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BATTLE MOUNTAIN (CANADA) INC.

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REPORT ON A FIXED-WING AIRBORNE MAGNETIC AND VLF-EM SURVEY KIRKLAND LAKE PROJECT LARDER LAKE MINING DIVISION, ONTARIO SEPTEMBER, 1989

VOLUME 1

Toronto, Ontario
15 March 1990

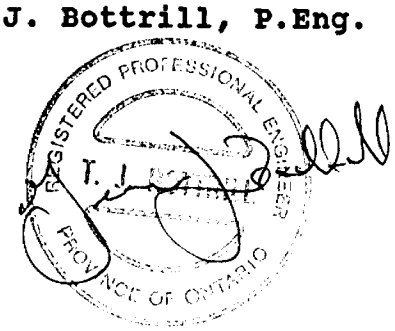
T.J. Bottrill, P.Eng.

BATTLE MOUNTAIN (CANADA) INC.

REPORT ON A FIXED-WING AIRBORNE MAGNETIC AND VLF-EM SURVEY KIRKLAND LAKE PROJECT LARDER LAKE MINING DIVISION, ONTARIO SEPTEMBER, 1989

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			580	Kirkland Lake Project Aeromagnetic Interpretation Stratagex Ltd. January, 1990	1:10,000

590

600

INTRODUCTION AND SUMMARY

Battle Mountain (Canada) Inc. (BMCI) has completed an airborne, fixed-wing geophysical survey covering parts of Teck, Lebel, Otto, Boston, Eby and Grenfell Townships in the Larder Lake District, as part of an on-going programme of exploration in the Kirkland Lake area of Ontario. The surveyed area covers five separate properties in total, as well as part of the sixth property. All of these are presently held by BMCI under an option agreement with Queenston Mining Inc. (formerly HSK Minerals Ltd.). In addition, the survey covers a large area around these properties, including that underlain by the present and past-producing mines in the Town of Kirkland Lake, along the "Mile of Gold".

The management contract for the survey was awarded to Grid Data North Ltd., Mississauga, Ontario, who in turn contracted the data collection to Terraquest Ltd., Toronto, Ontario. The final data reduction and compilation was completed by Grid Data North and their associated company, Tesla-10 Ltd. Subsequent to the receipt of the survey maps, Stratagex Ltd. of Toronto, Ontario, prepared an interpretation report based on the survey data as well as that from the Ontario Geological Survey KLIP survey (Questor INPUT and magnetics) and the relevant O.G.S. geological maps.

The survey covered 1083 km at a planned elevation of 60 m and a flight line spacing of 100 m flown at 155/335°, together with three tie-lines flown normal to the survey lines.

The survey included both magnetic and VLF-electromagnetic (VLF-EM) data. These were recorded at 0.1 second intervals, corresponding to 5 to 6 metres on the ground, with a magnetometer sensitivity of 0.001 nT, diurnally corrected. Flight path recovery (aircraft positioning) was determined from a colour video tape with a fiducial recorder at 0.1 second intervals, and by use of a satellite global-positioning system (GPS TANS) with the aircraft position recorded at 1.0 second intervals. A figure of merit was flown at the beginning of the survey and was satisfactory.

The magnetic data were recorded using a "horizontal gradiometer" system in which two separate sensors are carried in extensions from the ends of the wings of a fixed wing aircraft. As such, twice as much information is recorded as in a standard magnetic survey. As the sensors are mounted approximately 7 metres on either side of the centre line of the aircraft, the area is effectively surveyed with line spacings of 86 m, 14 m, 86 m, 14 m, etc. The data from the two sensors can be averaged, treated as independent survey lines or, when used as a horizontal gradiometer, can indicate the strength and possible orientation of magnetic sources between the flight lines.

The VLF-EM survey also used two separate sensors for transmitters which were orientated as a "line-station" close to normal to the flight path at 108° (Cutler, or Seattle at 286° for 2 lines) and an "ortho-station" at 163° (Annapolis). Therefore, in effect, two separate VLF-EM surveys were flown. Both in-phase and quadrature components were recorded, although only the in-phase "total-field strength" was plotted.

Further details on the survey parameters, interpretation features and final products are given in Appendix I, the survey report provided by Grid Data North Ltd. This report is accompanied by maps at a scale of 1:10,000 derived from the Ontario Basic Mapping series 1:20,000 maps, with UTM co-ordinates shown. Each map sheet covers an area of 5 km by 7 km on the ground at this scale (see Appendix A to the Grid Data North Report). The maps provided show the recovered flight-path (7 sheets), the total field magnetics (8) the calculated vertical magnetic gradient (7), and the two VLF-EM total field strengths (7 for each station).

The interpretation by Stratagex attempted to relate the complex results generated by the magnetic and VLF-EM surveys to the bedrock geology and to any specific or direct indications of metallic mineralization. As noted in the report, the area is extremely complex consisting of domains of markedly different magnetic amplitude and relief. The area is transected by numerous magnetic lineaments, some of which are related to geologically mapped faults. Some possibly significant discrepancies were noted between the geology as mapped and the observed magnetic domains, indicating various areas where further mapping is required or where the surface geology is not reflecting the bedrock at relatively shallow depths.

Six target areas were identified which are considered favourable for gold mineralization based on their geophysical similarity to the known deposits and/or other relevant features based on experience elsewhere. Recommendations were made for further evaluation of the results from a geological rather than a geophysical perspective, for further processing of the data in order to allow for the use of additional techniques such as digital image analysis, and for further geophysical interpretation of the re-processed data.

The complete report by Stratagex is included as Appendix II, accompanied by an interpretation map at 1:10,000 (as an overlay to the compiled geophysical data maps).



Ministry of Northern Development and Mines

Ontario

Geophysical-Geological-Geochemical Technical Data Statement

File _____

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Airborne Geophysical (Magnetic & VLF-EM)

Township or Area Teck, Lebel, Boston, Otto, Eby, Grenfell

Claim Holder(s) Battle Mountain (Canada) Inc.

Survey Company Terraquest & Grid Data North

Author of Report T. Bottrill

Address of Author #2910, 390 Bay St., Tor., Ont. M5H 2Y2

Covering Dates of Survey 28/8/89 to 12/9/89 (linecutting to office)

Total Miles of Line Cut _____

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
–Electromagnetic	
–Magnetometer	
–Radiometric	
–Other	
Geological	
Geochemical	

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer 40 Electromagnetic 40 Radiometric _____ (enter days per claim)

DATE: MAR 15 | 90 SIGNATURE: Terraquest T. Bottrill
Author of Report or Agent

Res. Geol. _____ Qualifications _____

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
L.	891865
L.	842493
L.	842494
L.	842495
L.	981876
L.	842782
L.	981871

TOTAL CLAIMS 7

If space insufficient, attach list

OFFICE USE ONLY

837 (85/12)

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations _____ Number of Readings _____

Station interval _____ Line spacing _____

Profile scale _____

Contour interval _____

MAGNETIC

Instrument _____

Accuracy – Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

_____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

_____

Base station value and location _____

_____

Elevation accuracy _____

INDUCED POLARIZATION RESISTIVITY

Instrument _____

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time _____ Frequency _____

– Off time _____ Range _____

– Delay time _____

– Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

_____

Corrections made _____

_____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

_____

Additional information (for understanding results) _____

_____

_____

AIRBORNE SURVEYS

Type of survey(s) Total Intensity Magnetic (Horizontal Gradient) & VLF-EM (Line, Ortho)

Instrument(s) Cesium high sensitivity magnetometers & Hertz Totem 2A VLF

(specify for each type of survey)

Accuracy magnetic 0.001 nT VLF-EM 1%

(specify for each type of survey)

Aircraft used Cessna 206 C-GUCE

Sensor altitude 60m

Navigation and flight path recovery method Video tape (0.1 second fiducial)

GPS TANS satellite positioning system (1.0 second position record)

Aircraft altitude 60m Line Spacing 100m

Miles flown over total area 1083 km (673 mi) Over claims only 13.26 km (8.2 mi)

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken _____

_____

_____

Total Number of Samples _____

Type of Sample _____
(Nature of Material)

Average Sample Weight _____

Method of Collection _____

_____

Soil Horizon Sampled _____

Horizon Development _____

Sample Depth _____

Terrain _____

_____

Drainage Development _____

Estimated Range of Overburden Thickness _____

_____

_____

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis _____

_____

_____

_____

General _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ANALYTICAL METHODS

Values expressed in: per cent ☐
p. p. m. ☐
p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others _____

Field Analysis (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Field Laboratory Analysis

No. (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Commercial Laboratory (_____ tests)

Name of Laboratory _____

Extraction Method _____

Analytical Method _____

Reagents Used _____

General _____

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX I

Survey Report on an Airborne Magnetics and VLF-EM Survey at Kirkland Lake area, Larder Lake Mining Division, Ontario
for Battle Mountain (Canada) Inc.
by Grid Data North Ltd., December, 1989

Appendix I

GRID DATA North Ltd

55A Port St. East, Mississauga,
Ontario, Canada, L5G 4P3

Tel: (416) 891-2245 Fax: (416) 271-4414

GDJ-005

SURVEY REPORT

on an

AIRBORNE MAGNETICS AND VLF-EM SURVEY

at

KIRKLAND LAKE AREA
LARDER LAKE MINING DIVISION
ONTARIO

for

BATTLE MOUNTAIN (CANADA) INC.

by

GRID DATA NORTH LTD

December, 1989

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5. GENERAL EVALUATION

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   A. Survey Location Map
   B. Data Processing
   C. Archive Tape Formats

1. INTRODUCTION

This report describes a fixed-wing airborne geophysical survey carried out on behalf of Battle Mountain (Canada) Inc. by Grid Data North Ltd. Survey flying was performed for Grid Data North by Terraquest Ltd. and data compilation was by Tesla-10 Ltd.

The area surveyed is located near Kirkland Lake, Ontario. The measured geophysical parameters were:

(a) total magnetic field and horizontal gradient
(b) VLF-EM (2 stations)

A total of 1083 kilometres of traverse and control lines were flown at a nominal spacing of 100 metres (traverse) and 2 km (control). They were flown during the period 31 August to 12 September, 1989.

With the exception of certain aspects of the flight line spacing, the quality of the geophysical data is considered to be within the contracted specifications.

2. SURVEY AREA

The survey area is located in Teck, Lebel, Otto and Grenfell Townships, in the Larder Lake Mining Division of Ontario. The survey block is approximately rectangular in shape, measuring 15 by 7 kilometres. It covers the towns of Kirkland Lake and Swastika and is crossed by highways 66 and 112 and the Ontario Northlands Railway.

The N.T.S. references are 42A/1 and 32D/4. A diagram of the survey area is shown in Appendix A.

3. DATA ACQUISITION

3.1 AIRCRAFT AND INSTRUMENTATION

(a) Aircraft

The survey was carried out using a Cessna 206 aircraft, registration C-GUCE, which carries two high sensitivity magnetometers and a VLF electromagnetic detector.

(b) Magnetometers

The magnetometers were high sensitivity, optically pumped cesium vapour sensors mounted in wing tip extensions, approximately 5 feet beyond the wing tip with a total separation of 14.3 metres. The specifications of the magnetometers are as follows:

Working range:	20,000-100,000 gammas
Sensitivity:	0.001 gammas
Sampling rate:	0.1 seconds
Model:	BIW 2321H8
Manufacturer:	Scintrex, Concord, Ontario

The magnetometer processor is a PMAG 3000 and the data acquisition system is a PDAS 1000, both manufactured by Picodas Group Inc.

The signal to noise ratio of the magnetic response is improved by a compensation technique provided by Picodas Group Inc. The sources of noise are permanent, induced and eddy current effects of the airframe, and the heading effects. The system uses three orthogonal fluxgate magnetometers to measure the aircraft attitude with respect to the earth's magnetic field vector. A mathematical model is used to solve this interference effect.

(c) VLF-EM

A Herz Industries model Totem 2A unit is used to measure two VLF stations with an accuracy of 1%. It uses three orthogonal coils to measure the total field strength and the vertical quadrature component of the magnetic field associated with the primary EM field.

The VLF sensor is mounted in a plastic tube projected forward from the midsection of the starboard wing.

(d) Data Acquisition/Recording

A PDAS-1000 microprocessor based system manufactured by Picodas was used to acquire survey data at a basic rate of 10 Hertz.

(e) Magnetic Base Station
A PBAS 9000 base station (Picodas) with Overhauser proton sensor was used to digitally record magnetic diurnal information at one second intervals.

(f) Positioning
A record of aircraft position was acquired using two systems.
(i) Video tape flight path record with electronic altitude compensation and fiducial record in 0.1 second intervals.
(ii) GPS TANS satellite positioning system manufactured by Trimble. Positional information recorded by PDAS-1000 at one second intervals.

(g) Ground Clearance
A King KRA-10 radar altimeter was used to measure ground clearance.

3.2 SURVEY SPECIFICATIONS

(a) General

Line Spacing:	100metres nominal
Line Direction:	155/335 cardinal degrees
Terrain Clearance:	200 feet nominal
Surveyed distance:	1083 line kilometres
Average ground speed:	50 to 65 metres/second
Data point intervals	
magnetic:	0.1 seconds, 5-6 metres
VLF-EM:	0.1 seconds, 5-6 metres
Tie-line interval:	2 kilometres nominal
Flight navigation:	visual, with aid of photomosaic
Figure-of-merit:	better than 5

(b) Tolerances

Line Spacing: No gap between traverse lines should be greater than 150 metres for a distance of 2 kilometres or more. This specification was exceeded in 14 instances.

Ground Clearance: Not to exceed 375 feet over a distance of 1 kilometre except for reasons of safety or where flight regulations do not permit. This tolerance was exceeded (as required by regulations) over the town of Kirkland Lake. The flight path map has been annotated (broken line) for those sections where the ground clearance was in excess of 400 feet. Aeromagnetic and VLF-EM data in this area are not reliable. No special steps were taken to level the magnetic field data in this area.

Magnetic diurnal: Maximum acceptable magnetic diurnal variation as measured by the base station was a departure from any 3 minute chord of 10 nT and/or a 3 minute chord slope of 15 nT. No reflights were required due to unacceptable diurnal variations.

Magnetometers: Compensated airborne magnetometer results satisfied the following: individual magnetometer noise envelopes less than 0.1 nT; figure-of-merit less than 5; and gradients accurate to less than 0.01 nT per metre.

3.3 SURVEY OPERATIONS

(a) Flying

The Terraquest aircraft C-GUCE, was mobilized to Kirkland Lake on 28 August 1989. The survey was completed in 10 flights between 31 August and 12 September 1989. Survey flying was carried out only between 1300 and 1900 hours to ensure availability of GPS (satellite) positioning information. Weather conditions (wind, precipitation and visibility) prevented survey flying on 5 days and restricted flying hours on 8 days.

The parameters used for the magnetic compensation technique were measured during flight U-147 on 31 August. During the same flight a magnetic figure-of-merit was performed.

(b) Magnetic Diurnal

The magnetic base station was positioned in a low gradient location within the survey area (near the junctions of highways 112 and 66). The measured diurnal variation was very flat during the entire period of survey flying. The maximum slope of any 3 minute chord was less than 4 nT.

(c) VLF-EM Stations

The selected "line" stations was NAA Cutler (24.0 kHz). Its bearing from the survey is 108 degrees. The alternate line station was NLK Seattle bearing 286 degrees. The selected "ortho" station was NSS Annapolis bearing 163 degrees.

The ortho station (NSS) was available during all of the survey flying. In two cases (flights 149 and 160), the line station NAA was unavailable and the signals from NLK Seattle were recorded. Since the bearings of NSS and NLK differ by 178 degrees (i.e. in opposite directions) data from these stations should be equivalent. This proved to be true as no negative effects were observed in the line station VLF-EM map.

(d) Flight Path
The aircraft position was recorded during the survey flying using (a) a video system and (b) a GPS TANS system. Flight path was proven in the field by recovering the video record. Picked points were plotted on a 1:10,000 scale "semi-controlled" photomosaic. This photomosaic was produced from 1:20,000 scale Ontario government air photographs flown in 1986. This photomosaic laydown was done on an NTS map photo-enlarged to scale and photos that were different in scale to the others by more than 2% were rephotographed to conform to the laydown scale.

4. DATA COMPILATION

4.1 FIGURE-OF-MERIT

An aeromagnetic figure-of-merit (FOM) is defined as the sum of the absolute value of peak-to-peak amplitudes variations in the magnetic total field record, caused by roll (+/- 10 degrees), pitch (+/- 5 degrees) and yaw (+/- 5 degrees) aircraft manoeuvres which are flown over a common point in the four cardinal direction (i.e. the sum of (12 values). The analog records from the FOM flight were analyzed and these 12 values extracted for each of the two magnetometers. The results were 2.6 nT (port sensor) and 2.8 nT (starboard sensor). The analog records and the calculations of FOM were delivered to the Battle Mountain office in Kirkland Lake.

4.2 FLIGHT PATH

Positional information from the video record and the GPS record were edited, checked and combined to form the flight path record. This process is outlined under item 3 in Appendix B.

4.3 DATA PROCESSING

The processing method applied to the field data in order to produce magnetic and VLF maps is described in Appendix B.

4.4 DATA PRESENTATION

The map product results of the survey are presented at a scale of 1:10,000. They are:

(1) Aeromagnetic contour maps
  (i) total field
  (ii) calculated vertical gradient
  (iii) total field Tesla-Contours (coloured line)
  (iv) coloured total field
(2) VLF total field contour maps
  (i) line station
  (ii) ortho station
(3) Flight path map

All maps except for 1(iv) were divided into 7 sheets conforming to the client's mapping system. In the case of 1(i) an eighth sheet was included. The coloured magnetic total field map was provided on one sheet.

Digital archive records on 9-track magnetic tape were provided for (i) the located flight line data and (ii) the gridded data sets. Format descriptions for these two records are provided in Appendix C.

5. GENERAL EVALUATION

5.1 FLIGHT PATH

The method employed to recover the aircraft flight path has resulted in reliable positional accuracies which meet the demands of geophysical mapping. However, the set of flight lines were not flown to maintain the planned 100 meter line spacing as well as was intended. As a result the flight path contains numerous instances of crossed flight lines, closely spaced flight lines and gaps greater than 150 metres.

5.2 MAGNETICS

Due to the "unevenly-spaced" flight path, it has not been possible to apply the measured horizontal gradient information to create a "superior" contour map of the total magnetic field. Evenly spaced flight lines are important for application of the transverse horizontal gradient during the gridding process in order to achieve a better definition of oblique features between the flight lines.

Total magnetic field maps have been produced in the normal manner from this data set by combining the two magnetic sensor values. This has produced good quality mineral exploration maps which will be very useful for updating the known geologic and structural information.

