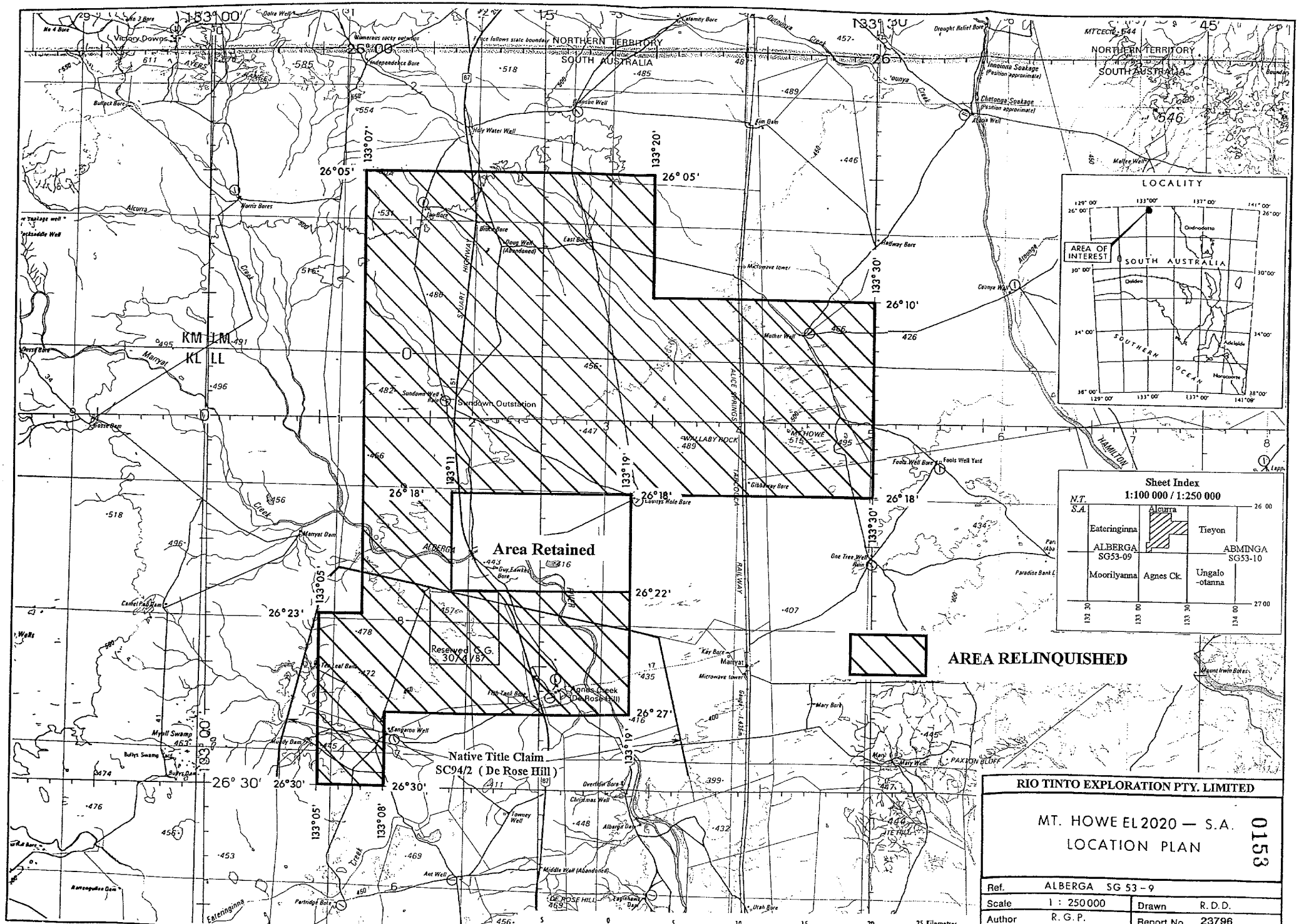
Terrill, J.E. 1997 EL 2020 Mt. Howe. Partial Surrender Report For The Period Ending April 15, 1997. 1:250 000 Alberga SG53-09, South Australia, Australia(CRAE Report No. 23518)

