MAP NO:116B/13

Minfile #:116B-61,82,84,102,103

ASSESSMENT REPORT: X

PROSPECTUS:

CONFIDENTIAL: X

OPEN FILE: -

DOCUMENT NO:093600

MINING DISTRICT:Dawson

TYPE OF WORK: GP airborne

REPORT FILED UNDER: Blackstone Resources

DATE PERFORMED: June, 1996

LATITUDE: 64 50

LONGITUDE:139 52

DATE FILED:Feb, 1997

AREA: Ogilvie Mountains

VALUE:$ 42,025

CLAIM NAME AND #: Monster,Gila,Movie,Rob,Scary,Cookie,Truk

WORK DONE BY: Equity Engineering, Etheridge Henley Williams

WORK DONE FOR: Blackstone Resources

Claims in Good Standing	

Remarks:Logistical report and interpretation of airborne magnetics and gamma-ray radiometric survey.

Logistics Report

for a

Helicopter Magnetic and Gamma-Ray Spectrometer Survey

of the

Monster Property, Yukon Territory

carried out on behalf of

Equity Engineering Limited and Blackstone Resources Incorporated

by

High-Sense Geophysics Limited
960610 - 1

Toronto, Canada
September, 1996

This report has been examined by
the Geological Evaluation Unit
under Section [illegible] ([illegible]) Yukon Quartz
[illegible] allowed as
representation work in the amount
of $ 42 025.00.

M. B[illegible] (signature)
for Regional Manager, Exploration and
Geological Services for Commissioner
of Yukon Territory.

TABLE OF CONTENTS

1. INTRODUCTION

In June of 1996, High-Sense Geophysics Ltd. was contracted by Equity Engineering Limited to provide a helicopter borne magnetic and radiometric survey for Blackstone Resources Incorporated over the Monster property situated in northern Yukon Territory, Canada. Flight operations commenced on July 12, 1996 and were completed by July 18, 1996 after a total of seventeen (17) sorties. Approximately 1659 line kilometers of total field magnetic and radiometric data, flown along north-south traverse lines, were collected, processed and plotted.

The technical objective of the survey was to provide high resolution magnetic and radiometric maps, suited for anomaly definition, detailed structural evaluation and identification of lithologic trends. All magnetic, radiometric, positioning, and altimeter data were recorded in a digital format. Fully corrected magnetic and radiometric maps were prepared by High-Sense's Toronto office after completion of survey activities.

The remainder of this report discusses survey location, logistics, equipment, personnel and parameters, plus flight operations and data processing/presentation, in more detail under the appropriate headings.

2. LOCATION

The survey area, identified as the Monster Property, was situated in Yukon Territory, approximately 80 kilometres due north of Dawson City. Terrain was predominantly mountainous and rugged. The area was flown in three separate stages : an initial reconnaissance survey grid (1000m line spacing), an inset detail survey grid (250m line spacing) and an additional coarse spaced grid (1000m line spacing) attached to the south central border of the original reconnaissance grid. Additional details are provided below, using UTM coordinates for a central meridian of 141°W - Zone 7 (see also accompanying map):

Reconnaissance Grid (REG) - approx. 80km north of Dawson City, Yukon Ter.

Corner No.	Easting (m)	Northing (m)
1	545000	7182000
2	545000	7194000
3	594000	7206000
4	594000	7182000
5	583000	7175000
6	572000	7175000
7	572000	7182000

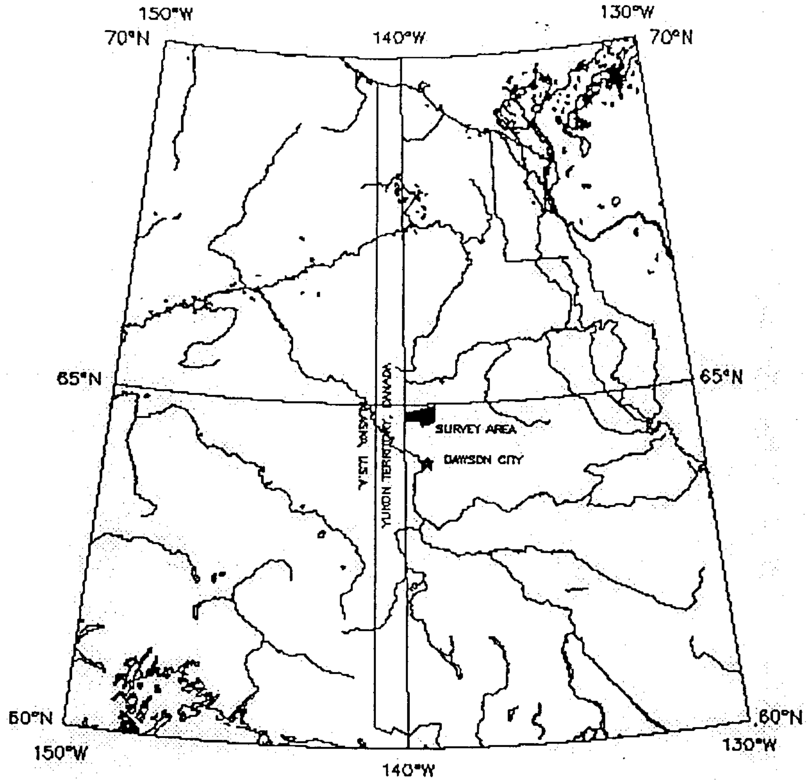
Detail Grid (DET) -

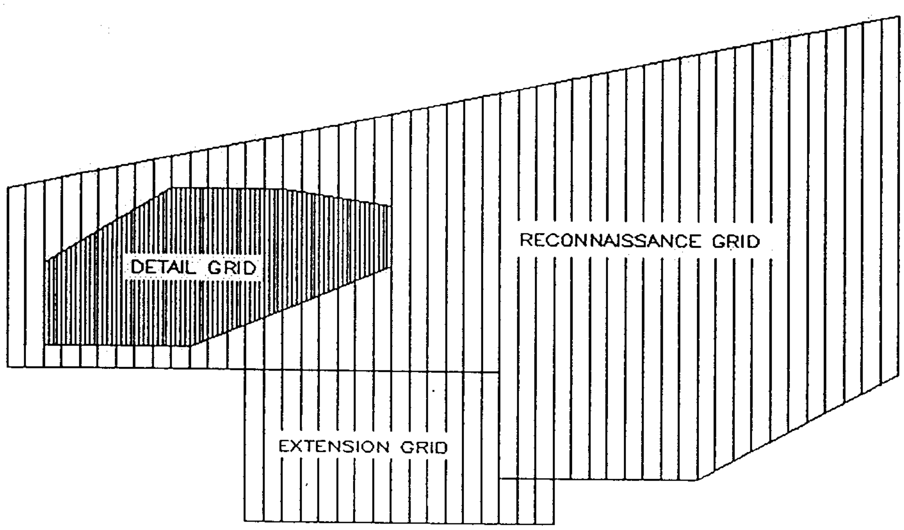
Corner No.	Easting (m)	Northing (m)
1	547000	7183500
2	547000	7189000
3	554000	7194000
4	560000	7194000
5	566000	7193000
6	566000	7189000
7	555000	7183500

Extension Grid (XTRA) -

Corner No.	Easting (m)	Northing (m)
1	558000	7172000
2	558000	7182000
3	572000	7182000
4	572000	7175000
5	575000	7175000
6	575000	7172000

Location Map: Monster Survey Blocks - Yukon Territory





3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

The aircraft used was a Bell 206B Jet Ranger helicopter (C-GTNY), owned and operated by Trans North Helicopters, Whitehorse, Yukon Territory. Installed equipment is detailed below.

3.2 Airborne Geophysical System

3.2.1 Magnetometer

A Scintrex H8 Optically Pumped Cesium Split Beam Sensor was mounted in a towed 'bird'. The Larmor frequency output was processed by a High-Sense magnetometer counter board that provides a resolution, without filtering, of 10 ppb ten times per second (in a magnetic field of 50,000 nT this resolution is equivalent to 0.005 nT).

3.2.2 Radiometric Equipment

An High-Sense Geophysics Limited KS-16 digital differential gamma spectrometer coupled to a 1024 in^3 NaI (Tl) crystal detector package was carried in the rear cargo area of the helicopter. Detector crystals were housed in a special heat stabilized container. The four primary channels of total count, potassium (K) uranium (U) and thorium (Th) were recorded once per second, together with the corresponding 256 channel radiometric spectrum.

3.2.3 GPS Navigation

A Novatel 751 ten channel GPS receiver, which is an integral component of the HS-GFCS-II flight control system, provided precise positioning information. The GPS antenna was mounted on the top tail-fin of the towed bird, ensuring accurate reported positioning of the magnetic sensor at all times.

3.2.4 Altimeter

A Terra Model TRA 3500 radar altimeter was used. The 'low-profile' transmitting and receiving antennae were mounted on the underside of the towed bird's lateral tail fins. This instrument operates over a range of 0 to 765m (2500') with a precision of 0.3m (1').

3.2.5 Geophysical Flight Control System

The High-Sense GFCS-II geophysical flight control system monitored and recorded magnetometer, spectrometer, altimeter and GPS equipment. Input from the various sensors were monitored and time stamped every 0.005 seconds for precise coordination of geophysical and position measurements.

GPS position coordinates and terrain clearance were presented to the pilot by means of LCD touch screen display. The magnetometer response, 4th difference, spectrometer response (4 channel profiles, 256 channel spectrum) and altimeter profile were also shown on the LCD touch screen display for real time monitoring of equipment performance.

3.2.6 Digital Recording

The output of the magnetometer, spectrometer and altimeter as well as uncorrected GPS coordinates were recorded digitally on disk at a sample rate of ten times per second by the HS-GFCS-II system. Line number, GPS time and system time were also recorded for use during subsequent differential GPS correction.

3.3 Ground Monitoring System

3.3.1 Magnetometer

A GEM Systems Overhauser magnetometer (GSM19W) was operated as a base station to record diurnal variations of the earth's magnetic field. Readings with a resolution of 0.1 nT were recorded digitally every second, and synchronized with GPS time ('time stamped') for accurate correction of the airborne data.

3.3.2 GPS Monitor

A Novatel 751 ten channel receiver with a fixed antenna was also active at the base of operations. Raw satellite data was digitally recorded to enable differential correction of the corresponding airborne data.

3.3.3 Recording

The output of the magnetic and GPS monitors was recorded digitally on a dedicated 486 'LunchBox' computer. A visual record of the last forty minutes of activity is graphically maintained on the computer screen to provide an up to date appraisal of significant activity. At the conclusion of each production flight raw GPS and magnetic data were transferred to the main compilation computer.

3.4 Field Compilation System

A 586 ('Pentium') PC computer and a Hewlett Packard colour printer/plotter were used for field data processing and presentation. Processing software and procedures were developed by High-Sense Geophysics Limited, and include the Geopak RTICAD imaging system. Profile plots, contours and colour/shadow images were generated on-site as required.

All digital data was verified at the project site to confirm that data recording took place within survey specifications. All digital data was duplicated on-site to help prevent loss.

4. PERSONNEL

4.1 Field Operations

Equity Engineering representative	: David Caulfied
High-Sense geophysicist	: Allen Duffy
Pilot, Trans North Heli.	: Andrew Page

4.2 Project Management

Equity Engineering Ltd.	: Dave Caulfied, Henry Awmack
High-Sense, Toronto office	: Zybnek Dvorak

5. SURVEY PARAMETERS

Traverse Line spacing	: 250 and 1000 meters *(see Appendix A)*
Control Line spacing	: **not flown** *(see Appendix A)*
Nominal Terrain clearance : bird	: 50 metres (150 feet)
Nominal Terrain clearance : heli.	: 70 metres (210 feet)
Navigation	: Global Positioning System
Traverse Line direction	: north-south
Measurement interval	: 0.1 second magnetics 1.0 second radiometrics
Airspeed (nominal)	: 80 km/hr
Measurement spacing (nominal)	: 2.5 meters
Airborne Digital Record	: Radar Altimeter Total Field Magnetics Gamma Ray Spectrometry Time (Local and GPS) Raw Global Positioning System (GPS) data
Base Station Record	: Ambient Total Field Magnetics Raw Global Positioning System (GPS) data Time (Local and GPS)

6. OPERATIONS AND PROCEDURES

6.1 Flight Planning

Outline of the survey blocks was specified by Equity Engineering Limited (section 2.0), and the coordinates used to generate pre-calculated navigation files. These, in turn, were used by the airborne data acquisition system to plan flights at the designated line spacing and orientation.

Total combined flying for all blocks was 1659 km. Areal coverage and data collection are both considered to be of good quality and within standard survey specifications. Line kilometers for individual blocks are summarized in Appendix A.

6.2 Base Station

A geophysical base station was established at the Trans North field hangar located at Dawson City. GPS and magnetic diurnal records were recorded covering all airborne production data, and time synchronised with the remote data based on GPS time.

The base station GPS antenna should be located at an accurately surveyed position point, since position errors are carried through to the differentially corrected data. Because no control point was available, the location of the

GPS antenna was determined by recording several hours of GPS data and averaging the resulting antenna coordinates (the assumption being that deliberate errors introduced by military 'selective availability' satellite signal distortion will average to zero over an extended period of time). The position fixes determined for the base station site were:

Dawson City (set up : July 12, 1996)

64° 03' 01.5354" N	**319.54 m asl**
139° 25' 53.7655" W	**(WGS 84 spheroid)**

6.3 Data Compilation

Data recorded by the airborne and base station systems was transferred to the field compilation system. As each flight was completed, the following compilation operations were carried out.

6.3.1 Flight Path Correction

GPS data was differentially corrected to remove errors introduced by 'selective availability', an intentional accuracy degradation method used by the military. The correction process uses the known fixed location of the base station to calculate the error associated with each satellite. These errors are then removed from the survey GPS data enabling a position to be calculated with an accuracy in the order of three meters, with four or more satellites in view. Satellite visibility and coverage was generally good throughout field operations, however the mountainous terrain typical in the survey area occasionally interfered with reception. Both GPS receivers were generally tracking a minimum of six satellites.

The navigational correction process yields a flight path expressed in WGS 84 Latitude-Longitude coordinates. Transformation to local Clarke 1866 (NAD 27) UTM coordinates used the following projection parameters :

	Semi-major axis (a)	Semi-minor axis(b)
WGS 84	6378216.4	6356752.3142
Clarke 1866	6378206.4	6356583.8000

Local datum shift applied :

Delta X	:	7
Delta Y	:	-139
Delta Z	:	-181

UTM central meridian = 141° W (Zone 7)

False Easting	:	500,000
False Northing	:	0

6.3.2 Magnetic Corrections

Diurnal variations recorded by the base station were subtracted directly from the aeromagnetic measurements to provide a first order diurnal correction. When the magnetic variations are noted to occur due to man-made causes, such as equipment passing by the sensor, they are edited out prior to applying the diurnal correction

Optically pumped magnetic sensors have an inherent heading error, typically several nanoTeslas peak-to-peak, as the sensor is rotated through 360 degrees. On reciprocal flight line directions the heading error is reasonably predictable; corresponding correction was made on the basis of aircraft heading.

6.3.3 Radiometric Corrections

Radiometric data, recorded in the raw state as a 256 channel spectrum, are separated into five energy windows representing contributions from total count, potassium, uranium, thorium and cosmic sources (see Appendix B for details). To determine fully corrected radiometric results, the data is subjected to additional reduction steps.

Airborne background components, caused by airborne radon daughter products, aircraft airframe, etc., were removed using data from 2500 foot background measurement lines. *Compton Stripping* corrections remove cross-channel effects due to the radiometric phenomena of Compton Scatter. *Altitude attenuation* corrections are required to compensate for variations in terrain clearances. Finally, a *sample interaction (or Savitsky-Golay') filter* is applied to reduce sample overlap. Final corrected data was presented in corrected counts-per-second.

6.3.4 Map Products and Digital Data

Following processing of all survey data in the Toronto office, two(2) copies of the final map products (see below), plus digital data (CD-ROM), extraction software and this logistics report were delivered to Equity Engineering Limited, Vancouver, Canada.

1. Colour image of total field magnetics with contours, flight path and Lat-Long/UTM reference grid,

2. Colour image of total count radiometrics with contours, flight path and Lat-Long/UTM reference grid,

3. Colour image of potassium with contours, flight path and Lat-Long/UTM reference grid,

4. Colour image of uranium with contours, flight path and Lat-Long/UTM reference grid,

5. Colour image of thorium with contours, flight path and Lat-Long/UTM reference grid, and,

6. Colour ternary image combining potassium, uranium and thorium (scaled by Total Count) with flight path and Lat-Long/UTM reference grid.

Respectfully submitted,

Allen Duffy, BSc.
High-Sense Geophysics Limited
September 9, 1996

APPENDIX A: MONSTER PROPERTY SURVEY BLOCK SUMMARY

EQUITY ENGINEERING LIMITED
BLACKSTONE RESOURCES INCORPORATED

MONSTER PROPERTY
YUKON TERRITORY, CANADA

Survey Block	*Abbrev. Name*	*Operations Base*	*Flights*	*Traverse Lines*			*Control Lines*		*Total Kms*
				Line Range	*Orient.*	*Spacing*	*Orient.*	*Spacing*	
Reconnaisance	REG	Dawson City	1,3,4,5,6,10, 12,13,14,15	1000 - 1490	N-S	1000m	not flown *		1047.073
Detail	DET	Dawson City	7,8,9,11,15	20 - 760	N-S	250m	not flown *		452.281
Extension	XTRA	Dawson City	15,16	2000 - 2170	N-S	1000m	not flown *		159.673
							Total kilometres		1659.027

* Due to the extremely rugged, mountainous terrain typical of the survey area, control lines were not flown. It was felt that control-traverse intersections would be of marginal use in levelling the magnetic data because of the near impossibility of achieving similar terrain clearances in the two line directions.

Summary of Operations
Magnetic and Radiometric
Surveys

APPENDIX B: Radiometric Data Reduction

RADIOMETRIC DATA REDUCTION

Radiometric data, recorded in its raw state as a 256 channel spectrum, are initially integrated into five elemental energy windows as defined below :

Window	Energy Range	Channel Range
Total Count	410 - 2810 keV	35 - 240
Potassium	1370 - 1570 keV	117 - 134
Uranium	1660 - 1860 keV	142 - 159
Thorium	2410 - 2810 keV	206 - 240
Cosmic	3000 - ∞ keV	256

The data is subsequently subjected to the following data reduction steps to yield fully corrected radiometric data in the Total Count, Potassium, Uranium and Thorium energy windows.

(1) Radiometric Background correction

A background component, caused by airborne Radon daughter products, down-scattered Cosmic sourced radiation and contamination associated with the aircraft frame and equipment, remains in each of the radioelement windows. While Cosmic and Aircraft background components remain reasonably constant, the airborne component is expected to vary temporally and geographically since the distribution of airborne sources depends on a number of factors such as atmospheric conditions, local ground conditions, etc. The traditional method of monitoring Radon related background conditions is to periodically acquire data over a reasonably large body of water, where ground sources of radiation are effectively screened. In areas where suitable bodies of water do not exist, high altitude (2500 ft clearance) background test lines are substituted under the assumption that ground based levels of radiation will have attenuated to negligible levels and, given a well-mixed atmosphere, that the Radon distribution is constant to the 2500' level.

Control points are formed by calculating the average countrates and time of acquisition in each of the radioelement channels from data recorded during the high altitude backgroung monitor lines. Background values for each data point are subsequently calculated by linearly interpolating, on the basis of time, between each control point and applying this value as a subtractive correction, i.e.

$$N^2_n = N^1_n - BKG_n$$

where :

N^2_n : atmospheric background corrected countrate for channel ‘n’ (‘n’ is any of TC, K, U or Th)

N^1_n : Raw, uncorrected countrate for channel ‘n’

BKG_n: time interpolated background value for channel ‘n’

(3) **Compton Scatter correction**

A gamma ray photon of a particular energy may collide with an electron, impart some of its energy to that electron, and be scattered as a lower energy photon. This phenomena - known as Compton Scattering - will cause some incident photons to be wrongly classified as lower energy events. The practical result of this phenomena is that, for example, a fraction of incoming Thorium radiation will appear in the Uranium and Potassium energy windows, and a fraction of incoming Uranium radiation will appear in the Potassium window. A very small amount of Uranium radiation may also be ‘back-scattered’ to the Thorium window. Effectively a channel interaction, this is corrected for by the application of Compton Stripping ratios. Corrected Potassium, Uranium and Thorium countrates are calculated by application of the following relations :

$$N^3_{Th} = (N^2_{Th} - a*N^2_U) / (1 - a*\alpha)$$
$$N^3_U = (N^2_U - \alpha*N^2_{Th}) / (1 - a*\alpha)$$
$$N^3_K = (N^2_K - \beta*N^3_{Th} - \gamma*N^3_U)$$
$$N^3_{TC} = N^2_{TC}$$

where :

N^3_n : Compton corrected countrate for channel ‘n’ (‘n’ is TC, K, U or Th - as indicated)
N^2_n : background corrected countrate for channel ‘n’ (‘n’ is TC, K, U or Th - as indicated)

α : Th → U stripping ratio
β : Th → K stripping ratio
γ : U → K stripping ratio
a : U → Th stripping ratio (“back-scatter”)

Values for each of the four Compton stripping ratios can be determined by formal calibration on standardized radiometric calibration pads. Typical values were used in the data reduction.

(4) **Altitude Attenuation correction**

Within the terrain clearances normally encountered in airborne radiometric surveys, ground originating radiation is assumed to attenuate exponentially with distance from source, i.e.

$$N_h = N_0 e^{-\mu h}$$

where :

N_h : countrate at **height = h**
N_0 : countrate at **height = 0**
μ : altitude attenuation coefficient

The attenuation coefficients, which are specific to each of the four radioelement windows, are evaluated using data from a special calibration exercise - **see Addendum B/1 : 'Altitude Attenuation Coefficients'.**

Variation due to terrain clearance is removed from the data by applying the simple relationship noted above in the following manner :

$$N^4_n = N^3_n * e^{-\mu_n(h_s - h)}$$

where :

N^4_n : height corrected countrate for channel 'n' ('n' is any of TC, K, U or Th)
N^3_n : Compton corrected countrate for channel 'n'

μ_n : altitude attenuation coefficient for channel 'n'
h_s : nominal survey terrain clearance
h : actual terrain clearance

Note that when interpreting height corrected data, care should be taken where terrain clearances significantly exceed the nominal (or programmed) survey clearance since countrates tend to be artificially boosted due to the exponential nature of the correction algorithm.

(5) **Sample Interaction filter**

As recommended by the Geologic Survey of Canada, final corrected data is filtered by an optimized filter, sometimes referred to as a 'Savitsky - Golay' filter, designed to reduce sample overlap effects. This is a five point convolution filter with following (normalized) coefficients :

-0.0857 0.3429 0.4857 0.3429 -0.0857

SUMMARY OF RADIOMETRIC PROCESSING COEFFICIENTS AND FACTORS (USED IN PROCESSING OF RADIOMETRIC DATA FOR EQUITY/'MONSTER' PROJECT)

Compton Stripping factors

α =	0.257
β =	0.407
γ =	0.773
a =	0.060

Altitude attenuation coefficients :

μ_{TC} =	0.002078	ft^{-1}
μ_{K} =	0.002537	ft^{-1}
μ_{U} =	0.001606	ft^{-1}
μ_{Th} =	0.001931	ft^{-1}

Nominal survey terrain clearance = 200 ft. (=70 m)

ADDENDUM B/1 : Altitude Attenuation Coefficients

ALTITUDE ATTENUATION COEFFICIENTS HELICOPTER RADIOMETRICS

1. Introduction

In the range of altitudes normally encountered in airborne radiometric operations, the decay with height of counts originating from the ground is assumed to follow a simple exponential drop-off, i.e.

$$N = N_0 e^{-\mu h}$$

where :

N	: countrate at some height, **h**
N_0	: countrate at **h = 0**
μ	: altitude attenuation coefficient

The attenuation coefficients, which are specific to each of the four standard energy windows (Total Count, Potassium, Uranium and Thorium), are used in the height correction procedure in the process of radiometric data reduction.

Values for each of the four attenuation coefficients (μ_{TC}, μ_K, μ_U, μ_{Th}) may be determined experimentally by performing the calibration procedure described below.

2. Procedure

The calibration exercise is best performed adjacent to a reasonably large body of water - ensuring the measurement of high quality atmospheric radiometric background data. Frequently, however, a suitable body of water is not available. In such cases background levels of radiation may be determined by acquiring data at high altitude (2500 ft) where radiation due to ground sources has attenuated to negligible levels. Note: this method requires a well mixed atmosphere up to the background monitoring altitude, and should not be attempted under conditions of thermal inversion).

A test location is established, ideally offering a moderate and fairly uniform radiometric response in each channel. The aircraft then commences a vertical ascent to a maximum of 700 feet mean terrain clearance, pausing to acquire data for approximately two minutes at a series clearance ‘steps’ (100 foot altitude intervals is sufficient).

The data acquisition phase is completed by measuring local atmospheric background, either over-water or by climbing to altitude. Averaged data is subsequently used to determine numeric values for the attenuation coefficients.

Altitude attenuation calibration was performed at the Trans North field hangar, located at Dawson City, on 18 July, 1996 (Flight #17). Local atmospheric background conditions were monitored at 2500 feet. The following series of measurements were acquired :

Line 100	: 16 ft approx. clearance (radar indicated)
Line 150	: 70 ft approx. clearance (radar indicated)
Line 200	: 130 ft approx. clearance (radar indicated)
Line 300	: 235 ft approx. clearance (radar indicated)
Line 400	: 360 ft approx. clearance (radar indicated)
Line 500	: 460 ft approx. clearance (radar indicated)
Line 600	: 610 ft approx. clearance (radar indicated)
Line 700	: 700 ft approx. clearance (radar indicated)
Line 10000	: 2500 ft clearance (background)

3. Analysis

Since height corrections to radiometric data are applied after Compton correction, data must first be corrected for ambient background and Compton stripping before being used to calculate attenuation coefficients. Thus, data is pre-processed by applying the measured background countrates followed by application of the stripping factors.

Individual test lines form a set of coincident data measured at the indicated series of terrain clearances. To calculate the attenuation coefficients, averaged countrates and heights for each of the individual lines are determined, followed by regression analysis (first order 'Least Squares Fit') to calculate the gradient and intercept factors of the **ln(radiometric channel) & altitude** dependency, i.e. the data is assumed to be constrained by the following relation :

$$\ln(N_h) = \mu * h + \ln(N_0)$$

where, for each individual channel (TC,K,U,Th) :

$\ln(N_h)$:	log of averaged countrate for the channel at height **h**
μ :	slope or gradient, the altitude attenuation factor for the channel
h :	averaged altitude
$\ln(N_0)$:	intercept factor, the log of the predicted countrate for the channel at **h = 0**

4. Results

Line	Avg. Ht. (ft)	ln(avgTC)	ln(avgK)	ln(avgU)	ln(avgTh)
100	16.07	5.84	3.64	1.05	1.87
150	69.77	5.69	3.38	0.91	1.81
200	130.66	5.56	3.18	0.81	1.65
300	234.47	5.36	2.94	0.67	1.37
400	361.31	5.06	2.66	0.27	1.02
500	462.32	4.89	2.35	0.40	0.84
600	608.93	4.65	2.04	0.24	0.81
700	696.50	4.36	1.86	-0.23	0.58

	Calculated Gradient	Calculated Intercept
Total Count	-0.002078	5.8452
Potassium	-0.002537	3.5741
Uranium	-0.001606	1.0337
Thorium	-0.001931	1.8670

Altitude attenuation factors used in radiometric correction process were therefore :

μ_{TC} = **0.002078** ft^{-1}
μ_K = **0.002537** ft^{-1}
μ_U = **0.001606** ft^{-1}
μ_{Th} = **0.001931** ft^{-1}

A graphical presentation of the data, displaying measured data as well as 'fitted data', appears in the following section.

CORRECTED DATA

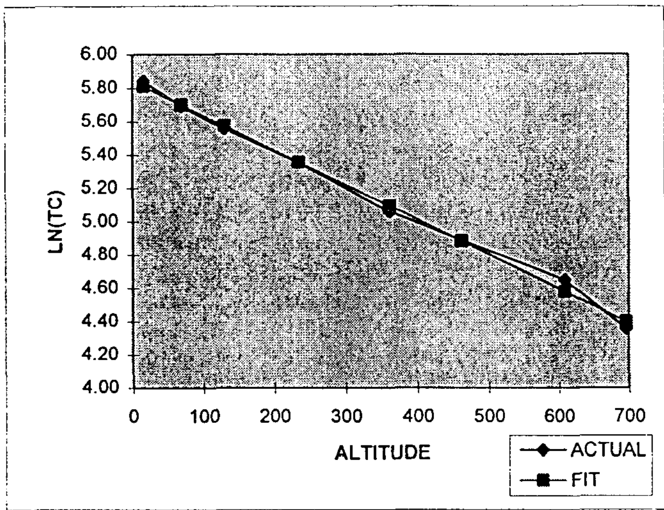
LINE	RADAR	TC	K	U	TH
100	16.0718	345.0556	38.1453	2.8456	6.4748
150	69.7679	296.2443	29.4611	2.4872	6.1324
200	130.6551	258.6883	24.0861	2.2517	5.1939
300	234.4687	211.692	18.9062	1.9585	3.9299
400	361.3093	157.4474	14.2763	1.316	2.7848
500	462.3171	132.9024	10.4531	1.4853	2.3082
600	608.9333	104.4212	7.6705	1.2745	2.2567
700	696.4958	78.0244	6.423	0.7972	1.789

LINE	RADAR	ln(TC)	ln(K)	ln(U)	ln(TH)
100	16.07	5.84	3.64	1.05	1.87
150	69.77	5.69	3.38	0.91	1.81
200	130.66	5.56	3.18	0.81	1.65
300	234.47	5.36	2.94	0.67	1.37
400	361.31	5.06	2.66	0.27	1.02
500	462.32	4.89	2.35	0.40	0.84
600	608.93	4.65	2.04	0.24	0.81
700	696.50	4.36	1.86	-0.23	0.58

	SLOPE	INTRCPT
TOTAL COUNT ATTENUATION COEFFICIENTS :	-0.002078	5.8452
POTASSIUM ATTENUATION COEFFICIENTS :	-0.002537	3.5741
URANIUM ATTENUATION COEFFICIENTS :	-0.001606	1.0337
THORIUM ATTENUATION COEFFICIENTS :	-0.001931	1.8670

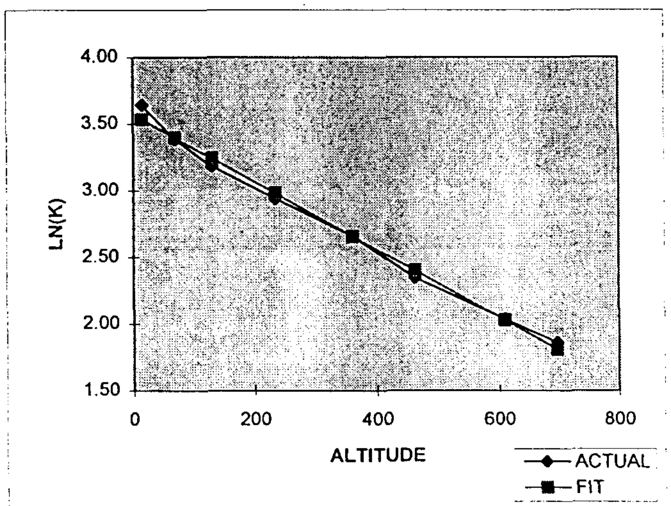
TOTAL COUNT : ANALYSIS

RADAR	ACTUAL	FIT
16.0718	5.8437	5.8118
69.7679	5.6912	5.7002
130.6551	5.5556	5.5737
234.4687	5.3551	5.3579
361.3093	5.0591	5.0943
462.3171	4.8896	4.8844
608.9333	4.6484	4.5797
696.4958	4.3570	4.3978



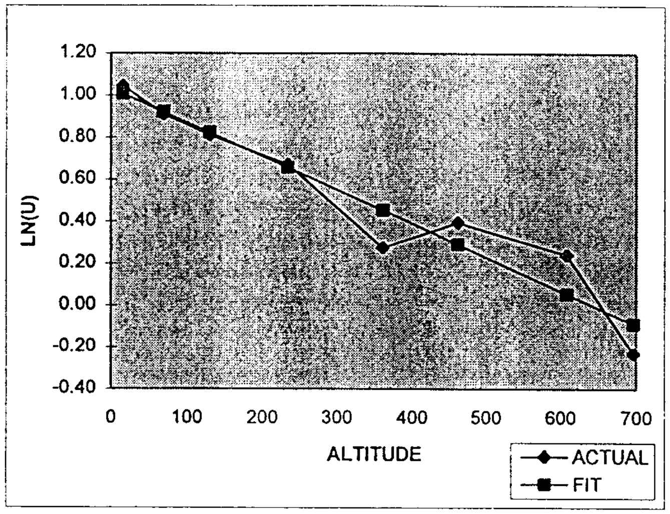
POTASSIUM : ANALYSIS

RADAR	ACTUAL	FIT
16.0718	3.641403	3.5334
69.7679	3.383071	3.3971
130.6551	3.181635	3.2427
234.4687	2.93949	2.9794
361.3093	2.658601	2.6576
462.3171	2.346899	2.4014
608.9333	2.037382	2.0295
696.4958	1.859885	1.8074



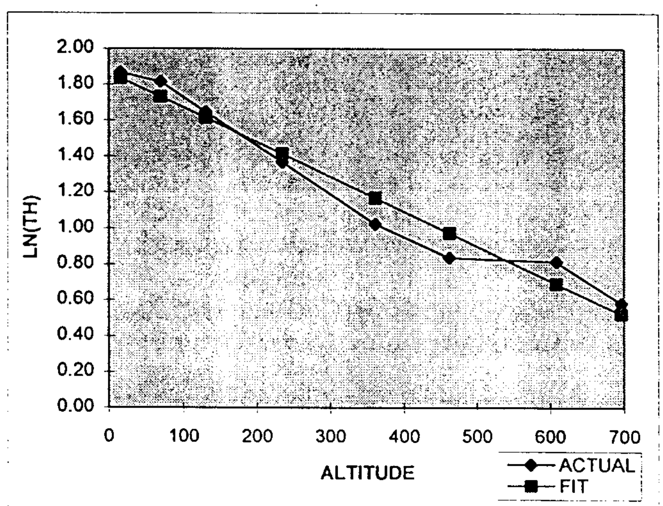
URANIUM : ANALYSIS

RADAR	ACTUAL	FIT
16.0718	1.045774	1.0079
69.7679	0.911158	0.9216
130.6551	0.811685	0.8239
234.4687	0.672179	0.6572
361.3093	0.274597	0.4536
462.3171	0.395617	0.2914
608.9333	0.242554	0.0560
696.4958	-0.22665	-0.0846



THORIUM : ANALYSIS

RADAR	ACTUAL	FIT
16.0718	1.867918	1.8360
69.7679	1.813586	1.7323
130.6551	1.647485	1.6147
234.4687	1.368614	1.4142
361.3093	1.024176	1.1693
462.3171	0.836468	0.9742
608.9333	0.813904	0.6911
696.4958	0.581657	0.5220



APPENDIX C : Digital Data Archives

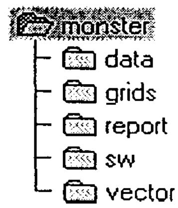
DIGITAL DATA ARCHIVES

1. Summary

The raw and processed digital data, together with the final data grids, are delivered on CD-ROM (three copies). The digital data is archived in GEOPAK Binary Database Format (.BDB); the gridded data is also archived in GEOPAK grid format (.GRD). Software and documentation are supplied on the CD-ROM to extract any combination of data channels from the binary databases into an ASCII 'flat file' format (program **DBEX**) - allowing the creation of custom data file formats as per the user's needs.

2. CD-ROM Directory Structure and Contents

Delivery data is stored on the CD-ROM under the following directory structure :



The following sections detail the contents of each sub-directory.

2.1 \MONSTER\DATA

Digital profile data is stored in GEOPAK binary database (.BDB) format. Two files exist in this directory : MAG.BDB (contains magnetic and related data for the entire MONSTER project - 10 Hz sample frequency) and SPEC.BDB (contains radiometric and related data for the entire MONSTER project - 1 Hz sample frequency). GEOPAK databases are structured as a series of direct access multi-channel records accessed by the original survey line number. Descriptions of record contents for both MAG and SPEC databases may be found immediately following this section.

The survey line numbering scheme for the MONSTER survey is as follows :

Line numbers 1000 to 1490 : reconnaissance survey (1000m)
Line numbers 20 to 760 : detail survey (250m)
Line numbers 2000 to 2170 : extension survey (1000m)

Data extraction software (DBEX.EXE) is resident in the \MONSTER\SW sub-directory - see section 2.4. User documentation is appended to this section, following the database record descriptions.

2.2 \MONSTER\GRIDS

The final processed data grids are stored in this sub-directory and consist of the following :

MAG.GRD	: final total field Magnetics (nT)
PTC.GRD	: final corrected Total Count (cps)
PK.GRD	: final corrected Potassium (cps)
PU.GRD	: final corrected Uranium (cps)
PTH.GRD	: final corrected Thorium (cps)
TNY.CPC	: radiometric 'ternary' grid (**note : this is a GEOPAK packed colour index grid**)

These grids are stored in **GEOPAK** grid format.