At this time (mid-December, 1989), work is continuing on application of the horizontal gradient to this data set by eliminating those portions of the flight lines which contain cross-overs and near approaches. Results of this work will be reported separately. The horizontal gradient data set has been adjusted for zero errors and remnant heading errors and has been used to assist certain aspects of processing. This data set will be useful in image-analysis work in conjunction with the other geophysical parameters. It should help reveal aspects which will assist exploration efforts.

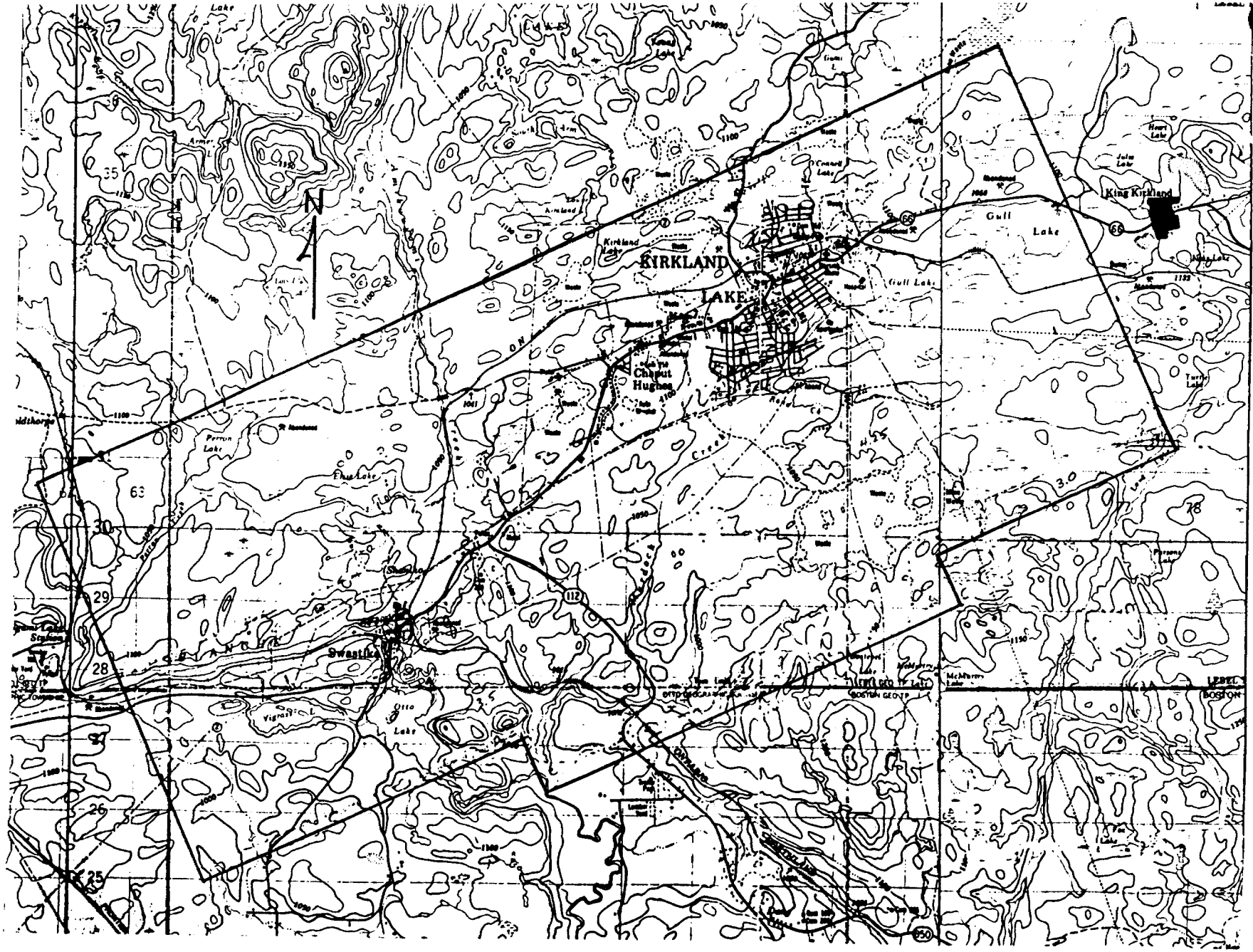
5.3 VLF-EM

This survey has produced a consistent, useful set of VLF contour maps. Both the line and ortho results are of interest as they emphasize different sets of conductive features.

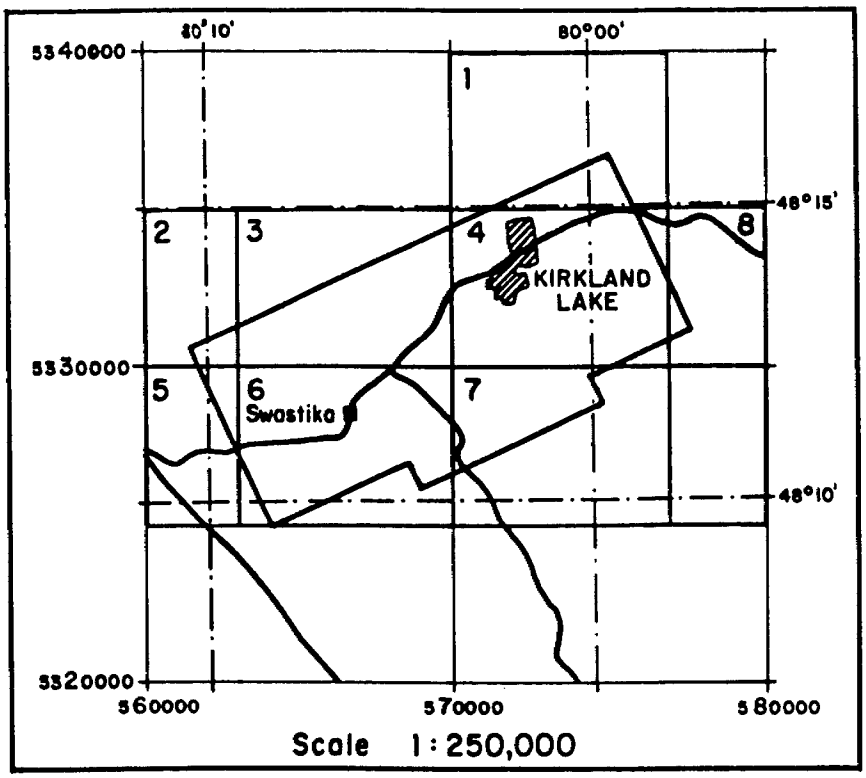
Respectfully submitted
GRID DATA NORTH LTD

Bart St. John-Smith
President, Geophysicist

a. 1274 |



Appendix A - Survey Area



Map Sheet Layout

APPENDIX A

DATA PROCESSING

A general conceptual outline of the processing applied to the acquired field data is provided below. Details of certain steps or parameter values are provided when they contribute to understanding of the process.

1. Data Preparation
   The field data was edited and prepared for the next stage.

2. Creation of Data Tape
   The data bases were configured and loaded with the prepared field data. Three main data base files were used for this survey; magnetometer, VLF-EM and flight path. The processing carried out on each is outlined below.

3. Flight Path

   The video recorded flight path was recovered in the field to a 1:10,000 scale semi-controlled photomosaic. Ontario Ministry of Natural Resources 1:20,000 topographic maps were used to apply control points to this photomosaic. Flight line points picked from the video record were digitized to form part of the flight path data base along with the GPS positional information. Speed checks were used to reject or correct bad picked-points. The GPS data was smoothed with a 7-point averaging filter and evaluated. These two sets of positional information were then merged by using the GPS data to fit in between the picked points. A few sections of 3-satellite (2-dimensional fix) data were rejected. Subsequent minor adjustments were made during the magnetic gridding process.

4. Horizontal Magnetic Gradient
   Statistical analysis was used to adjust the horizontal magnetic gradient for zero errors and remnant heading errors. Extensive work was also carried out to try and apply the horizontal gradient during the gridding of the total field. These have not generally been successful due to the "non-parallel" nature of the flight path in which many flight line cross or approach very close together. A more selective application of the horizontal gradient may prove useful and work is continuing in this regard.

5. Total Magnetic Field

The total magnetic field map was created using the average value of the left and fight magnetic sensors. The magnetic base station data was normalized and used to make a diurnal variation correction to the airborne total field values. No correction for regional variation was applied.

A parallax (lag) correction of 0.5 seconds was applied to the total field and it was gridded at 25 x 25 meters using a tensioned-cubic-spline technique. A light filter (3 X 3 average) was applied to the gridded data which was then contoured with a 10nT contour interval.

6. Vertical Magnetic Gradient

The vertical magnetic gradient was calculated in the space domain by convolving an 11 x 11 filter operator with the total field magnetic grid. It was plotted with a contour interval of 0.1nT/meter.

7. VLF-EM

The line and ortho VLF data was prepared for contouring by applying a band-pass filter to the raw line data. Lower and upper wave length limits were approximately 100 meters and 1 kilometer. The resulting values were gridded and contoured (2.5% interval). Negative contours were plotted in blue and black ink used for zero values and above.

8. Digital Archive Tapes

The digital data archive tapes were made for both the line data (LOCATED DATA TAPE) and the gridded data sets. Format descriptions are provided in Appendix C to this report.

TESLA-10 LOCATED DATA TAPE FORMAT DESCRIPTION

DENSITY . : 1600 BPI
DATA TYPE : ASCII
RECORD SIZE : 112
BLOCK SIZE : 4032

FIELD	CONTENTS	FORMAT	
1 - 3	Flight Number	(I3)	
4	Blank	(1X)	
5 - 10	Date as DDMMYY	(3I2)	
11	Blank	(1X)	
12 - 20	Time in Seconds	(F9.2)	
21	Blank	(1X)	
22 - 27	Line Number	(I6)	
28	Blank	(1X)	
29 - 34	Fiducial Number	(I6)	
35	Blank	(1X)	
36 - 46	Eastings in Metres	(F11.2)	
47	Blank	(1X)	
48 - 58	Northings in Metres	(F11.2)	
59	Blank	(1X)	
60 - 67	Data Channel : MAG1	(F8.2)	= RAW
68	Blank	(1X)	
69 - 76	Data Channel : MAG2	(F8.2)	= "
77	Blank	(1X)	
78 - 85	Data Channel : DIURN	(F8.2)	
86	Blank	(1X)	
87 - 94	Data Channel : MAG1C	(F8.2)	= COMPENSATED
95	Blank	(1X)	
96 - 103	Data Channel : MAG2C	(F8.2)	= "
104	Blank	(1X)	
105 - 112	Data Channel : FREE1	(F8.2)	= $\frac{MAG1C + MAG2C}{2}$

NOTE: Where any data item is unknown or undefined the entire output field for the item will be filled with nines in the appropriate format. (eg. format (F10.1) is 99999999.9, while format (I8) is 99999999)

MAG1 = PORT SENSOR, MAG2 = STARBOARD SENSOR

MAGNETIC DATA ARCHIVE

TESLA-10 LOCATED DATA TAPE FORMAT DESCRIPTION

DENSITY : 1600 BPI
DATA TYPE : ASCII
RECORD SIZE : 112
BLOCK SIZE : 4032

FIELD	CONTENTS	FORMAT
1 - 3	Flight Number	(I3)
4	Blank	(1X)
5 - 10	Date as DDMMYY	(3I2)
11	Blank	(1X)
12 - 20	Time in Seconds	(F9.2)
21	Blank	(1X)
22 - 27	Line Number	(I6)
28	Blank	(1X)
29 - 34	Fiducial Number	(I6)
35	Blank	(1X)
36 - 46	Eastings in Metres	(F11.2)
47	Blank	(1X)
48 - 58	Northings in Metres	(F11.2)
59	Blank	(1X)
60 - 67	Data Channel : V1I	(F8.2) = LINE TOTAL
68	Blank	(1X)
69 - 76	Data Channel : V1Q	(F8.2) = LINE QUAD
77	Blank	(1X)
78 - 85	Data Channel : V2I	(F8.2) = ORTHO TOTAL
86	Blank	(1X)
87 - 94	Data Channel : V2Q	(F8.2) = ORTHO QUAD
95	Blank	(1X)
96 - 103	Data Channel : V1IF	(F8.2) = BAND PASS FILTERED
104	Blank	(1X)
105 - 112	Data Channel : V2IF	(F8.2) = " " "

NOTE: Where any data item is unknown or undefined the entire output field for the item will be filled with nines in the appropriate format. (eg. format (F10.1) is 99999999.9, while format (I8) is 99999999)

VLF-EM DATA ARCHIVE

APPENDIX II

Interpretive Report on Terraquest Aeromagnetic/VLF Survey
HSK Project, Kirkland Lake, Ontario
on behalf of Battle Mountain (Canada) Inc.
by Jerry Roth, Stratagex Ltd., December, 1989

STRATAGEX

Appendix II

Proj#9024

INTERPRETIVE REPORT

on

TERRAQUEST AEROMAGNETIC/VLF SURVEY

HSK PROJECT

KIRKLAND LAKE, ONTARIO

on behalf of

BATTLE MOUNTAIN (CANADA) INC

by

Jerry Roth

STRATAGEX LTD

Toronto, Canada December, 1989

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MAP 1 INTERPRETIVE OVERLAY 1:10000

STRATAGEX

AEROMAGNETIC INTERPRETATION
HSK PROJECT
KIRKLAND LAKE

SUMMARY:

At the request of Battle Mountain (Canada) Inc., an interpretive study and analysis was carried out by STRATAGEX Ltd of the detailed, high-sensitivity aeromagnetic survey executed earlier in 1989 by Terraquest under the direction of Grid Data North over a 100 km^2 area centered on the Kirkland Lake gold camp in northern Ontario.

This survey constitutes one component of the HSK Project, an intensive effort by Battle Mountain and its partners to identify new gold deposits within this prolific camp.

The gold deposits of the Kirkland Lake camp, primarily hosted by Archean "Timiskaming" sediments, are generally to have originated through hydrothermal activity controlled by major, through-going fault systems, although host rock type and proximal intrusives likely exert a secondary role. Most of the major deposits are located along or very close to the Kirkland Lake deformation zone (KLDZ) in a block of Timiskaming sediments which have been intruded by a series of "Algoman" intrusives ranging from granite to diorite. However, other deposits and occurrences can be found within typical "Keewatin" mafic lavas and tuffs. Additionally, polymetallic ocurrences are known in the southern part of the area associated with interflow graphitic sediments and sulphide iron formations.

The survey was flown during September, 1989 at a nominal line spacing of 100m and a nominal elevation of 60m with a line orientation of 155 degrees using a combination of visual flight path control supplemented by satellite positioning (GPS). The Terraquest survey system employed a transverse gradiometer configuration with two cesium magnetometers installed on the wing tips, together with twin VLF sensors measuring orthogonal and in-line stations.

The resulting magnetic data have been compiled by Grid Data North as standard contoured total field and vertical gradient aeromagnetic maps. Problems stemming from rather irregular flight path and mislevelling have degraded the vertical gradient map and prevented the use of the transverse gradient information in compiling the total field data; however, the existing total field map is judged satisfactory for purposes of the present study.

The interpretation has also taken into consideration the stronger non-cultural conductors indicated in the compiled VLF maps, and the more credible INPUT anomalies indicated in the OGS KLIP survey of this area. Extensive use was made of various published geological maps for the townships of interest (Teck, Lebel, Otto, Boston, Eby and Grenfell).

The interpretation, embodied in a 1:10,000 overlay, has outlined a very complex geologic environment characterized by extensive structural disruption along major ENE faults (among them the KLDZ and LLDZ) with complementary NNE to ENE oblique faults.

Eleven lithomagnetic domains are inferred: domains I and II extend across the northern sector of the survey block, corresponding primarily to "Keewatin" mafic volcanics. Domains III and IV encompass most of the ENE band of "Timiskaming" sediments with "Algoman" intrusives; principal gold production from the Kirkland Lake camp has come from a restricted, largely non-magnetic region comprising subdomains III_C and IV_C. Domain V is a transitional region to the southwest containing both Timiskaming (V_A)and Keewatin rocks (V_B). Domain VI, located in the south-central portion of the survey, is an ovoid region of generally low susceptibility containing both Timiskaming (VI_A) and Keewatin rocks (VI_B) suggestive of a caldera-like feature. Domain VII contains highly magnetic units probably reflecting a border phase or halo adjoining the Lebel syenitic stock (domain VIII) in the southeast corner of the survey. Domains IX and X constitute adjacent bands of

moderate and strongly magnetic Keewatin volcanics and asssociated iron formations, respectively, along the southern margin of the survey, immediately north of the weakly magnetic Otto stock (domain XI).

Based on the aeromagnetic interpretation, integrated with published information as to geology and gold mineralization, six areas have been identified as potentially favourable for structurally controlled gold deposits. Target areas #1 thru 3 lie within or adjacent to the Kirkland Lake gold camp; area #4, chosen because of a possible high-level felsic intrusive, is located to the south; area #5 is located close to Swastika in the southwest; and area #6 identifies a cluster of gold occurrences adjacent to a probable small stock in eastern Grenfell Twp.

In addition, from cursory consideration of INPUT anomalies indicated on the OGS KLIP survey of this region, nine conductive features have been selected as meriting further attention, with a potential for stratigraphically controlled gold and/or polymetallic deposits.

Finally, the present interpretation should be carefully appraised in light of the extensive prior exploration and geological information for the Kirkland Lake gold camp, and through close interaction between geological and geophysical understanding and insights modified and updated on a regular basis.

STRATAGEX

AEROMAGNETIC INTERPRETATION
HSK PROJECT
KIRKLAND LAKE

1.0 INTRODUCTION

This report presents and describes an interpretive study carried out at the request of Battle Mountain (Canada) Inc. of a detailed aeromagnetic (+VLF) survey flown over an area centered on the Kirkland Lake gold camp.

This survey and the subsequent interpretation constitute part of the HSK Project, an intensive exploration program of the Kirkland Lake camp currently being conducted by Battle Mountain and its partners with a view to discovering additional gold deposits in this productive district.

This report will indicate the background and objectives of the survey, summarize pertinent geological aspects, and describe the airborne survey and subsequent processing before discussing the interpretation embodied in the attached 1:10000 overlay.

II. BACKGROUND

The Kirkland Lake gold camp has produced in excess of ten million ounces from a variety of deposits since production began in the early 1900s. Battle Mountain, commencing in early 1989, has made the search for additional deposits in this district a key component of its overall exploration effort.

The airborne survey was commissioned by Battle Mountain in mid-1989 as a means of obtaining regional perspective on this district. Although outcrop is comparatively abundant in much of the district, geological maps published for the various townships of interest (Teck, Lebel, Otto, Boston, Eby and Grenfell) span four decades and employ rather differing lithological nomenclature and geological biases.

A detailed, low-level, high-sensitivity aeromagnetic survey was selected as the most effective geophysical means of attaining the desired objective, with VLF constituting an additional potentially useful parameter.