Location

Alberga SG53-09 1:250 000 sheet

Keywords

Mt. Howe, Musgrave Block, Giles Complex

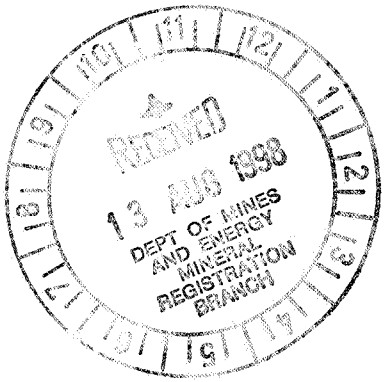

Area Retained
Native Title Claim
SC94/2 (De Rose Hill)
AREA RELINQUISHED
Reserved C.G.
30/4/87
Swindown Outstation
Agnes Creek
De Rose Hill
NORTHERN TERRITORY
SOUTH AUSTRALIA
LOCALITY
AREA OF INTEREST
Sheet Index
1:100 000 / 1:250 000
N.T.
S.A.
Alcurra
Eateringinna
Tieyon
ALBERGA
SG53-09
ABMINGA
SG53-10
Moorilyanna
Agnes Ck.
Ungalo
-otanna
RIO TINTO EXPLORATION PTY. LIMITED
MT. HOWE EL 2020 — S.A.
LOCATION PLAN
0153
Ref. ALBERGA SG 53 - 9
Scale 1 : 250000
Drawn R.D.D.
Author R. G. P.
Report No. 23796
Date Feb. '97
Plan No. SAg 6282

Rio Tinto Exploration Pty. Limited

A.C.N. 000 057 125

A member of the Rio Tinto Group

EL 2020 "Mount Howe", South Australia. Final and Fourth Annual Report for the Period Ending 17th June 1998.



Author: R.G. Parkinson

Date: July 1998

Submitted to: Chief Geologist - Southwest District

Copies to: Primary Industries and Resources SA (x2)
Rio Tinto Exploration, Australia Region, Perth

Submitted by: _____

Accepted by: _____

Exploration Report No. 23796

LIST OF CONTENTS

List of Appendices

List of Plans

1. Summary

Exploration Licence 2020 Mt Howe was granted on 26th September 1994 over an area of 1121 sq km. The tenement is situated approximately 10km south of the SA-NT border straddling the Stuart Highway and the Tarcoola-Alice Springs railway line. Tenement was applied for to test three positive magnetic features prominent in the 1969 BMR regional magnetic data that were possibly Giles Complex equivalents. In March 1997 the licence was partially surrendered, retaining 100 sqkm.

A magnetic/radiometric survey flown in 1994 delineated the three magnetic anomalies plus another discrete negatively polarised magnetic anomaly, named Cavanagh. Ground follow up and drilling attributed the three initial anomalies to magnetite rich granite-granodiorite. Drilling at Cavanagh intersected olivine cumulate, but lacking significant Ni-PGE chemistry. Three surface TEM traverses at Cavanagh did not define any bedrock conductors.

Four trial Airborne Electromagnetic (AEM) traverses identified three anomalies. Follow-up with surface TEM resolved the anomalies as early time responses attributed to an increase in the conductivity/depth of the overburden. Rock and soil geochemistry was not significantly anomalous.

Further review of the ground EM data to determine the significance of the anomalies again concluded that the features are due to surficial effects. Field inspection of EM anomalies did not identify any geological or geochemical targets.

No additional work on the tenement was warranted and the title was relinquished on 17th June 1998.

2. Introduction

Exploration Licence 2020, "Mount Howe" was initially acquired to test three large magnetic anomalies, identified in the BMR 1969 magnetic survey, as potential Giles Complex layered intrusives.

"Mount Howe", originally covering 1121 sqkm was granted to CRA Exploration Pty. Limited (CRAE) on 26th September, 1994. (On 4th July 1997 CRAE changed its name to Rio Tinto Exploration Pty. Limited). In March 1997 the licence area was reduced to 100 sqkm. The licence area is situated approximately 10 km south of the SA-NT border straddling the Stuart Highway and the Tarcoola to Alice Springs railway line.

This report details exploration activities undertaken by Rio Tinto Exploration Pty. Limited (Rio Tinto) during the fourth year of tenure, to the date of relinquishment on 17th June 1998. Activities included field inspection of EM anomalies, and review of EM data.

3. Conclusions and Recommendations

Further review of the ground EM data to determine the significance of the anomalies concluded that the features are due to surficial effects, probably related to increased cover thickness. Field inspection of EM anomalies did not identify any geological or geochemical targets.

No additional work on the tenement is warranted.

The tenement was recommended for relinquishment, actioned on 17th June 1998.

4. Review of Previous Work

4.1 Prior to Current Tenement

A review of previous exploration has not been completed.

4.2 During Current Tenement

Year 1: (Hughes 1995)

- Airborne magnetic and radiometric survey
- Soil sampling (four prospects) 59 -40# +80# and 82 -20# +40# samples
- rock sampling (5 samples)
- ground magnetic traverses (seven line km)

A magnetic/radiometric survey flown in 1994 delineated the three magnetic anomalies from the BMR survey plus another discrete negatively polarised magnetic anomaly, named Cavanagh. Ground follow up attributed the three initial anomalies to magnetite rich granite-granodiorite.