2.3 \MONSTER\REPORT

This sub-directory contains the various components of the final logistics report. Files are in either **Microsoft Word (.DOC)** or **Microsoft Excel (.XLS)** format, as listed below :

EQUITY.DOC	: text for main body of logistics report
SUMMARY.XLS	: survey block summary (Appendix 'A')
RADPROC.DOC	: text for radiometric processing description and summary (Appendix 'B')
ALTCOF.DOC	: text for radiometric altitude attenuation coefficient determinations (Addendum 'B/1')
ALTCOF.XLS	: accompanying spread sheet to altitude attenuation section (Addendum 'B/1')
ARCHIVE.DOC	: text for data archive and CD-ROM description (Appendix 'C')
DBX_MAG.XLS	: Magnetic database record description
DBX_SPEC.XLS	: Radiometric database record description
DBEX.DOC	: text for DBEX (Database Extraction Utility) User's manual

2.4 \MONSTER\SW

This sub-directory contains a copy of the database data extraction software **(DBEX.EXE).** Use this software to extract any or all of the geophysical data channels from the magnetic and radiometric databases and write to an output ASCII file. Additional file copies of the user documentation (DBEX.DOC - Microsoft Word format) and magnetic and radiometric database record descriptions (DBX_MAG.XLS, DBX_SPEC.XLS - Microsoft Excel format) are also included here.

2.5 \MONSTER\VECTOR

This directory contains the various graphics files used in the final map presentations. Primarily included for the convenience of those with access to GEOPAK software, these files are all in GEOPAK vector (.VEC) format and may be directly used by **GEOPAK RTICAD :**

BEQU.VEC	: map surround with UTM and LAT/LONG reference grids
FP.VEC	: flight path
CMAG.VEC	: magnetic contours
CPTC.VEC	: total count radiometric contours
CPK.VEC	: potassium radiometric contours
CPU.VEC	: uranium radiometric contours
CPTH.VEC	: thorium radiometric contours
TTL_MAG.VEC	: title block - magnetics
TTL_TC.VEC	: title block - total count
TTL_K.VEC	: title block - potassium
TTL_U.VEC	: title block - uranium
TTL_TH.VEC	: title block - thorium
TTL_TNY.VEC	: title block - ternary presentation

3.0 ATTACHMENTS

The following documents are attached to this appendix :

(1) Magnetic .BDB database structure summary (information to be used in conjunction with program DBEX, the data base extraction utility)

(2) Radiometric .BDB database structure summary (information to be used in conjunction with program DBEX)

(3) DBEX user documentation.

High-Sense Geophysics Limited

Archive Record MAG

Client name:	EQUITY ENGINEERING LIMITED		
Survey location:	MONSTER		
Date flown:	JUL, 1996		
Date processed:	AUG, 1996		
Name of BDB:	\MONSTER\DATA\MAG.BDB	*Number of channels:*	16

Final Geopak grid names, plus corresponding channel number (list all included on this media)	\MONSTER\GRIDS\MAG.GRD	(channel 9)

Channel #	Channel name	Description	Fortran format for DBEX (eg F12.2)
1	X	UTM EASTING	F12.1
2	Y	UTM NORTHING	F12.1
3	FID	COUNTER (1/10 SEC)	F8.0
4	TIME	GPS WEEK SECOND	F10.1
5	RAD ALT	RADAR ALTIMETER (feet)	F8.1
6	GPS HGHT	GPS ELEVATION (metres)	F8.1
7	RAW MAG	RAW MAGNETICS (nT)	F8.1
8	DIURNAL	DIURNAL MONITOR (nT)	F8.1
9	FNL MAG	FINAL MAGNETICS (nT)	F8.1
10	GPS LAT	RAW GPS LAT. (degrees, WGS84)	F9.4
11	GPS LONG	RAW GPS LONG. (degrees, WGS84)	F9.4
12	GPS PDOP	GPS PDOP (pdop)	F6.2
13	GPS NSATS	GPS NUMBER OF SATS (nsats)	F3.0
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			

High-Sense Geophysics Limited

Archive Record

SPEC

Client name: EQUITY ENGINEERING LIMITED
Survey location: MONSTER
Date flown: JUL, 1996
Date processed: AUG, 1996
Name of BDB: \MONSTER\DATA\SPEC.BDB *Number of channels:* 16

Final Geopak grid names, plus corresponding channel number (list all included on this media)

\MONSTER\GRIDS\PTC.GRD (channel 11)
\MONSTER\GRIDS\PK.GRD (channel 12)
\MONSTER\GRIDS\PU.GRD (channel 13)
\MONSTER\GRIDS\PTH.GRD (channel 14)

Channel #	Channel name	Description	Fortran format for DBEX (eg F12.2)
1	X	UTM EASTING	F12.1
2	Y	UTM NORTHING	F12.1
3	FID	COUNTER (1/10 SEC)	F8.0
4	TIME	GPS WEEK SECOND	F10.1
5	RAD ALT	RADAR ALTIMETER (feet)	F8.1
6	GPS HGHT	GPS ELEVATION (metres)	F8.1
7	RAW TC	RAW TOTAL COUNT (cps)	F6.0
8	RAW K	RAW POTASSIUM (cps)	F6.0
9	RAW U	RAW URANIUM (cps)	F6.0
10	RAW TH	RAW THORIUM (cps)	F6.0
11	FNL TC	FINAL TOTAL COUNT (cps)	F6.0
12	FNL K	FINAL POTASSIUM (cps)	F6.0
13	FNL U	FINAL URANIUM (cps)	F6.0
14	FNL TH	FINAL THORIUM (cps)	F6.0
15	GPS LAT	RAW GPS LAT. (degrees,WGS84)	F9.4
16	GPS LONG	RAW GPS LONG. (degrees,WGS84)	F9.4
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			

PROGRAM "DBEX" - DATABASE EXTRACT

The database extract program function is to copy data to a ASCII or BINARY file.

/ EXIT

Exit may be selected whenever the main menu options list is displayed. All open files are closed, the program terminates and control returns to DOS.

1 OPEN DATABASE

This function is required to open a database for read/write activity. If a database is already open and OPEN DATABASE is selected, an error message is displayed and the main menu select list is re-displayed.

If there is no database open, the routine prompts for the filename of the database file to open. Once entered, the file is opened. If an error occurs during the open sequence, an error is displayed and the file is not opened. The open database function is also the first step taken to create a new database.

2 CLOSE DATABASE

Closes the currently open database. If no database is open, an error is displayed and the main menu select list is re-displayed.

3 GENERATE LINE:FID:X:Y:Z1:Z2... FILE

This function generates a LINE,FID,X,Y,Z1,Z2,Z3... file from the lines in a database. The output LFXYZZ file may be generated in an ASCII or BINARY format. The LFXYZZ file is compatible for input to GEOPAK ground survey programs.
The run parameters are:

Line:fid:fid filename [/=none] :

The entire database may be examined and each line which is NOT marked deleted will be output to the LFXYZ file if a slash is entered to the above prompt. If a filename is entered, the file must exist and contain one line entries consisting of:

- Line number
- Fid start
- Fid end

This file is called a Line Fid Fid file or "LFF" file. The LFF file contains one LFF entry for each line to be processed. The file is read using a FORTRAN free format read. An EOF in the LFF file terminates processing of lines into the LFXYZ file.

Enter next line range [/=END] :

This prompt appears only if a slash "/" is input in response to the LFF filename request. A list of line ranges to process is required. Up to 20 line ranges may be input. At least one range must be input. A line range may not have a range end line number which is smaller than the range start line number.

LFXYZ filename :

A DOS filename must be entered. This file receives either the ASCII or BINARY output.

ASCII or BINARY output file [A/B] :

An "A" or "B" must be entered to the above prompt. If an "A" is entered, the output file will be generated in a standard ASCII format. If a "B" is entered, BINARY is selected. The BINARY file format is FORM=UNFORMATTED (Microsoft FORTRAN compatible).

Parameter input filename [/=NONE] :

Program parameters may be read from a file on disk instead of through the keyboard. If a file contains the answers to the channel selection parameters, the filename may be entered and the parameters will be read from the file and no input is required from the keyboard. The parameters that are read from the file are marked with a "(P)" indicator.

Parameter output filename [/=NONE] :

The program can build an answer file from the answers to the prompts that are input via the keyboard. The answers written to the file are flagged with a "(P)". If a slash "/" is input, no output parameter file is generated.

(P) **The line number is automatically inserted in front of each record. Each channel following the line number must be specified, including FID, X and Y.**

Do you want the line number [Y/N] [Def=Y] :

The above information and prompt is displayed. If "N" is entered to the query, the line number information will not be written to the output file.

The Line number is extracted from the line headers in the database.

(P) **Do you want the flight number [Y/N] [Def=Y] :**

If "N" is entered to the query, the flight number information will not be written to the output file.

The Flight number is extracted from the line headers in the database.

(P) **Do you want the date [Y/N] [Def=Y] :**

If "N" is entered to the query, the date flown will not be written to the output file.

The Date is extracted from the line headers in the database.

The X and Y data come from channels 1 and 2 in each data record. The Z channel(s) are selected when the following prompt appears.

(P) **Enter Z channel numbers [/ on end] :**

A list of at least one channel number must be entered. The entry is FORTRAN free format. The channel number(s) entered must be in the range of 1 to the number of channels in the database record. The list of channel numbers must be terminated with a slash.

(P) **Data records may be extracted from the database using one of the following selection criteria:**

1 = on a record basis
2 = on a distance basis
3 = on a time basis

Enter the extraction code :

Enter one of the codes (1,2 or 3) to select how the data is to be extracted from the database. The normal method is 1, on a record mode. Distance and time modes cause records to be interpolated at fixed increments along the line in either distance or time increments.

(P) Extract & write every Nth record [/=1] :

This question is asked only if the extraction code is 1 (record basis). If "1" or a slash is entered, each database record will be copied. If a number greater than 1 is input, i.e. "N", only every "N"th record will be copied from the database to the output file.

(P) Enter the sampling distance (metres) :

This question is asked only if the extraction code is 2 (distance basis). The distance in metres along the flight lines that data samples are to be extracted at is entered.

(P) Enter the time sampling interval (seconds) :

This question is asked only if the extraction code is 3 (time basis). Data records are extracted on a time basis in a manner similar to the distance extraction of data records.

(P) Output records that have defaults [Y/N] (Def=Y) :

If "Y" is input in response to the above question, each output record is examined for defaults. If there are any, the record is not written to the output file.

(P) A format specifier must be built for each Z channel being output to the XYZ file. Standard FORTRAN notation is used. All Z channels are written using floating point instead of integer, i.e. Fnn.n not Inn. Entering "F10.2" (quotes not included) specifies 10 characters with 2 decimal places.

Enter channel nn format :

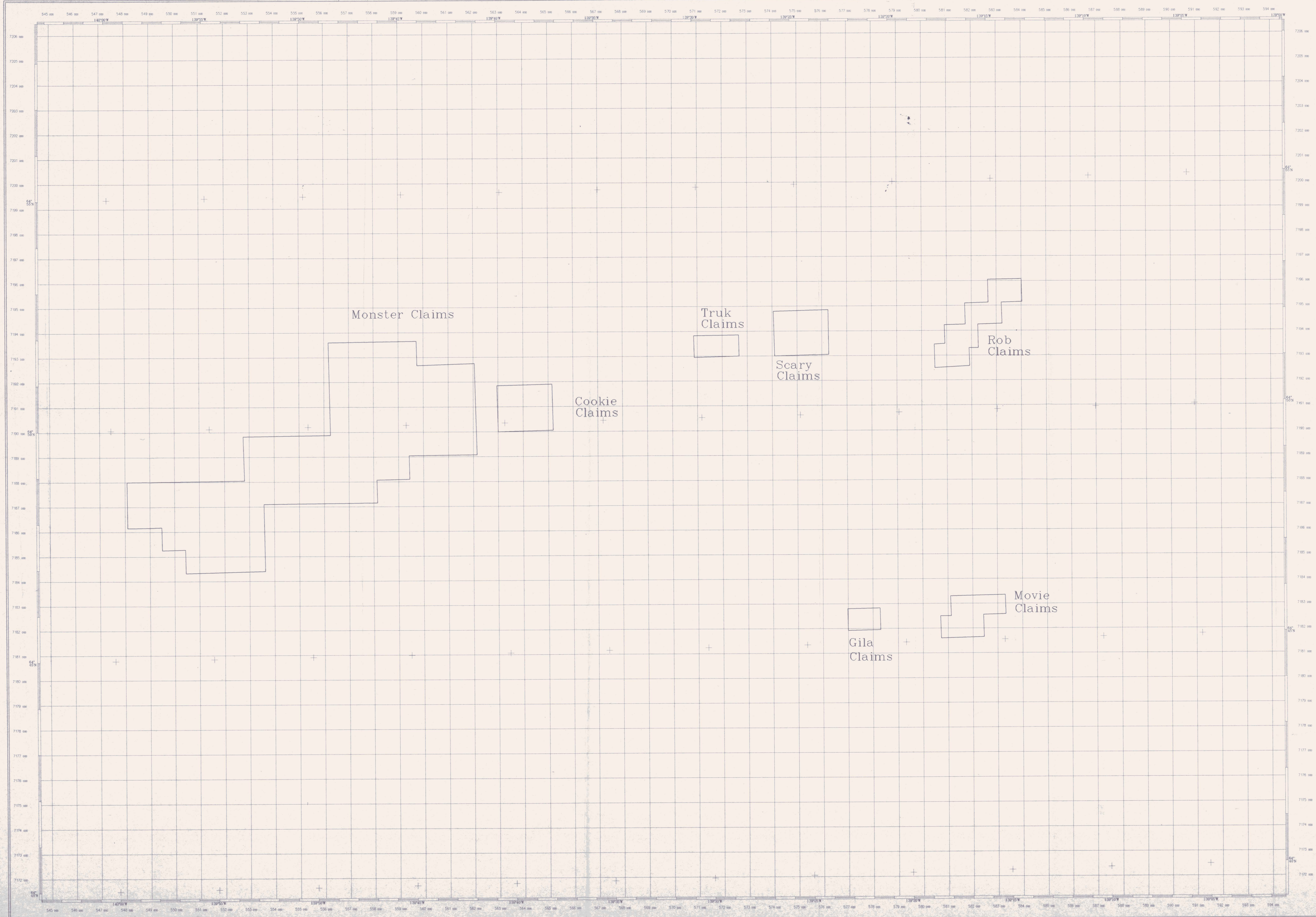
The above prompt appears only when the output file is ASCII. It is asked for each of the Z channels being output to the file. The LINE, FID, X and Y portion of each output line is written using the FORTRAN (I8,F9.2,2F12.2) format. This format must be entered by the user. The remainder of the format (for the Z data) is defined by the user.

At this point, the parameter input and/or output files are closed if they were being used. The program begins creating the LFXYZ file. The output will contain the data in the LINE,FID,FID ranges specified in the LFF file if one was present. Otherwise, the entire database within the line range(s) specified will be output to the LFXYZ file using the selected extraction method.

An activity line is displayed on the video screen for each line being processed.

Processing line : nnnnnnnnn

Program control reverts back to the main DBT options display when the processing completes.



Scale 1 : 50 000

metres

SURVEY SPECIFICATIONS

Nominal Terrain Clearance (Helicopter) : 210 ft (70 m)
Nominal Terrain Clearance (Bird) : 150 ft (50 m)
Line Spacings : 1000 m, 250 m

EQUIPMENT

Aircraft Type : Bell 206 "Jet Ranger"
Configuration : Towed Bird
Digital Acquisition System : High Sense HS-GFCS-II
GPS Navigation : Novatel 751 10 channel
Radar Altimeter : Terra 3500
Magnetometer : Scintrex H8 Cesium
Spectrometer : High Sense KS-16
Crystal Package : 1024 cu. in NaI (Tl) downward

COMPILATION

FLIGHT PATH:

GPS data recorded during the flight has been differentially corrected and transformed to correspond to the NAD 27 (Clarke 1866) UTM coordinate system.

093600 1/2

BLACKSTONE RESOURCES INC.

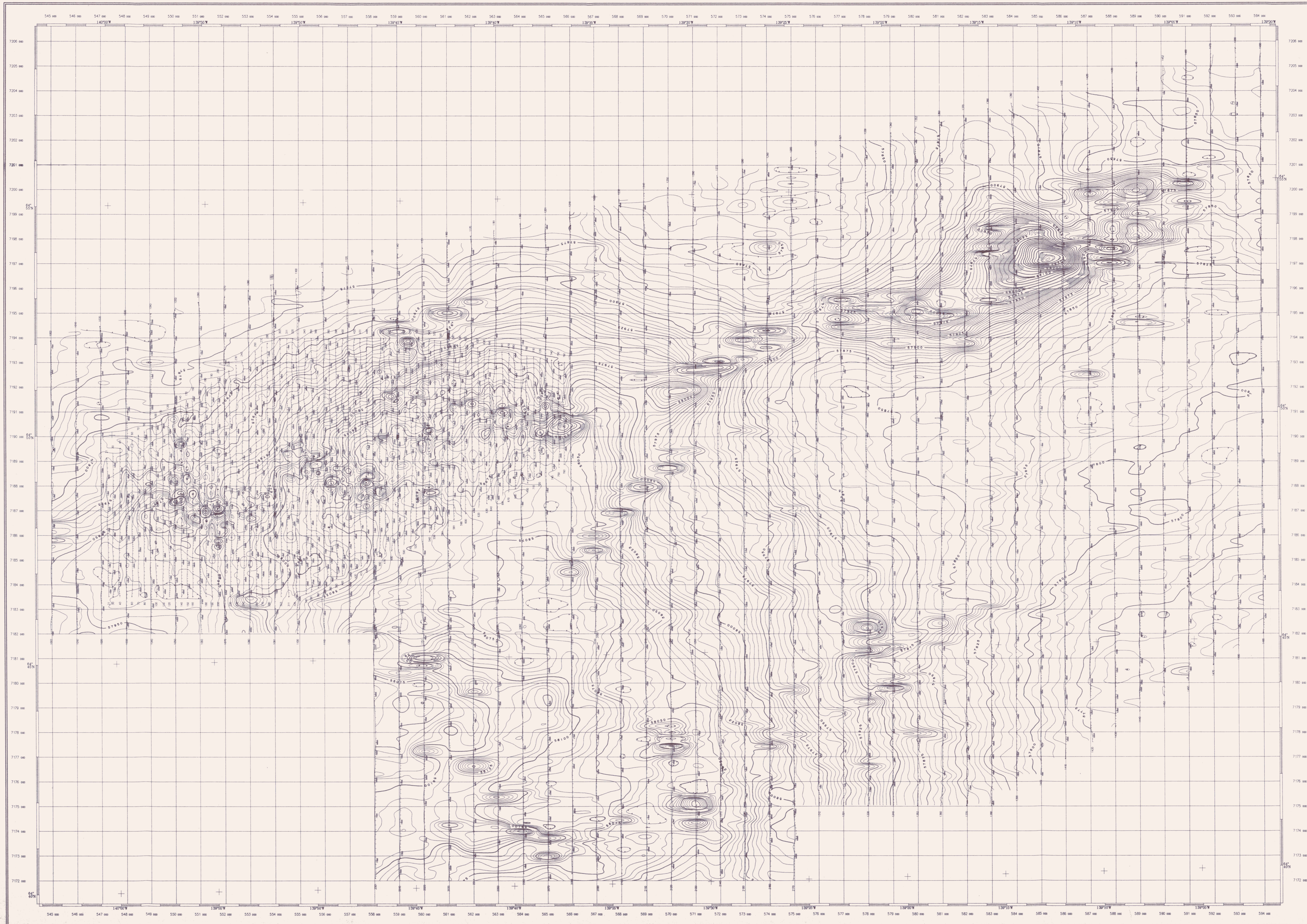
MONSTER PROJECT

LOCATION OF CLAIMS

MAP SCALE	1 : 50 000	PROJECT REF #	90610-1
MAP SHEET		DATE FLOWN	JULY, 1996
MAP PROJECTION	NAD 27	DATE COMPILED	AUG, 1996

SURVEY FLOWN AND COMPILED BY High-Sense GEOPHYSICS LIMITED FIELD COMPILATION SYSTEM

#1



Scale 1 : 50 000

1 000 0 1 000 2 000 3 000

metres

SURVEY SPECIFICATIONS

Nominal Terrain Clearance (Helicopter) :	210 ft (70 m)
Nominal Terrain Clearance (Bird) :	150 ft (50 m)
Line Spacings :	1000 m, 250 m

EQUIPMENT

Aircraft Type :	Bell 206 "Jet Ranger"
Configuration :	Towed Bird
Digital Acquisition System :	High Sense HS-GFCS-II
GPS Navigation :	Novatel 751 10 channel
Radar Altimeter :	Terra 3500
Magnetometer :	Scintrex H8 Cesium
Spectrometer :	High Sense KS-16
Crystal Package :	1024 cu. in NaI (Tl) downward

COMPILATION

FLIGHT PATH:

GPS data recorded during the flight has been differentially corrected and transformed to correspond to the NAD 27 (Clarke 1866) UTM coordinate system.

MAGNETICS: 093600 1/2

The magnetic data has been corrected for diurnal variation and heading error.

Grid interval :	50 metres
Contour intervals :	5, 25, 100 nT

BLACKSTONE RESOURCES INC.

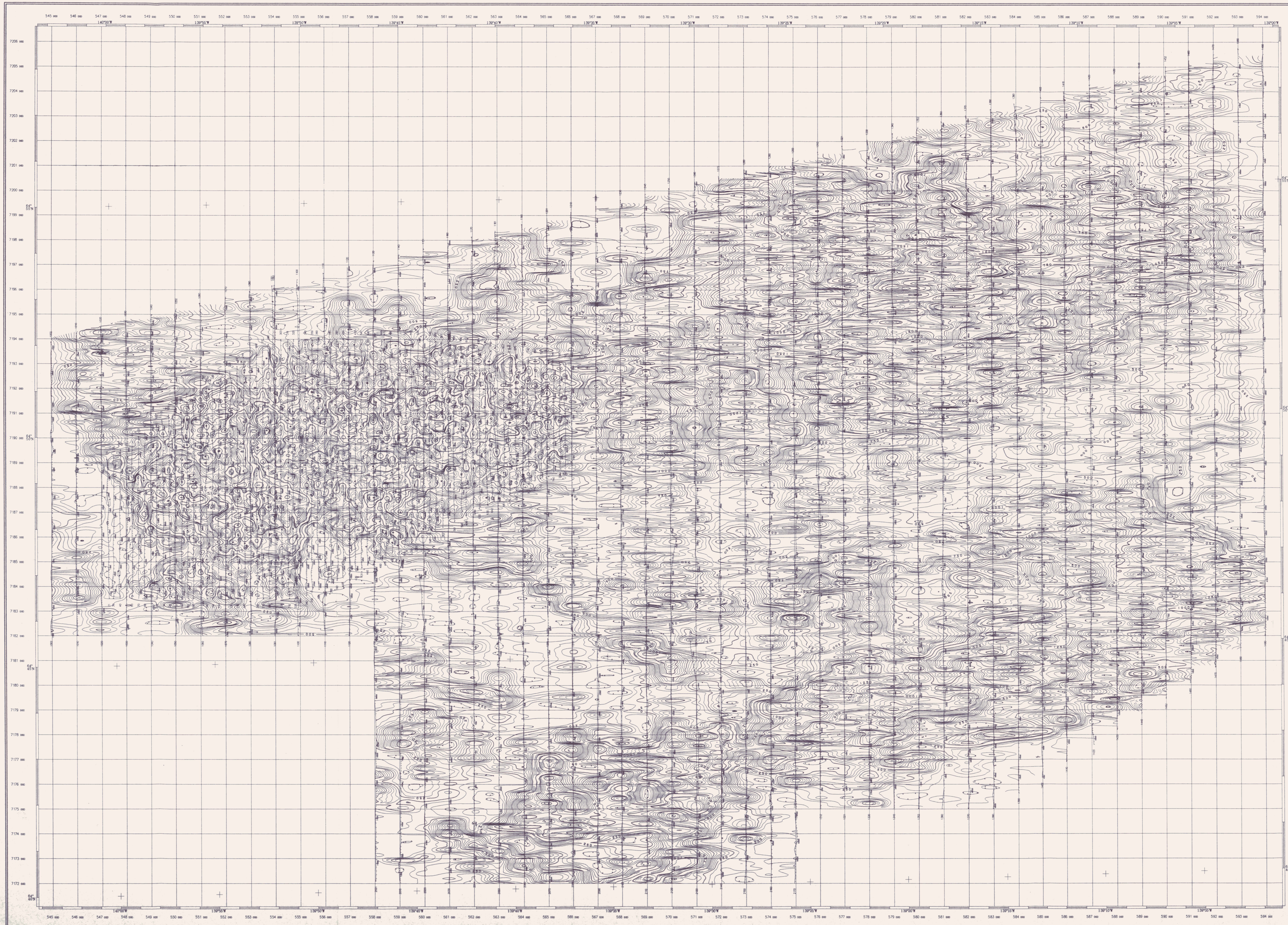
MONSTER PROJECT

TOTAL FIELD MAGNETICS

MAP SCALE	1 : 50 000	PROJECT REF #	90610-1
MAP SHEET		DATE FLOWN	JULY, 1996
MAP PROJECTION	NAD 27	DATE COMPILED	AUG, 1996

SURVEY FLOWN AND COMPILED BY High-Sense GEOPHYSICS LIMITED FIELD COMPILATION SYSTEM

#2



Scale 1 : 50 000

1 000 0 1 000 2000 3000

metres

SURVEY SPECIFICATIONS

Nominal Terrain Clearance (Helicopter) :	210 ft (70 m)
Nominal Terrain Clearance (Bird) :	150 ft (50 m)
Line Spacings :	1000 m, 250 m

093600 1/Z EQUIPMENT

Aircraft Type :	Bell 206 "Jet Ranger"
Configuration :	Towed Bird
Digital Acquisition System :	High Sense HS-GFCS-II
GPS Navigation :	Novatel 751 10 channel
Radar Altimeter :	Terra 3500
Magnetometer :	Scintrex H8 Cesium
Spectrometer :	High Sense KS-16
Crystal Package :	1024 cu. in NaI (Tl) downward

COMPILATION

RADIOMETRICS :

Integral windows were extracted from the 256 channel radiometric spectrum using the following energy thresholds :

Total Count	410 – 2810 keV
Potassium	1370 – 1570 keV
Uranium	1660 – 1860 keV
Thorium	2410 – 2810 keV

Data was subsequently corrected for ambient background radiation, "Compton" effect and altitude attenuation. Radiometric data is presented in corrected counts per second.

The grid interval is :	50 metres
Contour intervals :	50, 250, 1000 cps

BLACKSTONE RESOURCES INC.

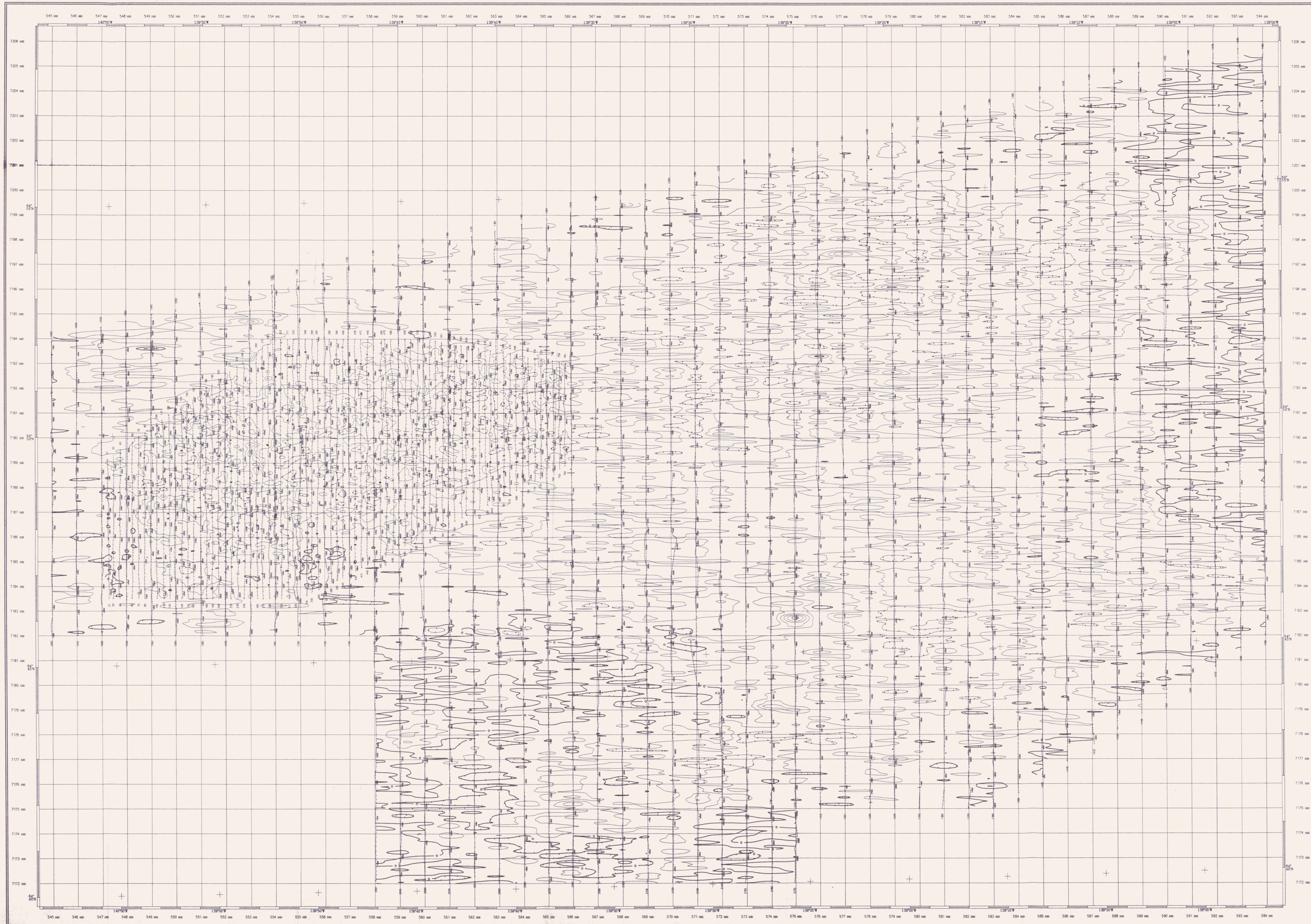
MONSTER PROJECT

TOTAL COUNT

MAP SCALE	1 : 50 000	PROJECT REF #	90610-1
MAP SHEET		DATE FLOWN	JULY, 1996
MAP PROJECTION	NAD 27	DATE COMPILED	AUG, 1996

SURVEY FLOWN AND COMPILED BY *High-Sense* GEOPHYSICS LIMITED FIELD COMPILATION SYSTEM

#3



Scale 1 : 50 000

1 000 0 1 000 2000 3000

metres

SURVEY SPECIFICATIONS

Nominal Terrain Clearance (Helicopter) :	210 ft (70 m)
Nominal Terrain Clearance (Bird) :	150 ft (50 m)
Line Spacings :	1000 m, 250 m

093600 1/2

EQUIPMENT

Aircraft Type :	Bell 206 "Jet Ranger"
Configuration :	Towed Bird
Digital Acquisition System :	High Sense HS-GFCS-II
GPS Navigation :	Novatel 751 10 channel
Radar Altimeter :	Terra 3500
Magnetometer :	Scintrex H8 Cesium
Spectrometer :	High Sense KS-16
Crystal Package :	1024 cu. in NaI (Tl) downward

COMPILATION

RADIOMETRICS :

Integral windows were extracted from the 256 channel radiometric spectrum using the following energy thresholds :

Total Count	410 – 2810 keV
Potassium	1370 – 1570 keV
Uranium	1660 – 1860 keV
Thorium	2410 – 2810 keV

Data was subsequently corrected for ambient background radiation, "Compton" effect and altitude attenuation. Radiometric data is presented in corrected counts per second.

The grid interval is :	50 metres
Contour intervals :	5, 25, 100 cps

BLACKSTONE RESOURCES INC.

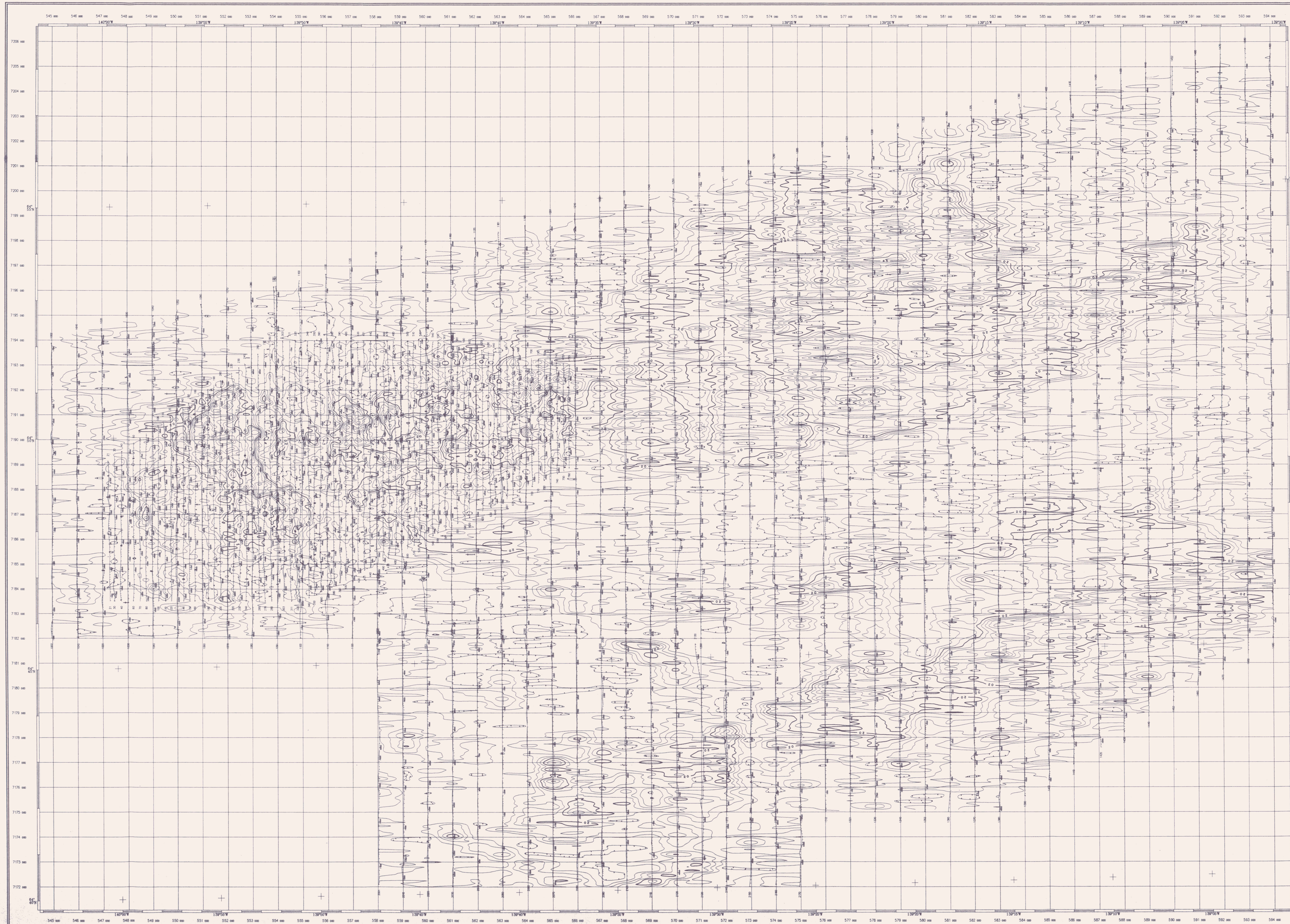
MONSTER PROJECT

URANIUM

MAP SCALE	1 : 50 000	PROJECT REF #	90610-1
MAP SHEET		DATE FLOWN	JULY, 1996
MAP PROJECTION	NAD 27	DATE COMPILED	AUG, 1996

SURVEY FLOWN AND COMPILED BY High-Sense GEOPHYSICS LIMITED FIELD COMPILATION SYSTEM

#4



Scale 1 : 50 000

1 000 0 1 000 2 000 3 000 metres

SURVEY SPECIFICATIONS

Nominal Terrain Clearance (Helicopter) :	210 ft (70 m)
Nominal Terrain Clearance (Bird) :	150 ft (50 m)
Line Spacings :	1000 m, 250 m

EQUIPMENT

Aircraft Type :	Bell 206 "Jet Ranger"
Configuration :	Towed Bird
Digital Acquisition System :	High Sense HS-GFCS-II
GPS Navigation :	Novatel 751 10 channel
Radar Altimeter :	Terra 3500
Magnetometer :	Scintrex H8 Cesium
Spectrometer :	High Sense KS-16
Crystal Package :	1024 cu. in NaI (Tl) downward

093600 COMPILATION

RADIOMETRICS : 1/2

Integral windows were extracted from the 256 channel radiometric spectrum using the following energy thresholds :

Total Count	410 – 2810 keV
Potassium	1370 – 1570 keV
Uranium	1660 – 1860 keV
Thorium	2410 – 2810 keV

Data was subsequently corrected for ambient background radiation, "Compton" effect and altitude attenuation. Radiometric data is presented in corrected counts per second.

The grid interval is :	50 metres
Contour intervals :	5, 25, 100 cps

BLACKSTONE RESOURCES INC.