III. GEOLOGY AND EXPLORATION HISTORY

Early discoveries, resulting from prospecting, lead to the establishment of the Kirkland Lake gold camp circa 1905, with some of the more famous gold mines in Canada such as the Teck-Hughes, Lakeshore, and Sylvanite.

Continued prospecting and exploration, guided by the evident fault-controlled character of the gold mineralization, led to the discovery of many additional occurrences and deposits, including the cluster of deposits near Swastika during the 1920s and 1930s.

Production gradually declined during the '50s and '60s, with little exploration undertaken apart from continuing efforts underground at the few remainiong producers.

A resurgence of exploration followed the rise in the price of gold in 1978. However, much of that exploration was focussed on testing or evaluating known occurrences held by specific companies, with little effort directed at regional scale aspects to identify new favourable environments and to augment geological understanding of the district as a whole.

This uneven history is reflected in the published geologic maps for the various townships, which in the case of Lebel and Teck Twonships date from 1944/45. These older maps divide the Archean rock units using the now largely disused terms of Keewatin (primarily mafic volcanics with subordinate tuffs and iron formation), Timiskaming (largely conglomerates and related sediments, but including trachytes and possible tuffaceous lithologies), and Algoman (principally encompassing granites, syenites and diorites intrusive into the Timiskaming and Keewatin units.

Based on the extensive geological information reflected in both older and current mapping, the "Timiskaming" sediments occupy a broad band extending ENE across the center of the survey area, flanked by "Keewatin" volcanics to the north and south. The "Algoman" intrusives occur throughout this district, with no particular distribution of lithologic types evident in the published geology.

Two major ENE-trending faults, designated the Kirkland Lake and Larder Lake deformation zones, extend through the block of Timiskaming sediments. Lesser but still important NNE to NE-trending faults (such as the Murdock Creek and the Lakeshore faults) form a complementary set oblique to dominant ENE deformation zones. A host of lesser sub-parallel and transverse faults are indicated in the published maps, but it is difficult to assess their importance and/or their geologic reality.

Historically, most of the gold production in the Kirkland Lake camp has been associated with a restricted segment of the Kirkland Lake deformation zone north and northwest of the townsite. A cluster of smaller producers related to a separate set of structural features is found immediately south of the town of Swastika. There are a host of other occurrences, some of which have seen underground exploration and/or limited production, throughout the district, with apparent clusters southeast of Gull Lake and just beyond the western boundary of the airborne survey near Cook Lake in Grenfell Township.

Structurally controlled gold quartz vein mineralization is clearly the dominant and most significant deposit type in this district. Such a deposit type would have at best an indirect geopysical expression. Additionally, several polymetallic occurrences in the "Keewatin" volcanics in the southern portion of the area surveyed suggest a subordinate deposit type, associated with conductive graphitic or sulphidic horizons, and hence susceptible to direct detection.

The specific reasons or factors leading to the concentration of gold mineralization in a restricted segment of the extensive KLDZ remain obscure, but presumably involve a confluence of favourable host lithologies, suutable fault or fracture induced permeability, a nearby source of heat, and hydrothermal fluids capable of transporting sufficient gold from its primary source. The recent re-evaluation of the Kerr Addison gold deposit pointing to a key role by hitherto unrecognized sheet-like intrusives suggests that this element may also be of greater importance in the Kirkland Lake camp.

IV. SURVEY DESCRIPTION

The combined aeromagnetic/VLF survey was contracted to Grid Data North, who in turn contracted actual data acquistion by Terraquest Ltd. The survey was flown in September, 1989 employing Terraquest's instrumentation consisting of two magnetometers installed in the wing-tips of a fixed-wing aircraft, together with a Herz TOTEM 2A VLF system capable of recording total field and quadrature components from two VLF stations. This arrangment of magnetometers, both cesium high-sensitivity instruments, is designed to enable measurement of the transverse magnetic gradient, and hence more accurately define the magnetic field between the flight lines. The flight lines, oriented 155-335 , were specified to be at an elevation of 60m and a separation of 100m controlled using a combination of visual flight path guidance and recovery mated with the GPS satellite positioning system. Three tie lines were also flown.

Following completion of the survey, the data were processed by TESLA-10 subsidiary of Grid Data North. At that time it was discovered that the actual flight path was highly irregular, with many lines overlapping, crossing or exhibiting large excursions from the nominal flight path. This added considerably to the task of producing a coherent, credible contoured version of the total field. It also tended to degrade the contoured map of the calculated vertical gradient, since such an operator tends to enhance not only near-surface magnetic sources but also any perturbations stemming from mislocation or mislevelling of the total field data. Finally,

the transverse gradient information could not be employed to improve the contoured total field map.

Despite these problems, the compiled and contoured total field data are judged to reflect the local variations of the magnetic field with reasonable fidelity, as judged by: (i) inherent coherency; (ii) general conformity with the aeromagnetic data recorded by the OGS KLIP survey; (iii) coherency of the accompanying VLF anomalies.
The interpretation discussed in the following section has primarily relied on this representation, with secondary recourse to the contoured vertical gradient map.

Relevelling employing the tie lines and selective checks of the flight path might well produce an improved version of the total magnetic field map, from which an improved version of the vertical gradient map could be calculated. Additional improvement might also result from treating the individual sensor data as if constituting separate survey lines and splining across them.

V. INTERPRETATION

5.1 General

The interpretive effort, as noted above, was primarily directed at the total field aeromagnetic data compiled in contoured form and is principally embodied in the attached interpretive overlay. Hence the ensuing discussion of the interpretation will revolve largely around this data set, with the observations and analysis supported by reference to the contoured calculated vertical gradient data and to the contoured aeromagnetic data obtained in the regional KLIP program.

Subordinate to the above but included for the sake of completeness is a discussion of the VLF results from the present survey by Terraquest, plus the principal INPUT anomalies recorded in the KLIP survey flown by Questor.

Where feasible, the discussion will seek to incorporate geological evidence or inference in the geophysical evaluation.

5.2 Aeromagnetics

The aeromagnetic data have been evaluated and interpreted in terms of (i) lithomagnetic domains characterized by similar magnetic properties, (ii) magnetic sources for individual anomalies, with generalized susceptibilities of strong, moderately strong, moderate and weak, and (iii) indicated faults, as discussed further below.

The contoured total field data display a substantial number of anomalous responses which exhibit a large range of forms and amplitudes. Most magnetic sources are within 50m of the surface; the apparent increase in source depths over the Kirkland Lake townsite is due to the increase in flight height in this sector.

The area covered by the aeromagnetic survey has been divided into eleven magnetic domains, with a number of these domains further divided into two or more subdomains.

Domain I, which principally occupies the northwestern corner of the survey, is characterized by very low susceptibility, with a few weak, impersistent sources trending NW-SE. Mafic volcanics (1a,b; k1) predominate in this region. A small area with comparable characteristics and lithological association designated subdomain I_B is present in the extreme northeastern sector of the survey. Although domain I contains comparatively few gold occurrences, the cluster near Cook Lake in Grenfel Twp just west of the present survey deserves mention; in the larger KLIP survey, these prospects lie north of an isolated magnetic source probably reflecting a small dioritic intrusive.

Domain II, located along the northern margin of the survey, adjoining domain I, is characterized by several strong, linear anomalies striking nearly east-west, and a somewhat higher average susceptibility than domain I. Mafic volcanics also predominate in this domain, with the strong magnetic sources apparently caused by dioritic or gabbroic intrusives.

Domain III constitutes a narrow band containing moderate to strongly linear magnetic sources which collectively extend ENE across the north-central portion of the survey area. Domain III is separated from domains I and II to the north by a major discontinuity inferred to consist of a fault or series of faults. The domain is primarily underlain by Timiskaming sediments intruded by "Algoman" quartz porphyries, syenites and mafic syenites; the magnetic sources are inferred to reflect the more mafic intrusives, although in many places a firm correlation with surface geology cannot be established

In detail domain III has been subdivided into subdomains III_A thru III_C. Subdomain III_A forms a narrow band with

weakly magnetic sources in the western sector of the domain. Subdomain III_B constitutes the bulk of the domain with its typical linear magnetic sources. Subdomain III_C is a restricted, largely non-magnetic portion of the domain; it is of particular interest since it contains a sizeable percentage of the gold veins north of the KLDZ.

Domain III is bounded to the south by the the KLDZ, whose geophysically inferred position corresponds well with the mapped trace of the fault. In addition, a series of transverse faults cross the domain, with the more consequential oriented NNE to NE. Note that certain of these faults are not well expressed magnetically; in particular, the Lakeshore fault is not readily discernible from the magnetic data.

Domain IV, located south of domain III, forms a band approximately two kilomenters in width bounded by the KLDZ to the north and the Larder Lake DZ to the south. Like domain III, it exhibits variable magnetic properties, with moderate to strong magnetic sources embedded in a background of low susceptibility, although in domain IV the magnetic sources are larger and more ovoid than in domain III.

The domain as a whole corresponds to a band of Timiskaming sediments with subordinate Algoman intrusives. A reasonable correlation of magnetic sources with syenitic to dioritic intrusives can be made in some places, while in others mainly sediments of likely non-magnetic character are mapped. These latter features may reflect magnetic sources largely unexposed or perhaps ensembles of narrow dike-like bodies.

Domain IV has been subdivided into subdomains IV_A thru IV_C. The principal subdomain IV_A comprises the larger, moderate to strongly magnetic sources found in the eastern portion of the domain. Subdomain IV_B is a restricted largely non-magnetic region in the west-central sector of the domain. Subdomain IV_C is a small, mainly non-magnetic region approximately corresponding to the town of Kirkland Lake and

located immediately south of similarly non-magnetic subdomain III_C. The close correlation of this subdomain IV_C with a substantial portion of the productive segment of the KLDZ prompts speculation as to pervasive alternation related to mineralization in this sector. (Note that although survey elevations were significantly higher over the townsite for safety reasons, susceptibilities are indeed lower, as confirmed by the KLIP data.) Subdomain IV immediately east of the townsite contains a large, moderately magnetic source and hence resembles subdomain IV_B to the west.

In addition to the KLDZ and LLDZ strike faults bounding domain IV to the north and south, respectively, several oblique and cross faults are inferred, of which the Murdock Creek fault (MCFZ) is the most notable. Published geology shows a considerable number of additional (minor?) oblique faults in subdomain IV_D which do not have any corresponding geophysical expression.

Domain V comprises a narrow band extending ENE across the west-central sector of the survey south of the LLDZ. Like domain IV to the north, domain V harbors broad, irregular moderate to strong magnetic sources.

Geologically the domain would appear to represent a transitional region, with Timiskaming sediments predominating in the north and typical "Keewatin" mafic volcanics in the south. This distinction, although not apparent magnetically, is indicated by the subdomains V_A and V_B, respectively. The large, strongly magnetic feature in the western portion is designated subdomain V_C.

The cause(s) of the individual magnetic sources in domain V are largely uncertain, as a variety of surface lithologies are observed. The origin of the large, strongly magnetic feature designated subdomain V_C is judged very likely to be an intrusive; mapped outcrops of "Algoman" units A2 and A4 lend support to this inference.

The principal structural feature affecting domain V is the LLDZ forming its northern boundary. In addition, a variety of strike, oblique and transverse faults are interpreted to transect the domain; of these the most persistent and possibly the most interesting is an oblique fault inferred to strike northeast through several of the gold deposits south of the town of Swastika. The confluence of a number of faults in this immediate area is notable and suggests an environment with additional exploration potential.

Domain VI occupies an extensive, crudely ovoid region in the south-central and southeast portions of the survey lying to the west of domain V and south of domain IV. It is characterized by scattered weak, quasi-linear, impersistent magnetic sources of various orientations but dominantly trending east-northeast. Two strong, broad magnetic anomalies at the centre of domain VI are considered probable mafic or syenitic intrusives and are assigned to a separate domain VII.

Domain VI is somewhat enigmatic as to its lithological correlation. The northern portion is underlain by a variety of Algoman intrusives (A2, A4, A5) with subordinate mafic volcanics (K1), while the southern portion is predominantly underlain by mafic volcanics with subordinate intrusives. On this tenuous basis, the domain has been divided into a northern subdomain VI_A and a southern subdomain VI_B.

The overall character of domain VI is speculatively attributed to a composite but predominantly felsic intrusive with remnants of (altered?) volcanics, and may in fact be the locus of a now largely obliterated caldera. Its location south of the magnetically subdued sectors hosting many of the principal gold deposits also prompts speculation as to a possible role of this hypothesized intrusive vis-a-vis gold mineralization, and lends encouragement to further examination of the LLDZ and Harvey faults along the northern margin of this domain.

Structurally, domain VI is bounded by the LLDZ to the north. Other lesser faults with a similar ENE orientation are inferred within the domain. Transverse N-S and NNE faults form boundaries with domain VI to the west and with domain VII at its centre.

Finally, an intriguing small circular magnetic feature within subdomain VI_A is speculatively ascribed to a high-level felsic stock (cf. target #4).

Domain VII comprises two adjoining distinct, oblong, moderately strong to very strong magnetic regions in the southeastern sector of the survey, internal to weakly magnetic domain VI.

The larger region, designated subdomain VII_A, does not have a clearly indicated geological source. It lies adjacent to the younger Lebel stock which occupies a significant area to the southeast, and hence may be caused by metamorphic effects or a mafic phase associated with this stock, which is itself only weakly magnetic. Alternatively, Algoman intrusives of dioritic composition could account for the anomaly, as could a remnant of iron formation found more extensively in Boston Twp to the south.

The smaller and slightly less magnetic feature designated subdomain VII_B is regarded as a likely Algoman intrusive (A2?).

Both subdomains exhibit rather linear boundaries, supporting likely bounding faults; in particular, the eastern margin of subdomain VII_A exhibits a distinctly linear aspect in the larger scale KLIP survey, reinforcing this inference.

Domain VIII, barely glimpsed in the present survey in the extreme southeast corner, corresponds to the Lebel stock. Its distinctive weakly magnetic character is readily recognized in the larger scale KLIP survey.

Domains IX and X are two narrow bands of moderate and strongly magnetic lithologies, respectively, which extend crudely east-west along the southern boundary of the survey, south of domains V and VI.

Domains IX and X are readily correlated with an interval of mafic volcanics accompanied by subordinate intermediate tuffaceous rocks and iron formation. The unit containing the iron formation, lying immediately north of the Otto stock, corresponds to domain X.

These domains, although presenting a lower potential for Kirkland Lake style gold mineralization, harbor a significant number of INPUT conductors, with a least one copper-zinc occurrence, and hence merit consideration for stratigraphically controlled gold and/or polymetallic deposits.

Finally, domain XI, located at or beyond the southern margin of the present survey, is seen in the larger KLIP survey to comprise a broad ovoid region of low susceptibility, readily correlated with the Otto stock. Also primarily discernible in the KLIP data is a major north-south fault which extends through the Otto stock, with an indicated dextral movement offsetting the iron formations of domain X.

Particular structural aspects have been described in the above discussion of the individual domains. Consideration of the the structural framework as a whole prompts the following general observations derived from the present interpretation:

i) ENE-trending strike faults constitute the dominant structural element; a number of faults with this orientation additional to the known KLDZ and LLDZ are inferred;

ii) NNE- to NE-trending oblique faults constitute the second most important structural alignment, forming a complementary set to the ENE strike faults; these are surprisingly difficult to recognize in the magnetic data;

iii) Cross faults predominantly oriented north-south are identified both on geological and magnetic evidence; however, they appear to be comparatively late, with minor displacements (except for the fault that dissects the Otto stock), and unrelated to gold mineralization.

5.3 VLF and INPUT

The VLF data for the in-line and orthogonal stations constitute a minor but useful complement to the aeromagnetic survey.

After elimination of the many cultrual responses caused by railroadls, pipelines, hydro lines, inter alia, the remaining conductors exhibit poor correspondence with mapped and interpreted faults but generally correlate with topographic features. Consequently they may be indirectly delineating additional faults and shear zones.

The compiled INPUT anomalies from the KLIP survey, on the other hand, quite likely originate from discrete bedrock conductors, although those close to Kirkland Lake or roads may still be influenced by culture. Based on their general characteristics, but without full scrutiny of original tapes, a sizeable number of INPUT conductor axes have been interpreted, with a distinct concentration in the south in domains IX and X. Nine conductive zones have been selected as of interest as possible stratigraphically controlled gold or polymetallic mineralization, as seen in the attached overlay.

VI. CONCLUSIONS

The interpretation of the detailed aeromagnetic survey over the Kirkland Lake gold camp has brought forth insights and indicated potentially favourable areas additional to those discernible solely on the basis of the abundant geologic information and the many deposits and occurrences known from the intensive exploration conducted over the eighty-five year history of this district.

In particular, the study has elaborated and augmented existing information as follows:

1) The evident complexity of magnetic sources and inferred faults reinforces and extends the known complexity of this major gold camp;

2) The structural framework is seen to be dominated by a series of ENE-trending faults, which include the major KLDZ and LLDZ with their known association with gold mineralization;

3) A series of faults oriented NE to NNE form a secondary set complementary to the ENE strike faults; they are judged to exert some influence on gold mineralization;

4) Eleven magnetic domains, largely aligned with the dominant ENE structural grain, have been interpreted from the complex assemblage of magnetic anomalies;

5) Magnetic domains III and IV, largely underlain by Timiskaming sediments and separated by the KLDZ, are judged the most interesting in terms of gold potential;

6) No markedly anomalous magnetic features can be correlated with the major gold producers of the Kirkland Lake camp; however, subdomains III_C and IV_C, which contain a significant number of the major producers, are characterized by negligible susceptibility, possibly reflecting pervasive alteration;

7) Domain VI, a broad ovoid area south of Kirkland Lake characterized by weak, impersistent magnetic sources, cannot be clearly related to a comparably distributed rock unit, but may reflect a composite felsic intrusive with remnants of mafic volcanics that mark the locus of a largely obliterated caldera;

8) Most of the larger, stronger magnetic sources are attributed to "Algoman" intrusives of syenitic to dioritic composition, although the geologic correlation is often weak and uncertain;

9) Six target areas have been identified as potentially favourable for gold mineralization, based on similarity and proximity to the known deposits (#1-3), possible

high-level felsic intrusive (#4), structural complexity associated with a cluster of lesser past porducers near Swastika (#5), and a cluster of gold occurrences near an inferred mafic intrusive near Cook Lake (#6);

10) A modest potential exists for stratigraphically hosted gold and/or polymetallic deposits associated with conductive graphitic or sulphidic horizons in the volcanics and volcaniclastics in the southern margin of the survey area; consequently nine conductive targets have been selected on the basis of the previous KLIP Input survey.