Year 2: (McInnes 1996)

- trial airborne electromagnetic survey (100 line km)
- aircore drilling (41 holes for 247m)
- petrological analysis 3 samples
- ground TEM (5 traverses)

Drilling of one magnetic target confirmed the anomaly as magnetite rich granite-granodiorite. Drilling at Cavanagh intersected olivine cumulate, but Ni-PGE chemistry was insignificant. Three surface TEM traverses at Cavanagh did not define any bedrock conductors.

Four trial Airborne Electromagnetic (AEM) traverses resulted in the identification of three anomalies. Follow-up with surface TEM resolved the anomalies as early time responses attributed to an increase in the conductivity/depth of the overburden. Rock and soil samples collected did not return significantly anomalous geochemical results.

Year 3: (Terrill 1997)

- No field work

Previous work on the tenement was carefully reassessed. A decision was made to relinquish all but a 100 sqkm area of the tenement.

5. Exploration Completed for the Period 27th March 1997 to 17th June 1998

Work completed during the period included field inspection of EM anomalies, and review of EM data.

A report of the field inspection of EM anomalies is included as Appendix 1.

A further review of the EM data to determine the significance of the anomalies was undertaken. It was again concluded that the anomalies are due to surficial effects, probably related to increased cover thickness. A written report on the review was not produced.

6. Rehabilitation

Drill Site MH01 has been rehabilitated, but rig wheel marks on the access track are still visible. These do not pose an erosion hazard.

All flagging used in the TEM survey was removed whilst the survey was in progress. Grid pegs were used every 200 m to mark out the traverses and these still remain at the four areas where surface TEM was undertaken.

No additional rehabilitation is required.

References

Hughes, A.R. 1995 Mt. Howe EL 2020, South Australia, Annual Report For The First Year of Tenure Ended September 25, 1995 (CRAE Report No. 21155)

McInnes, D.J. 1996 Mt. Howe EL 2020, South Australia, Annual Report For The Second Year of Tenure Ended September 25, 1996 (CRAE Report No. 22658)

Terrill, J.E. 1997 EL 2020 Mt. Howe. Partial Surrender Report For The Period Ending April 15, 1997. 1:250 000 Alberga SG53-09, South Australia, Australia (CRAE Report No. 23518)