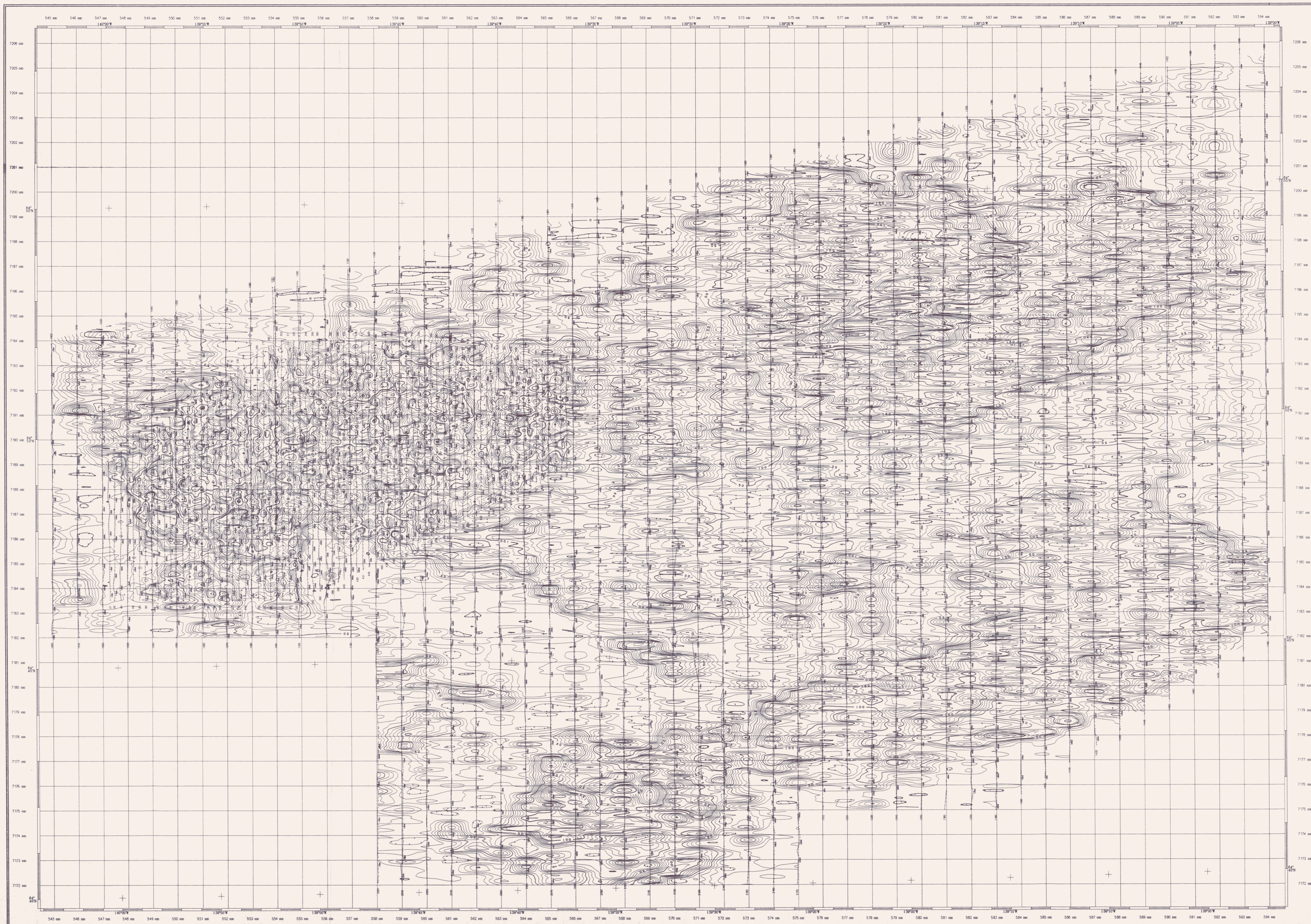
MONSTER PROJECT

THORIUM

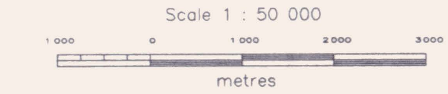
MAP SCALE	1 : 50 000	PROJECT REF #	90610-1
MAP SHEET		DATE FLOWN	JULY, 1996
MAP PROJECTION	NAD 27	DATE COMPILED	AUG, 1996

SURVEY FLOWN AND COMPILED BY *High-Sense* GEOPHYSICS LIMITED FIELD COMPILATION SYSTEM

#5



Scale 1 : 50 000



SURVEY SPECIFICATIONS

Nominal Terrain Clearance (Helicopter) :	210 ft (70 m)
Nominal Terrain Clearance (Bird) :	150 ft (50 m)
Line Spacings :	1000 m, 250 m

EQUIPMENT

Aircraft Type :	Bell 206 "Jet Ranger"
Configuration :	Towed Bird
Digital Acquisition System :	High Sense HS-GFCS-II
GPS Navigation :	Novatel 751 10 channel
Radar Altimeter :	Terra 3500
Magnetometer :	Scintrex H8 Cesium
Spectrometer :	High Sense KS-16
Crystal Package :	1024 cu. in NaI (Tl) downward

003600 1/2 COMPILATION

RADIOMETRICS :

Integral windows were extracted from the 256 channel radiometric spectrum using the following energy thresholds :

Total Count	410 – 2810 keV
Potassium	1370 – 1570 keV
Uranium	1660 – 1860 keV
Thorium	2410 – 2810 keV

Data was subsequently corrected for ambient background radiation, "Compton" effect and altitude attenuation. Radiometric data is presented in corrected counts per second.

The grid interval is :	50 metres
Contour intervals :	10, 50, 250 cps

BLACKSTONE RESOURCES INC.

MONSTER PROJECT

POTASSIUM

MAP SCALE	1 : 50 000	PROJECT REF #	90610-1
MAP SHEET		DATE FLOWN	JULY, 1996
MAP PROJECTION	NAD 27	DATE COMPILED	AUG, 1996

SURVEY FLOWN AND COMPILED BY High-Sense GEOPHYSICS LIMITED FIELD COMPILATION SYSTEM

#6

STATEMENT OF EXPENDITURES
MONSTER PROJECT AREA
APRIL 1 - SEPTEMBER 30, 1996

CANADA) In the matter of an evaluation program on the Monster property

I, David A. Caulfield for Equity Engineering Ltd., 207, 675 West Hastings Street, Vancouver, B.C. do solemnly declare that an airborne geophysical survey measuring radiometrics, and magnetics was carried out on the Monster, Movie, Truk, Gila, Rob, Cookie and Scary claims.. The following expenses were incurred during the course of this work and in the compilation and reporting of the results:

PROFESSIONAL FEES AND WAGES:		
David A. Caulfield, P.Geo.		
5.75 days @ $425/day		$ 2,443.75
EXPENSES:		
Accommodation	$ 322.00	
Aircraft Charters	2,883.20	
Airfare	1,621.50	
Bulk Fuel	2,848.70	
Courier	37.14	
Expediting	62.50	
Freight	49.69	
Helicopter Charters	30,236.05	
Maps and Publications	48.50	
Meals	264.19	
Printing and Reproductions	74.53	
Telephone Distance Charges	107.22	38,555.22
SUBCONTRACTS:		
Airborne Geophysical Survey		57,515.90
MANAGEMENT FEES:		
15% on expenses	$ 5,783.28	
7.5% on subcontracts	4,313.69	10,096.97
	Subtotal:	$ 108,611.84
GST:		7,602.83
	Total:	**$ 116,214.67**

Note:

1. The costs applied to each claim was calculated by taking the line kilometres flown over each property, including a claim width perimeter, and multiplying this number by the average cost per line kilometre for the entire survey.

2. In addition, an interpretative study was recently was completed at a cost of at least $38,456 (36,980 AUS) appended to Etheridge Henley Williams report. This study was prorated by the number of claims and applied evenly to all claims.

And I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of the Canada Evidence Act.

Declared before me at Vancouver in the)
Province of British Columbia this)
24th day of January, 1997)

David A. Caulfield

Notary Public for the Province of British Columbia

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ETHERIDGE HENLEY WILLIAMS

Etheridge Henley Williams is a registered Partnership (Australian Capital Territory, Western Australia) between Epithermex International Pty Ltd (ACN 008 634 357), Tectonex Geoconsultants Pty Ltd (ACN 008 653 496) and Aurel Pty Ltd (ACN 066 788 636).

Blackstone Resources Inc.

Structural Interpretation and Targeting of Monster and Environs Geophysical Survey Yukon Territory, Canada

Assessment Report

January 1997

Compiled by:

Project consultant

Endorsed by:

Principal

The conclusions and recommendations expressed in this report represent the opinions of the authors based on the data available to them. The opinions and recommendations provided from this information are in response to a request from the client and no liability is accepted for commercial decisions or actions resulting from them.

Executive Summary

Blackstone Resources Inc. ('Blackstone') commissioned Etheridge Henley Williams ('EHW') to process and interpret a helimag and radiometric survey over their Monster Property and environs in Yukon Territory, Canada. The interpretation involved integration of the geophysical data with recent exploration data and regional government geological information. The objectives of the interpretation project were to assess the prospectivity of the survey area for Olympic Dam / Ernest Henry-style targets, to develop targeting criteria, and, if possible, to identify specific targets.

Geophysical Data and Image Processing

The helicopter-borne magnetics and radiometric survey was flown at 250 m line spacing over the Monster claims area, and at 1000 m line spacing over the broader southern Ogilvie Mountains area encompassing the principal breccia exposures. The resolution of the survey was therefore mainly appropriate for evaluating the regional structural setting and geophysical characteristics of the mineralised breccia system, rather than for specific target generation.

The absence of control lines in the survey meant that specialist data processing was necessary to achieve reasonably levelled data. A range of images incorporating this specialist processing was produced and incorporated into the interpretation.

Modelling of selected magnetic features was carried out using Model Vision™ software, to assess the depth, size, dip and magnetic susceptibility of potential sources.

The principal features interpreted from magnetic and radiometric data are listed in Summary Table 1 below.

Structural Setting of Mineralised Breccias

Although the principal structural controls on the localisation of breccias are approximately E-W striking thrust faults, the geophysical and geological data have provided the important additional factors listed in Summary Table 2.

Targeting Criteria and Targets

The breccia-hosted mineralisation in the Ogilvie Mountains clearly belongs to the broad class of ferruginous, breccia-hosted Cu ± Au ± Co ± U ± Ag deposits that occur predominantly in Middle to Late Proterozoic rocks throughout the world. The Australian deposits at Olympic Dam and Ernest Henry in Australia are the best known examples of this class, the former originating at a shallow crustal level.

We have defined two principal types of targeting criteria in the Ogilvie Mountains:

- Magnetic and radiometric features that may represent targets in their own right;
- Structural targets with particular emphasis on sites of maximum dilation.

On the basis on these targeting criteria, we have identified and prioritised target areas within the existing Blackstone claims, and have recommended acquisition of additional claims to cover a range of structural and geophysical targets. It is emphasised that the spatial resolution of the geophysical data, especially outside the Monster claims area, is insufficient to define or prioritise specific prospects/drill targets. The priority target areas that we have identified from the geophysical survey require specific follow-up field programs, as defined in Summary Table 3.

Claim extensions to fully cover geophysical and structural features are recommended to the Monster, Cookie, Rob and Gila claims. New claim areas are recommended to cover geophysical features overlying the deep intrusion south of the Monster claims.

Recommended Program

Our principal recommendation is that a targeted field program of structural mapping and ground geophysics, (principally IP or EM) be undertaken in the priority target areas. This program is principally designed to:

- establish the structural settings and signatures of high grade mineralisation;
- define areas of optimum continuity of grade, possibly by a limited drill program;
- develop specific drill targets for the 1998 field season.

Summary Table 1 Principal Features Interpreted from Magnetic and Radiometric Data

- The most prominent magnetic feature is a deep (9 km) magnetic high (about 15 km across) beneath the western half of the survey area. We interpret this feature to be an intrusive +/- its thermal aureole, and suggest that it may be the source of the small, high level diorite intrusives identified throughout the area, and also possibly mineralising fluids and metals.
- The principal contributor to variation in radiometric spectra is the primary stratigraphic contrast. The narrower parts of the northern and southern breccia zones do not show up well, at least in part because of the low spatial resolution in this area.
- A complex zone of weakly to moderately elevated magnetic intensity corresponds approximately to the Northern Breccia Zone along the Monster Fault. In detail, the structure as mapped from the magnetics is complex, comprising a series of en-echelon, approximately E-W trending segments which are systematically offset on NE trending cross structures. The southern breccia zone generally has lower magnetic intensity, and has the same en-echelon character.
- The magnetic source along much of the Northern Breccia Zone is systematically displaced to the south of (ie, down dip from) the mapped breccia, consistent with increasing magnetite with depth in the fault zone.
- A discrete, higher intensity magnetic feature in the Northern Breccia Zone occurs within the Cookie claim area. Preliminary modelling indicates that it contains approximately 5 - 10% magnetite. It is a blind anomaly with modelled depth to top range one to two hundred meters, and has a depth extent of the order of 1000m.
- The western breccia areas within the Monster claims are characterised by high frequency magnetic "roughness" with variable amplitudes of about 10nT, but no underlying magnetic source. These breccias are also characterised by elevated potassium in the radiometrics.
- The area south of the Monster claims, above the centre of the inferred deep intrusive body, contains a number of small, discrete, low amplitude magnetic anomalies that represent sources at, or within a few hundred meters of the surface. Some of these correspond to outcropping breccia bodies in the southern extension to the survey, others are aligned along NE trending structures, and others appear to be unrelated to any mapped or imaged feature.
- A suite of approximately NE trending, subtle linear features are interpreted confidently as faults and occur throughout the survey area. These linear features offset the magnetic expression of both the northern and southern breccia belts, link the separate breccia bodies in the Monster claims, contain discrete magnetic sources away from the breccia belts, and probably host the major magnetic features in the Olympic and Cookie claims.

Summary Table 2 Structural Setting of Mineralised Breccias

- The E-W striking breccia zones are systematically offset by a set of NE trending faults. More importantly, the breccia thickness and magnetic intensity increase where these structures intersect.
- The NE trending faults host breccia, mineralised stockworks and unexplained magnetic.
- Less common N-S faults also influence breccia development, and intersections between NE, E-W and N-S structures may be particularly prospective (eg, Monster East - Cookie area).
- In the Monster claims area, the breccias are both bounded and localised by NE-trending faults. The Monster West and Monster Southwest breccias can be interpreted as dilational stepovers between NE faults.

Summary Table 3 Targeting Criteria and Targets

- *Cookie - Monster East area* - intersection of E-W, NE and N-S trending structures, strong surface mineralisation, and down-dip magnetic sources at 100 - 200 m depth.
- *Monster West* - potential dilational stepover between NE faults, extensive potassium alteration, widespread surface mineralisation.
- *Monster Southwest* - same structural setting and geophysical character as Monster West, breccias along NE fault, essentially unexplored.
- *Rob claims* - poorly exposed NE-trending fault zone with alteration and mineralisation, Major-General's Olympic claim is along strike on the same fault.

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1. Background and Brief

Blackstone Resources Inc ('Blackstone') contracted Etheridge Henley Williams ('EHW') to process and interpret a helicopter-borne magnetic and radiometric survey over their Monster Property and environs in Yukon Territory, Canada. The interpretation involved integration of the geophysical data with recent exploration data and regional government geological information. The principal objectives of the interpretation project were to assess the prospectivity of the survey area for Olympic Dam / Ernest Henry-style targets, to develop targeting criteria, and if possible, to identify specific targets.

2. Geophysical Data

Hi-Sense Geophysics Limited conducted a helicopter geophysical survey of the Monster Property in June, 1996. Data collected by Hi-Sense was supplied on CD-ROM along with a digital version of their logistics report. Segments of their report are reproduced where it is relevant to reporting on the processing and interpretation of the geophysical data. The survey was acquired by a helicopter mounted system to assist in maintaining a minimal and consistent terrain clearance in rugged terrain. A total of 1659 line kilometres of airborne geophysical data was acquired in this survey.

2.1 Location

The survey area, identified as the Monster Property, was situated in Yukon Territory, approximately 80 kilometres due north of Dawson City (Figure 1). The terrain is predominantly mountainous and rugged. The area was flown in three separate stages: an initial reconnaissance survey grid (1000m line spacing), an inset detail survey grid (250m line spacing) and an additional coarse spaced grid (1000m line spacing) attached to the south central border of the original reconnaissance grid. Additional details are provided below, using UTM coordinates for a central meridian of 141°W - Zone 7.

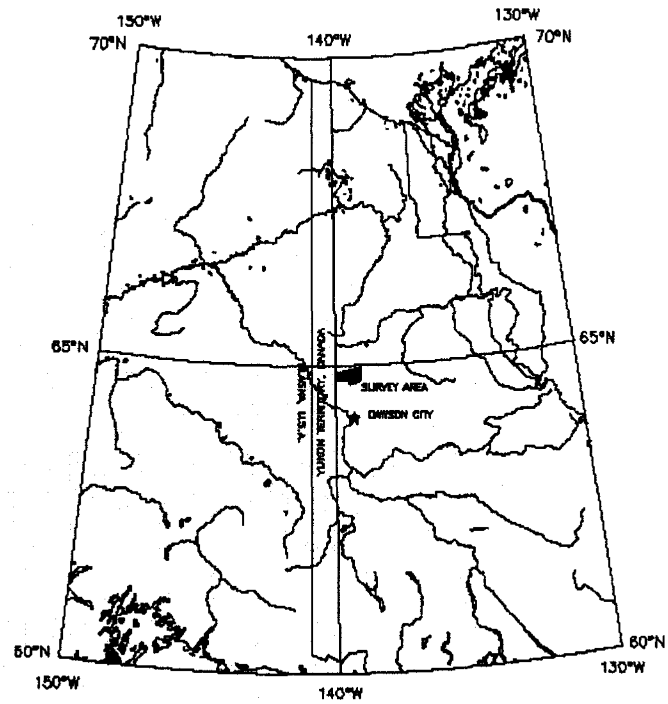


Figure 1 Location of Monster property airborne geophysical survey.

The survey was flown in three segments:

Segment Identification	Line Spacing	Kilometres
Reconnaissance Grid (REG)	1000 m	1047
Detail Grid (DET)	250 m	452
Extension Grid (XTRA)	1000 m	160

The reconnaissance grid was flown to provide coverage of a major magnetic anomaly over the area and establish a context for the detailed survey. The detailed survey was designed to provide good coverage of the Monster Property and outcropping haematite breccias. The extension survey was flown to use all of the funds allocated to the geophysical survey, because the original survey came in under budget. Because the extension survey was added after completion of the reconnaissance grid, otherwise continuous flight lines were broken at survey boundaries. This resulted in minor degradation of the data continuity and both magnetic and radiometric corrections failed to eliminate minor differences at the boundaries. Minor anomalies are present in the magnetic data and there is a significant shift in the background uranium values for the extension grid (see Figure 10 below).

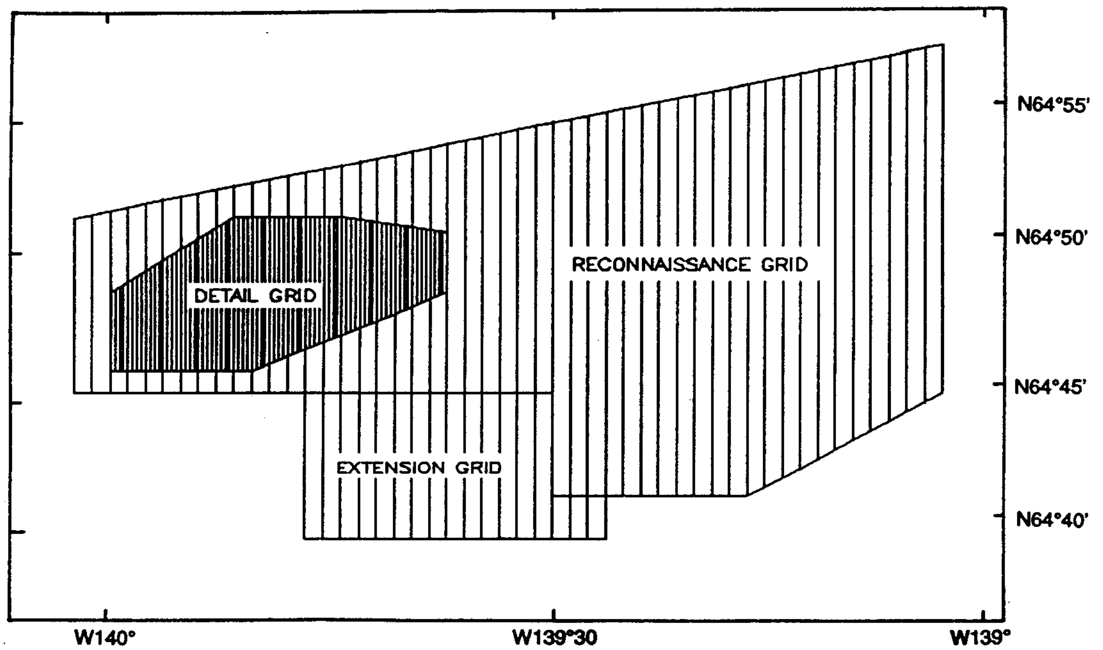


Figure 2 Schematic map of the flight path for the reconnaissance, detailed and extension surveys.

2.2 Survey Specifications

A summary of the survey equipment and logistic specifications are provided from the contractor's report.

2.2.1 Airborne Geophysical System

2.2.1.1 Magnetometer

A Scintrex H8 Optically Pumped Caesium Split Beam Sensor was mounted in a towed 'bird'. The Larmor frequency output was processed by a High-Sense magnetometer counter board that provides a resolution, without filtering, of 10 ppb ten times per second (in a magnetic field of 50,000 nT this resolution is equivalent to 0.005 nT).

2.2.1.2 Radiometric Equipment

A High-Sense Geophysics Limited KS-16 digital differential gamma spectrometer coupled to a 1024 in^3 NaI (Tl) crystal detector package was carried in the rear cargo area of the helicopter. Detector crystals were housed in a special heat stabilised container. The four primary channels of total count, potassium (K) uranium (U) and thorium (Th) were recorded once per second, together with the corresponding 256 channel radiometric spectrum.

2.2.1.3 GPS Navigation

A Novatel 751 ten channel GPS receiver, which is an integral component of the HS-GFCS-II flight control system, provided precise positioning information. The GPS antenna was mounted on the top tail-fin of the towed bird, ensuring accurately reported positioning of the magnetic sensor at all times.

2.2.1.4 Altimeter

A Terra Model TRA 3500 radar altimeter was used. The 'low-profile' transmitting and receiving antennae were mounted on the underside of the towed bird's lateral tail fins. This instrument operates over a range of 0 to 765m (2500') with a precision of 0.3m (1').

2.2.1.5 Geophysical Flight Control System

The High-Sense GFCS-II geophysical flight control system monitored and recorded magnetometer, spectrometer, altimeter and GPS equipment. Input from the various sensors were monitored and time stamped every 0.005 seconds for precise coordination of geophysical and position measurements.

GPS position coordinates and terrain clearance were presented to the pilot by means of LCD touch screen display. The magnetometer response, 4th difference, spectrometer response (4 channel profiles, 256 channel spectrum) and altimeter profile were also shown on the LCD touch screen display for real time monitoring of equipment performance.

2.2.1.6 Digital Recording

The output of the magnetometer, spectrometer and altimeter as well as uncorrected GPS coordinates were recorded digitally on disk at a sample rate of ten times per second by the HS-GFCS-II system. Line number, GPS time and system time were also recorded for use during subsequent differential GPS correction.

2.2.1.7 Ground Monitoring System

Magnetometer: A GEM Systems Overhauser magnetometer (GSM19W) was operated as a base station to record diurnal variations of the earth's magnetic field. Readings with a resolution of 0.1 nT were recorded digitally every second, and synchronised with GPS time ('time stamped') for accurate correction of the airborne data.

GPS Monitor: A Novatel 751 ten channel receiver with a fixed antenna was also active at the base of operations. Raw satellite data was digitally recorded to enable differential correction of the corresponding airborne data.

Recording: The output of the magnetic and GPS monitors was recorded digitally on a dedicated 486 'LunchBox' computer. A visual record of the last forty minutes of activity is graphically maintained on the computer screen to provide an up to date appraisal of significant activity. At the conclusion of each production flight raw GPS and magnetic data were transferred to the main compilation computer.

2.2.2 Field Compilation System

A 586 ('Pentium') PC computer and a Hewlett Packard colour printer/plotter were used for field data processing and presentation. Processing software and procedures were developed by High-Sense Geophysics Limited, and include the Geopak RTICAD imaging system. Profile plots, contours and colour/shadow images were generated on-site as required.

All digital data was verified at the project site to confirm that data recording took place within survey specifications. All digital data was duplicated on-site to ensure against loss.

2.2.3 Survey Parameters

Traverse Line spacing:	250 and 1000 meters
Control Line spacing:	not flown
Nominal Terrain clearance - bird:	50 metres (150 feet)
Nominal Terrain clearance - heli.:	70 metres (210 feet)
Navigation:	Global Positioning System
Traverse Line direction:	north-south
Measurement interval:	0.1 second magnetics
	1.0 second radiometrics
Airspeed (nominal):	80 km/hr
Measurement spacing (nominal):	2.5 meters
Airborne Digital Record:	Radar Altimeter
	Total Field Magnetics
	Gamma Ray Spectrometry
	Time (Local and GPS)
	Raw Global Positioning System (GPS) data
Base Station Record:	Ambient Total Field Magnetics
	Raw Global Positioning System (GPS) data
	Time (Local and GPS)

2.3 Contractor Processing

Data recorded by the airborne and base station systems was transferred to the field compilation system. As each flight was completed, the following compilation operations were carried out.

1. Flight path correction by post processing of differential GPS data;
2. Conversion of GPS data to Clarke 1866 UTM coordinates;
3. Diurnal and heading correction of magnetic data;
4. Radiometric correction for background, Compton scattering and altitude;
5. Radiometric deconvolution filter.

Radiometric data, recorded in its raw state as a 256 channel spectrum, were initially integrated into five elemental energy windows as defined below :

Window	Energy Range	Channel Range
Total Count	410 - 2810 keV	35 - 240
Potassium	1370 - 1570 keV	117 - 134
Uranium	1660 - 1860 keV	142 - 159
Thorium	2410 - 2810 keV	206 - 240
Cosmic	3000 - ∞ keV	256

The data were subsequently subjected to the following data reduction steps to yield fully corrected radiometric data in the Total Count, Potassium, Uranium and Thorium energy windows.

2.4 Located Data Format

High-Sense supplied the geophysical data on CD-ROM in Geopak database format. Software was supplied to allow the data to be unloaded in a convenient end-user format. Data from the magnetic and gamma ray spectrometer instruments were recorded in different data bases to accommodate the higher sampling rate of the magnetometer system. Formats for the two data sets are provided in the following tables.

Table 1: Format Information for Located Magnetic Data

Channel	Channel Name	Description	Format
1	X	UTM EASTING	F12.1
2	Y	UTM NORTHING	F12.1
3	FID	COUNTER (1/10 SEC)	F8.0
4	TIME	GPS WEEK SECOND	F10.1
5	RAD ALT	RADAR ALTIMETER (feet)	F8.1
6	GPS HGHT	GPS ELEVATION (metres)	F8.1
7	RAW MAG	RAW MAGNETICS (nT)	F8.1
8	DIURNAL	DIURNAL MONITOR (nT)	F8.1
9	FNL MAG	FINAL MAGNETICS (nT)	F8.1
10	GPS LAT	RAW GPS LAT. (degrees, WGS84)	F9.4
11	GPS LONG	RAW GPS LONG. (degrees, WGS84)	F9.4
12	GPS PDOP	GPS PDOP (pdop)	F6.2
13	GPS NSATS	GPS NUMBER OF SATS (nsats)	F3.0

Table 2: Format Information for Located Gamma Ray Spectrometer Data

Channel	Channel Name	Description	Format
1	X	UTM EASTING	F12.1
2	Y	UTM NORTHING	F12.1
3	FID	COUNTER (1/10 SEC)	F8.0
4	TIME	GPS WEEK SECOND	F10.1
5	RAD ALT	RADAR ALTIMETER (feet)	F8.1
6	GPS HGHT	GPS ELEVATION (metres)	F8.1
7	RAW TC	RAW TOTAL COUNT (cps)	F6.0
8	RAW K	RAW POTASSIUM (cps)	F6.0
9	RAW U	RAW URANIUM (cps)	F6.0
10	RAW TH	RAW THORIUM (cps)	F6.0
11	FNL TC	FINAL TOTAL COUNT (cps)	F6.0
12	FNL K	FINAL POTASSIUM (cps)	F6.0
13	FNL U	FINAL URANIUM (cps)	F6.0
14	FNL TH	FINAL THORIUM (cps)	F6.0
15	GPS LAT	RAW GPS LAT. (degrees,WGS84)	F9.4
16	GPS LONG	RAW GPS LONG. (degrees,WGS84)	F9.4

3. Geophysical Processing and Presentation

3.1 Magnetic Data

3.1.1 Data Quality and Interpretability

The data provided are generally of good quality, and have enabled us to provide a robust structural interpretation of the setting of the mineralised breccia systems, as appropriate to the scale of this survey. We have identified a number of minor issues of data quality which we have documented below particularly for future reference if additional surveys are flown in this area. These quality issues, required that additional processing was necessary to generate the images provided with this report.

The following factors contributed to minor degradation of data quality:

- No tie lines were flown.
- Bird swing and instrumental noise.
- Line spacing versus sensor height.
- Rapid changes in flight path direction.
- Limited post-processing of raw data.
- Lines not continuous into the Extension Area.

Tie lines were not flown by the contractor because they believed that there would be a large height differential at cross-over points and thus be of limited value. Procedures are available for correction of height mismatches, and we recommend tie lines in all surveys. The absence of tie lines impacted on the detailed levelling of the data and resulted in minor degradation of image quality. This factor is principally of concern only for more advanced processing and the use of highly filtered images.

Bird swing and instrumental noise caused some problems with the correlation of narrow geological features. The magnetic sensor is towed in a bird approximately 20 metres below the helicopter. By placing the sensor in a bird, magnetic noise from the helicopter is minimised, but another form of noise is introduced when the bird swings in the magnetic field as the helicopter manoeuvres around obstacles. This manoeuvre noise is only difficult to separate from geological magnetic sources where the anomaly wavelengths are similar to those from near surface magnetic sources, as is the case in some of the breccia areas.

Figure 3 shows a noise analysis for Line 1020. The two central tracks display a residual magnetic anomaly trace (diffuc) and a spike analysis trace (diff_med). The "diffuc" trace was created by upward continuation of the magnetic data by 100 metres and then subtracting the

Upward Continuation Test

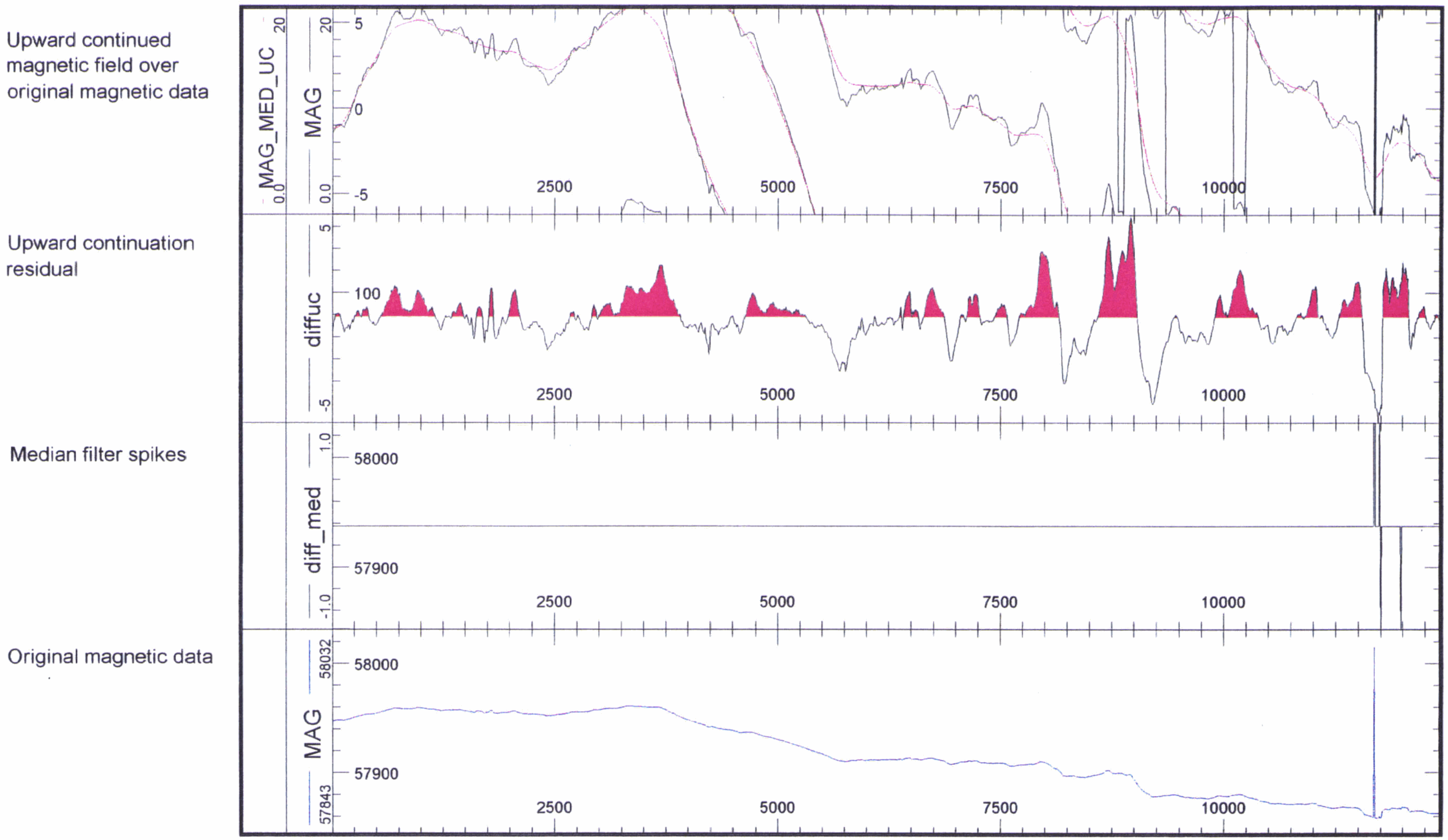


Figure 3 Upward continuation test, carried out as part of noise spike analysis of Line 1020. The variability of the upward continuation residual (diffuc) indicates there is considerable system noise. (nT units).

result from the original magnetic data trace. This process isolates short wavelength anomalies associated with near surface magnetic sources and instrumental noise. Visual inspection of this trace suggests that there is a system noise envelope of approximately +/- 1.5 nanotesla. We have used images derived from the 100m upward continued data to remove this noise contribution, and we consider that very little geological information has been lost in this process.

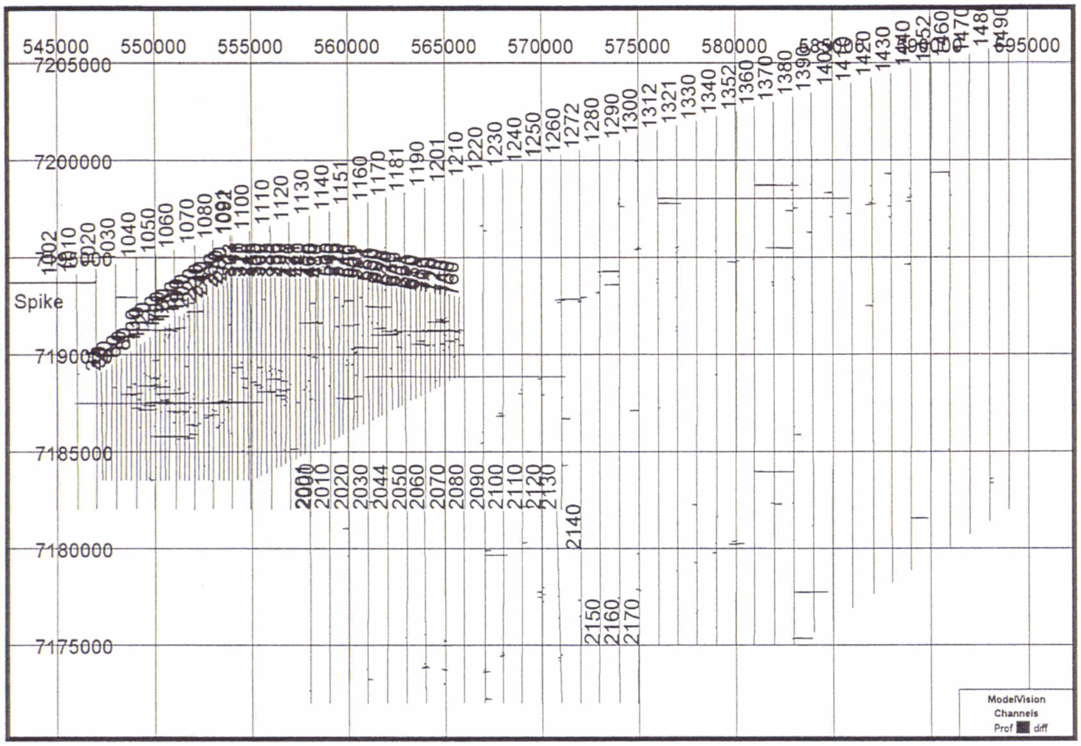
Instrumental noise creates spikes in the magnetic field. This can be caused by any part of the system including radio transmissions, cable problems, instrument malfunction or external sources. This type of noise is normally removed by the contractor prior to delivery of the final survey results. An example of noise spikes is shown in Figure 4 at the northern end of the Line 1020. These spikes were separated from the data using a median filter. A 4^{th} difference analysis was applied to the line and displayed in the fourth track. This is used as a monitor of instrument noise and clearly identifies spikes. It shows a noise envelope of +/- 0.1 nanotesla excluding the obvious spikes. This is much lower than the overall system noise of +/- 1.5 nanotesla. The map in Figure 4 shows the location and number of spikes found in the data set.