VII. RECOMMENDATIONS

Based on the preceding discussion and conclusions, and bearing in mind the underlying objective and inherent limitations of this interpretive effort, it is recommended that:

1) The present interpretation be carefully appraised in terms of detailed geology and gold occurrences, including efforts directed at resolving contentious or uncertain lithological attributions;

2) In particular, the six target areas inferred to be favourable for additional gold mineralization be carefully scrutinized to gauge their geologic validity;

3) The indicated nine Input conductors should be screened by inspection of the original analog records and prior exploration efforts;

4) Where warranted and accessible, those favourable gold target areas and Input conductors should be subjected to further exploration via ground geological and geophysical surveys as appropriate;

5) Improvements to the existing aeromagnetic compilation should be undertaken at a modest additional outlay so as to achieve a more useful vertical gradient map, with consideration also given at that time to multi-channel computer-generated profiles;

6) The present interpretation should be revised and updated on a regular basis as additional geologic data and insights are gained, thru close interaction with the project geological staff.

Respectfully submitted,

Jerry Roth 2.079

Jerry Roth, M.A.

Senior Consulting Geophysicist

2060

1945-1

2263A

53A

2264*

2262

1946-1

186

2239

2263B

2268

448

501

2269

2270

Cartography by SURVEYS & MAPPING BRANCH, MINISTRY OF NATURAL RESOURCES, Queen's Park Toronto. Ontario. additional copies of this map may be obtained from

st Resources Inventory Maps compiled from air photographs flown in 1978 were base of this map. Revised to 1980.

verse Mercator Projection

1:100,000

LOCATION MAP - TERRAQUEST SURVEY

Fig. 1

COL. GEOLOGY

MAPS GEOLOGY

IMAGERY

B&W ONLY

STRATAGEX

REFERENCES

ODM, L944, Geol. Map 53a, Lebel Twp (1" = 1000')

ODM, 1945, Geol. Map 1945-1, Teck Twp ((1" = 1000')

ODM, 1957, Geol. Map 1957-4, Boston Twp (1" = 1/2 mi)

ODM, 1963, Geol. Map 2060, Bompas & Grenfell Twps (1"=1/2mi)

OGS, 1969, Geol. Map 2239, Eby-Otto Twps (1" = 1/2mi)

OGS, 1979, Airborne EM and Magnetic Survey, Kirkland Lake Area (KLIP), by Questor Surveys

42A01SE0002 2.13185 TECK

020

BATTLE MOUNTAIN (CANADA) INC.

2.13185

REPORT ON A FIXED-WING AIRBORNE MAGNETIC AND VLF-EM SURVEY KIRKLAND LAKE PROJECT LARDER LAKE MINING DIVISION, ONTARIO SEPTEMBER, 1989

VOLUME 2

Toronto, Ontario
15 March 1990

T.J. Bottrill, P.Eng.

42A01SE0002 2.13185 TECK

LIST OF DRAWINGS

VOLUME 2

Drawing Number	Description	Scale
70000 35000 MAG1	Total Field Magnetic Contours	1:10,000
56000 30000 MAG2	Total Field Magnetic Contours	1:10,000
63000 30000 MAG3	Total Field Magnetic Contours	1:10,000
70000 30000 MAG4	Total Field Magnetic Contours	1:10,000
56000 25000 MAG5	Total Field Magnetic Contours	1:10,000
63000 25000 MAG6	Total Field Magnetic Contours	1:10,000
70000 25000 MAG7	Total Field Magnetic Contours	1:10,000
77000 30000 MAG8	Total Field Magnetic Contours	1:10,000
70000 35000 VG1	Calculated Vertical Gradient	1:10,000
56000 30000 VG2	Calculated Vertical Gradient	1:10,000
63000 30000 VG3	Calculated Vertical Gradient	1:10,000
70000 30000 VG4	Calculated Vertical Gradient	1:10,000
56000 25000 VG5	Calculated Vertical Gradient	1:10,000
63000 25000 VG6	Calculated Vertical Gradient	1:10,000
70000 25000 VG7	Calculated Vertical Gradient	1:10,000

42A01SE0002 2.13185 TECK

030

BATTLE MOUNTAIN (CANADA) INC.

2.13185

REPORT ON A FIXED-WING AIRBORNE MAGNETIC AND VLF-EM SURVEY KIRKLAND LAKE PROJECT LARDER LAKE MINING DIVISION, ONTARIO SEPTEMBER, 1989

VOLUME 3

Toronto, Ontario
15 March 1990

T.J. Bottrill, P.Eng.

42A01SE0002 2.13185 TECK

LIST OF DRAWINGS

VOLUME 3

Drawing Number	Description	Scale
70000 35000 VLF1-O	VLF Total Field Contours - Line Station	1:10,000
56000 30000 VLF2-O	VLF Total Field Contours - Line Station	1:10,000
63000 30000 VLF3-O	VLF Total Field Contours - Line Station	1:10,000
70000 30000 VLF4-O	VLF Total Field Contours - Line Station	1:10,000
56000 25000 VLF5-O	VLF Total Field Contours - Line Station	1:10,000
63000 25000 VLF6-O	VLF Total Field Contours - Line Station	1:10,000
70000 25000 VLF7-O	VLF Total Field Contours - Line Station	1:10,000
70000 35000 VLF1-L	VLF Total Field Contours - Orthogonal Station	1:10,000
56000 30000 VLF2-L	VLF Total Field Contours - Orthogonal Station	1:10,000
63000 30000 VLF3-L	VLF Total Field Contours - Orthogonal Station	1:10,000
70000 30000 VLF4-L	VLF Total Field Contours - Orthogonal Station	1:10,000
56000 25000 VLF5-L	VLF Total Field Contours - Orthogonal Station	1:10,000
63000 25000 VLF6-L	VLF Total Field Contours - Orthogonal Station	1:10,000
70000 25000 VLF7-L	VLF Total Field Contours - Orthogonal Station	1:10,000
	Kirkland Lake Project Aeromagnetic Interpretation Stratagex Ltd. January, 1990	1:10,000

42A01SE0002 2.13185 TECK

900

BATTLE MOUNTAIN (CANADA) INC.
Box 635
37 Station Road
Kirkland Lake, Ontario
P2N 3K1

RECEIVED
MAY 11 1990
MINING LANDS SECTION

90/05/07

Dear Jill

Please find attached the topo maps requested.

The maps are at the same scale as the geophysical maps and cover the main part of the area covered by the airborne survey. In addition the 7 claims requiring assessment credits were plotted as accurately as possible to assist in your evaluation of the assessment credits.

Regards

D R Bamey

Ontario

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Mining Lands Section
3rd Floor, 880 Bay Street
Toronto, Ontario
M5S 1Z8

Telephone: (416) 965-4888

May 7, 1990

File: 2.13185

REGISTERED

Mr. T.J. Bottrill
Senior Geologist - Canada
Battle Mountain
390 Bay St. Suite 2910
TORONTO, Ontario
M5H 2Y2

Dear Sir:

RE: Airborne Geophysical Certificate on Mining Claim L 1111433 in Teck Township

Enclosed is an Airborne Geophysical Certificate issued under Section 78 of the Mining Act R.S.O. 1980.

It is your responsibility to file this certificate with the mining recorder no later than sixty (60) days from the date of issue of the certificate.

Upon recording of this certificate the time for performing the first and all subsequent periods of work for claims listed shall fall due one year later than the times prescribed in subsection 1 of Section 76.

Yours sincerely

W.R. Cowan
Provincial Manager, Mining Lands
Mines and Minerals Division

/dl:dvl
Enclosure

cc: Mining Recorder
Kirkland Lake, Ontario

Ministry of Northern Development and Mines

Ontario

Airborne Geophysical Certificate

Mining Act

This is to certify that Battle Mountain (Canada) Inc. has met the requirements of Section 78 of the Mining Act, with respect to the following mining claim in the Township ~~XXXXXX~~) of Teck.

Mining Claims (Please list)

L 1111433

Signed copy went to claim holder + Mining Recorder May 28 93

BATTLE MOUNTAIN (CANADA) INC.

2.13185

19 March 1990

BATTLE MOUNTAIN GOLD COMPANY

Mining Lands Branch
Ministry of Northern Development and Mines
880 Bay Street, 3rd Floor
Toronto, Ontario
M5S 1Z8

RECEIVED

MAR 20 1990

MINING LANDS SECTION

Attention: Ms. Jill Stewart

Dear Ms. Stewart:

Report on a Fixed Wing Airborne Magnetic and VLF-EM Survey
Kirkland Lake Project
Larder Lake Mining Division, Ontario
September, 1989

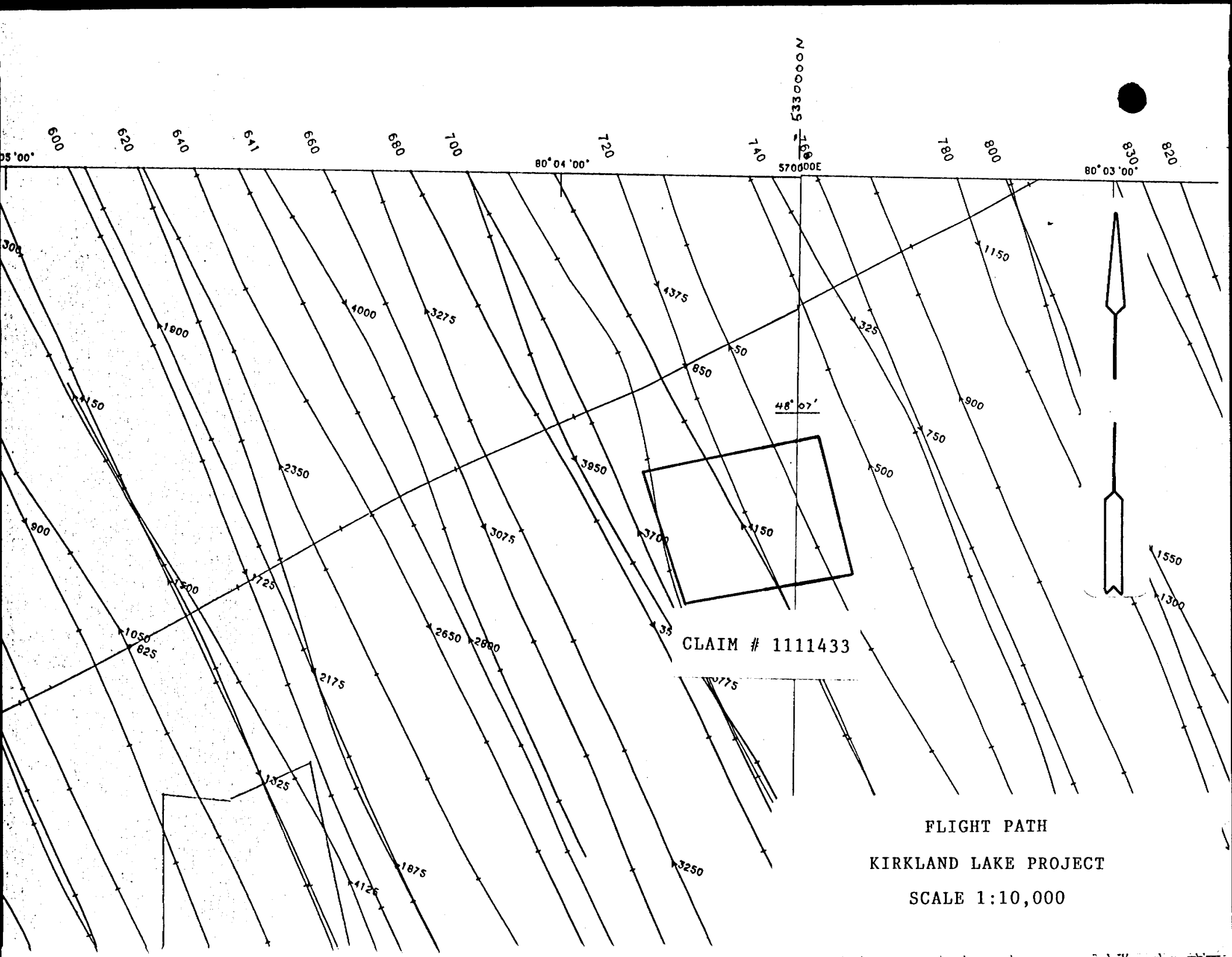
Please find enclosed two copies of our report covering the above named survey managed on our behalf by Grid Data North Limited, and flown by Terraquest Limited. The report includes a summary statement prepared by ourselves, together with the complete text of the operators report prepared by Grid Data North and the interpretation report prepared for us by Stratagex Ltd.

We are submitting the entire survey data covering 1083 km of flight-lines for two magnetic sensors (a "horizontal-gradiometer" system) and two VLF-EM stations. We are, however, only requesting assessment credits of 80 days per claim for a total of seven (7) claims (or the maximum allowable of 23 days on claim 842782 which has 57 days of geophysics already recorded). The report and data are being provided unedited (unscreened) in the interests of providing a data-base of real use to others interested in researching the area through the assessment files.

We would also like to request a Geophysical Certificate for claim L.1111433 in Teck Township. This claim was acquired by BMCI on September 29th, 1989, after the date on which the survey was completed. It had been staked earlier last year by HSK Mineral Ltd., but was not included in our agreement with them which was signed on June 15th, 1989. This agreement, including an amendment covering claim 1111433, has been recorded with the Mining Recorder for the Larder Lake Division. Approximately 0.66 line miles of survey were flown over the claim as shown on the attached part of the flight path map.

Yours faithfully,
BATTLE MOUNTAIN (CANADA) INC.

Terence J. Bottrill, P.Eng.
Senior Geologist - Canada


600
620
640
641
660
680
700
720
740
760
780
800
820
830
5330000N
5700000E
80°04'00"
80°03'00"
48°07'
CLAIM # 1111433
FLIGHT PATH
KIRKLAND LAKE PROJECT
SCALE 1:10,000

BATTLE MOUNTAIN (CANADA) INC. 2.13185

BATTLE MOUNTAIN GOLD COMPANY

May 3, 1990

Ministry of Northern Development
and Mines
Mining Land Section
Mineral Development and Lands Branch
880 Bay Street, 3rd Floor
Toronto, Ontario
M5S 1Z8

Attention: Ms. J. Stewart

Dear Ms. Stewart:

Re: Statement of Qualifications

With reference to your fax of May 3, 1990, I am enclosing a Statement of Qualifications for myself as the author of the Airborne Geophysical Survey undertaken at Kirkland Lake in September 1989, and with reference to the airborne certificate which has been requested on claims L.891865 et al. in Teck Township, Larder Lake Mining Division.

Yours faithfully,

BATTLE MOUNTAIN (CANADA) INC.

Terence J. Bottrill, P.Eng.
Senior Geologist - Canada

TJB/jac
Encl.

STATEMENT OF QUALIFICATIONS

I, Terence J. Bottrill, a resident of 192 Weldon Avenue, in the Town of Oakville, Province of Ontario, Canada, hereby certify that:

1) I am a graduate of the University of Leicester, Leicester, England, having obtained the degree of Bachelor of Science, Upper Second Class Honours in 1968;

2) I am a Registered Professional Engineer in the Province of Ontario and a member in good standing of the Association of Professional Engineers of Ontario;

3) I am a member of the Institution of Mining and Metallurgy of London, England, as well as a Fellow of the Geological Association of Canada;

4) I have been practicing as a geologist since graduation and presently have the position of Senior Geologist - Canada with Battle Mountain (Canada) Inc. of Suite 2910, 390 Bay Street, Toronto, Ontario;

5) I personally supervised the Kirkland Lake project of Battle Mountain, including the airborne survey undertaken under contract by Grid Data North Ltd. in September, 1989 and was the author of the report on that survey dated March 15th, 1990.

Terence J. Bottrill, B.Sc., P.Eng., F.G.A.C., M.I.M.M.

May 03, 1990

Ministry of Northern Development and Mines

Ontario

M.L.

DOCUMENT No. W9008.0498

2.13185 L.P.

MAR 14 called

Mining Act

Report of Work (Geophysical, Geological and Geochemical Surveys)

Instructions
- Please type or print.
- Refer to Section 77, the Mining Act for assessment work requirements and maximum credits allowed per survey type.
- If number of mining claims traversed exceeds space on this form, attach a list.
- Technical Reports and maps in duplicate should be submitted to Mining Lands Section, Mineral Development and Lands Branch:

Apr 15

Type of Survey(s)	Mining Division	Township or Area
AIRBORNE GEOPHYSICAL	Larder Lake	Teck, Lebel, Boston, Otto and Eby

Recorded Holder(s)
Battle Mountain (Canada) Inc.,

Prospector's Licence No.
T 5179

Address
Suite 2910, 390 Bay Street, Toronto, Ontario M5H 2Y2 Don Boucher 567 4840

Telephone No.
416: 867-9815

Survey Company
Terraquest

Name and Address of Author (of Geo-Technical Report)
Bart St. John Smith
Grid Data North Ltd., 55A Port St. E., Mississauga, Ont. L5G 4P3.

Date of Survey (from & to)
28-08-89 (Day | Mo. | Yr.) 12-09-89 (Day | Mo. | Yr.)

Credits Requested per Each Claim in Columns at right

		Days per Claim
Special Provisions For first survey: Enter 40 days. (This includes line cutting)	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Other	
	Geological	
	Geochemical	
Man Days Complete reverse side and enter total(s) here	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Other	
	Geological	
	Geochemical	
Airborne Credits Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Other	

Total miles flown over claim(s). 8.2

Date: Feb 12/90 — Recorded Holder or Agent (Signature): David Sharp

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Mining Claim Prefix	Mining Claim Number	Mining Claim Prefix	Mining Claim Number
L	891865	Teck			
L	981871	Teck			
L	981876	Teck			
L	842493	Otto			
L	842494	Otto			
L	842495	Otto			
L	842782	Otto * 12 days AEM, 1 day Mag.			

RECEIVED
MAR 09 1990
MINING LANDS SECTION

* Maximum allowed.

Total number of mining claims covered by this report of work. 7

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in this Report of Work, having performed the work or witnessed same during and/or after its completion and annexed report is true.

Name and Address of Person Certifying
T. J. Bottrill, Battle Mountain (Canada) Inc., 2910, 390 Bay Street, Toronto, Ontario M5H 2Y2.

Telephone No. (416)867-9815

Date: February 2, 1990 — Certified By (Signature): T. J. Bottrill

ONTARIO GEOLOGICAL SURVEY ASSESSMENT FILES OFFICE

JUL 09 1990

RECEIVED

LARDER LAKE MINING DIVISION RECEIVED FEB 14 1990 1:25 pm L.P.

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
503 L.P.	Feb. 14/90	T. Bottrill
	Date Approved as Recorded: 14 May 90	Provincial Manager, Mining Lands

1362 (89/06)

Ontario

Ministry of Northern Development and Mines

Geophysical-Geological-Geochemical Technical Data Statement

2.18185

File _____

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Airborne Geophysical (Magnetic & VLF-EM)

Township or Area Teck, Lebel, Boston, Otto, Eby, Grenfell

Claim Holder(s) Battle Mountain (Canada) Inc.