Location

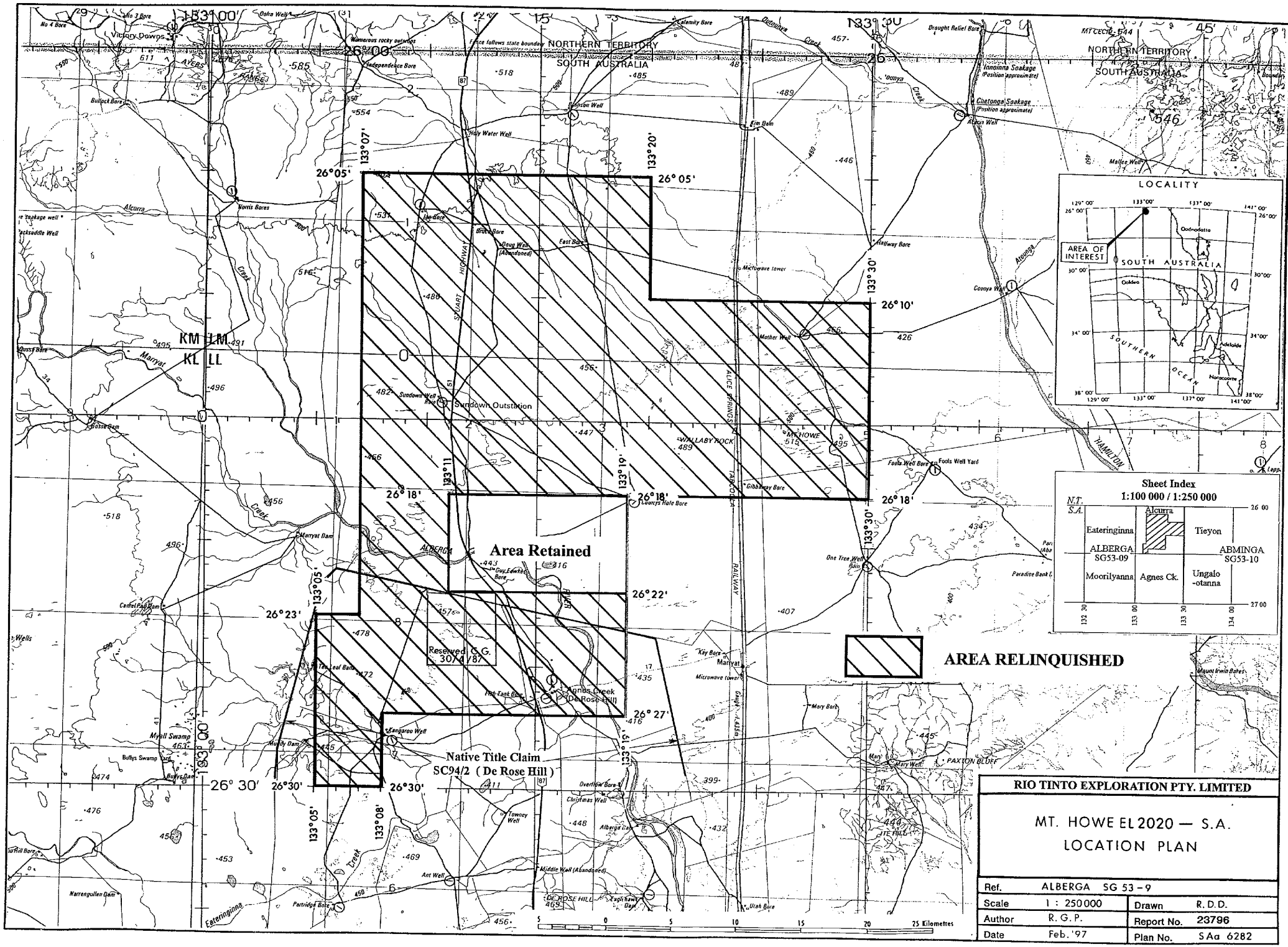
Alberga SG53-09. 1:250 000 sheet

Keywords

Airborne Electromagnetic, TEM, Magnetic,
Mt. Howe, Musgrave Block, Giles Complex

DPO Register

82206 Rock
82211 Pisolite



RIO TINTO EXPLORATION PTY. LIMITED

MT. HOWE EL 2020 — S.A.
LOCATION PLAN

Ref.	ALBERGA SG 53 – 9		
Scale	1 : 250000	Drawn	R.D.D.
Author	R. G. P.	Report No.	23796
Date	Feb. '97	Plan No.	SAa 6282

0160

Appendix 1

Field Inspection of EM Anomalies on EL2020 Mt. Howe in October 1997 by Mike Donnelly.

RIO TINTO

Memorandum

To: **Tim McConachy**
Copy: Scott Caithness
Rob Parkinson
John Terrill
From: Mike Donnelly
Date: **26 March 1998** File: EL 2020 Mt Howe (S.A.) Technical

Field Inspection of EM Anomalies on EL 2020 Mt Howe in October 1997

Introduction

Exploration Licence 2020 Mt Howe was granted on 26 September 1994 over an area of 1121 sq km. The tenement is situated approximately 10km south of the SA-NT border straddling the Stuart Highway and the Tarcoola-Alice Springs railway line. Tenement was applied for to test three positive magnetic features prominent in the 1969 BMR regional magnetic data that were possibly Giles Complex equivalents.

A magnetic/radiometric survey flown in 1994 delineated the three magnetic anomalies plus another discrete negatively polarised magnetic anomaly, named Cavanagh. Ground follow up and drilling attributed the three initial anomalies to magnetite rich granite-granodiorite. Drilling at Cavanagh intersected olivine cumulate which from petrological examination had features consistent with the sample coming from a layered ultramafic body. Three surface TEM traverses at Cavanagh did not define any bedrock conductors.

Four trial lines of Airborne Electromagnetic (AEM) traverses were flown in January 1996 over EL 2020. Three anomalies were identified and followed up with surface TEM. One displayed no feature of interest. The other two, referred to as Areas 1 and 2, displayed early time anomalies attributed to an increase in the conductivity/depth of the overburden. Drill testing of these two electromagnetic anomalies was recommended by McInnes (1996). Rock and soil samples collected at Areas 1 and 2 did not return significantly anomalous geochemical results. Weakly elevated Pb-Zn (100ppm & 150ppm respectively) in a rockchip sample from Area 1 also contains elevated levels of Fe and Mn (28.9% and 0.16% respectively).

In March 1997, partial surrender reduced the tenement to 100 sq km, retaining Areas 1 and 2.