Line spacings vary from 250 to 1000 metres at a nominal sensor height of 50 metres. The narrow magnetic anomalies recorded in this survey cannot in some cases be correlated from one line to the next even at the 250 metre line spacing. Many of the magnetic anomalies associated with the breccias are discontinuous and located at the ground surface with minimal weathering. The erratic pattern of the geology makes it difficult to build a proper geological picture because the geology changes rapidly between lines. With closer line spacing, noise related anomalies will not correlate, whereas geological sources will remain coherent if the lines are close enough to properly sample the changes.

Rapid changes in flight path direction caused problems with bird swing and line based analysis procedures. This is an unavoidable part of helicopter surveys but adds to the noise levels during analysis. Figure 5 shows an example from the Detailed Survey with rapid changes in flight path direction highlighted. The effect of such changes on data quality are shown in Figure 6.

Post-processing of the raw magnetic data by the contractor normally includes removal of instrumental noise and removal of line related levelling problems. The contractor had applied only minimal processing to this data set, so additional processing was required prior to interpretation.

Noise Spike Analysis



Map showing the location of major noisespikes

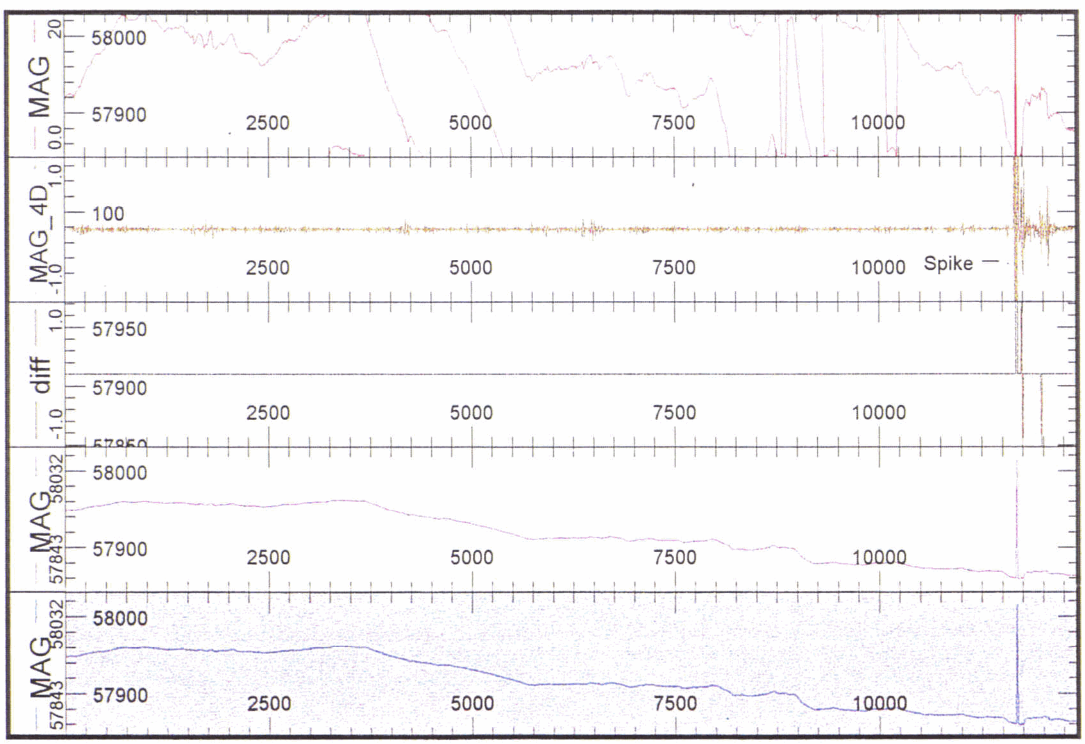
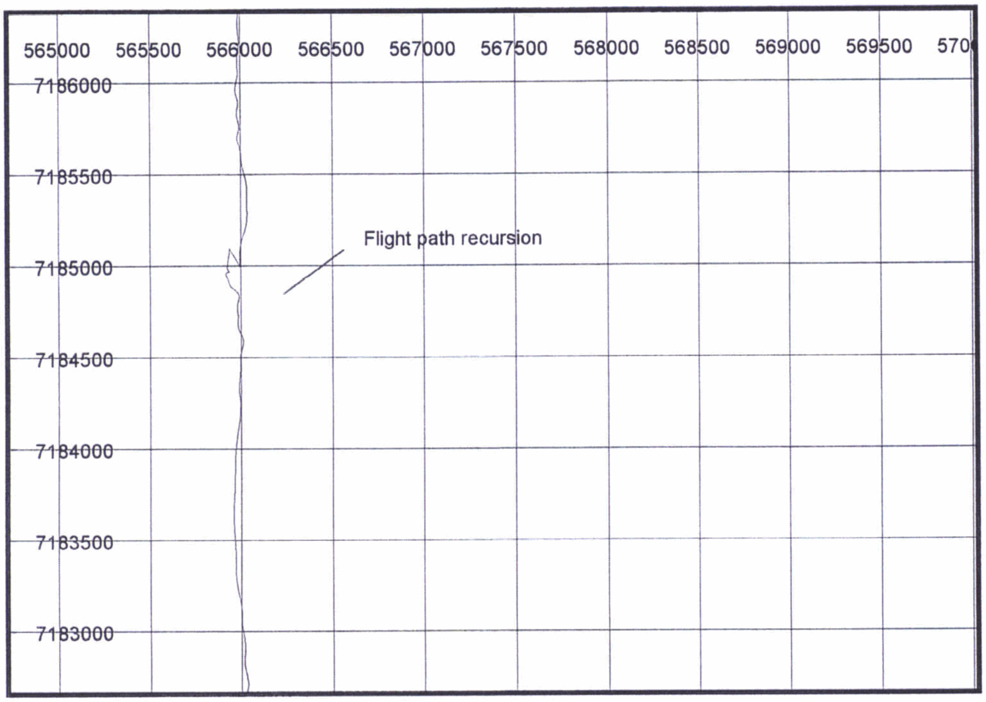
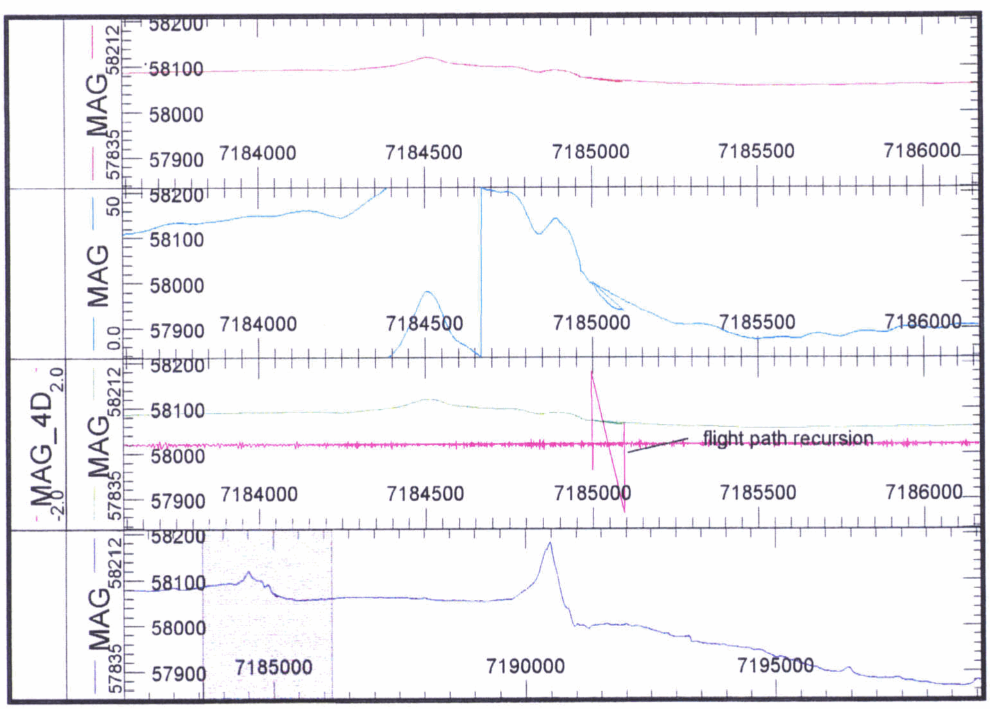


Figure 4 Detailed noise spike analysis for Line 1020, with map showing location of major noise spikes. (nT units).

Example of Flight Path Recursion



Flight Path for Line 1210



Multitrack plot showing 4th difference and data flight path recursion

Figure 5 Diagram showing rapid changes in flight path direction within the detailed survey area, which causes noise in the survey. (UTM map grid values).

Significant Changes in Flight Line Direction

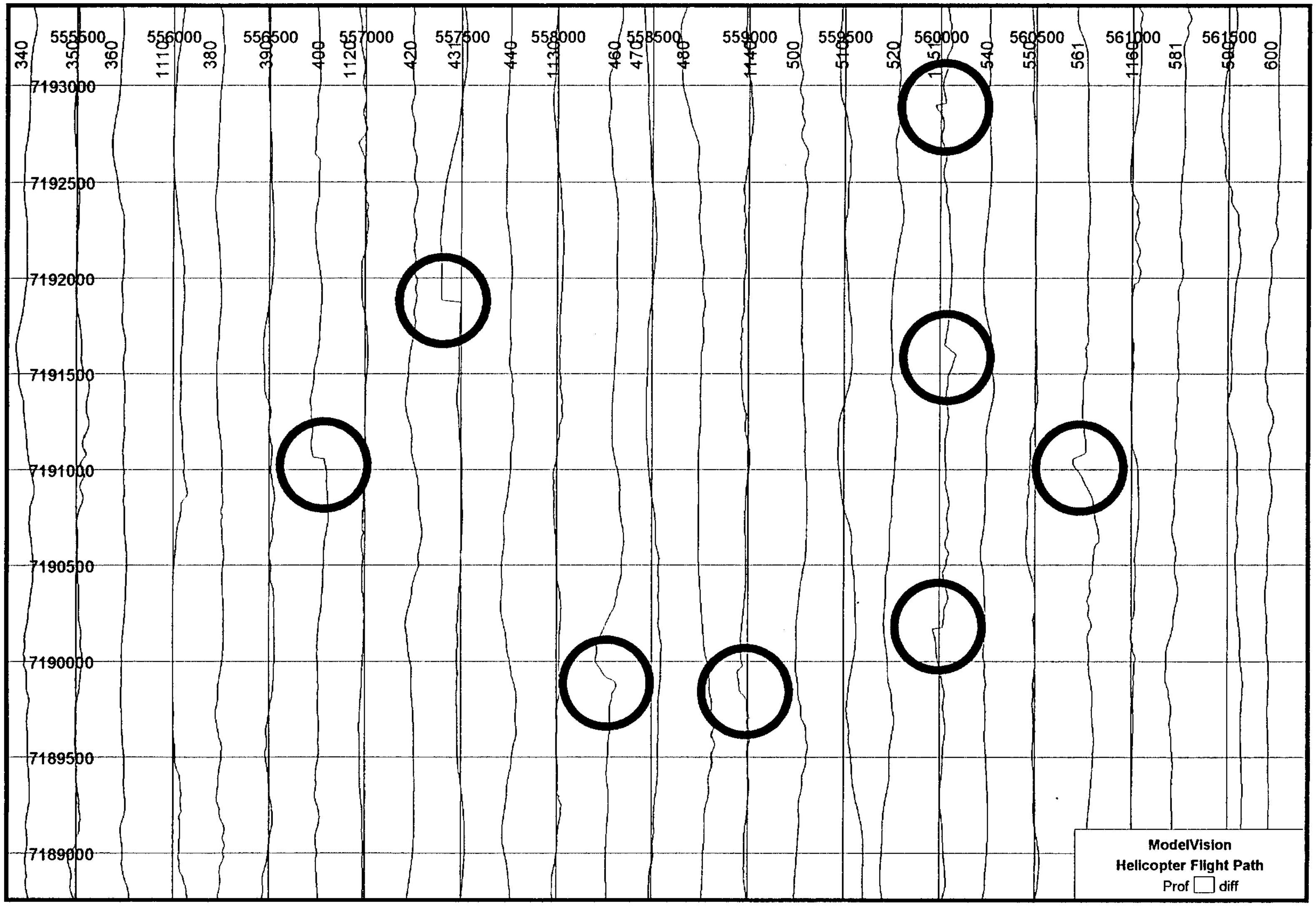


Figure 6 Example of flight path recursion in line 1210, and its effect on data quality (nT units, UTM map grid values).

Lack of line continuity from the Reconnaissance Survey into the Extension Area created problems with line based analysis procedures and made integration of the two parts of the survey more difficult in terms of magnetic datum adjustment.

3.1.2 Specialised Processing and Image Production

3.1.2.1 Median Filtering and Upward Continuation

To improve the continuity of features in the magnetic images, two sets of filters were applied to the magnetic data using the line based filter procedures in ModelVision. The first was a median spike rejection filter. This removed all the data spikes but had a side effect of clipping some short wavelength anomalies. In general this is not a problem, as most of these small anomalies are within the system noise envelope identified above.

Following the spike removal, an upward continuation procedure was applied to each flight line. This procedure simulates the effect of recording the data at a higher ground clearance. An upward continuation height of 100 metres was chosen to reduce the impact of system noise and near surface magnetic sources that could not be correlated from one line to the next.

Both the upward continued and original magnetic data were used to generate image products for use in map interpretation (see Figures 7 & 8).

3.1.2.2 Regional-Residual Separation

A deep source (9 km) magnetic anomaly dominates the whole area and is of little importance when analysing magnetic sources in the upper 2000 metres of section. Near surface magnetic sources are often better imaged by separation of the contributions from deep sources. This separation process is often called regional-residual separation where the regional is the component contributed by the deep source. The residual is created by subtracting the regional from the magnetic image.

Many methods exist for this process and the one chosen for this project is termed two dimensional (2D) polynomial regional modelling. A polynomial is a mathematical term for a smooth two dimensional surface that has the form:

$$F = a + bx + cy + dx^2 + exy + fy^2 + \dots\dots$$

where x,y are the east and north values and a, b, c, d, e, f, ... are constants determined by the interpreter. The order of the polynomial determines how many highs and lows will be modelled across the area. A fifth order polynomial surface was used in this project which means that the above equation had terms up to X^5 and y^5.

Total Magnetic Intensity

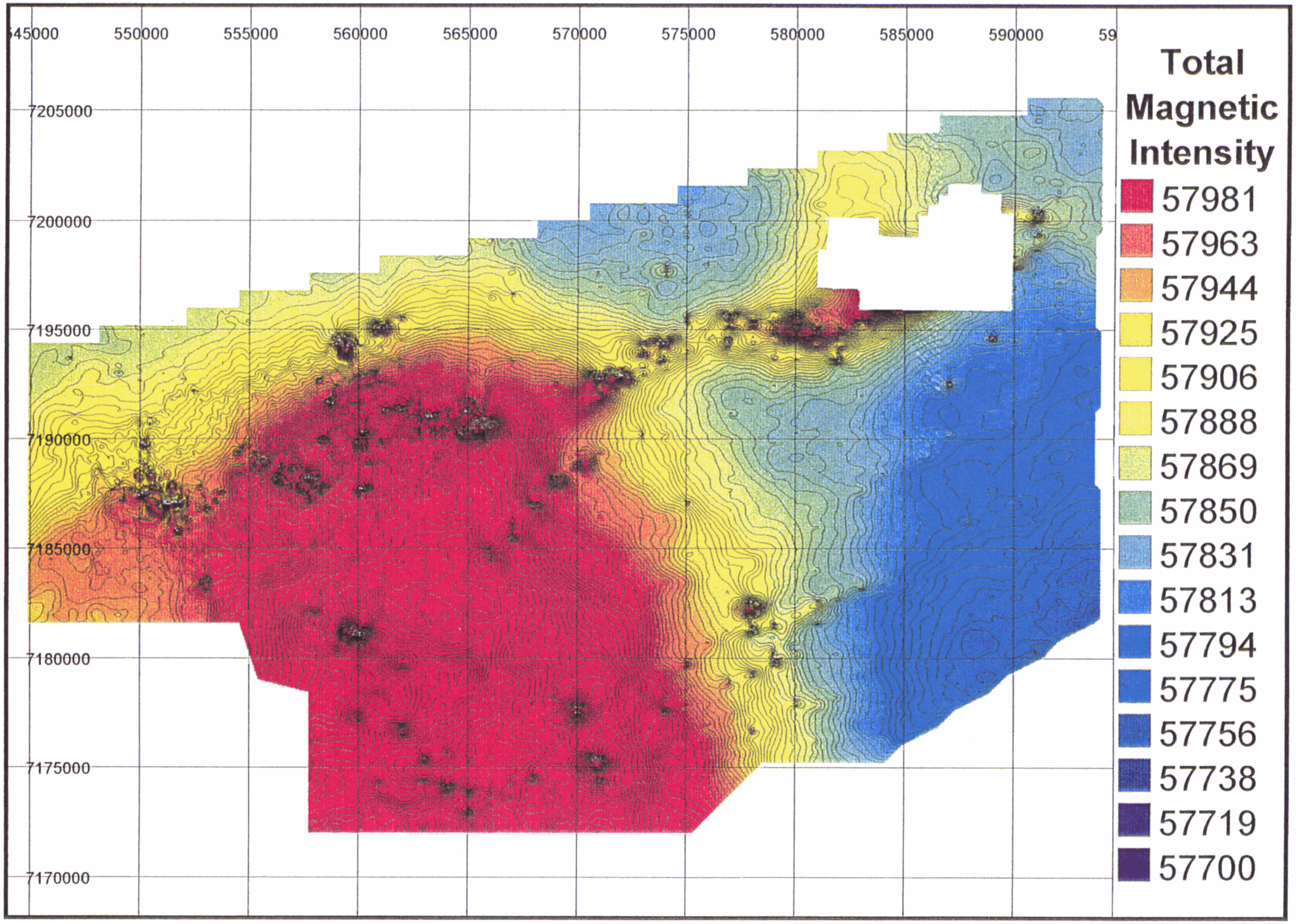


Figure 7 Total magnetic intensity data. Contours in 5 nT intervals.

Upward Continued Magnetic Field

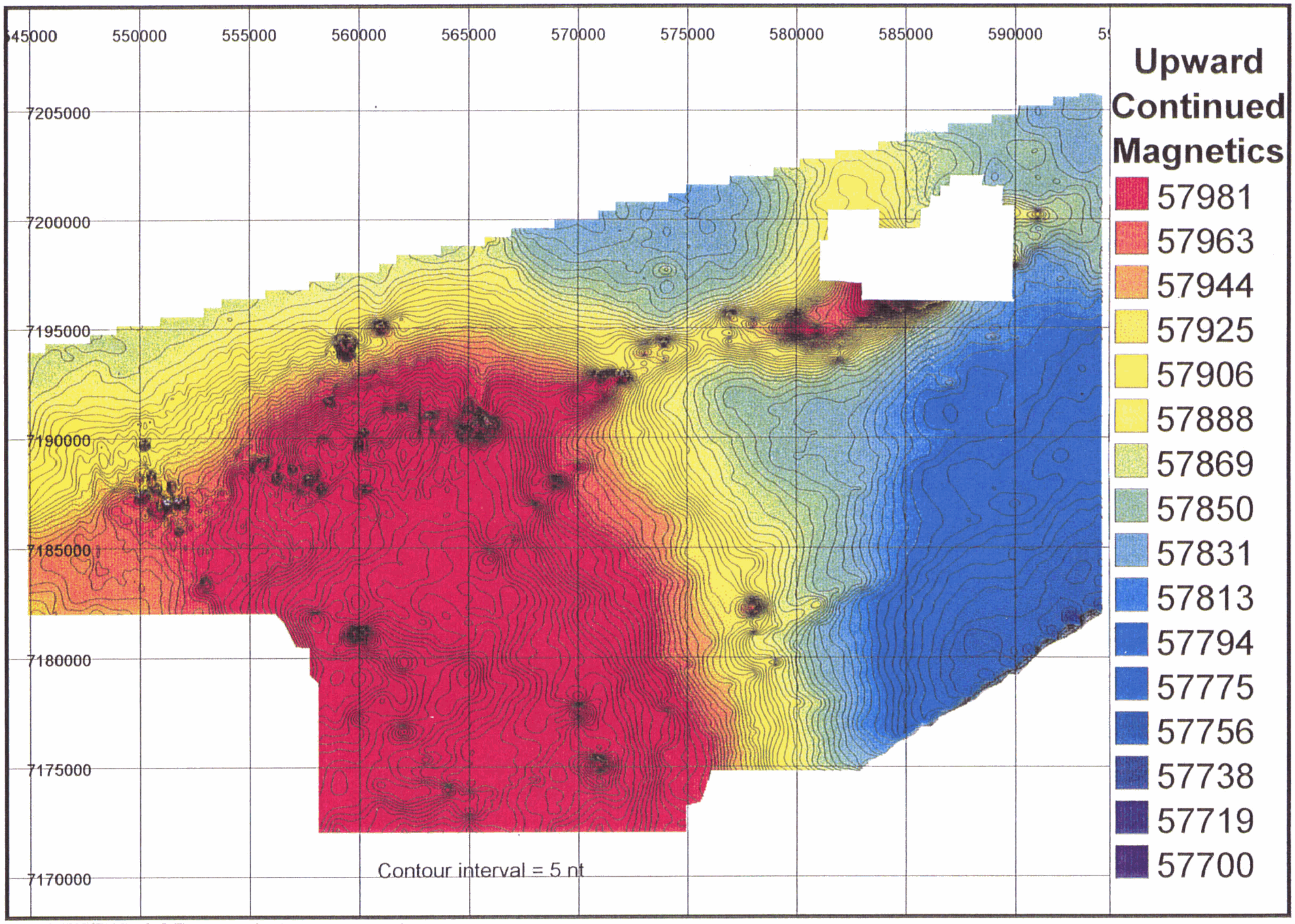


Figure 8 Upward continued total magnetic intensity data (100m). Contours in 5 nT intervals

The surface is constructed interactively but the interpreter does not have to think about the constants in the equation. The task is to create a smooth surface that closely the interpreter's model of the "regional" magnetic field. This surface was computed from the image of the upward continued channel data. The 5th order residual data, and contours of regional data used in its construction, are displayed in Figure 9.

3.1.2.3 First Vertical Derivative

Images of the first vertical derivative (1st VD) of the magnetic field were generated from the upward continued (100m) magnetic image using ER Mapper's Fast Fourier Transform (FFT) image filters. The 1st VD computes the vertical rate of change of the magnetic field. The rate of change is greatest directly over magnetic bodies and emphasises magnetic sources that are close to the surface. Computed values are negative over the top of a magnetic source and are normally inverted so that a positive anomaly is seen over a magnetic source. This inversion has been applied to the 1st VD images.

Application of the 1st VD to the image of unfiltered magnetic data highlighted every minor anomaly peak and contributed to a speckled appearance in the image. Although some noise remains, the image is significantly improved when compared with the 1st VD derived from the unfiltered data.

3.2 Spectrometer Data

3.2.1 Data Quality and Interpretability

The spectrometer system used on this survey contained a 1024 cubic inch NaI(Tl) crystal detector package which is a crystal volume for a helicopter mounted acquisition system. This detector volume, coupled with the low speed of the helicopter, provides good gamma ray counting statistics. No comment is provided by the contractor on logistic problems of the survey or data quality.

Summary statistics for Line 1020 (see Figure 3) and the complete survey are presented in Table 3 below. The average background values for the uranium (U) and thorium (Th) are very low, while potassium (K) is high. Negative minimum values are a result of the contractor processing procedures and low count statistics over some parts of the survey. This is normal for this type of survey.

5th Order Residual Image with Regional & Residual Contours

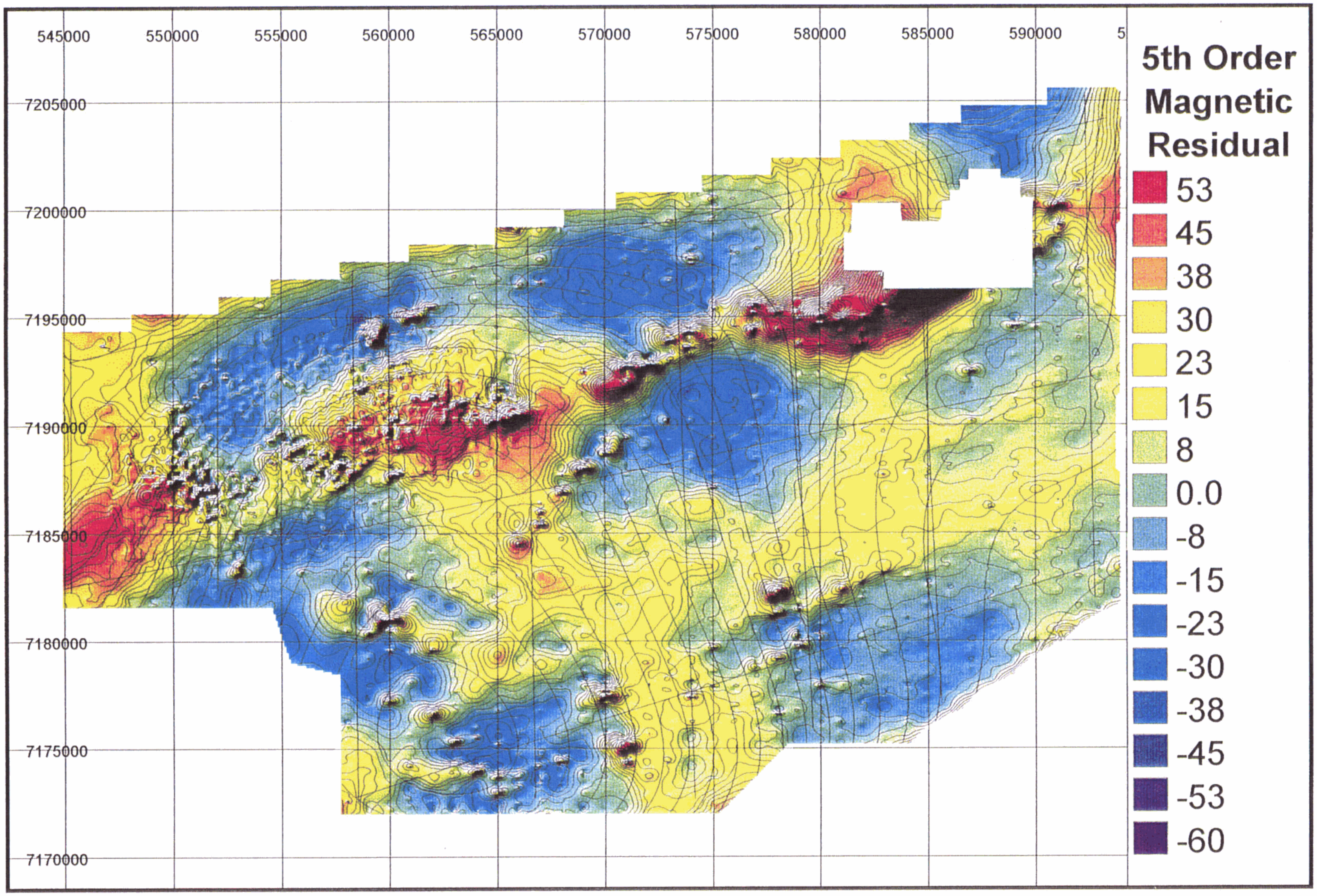


Figure 9 Image showing fifth order residual data, and contours of regional data used to construct the residual. (nT units).

Table 3: Spectrometer Statistics

Channels statistics for Project:

Name	Points	Min	Max	Average	Std. Dev
X	16891	544939.500	564084.313	554970.563	5530.596
Y	16891	7182007.000	7198547.000	7189151.500	4061.553
TC	16891	-27.000	2694.000	610.514	466.208
K	16891	-15.000	374.000	68.500	57.658
U	16891	-6.000	26.000	5.012	4.079
Th	16891	-6.000	55.000	9.019	9.060

Channels statistics for line 1020:

Name	Points	Min	Max	Average	Std. Dev
X	641	546834.625	547060.688	546994.188	29.403
Y	641	7182105.000	7194397.000	7188935.500	3703.008
TC	641	27.000	1389.000	375.863	328.279
K	641	-4.000	199.000	40.916	43.798
U	641	-5.000	16.000	3.554	2.971
Th	641	-3.000	31.000	5.320	5.590

Processing procedures applied by High-Sense Geophysics were appropriate and produced a satisfactory result for this survey. The Extension Survey has a low background for uranium (Figure 10). Background variations can be caused by atmospheric changes in the uranium channel. This type of noise is introduced by atmospheric and cosmic contributions. In fixed wing systems, lead shielded, upward looking crystals are used to monitor this background, but the additional weight is impractical for helicopter systems. The use of tie line processing and more detailed analysis would normally improve the quality of this type of survey. Since tie lines were not flown, the contractor could not attempt second order adjustment of the spectrometer data.

Figure 11 displays the spectrometer data for Line 1020 and provides an indication of the statistical noise levels in each of the channels. The total count (TC) channel provides the most coherent anomaly recognition, followed in order by potassium (K), thorium (Th) and uranium (U). Rapid variations along the line over distances of 100 - 200 metres in the uranium and thorium channels are mainly caused by statistical variations in the gamma ray emissions from the ground surface rather than geological changes. Filtering techniques are required to look at broader changes that are buried in this noisy background.

Low Uranium Background in Extension Survey

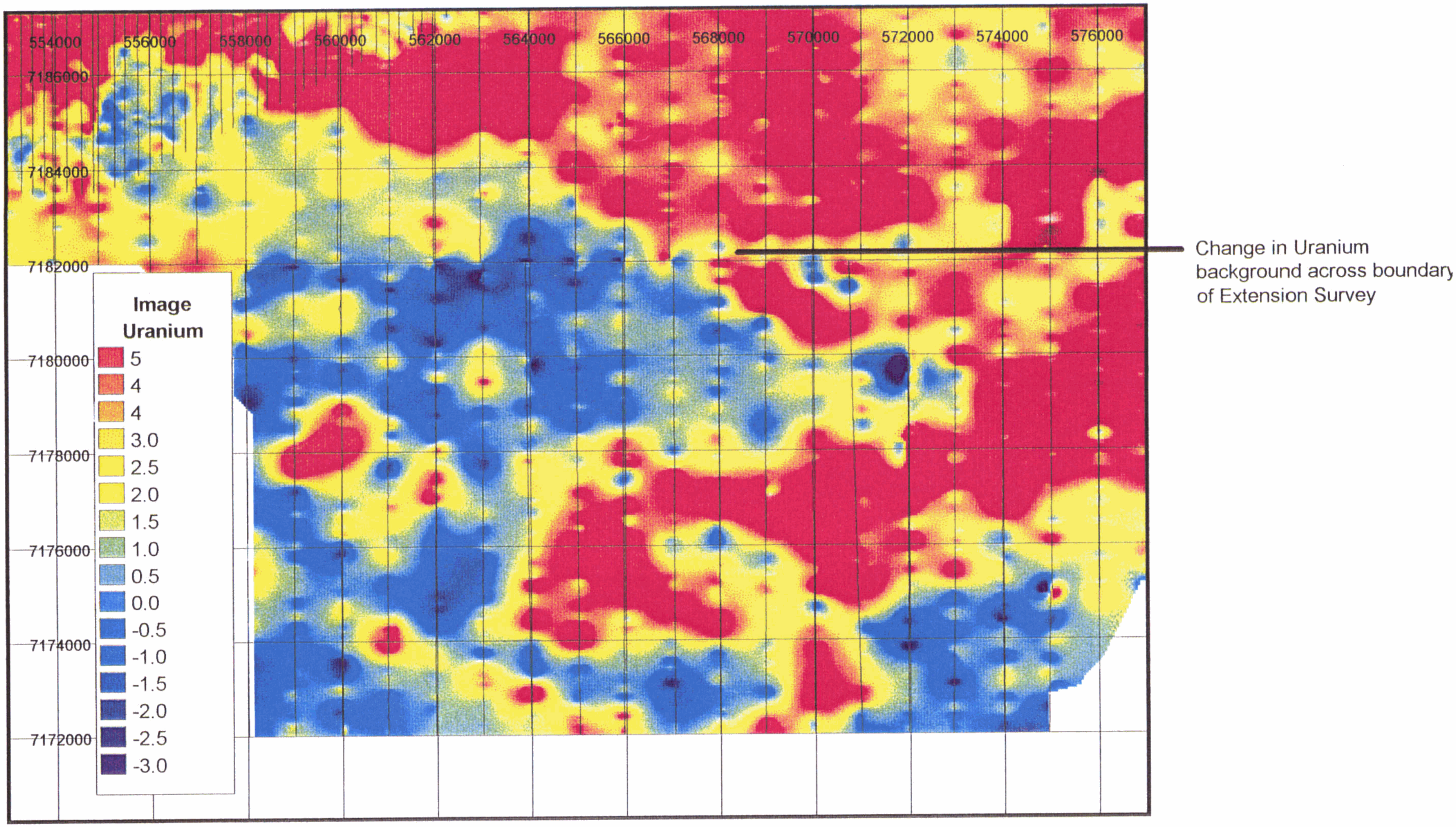


Figure 10 Diagram showing the low uranium background in the extension survey, and the change in data values across the survey boundary (Units: processed counts/sec).

Line 1020 Spectrometer Channels

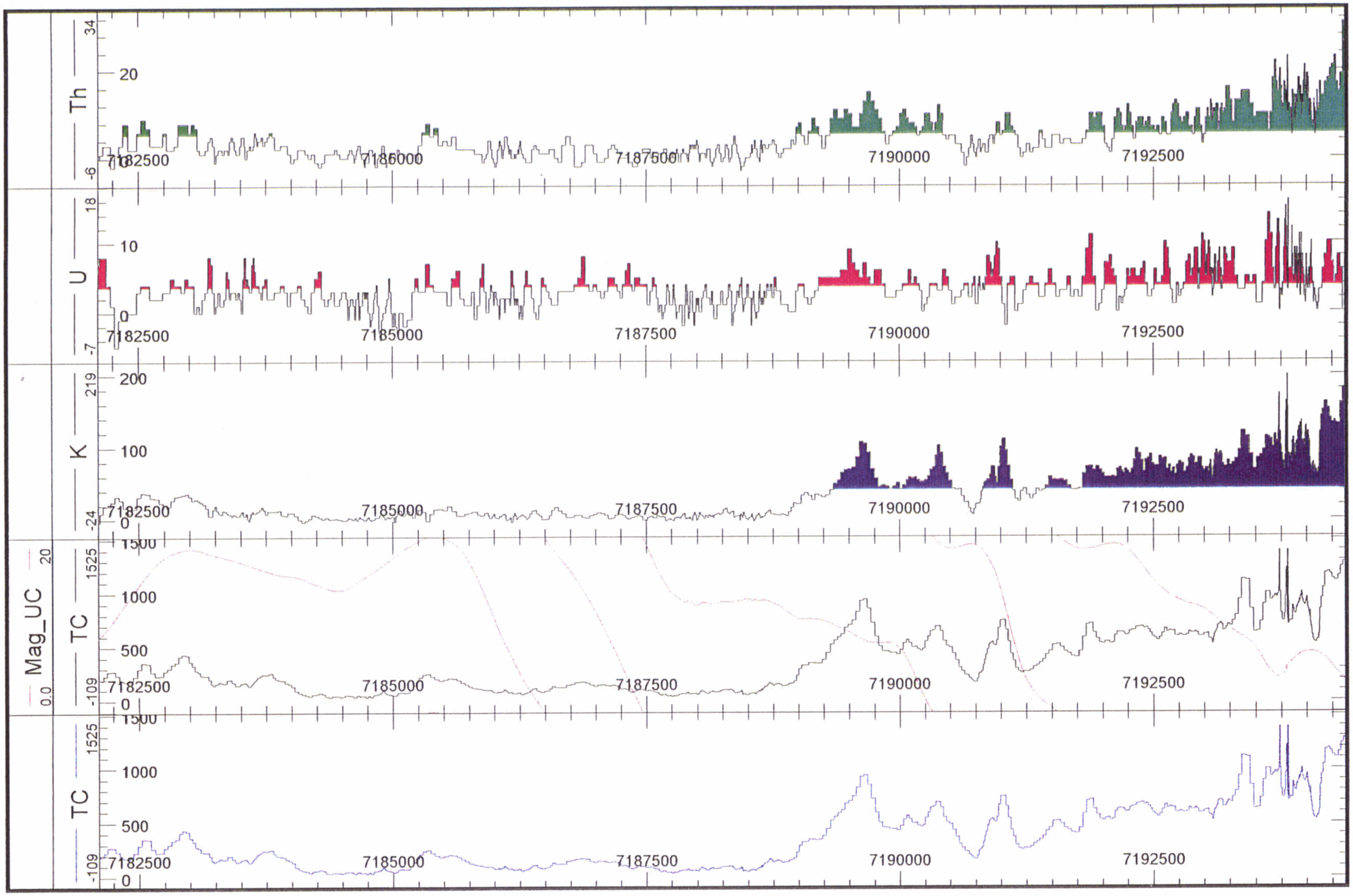


Figure 11 Spectrometer data for Line 1020 showing the statistical noise levels in each of the channels (Units: processed counts/sec and nT).