Survey Company Terraquest & Grid Data North

Author of Report T. Bottrill

Address of Author #2910, 390 Bay St., Tor., Ont. M5H 2Y2

Covering Dates of Survey 28/8/89 to 12/9/89 (linecutting to office)

Total Miles of Line Cut _____

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
--Electromagnetic	
--Magnetometer	
--Radiometric	
--Other	
Geological	
Geochemical	

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer 40 Electromagnetic 40 Radiometric _____ (enter days per claim)

DATE: MAR 15 | 90 SIGNATURE: James J. Bottrill
Author of Report or Agent

Res. Geol. _____ Qualifications This report

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
L.	891865
L.	842493
L.	842494
L.	842495
L.	981876
L.	842782
L.	981871

TOTAL CLAIMS 7

If space insufficient, attach list

OFFICE USE ONLY

837 (85/12)

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations _____ Number of Readings _____

Station interval _____ Line spacing _____

Profile scale _____

Contour interval _____

MAGNETIC

Instrument _____

Accuracy – Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

_____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

_____

Base station value and location _____

_____

Elevation accuracy _____

INDUCED POLARIZATION
RESISTIVITY

Instrument _____

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time _____ Frequency _____

– Off time _____ Range _____

– Delay time _____

– Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

_____

Corrections made _____

_____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

_____

Additional information (for understanding results) _____

_____

_____

AIRBORNE SURVEYS

Type of survey(s) Total Intensity Magnetic (Horizontal Gradient) & VLF-EM (Line, Ortho)

Instrument(s) Cesium high sensitivity magnetometers & Hertz Totem 2A VLF

(specify for each type of survey)

Accuracy magnetic 0.001 nT VLF-EM 1%

(specify for each type of survey)

Aircraft used Cessna 206 C-GUCE

Sensor altitude 60m

Navigation and flight path recovery method Video tape (0.1 second fiducial)

GPS TANS satellite positioning system (1.0 second position record)

Aircraft altitude 60m Line Spacing 100m

Miles flown over total area 1083 km (673 mi) Over claims only 13.26 km (8.2 mi)

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken _____

Total Number of Samples _____

Type of Sample _____
(Nature of Material)

Average Sample Weight _____

Method of Collection _____

Soil Horizon Sampled _____

Horizon Development _____

Sample Depth _____

Terrain _____

Drainage Development _____

Estimated Range of Overburden Thickness _____

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis _____

General _____

ANALYTICAL METHODS

Values expressed in: per cent ☐
p. p. m. ☐
p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others _____

Field Analysis (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Field Laboratory Analysis

No. (_____ tests)

Extraction Method _____

Analytical Method _____

Reagents Used _____

Commercial Laboratory (_____ tests)

Name of Laboratory _____

Extraction Method _____

Analytical Method _____

Reagents Used _____

General _____

Bernhardt Twp. M.327

Otto Twp. M379

Lebel Twp. M 359

KIRKLAND LAKE

THE TOWNSHIP OF TECK

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE 1 INCH = 40 CHAINS

DISPOSITION OF CROWN LANDS

ROADS	
RESERVED ROADS	
RAILWAYS	
CANAL	
POWER LINES	
MUNICIPAL BOUNDARIES	
LINES	
CONCESSIONS	

NOTES

Mining rights only are withdrawn from staking on the shore allowance of all lakes and rivers.

Areas shown thus [symbol] for slime disposal

Mining claim L.5779 - Mining Rights subject to Sec. 36 of the Mining Act R.S.O. 1950)

AREAS WITHDRAWN FROM STAKING

(R1) SURFACE RIGHTS WITHDRAWN FROM STAKING SECTION 43/70 ORDER NO. W76/80

(R2) SURFACE AND MINING RIGHTS WITHDRAWN FROM STAKING SECTION 36/80 ORDER NO. W108/82

(R3) ~~SURFACE AND MINING RIGHTS WITHDRAWN FROM STAKING SECTION 36/80 ORDER NO. W8/86~~ ORDER NO. O-20/88 OPENS PART W-08/86

(R4) SURFACE AND MINING RIGHTS WITHDRAWN FROM STAKING SECTION 36/80 ORDER NO W9/86 ORDER NO. O-22/88 OPENS PART OF W9/86

(R5) SURFACE AND MINING RIGHTS WITHDRAWN FROM STAKING SECTION 36/80 ORDER NO. W18/86

(R6) ~~MINING RIGHTS WITHDRAWN FROM STAKING SECTION 36/80 ORDER NO. W90/87 NR~~ ORDER NO. O-33/88 OPENS W-90/87

(R7) MINING RIGHTS WITHDRAWN FROM STAKING SECTION 36/80 ORDER NO. W-22/88

(98) MINING RIGHTS WITHDRAWN FROM STAKING SECTION 36/80 ORDER NO. ~~W-1198~~ W-L 2/89 NR

(R9) ~~MINING RIGHTS WITHDRAWN FROM STAKING SUBJECT TO PENDING PROCEEDINGS~~

(R8) MINING RIGHTS WITHDRAWN FROM STAKING SECTION 36 ORDER NO. W-L 3789 NR

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES, FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON.

DATE OF ISSUE
MAR 26 1990
LARDER LAKE MINING DIVISION

PLAN NO. M. 392

MINISTRY OF NORTHERN DEVELOPMENT AND MINES

42A01SE0002 2.13185 TECK

200

TOWNSHIP OF OTTO
FOREST ENTRY ROADS

TECK TP. - M.392

EBY TP. - M.345

BOSTON TP. - M.332

MARQUIS TP. - M.362

THE TOWNSHIP OF OTTO

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE: 1-INCH=40 CHAINS

LEGEND

PATENTED LAND	or (P)
CROWN LAND SALE	C.S.
LEASES	(L)
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	C.
PATENTED S.R.O.	

NOTES

400' surface rights reservation along the shores of all lakes and rivers.

(H) SURFACE AND MINING RIGHTS WITHDRAWN FROM STAKING SEC. 36/80, W.9786, JAN. 24, 1986.

* APPLICATION UNDER THE PUBLIC LANDS ACT ~~56(1)~~ or (b) OF THE MINING ACT

CL 5029 DISPOSITION OF CROWN LAND

DATE OF ISSUE
DEC 6, 1990
LARDER LAKE MINING RECORDER'S OFFICE

NOTICE OF FORESTRY ACTIVITY

THIS TOWNSHIP / AREA FALLS WITHIN THE TIMISKAMING MANAGEMENT UNIT

AND MAY BE SUBJECT TO FORESTRY OPERATIONS. THE MNR UNIT FORESTER FOR THIS AREA CAN BE CONTACTED AT: P.O. BOX 129
SWASTIKA, ONT.
P0K 1T0
705-642-3222

PLAN NO.- M-379

MINISTRY OF NORTHERN DEVELOPMENT AND MINES

42A01SE0002 2.13185 TECK

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

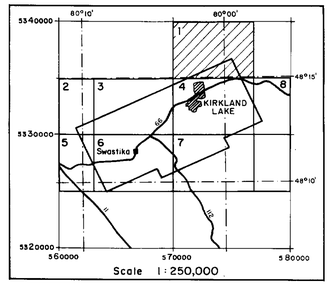
LEGEND

1325 ——+——→——+——

Line Number + Start of Line
Annotation Interval = 25
Arrow Indicates Flight Direction
Tick interval = 5

Dashed flight lines between dots indicate ground clearance greater than 120 metres over the town of Kirkland Lake. Magnetic data is unreliable in this area.

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

FLIGHT PATH
KIRKLAND LAKE PROJECT

PROJECT No. = 75-JU-28	DATA BY =
N.T.S. = 42 A/1 32 D/4	DRAWN BY = TESLA-10 LTD
DRAWING No. = 70000-35000-FB1	DATE = NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

2.13185

42A01SE0082 2.13185 TECK

220

556000E
5335000N
80°14'00"
80°13'00"
80°12'00"
80°11'00"
80°10'00"
563000E
5335000N
48°10'00"
5334000N
48°09'00"
5332000N
48°08'00"
5330000N
558000E
560000E
562000E
563000E
230

42A01SE0002 2.13185 TECK

2030 10 30 50 70 90 110 1600 130 2675 170 1500 200 2200 2300 1900 2375 2025 2775 1125 1325 1750 1450 1850 2250 2050 1425 1225 1150 1350 1250 1050 850 650 450 250 75 20 40 80 80 71 100 140 160 180 120

SURVEY SPECIFICATIONS

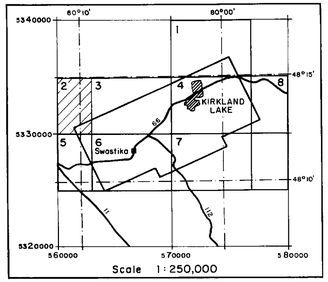
Magnetometer	Cesium Vapour
Sample Interval	5 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

LEGEND

1325 ——+——>——+——

Line Number : Start of Line
Annotation Interval : 25
Arrow Indicates Flight Direction
Tick Interval : 5

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

BATTLE MOUNTAIN (CANADA) INC.

FLIGHT PATH
KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-88	DATA BY :
N.T.S. : 42A01 & 02 D/E	DRAWN BY : TESLA-10 LTD
DRAWING No. : 56000 -30000-FP2	DATE : NOV 1989

0 200 400 600 800 1000m

Scale 1:10000

2.13185

SURVEY SPECIFICATIONS

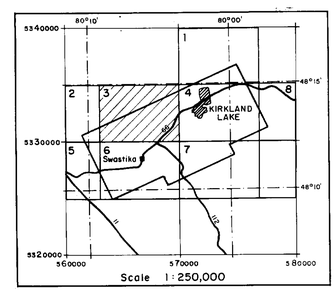
Magnetometer	..... Cesium Vapour
Sample Interval	..... 6 m
VLF	..... Hertz Totem 2A
Sample Interval	..... 30 m
Stations	..... Line NAA , NLK Ortho NSS
Line Spacing	..... 100 m
Survey Height	..... 60 m
Line Direction	..... 155 - 335 Deg
Flown By	..... Terraquest Ltd
Processing By	..... Tesla-10 Ltd.

LEGEND

1325 ——+——→——+——

Line Number : Start of Line
Annotation Interval : 25
Arrow Indicates Flight Direction
Tick Interval : 5

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

2.13185

FLIGHT PATH

KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 63000-30000-FP3	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

240

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

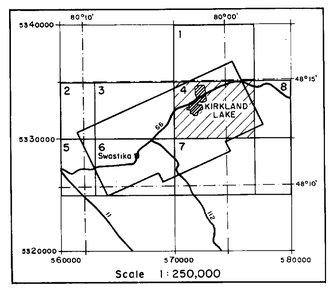
LEGEND

1325 ——+——›——+——

Line Number = Start of Line
Annotation Interval = 25
Arrow Indicates Flight Direction
Tick Interval = 5

Dashed flight lines between dots indicate ground clearance greater than 120 metres over the town of Kirkland Lake. Magnetic data is unreliable in this area.

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

FLIGHT PATH
KIRKLAND LAKE PROJECT

PROJECT No. = 75-JU-28	DATA BY =
N.T.S. = 42 A/1 32 D/4	DRAWN BY = TESLA-10 LTD
DRAWING No. = 70000-30000-FP4	DATE = NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

250

2.13185

556000E
5330000N
80°14'00"
80°13'00"
80°12'00"
80°11'00"
80°10'00"
563000E
5330000N
48°07'00"
48°06'00"
48°05'00"
5326000N
5325000N
558000E
560000E
562000E
563000E
5325000N
5325000N
10
30
50
70
90
110
1625
875
1500
325
475
1250
125
1100
20
41
2020
60
40
2125
200
20
800
75
2010

SURVEY SPECIFICATIONS

Magnetometer	..... Cesium Vapour
Sample Interval	..... 6 m
VLF	..... Hertz Totem 2A
Sample Interval	..... 30 m
Stations	..... Line NAA , NLK Ortho NSS
Line Spacing	..... 100 m
Survey Height	..... 60 m
Line Direction	..... 155 - 335 Deg
Flown By	..... Terraquest Ltd
Processing By	..... Tesla-10 Ltd.

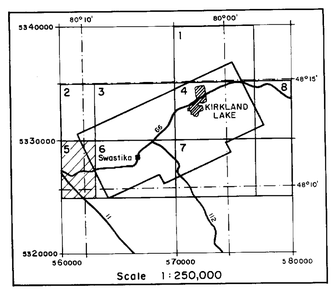
LEGEND

1325 ——+——→——+——

Line Number : Start of Line
Annotation Interval : 25
Arrow Indicates Flight Direction
Tick Interval : 5

N

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

FLIGHT PATH

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 56000-25000-FPS	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A13E0002 2.13185 TECK

SURVEY SPECIFICATIONS

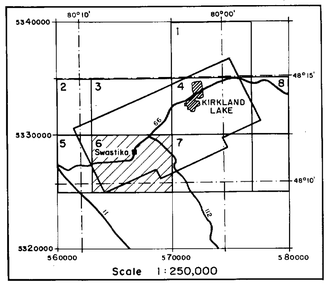
Magnetometer	..... Cesium Vapour
Sample Interval	..... 6 m
VLF	..... Hertz Totem 2A
Sample Interval	..... 30 m
Stations	..... Line NAA , NLK Ortho NSS
Line Spacing	..... 100 m
Survey Height	..... 60 m
Line Direction	..... 155 - 335 Deg
Flown By	..... Terraquest Ltd
Processing By	..... Tesla-10 Ltd.

LEGEND

1325 ——+——→——+——

Line Number : Start of Line
Annotation Interval : 25
Arrow Indicates Flight Direction
Tick Interval : 5

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

FLIGHT PATH

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 63000-25000-FP6	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

270

SURVEY SPECIFICATIONS

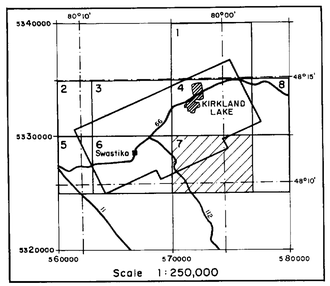
Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

LEGEND

1325 ——+——→——+——

Line Number : Start of Line
Annotation Interval : 25
Arrow Indicates Flight Direction
Tick interval : 5

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

BATTLE MOUNTAIN (CANADA) INC.

FLIGHT PATH

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-25000-FP7	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

280

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-IO Ltd.

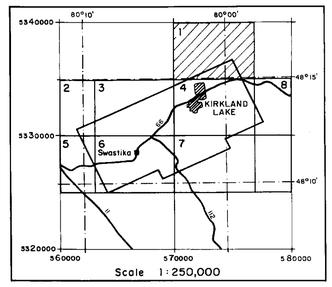
LEGEND

Contour Interval 10 Nanoteslas

1000 nT. contour
100 nT. contour
10 nT. contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

TOTAL FIELD MAGNETIC CONTOURS

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-IO LTD
DRAWING No. : 70000-35000-MAG1	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

290



SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

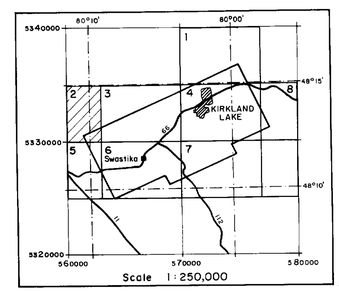
LEGEND

Contour Interval 10 Nanoteslas

1000 nT. contour
100 nT. contour
10 nT. contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

TOTAL FIELD MAGNETIC CONTOURS

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 56000-30000-MAG2	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

300

SURVEY SPECIFICATIONS

Magnetometer	..... Cesium Vapour
Sample Interval	..... 6 m
VLF	..... Hertz Totem 2A
Sample Interval	..... 30 m
Stations	..... Line NAA , NLK
	Ortho NSS
Line Spacing	..... 100 m
Survey Height	..... 60 m
Line Direction	..... 155 - 335 Deg
Flown By	..... Terraquest Ltd
Processing By	..... Tesla-10 Ltd.

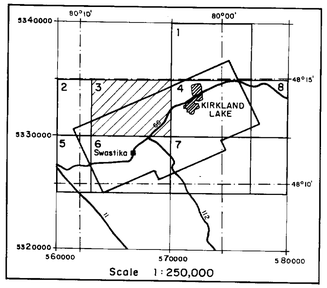
LEGEND

Contour Interval 10 Nanoteslas

1000 nT. contour
100 nT. contour
10 nT. contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

TOTAL FIELD MAGNETIC CONTOURS

KIRKLAND LAKE PROJECT

PROJECT No. : 2-JU-28	DRAWN BY :
NTS : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 63000-30000-MAG3	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

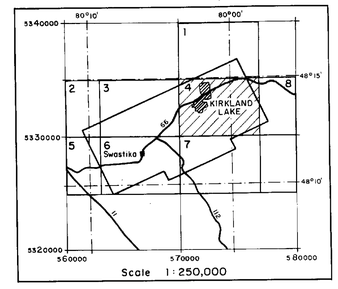
LEGEND

Contour Interval 10 Nanoteslas

1000 nT. contour
100 nT. contour
10 nT. contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

TOTAL FIELD MAGNETIC CONTOURS

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-30000-MAG4	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

42A01SE0002 2.13185 TECK

556000E
5330000N
80°14'00"
80°13'00"
80°12'00"
80°11'00"
80°10'00"
563000E
5330000N
48°07'00"
48°06'00"
5328000N
5326000N
48°05'00"
5325000N
556000E
558000E
560000E
562000E
563000E

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	5 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ontho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

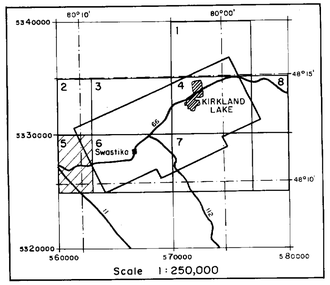
LEGEND

Contour Interval 10 Nanoteslas

1000 nT. contour
100 nT. contour
10 nT. contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

TOTAL FIELD MAGNETIC CONTOURS

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
NTS : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 56000-25000-MAG5	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

330

563000E 80°09'00" 80°08'00" 80°07'00" 80°06'00" 80°05'00" 80°04'00" 570000E

53300000N

48°07'00"

48°06'00"

48°05'00"

5328000N

5326000N

5325000N

563000E 584000E 586000E 568000E 570000E

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA . NLK
	Grtho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

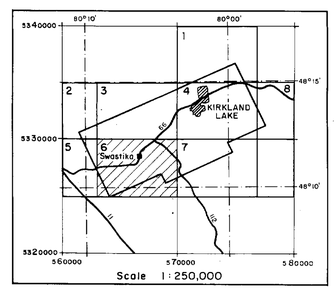
LEGEND

Contour Interval 10 Nanoteslas

1000 nT. contour
100 nT. contour
10 nT. contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

TOTAL FIELD MAGNETIC CONTOURS

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
PLOT : A1 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 63000-25000-MAG6	DATE : NOV 1989

0 200 400 600 800 1000m

Scale 1:10000

42A015E0002 2.13185 TECK

340

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA . NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

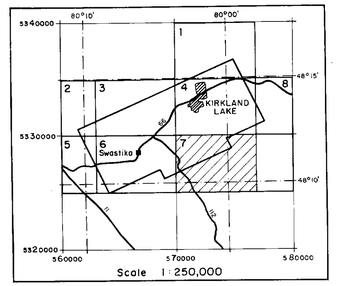
LEGEND

Contour Interval 10 Nanoteslas

1000 nT. contour
100 nT. contour
10 nT. contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

BATTLE MOUNTAIN (CANADA) INC.