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Work Completed in October 1997

Field inspection of the two ground EM features was made on 25-26 October 1997 by John Terrill, Charles Foster, Garry Coulthard and the author. The grids were re-established, the prospects mapped and pisolites sampled at Area 2. Sketch plans are attached.

Area 1 is crossed by several generations of the Stuart Highway and is covered by sand and minor silcrete. Two rock chip samples were collected and assayed by Amdel Adelaide (Appendix 1). The samples were dried, entire samples pulverised to nominal -75um and assayed as follows:-

- Au, Pt and Pd by 50 gram fire assay with an AAS finish
- Ag, As, Ba, Bi, Ca, Cd, Ce, Co, Cr, Cu Fe, K, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Sr, Ti, V, Y and Zn by mixed acid digest with ICP.OES finish

A grab sample of quartz-feldspar-biotite gneiss from a waterbore? drill spoil assayed 4100 ppm Ba, 460 ppm Ce, 3800 ppm P and 2700 ppm Sr. A subcrop grab sample of sandy quartz-feldspar rock assayed 3350 ppm Ba and 195 ppm Ce.

Area 2 is also covered by sand and minor silcrete. Pisolite samples were collected at 100m spacing along each of the three grid lines as shown on the sketch plan. Each sample comprised approximately 100g of hand-picked pisolites. Sampling was discontinuous along each line due to the rarity of pisolites and hence difficulty in sample collection. Note that there is a gridding error on the baseline and as such the southern line is actually 500m south of the middle line rather than the 400m it should be. Sampling comprised 18 samples on the grid, one field duplicate, two background samples (three and seven km to the west) and three orientation-type samples of different size fractions 200m north of the grid (Appendix 2).

Pisolite samples were assayed by Amdel Adelaide and results are presented in Appendix 2. The samples were dried, entire samples pulverised to nominal -75um and assayed as follows:-

- Au, Pt and Pd by 50 gram fire assay with an ICP.MS finish
- Co, Cr, Cu, Fe, Mn, Ni and Zn by mixed acid digest with ICP.OES finish
- Ag, As, Bi, Cd, Mo, Pb, Sb, Th and U by mixed acid digest with ICP.MS finish.

Elevated Cu values of 250 ppm and 260 ppm were returned from the western-most samples on the central and northern lines. Background is 60-130 ppm Cu. A spot high of 6.4 ppb Au with slightly elevated Cu (155 ppm) is located adjacent to the sample with 250 ppm Cu. Maximum values for Pt-Pd-Ni-Zn-Pb were only 2 ppb Pt, 3 ppb Pd, 48 ppm Ni, 89 ppm Zn and 49 ppm Pb.