On the northern end of Line 1020 (right side of Figure 11), the potassium and total count channels show some uncharacteristic noise spikes. These also correlate with noise spikes in the magnetic channel. It is surprising that this type of data problem has not been cleaned up by the survey contractor. This is symptomatic of noise problems throughout the survey.

3.2.2 Image Generation

Images supplied by the contractor exhibited significant noise characteristics and required substantial additional processing prior to interpretation. Each channel was re-gridded using ModelVision™ after applying a light filter to remove noise spikes such as those exhibited in Line 1020.

These grids were then used in the ER Mapper™ image processing system to produce a composite RGB image of the potassium, uranium and thorium channels. Additional image filters were applied to improve the continuity of anomalies between lines. This procedure reduced the visual impact of statistical noise and improved visual continuity associated with changes in outcrop geology.

The brighter and more colourful regions of the image are associated with high count rates, while the darker areas correspond to low count rates (see Total Count inset, Figure 12). Gamma ray emissions are attenuated by the aircraft height, soil cover and vegetation. These attenuations are approximately equivalent for each of the channels and their impact can be minimised by ratio normalisation. Various techniques are available and the method used in this work applies a normalisation in the following manner:

$$U_{rat} = (U+U_{med})/(U + U_{med} + Th + Th_{med} + K + K_{med})$$

where

$U_{med,}$ Th_{med} and K_{med} are the median values for the U, Th and K channels.

Division by the sum of the channels has the effect of compensating for attenuation associated with the factors described above. The values are biased by the median values of the channels to avoid noisy ratios in regions of low or negative count rates. Images 4 and 8 are the result of processing the spectrometer data in this manner.

Two methods of data processing have different applications: ratio images highlight the relative proportions of potassium, uranium and thorium and are useful for delineating processes such as hydrothermal alteration; while the more standard images show both absolute variations in the element concentrations as well as the relative proportions, and are more useful for outlining the distribution of geological units.

Overview Images for Spectrometer Magnetic Residual & Elevation

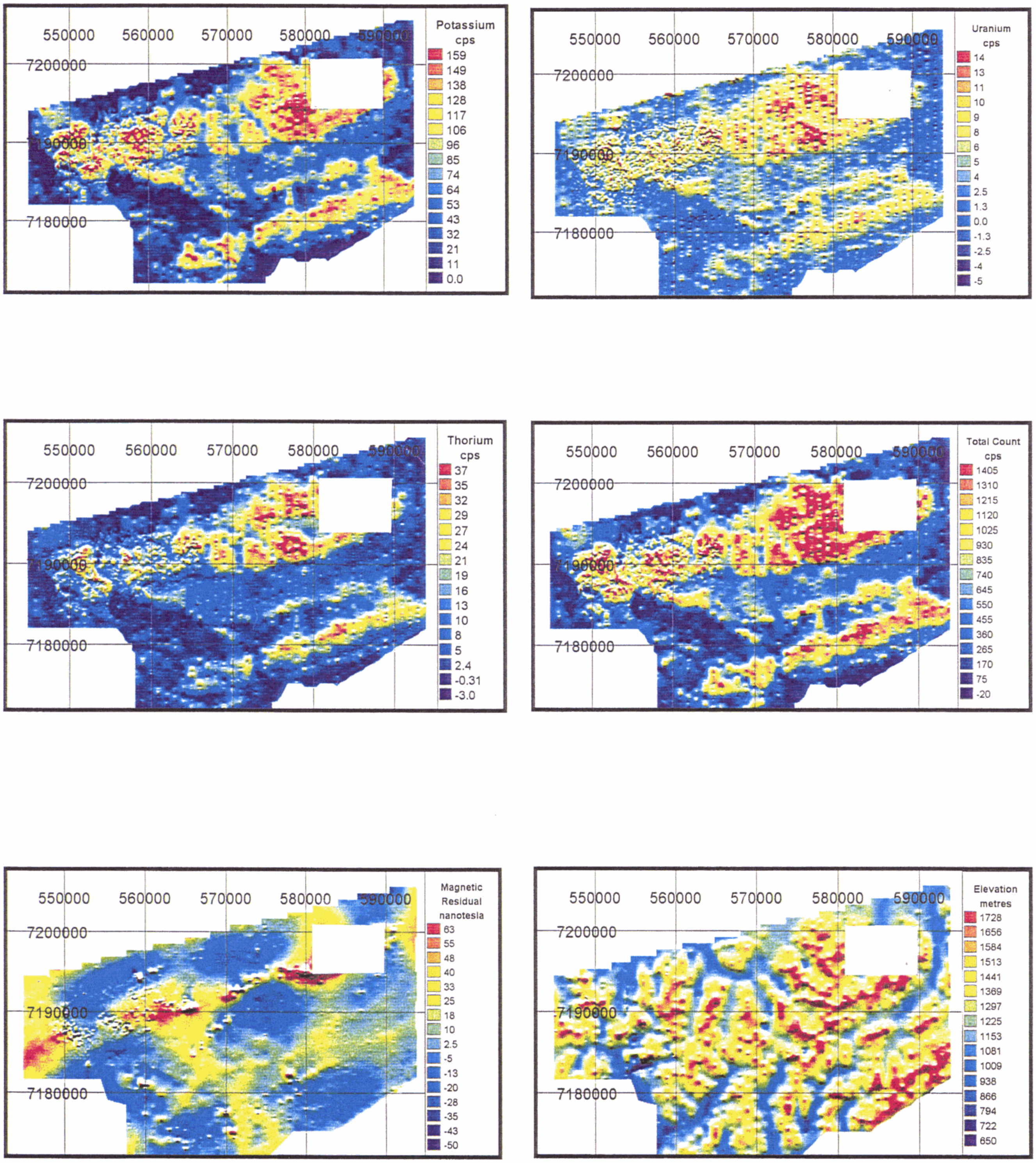


Figure 12 Diagram comparing radiometric survey data, magnetic residual data with ground elevation (Units: counts/sec, nT, metres).

3.3 Elevation Data

3.3.1 Data Quality and Limitations

Terrain elevation was computed from the difference between the GPS helicopter height and radar altimeter readings. Typically the helicopter attitude varies rapidly with large changes in pitch and yaw causing noisy radar altimeter readings. Elevation calculations are noisy as a result, but provide a useful digital product for comparison with the magnetic and spectrometer image products (Figure 12).

3.3.2 Image Generation

An elevation image (Figure 13).was produced in ModelVision and then transferred to the ER Mapper image processing system. The elevations were filtered in ModelVision prior to gridding and further filtered in ER Mapper to produce a coherent image.

Elevations from the detailed survey were omitted from the image as there were significant level shifts from that of the regional survey. This may indicate a problem with the radar altimeter or the GPS height calculations. The latter is probably true and as a result, the height corrections for the spectrometer channels may exhibit related errors. No analysis has been performed to ascertain the significance of this error as it is of secondary importance in the interpretation of the survey results.

3.4 Image Processing

Processing of the raw image data produced in ModelVision™ was performed using the ER Mapper™ image processing system (Appendix B). Many different images were prepared in support of the interpretation and data quality analysis. Only some of the images produced have been included in the report.

Three different image display types have been used in this report:

1. Hue, saturation and intensity (HSI);
2. Grey scale;
3. Red, green and blue (RGB).

The HSI image provides a method of displaying a colour image of the magnetic field, along with highlights and shadows that accentuate the subtle gradients present in the magnetic data. Image colours (hue) range from blue for low magnetic values to red for high magnetic values. The image highlights or light patches are simulating the reflection of light from a topographic

Elevation Image

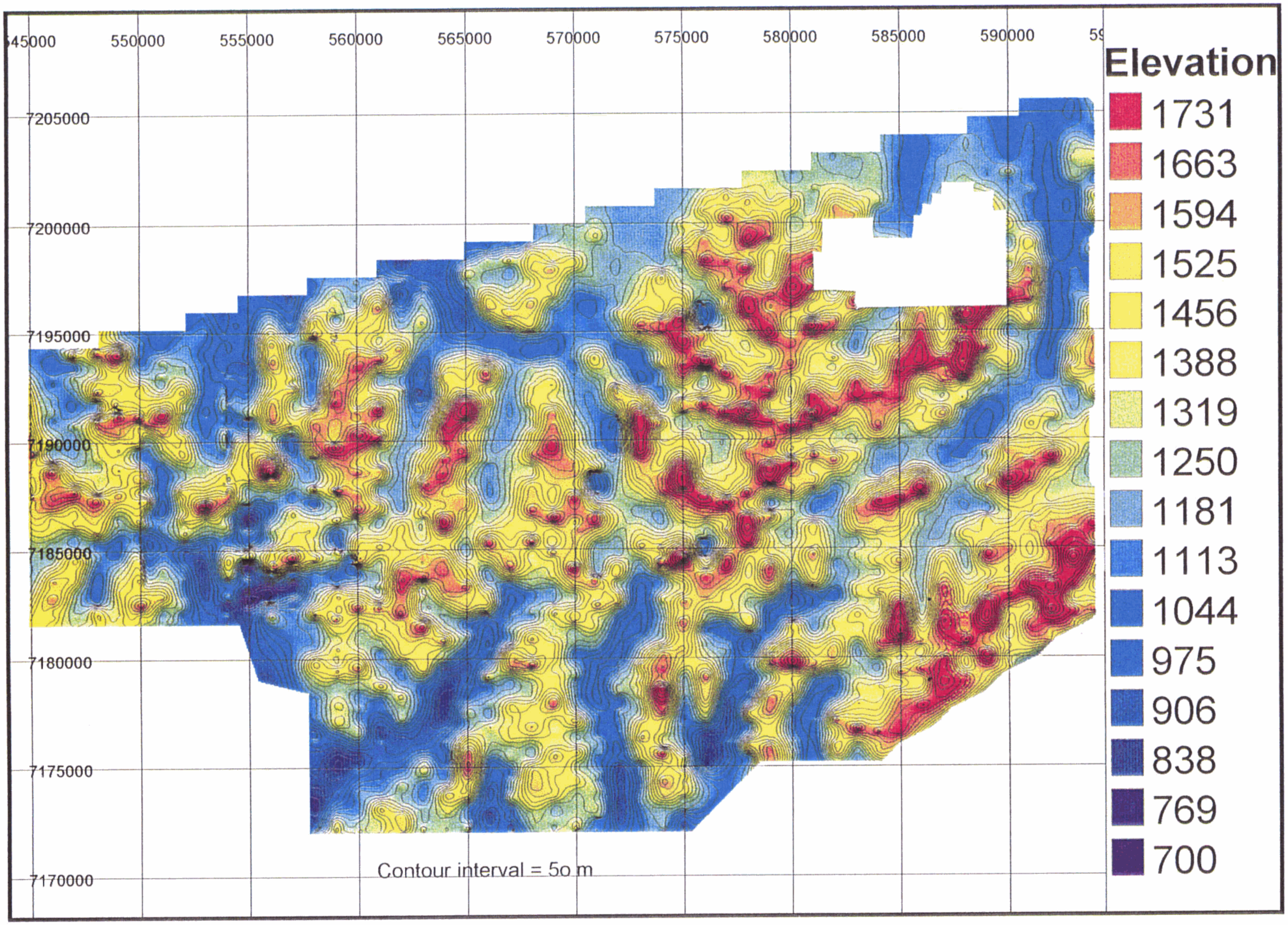


Figure 13 Terrain elevation image, in metres with 50m contours, computed from the difference between GPS helicopter height and radar altimeter readings.

surface (magnetic field). Conversely, the intensity component simulates the shadows that would appear on the opposite side of the topographic highs.

Grey scale images are used to visualise a single image layer as a continuous change in grey tone with amplitude. In some cases, a shadow enhancement procedure is used to highlight subtle changes in gradient. This type of image is useful when mapping subtle trends in the data that might otherwise be obscured in a colour presentation. The direction of illumination is illustrated with an annotated and shaded hemisphere in the legend area of the image.

RGB images are equivalent to the presentation of a standard colour photograph where the red, green and blue components are identical to our visual perception. Image processing allows us to use this colour model for non-photographic data where the red, green and blue channels are mapped to the geophysical measurements. In this case red, green and blue have been used to display the potassium, uranium and thorium spectrometer channels.

4. Geological Interpretation of Geophysical Data

4.1 Interpretation Rationale and Methodology

The approach taken in this study was based on a regional analysis of the sequence and geometry of deformation events, and determination of the timing of mineralisation in that sequence. Such methodology is widely applied to regional target generation for a range of mineral deposits, and has been successful in petroleum exploration and the search for stratiform base metal deposits. Targeting criteria are then developed from a knowledge of the movement directions and likely structural control mechanisms for the mineralising event.

Accordingly, the study has attempted to address the following aspects of the regional to deposit-scale geology:

1. **Regional to Local Structural Patterns** - what is the present structural pattern of the Ogilvie Mountains and Yukon Region? How did it evolve?

2. **Timing** - what was the structural and tectono-stratigraphic event history, and in particular, during which event(s) did the mineralisation take place?

3. **Local Fault Kinematics** - which faults are important in the Ogilvie Mountains area, and what was their detailed movement sense during the mineralising event?

4. **Deposit-scale Structural Controls** - which structural sites were appropriate for localisation of mineralisation, and are therefore potential target areas? Does the available geological or geochemical data provide any evidence for mineralisation in these locations?

5. **Targets and Exploration Strategy** - Identify key locations, or information deficits, for exploration. In conjunction with input from Blackstone, decide which target areas and exploration strategies are likely to be appropriate.

We have identified structures important for the localisation of mineralisation, and the model we propose can be tested and refined. Future work programs can be directed to eliminate information deficits.

4.2 Geological Setting of the Survey Area

4.2.1 General Geological Setting

The information summarised below has been derived from various government, university and company reports supplied by Blackstone Resources. The principal sources of information have been Lane (1990), the Dawson 1:250,000 geological map sheet (Thompson, 1995), and various reports on Blackstone claims by Equity Engineering (Baknes, 1995).

Middle and Late Proterozoic rocks are exposed in the Coal Creek Inlier, an oval-shaped erosional window in the Ogilvie Mountains. The rocks comprise a shallow rift-related sequence of siliciclastics and carbonates, mainly deposited in a shallow water environment. The Proterozoic succession, from youngest (top) to oldest (bottom) comprises:

Mount Harper Group

Fifteenmile Group

Wernecke Supergroup:
- Gillespie Lake Group
- Quartet Group
- Fairchild Group

Two breccia complexes, the Northern Breccia Belt and Southern Breccia Belt, are hosted within this sequence and are closely associated with diorite dykes and plugs. The breccias coincide with changes in dip direction of the Proterozoic sequences, and are recognised as being located within thrust faults. The age of breccia formation and mineralisation is thought to be Proterozoic, on the basis of galena Pb-isotope dating (see Lane, 1990).

4.2.2 Structural Framework - Timing of Brecciation & Mineralisation

The geometry of Proterozoic and Paleozoic formations in the Yukon Territory is that of a typical fold-thrust belt, although the Proterozoic sediments are interpreted to have been deposited in an extensional margin setting. Normal faults and strike-slip transfers, typical of extensional settings, probably developed in the deep basement while the sediments accumulated in the basin forming above. Thrust faults and much of the thrust-fold geometry developed during a compressional event after Mid-Late Proterozoic sediment deposition.

The strike of Proterozoic formations is approximately parallel to their bounding thrusts. The strikes change across the Ogilvie Mountains from WNW in the west, to ENE in the east. Thrusts provide the main sites where breccias are located. A change in the shape and orientation of breccias also occurs from west to east across the region, broadly corresponding with the change in strike of the thrusts and unit contacts.

Intermediate to mafic intrusives, generally referred to as "diorites", are present as dykes and small, irregular-shaped stocks throughout the Ogilvie Mountains. At a number of localities diorites are shown on maps to cross-cut thrust faults between Proterozoic sediment sequences, for example at the eastern end of the Southern Breccia belt (GSC 1:50,000 Provisional Map Sheet 116 B/14, 586000E, 7184000N), indicating that **diorite intrusion post-dated the early thrusting event**.

Diorite dykes mostly strike east-west parallel to thrust-faults, and dip steeply. Some dykes are laterally extensive and continuous for 3-5 km along their east-west strike. Since dykes are extensional structures, they are unlikely to have intruded during compression. Rather, their intrusion is thought to have occurred during a later, approximately N-S extensional event, which would have reactivated the existing thrust faults, and therfore provided dilatent sites in parallel.

Diorites are commonly associated with the breccia bodies. Rare fragments of diorite/mafic intrusives have been found within the breccia, and diorite dykes also cross-cut the breccia. Diorite intrusion is therefore demonstrated to be synchronous with breccia formation. Hydrothermal minerals comprise much of the breccia matrix, and Cu-Au-Ag-Co mineralisation is thought to have occurred during the same breccia forming event. **On the basis of their relationship to the diorites, breccia formation and mineralisation must also have post-dated the main thrusting event.**

Breccias and mineralisation are interpreted to have developed during a weak N-S extensional event after the main thrusting. Normal movement on thrust faults, and interaction with steeply dipping NE trending "cross faults" (identified principally from magnetic data below), created dilational sites in which the breccias developed. Although locally breccias and dykes may be important, at a regional scale their volume is insignificant, indicating the amount of extension was relatively minor (<1%).

The structural framework used in this report is based on the interpretation that breccia formation and mineralisation occurred during a relatively minor extensional event which postdated and reactivated older thrust faults and N to NE trending basement faults. The clear spatial and temporal association between brecciation, diorite intrusion and mineralisation indicates that they are genetically linked. We regard the association with a high level intrusive suite and possibly a large, buried intrusion to be typical of this style of mineralisation, and to be a positive indication of prospectivity for Olympic Dam / Ernest Henry style mineralisation.

4.2.3 Post-mineralisation Sedimentation and Deformation

Sequences of Paleozoic sediments were unconformably deposited on Late Proterozoic sediments. There do not appear to be any localities/exposures where Wernecke Breccias are in depositional contact with Paleozoic rocks in either the Ogilvie or the Wernecke Ranges, constraining the timing of mineralisation and the extensional event to prior to the Paleozoic. However, there are no recorded occurrences of similar breccias on the thrust faults within the Paleozoic sequence, **and we conclude that the breccias are probably pre-Paleozoic in age.**

Thrust faults and folds in the Paleozoic sequences south of the Coal Creek Inlier appear to have developed during a second Paleozoic-?Mesozoic compressional event. Late-stage (?Mesozoic) reactivation of existing basement faults, particularly steep NE trending faults, may have been related to this approximately N-S compression. These have resulted in offsets in Cambro-Ordovician and undifferentiated Paleozoic/Mesozoic sequences, as well as Wernecke Breccia and Proterozoic rocks, at the northern flanks of the Ogilvie Mountains.

4.3 Interpretation of Regional Survey

The interpretation of the geophysical data was carried out, and is presented, at two distinct scales.

1) Images 1 to 4 (1:100,000) were used to provide a picture of the overall magnetic and radiometric character of the area, and of the structural setting and regional structural controls on the distribution of breccias and outcropping mineralisation.

This more regional view is presented first, and the structural interpretation at this scale is presented in Map 1.

2) Images 5 to 8 (1:50,000) of the more detailed Monster survey area were then used to try to develop specific associations between the more detailed ground-based knowledge of the distribution of breccias, faults, diorites and mineralisation and the higher resolution geophysical data in this area. The interpretation of this area is presented in Map 2.

The basic interpretation of the geophysical data is followed by analysis of the structural setting of brecciation and mineralisation, and the development of potential targets. This is synthesised in Map 3.

4.3.1 Overall Magnetic Character

Proterozoic and Paleozoic sediment sequences dominate the geology of the Ogilvie Mountains, but these rocks are generally non-magnetic. In the Total Magnetic Intensity image of the regional survey (Image 1) there are no magnetic features which can be directly attributed to outcropping primary sedimentary units. Instead, the Total Magnetic Intensity image is dominated by a large, broad area of elevated magnetic intensity from a deeply buried source beneath the western half of the survey.

Modelling has been applied in this study in order to constrain the location and strength of the magnetic source responsible for this anomaly. Line locations for all magnetic models applied in this study are shown in Figure 14. Modelled magnetic intensities are in nT units, and the susceptibilities of bodies given in SI units. The broad anomaly under the western survey area is examined in model lines L4, L5, and T6 (Figures 14, 15, and 16). In order to match the observed magnetic field, models require a very large body with a magnetic susceptibility of 0.0377 SI units at a depth of 9000m. The polygonal shape of the body used in the model is shown in Figure 14. The modelling indicates that a very large volume of rock with elevated magnetite concentrations must occur under the western half of the survey.

We interpret this feature to be an intrusive +/- its aureole[*] , and suggest that it may be the source of the small, high level diorite intrusives throughout the area, and possibly the source of mineralising fluids and metals. Although this feature is modelled with a depth

[*] Conversion of the primary iron contents of intruded rocks to magnetite in the high temperature contact zone or aveole of an intrusive characteristically develops an annular high intensity magnetic signature.

of 9000 metres, it could be shallower if the top of the feature is convex upwards - a strong possibility for a pluton of this size.

Other magnetic features in the survey area are of substantially lower magnetic intensity and of much smaller size. These features occur throughout the survey area, but are best developed in association with the Northern Breccia Zone. The largest amplitude of these smaller anomalies occurs within the Blackstone Resources Cookie claim area. In the 5th Order Residual Image (Image 2), which has had the effects of the deep intrusion removed, the Cookie anomaly and other discrete magnetic features are much more prominent, and we have used this presentation of the magnetic data more extensively in our interpretation.

4.3.2 The Magnetic Character of the Mapped Breccia Bodies

The magnetic character of the mapped breccias varies significantly throughout the survey area. For example, the westernmost breccia bodies in the Monster claims area are magnetically subdued, but with subtle high frequency internal magnetic variation. In contrast, the Northern Breccia Zone from the Cookie claims to the Rob claims is consistently associated with, although systematically offset from, a discrete magnetic high. This variation in magnetic character may reflect some or all of the following:

- The breccias have a variable magnetic signature, due to differences in their magnetite:haematite ratio. Variable magnetite might reflect subtle variations in fluid flow and/or fluid chemistry during mineralisation. However, we could not determine an obvious association between recorded surface mineralisation and magnetic features within the breccias.

- The breccias are spatially associated with a different magnetic source, for example diorite, but are not necessarily the magnetic source themselves. However, the diorites seem to be equally variably magnetic. Most of the larger mapped diorite bodies appear to be non-magnetic or very weakly magnetic. On the other hand, and as described below, some of the smaller magnetic anomalies in the Monster claims appear to correspond to outcropping diorite.

- The area of breccia bodies mapped at the surface does not reflect the sub-surface volume of breccia, and therefore of magnetic source material, at various locations. There is sufficient relief in the area to discount this as a significant contribution to the variation in high frequency (ie, very near surface) magnetic character of the breccias.

Model Line Locations

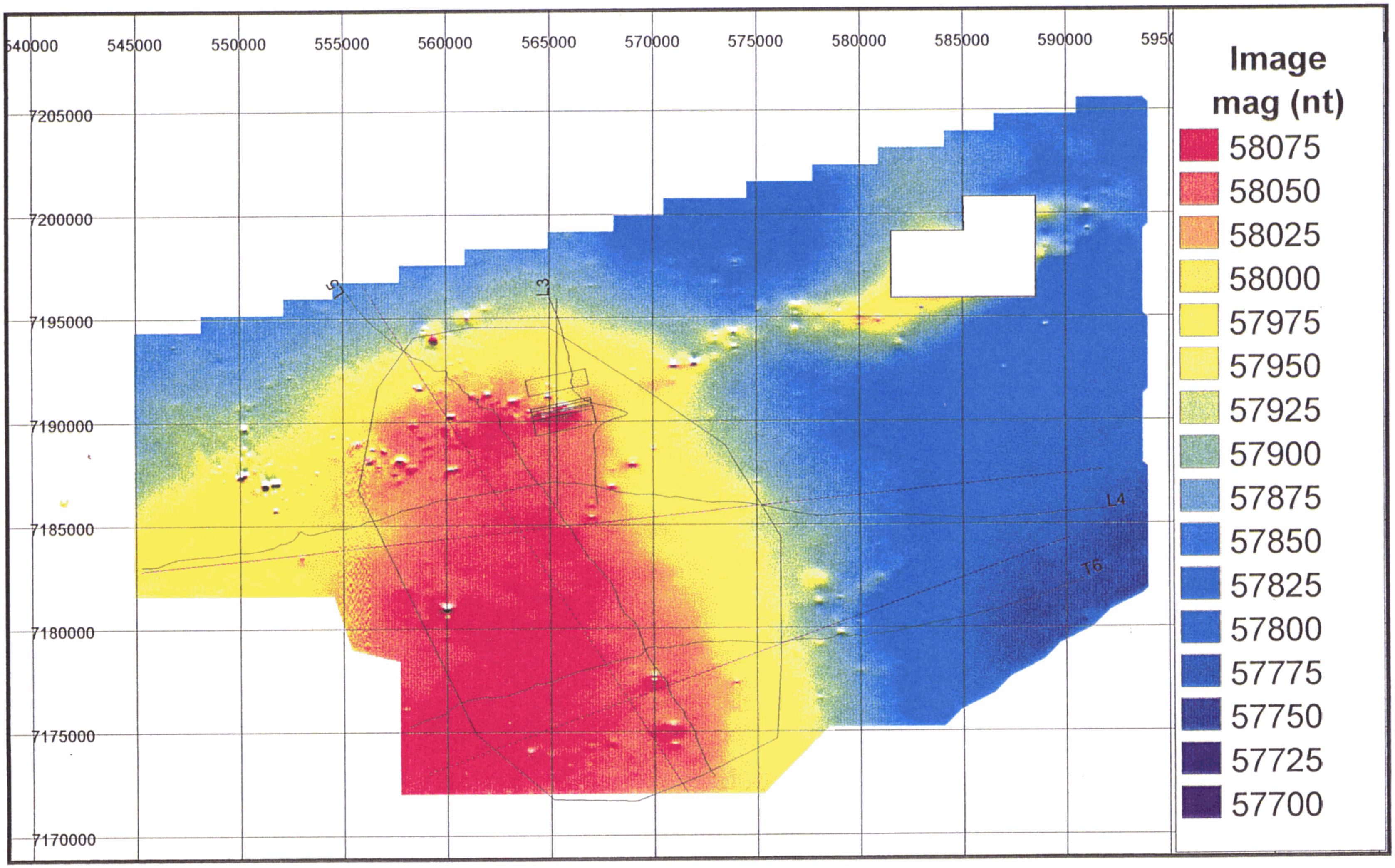


Figure 14 Map view of the magnetic modelling line location, and the outline of bodies used in the models.

Deep Source Magnetic Model

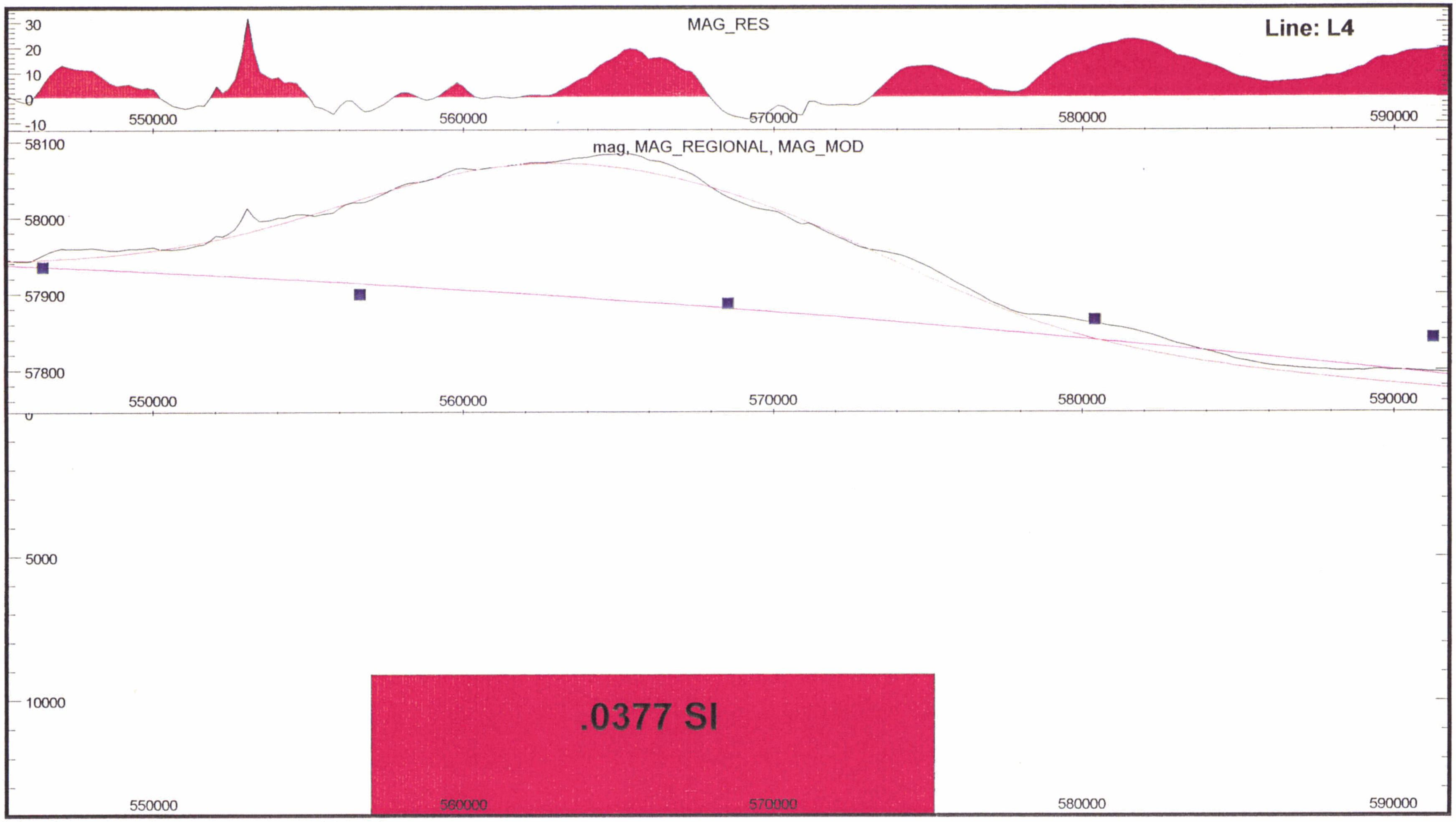


Figure 15 Model Line L4, across the large deep source body.

Deep Source Magnetic Model

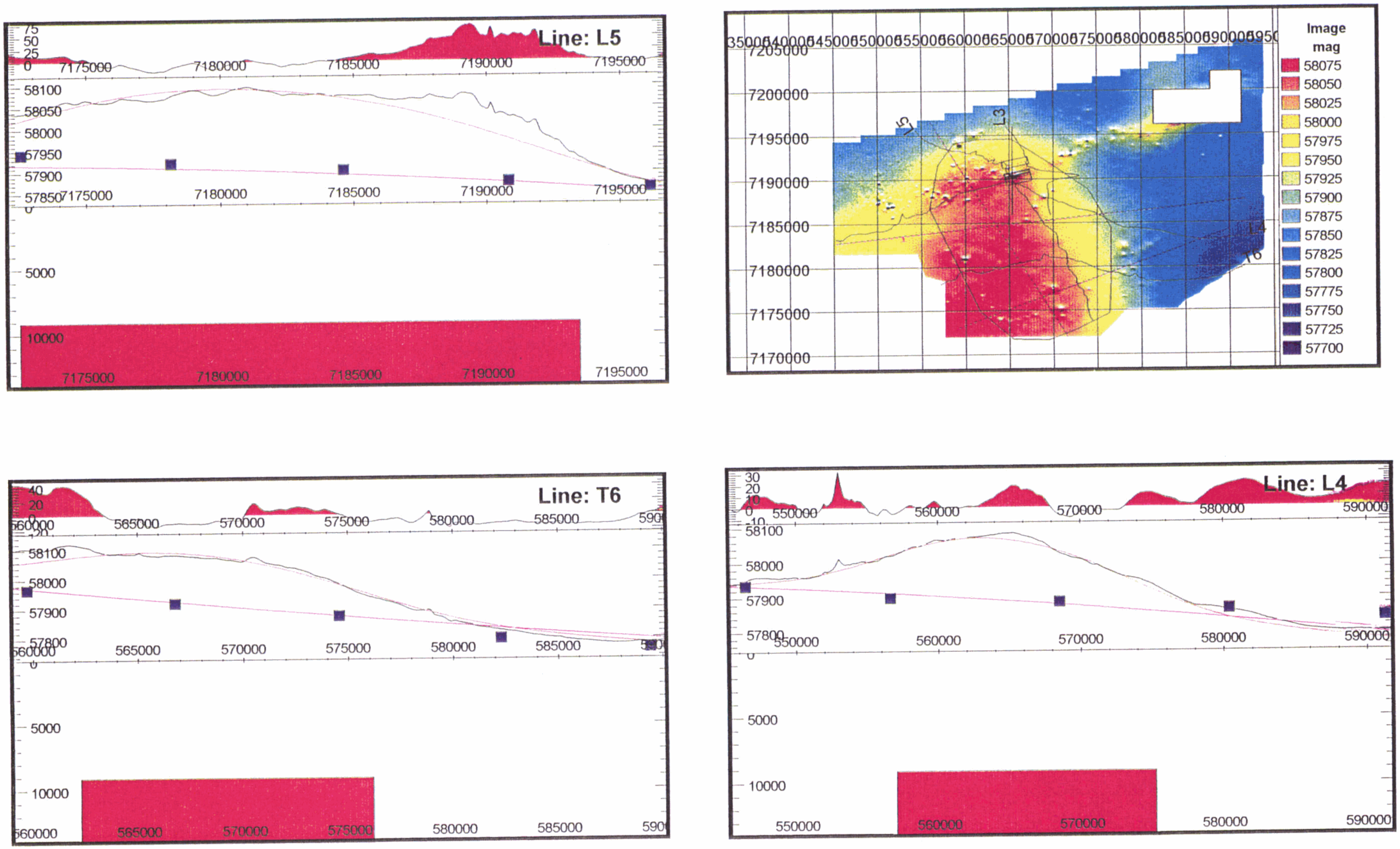


Figure 16 Model Lines L4, L5, T6, across the deep magnetic source.

We note that there is substantially more detailed variation in the magnetic character associated with the breccias in the detailed survey area over the Monster claims. It is likely that such detail is present elsewhere, but is not resolved where the flight line spacing was 1000m.

The Cookie and other smaller individual anomalies, form part of a complex zone of elevated magnetic intensity which corresponds approximately to the Northern Breccia Zone along the Monster Fault. In detail, the structure of this zone as mapped from the magnetics, appears to be more complex than represented on the geological maps. The zone comprises a series of en-echelon, approximately E-W trending segments which are systematically offset on NE trending cross structures. This contrasts with the smoothly continuous, although quite strike-variable, representation of the breccia zones on the geological maps (eg, Lane, 1990).

The Southern Breccia Zone is of significantly lower magnetic intensity, being almost unresolvable even in the residual image at its eastern end. Like the northern zone, the magnetic feature is offset systematically from the mapped fault and breccia zone, a characteristic which we discuss below.

4.3.3 Modelling of the Cookie Anomaly

The Cookie anomaly was modelled with line L3 (Figures 14, 19). The anomaly is an intermediate amplitude magnetic feature that has magnetic sources quite close to the surface. The dominant magnetic source (0.012 SI - shown in blue) is less than 200 metres from the ground surface, while a secondary source (0.031 SI - red) has a higher magnetic susceptibility and is 150 metres deeper. These sources are very close together and the precision of modelling for the deeper body is limited. Some variations in position, dip and shape are possible for this magnetic source.

Most geophysical literature focuses on the magnetic properties of magnetite, as this is normally the major contributor to magnetic anomalies encountered in magnetic surveys. Pure magnetite susceptibilities range from 1.2 to 20 SI units. Haematite is also magnetic but susceptibilities are much lower and range between 0 and 0.04 SI units. When these minerals are diluted in a host rock the magnetic properties will be proportionally lower. Although the total magnetic amplitude of anomalies along the Monster Fault are not very large (cf. 5^{th} order residual anomalies), the very low susceptibility of the haematitic breccias in outcrop suggests that most of the magnetic signature is from magnetite.

Magnetic susceptibilities estimated for the more intense magnetic sources, such as that in the Cookie area, are too high to be due to haematite alone, and are probably related to increased concentrations of magnetite.

Line 3 Magnetic Model

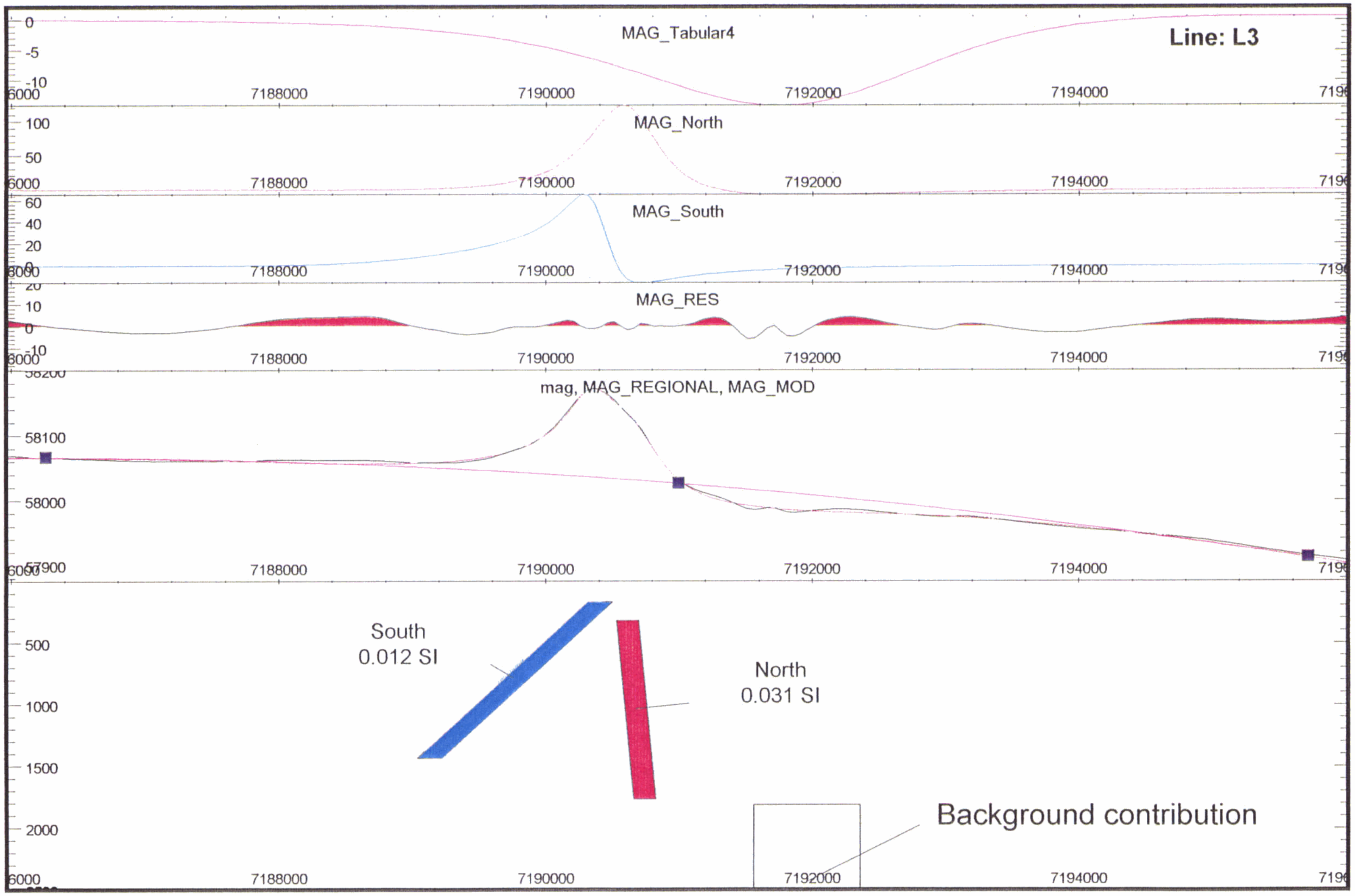


Figure 19 Model Line L3, across the Cookie anomaly.

The amplitude of the Cookie anomaly strongly suggests that it corresponds to magnetite-bearing sources. Preliminary modelling of this source indicates that it contains approximately 5 - 10% magnetite, it is blind with depth to top of 100 to 200 meters, and that it has a depth extent of at least several hundred metres. It is not known whether the sources of this and other anomalies are related to hydrothermal magnetite within the breccias or magnetite-bearing intrusives. However, we favour the former because magnetite has been described from the breccias, and most of the outcropping intrusives appear to be weakly to non-magnetic.

4.3.4 Other Anomalies in Regional Survey

The area south of the Monster claims, above the centre of the inferred deep intrusive body, contains a number of small, discrete, low amplitude magnetic anomalies. These features are more prominent in the 5th Order Residual Image (Image 2), and represent sources at or within a few hundred meters of the surface. They extend well into the Extension Survey area. Some of these correspond to outcropping breccia bodies, such as those in the Southern Breccia Belt, and others appear to be unrelated to any mapped or imaged feature.

A series of anomalies are aligned in a NE trend, 5 km to the south of the Monster Property. This array of apparently discrete anomalies may be more continuous than appears on the images. At the relatively large flight line spacing (1000m) in this area, linear magnetic features tend to break up into individual anomalies where the flight lines cross the linear feature. This is a function of the gridding process which interpolates between the flight lines. The anomalies do not correspond directly with any obvious mapped breccia or other known geological features. They are aligned in a NE direction, along a more extensive magnetic linear which is interpreted to be a major basement fault zone at depth. This structure may be prospective where magnetic, and we recommend ground follow up and possible claim acquisition along it (see below).

4.3.5 Regional Radiometric Character

Subtle colour variations in the 1:100,000 Normalised Radiometrics Image (Image 4), correspond broadly with major stratigraphic units. The general features of their relative chemistry are as follows:

- Paleozoic sediments - high uranium
- Upper Fifteenmile Group - moderate uranium
- Lower Fifteenmile Group - moderate uranium & potassium (variable)
- Gillespie Lake Group - moderate potassium (variable)
- Quartet Group - high thorium
- Fairchild Group - moderate to high potassium (variable)
- Wernecke Breccia - low, or moderate-high potassium

However, the principal value of the radiometric data is to map hydrothermal alteration. The breccias are known to be potassically altered, containing K-feldspar and some sericite (Lane, 1990; Baknes, 1995) This style of mineralisation is also commonly elevated in uranium (eg, Olympic Dam, Ernest Henry).

Areas of elevated potassium in the radiometrics image (Image 4) are shown in red. The red areas in the Monster claims area in the west of the survey correspond quite well to areas of mapped breccia, and these correlations are discussed below in the context of the detailed survey there.

In contrast, the Northern Breccia Belt between the Cookie and the Rob claims is barely distinguishable on the regional radiometrics image (Image 4). The large patch of elevated potassium centred at about 580000E;7195000N corresponds to a window into the Fairchild Group, which is shown on the geological maps to be largely unbrecciated. Similarly, the Southern Breccia Belt is not well imaged in Image 4, although several patches of breccia in and immediately adjacent to the southern extension survey area do show as potassium highs.

The rather poor correlation of breccia with elevated potassium outside the Monster detailed survey area is probably partly a function of the broader line spacing in the regional survey, together with some variation in the intensity of potassium alteration in the breccias. The relatively small footprint of the radiometric 'sample' compared to the line spacing of 1000m means that the sampling statistics over narrow, variably potassic parts of the breccia system are not ideal. The limitations of outcrop and scree thickness will also impact on the effectiveness of radiometrics to precisely record the distribution of potassic alteration. **However, the radiometric data do indicate that the extent and intensity of potassium alteration in the breccias are variable. It would be useful to investigate possible field correlations of this variability with elevated copper and/or cobalt values (see discussion of detailed survey area below).**

At the regional scale, there is no evidence of selective enrichment or depletion in either uranium or thorium within the main breccia zones.

4.3.6 Structural Interpretation of Regional Magnetic Data

The structural interpretation of the regional geophysical data is shown in Map 1. The interpretation was derived from a range of image and contour presentations of the magnetic data, with limited input from the radiometric data. Images 1 to 4 are the presentations from which most of the information was gleaned, with particular emphasis for structural features on Images 2 and 3.

The principal outcome of the structural interpretation has been the recognition and mapping of a number of north to northeast trending faults which segment the thrust faults that are emphasised in the previously structural mapping. Very few of the north to northeast trending faults appear on the geological maps, but short segments have been mapped and do correlate well with the magnetically mapped features. Most importantly, the intersections between the north to northeast trending faults and the thrust structures appear to be a first order control on enhanced brecciation and mineralisation.

4.3.6.1 The Northern Breccia Belt

The northern breccia belt has an overall east-northeast strike, forming a relatively linear trace on regional scale maps. In detail, however, the belt is **segmented** (Figure 20), comprising an en-echelon series of 2-4 km long segments, trending mostly E-W in the east, and NW-SE in the west. Outcrop patterns on detailed 1:50 000 scale geological maps (GSC Open File 2489) have smaller variations at c.1km scales, which are caused by the mountainous topography. The mapped outcrop patterns suggest that many of the breccia bodies in the northern breccia belt dip to the south, at angles as low as 20°. Geological maps also show the belt to be cross-cut and segmented by NE striking faults, and some N and NW striking faults.

The eastern end of the breccia belt, from the Rob to the Truk claims, has a different structure to the western part of the belt in the Monster claims area. In the east, Proterozoic strata strike ENE and dip away in opposite directions on either side of the belt, whereas in the west the strata strike in a more WNW orientation and have variable dip. A steeply dipping axial cleavage strikes c.075° throughout the Northern Breccia belt's host-rocks. The change in host-rock structure is reflected in the shape and size of the breccia bodies (Figure 20), and corresponding changes in their magnetic signature..

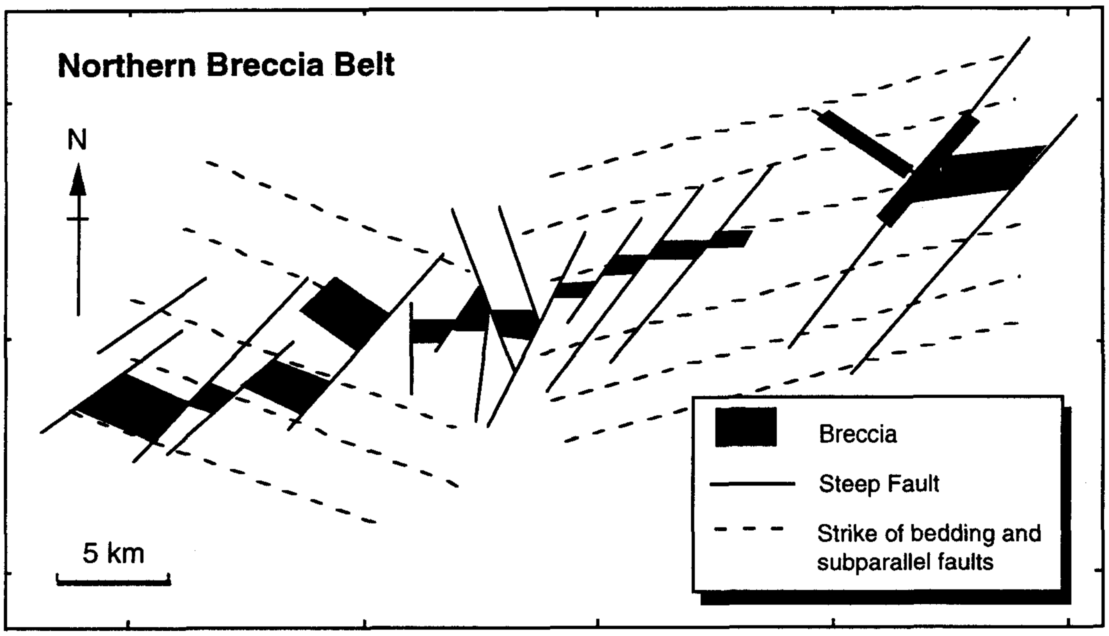


Figure 20: Cartoon summarising the shape of breccia bodies in plan view, and the main structural features of their host-rocks. Notice the change in character of the breccia belts from east to west. Similar variations occur in the Southern Breccia Belt.

In the 5th Order Residual Image (Image 2), which has had the magnetic effects of a deep intrusion removed to amplify small-scale magnetic features, a broad zone of elevated magnetic intensity corresponds approximately to the location of the Northern Breccia Belt. However in detail, the crest of this magnetic high is systematically displaced about 1 km to the south of the mapped surface exposures of breccia, on its down dip side (Map 3).

Although offsets between magnetic source and anomaly peak are common at equatorial latitudes due to a low inclination of the earth's magnetic field, they are unlikely to occur for this reason in the Yukon region (where inclination of the earth's field is about 80°). The source of the magnetic high must therefore be offset from the surface position of the breccia. **Since the offset is consistently to the south of the surface expression of the south-dipping structure, and the magnetic anomalies show some evidence of not being sourced at the surface, we conclude that the more magnetic material must lie down dip within the breccia.**

The Northern Breccia Belt is a segmented, weakly to moderately magnetic feature, comprising a series of 2-4km long, en-echelon bodies. Segmentation occurs across north to northeast striking faults. Offset between surface geology and the magnetic high indicates that much of the source of the magnetic high lies down dip of the surface breccia on the south dipping Monster Fault. The most prominent magnetic feature occurs within and immediately adjacent to the Cookie claim.

Distinctive areas of variable magnetic signature occur within the detailed survey of the Monster Property. In detail these areas only approximately correspond with the mapped surface exposure of the breccia (Map 2), indicating that some breccias exposed at the surface are thin. Breccias in the Monster Southwest and Monster West generally have a low intensity, but magnetically 'rough' signature, which is different from the more elevated magnetic signatures associated with breccias further east (Monster East, Cookie, Truk, Scary).

4.3.6.2 The Southern Breccia Belt

The Southern Breccia Belt consists of ten small bodies of breccia which are also aligned in an ENE trend. The southern belt is structurally similar to its northern equivalent, with the style of breccia bodies different in the east and west, and with segmentation of the belt on northeast trending structures.

The easternmost body of breccia crops out in the Movie claim. It is tabular, and bounded by faults striking NNE and NE. The relationship between outcrop patterns and topography indicate that the faults (and breccia) dip steeply to the north. The distribution of Proterozoic sediments, with the younger Lower Fifteen Mile Group to the north downthrown relative to the older Quartet Group at the south, suggests there has been quite a lot of normal/extensional movement on the fault. Minor magnetic highs in Image 2 occur to the north of the breccia surface exposure, on its down dip side, consistent with increased susceptibility/magnetite content with depth.

A small breccia body in the Gila claim is associated with a magnetic high which is displaced to the south of the breccia's surface exposure. This may indicate the body has a southward plunge and increasing magnetite with depth. Alternatively, the anomaly may be related to a diorite dyke in the breccia, and could be explained if a buried diorite body containing magnetite was present to the south of the claim.

Bodies of breccia forming the western end of the Southern Breccia Belt are irregular in shape and variably magnetic. Some are associated with strong magnetic highs, whereas others have little or no magnetic signature at all. The breccias which are magnetic, are those which occur on regional-scale magnetic lineaments interpreted as major crustal fault zones.

Breccias of the Southern Belt which are magnetic, generally appear to be those which are located on/near deep basement structures and major crustal faults. However, this may reflect the presence of diorites rather than mineralisation. If a direct link can be made between deep crustal structures and the sourcing and passage of metalliferous fluids, it will provide an important targeting criterion that can be used in conjunction with EHW's structural interpretation.

4.3.6.3 Regional Structure

The structural framework as mapped from the various magnetics images is displayed in Map 1. The main structural features that are recognised and mapped throughout the regional survey area are as follows.

1) A suite of approximately subtle NE trending, linear features occur throughout the survey area. These discontinuous and branching linear features;

   - offset the magnetic expression of both the northern and southern breccia belts,
   - link the separate breccia bodies in the Monster claims,
   - contain discrete magnetic sources away from the breccia belts, and
   - appear to partly control the locations of both the thicker breccia bodies and the more major parts of the breccia system (eg, Cookie claim area).

2) The magnetic linears are interpreted to be faults or fault zones, probably related to repeated reactivation of old basement structures. We consider that they probably formed during the rift event that generated the mid-Proterozoic basin into which the main sedimentary sequence was deposited. The faults are quite complex and variably developed in the surface geology, but there are a sufficient number of occrrances where they clearly offset contacts, correspond to mapped fault segments, or match linear valleys, that we are confident that they are indeed faults. Their lack of apparent continuity and the systematic offset in the surface geology is consistent with their interpretation as a consequence of mild reactivation of basement structures.

3) There are three main northeast trending fault zones (Map 1) -

   - one that marks the western termination of the Southern Breccia Belt and passes NE through the Rob claims and into the northeasternmost corner of the survey area.
   - a second zone passes through the centre of the survey area, contains the NE trending array of magnetic features south of Cookie and passes through the Truk and Scary claims.
   - the westernmost zone is broader and more complex and encompasses and segments the breccia bodies within the Monster and Cookie claims. This

zone is discussed and interpreted in more detail within the detailed survey area below (Map 2).

4) A complex, diffuse array about 5 to 10 km wide of discontinuous, north-trending linears passes through the centre of the survey area, and corresponds broadly with the overall change in strike of the Proterozoic units and associated thrusts from northwest in the west to ENE in the east. Two of the north-south linears bracket the Cookie claims area.

5) Other short magnetic linears are approximately parallel to the strike of the Proterozoic units and thrusts in the area.

The magnetics have, in our view, provided a reasonably complete picture of the principal structural features in the area, especially when integrated with the mapped geology. This structural framework is integrated with other geological and exploration data in order to develop an exploration strategy and targeting recommendations in section 5 (see also Map 3).

4.3.7 Magnetic Signature of Diorites

Unaltered diorites comprise inter-grown plagioclase and interstitial hornblende, with minor quartz and **local magnetite**. They are variably altered and commonly chloritized. Where altered, they generally contain minor haematite, and it is expected that any primary magnetite will have been destroyed. Lithological descriptions of diorites refer to variable magnetite content and alteration, so that it is expected that they **should have highly variable magnetic susceptibility**.

The geophysical survey has provided conflicting evidence as to the magnetic signature of diorites, consistent with the very variable degree of alteration and magnetite destruction. In the detailed Monster Property survey (Map 2), there is typically a magnetic high corresponding to areas where larger bodies of diorite have been either mapped or described. Good examples are in the Monster Southwest area (551500E 7187000N) and about a large irregular stock in the Monster West (556500E 7188500N). Highs attributed to diorite have been identified with a "D" in Map 2. There are other localities in the detailed survey where magnetic highs occur of a similar size, but no diorite has been described - presumably either diorite is not exposed at the surface and has not been recognised in geological mapping, or these magnetic highs relate to another type of magnetic source. These magnetic highs are identified in Map 2 with "H" or "U" (source unknown).

In the regional survey, with wider line spacing, the relationship between diorites and magnetic highs is opposite to the detailed survey. Diorite dykes have no corresponding magnetic signature in the regional survey, even though some are of significant lateral extent, over 4 km along strike (eg. 561000E 71945000N and 565000E 7193250N). Either these dykes are non-magnetic, the dykes are not big/thick enough to show up at the scale of the survey, or possibly their signature is similar to noise spikes and was "removed" during data smoothing/processing. There are one or two anomalies in the regional survey, which have associated diorites which might extend to larger bodies at depth (e.g. in Gila claim).

Diorite intrusions account for some of the magnetic highs in the detailed survey, and may be significant magnetic sources, but laterally extensive dykes have no observed effects in the regional survey. This may be caused by variable susceptibility or the spatial resolution of the survey. We cannot entirely rule out the possibility that buried diorites containing magnetite could be the source of anomalies in the regional survey.

4.4 Interpretation of Detailed Survey

The detailed part of the geophysical survey over the Monster claims and their immediate environs provides a substantially higher resolution picture of the relationships between structure, breccia bodies, magnetic features and targeting criteria than the regional survey. We have interpreted structure from the detailed magnetics and radiometrics images (Images 5 to 8), and have attempted to correlate magnetic and radiometric features with mapped geology to produce Map 2.

4.4.1 Correlation of Mapped Breccias with Magnetics and Radiometrics

There are four main areas of mapped breccia with two quite different magnetic characteristics within the detailed survey area.

1) The breccia bodies in the eastern part of the area are characterised by distinctly elevated, although variable magnetic intensity, especially in the 5th order residual image (Image 6). Another area of elevated magnetic intensity occurs in the westernmost part of the survey, although an absence of detailed mapping in this area makes it difficult to correlate magnetic intensity with breccia development.

2) The western and southwestern breccia bodies, as defined in Baknes (1992), are clearly recognisable by their high frequency magnetic roughness, but on a base magnetic level are not distinctive relative to the unaltered metasedimentary rocks (Image 6).

The correspondence between these magnetic features and mapped surface exposures of breccia is reasonable, but not 1:1 (Map 2). It is likely that, given the limitations of outcrop, topography and access, **the magnetic and radiometric data provide a more reliable indication of the true extent of near-surface breccia than does surface mapping at this stage.**

The correlation between magnetics and diorites was dealt with in the previous section, but attention is drawn here to the partial association of mapped diorite with small magnetic highs within the generally magnetically subdued western and southwestern breccia areas (Map 2).

The correspondence of high potassium counts in the radiometric data with mapped breccia is much better in the detailed survey than in the regional data (Image 8, Map 2). The following specific correlations and features of interest have been noted,

- the correlation between magnetics, elevated potassium and mapped breccia is much closer in the western and southwestern breccia bodies than in the eastern ones.

- the E-W ridge of elevated magnetics in the eastern part of the Monster claim and the Cookie claim areas correlates with an area of generally low radiometrics. The modelling of the magnetics at the Cookie claims (see above) indicates that the principal magnetic source is subsurface, although some of the high frequency roughness in the Images 6 and 7 is probably reflecting a lower order variability in the surface breccias.

- the area of elevated potassium in the northern part of the detailed survey area corresponds to magnetically rough, but overall lower intensity magnetics, more like the western breccia bodies.

- the radiometric data reflect topography more closely than does the magnetics, because of the shallow penetration of the radiometric technique and the redistribution of material on the surface.

4.4.2 Structural Interpretation

Within the detailed survey area, the broad, complex northeast trending fault zone interpreted at 1:100,000 resolves itself into four or five narrower zones (Map 2) with the following characteristics,

- these fault zones largely bound and segment the several discrete breccia bodies as defined by a combination of magnetics, radiometrics and mapping.

- they are essentially continuous across the detailed survey area and segment / offset an array of northwest trending magnetic linears.

- shorter northeast trending linears also occur within some of the breccia bodies, and there is some correlation with mapped faults and zones of mineralisation.

- the northwest trending magnetic linears also bound breccia bodies, but appear to be consistently terminated against the northeast trending structures.

The distribution of breccias and fold/fault structures in the Monster area is quite different to that in the eastern part of the Northern Breccia Belt and in the Southern Breccia Belt. The average strike of bedding swings abruptly from ENE to ESE, the complexity of folding and faulting increases, and the breccias comprise more equidimensional bodies not confined to a single Monster Fault structure.

However, little detailed information can be gleaned from the geophysical data about the specific structural controls on the distribution of breccia or mineralisation. The limited field program carried out in 1994 (Baknes, 1995) made observations which should be followed up during the next field program. The best Cu grades are commonly, but by no means exclusively, associated with quartz-carbonate stockwork vein zones. These zones represent structurally controlled dilation, and the orientation of veins within them and of banding in fault/shear zones will provide structural information for refining targeting criteria and defining drill targets.

Mineralised zones of shearing + stockwork veining range in strike from northwest(Monster East and Cookie) to north (Monster East) to northeast (4900 zone). Without additional structural field work it is not possible to relate this information to either the structural framework or the distribution of breccia and alteration determined from the geophysical data.

The distribution of faults and breccia in the Monster area has been significantly refined from the geophysical images, indicating that brecciation is localised where displacement steps progressively to the southwest on the principal northeast trending faults. Stepping of displacement in this way is a primary mechanism for localising dilation, fluid flow and mineralisation. Field-based structural follow-up is required to relate the scale of geophysical interpretation (1:50, 000) to the scale of mineralisation and prospect definition.

5. Targeting Criteria and Targets

The breccia-hosted mineralisation in the Ogilvie Ranges clearly belongs to the broad class of ferruginous, breccia-hosted, Cu±Au±Co±U±Ag deposits that occur predominantly in Middle to Late Proterozoic rocks throughout the world.

Olympic Dam and Ernest Henry respectively represent lower and higher temperature examples of this class of deposit. In the Stuart Shelf and Cloncurry regions respectively where these deposits occur, ferruginous breccias with sub-economic, and commonly quite low, Cu and precious metal values occur more frequently than economic ore deposits of this style. This is clearly also the situation in the Ogilvie Ranges. However, the very wide distribution of >0.1% Cu in the breccia bodies in the Ogilvie Ranges is not matched in the well exposed 'ironstone breccias' of the Cloncurry district, and bodes well for the chances of finding mineralisation of economic scale here.

In the Cloncurry and Stuart Shelf / Gawler Craton areas that host the best examples of these deposits in Australia, the association of the mineralisation with a particular suite of intrusives, and with reactivation of regional to local structures during intrusion have been the keys to developing robust exploration models. The Ogilvie Range breccias are temporally, spatially and probably genetically associated with a suite of diorite dykes and small stocks, and we have outlined structural controls which depend on mutual reactivation of cover thrusts and basement faults.

Ernest Henry and the other deposits in the Cloncurry region are generally associated with high (400°-500°C) temperature alteration assemblages, indicating closer proximity to the inferred intrusive source. Intrusives of comparable age to the mineralisation are generally seen in outcrop or shallow geophysical signatures. Magnetite is the dominant Fe oxide, and Au:Cu ratios are commonly in excess of 1g/t:1%. In contrast, Olympic Dam formed close to the paleo-surface, and is characterised by haematite-bearing, lower temperature alteration assemblages, and generally low Au:Cu ratios.

We consider the Ogilvie Ranges breccias and mineralisation to be intermediate in depth and temperature between these two end members. The apparent increase in magnetite with depth in the breccia zones supports this view, and may be associated with increasing gold values with depth.

There is no shortage of evidence for widespread economic to near-economic grade mineralisation throughout the breccias in the Ogilvie Ranges. The outstanding targeting issue is how to define those parts of the breccia systems that have the greatest continuity of grade.

In our opinion, determination of the details of the structural control on brecciation and associated fluid flow will best resolve this issue. Our experience in similar systems elsewhere is that the best grades are associated with maximum dilation in the breccia system. Brecciation associated principally with tectonic fracture of the rock in a relatively tight fault zone is generally not as prospective.

The principal outcome from the geophysical data has been a greater understanding of the larger scale structural controls on the localisation of brecciation and, to a lesser extent, mineralisation. This understanding needs to be supplemented by specific field observations to produce robust targeting criteria and specific drill targets. The following discussion of targeting criteria and targets therefore focuses on the structural setting of brecciation and mineralisation. Although it also deals with the direct geophysical definition of prospective features, we regard any direct correlation between prospectivity and magnetic or radiometric features to be complex and difficult to apply.

5.1 Targeting Criteria

The regional data flown at 1000m line spacing is appropriate for defining broad target areas and more regional structural controls on mineralisation rather than specific prospects. In this case, the regional survey has been successful in defining

- some specific geophysical features outside the existing claim areas that require ground follow up;
- the gross structural setting of the mineralised breccias, including some new ideas on specific structural controls on the localisation of mineralisation;
- specific ground follow up procedures in order to refine understanding of structural controls on high grade mineralisation and define specific drill targets.

Even in the detailed survey area, the resolution and character of the data did not permit the definition of specific drill targets. However, a substantial improvement in understanding of the structural controls on the distribution of breccias, and to some extent of the mineralisation, has emerged; leading to clear a definition of ground follow-up programs and an exploration strategy.

This section of the report will first discuss the principal criteria and methods that were used to develop targets of the two main types defined in the first two bullet points above. This will be followed by definitions and discussions of some specific target areas, and will finally make some recommendations for the next phase of exploration.

5.1.1 Direct Application of Geophysical Techniques

In both barren and mineralised breccias in the Ogilvie Ranges, the principal iron-bearing phase is haematite. Magnetite is quite rare and there is no evidence from prior exploration work that the high grade breccias are more or less magnetic than the barren ones. **There is therefore no immediate justification for simply equating magnetic features with targets.** However, outcomes from the magnetic survey suggest that the more magnetic parts of the breccia systems and related structures should be targeted for additional claim acquisition and ground examination.

- The consistent evidence from the magnetic survey that the breccias become more magnetic with depth is interpreted to indicate that the hydrothermal magnetite increases in the breccias with depth. The contribution of magnetic intrusives (diorites) to this is difficult to judge, but the lack of a systematic association of magnetic highs with outcropping diorite suggests that this cannot be the only explanation. The implications for targeting are as follows,

  a) Magnetite-bearing breccias of this type are commonly more gold-rich than the purely haematitic ones, although the relationship is inconsistent;

  b) There is some indication in the geochemical data from the Ogilvie Ranges that there is a correlation between iron and copper in the breccias. If this is carried down into the more magnetite-rich parts of the systems, then the magnetics would become a significant factor in defining specific targets.

- There is an association between northeast trending fault zones, especially at their intersections with other structures, and both preferential breccia development and enhanced magnetic intensity. The Cookie claim area is a good example. This association between structural complexity and magnetisation may help to define the sites of maximum fluid throughput, and therefore optimum continuity of economic grades.

In summary, we regard the more magnetic parts of the breccia systems, and indeed magnetic features on structures without recorded breccia, to be worth further examination. This leads to recommendations below for both additional claim acquisition and prioritisation of existing target areas.

There is some evidence from the Australian systems of this type that the mineralised iron-rich breccias are distinguished from the barren ones by having more intense potassic alteration. For example, the Ernest Henry magnetic anomaly/ore zone is distinct from all the non- or weakly mineralised ironstones in the Cloncurry belt because of its intense K-feldspar alteration, which extends over an area slightly larger than the ore zone. Uranium anomalies are commonly restricted entirely to the ore zone and sporadic even within it, and hence would cover only 1-2 pixels on an image of even the more detailed survey. **A prospective association in the radiometric data may therefore be large areas of high potassium associated with smaller isolated U anomalies.**

Radiometrics mapping should be quite effective in the Ogilvie Mountains due to the good exposure of unweathered rock. However, the wide valleys with their glacial and alluvial fill and steep slopes covered by extensive scree, reduce the applicability of the radiometric data to direct targeting. Overall, the radiometrics were somewhat disappointing, with apparently variable relationships between potassium enrichment and both breccia development and mineralisation. In addition, uranium and thorium showed no obvious association with either breccias, or the better mineralised parts of them.

Within the detailed survey area there is a negative correlation between potassium levels and magnetic intensity within the main breccia areas. There is nothing in the existing geological data which provides an explanation for this, but it should be followed up during the next field season. We note that, within the Monster breccia bodies, more prospects have been identified within the potassic breccias with lower overall magnetic intensity.

5.1.2 Structural Targeting Criteria

The Wernecke Breccias are structurally controlled, and interpreted to have been localised by:

- normal reactivation of pre-existing ~E-W trending faults;
- probable strike-slip reactivation of N to NE trending basement structures.

Despite the apparent primary control by the thrust faults, the NE trending structures are interpreted to have been a key element in maximising breccia development:

- at intersections between NE structures and thrusts
- at dilational sites on the NE structures, probably localised where intersected by more northerly trending structures.

Direct correlation of a mineralised occurrence with a specific structural or geophysical feature has not been possible because known areas of mineralisation are usually on scales of tens of metres, whereas the resolution of the geophysical data is generally >100m. Within the broader target areas that are identified below, more detailed structural mapping (esp., data on vein/fault relations, vein orientations, structural setting of well mineralised areas with dilatant structures) is required.

The key to exploration for this deposit type is to determine the specific structural controls on the localisation of maximum dilation and associated mineralisation.

We have recognised the role of one or two sets of north to northeast trending, basement fault sets in localising maximum breccia development, deeper magnetite-bearing alteration, and maximum vertical potential for mineralisation along the Monster Fault and other thrust structures. Because of the resolution of the geophysical data over most of the area, application of this to targeting is limited to identifying prospective areas at the scale of a few kilometres. This has principally resulted in recommendations for additional claim development, rather than specific drill target definition.

Within the Monster detailed survey area, the Monster fault breaks up into a number of northwest trending fault / fold / breccia segments. These segments are bound by more continuous northeast trending faults than bound breccia bodies.

The main relationships that we have recognised between structural setting and mineralisation are as follows,

- breccias, diorites and mineralisation were all emplaced during an approximately N-S extension event that largely reactivated older structures, and apparently involved only small (<hundreds of metres) offsets.
- normal reactivation of thrusts caused local dilation on steeper dipping parts (ramps).
- strike-slip reactivation of NE-trending faults, probably in a sinistral sense, caused localisation of dilation at left steps or bends.
- intersections of thrusts with NE faults are the primary control on the formation of thicker breccia bodies, and probably better mineralisation.
- intersections of NE and N trending faults may be a secondary, but important control on breccia formation and mineralisation. In particular, these intersection are likely to have formed pipe-like dilation sites which would have been ideal pathways for upwards flow of diorite magma and related hydrothermal fluids.
- mineralisation is commonly found at contacts between breccia and diorite, due to the competency contrast between the two lithologies, which causes preferential fracturing. The diorite magma was probably also preferentially intruded into the same dilational sites as mineralising fluids.

These relationships represent a significant increase in understanding of the general controls on the localisation of brecciation and mineralisation, and are used in section 5.2 to generate recommendations for new claim acquisition. They have also proved useful in developing priorities among existing targets, and defining specific field program to refine targets to drill stage.

5.2 Targeting Recommendations

The principal targeting recommendations have come about through the identification of areas requiring new claims or extensions to existing claims. However, a number of specific, smaller target areas for follow up, within or immediately adjacent to existing claims, have also been identified and we present these first.

5.2.1 Recommended Targets in the Monster - Cookie Claims Area

The detailed survey in the Monster area has:

- identified the main structural controls on breccia development,
- expanded the likely area of breccia,
- identified some magnetic and radiometric features for follow-up.

The principal structures and geophysical features for follow up are presented on Maps 1 and 3. These maps display the correlations between individual magnetic and radiometric anomalies and mapped geology from various reports on the area. The following specific features or target areas are recommended for field follow-up, in priority order.

5.2.1.1 Cookie Claim (+ recommended extensions)

The Cookie claim area is considered to be a high priority target because:

- it is structurally complex, at the intersection of the northeast and north trending faults with the main Monster fault;
- there is evidence of widespread mineralisation in outcrop and soil geochemistry;
- it contains a distinctive magnetic feature at relatively shallow depth;
- brecciation and mineralisation appears likely to continue into two wide N-S valleys with no outcrop.

A structural mapping and ground geophysical program is recommended, with additional sampling, to define specific drill targets. The likelihood of connection between the surface brecciation mineralisation and the modelled magnetic features implies substantial vertical continuity of mineralised bodies.

5.2.1.2 Monster West

The Monster West breccias returned the most extensive highly anomalous (+0.1%) copper values in the 1994 and earlier field programs (Baknes, 1995). In addition, this area contains the most surface prospects defined by significant areas of more continuous mineralisation.

Geophysically, it and the Monster Southwest breccias are distinctive because of the absence of underlying magnetic material and generally elevated potassium counts in radiometric images. The resolution of the geophysical data does not allow specific structural targets to be defined within the breccia area. However, Maps 1 and 3 show that most of the small magnetic features correlate with mapped diorite, and are not likely to be sourced from hydrothermal magnetite. Specific potassium highs on Maps 1 and 3 and Image 8 should be followed up on the ground.

The significance of the absence of an underlying magnetic source in this area is unclear. It may mean that the breccia body is underlain by a shallowly dipping, rather than a sub-vertical and deep-rooted body , as at Cookie.

We recommend ground geophysics and structural mapping in this area, with particular attention to determining the structural controls on various styles of mineralisation.

5.2.1.3 Monster Southwest and Extensions

The Monster Southwest area is very similar in geophysical character and structural setting to Monster West, but it has had only cursory mapping and sampling.

We give it moderate to high priority on the basis of its similarity to Monster West, and suggest structural mapping and sampling prior to defining a ground geophysical program. The breccia extensions and related geophysical features that extend outside the claims area should also be followed up. The elongate, NE-trending breccia body and coincident radiometric magnetic feature is of particular interest, because it coincides with one of the major faults interpreted from the magnetic data.

5.2.1.4 Monster East

The Monster East area has been quite extensively mapped and sampled. Mineralised stockwork zones up to 15m wide and mineralised quartz-carbonate altered, north to northwest trending, shear zones containing moderate to high Cu $\pm$ Co grades occur here.

The northern part has a magnetic and radiometric signature similar to that at Monster West and Southwest. However the southern part (and extending beyond the claims area is underlain by a substantial, E-W trending magnetic source that extends into the Cookie area.

The geophysical data have demonstrated the association of the surface breccia with a substantial subsurface magnetic source down-dip to the south. This association should be followed up by ground geophysics and structural mapping to try to establish continuity of the higher grade zones.

5.2.2 Additional or Expanded Claims

From comparison with similar areas in Australia in terms of extent of mineralised structures and metal values, it is likely that a resource will be defined in the Ogilvie Ranges, but it is not possible to predict the magnitude of such a resource. On this comparative basis alone, **an aggressive tenement acquisition is recommended.**

The current claim acquisition strategy has been justifiably based on the surface distribution of mineralisation within mapped breccia. The geophysical survey and resultant information on controls on distribution of breccia and mineralisation has led to a number of recommendations with respect to expanded/additional tenement acquisition.