TOTAL FIELD MAGNETIC CONTOURS

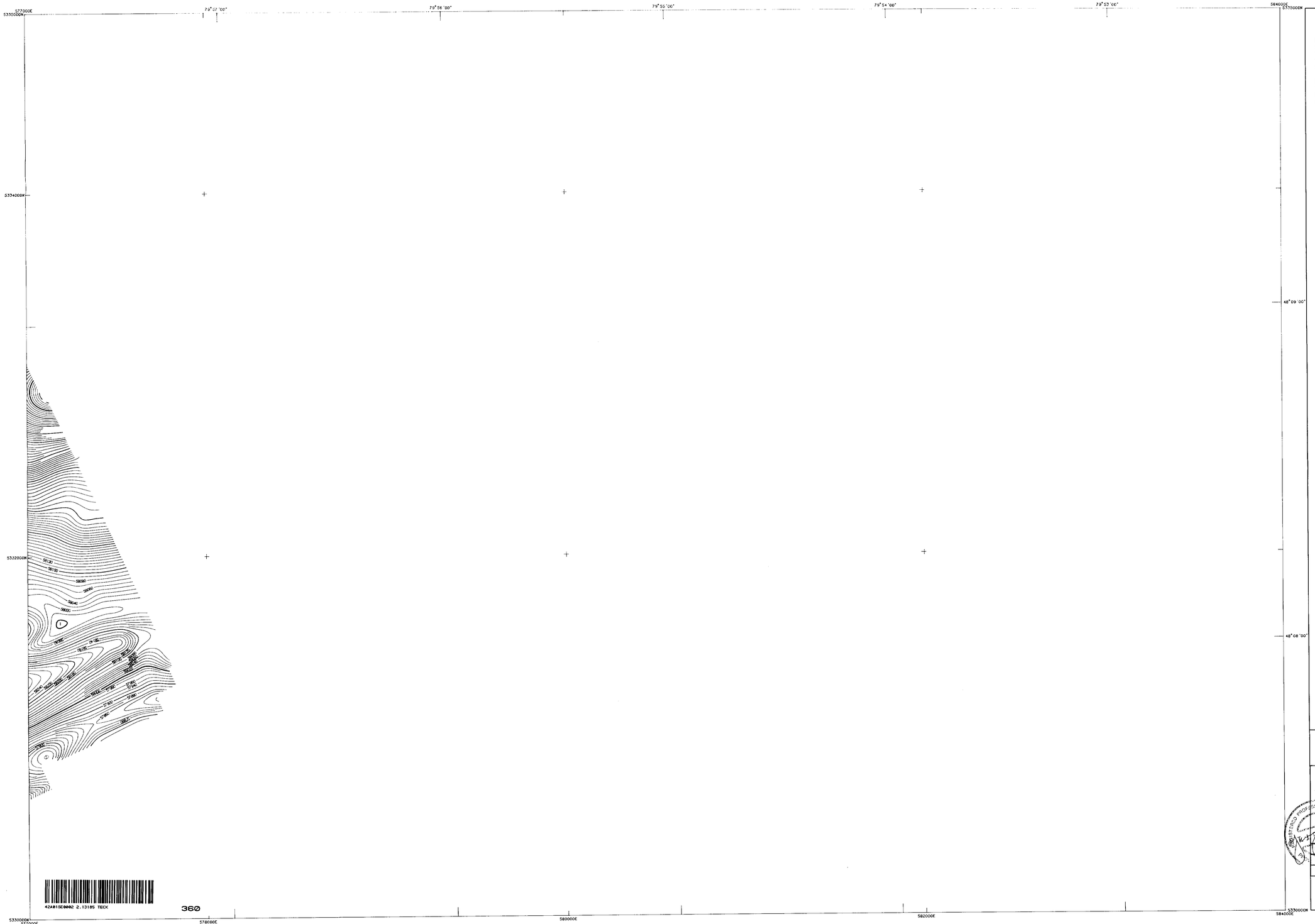
KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
NTS : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-25000-MAG7	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0082 2.13185 TECK



SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA . NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

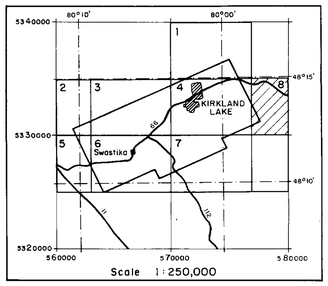
LEGEND

Contour Interval 10 Nanoteslas

1000 nT. contour
100 nT. contour
10 nT. contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

BATTLE MOUNTAIN (CANADA) INC.

TOTAL FIELD MAGNETIC CONTOURS

KIRKLAND LAKE PROJECT

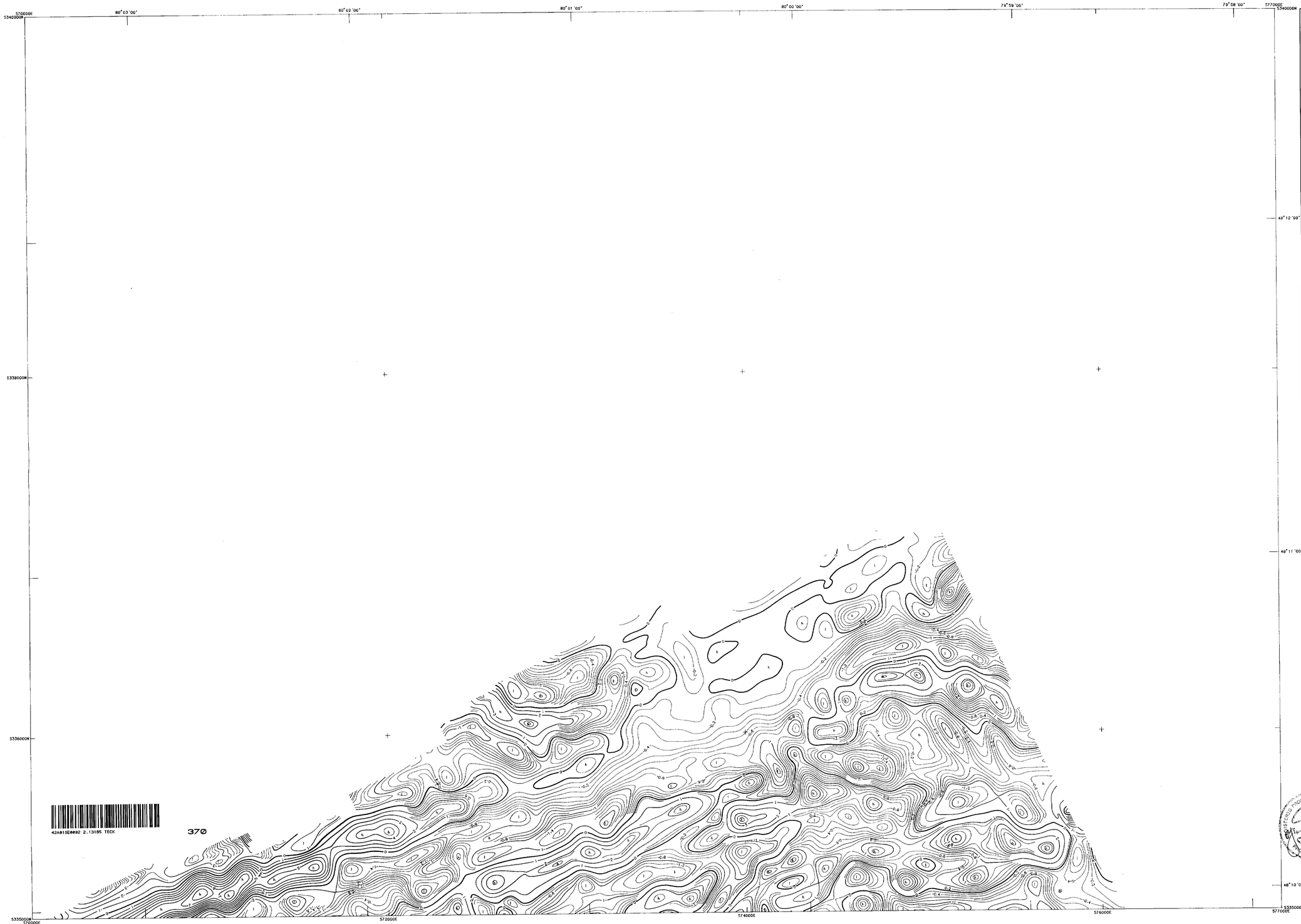
2.13185

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 77000-30000-MAG8	DATE : NOV 1989

0 200 400 600 800 1000m

Scale 1:10000

42A01SE0002 2.13185 TECK



SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

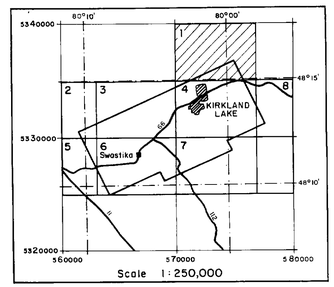
LEGEND

Contour Interval 0.1 Nanoteslas / Meter

10 nT./m contour
1 nT./m contour
0.1 nT./m contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

CALCULATED VERTICAL GRADIENT

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
SURVEY BY : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-35000-VG1	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

370

556000E
5335000N
80°14'00"
80°13'00"
80°12'00"
80°11'00"
80°10'00"
563000E
5335000N
48°10'00"
5324000N
48°09'00"
5332000N
48°08'00"
5330000N
556000E
558000E
560000E
562000E
563000E

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

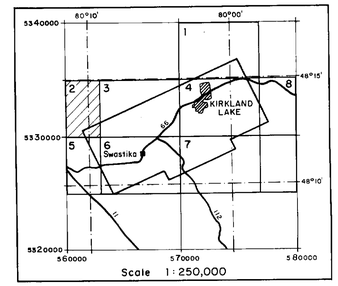
LEGEND

Contour Interval 0.1 Nanoteslas / Meter

10 nT./m contour
1 nT./m contour
0.1 nT./m contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

CALCULATED VERTICAL GRADIENT

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
NTS : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 30000-56000-VG2	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

380

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

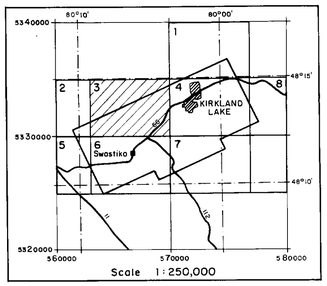
LEGEND

Contour Interval 0.1 Nanoteslas / Meter

10 nT./m contour
1 nT./m contour
0.1 nT./m contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

CALCULATED VERTICAL GRADIENT

KIRKLAND LAKE PROJECT

PROJECT No. : 75-10-28	DRAWN BY :
SIZE OF SHEET : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 63000-30000-VG3	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO
2 13185

42A81SE0002 2.13185 TECK

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	8 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Cutler, NSS
Line Spacing	100 m
Survey Height	80 m
Line Direction	135 - 315 (Az)
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

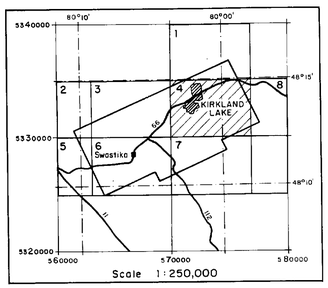
LEGEND

Contour Interval 0.1 Nanoteslas / Meter

10 nT./m contour
1 nT./m contour
0.1 nT./m contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

BATTLE MOUNTAIN (CANADA) INC.

CALCULATED VERTICAL GRADIENT

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
PLOT No. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-30000-VG4	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

400

556000E
5330000N
80°14'00"
80°13'00"
80°12'00"
80°11'00"
80°10'00"
563000E
5330000N
48°07'00"
48°06'00"
48°05'00"
5328000N
5326000N
5325000N
558000E
560000E
562000E
563000E

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

LEGEND

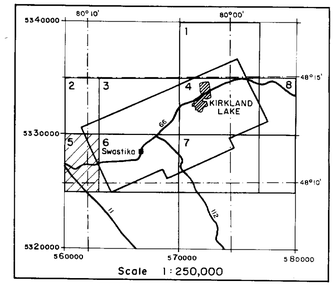
Contour Interval 0.1 Nanoteslas / Meter

10 nT./m contour
1 nT./m contour
0.1 nT./m contour

Mesh Size 25m X 25m

N

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

CALCULATED VERTICAL GRADIENT

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-120	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 56000-25000-VGS	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

410

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK
	Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

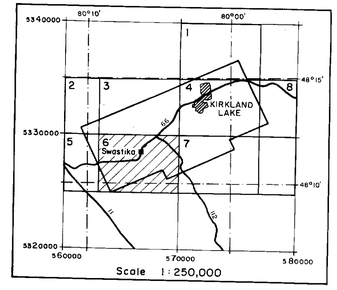
LEGEND

Contour Interval 0.1 Nanoteslas / Meter

10 nT./m contour
1 nT./m contour
0.1 nT./m contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

CALCULATED VERTICAL GRADIENT

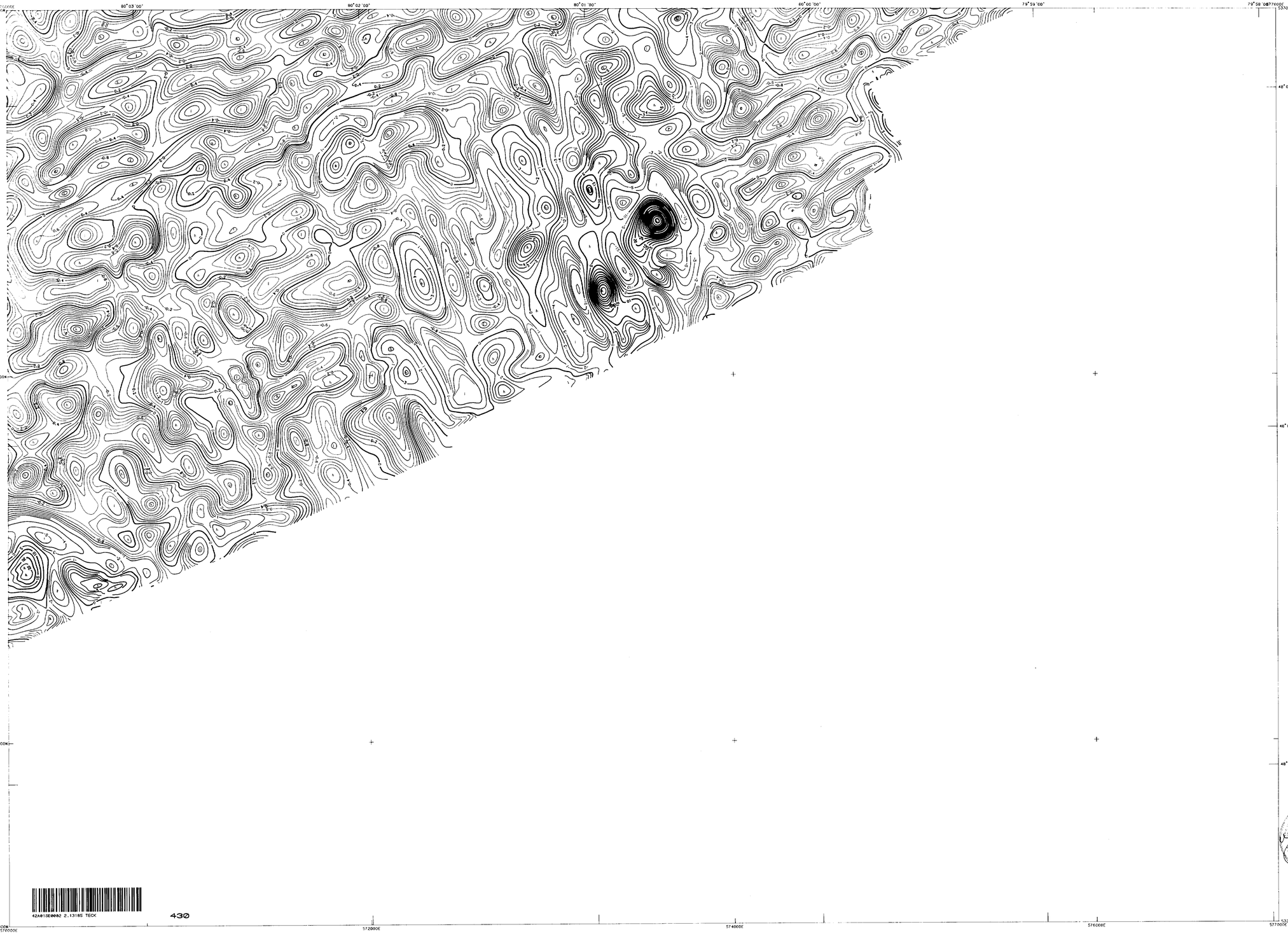
KIRKLAND LAKE PROJECT

2.13185

PROJECT No. * 85-JUN-28	DATA BY *
NCT.S.O.T. 42 A/1 32 D/4	DRAWN BY * TESLA-10 LTD
DRAWING No. * 63000-25000-VG6	DATE * NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK



SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

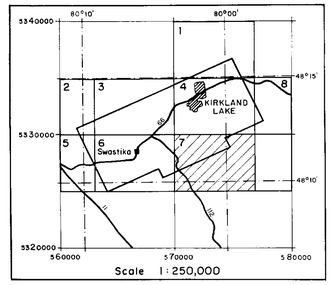
LEGEND

Contour Interval 0.1 Nanoteslas / Meter

10 nT./m contour
1 nT./m contour
0.1 nT./m contour

Mesh Size 25m X 25m

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

BATTLE MOUNTAIN (CANADA) INC.