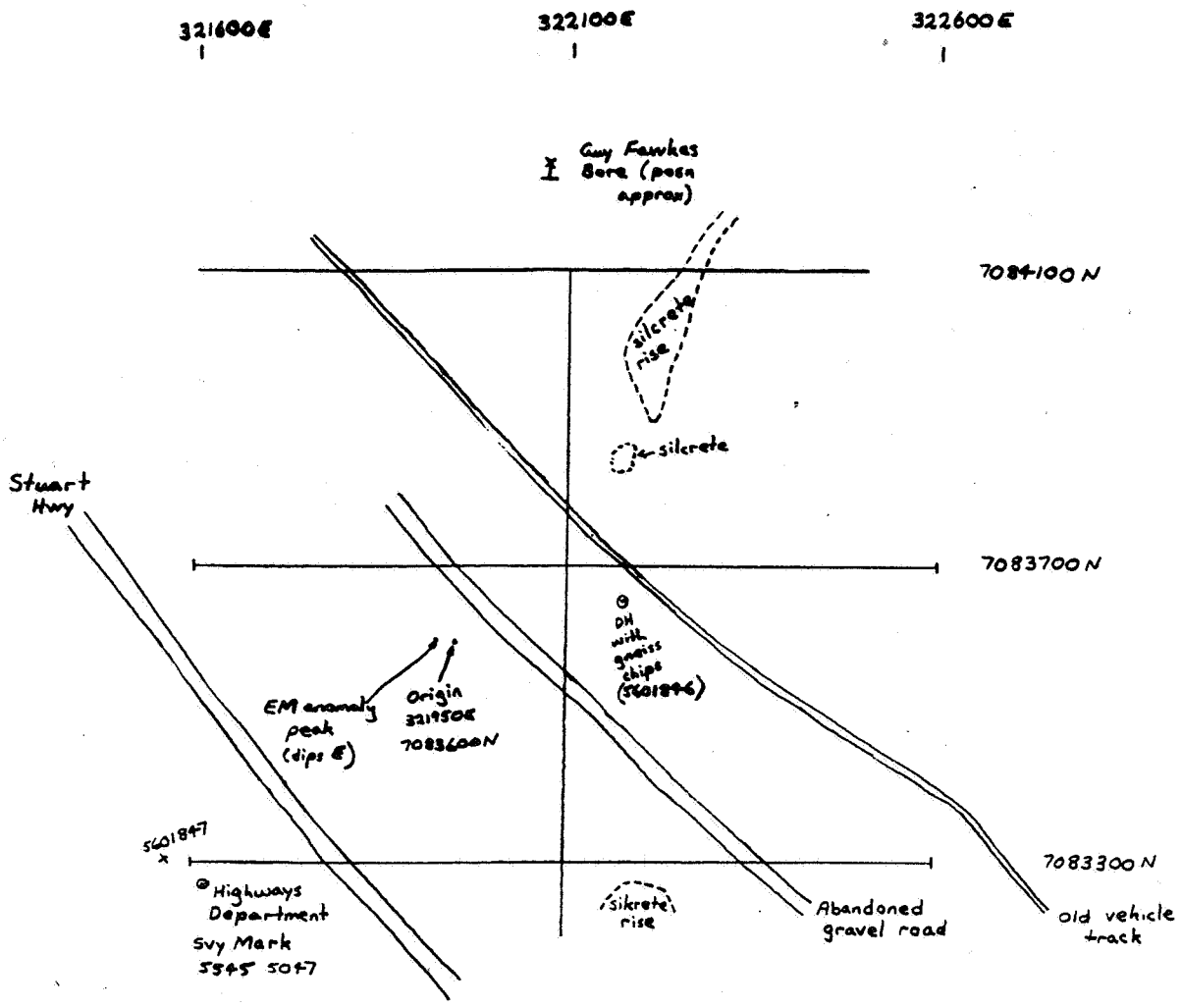
Conclusions

No cause for the electromagnetic anomalies at Areas 1 and 2 is apparent from field inspection. Further work is dependant upon Dave McInnes' recommendations from review of EM and magnetic data. If further work is recommended, it is expected that the anomalies will be drill tested. If no indications of mineralisation are intersected when drilling, it is anticipated that EL 2020 Mt Howe would be surrendered.

Regards

M. Donnelly

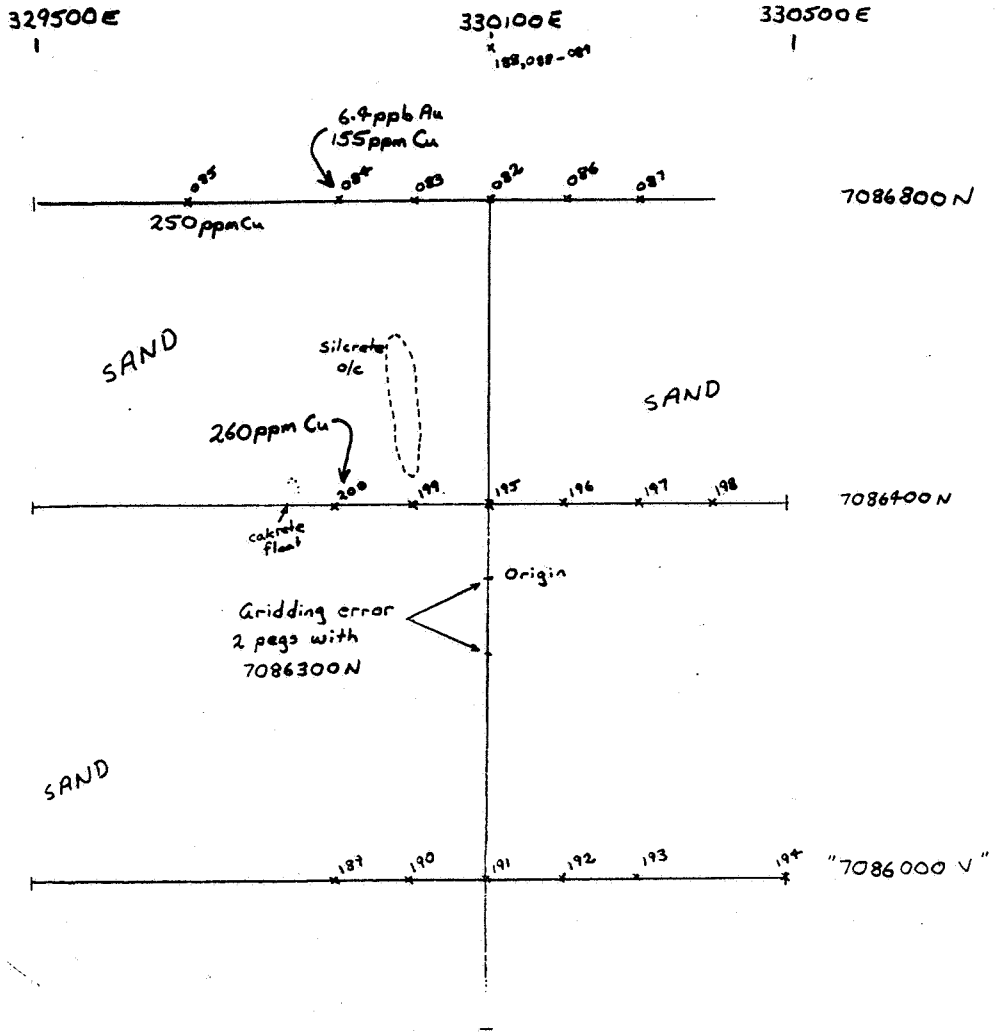
Mike Donnelly
Senior Geologist.