The magnetic survey has identified significant down dip extensions to the structures and related alteration. We recommend that some tenements be enlarged to encompass these down dip extensions. The survey has also outlined some prospective areas of high magnetic intensity that are not covered by existing claims:

5.2.2.1 Monster Claim Extension

Most of the surface exposures of breccia in the Northern Breccia belt are well covered by the Monster (60 km^2), Cookie (4 km^2), Truk (2 km^2) and Scary (4km^2) claims. However, the claims do not cover the down-dip extensions of all breccia bodies. In particular, a major magnetic feature located at the southeast corner of the Cookie Claim is not covered. Obtaining a tenement over this feature should be considered high priority. In order to completely cover down-dip extensions of breccia which are more magnetic, we recommend extending the Monster Property to include the Cookie, Truk and Scary Claims, with an additional 50 km^2 as shown in Map 3.

5.3 *Recommended Priorities and Programs*

The geophysical survey has provided a very good understanding of the regional structural framework for the mineralised breccias in the southern Ogilvie Mountains. As outlined in the previous sections, it has identified key controlling structures that were previously largely unknown. However, the scale of data acquisition has meant that its principal impact has been at the ≥ 1000 m scale. The next phase of exploration, should focus on connecting outcrop-scale observations and mineralised occurrences to the larger scale structural framework.

The priority exploration tasks at this stage are:

- **to establish the specific geological controls on the localisation of Cu + Au + Ag + Co within the larger Fe-rich fault/Breccia system;**
- **to establish the controls optimising continuity of grade within these systems using a combination of geological, geophysical and geochemical techniques.**

5.3.1 Recommended Program for 1997

We recommend that the next phase of exploration focus on the following:

1. Field structural evaluation of both known mineralisation prospects and the additional target areas specified in the previous section. The geological component of the definition of specific drill targets involves the determination of the ~100m-scale structural controls on > ~0.1% Cu.

2. Ground geophysics, with emphasis on direct targeting of sulphide-rich parts of the breccia systems. IP and Em techniques have been successful in exploring for this style of mineralisation in other areas (eg, Wernecke Ranges, Cloncury district). However, specialist geophysical advice should be sought to select the method(s) most suited to the mineralisation and terrain in the Blackstone properties. Detailed ground magnetics and gravity are potentially useful as direct targeting tools, but only after the relationships between magnetic susceptibility, density and metal grade are better established.

3. Limited diamond drilling of one or two of the best mineralised and other priority areas (eg, Monster West, Cookie) is recommended in the latter part of the 1997 field season. Field programs early in the season may provide specific drill targets, but the emphasis should be on acquiring additional information about controls on, and styles of, mineralisation, and their relationship to geophysical and geological signatures. This will provide the basis for planning a major drilling program in 1998.

Overall, we recommend that the priority for 1997 be to carry out an intensive ground geological and geophysical program (with additional sampling) designed to define a substantial drilling program for 1998. We suggest that consideration be given to a limited core drilling program late in the 1997 season, principally to acquire information on the structural setting and continuity of some of the known mineralised areas.

5.3.2 Prioritisation of Target Areas

Although the geophysical survey has provided important information on the regional structural setting of the breccias and their Cu (+ Au + Ag + Co) mineralisation, definition and specific prioritisation of drill targets requires an additional phase of structural mapping, sampling and ground geophysics. At this stage we can only allocate general priorities to areas for the ground program outlined in the previous section.

- The highest priority for ground follow-up is in the Cookie, Monster West and Monster East areas, and their recommended extensions. In particular, the structurally complex area with elevated magnetics incorporating the Cookie claims, the easternmost part of the Monster claims and unclaimed areas between and adjacent to them are considered to be particularly prospective. The Monster West area has the most extensive outcropping mineralisation, and is therefore an obvious priority to determine controls on mineralisation.

- We also give high priority to acquiring additional claim areas, as detailed in the previous sections and shown on Map 3. It may be possible to reduce the extent of additional claim acquisition by assessing some of the areas on the ground prior to claiming.

- At this stage we assign moderate priority to ground follow-up in the Southern Breccia Belt and in the central to eastern parts of the Northern Breccia Belt. However, the structural setting, poor outcrop and accessibility of the Rob claim area places it at the top of this group.

In conclusion, we consider the Ogilvie Mountains to be highly prospective for Olympic Dam/Ernest Henry - style mineralisation for the following reasons, which are set out in more detail in Appendix A. Systematic exploration of the breccias is strongly recommended.

1. There is no question that the Ogilvie breccias and their contained mineralisation are of the same general style as those at Olympic Dam and Ernest Henry. They are probably intermediate in temperature and depth of formation between the Australian deposits.

2. In comparison to Proterozoic iron-rich breccia systems in other regions, the Ogilvie Mountains' breccias have more widespread evidence of economic grades of Cu and associated metals. The exploration task is to locate where these grades have the continuity to make up a mineable resource.

3. The Ogilvie Mountains' breccias are grossly underexplored, with little more than surface prospecting of parts of the two main breccia belts. The geophysical survey has provided important new insights into structural controls on the localisation of the breccias and mineralisation. In particular, the potential for bodies of substantial vertical extent with relatively small surface "footprints" is high.

5.3.2.1 Rob Claim Extension

We consider that the Olympic area is prospective, especially in terms of structural setting and magnetic signature. The Rob tenements (~5km^2) partly cover the extension of the NE structure that appears to host the magnetic feature, but it should be enlarged to ensure this. In addition, we recommend that the weakly brecciated areas to the west of the Olympic claims be acquired, at least to follow up the potassium anomaly there. In Map 3 we have drawn a possible 30km^2 extension for the Rob Claim, covering an area from the Scary claim to the current Rob Claim, and to the east of the current Rob Claim.

5.3.2.2 New Claim A (20km^2)

Depending on pressure on tenements prior to the next field season, consideration should be given to claiming the areas with small magnetic features overlying the deep magnetic source south to southeast of the Monster Property. The NE-trending zone of magnetic highs 5 km southeast of the Cookie claim is a particular priority.

5.3.2.3 New Claim B (15km^2)

The southern area of the geophysical survey covered a structurally complex area containing a number of breccia bodies, magnetic sources and radiometric anomalies. The resolution of the geophysical data did not allow us to determine structural detail in this area, but its complexity in regional geological maps makes it attractive. Some bodies clearly have both high magnetic and potassium signatures, and are located above a deep magnetic lineation. Depending on exploration priorities, we recommend that the magnetic breccia bodies shown in Map 3 as Claim Area B, be fully explored.

5.3.2.4 Expanded Gila Claim

Map 3 shows the relationship between the outcropping breccia in the Gila Claim, and the associated anomaly displaced slightly to the south. We recommend that the claim be expanded to fully cover the magnetic anomaly. The suggested expansion requires a change in area from 1 km^2 to 5 km^2.

6. Bibliography

Baknes, M. E. (1995). 1994 Geological Report on the Monster 1-265 Claims, Dawson Mining District, Yukon Territory. In-house report prepared for Pendisle Resources Ltd.

Lane, R. A. (1990). Geological Setting and Petrology of the Proterozoic Ogilvie Mountains Breccia of the Coal Creek Inlier, Southern Ogilvie Mountains, Yukon Territory. M.Sc. Thesis, The University of British Columbia, 223pp.

Shevchenko, G. (1993). Geological and Geochemical Surveys on the Olympic 1-168 Claims, Dawson Mining District, Yukon Territory. Assessment Report for Placer Dome Exploration Ltd and Major General Resources Ltd.

7. Cost Statement (Australian dollars)

Geophysical Data Processing, Image Processing and Modelling	$12, 000
Production of Images	$1, 630
Interpretation and Reporting (consulting fees only)	$18, 000
Presentations to Blackstone and Potential investors (include prep time)	$2, 750
Drafting, map production and colour presentations	$1, 950
Miscellaneous expenses (couriers, communications, copying, etc)	$650
	$36, 980

8. Appendix A: Ernest Henry-type Deposits

The Ernest Henry Cu-Au deposit was discovered by Western Mining Corporation Ltd. and Hunter Resources Ltd. in 1991 within early Proterozoic rocks of the eastern Mount Isa Inlier (Cloncurry Belt), about 130km ENE of Mt Isa (35 km NE of Cloncurry), Queensland, Australia. The deposit contains a measured and indicated resource of 167Mt at 1.1% Cu and 0.54 g/t Au.

Ernest Henry is the largest of a number of Cu-Au deposits in the eastern part of the Mount Isa Inlier. The Osborne (~15Mt at 3.0% Cu + 1.3g/t Au), Selwyn (~5Mt at 1.0% Cu + 5.0g/t Au), Eloise (~3Mt at 5.8% Cu + 1.5g/t Au) and Mt Elliot (~2Mt @ 3.0% Cu and 1,3g/t Au) deposits are currently being mined. Most of the deposits and numerous smaller occurrences are associated with 'ironstones' and coincide with moderate to large amplitude magnetic anomalies.

Ernest Henry and the other deposits of the Cloncurry Belt have a number of similarities (and some obvious differences) to a variety of iron-rich Cu-Au deposits in middle Proterozoic terranes elsewhere (eg., Olympic Dam; the magnetite-rich iron deposits of the US mid-west; possibly the Kiruna-type deposits of Scandinavia; and possibly the Wernecke Breccias in the Ogilvie Mountains, Yukon Territory).

8.1 Geological Setting of Ernest Henry-type deposits

The Cloncurry Belt comprises early to middle Proterozoic meta-sedimentary and meta-igneous rocks intruded by at least two quite distinct suites of granitoids. The metamorphic rocks range in depositional age from about 1800Ma to as young as 1630Ma, and were derived from two or three principal tectonostratigraphic sequences that occured throughout northern Australia. Metamorphic grade ranges from mid-greenschist to upper amphibolite facies, and all of the supracrustal rocks have been subject to a complex compressional to transpressional deformational history during the Isan Orogeny between about 1600 and 1500Ma.

The older granitoid suite was intruded during a widespread extensional event dated at about 1740Ma, and has consequently been overprinted by the Isan Orogeny. The younger and more voluminous granitoids of the Williams Batholith intruded near the close of the Isan Orogeny at about 1500Ma, and are spatially and temporally associated with a regional hydrothermal alteration event of spectacular scale and intensity.

8.2 Deposit Characteristics

All of the significant Cu-Au deposits in the Cloncurry Belt share the following characteristics:

1. They postdate the principal regional metamorphism and associated foliation(s) of the Isan Orogeny.
2. They are spatially and temporally associated with the Williams Batholith granitoids.
3. They are structurally controlled by fault/shear zones, commonly with a complex brittle-ductile character; breccias and kink-folds are common in ore zones.
4. They occur in a wide variety of host rocks, including felsic to mafic meta-volcanics, granitoids, (meta)-diabase, and meta-sedimentary rocks ranging from carbonaceous slates to calc-silicates.
5. They are associated with iron-rich, high temperature alteration assemblages, most commonly magnetite-bearing (ironstones), although massive pyrrhotite-pyrite-chalcopyrite mineralisation occurs at Osborne and Eloise
6. Cu:Au ratios range from about 4:1 (Eloise and other sulphide-rich, magnetite-poor deposits) to less than 1:5 (parts of the Selwyn deposit). Mineralised systems range from very low grades of both Cu and Au to quite high grade ores (eg., Selwyn and Eloise).

The key factors in developing exploration models for this type of deposits are the granitoid association and the structural association.

8.3 The Granitoid Association

A genetic link between the Cu-Au deposits of the Cloncurry district and the granitoids of the Williams Batholith is now well established and broadly accepted. Middle Proterozoic Cu-Au mineralisation, including the Olympic Dam deposit in the Gawler craton of southern Australia, is associated with a distinctive suite of similar post orogenic granitoids (Hiltaba Suite).

The characteristics of the Williams-type granitoids of the Cloncurry district are as follows:

1. They are I-type and dominantly granodiorite or more felsic in composition (mostly >60% SiO_2); as such, they differ significantly from the more mafic suites generally associated with porphyry Cu-Au mineralisation in modern and ancient arc settings.
2. They commonly show evidence in their chemistry of significant crystal fractionation.

3. Widespread metasomatic alteration of the granitoids and their country rocks; both high K/Na and lowK/Na alteration styles are common.

8.4 The Structural Association

A strong structural control is evident in most deposits of this type. The most common structural association is with dilational breccias on ductile to brittle shear/fault zones. In the Cloncurry district, Cu-Au deposits occur in dilational sites on reverse, oblique-reverse and strike-slip faults with a range of orientations.

Ernest Henry appears to have formed on a reverse shear/fault zone where it shallowed in dip as it passed through a more competent meta-volcanic unit within calc-silicates. Ore grade mineralisation corresponds closely to throughgoing dilational brecciation of the meta-volcanics.

Deformation accompanying mineralisation, although locally significant, is regionally minor and related largely to limited reactivation of structures formed earlier in the deformation history.

8.5 Exploration Criteria for the Australian Deposits

The principal regional to local exploration criteria, which follow EHW's current understanding of Ernest Henry-type mineralisation, are as follows:

1. Proximity, preferably in the roof zones, to a distinctive suite of middle Proterozoic post-orogenic, fractionated granitoids.
2. Dilational sites on active shear/fault zones in the aureoles of the prospective granitoids.
3. More competent rock units, but otherwise little host-rock control.
4. Iron-rich alteration: most of the known mineralisation is associated with magnetite-bearing alteration, and magnetics is therefore a widely used prospecting tool. However, Cu/Au-poor magnetite ironstones are widespread and some deposits contain little or no magnetite.

8.6 Wernecke Breccia Comparison

8.6.1 General Similarities

The Wernecke Breccia of the Ogilvie Mountains has obvious superficial similarities to Ernest Henry and Olympic Dam deposits in Australia, in that they are:

- Proterozoic

- iron-rich
- structurally controlled
- have a Cu-Au-U-Co association.

The only other significant similarity with respect to Olympic Dam, rather than Ernest Henry, is that surface exposures of breccia are dominated by haematite, with only trace amounts of magnetite. Alteration assemblages in the Wernecke Breccia contain haematite - chlorite - quartz - carbonate, and are generally lower temperature than those at Ernest Henry.

8.6.2 Similarities with Ernest Henry

Wernecke Breccias are hosted within sedimentary rocks, with sedimentary clasts, whereas Olympic Dam is hosted within granitic/volcanic rocks. In this respect there may a greater similarity to the Ernest Henry environment.

1. Ernest Henry breccias are complex, forming bodies concordant to stratigraphy/regional structural grain and discordant to stratigraphy.
2. The general mineralogy of ±haematite ±specularite ±carbonate ±chlorite ±silicification, and associated chalcopyrite mineralisation, is typical of the late alteration in and around Ernest Henry.
3. Extensive metasomatism is described around Ernest Henry breccias.
4. Medium/high amplitude structurally controlled magnetic anomalies in the Ogilvie Mountains show some similarity to those in the Cloncurry belt, however many anomalies appear to have deep sources. Anomalies associated with Wernecke Breccias indicate there is magnetite rich alteration at depth, within breccias rich in haematite at surface.
5. There is a possible magmatic link between mineralisation in the Wernecke Breccia and a large intrusion at depth, interpreted from the magnetics.

8.6.3 Differences from Ernest Henry

There are some pronounced differences between the Wernecke Breccias and the Ernest Henry environment:

- lack of magnetite and dominance of lower temperature alteration assemblages, whereas the Ernest Henry deposit and regional metasomatism throughout the Cloncurry belt is dominated by high temperature assemblages amphibole - biotite - K-feldspar - albite - magnetite - pyroxene..

- the lack of volcanics (intermediate/felsic) throughout the host stratigraphy which are the dominant host rocks at Ernest Henry.
- albitic alteration does not appear to be regionally pervasive in the Ogilvie Mountains.

8.6.4 Chemistry of Wernecke Breccia

Placer Dome undertook a geological and geochemical study of the Olympic 1-168 Claims for Major General Resources Ltd. In 1993. There study outlined:

- a strong Cu-Au-Co-U-F association, but Au levels which appear to be very low in comparison to Ernest Henry and Olympic Dam. Au has a weak positive correlation with respect to Cu.
- F displaying a strong positive correlation with respect to Au + Cu. Fluorite is a common accessory with respect to mineralisation at and around Ernest Henry (providing evidence for a suggested magmatic link).
- generally higher Fe_20_3 corresponding to higher Cu; which is also the case at Ernest Henry and Olympic Dam.
- anomalous K_20 and low Na_20 (depleted) associated with Cu, similar to Ernest Henry.

8.6.5 Summary

The Wernecke breccia-hosted mineralisation in the Ogilvie Mountains clearly belongs to a broad class of ferruginous, breccia-hosted, Cu±Au±Co±U±Ag deposits that occur predominantly in Middle to Late Proterozoic rocks. In detail, the Wernecke breccias have both similarities and differences with the lower temperature Olympic Dam deposit and the higher temperature Ernest Henry deposit, and the formational environment (ie, fluid temperature, proximity to source intrusion, crustal level) may be intermediate between the two.

9. Appendix B: Magnetic Modelling

9.1 Method

Computer simulation of the magnetic response of magnetic source rocks is an important aspect of the geological interpretation of a magnetic survey. It assists with the understanding of depth and map positions of the magnetic sources that produce particular magnetic anomalies. Most modelling is performed along cross-sections below lines of magnetic data. Example cross-sections are illustrated in figures within this section of the report.

Lines may be from the original survey or extracted from the images generated from the original line data. All modelling was performed on lines extracted from the grid. This process has the advantage of optimising the orientation of the cross-section so that it is perpendicular to the anomaly trend.

ModelVision™ was used to perform the magnetic modelling and a description of the package's capabilities are included in this Appendix. All modelling was done relative to the helicopter sensor which is on average 50 metres above ground. An adjustment of 50 metres is required to estimate local depths. Advanced modelling, which incorporates the datum height of the sensor, was not performed in this initial investigation.

Magnetic bodies representing rock volumes of uniform magnetic susceptibility are manipulated in ModelVision™ by changing the position, shape, and magnetic susceptibility until a good match is achieved between the field data and model response. No unique solution can be obtained but useful information can be derived from the modelling that helps define the most probable depth and attitude of the magnetic source.

Simple body shapes are often enough to assess the primary shape and location of the magnetic anomalies. Simple tabular bodies have been used for most lines in this preliminary model analysis. A more complex polygonal body has been used to model the deep magnetic source in the western part of the survey.

Fundamental assumptions made in this modelling include:

- Sensor datum is flat;
- Remanent magnetism is ignored;
- Demagnetisation effects are not computed;
- Magnetic field intensity = 57,600 nanotesla;
- Magnetic field inclination = 79 degrees;
- Magnetic field declination = 30 degrees;

- Modelling of a curved regional magnetic field.

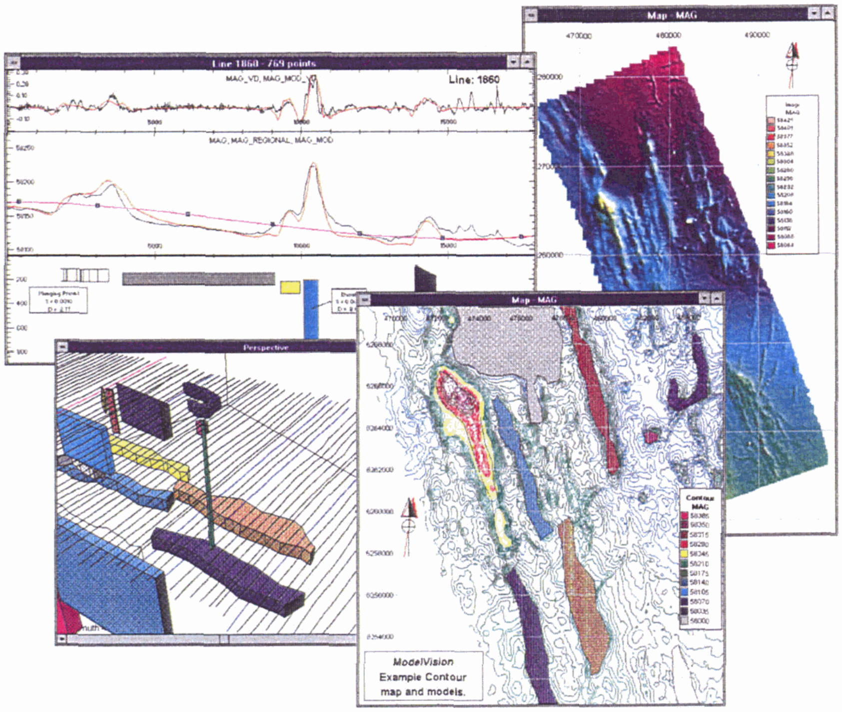
None of these assumptions are expected to have any significant impact on the geological information derived from the model cross-sections. Remanent magnetism can, however, effect the estimation of magnetic model dip angles. Since no information is available on the possible remanent magnetisation of the model targets, the use of dip information from these models must be used with caution.

A smooth local regional is also included in the modelling to help remove the influence of magnetic sources that are a large distance away from the zone of investigation. This regional is created inter-actively by matching the flanks of the magnetic anomaly. In some cases a deep magnetic source may be included to assist with modelling of the regional.

9.2 ModelVision Interpretation System

ModelVision

A new concept in geophysical modelling



ModelVision is a new and innovative system for visualizing and modelling 3D gravity and magnetics data. Speed and flexibility are the trademarks of ModelVision.

High Performance

Innovative techniques provide a very high level of modelling performance. Real time data compression is used to increase performance up to 100 fold.

Flexible Data Sources

Modelling can be performed on located (x,y,z) data and grids.

ModelVision supports commonly used formats from companies including Encom, ER Mapper, Geosoft, and Geopak. Interactive links to Intrepid or company-specific databases are also available.

Analysis and Filtering

Convolution and FFT filtering is provided for line data and convolution filters are provided for grids.

Computed data channels can be defined with an easy-to-use visual calculator that operates on lines, grids, points and drillholes.

Powerful Modelling

Full support is provided for commonly used bodies including Dykes, 3D polygons, Spheres, Ellipses and Cylinders. Generalised 3D bodies are supported using the faceted body option.

Real time modelling updates profiles and map views as bodies are moved or modified. Use in-line filters such as 1st VD or inversion to improve modelling precision. Simultaneous modelling of gravity and magnetics is also supported.

Integrated Views

Data can be displayed as cross-section profiles, stacked profiles, contour maps, perspective views and images.

Comprehensive multichannel options are available for comparing gravity and magnetics with other data. Cartographic backdrops can be applied to all map views.

ER Mapper Interface

ModelVision interfaces directly to ER Mapper. Images can be used as a backdrop to ModelVision's map views and profiles can be extracted from images and used as data for modelling.

Platform Independence

ModelVision is available to run under MS Windows on PCs and on Sun and Silicon Graphics UNIX workstations.

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World Wide Web: http://www.encom.com.au

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ModelVision Specifications

User Interface

- Full graphical user interface
- Windows 3.11, UNIX Motif, Win NT, Win 95
- Dynamically linked windows.
- Toolbar and Pull down menus.

Data Import

- Industry standard located (xyz) file including Geosoft and generic formats.
- Dynamic database links to Intrepid, XLMAP, or user defined.
- Grid import from ASEG-GXF, Geosoft, Geopak USGS, Intrepid and Encom.
- ER Mapper integration and image/profile links.
- Work session files for project snapshots.
- Vector backdrop of ER Mapper ".erv" files.

Data Processing

- Expression evaluation through compute option.
- FFT filters operating on line data with wavelength, derivatives, reduction to pole, pseudo-gravity etc.
- Convolution filters with high, low, band pass, derivative, continuation, median and AGC.
- Statistical analysis.
- Extract data from grids such as gravity onto a line dataset.
- Grid random or line data and create ER Mapper image files.

Data Display

- Multi-track display for line data analysis, QC, filter evaluation. Wide range of display formats.
- Zoom and pan. Automatic fitting as required.
- Contour and image maps of computed or input grids. Control of scaling, colour levels, contour range and sun shading.
- Stacked profile and grid profile maps. Both theoretical and computed responses can be displayed.
- Map displays can have backdrop views of tenement, cadastral or interpretations.
- Support for random points and graphical editing.
- Perspective views of models with real time rotation.
- Log displays of borehole responses as cross-sections, maps or perspective views.

Model Types

- 3D dipping polygons, dipping tabular body, dyke, ellipsoid, sphere and elliptic cylinders.
- Generalised 3D contoured bodies.

Modelling Features

- Graphical body editing. 3D drag and drop.
- Compute on demand or immediate mode.
- Immediate update of related windows.
- Demagnetization for sphere and ellipsoid.
- General demagnetization and anistropy modelling under development
- Remanence.
- Rugged terrain modelling at any x, y, z location.

Inversion Modelling

- Generalised inversion with user constraints.
- Multi-body and regional.
- RMS error indicator.
- Interpreter intervention.

QC Features

- Simulate an airborne survey in rugged terrain.
- Supply contractor with QC datasets to test levelling, datum corrections and reduction to the pole procedures.
- Compare contractor grids with flight line data.
- 4th difference filter for on-site noise analysis.
- Multi-channel data analysis.
- Partial mapping of data on-site.
- Compare processed data with raw, diurnal and IGRF.

AutoMag Option

- Automated depth analysis and integrated modelling.
- Uses 1st VD for enhanced depth precision.
- Based on research improvement to Naudy method.
- Interactive tuning and testing of solutions.
- Batch facility for selected lines.
- Interactive editing of solutions over image, profile and contour backdrops.

Hardware Supported

- Standard MS Windows on 386/486 IBM or compatible. Win NT and Win 95 compliant.
- Sun Sparc equivalent with Solaris 2.
- Silicon Graphics family with Irix 5 or later.

Information

If you are interested in finding out more about ModelVision, or you wish to arrange a demonstration of the software, please contact Encom's Sydney office.

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Email: mvision@encom.com.au

9.3 ER Mapper Image Processing System

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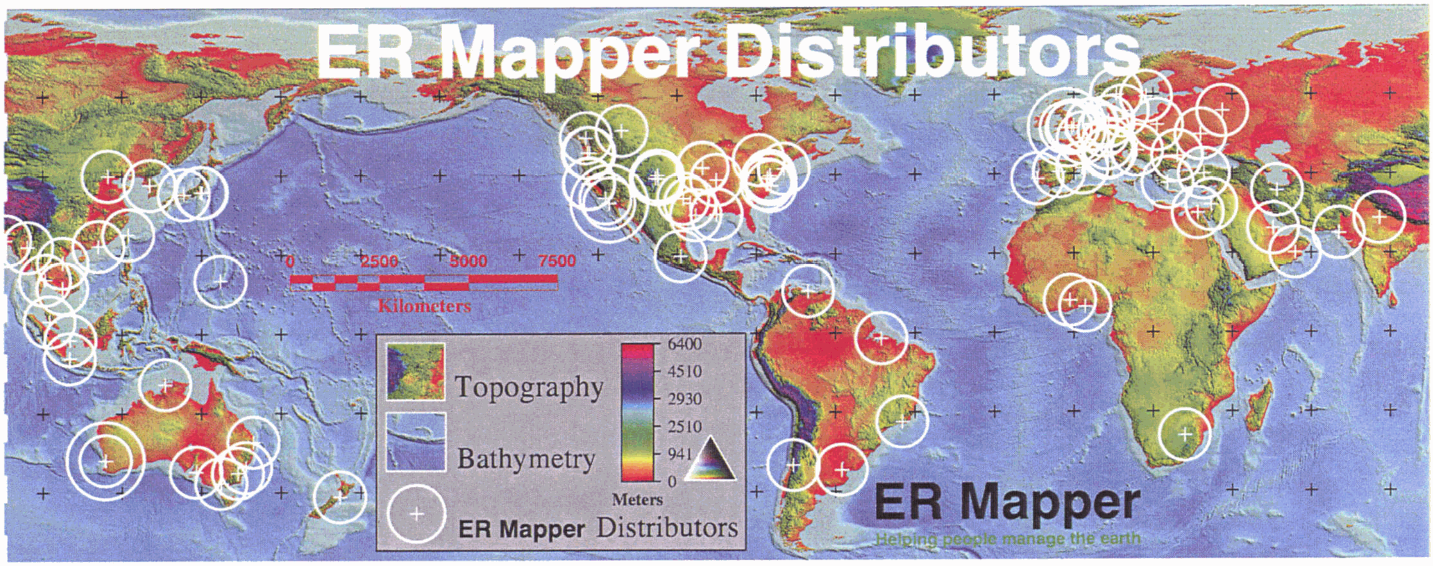
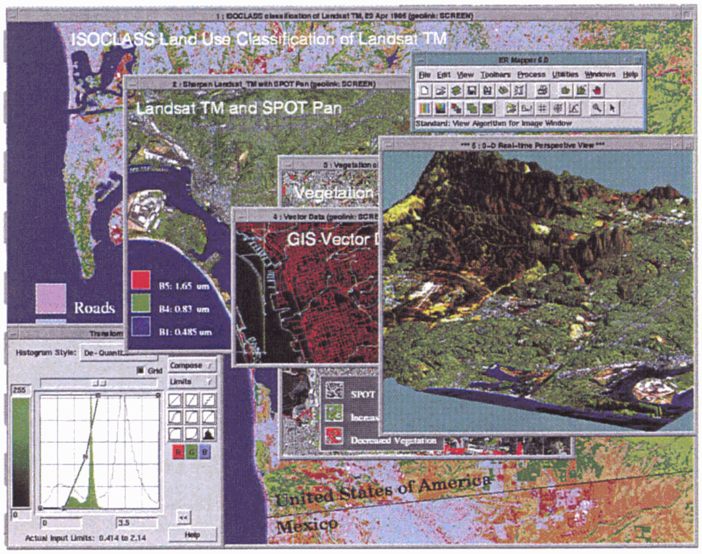
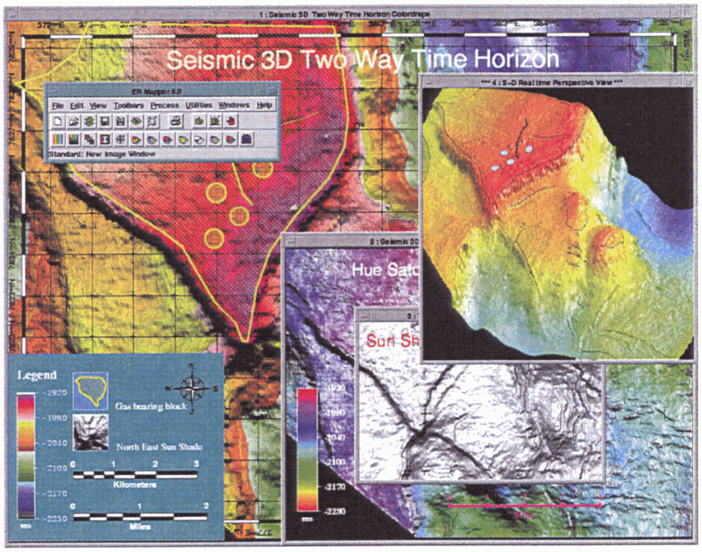
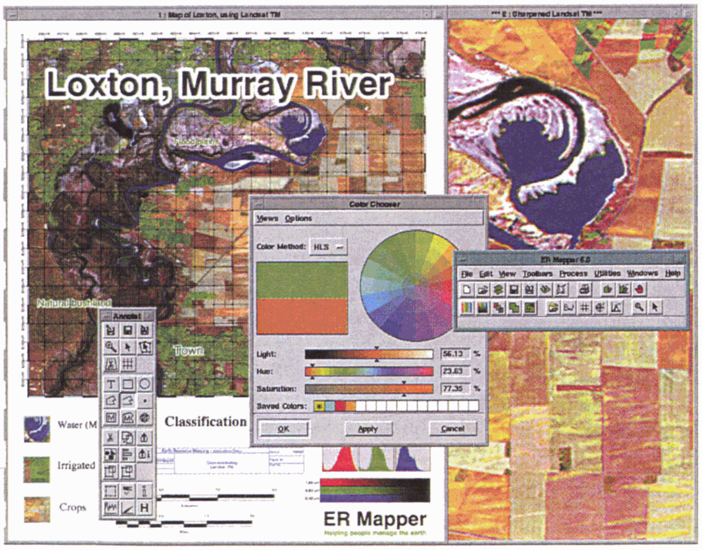
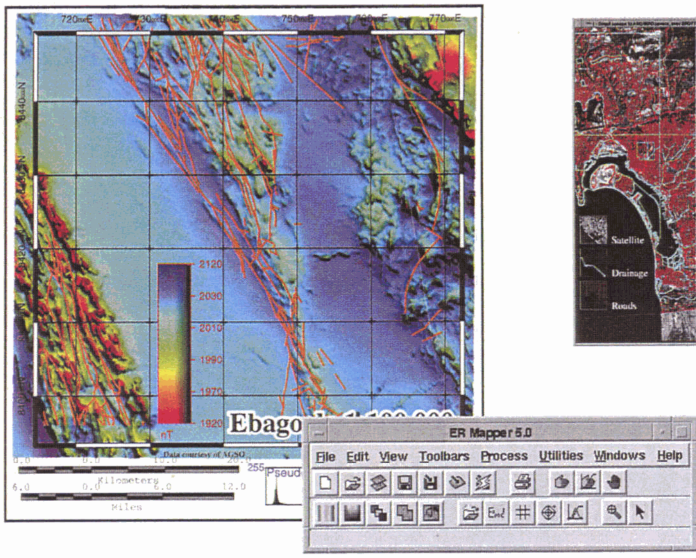


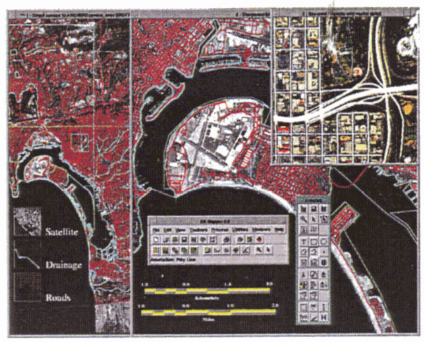






Ease of Use and Power





Applications

ER Mapper is the premier Image Processing System used in a wide range of Applications including:

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- Algorithm spatial modeller
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- ISOCLASS and supervised classification
- Map composition
- PostScript engine
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- GenaMap link
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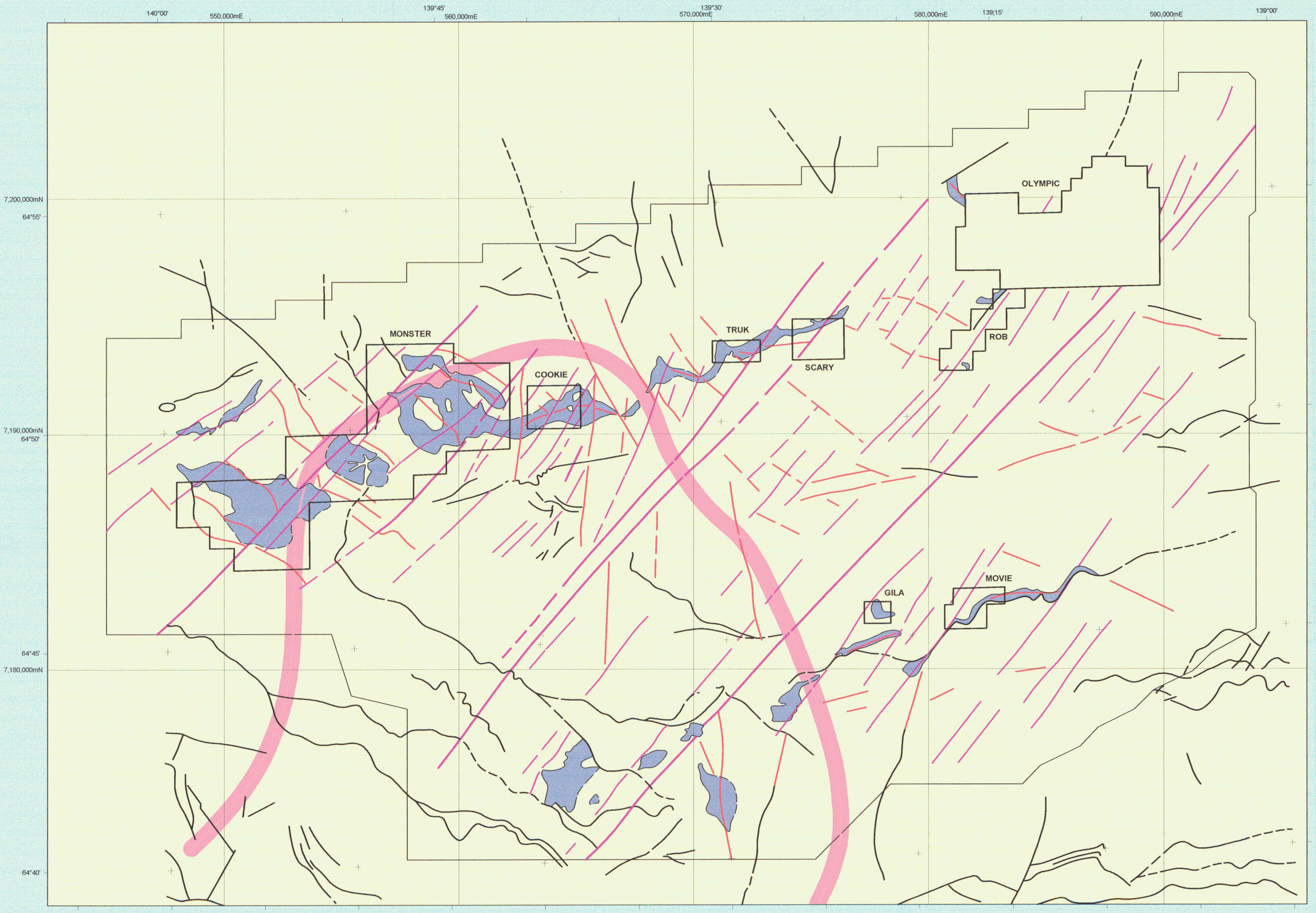


LEGEND

- Claims
- Wernecke Breccia
- Deep Intrusive body (approx. boundary at ~9km depth)

FAULTS

Mapped thrusts & steep faults

- Approximate / defined
- inferred

Steep NE trending structures (probably faults)

- deep basement / major
- shallow major
- shallow minor

Steep - moderately dipping reactivated normal & thrust faults, and reactivated unit contacts

- shallow major
- shallow minor

093600

2/2

GN

MN

Map Projection: Universal Transverse Mercator, Northern Hemisphere
Central Meridian: 141 degrees West (Zone 7)
Geodatic Datum: Clarke 1866 (NAD 27)

0 5 10km

SCALE 1:100,000

ETHERIDGE HENLEY WILLIAMS
Geoscience Consultants

COMPILED: S.Cox	**BLACKSTONE RESOURCES Inc.**
CHECKED: S.Cox	
DATE: 6.1.1997	**MONSTER PROPERTY REGION YUKON TERRITORY**
DRAWN: SUN DRAFTING	
REF: YUKON	**STRUCTURAL INTERPRETATION OF AEROMAGNETIC DATA**
REVISION:	
DRAWING No. YUAARD001.wor	SCALE 1:100,000 (0 1 2km) — MAP 1

#7

LEGEND

Mapped extent of Wernecke Breccia

Areas of high K, either alteration or original lithology

Claim boundary

Geophysical Survey Area

FAULTS

Steep NE trending, dominantly strike-slip with strong or weak magnetic discontinuity

major / strong

minor / weak

Steep - inclined reactivated, reverse and normal faults, some along lithologic boundaries

major / strong magnetic discontinuity

minor / weak magnetic discontinuity

MAGNETIC FEATURES

(D) Diorite source

(B) Breccia source, or unmapped diorite

(U) Unknown source

(+) Source assumed as noted

(H) Large area of high magnetic intensity related to large magnetic body at depth

Areas of highly variable magnetic intensity, probably corresponding to breccia at depth

GN

MN

093600 7/2

Map Projection: Universal Transverse Mercator, Northern Hemisphere
Central Meridian: 141 degrees West (Zone 7)
Geodetic Datum: Clarke 1866 (NAD 27)

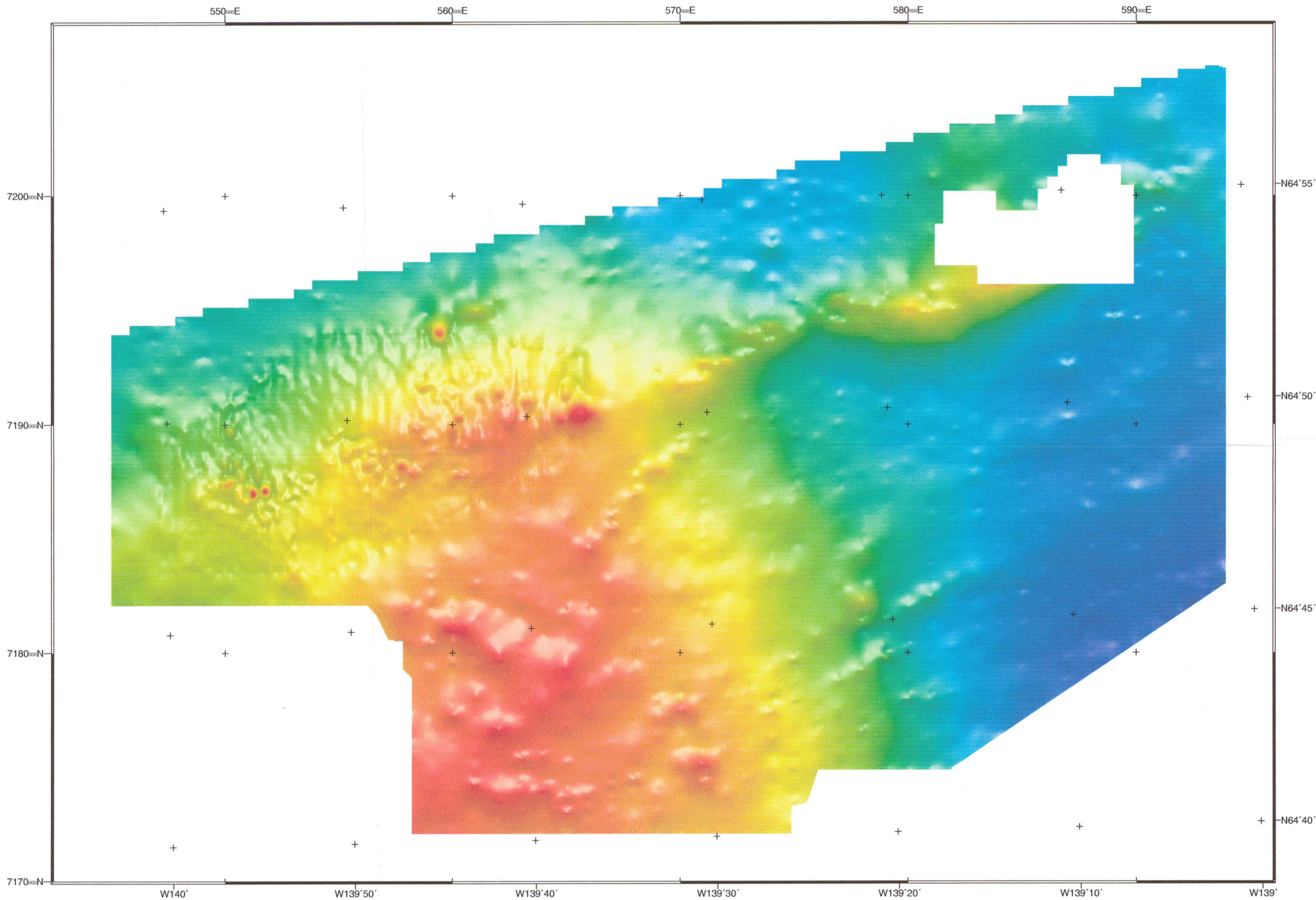
0 2.5 5km

SCALE 1:50,000

ETHERIDGE HENLEY WILLIAMS
Geoscience Consultants

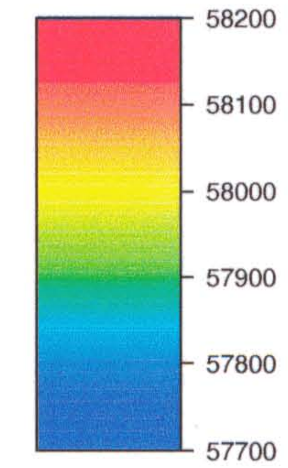
COMPILED: S.Cox	BLACKSTONE RESOURCES Inc.
CHECKED: S.Cox	MONSTER PROPERTY DETAILED SURVEY
DATE: 20.11.1996	YUKON TERRITORY
DRAWN: SUN DRAFTING	STRUCTURAL INTERPRETATION OF AEROMAGNETIC DATA
REF: YUKON	
REVISION:	
DRAWING No. MOARD001.wor	SCALE 1:50,000 — MAP 2

#8

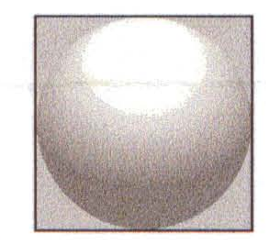


GN
MN

HSI colour model



Illumination
Sun Angle 0/45



093600 2/2

Map Projection : Universal Transverse Mercator, Northern Hemisphere
Central Meridian : 141 degrees West (Zone 7)
Geodetic Datum : Clarke 1866 (NAD 27)

Scale 1:100 000

0 2 4 6 8 10

Kilometers

Blackstone Resources Inc.

Monster Property Regional Survey, Yukon Territory
Total Magnetic Intensity Image
Upward Continuation = 100 metres
HSI colour model

DATE: 18/12/96	BY: EHW	PLAN NO.
SCALE: 1:100 000	REF. 30	IMAGE 1

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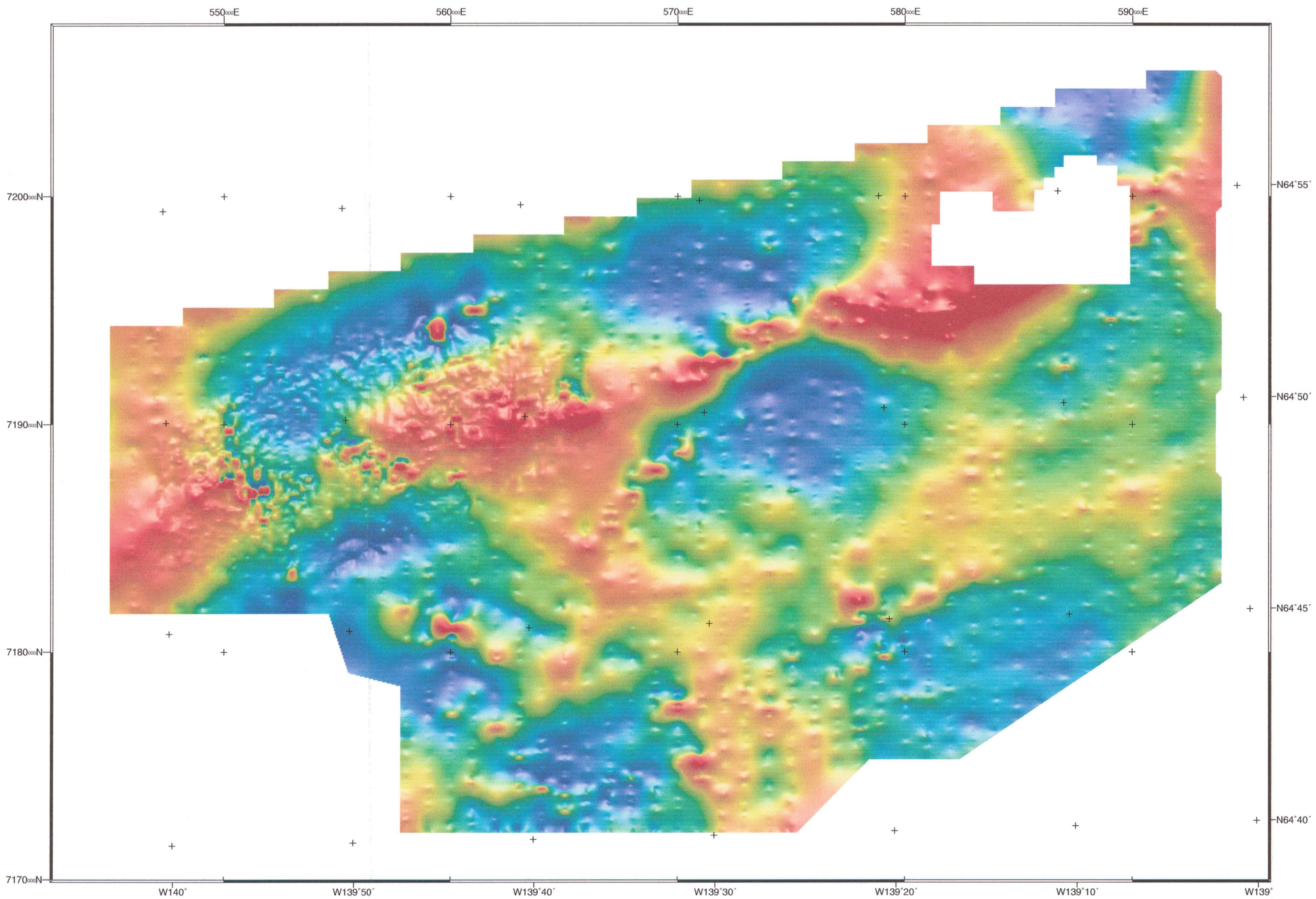
Deakin ACT 2600

#9



GN
MN

HSI colour model
70
50
30
10
-9
-30

Illumination
Sun Angle 0/45

093600 2/2

Map Projection : Universal Transverse Mercator, Northern Hemisphere
Central Meridian : 141 degrees West (Zone 7)
Geodetic Datum : Clarke 1866 (NAD 27)

Scale 1:100 000
0 2 4 6 8 10
Kilometers

Blackstone Resources Inc.

Monster Property Regional Survey, Yukon Territory
5th Order Residual Magnetic Image
HSI colour model

DATE: 18/12/96	BY: EHW	PLAN NO.
SCALE: 1:100 000	REF. 31	IMAGE 2

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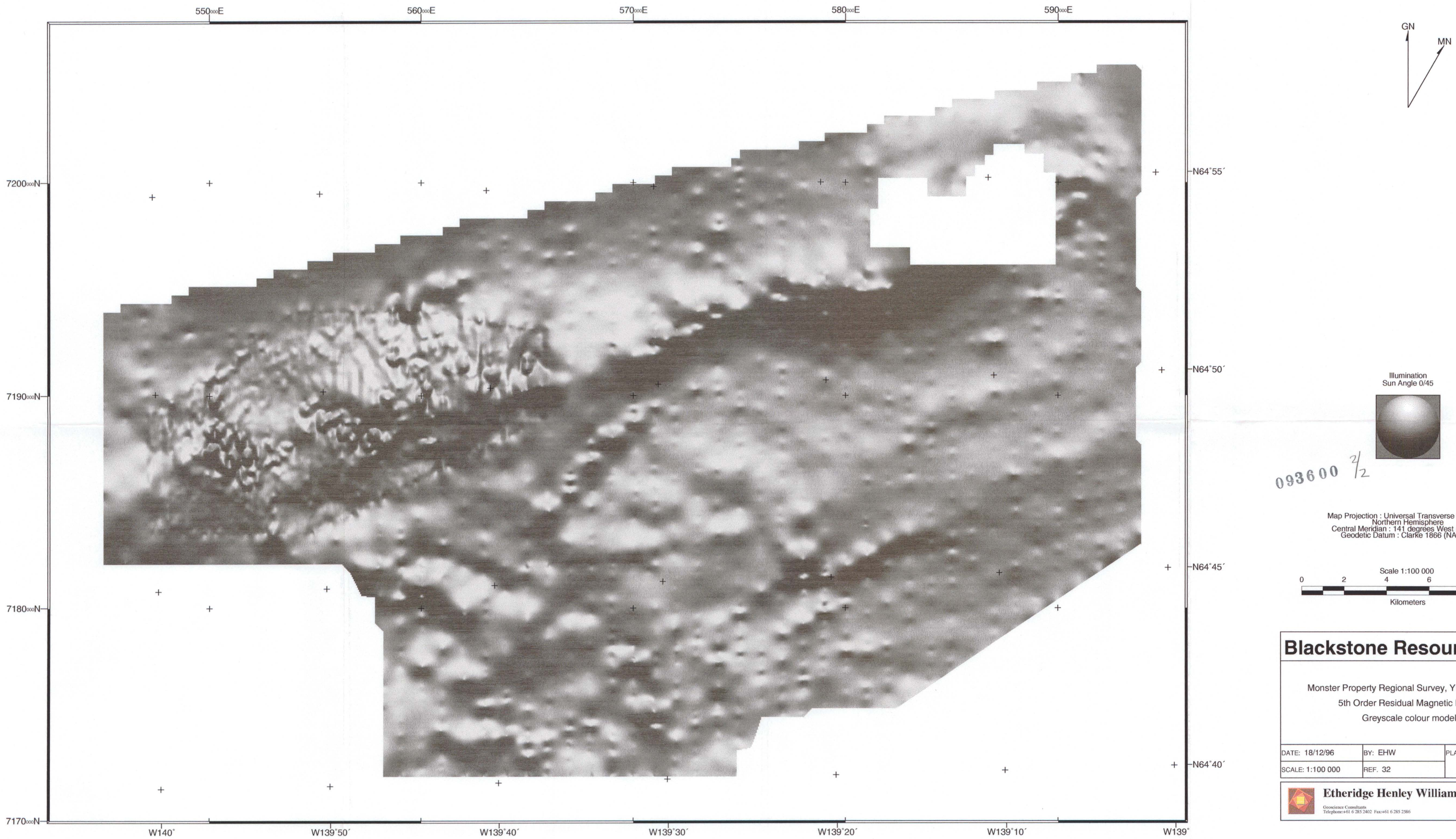
#10



093600 2/2

Map Projection : Universal Transverse Mercator, Northern Hemisphere
Central Meridian : 141 degrees West (Zone 7)
Geodetic Datum : Clarke 1866 (NAD 27)

Blackstone Resources Inc.

Monster Property Regional Survey, Yukon Territory
5th Order Residual Magnetic Image
Greyscale colour model

DATE: 18/12/96	BY: EHW	PLAN NO.
SCALE: 1:100 000	REF. 32	IMAGE 3

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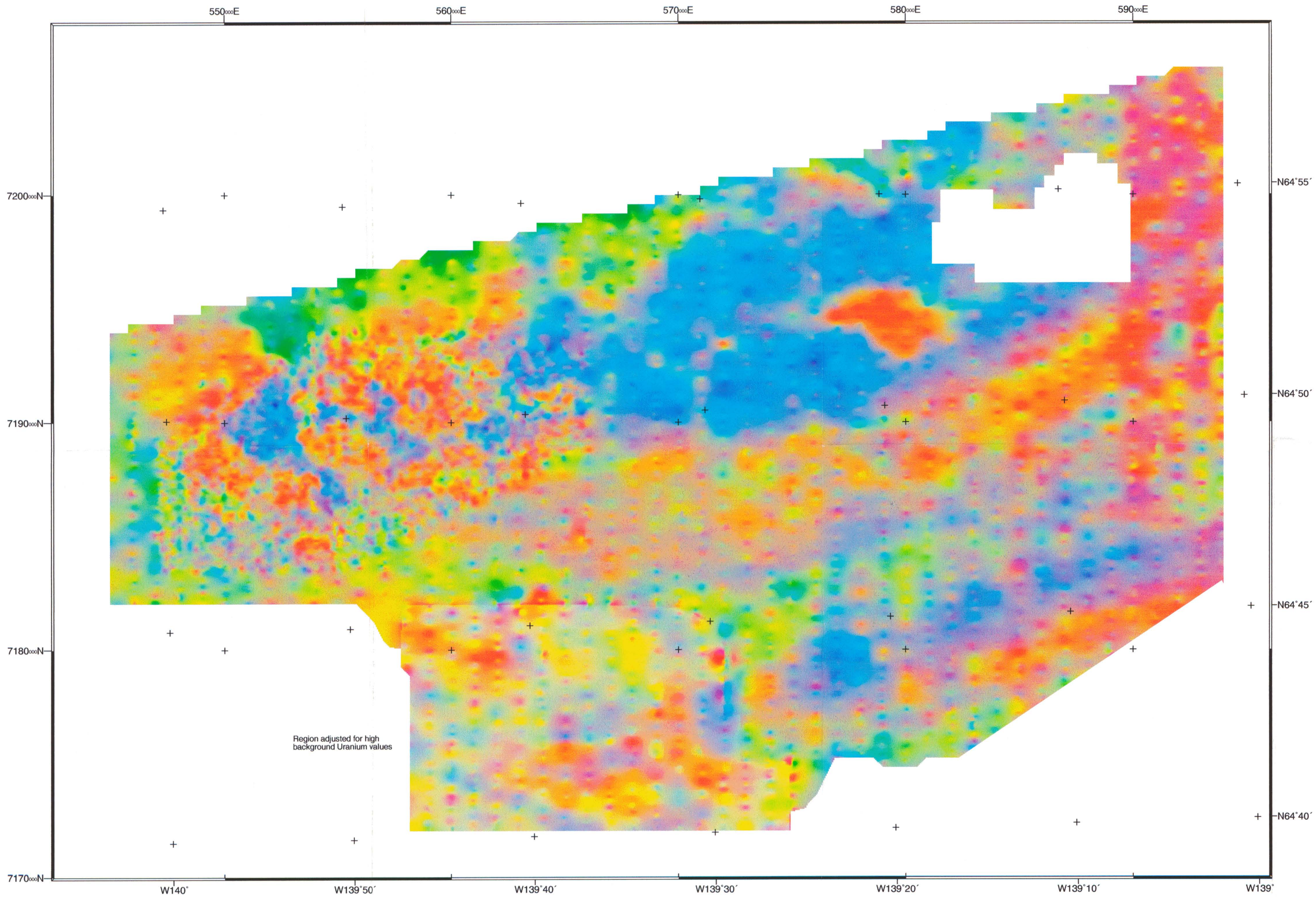
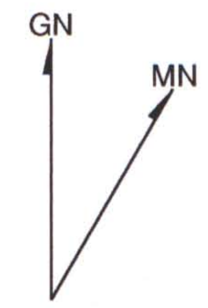
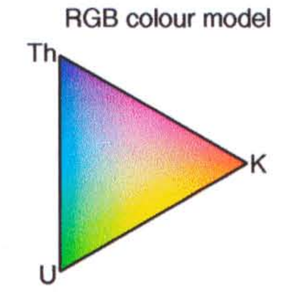
#11







009860 2/2

Map Projection : Universal Transverse Mercator, Northern Hemisphere
Central Meridian : 141 degrees West (Zone 7)
Geodetic Datum : Clarke 1866 (NAD 27)

Scale 1:100 000
0 2 4 6 8 10
Kilometers

Blackstone Resources Inc.

Monster Property Regional Survey, Yukon Territory
Normalised Potassium, Uranium, Thorium
K=Red, U=Green, Th=Blue
RGB colour model

DATE: 18/12/96	BY: EHW	PLAN NO.
SCALE: 1:100 000	REF. 33	IMAGE 4

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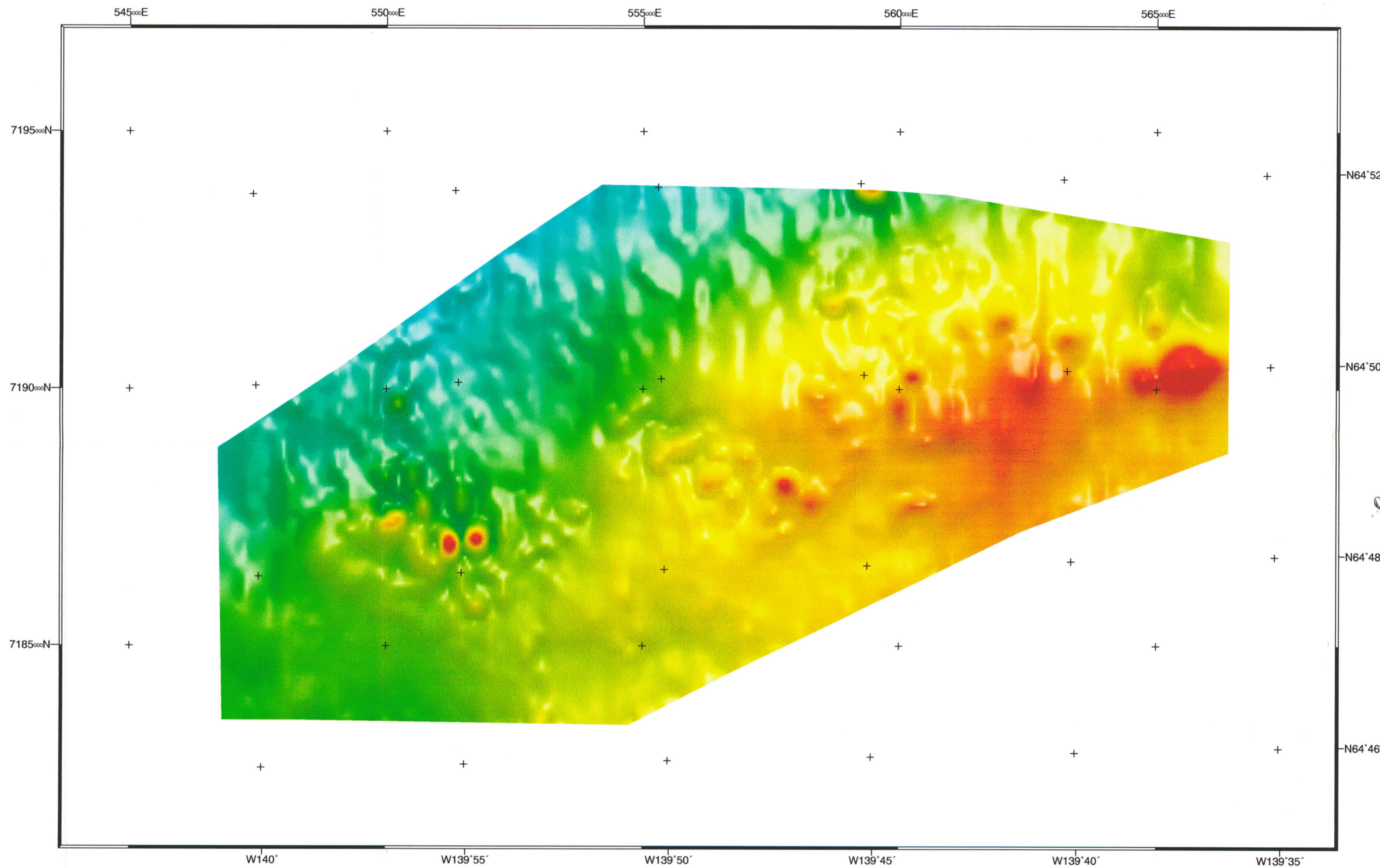
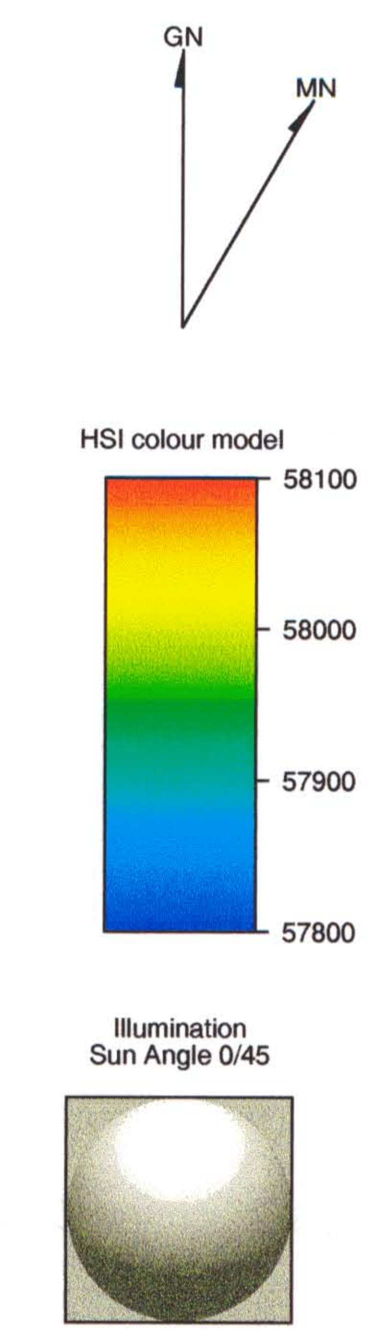
#11

#12





093600
2/2

Map Projection : Universal Transverse Mercator, Northern Hemisphere
Central Meridian : 141 degrees West (Zone 7)
Geodetic Datum : Clarke 1866 (NAD 27)

Scale 1:50 000

0 1 2 3 4 5
Kilometers

Blackstone Resources Inc.

Monster Property Detailed Survey, Yukon Territory
Total Magnetic Intensity Image
Upward Continuation = 100m
HSI colour model

DATE: 19/11/96	BY: EHW	PLAN NO.
SCALE: 1:50 000	REF. 27	IMAGE 5

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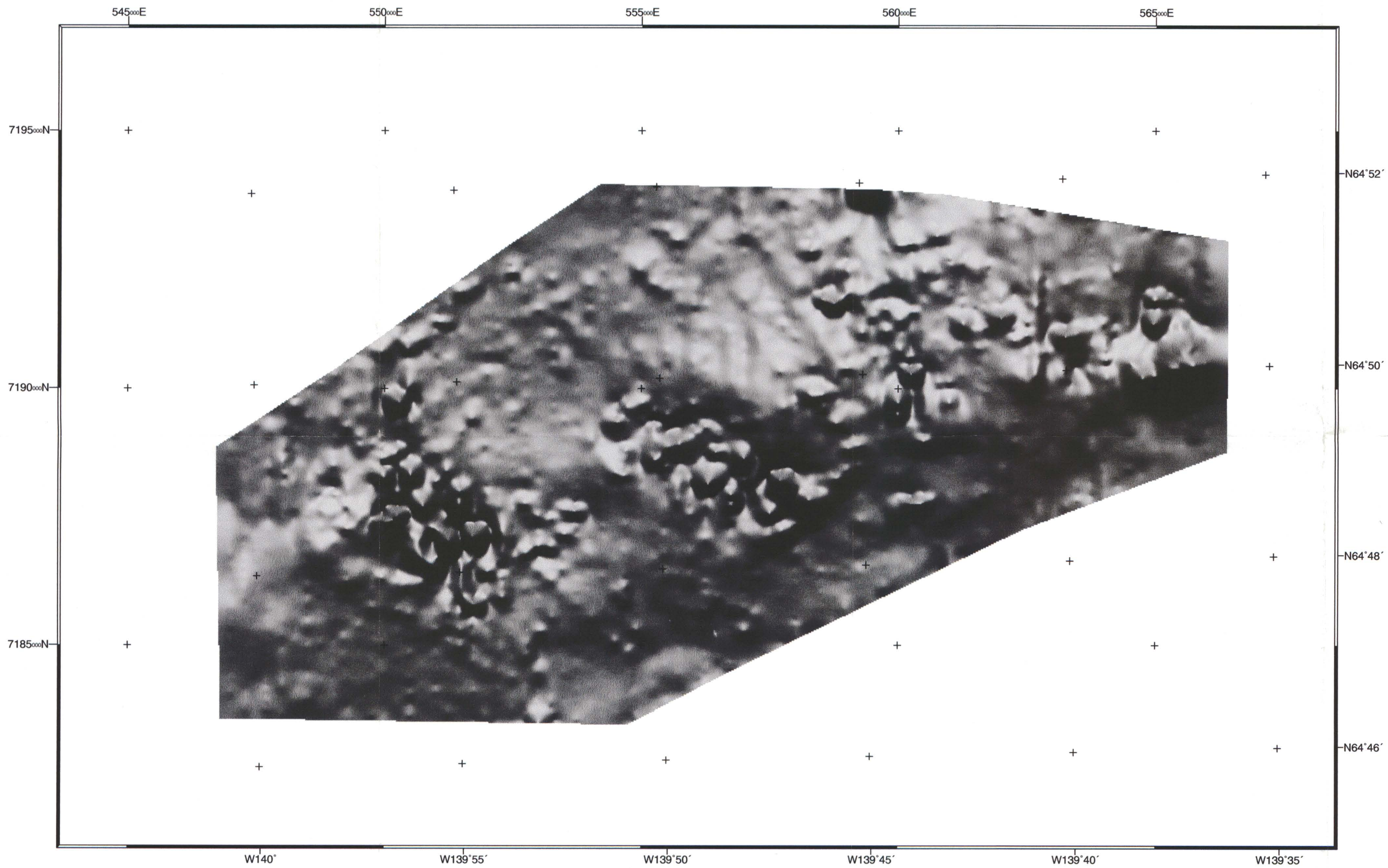
#13

545000E
550000E
555000E
560000E
565000E
7195000N
7190000N
7185000N
N64°52´
N64°50´
N64°48´
N64°46´
W140°
W139°55´
W139°50´
W139°45´
W139°40´
W139°35´
GN
MN
HSI colour model
100
71
42
13
-15
-45
Illumination
Sun Angle 0/45
093600 2/2
Map Projection : Universal Transverse Mercator, Northern Hemisphere
Central Meridian : 141 degrees West (Zone 7)
Geodetic Datum : Clarke 1866 (NAD 27)
Scale 1:50 000
0 1 2 3 4 5
Kilometers
Blackstone Resources Inc.
Monster Property Detailed Survey, Yukon Territory
5th Order Residual Magnetic Image
HSI colour model
DATE: 21/11/96
BY: EHW
PLAN NO.
SCALE: 1:50 000
REF. 29
IMAGE 6
Etheridge Henley Williams
Geoscience Consultants

#14



Illumination
Sun Angle 0/45

Map Projection : Universal Transverse Mercator, Northern Hemisphere
Central Meridian : 141 degrees West (Zone 7)
Geodetic Datum : Clarke 1866 (NAD 27)

Scale 1:50 000

0 1 2 3 4 5

Kilometers

Blackstone Resources Inc.

Monster Property Detailed Survey, Yukon Territory
5th Order Residual Magnetic Image
Greyscale colour model

DATE: 19/11/96	BY: EHW	PLAN NO.
SCALE: 1:50 000	REF. 13	IMAGE 7

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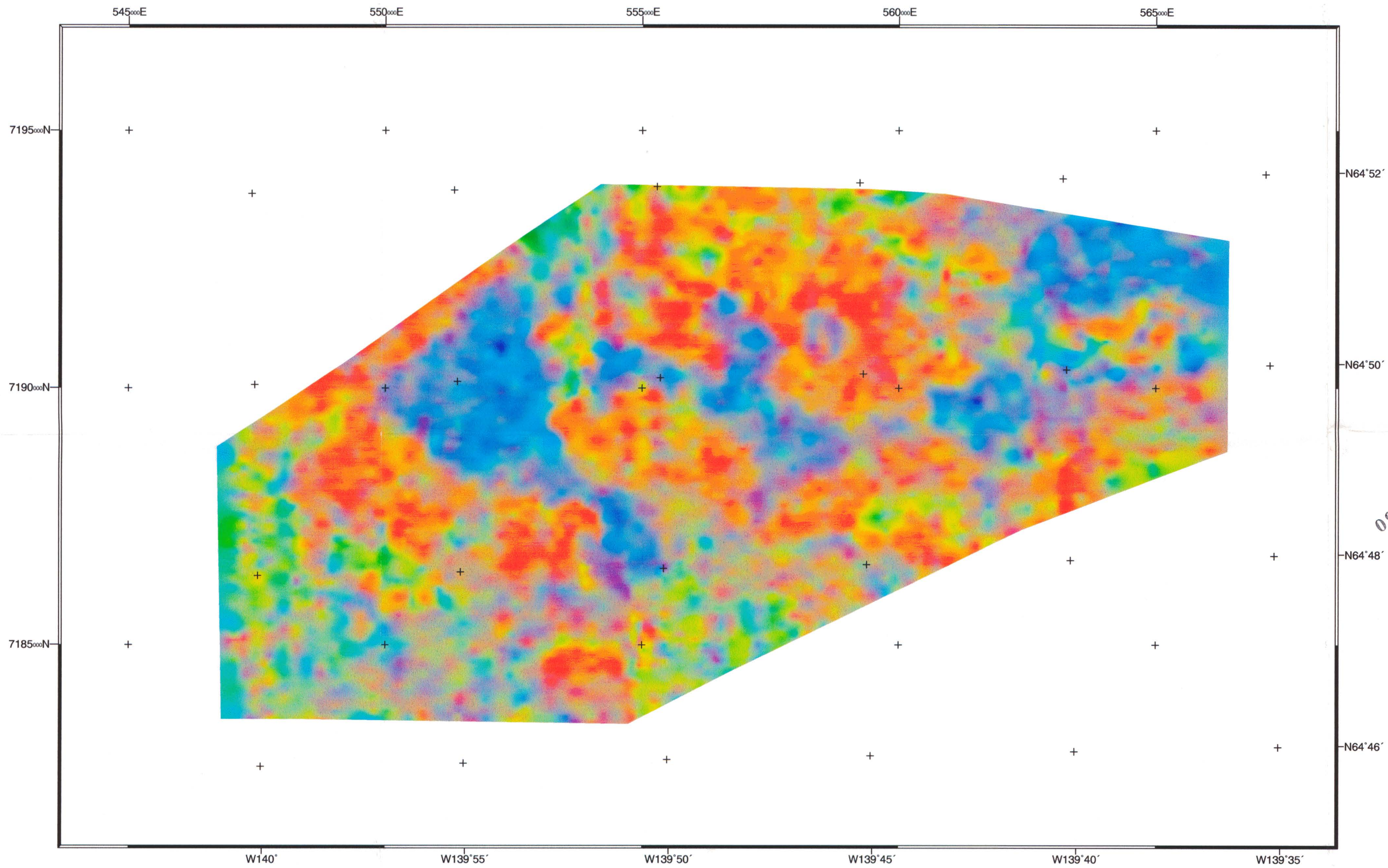
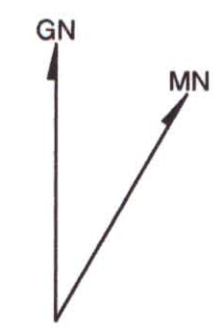
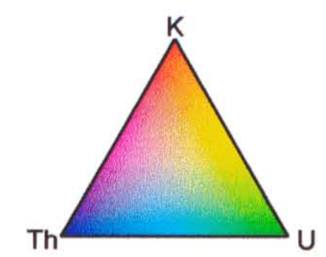
093600 .2/2

#15





RGB colour model



093600 2/2

Map Projection : Universal Transverse Mercator, Northern Hemisphere
Central Meridian : 141 degrees West (Zone 7)
Geodetic Datum : Clarke 1866 (NAD 27)

Scale 1:50 000

0 1 2 3 4 5

Kilometers

Blackstone Resources Inc.

Monster Property Detailed Survey, Yukon Territory
Normalised Potassium, Uranium, Thorium
K=Red, U=Green, Th=Blue
RGB colour model

093600 2/2

DATE: 19/11/96	BY: EHW	PLAN NO.
SCALE: 1:50 000	REF. 20	IMAGE 8

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#16