CALCULATED VERTICAL GRADIENT

KIRKLAND LAKE PROJECT

2.13185

PROJECT No. : 75-JU-28	DATA BY :
MAP : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-25000-VGT	DATE : NOV 1989

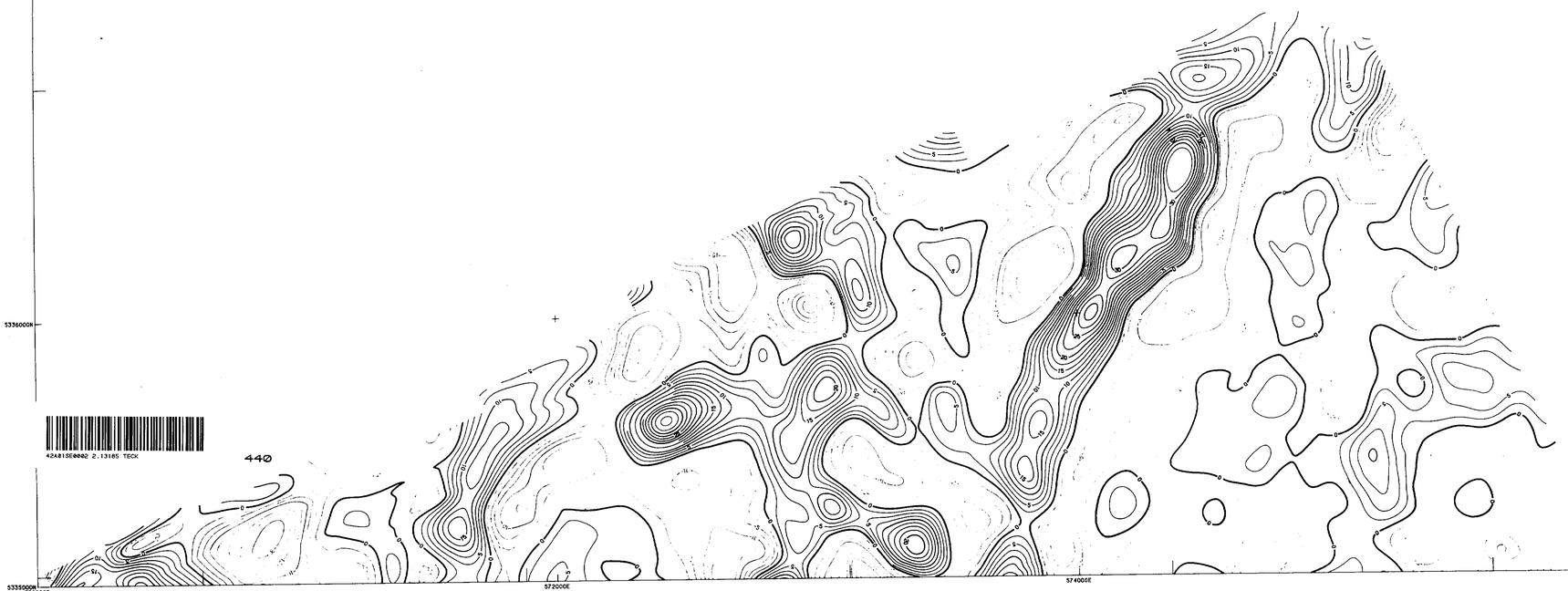
0 200 400 600 800 1000m

Scale 1:10000

42A01SE0002 2.13185 TECK

430

570000E
5340000N
80°03'00"
80°02'00"
80°01'00"
80°00'00"
79°59'00"
79°58'00"
577000E
5340000N
48°12'00"
48°11'00"
48°10'00"
5338000N
5336000N
5335000N
570000E
572000E
574000E
576000E
577000E



SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

LEGEND

Contour Interval 2.5 %

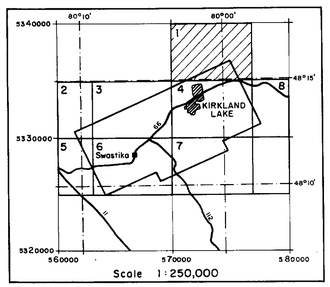
- 100 % contour
- 10 % contour
- 2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m

N.S.S

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

2.13185

ORTHO STATION
VLF TOTAL FIELD CONTOURS
KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-35000-VLF1-D	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK
440

556000E
5335000N
80°14'00"
80°13'00"
80°12'00"
80°11'00"
80°10'00"
563000E
5335000N
48°10'00"
5334000N
48°09'00"
5332000N
48°08'00"
5330000N
560000E
558000E
560000E
562000E
563000E

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

LEGEND

Contour Interval 2.5 %

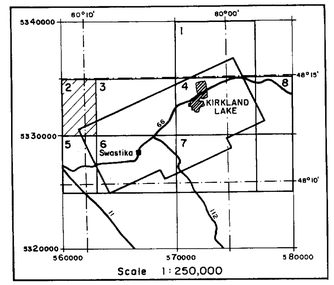
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m

N.S.S

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

2.13185

ORTHO STATION
VLF TOTAL FIELD CONTOURS

KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 56000-30000-VLF2-0	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

450

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

LEGEND

Contour Interval 2.5 %

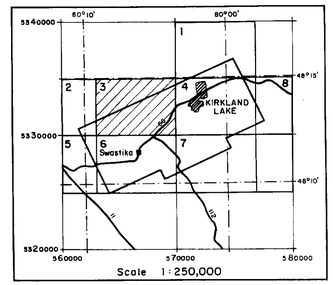
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m

N.S.S

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

BATTLE MOUNTAIN (CANADA) INC.

2.13185

ORTHO STATION
VLF TOTAL FIELD CONTOURS
KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 63000-30000-VLF3-0	DATE : NOV 1989

0 200 400 600 800 1000m

Scale 1:10000

42A01SE0002 2.13185 TECK

460

570000E
5335000N
80°03'00"
80°02'00"
80°01'00"
80°00'00"
79°59'00"
79°58'00"
5340000N
5332000N
5330000N
48°09'00"
572000E
574000E
576000E

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

LEGEND

Contour Interval 2.5 %

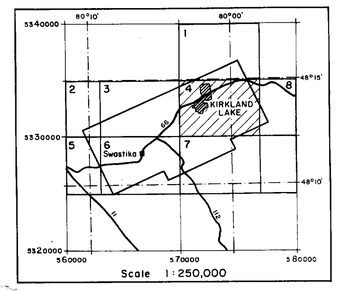
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m

N.S.S

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

2.13185

BATTLE MOUNTAIN (CANADA) INC.

ORTHO STATION
VLF TOTAL FIELD CONTOURS
KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-30000-YLF4-D	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

80°14'00" 80°13'00" 80°12'00" 80°11'00" 80°10'00"

556000E 563000E

5330000N

48°07'00"

5328000N

48°06'00"

5326000N

48°05'00"

5325000N

556000E 558000E 560000E 562000E 563000E

SURVEY SPECIFICATIONS

Magnetometer	..... Cesium Vapour
Sample Interval	..... 6 m
VLF	..... Hertz Totem 2A
Sample Interval	..... 30 m
Stations	..... Line NAA , NLK Ortho NSS
Line Spacing	..... 100 m
Survey Height	..... 60 m
Line Direction	..... 155 - 335 Deg
Flown By	..... Terraquest Ltd
Processing By	..... Tesla-10 Ltd.

LEGEND

Contour Interval 2.5 %

100 % contour
10 % contour
2.5 % contour

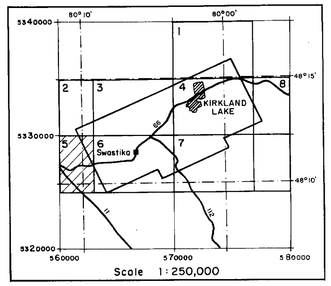
BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m

N

N.S.S

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

BATTLE MOUNTAIN (CANADA) INC.

~~2.13185~~ **2.13185**

ORTHO STATION
VLF TOTAL FIELD CONTOURS
KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 56000-25000-VLFS-0	DATE : NOV 1989

0 200 400 600 800 1000m

Scale 1:10000

42A01SE0002 2.13185 TECK

480

563000E
5330000N
80°09'00"
80°08'00"
80°07'00"
80°06'00"
80°05'00"
80°04'00"
570000E
48°07'00"
48°06'00"
5328000N
5326000N
48°05'00"
5325000N
563000E
564000E
566000E
568000E
570000E

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terrasquest Ltd
Processing By	Tesla-10 Ltd.

LEGEND

Contour Interval 2.5 %

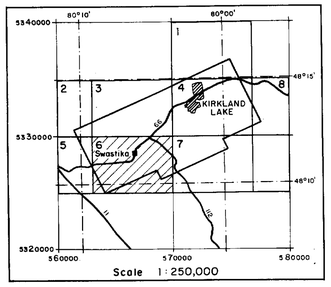
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m

N.S.S

SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

2.13185

ORTHO STATION
VLF TOTAL FIELD CONTOURS
KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 63000-25000-VLF6-0	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

490

570000E 5330000N

80°03'00" 80°02'00" 80°01'00" 80°00'00" 79°59'00" 79°58'00" 577000E 5330000N

48°07'00"

48°05'00"

5328000N

5326000N

5325000N 570000E 572000E 574000E 576000E 577000E 5325000N

500

42A015E0002 2.13185 TECK

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

LEGEND

Contour Interval 2.5 %

100 % contour
10 % contour
2.5 % contour

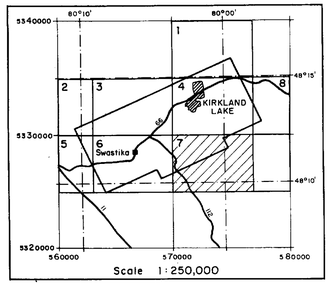
BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m

N

N.S.S

SURVEY MANAGED BY
GRID DATA NORTH LTD



Scale 1:250,000

BATTLE MOUNTAIN (CANADA) INC.

2.13185

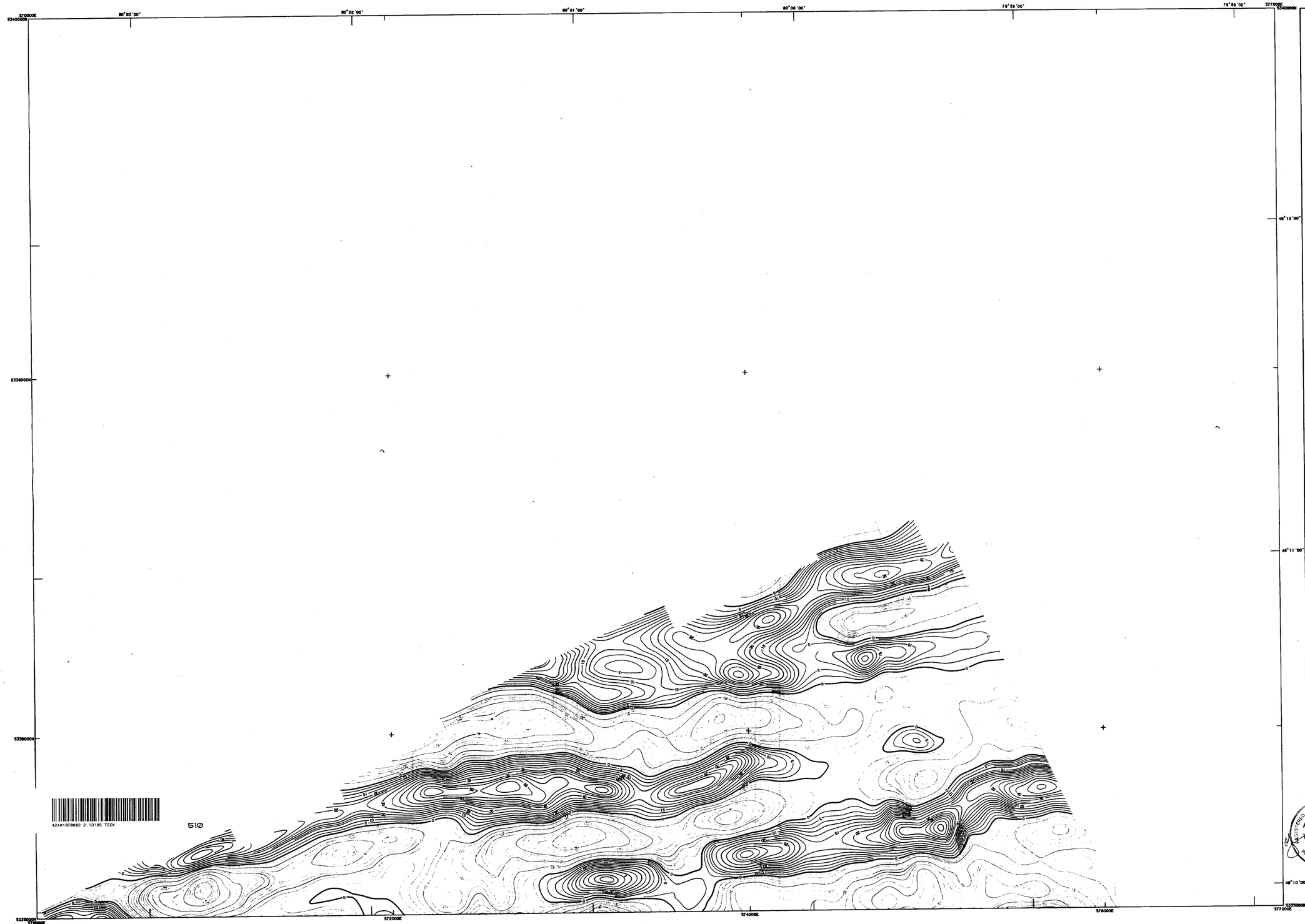
ORTHO STATION
VLF TOTAL FIELD CONTOURS

KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-25000-VLF7-0	DATE : NOV 1989

0 200 400 600 800 1000m

Scale 1:10000



SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ontho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

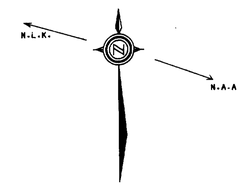
LEGEND

Contour Interval 2.5 %

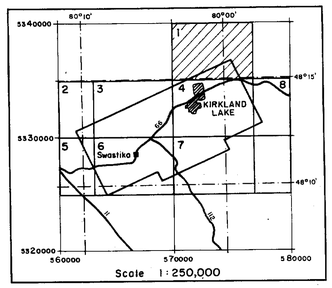
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m



SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

~~2.13185~~

LINE STATION
VLF TOTAL FIELD CONTOURS
KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
~~N.T.S.~~ : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-35000-VLF1-L	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A015E0002 2.13185 TECK

510

556000E
5335000N
80°14'00"
80°13'00"
80°12'00"
80°11'00"
80°10'00"
563000E
5335000N
48°10'00"
5334000N
48°09'00"
5332000N
48°08'00"
5330000N
556000E
558000E
560000E
562000E
563000E

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

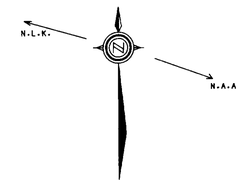
LEGEND

Contour Interval 2.5 %

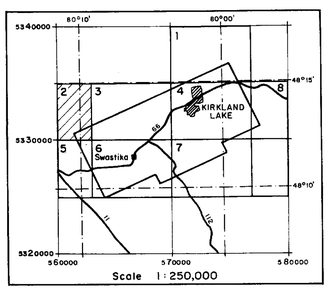
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m



SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

2.13185

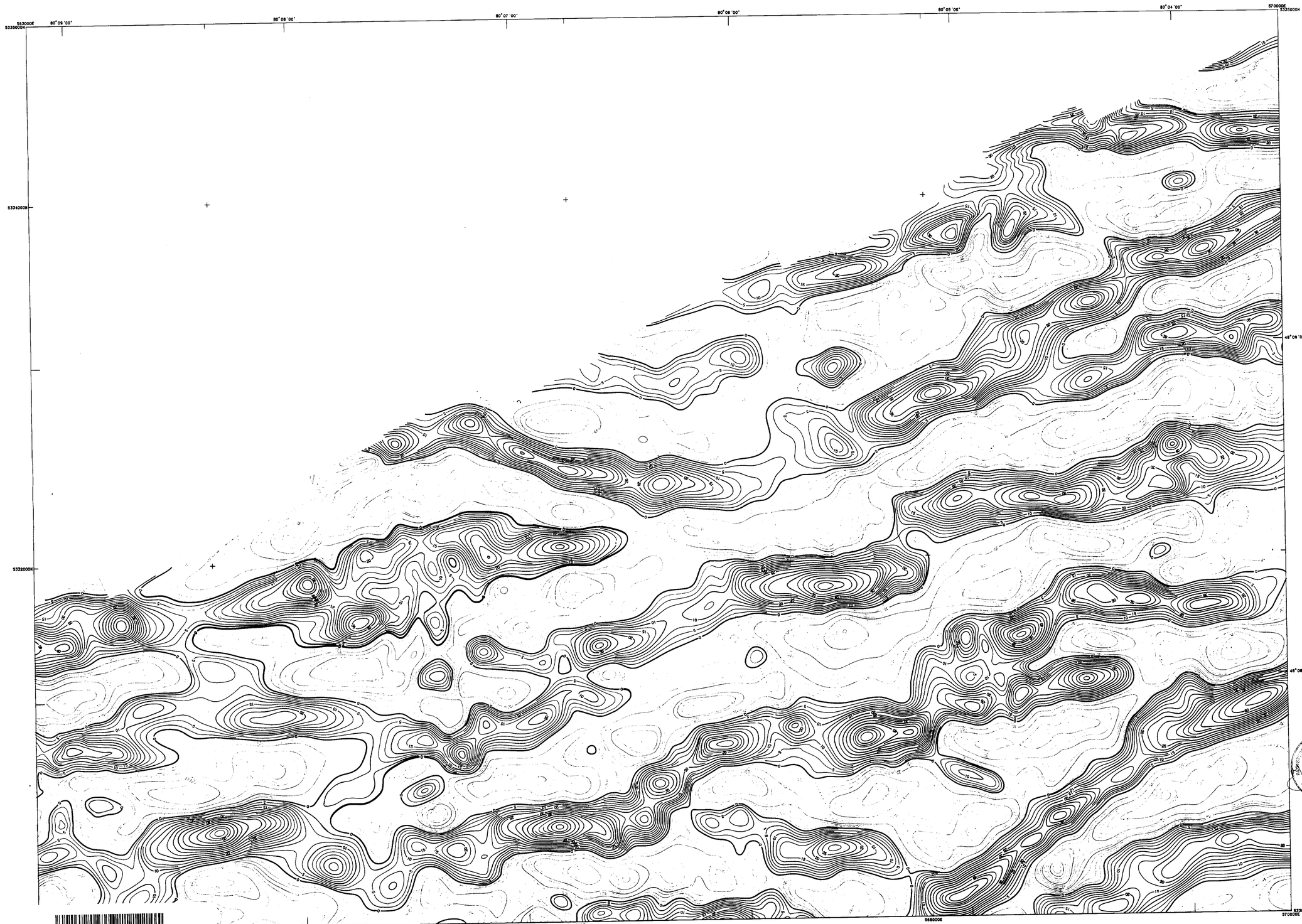
LINE STATION
VLF TOTAL FIELD CONTOURS
KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
NTS : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 56000-30000-VLF2-L	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

520



SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

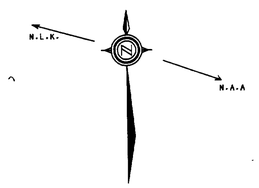
LEGEND

Contour Interval 2.5 %

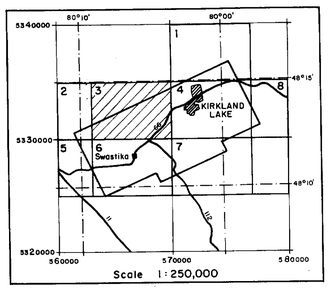
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m



SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

2.13185

LINE STATION
VLF TOTAL FIELD CONTOURS

KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 63000-30000-VLF3-L	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

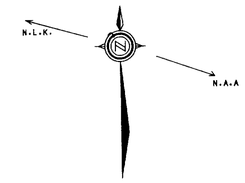
LEGEND

Contour Interval 2.5 %

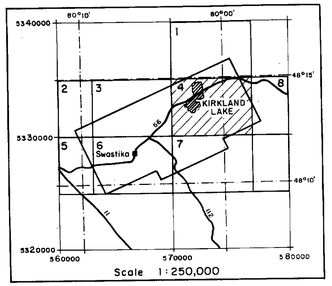
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m



SURVEY MANAGED BY
GRID DATA NORTH LTD



2.13185

BATTLE MOUNTAIN (CANADA) INC.

T. J. GOTHARD

LINE STATION
VLF TOTAL FIELD CONTOURS

KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-30000-VLF4-L	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA , NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

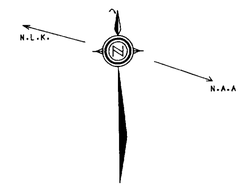
LEGEND

Contour Interval 2.5 %

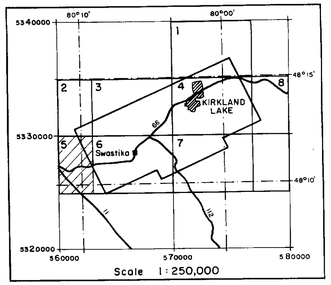
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m



SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

~~2.13185~~

LINE STATION
VLF TOTAL FIELD CONTOURS
KIRKLAND LAKE PROJECT

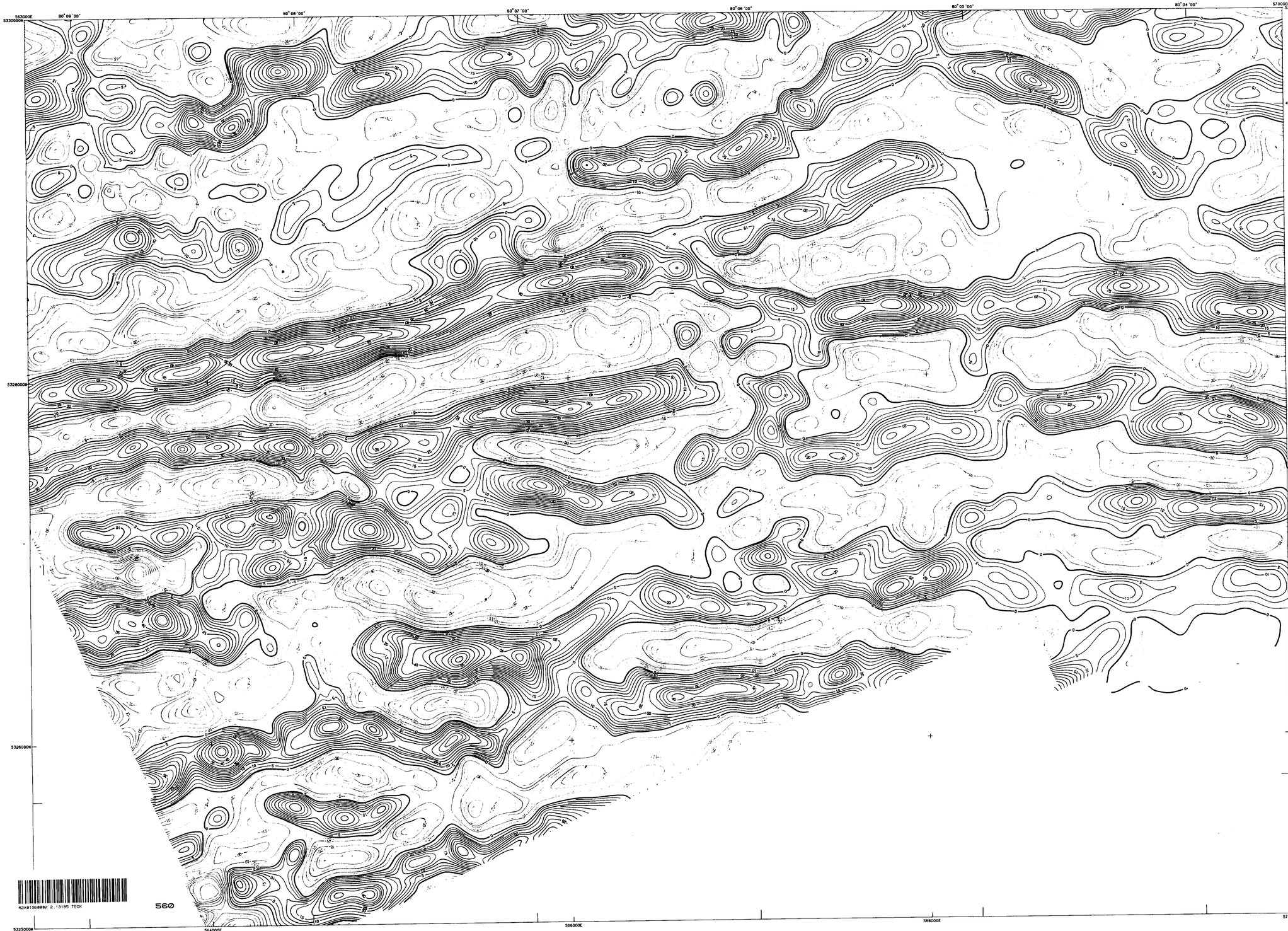
PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 56000-25000-VLF5-L	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

550

5330000N
5328000N
5326000N
5325000N
556000E
558000E
560000E
562000E
563000E
80°14'00"
80°13'00"
80°12'00"
80°11'00"
80°10'00"
48°07'00"
48°06'00"



SURVEY SPECIFICATIONS

Magnetometer	..... Cesium Vapour
Sample Interval	..... 6 m
VLF	..... Hertz Totem 2A
Sample Interval	..... 30 m
Stations	..... Line NAA , NLK Ortho NSS
Line Spacing	..... 100 m
Survey Height	..... 60 m
Line Direction	..... 155 - 335 Deg
Flown By	..... Terraquest Ltd
Processing By	..... Tesla-10 Ltd.

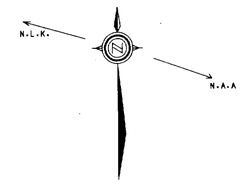
LEGEND

Contour Interval 2.5 %

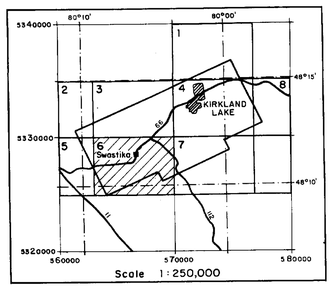
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m



SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

2, 13185

LINE STATION

VLF TOTAL FIELD CONTOURS

KIRKLAND LAKE PROJECT

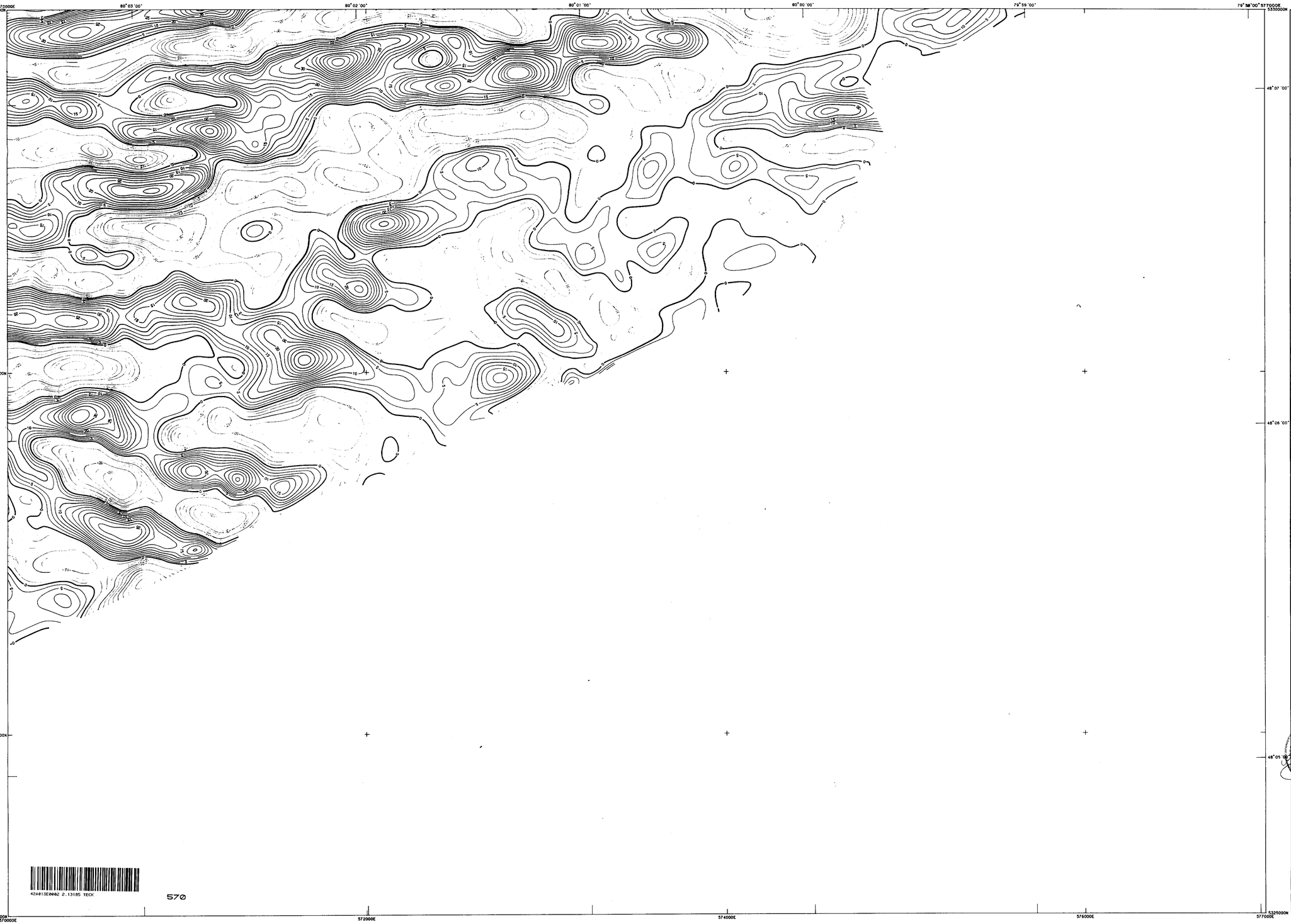
PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 63000-25000-VLF6-L	DATE : NOV 1989

0 200 400 600 800 1000m

Scale 1:10000

42A01SE0002 2.13185 TECK

560



SURVEY SPECIFICATIONS

Magnetometer	Cesium Vapour
Sample Interval	6 m
VLF	Hertz Totem 2A
Sample Interval	30 m
Stations	Line NAA . NLK Ortho NSS
Line Spacing	100 m
Survey Height	60 m
Line Direction	155 - 335 Deg
Flown By	Terraquest Ltd
Processing By	Tesla-10 Ltd.

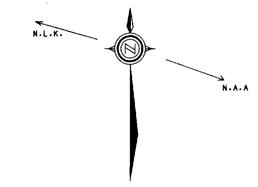
LEGEND

Contour Interval 2.5 %

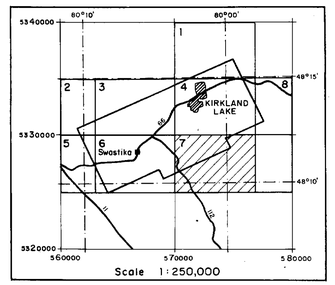
100 % contour
10 % contour
2.5 % contour

BLACK - ZERO AND ABOVE
BLUE - NEGATIVE

Mesh Size 25m X 25m



SURVEY MANAGED BY
GRID DATA NORTH LTD



BATTLE MOUNTAIN (CANADA) INC.

2.13185

LINE STATION

VLF TOTAL FIELD CONTOURS

KIRKLAND LAKE PROJECT

PROJECT No. : 75-JU-28	DATA BY :
N.T.S. : 42 A/1 32 D/4	DRAWN BY : TESLA-10 LTD
DRAWING No. : 70000-25000-VLF7-L	DATE : NOV 1989

0 200 400 600 800 1000m
Scale 1:10000

42A01SE0002 2.13185 TECK

570

1km

GRENFELL TWP.
TECK TWP.
Parron Lake
LARDER LAKE FAULT
GRENFELL
EBY
TECK
OTTO
GNR
LLDZ
KLDZ
SWASTIKA
HWY 66
Murdock Creek
OTTO STOCK

LEGEND

MAGNETIC DOMAINS: I, II, etc.

MAGNETIC SOURCES: Uncertain Boundaries ?
Dips (↘) where other than vertical

- High Susceptibility
- Medium-High Susceptibility
- Moderate Susceptibility
- Low Susceptibility

Corresponding lithologies: (See individual Twp. geology maps)
"Keewatin" Volcanics: K1, 1a, etc.
- Iron Formation 2b, 1f
- Mafic/Ultramafic 4b (gabbro)

"Timiskaming" Sediments and Assoc. Volcanics: T1, etc.;3c

"Algoman" Intrusives: 7, 9, A1, etc.
- Mapped boundaries
- Interpreted boundaries

Gold Deposits and Occurrences: ◪, ⚒, Au (25), Veins —

FAULTS:

	Interpreted	Geologic Support	Geology Only
Major	~~~	~ — ~	——
Intermediate	~~~	~ — ~ —	— — —
Minor	~~~~	~ — ~ — ~	- - - -

*Productive Sector
KLDZ

TARGET AREAS/ENVIRONMENT: ✱(1) - (6)
*Only selected, more important faults
(e.g. Murdock Creek Fault Zone (MCFZ)
Lakeshore Fault

Topo Linear:
(No support from magnetics or geology) —·—·—·—·—
*i.e. not primarily indicated by Magnetics

AEM INPUT:
- Anomalies ○ ◑ ● etc.
- Conductor Axes:
- Priority Targets: ✱(1) - (9)

VLF (See VLF Compilation Maps)
- Possible Geologic Conductors .....

MISCELLANEOUS:
- Map Sheet Numbers and Corners 3|4 / 6|7
- ONR
- Highways
- Lakes
- NTS Grid Corners +
- Twp. Corners/Boundaries

42A01SE0002 2.13185 TECK

563000 E.

570000 E.

5330000 N.

5326000 N.

Perron Creek

GRENFELL TWP.
TECK TWP.

HWY 66

Amikougami Creek

HWY 112

SWASTIKA

Rapids

L981871

L981876

L842782

Vigrass Lake

Otto Lake

TECK TWP.
OTTO TWP.

Murdock Creek

EBY TWP.
OTTO TWP.

L842495 | L842494 | L842493

Rapids

Blanche River

BD

42A/1 | 32D/4

Kirkland Lake

Swastika

TECK TWP.

LEBEL TWP.

OTTO TWP.

BOUTILIER TWP.

SCALE 1:125,000

METRES 2000 0 4000 METRES

1:2,500 SHEET | 1:5,000 SHEET | 1:10,000 SHEET | 1:20,000 SHEET

BATTLE MOUNTAIN (CANADA) INC.

BATTLE MOUNTAIN GOLD COMPANY

KIRKLAND LAKE PROJECT
HSK Minerals Limited
ONTARIO

MAP 6

PROJECT No.: 75-JV-28	DATA BY:
N.T.S. 42A/1 & 32D/4	DRAWN BY:
DRAWING No.: 63000 25000	DATE:
SCALE: 1:10,000	

100 0 100 200 300 400 500 METRES

42A01SE0002 2.13185 TECK

570000 E

577000 E

5330000 N

5325000 N

Murdock Creek

Beaver Dam

Dam

Tailings

Tailings

Bostebel Lake

McMurtry Lake

Boston Creek

Beaver Dam

Beaver Dam

Fox Lake

Boston

L891865

TECK TWP.

OTTO TWP.

LEBEL TWP.

BOSTON TWP.

TECK TWP.

LEBEL TWP.

OTTO TWP.

BOSTON TWP.

LOT 1
CON 6

LOT 1
CON 5

ONR

HWY 112

DANE

Tailings

BD

BD

BD

4 3 2

4 3 2

323

306

308

310

301

320

325

333

340

346

350

368

355

358

340

379

372

350

343

350

366

341

346

339

332

360

379

380

357

330

347

340

316

299

292

285

281

283

279

280

285

291

275

315

320

340

332

340

339

344

339

336

321

330

331

313

359

344

351

374

349

340

330

340

330

332

340

339

344

10

20

30

40

50

60

70

80

90

100

50

60

80°02'

80°00'

79°58'

42A/1 | 32D/4

80°00'

5333750

5332500

5331250

5330000

5328750

5327500

5326250

5325000

48°05'

563000 564750 566500 568250 570000 571750 573500 575250 577000

SCALE 1:125,000

METRES 2000 0 4000 METRES

250 m 1750 m 1:2,500 SHEET

500 m 3500 m 1:5,000 SHEET

1000 m 7000 m 1:10,000 SHEET

2 Km 14 Km 1:20,000 SHEET

BATTLE MOUNTAIN (CANADA) INC.

SMITH HOUSTON SOLO COMPANY

KIRKLAND LAKE PROJECT
HSK Minerals Limited
ONTARIO

MAP 7

PROJECT No.: 75-JV-28	DATA BY:
N.T.S.: 42A/1 & 32D/4	DRAWN BY:
DRAWING No.: 70000 25000	DATE:
SCALE 1:10,000	

100 0 100 200 300 400 500 METRES

42A01SE0002 2.13185 TECK

600

LOWER KIRKLAND LAKE

TECK TWP
LEBEL TWP

ONR

LSF

HWY 66

KLDZ

MCFZ

KIRKLAND LAKE TOWNSITE

MIDDLE HARVEY FAULT

Mudlark Creek

LLDZ

TECK
OTTO

LEBEL
BOSTON

LEBEL STOCK
(Syenite)

LONG LAKE

A4 (Diorite)
(+K1 (MV)

3K
(MV)

1a (MV)

K1, (Ag)

K1,(A2, A5)

K1,A2

T4 (A5A9)

T4 T2

T2 T4

T10 (T3, A2)

(A5)
T12
(Tuff)

2.13185

0 1 2 3 4 KM

Battle Mountain (Canada) Inc.

KIRKLAND LAKE PROJECT
Ontario

AEROMAGNETIC INTERPRETATION

SCALE: 1 : 10,000

STRATAGEX LTD.
J. ROTH

JAN. 1990