x 5601847 Rockch.p sample

Giles Project, S.A.
Mount Howe EL2020
Area 1 - EM Anomaly
Sketch Plan

1:10000
MJD
25/10/97



x187 Pisolite sample
Prefixed by 5602

Giles Project, S.A.
Mt Howe EL2020
Area 2 - EM Anomaly
Sketch Plan

1:10000
MJD
25/10/97

Appendix 1: Rockchip Sampling
Mt Howe EL 2020
DPO 82206

Sampno	AMG East	AMG North	Zone	Prospect	Categor	Samptype	Description	Au	Pt	Pd	Ag	Al	As	Ba	Bi	Ca	Cd	Ce	Co	Cr	Cu	Fe
5601846	322075	7083650	53	Area 1	DH	CHIPS	Drill spoil grab of qtz-feld-bt gneiss	<1	<5	<1	<1	8.01	4	4100	<5	2.27	<5	460	21	46	22	4.74
5601847	321560	7083300	53	Area 1	RK	RKGRAB	Subcrop composite grab sample of sandy qtz-feld rock; some silcrete, fracturing, MnO staining & qtz-hem	<1	<5	<1	<1	8.22	<3	3350	<5	0.455	<5	195	6	210	21	2.52
							SCHEME	FA3	FA3	FA3	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E
							DL	1	5	1	1	0.001	3	5	5	0.001	5	10	2	2	2	0.01
							UNITS	PPB	PPB	PPB	PPM	%	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	%

Sampno	K	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Sb	Sr	Ti	V	Y	Zn
5601846	3.35	1.58	650	<3	2.42	25	16	3800	90	5	2700	6750	125	28	115
5601847	1.83	0.23	360	<3	0.085	10	15	550	30	5	390	2700	52	20	47
SCHEME	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E
DL	0.001	0.001	5	3	0.001	5	2	5	5	5	2	10	2	2	2
UNITS	%	%	PPM	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM

Appendix 2: Pisolite Sampling
Mt Howe EL 2020
DPO 82211

Sampno	Comments	AMG East	AMG North	Zone	Prospect	Au	Au Dp1	Pt	Pd	Co	Cr	Cu	Fe	Mn	Ni	Zn	Ag	As	Bi	Cd	Mo	Pb	Sb	Th	U
5602082	hand-picked pisolites	330100	7086800	53	Area2-EM Anomaly	<0.2	0.4	<0.2	3	26	230	125	367000	300	38	75	0.4	19.5	0.2	0.2	2.8	36.5	0.5	13.5	0.79
5602083	hand-picked pisolites	330000	7086800	53	Area2-EM Anomaly	0.8		<0.2	2	22	330	64	294000	370	30	64	0.4	20.5	0.2	<0.1	3.1	27	1	13	0.69
5602084	hand-picked pisolites	329900	7086800	53	Area2-EM Anomaly	6.4	5.6	1	2	21	370	155	373000	300	31	68	0.4	17.5	0.2	0.2	3.8	32	0.5	12	0.76
5602085	hand-picked pisolites	329700	7086800	53	Area2-EM Anomaly	0.8		2	3	19	210	250	353000	220	44	81	0.2	15.5	<0.1	0.1	2.4	30.5	<0.5	17	1.3
5602086	hand-picked pisolites	330200	7086800	53	Area2-EM Anomaly	1.2		1	2	16	300	105	360000	280	37	70	0.4	20	0.2	0.1	3.1	37	0.5	13.5	0.78
5602087	hand-picked pisolites	330300	7086800	53	Area2-EM Anomaly	1.6		1	2	15	390	100	360000	250	41	76	0.3	13	0.2	0.1	2.4	25.5	<0.5	11	0.78
5602088	>5mm pisolites	330100	7087000	53	Area2-EM Anomaly	1	0.6	1	5	11	420	97	441000	310	34	76	0.2	11.5	<0.1	0.3	1.1	29	<0.5	9.5	0.52
5602089	largest pisolite @ 088 & 188	330100	7087000	53	Area2-EM Anomaly	0.8	1	<0.2	5	8	280	54	417000	95	32	70	0.2	4	<0.1	<0.1	0.8	14.5	<0.5	7.5	0.49
5602090	side of main track	327300	7087100	53		0.4		2	1	18	320	105	334000	390	42	86	0.4	17.5	0.2	0.2	2.9	34	<0.5	12	0.74
5602091	side of main track	323150	7086350	53		<0.2		1	1	36	200	125	414000	550	52	100	0.3	35.5	0.1	0.2	2.2	25	<0.5	11.5	0.9
5602187	Field duplicate of 5602082	330100	7086800	53	Area2-EM Anomaly	0.6	0.8	1	1	25	230	115	391000	260	42	78	0.4	18.5	0.2	0.2	2.5	35	0.5	13	0.73
5602188	<5mm pisolites	330100	7087000	53	Area2-EM Anomaly	1.4		1	3	9	390	92	438000	370	37	80	0.2	12.5	0.1	0.4	1.3	28.5	<0.5	11.5	0.53
5602189	Line "7086000N"	329900	7085900	53	Area2-EM Anomaly	0.4		1	1	23	200	125	323000	500	48	76	0.3	20	0.2	0.1	2.5	22.5	<0.5	8.5	0.64
5602190	Line "7086000N"	330000	7085900	53	Area2-EM Anomaly	1		<0.2	1	15	220	95	342000	390	40	69	0.4	18	0.3	0.2	2.6	36.5	0.5	13	0.65
5602191	Line "7086000N"	330100	7085900	53	Area2-EM Anomaly	0.6		1	1	26	240	92	348000	330	39	78	0.4	18	0.3	0.2	3.1	33.5	0.5	12	0.77
5602192	Line "7086000N"	330200	7085900	53	Area2-EM Anomaly	<0.2		<0.2	1	32	270	100	351000	310	43	89	0.5	20	0.2	0.1	3.7	39	0.5	20.5	0.9
5602193	Line "7086000N"	330300	7085900	53	Area2-EM Anomaly	1.4		<0.2	<0.2	22	300	93	347000	500	45	83	0.5	19	0.3	0.1	6	40	1	16	0.8
5602194	Line "7086000N"	330500	7085900	53	Area2-EM Anomaly	2.4		<0.2	<0.2	20	270	130	341000	450	45	81	0.4	19	0.3	0.1	5	37	0.5	13	0.91
5602195	baseline	330100	7086400	53	Area2-EM Anomaly	1		<0.2	1	24	310	74	284000	240	28	37	0.6	17	0.2	<0.1	3.8	36	0.5	15	0.87
5602196	hand-picked pisolites	330200	7086400	53	Area2-EM Anomaly	0.6	0.8	<0.2	2	26	400	77	339000	330	40	63	0.4	15	0.2	0.2	2.8	48	0.5	17	0.67
5602197	hand-picked pisolites	330300	7086400	53	Area2-EM Anomaly	1.6		1	1	19	350	73	338000	310	34	54	0.4	15.5	0.2	0.2	2.9	49	0.5	12.5	0.61
5602198	hand-picked pisolites	330400	7086400	53	Area2-EM Anomaly	0.4		<0.2	<0.2	19	350	69	331000	260	34	57	0.4	14	0.2	0.1	3.5	44	1	13.5	0.59
5602199	hand-picked pisolites	330000	7086400	53	Area2-EM Anomaly	0.4		1	<0.2	19	310	92	295000	190	29	52	0.5	15.5	0.2	<0.1	3.5	33	1	14	0.8
5602200	hand-picked pisolites	329900	7086400	53	Area2-EM Anomaly	0.6		2	2	16	260	260	389000	280	44	76	0.2	16	0.1	0.1	2.5	33	0.5	26	1.3
					SCHEME	FA3M	FA3M	FA3M	FA3M	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3M	IC3M	IC3M	IC3M	IC3M	IC3M	IC3M	IC3M	IC3M
					DL	0.2	0.2	0.2	0.2	2	2	2	100	5	2	2	0.1	0.5	0.1	0.1	0.1	0.5	0.5	0.02	0.02
					UNITS	PPB	PPB	PPB	PPB	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM