87-324-16110

BOTCO MINING AND EXPLORATION

GEOPHYSICAL REPORT ON A 3/88

MAGNETOMETER AND VLF-ELECTROMAGNETOMETER

ON THE

U AND ME CLAIMS

CARIBOO MINING DIVISION

LATITUDE: 53°09'N LONGITUDE: 122°10'W

NTS 93G/1E

AUTHORS: Richard Hermary, B.Sc., Geophysicist

Glen E. White, B.Sc., P.Eng., Consulting Geophysicist

DATE OF WORK; August 25,1986

DATE OF REPORT: May 25,1987

Owner: J.C. Bot

Operator: White Geophysical Inc.

WESTERN GEOPHYSICAL AERO DATA LTD.

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ILLUSTRATIONS

INTRODUCTION

Western Geophysical Aero Data Ltd. was commissioned by **Botco Mining and Exploration** to process and interpret an airborne magnetometer and VLF-electromagnetometer survey conducted over the western portion of the **U and Me** claims located some 30 kilometres northeast of Quesnel, B.C. The survey was flown on August 25,1986 and 32 line kilometres of data was recovered to evaluate the property.

The **U and Me** claims are geologically situated in the north-westerly trending Quesnel Trough and lie between two significant gold discoveries; the Gabriel Resources zone to the northwest and the Mary Creek Resources discovery to the southeast. Due to very little outcrop present on the **U and Me** claims this report was compiled in order that it may assist in the geological mapping of any favorable geological structures or formations trending on to the property as well as delineating any anomalous magnetic or conductive zones which warrant ground evaluation.

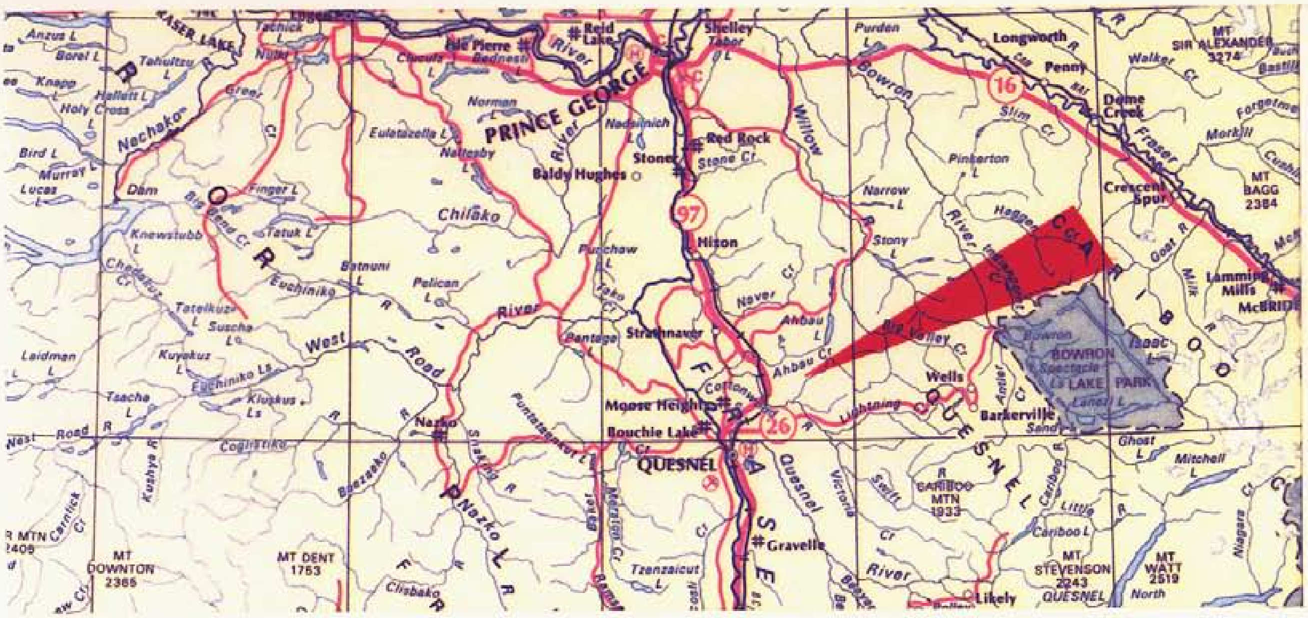
PROPERTY

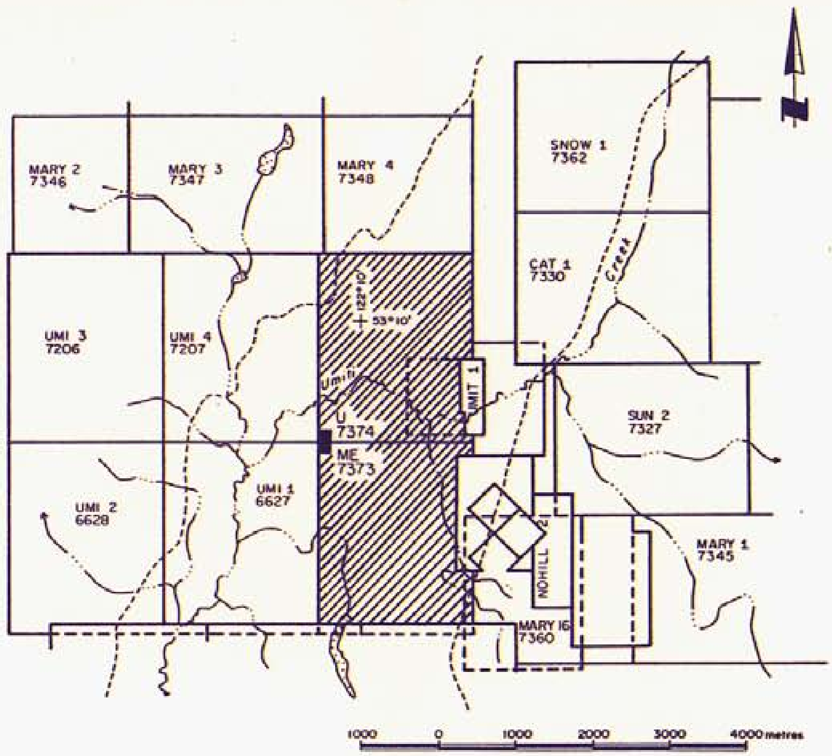
The **U and Me** claims consist of 40 contiguous units described below and illustrated on Figure 1.

CLAIM NAME	RECORD #	UNITS	EXPIRY DATE
U	7374	20	March 3,1987
ME	7373	20	March 3,1987

LOCATION AND ACCESS

The property is located some 30 kilometres northeast of Quesnel, B.C. in the Cariboo Mining Division with NTS map coordinates 93G/1E. The approximate geographical





BOTCO MINING & EXPLORATION

U & ME CLAIMS

LOCATION AND CLAIMS MAP

Western Geophysical Aero Data Ltd

FIGURE 1

coordinates are a latitude of 53°09'N and a longitude of 122°10'W. Logging activity in the area has provided extensive road networks which provide easy access to the property. These logging roads are accessible from both Highway 97 heading north and Highway 26 heading east from Quesnel.

GENERAL GEOLOGY

The general geology of the claims area is outlined on G.S.C. map 1424A, Geology of the Parsnip River area. The area was originally mapped by Amos Bowman of the Geological Survey of Canada in 1885-86 and subsequently by H.W.Tipper, also of the G.S.C., in 1961 and further updated in 1974. The applicable portion of this map is reproduced as Plate 1 of this report.

The **U and Me** properties lie within the northwesterly trending Quesnel Trough, which is predominantly underlain by the Upper Triassic and Lower Jurassic Takla Group. The unit underlying the claims consists mainly of phyllite and slate. In the southeastern portion of the claim block there is a mapped outcrop of augite porphyry basaltic tuffs, flows and conglomerates, with argillite and siltite, and local andesitic basalt belonging to the Upper Triassic and/or Lower Jurassic Nicola Group. The Eureka Thrust fault cuts the northeast corner of the **U** claim. Early Cretaceous intrusions have been mapped both to the north and south of the subject property.

PROPERTY GEOLOGY

No detailed geological mapping is known by the author. The majority of the **U and Me** claims are covered by glacial till and moraine.

LEGEND

MIOCENE AND PLIOCENE

- **MPvb** — Olivine basalt flows, breccia, tuff

OLIGOCENE AND MIOCENE

- **OMε** — Andesite, basalt, dacite

UPPER CRETACEOUS AND LOWER TERTIARY

- **KToL** — Rhyolite, dacite, trachyte, sandstone, shale, conglomerate

CACHE CREEK TERRANE

UPPER PALEOZOIC

Cache Creek Group

- **uPc** — Grey limestone, minor greenstone, chert and argillite, serpentinite, basalt, dark grey ribbon chert and greenish micritic (?) limestone

QUESNEL TERRANE

UPPER TRIASSIC AND/OR LOWER JURASSIC

Takla Group

- **Ŧd** — Diorite
- **uŦJTb** — Greywacke, siltstone, minor conglomerate
- **uŦJTa** — Andesite, volcaniclastics, greywacke, slate
- **uŦc** — Sandy limestone, limestone
- **uŦp** — Siltite, pelite, limestone, minor bioclastic limestone
- **Ŧp** — Phyllite, slate

Nicola Group

- **ŦJNi** — Syenite, monzodiorite, subvolc. intrusions
- **ŦJNl** — Limestone, quartzitic, sandy limestone & slate
- **ŦJNd** — Basalt, agglm., brx., congl., and lesser tuffs and argillite
- **ŦJNc** — Augite porph. basalt tuff, brx., minor flows, tuff, arg. and siltite, local andesite basalt
- **ŦJNb** — Basalt tuff and siltite, arg., greywacke, & slate, minor basalt, brx., aggl., polymictic cong.
- **ŦJNa** — Slate, arg., phyllite, f. gr. and minor cs. grywke. and lesser tuff, tuff siltite and arg.

UPPER PALEOZOIC ?

- **IPu** — Crooked amphibolite
  Serpentinite, amphibolite

SLIDE MOUNTAIN TERRANE

UPPER TRIASSIC

- **uŦ** — Shale, sandstone

UPPER PALEOZOIC

- **uPSM** — Slide Mtn. Group; Antler Formation
  Phyllite, minor micritic lst., diorite, dacite tuff and aggl., grey and olive ribbon chert, slate and argillite, pillow basalt, brx., dior., and minor serpentinite

BARKERVILLE TERRANE

HADRYNIAN AND PALEOZOIC

Snowshoe Group

- **HPs** — Undifferentiated grit, pelite, marble
- **HPsq** — Grit, quartzite
- **PIPs** — Grey and olive grey schistose, quartzite, schist, phyllite, marble, amphibolite, siltite and minor white to dark grey quartzite.
- **PIPsa** — Light grey orthoquartzite, grey schistose quartzite, schist, phyllite

CARIBOO TERRANE

HADRYNIAN AND PALEOZOIC

- **HPc** — Guyet Fm; basalt flow, aggl., limestone, conglomerate
  Black Stuart Group; chert, black pelite, sandstone

Cariboo Group
Yanks Peak and Midas Fm.; quartzite, phyllite, siltite. Yankee Belle Fm.; quartzite, phyllite
Cunningham Fm., limey marble Isaac Fm; phyllite, calcareous phyllite, siltite, quartzite, marble

Kaza Group
Grit, quartzite, phyllite

INTRUSIVE ROCKS

LOWER CRETACEOUS

Naver Pluton

- **eKg** — Porphyritic granite, quartz monzonite, granodiorite, aplite and pegmatite
- **Ki** — Biotite granite, quartz monzonite, monzonite, granodiorite (satellites of Naver Pluton)

MIDDLE JURASSIC

- **mJi** — Potassium feldspar mega crystalline hornblende quartz monzonite, granodiorite and granite

JURASSIC OR YOUNGER

- **um** — Ultramafic intrusion

LOWER TRIASSIC

Takomkane Batholith

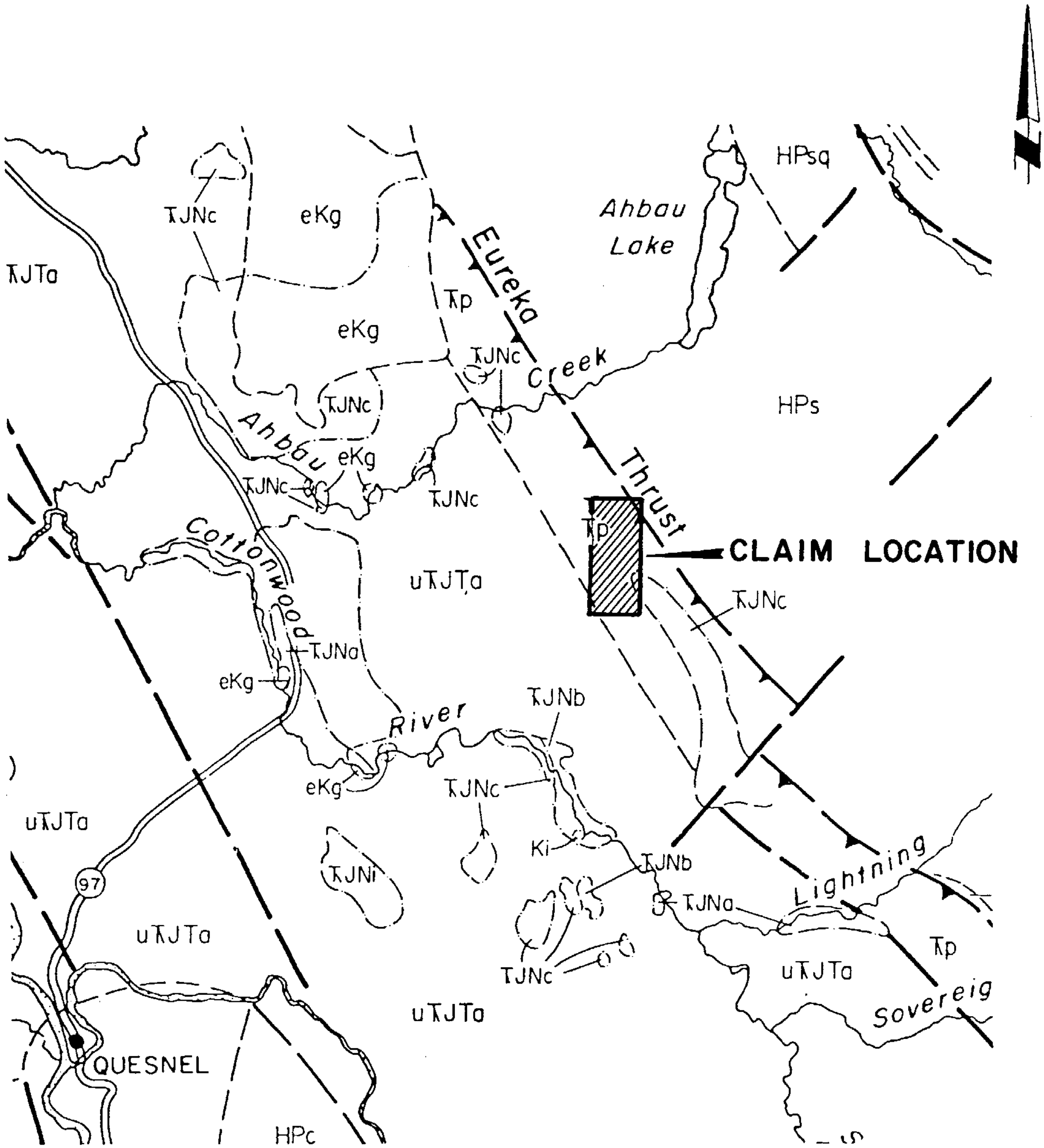
- **lŦg** — Porphyritic granite, granodiorite, quartz diorite, quartz monzonite
- **lŦy** — Hornblende syenite and monzonite

UNKNOWN AGE

- **gn** — Augen granite, gneissic biotite granite

SYMBOLS

- Thrust Fault (teeth on hanging wall)
- Major Fault (approximate)
- Geologic Contact (approximate)
- Outcrop Boundary



BOTCO MINING & EXPLORATION

U & ME CLAIMS

GENERAL GEOLOGY

Western Geophysical Aero Data Ltd.

SCALE : 1 : 250,000

PLATE 1

PREVIOUS WORK

No previous work has been done on the **U and Me** claims known by the the author. Work on nearby properties has indicated potential gold, copper and zinc mineralization which may extend on to the **U and Me** claims.

AIRBORNE VLF-ELECTROMAGNETIC AND MAGNETIC SURVEY

This survey simultaneously monitors and records the output signal from a proton precession magnetometer and two VLF-EM receivers installed in a bird designed to be towed 100 feet below a helicopter. A gimbal and shock mounted TV camera, fixed to the helicopter skid, provides input signal to a video cassette recorder allowing for accurate flight path recovery by correlation between the flight path cassette and air photographs of the survey area. A KING KRA-10A radar altimeter allows the pilot to continually monitor and control terrain clearance along any flight path.

Continuous measurements of the earth's total magnetic field intensity and of the total horizontal VLF-EM field strength of two transmission frequencies are stored in three independent modes: an analogue strip chart recorder, digital magnetic tapes and a digital video recovery system. A three-pen analogue power recorder provides direct, unfiltered recordings of the three geophysical instrument output signals. A Hewlett-Packard 9875 tape drive system digitally records all information as it is processed through an onboard micro-computer. The magnetic and electromagnetic data is also processed through the onboard micro-computer, incorporating an analogue to digital converter and a character generator, then superimposed along with the date, real time and terrain clearance upon the actual flight path video recording to allow exact correlation between geophysical data and ground location. The input signals are averaged and updated on the video display every second.

Correlation between the strip chart, digital tape and the video flight path recovery tape is controlled via fiducial marks common to all systems. Line identification, flight direction and pertinent survey information are recorded on the audio track of the video recording tape.

DATA PROCESSING

Field data is digitally recorded, with the time of day fiducial, on magnetic cassettes in a format compatible with the Hewlett-Packard 9845 computer. The recovered flight path locations are digitized and the field data is processed to produce plan maps of each of the parameters. A variety of formats are available in which to display this data.

Total field intensity magnetic information is routinely edited for noise spikes and corrected for any diurnal variations recorded on a base magnetometer located in the survey area.

Total field intensity VLF-EM signals are sensitive to topographic changes and sensor oscillation. Oscillation effects can be reduced by filters tuned to the dominant period. Long period effects attributable to topography can be removed by high pass filtering the planimetric data.

DISCUSSION OF RESULTS

The airborne survey was flown on August 25,1986 and 32 line kilometres of magnetometer and VLF-EM data were examined to evaluate the **U and Me** claims. Survey lines were oriented east-west and spaced at 200 metre intervals. Data was gathered at 1 second intervals, providing an average station spacing of approximately 20 metres. The sensors maintained an average terrain clearance of 60 metres during the course of the survey. Magnetic data is presented in contour form as Figure 2 of this report and the VLF-EM data is presented as profiles on Figures 3 and 4 representing the Seattle and Annapolis frequency information respectively.

The magnetic contour map is influenced by a northwesterly trending magnetic high. The magnetic high is probably caused by surface or near surface zone of diorite Takla Group rocks. The magnetic contours run in a northwesterly direction which parallel the Eureka Thrust fault. The shallow magnetic gradient is another indication of the trend of the Eureka Thrust fault. Magnetic lows in the central and southern portion of the claims western border indicate crosscutting faults perpendicular to the Eureka Thrust fault. The magnetic lows are probably caused by altered zones associated with faulting. One other inferred fault can also be traced on to the northern half of the claims area. This fault is indicated by a steep gradient in proximity to a magnetic low.

The VLF-EM data is presented as profiles on Figures 3 and 4. No data is presented for lines 114 to 118 and 125 because of a temporary malfunction of the digital tape drive system. The information was recorded on analogue tape and has been reviewed for this interpretation. Any conductivity lineations observed in the analogue charts have been duly flagged on the VLF-EM profile maps.

The most distinctive response observed on Figures 3 and 4 is a dramatic increase in the VLF-EM signal strengths on lines 124 to 119. This response is not observed on the analogue strip charts of the northern most lines and appears to be restricted to a narrow west-northwesterly trending band which traverses the center portion of the **U** claim. this trend correlates with the northeastern flank of the magnetic high and the two features are likely structurally related. Although the trend appears to be comprised of a zone of VLF-EM noise, the signals recorded on the two different VLF-EM frequencies reflect essentially the same field variations. This suggests that the anomalous trend is generated by a near surface zone of high conductivity material which is itself made up of numerous, randomly spaced conductive lenses. Phyllitic lenses or splay fractures surrounding fault zones often generate this type of VLF-EM response. Additional geophysical and geological input is required for a more thorough and complete model of the geology and structures in the claim area.

SUMMARY AND CONCLUSIONS

During August 1986, Western Geophysical Aero Data Ltd. flew 32 kilometres of airborne magnetometer and VLF-electromag netometer survey across the western portion of the **U and Me** claims northeast of Quesnel, B.C.

The magnetic data is dominated by a northwesterly trending magnetic high probably caused by a near surface zone of dioritic Takla Group rocks. The magnetic contours also parallel the Eureka Thrust fault which is indicated by the shallow magnetic gradient. Several magnetic lows indicate cross faulting perpendicular to the Eureka Thrust fault. Another major fault indicated by the magnetic data may extend well into the **U** claim.

A west-northwesterly trending zone of anomalous VLF-EM responses crosses this magnetic feature near the center of the **U** claim. This zone correlates with the discontinuity in the northwesterly trending magnetic high response and is interpreted as reflecting a major structural break.

A popular theory concerning the origin of the gold deposits in the Quesnel trough is remobilization of the gold from the Snowshoe group which underlies the Takla group in the Umiti Creek area. The mobilization is thought to be initiated by the thermal activity generated by the intrusion of the youngest Takla group unit, a diorite, into the country rock, with the gold precipitating out from solutions in any structural or lithologically permeable sites around the intrusive mass. The magnetic and VLF-EM data suggests that there is a high probability that these conditions exist and may extend on to the **U and Me** claims.

RECOMMENDATIONS

An airborne magnetometer and VLF-EM survey should be carried out over the remaining portions of the **U and Me** claims. Lines should be flown in the east-west direction and spaced at 200 meters apart. The survey should also overlap the previously flown area in order that correlation between the new data and previously flown data can be done. Based on encouraging results from the airborne survey ground targets should be determined and investigated.

The airborne determined ground targets should be followed up with a comprehensive ground program. The ground program should consist of geological mapping, geochemical soil analysis for gold and detailed ground magnetics and VLF-EM. Contingent upon encouraging results from these efforts, trenching and diamond drilling may eventually be warranted.

Respectfully Submitted,

R. Hermary

Richard G. Hermary, B.Sc.,
Geophysicist

PROFESSIONAL
PROVINCE OF
GLEN E. WHITE
BRITISH COLUMBIA
ENGINEER

Glen E. White, B.Sc., P.Eng.
Consulting Geophysicist

INSTRUMENT SPECIFICATIONS

BARRINGER AIRBORNE MAGNETOMETER

MODEL:		Nimbin M-123
TYPE:		Proton Precession
RANGE:		20,000 to 100,000 gammas
ACCURACY:		± 1 gamma at 24 V d.c.
SENSITIVITY:		1 gamma throughout range
CYCLE RATES:		
Continuous	-	0.6, 0.8, 1.2 and 1.9 seconds
Automatic	-	2 seconds to 99 minutes in 1 second steps
Manual	-	Pushbutton single cycling at 1.9 seconds
External	-	Actuated by a 2.5 to 12 volt pulse longer than 1 millisecond.
OUTPUTS:		
Analogue	-	0 to 99 gammas or 0 to 990 gammas - automatic stepping
Visual	-	5 digit numeric display directly in gammas
EXTERNAL OUTPUTS:		
Analogue	-	2 channels, 0 to 99 gammas or 0 TO 990 gammas at 1 m.a. or 1 volt full scale deflection.
Digital	-	BCD 1, 2, 4, 8 code, TTL compatible
SIZE:		Instrument set in console 30 cm X 10 cm X 25 cm
WEIGHT:		3.5 Kg.
POWER REQUIREMENTS:		12 to 30 volts dc, 60 to 200 milliamps maximum.
DETECTOR:		Noise cancelling torroidal coil installed in air foil.

INSTRUMENT SPECIFICATIONS

FLIGHT PATH RECOVERY SYSTEM

i) T.V. Camera:

Model:	RCA TC2055 Vidicon
Power Supply:	12 volt DC
Lens:	variable, selected on basis of expected terrain clearance.
Mounting:	Gimbal and shock mounted in housing, mounted on helicopter skid.

ii) Video Recorder:

Model:	Sony SLO-340
Power Supply:	12 volt DC / 120 volt AC (60Hz)
Tape:	Betamax 1/2" video cassette - optional length.
Dimensions:	30 cm X 13 cm X 35 cm
Weight:	8.8 Kg
Audio Input:	Microphone in - 60 db low impedance microphone
Video Input:	1.0 volt P-P, 75Ω unbalanced, sync negative from camera.

iii) Altimeter:

Model:	KING KRA-10A Radar Altimeter
Power Supply:	27.5 volts DC
Output:	0-25 volt (1 volt /1000 feet) DC signal to analogue meter, 0-10 v (4mv/ft) analogue signal to microprocessor.
Mounting:	fixed to T.V. camera housing, attached to helicopter skid.

INSTRUMENT SPECIFICATIONS

DATA RECORDING SYSTEM

i) Chart Recorder

Type:	Esterline Angus Miniservo III Bench AC Ammeter - Voltmeter Power Recorder.
Model:	MS 413B
Specification:	S-22719, 3-pen servo recorder
Amplifiers:	Three independent isolated DC amplifiers (1 per channel) providing range of acceptable input signals.
Chart:	10 cm calibrated width z-fold chart.
Chart Drive:	Multispeed stepper motor chart drive, Type D850, with speeds of 2,5,10,15,30 and 60 cm/hr. and cm/min.
Controls:	Separate front mounted slide switches for power on-off, chart drive on-off, chart speed cm/hr. - cm/min. Six position chart speed selector individual front zero controls for each channel.
Power Requirements:	115/230 volts AC at 50/60 Hz (Approximately 30 W).
Writing System:	Disposable fibre tipped ink cartridge (variable colors)
Dimensions:	38.6 cm X 16.5 cm X 43.2 cm
Weight:	9.3 kg.

ii) Digital Video Recording System

Type:	L.M. Microcontrols Ltd. Microprocessor Control Data Acquisition System.
Model:	DADG - 68
Power Requirements:	10 - 14 volts DC, Maximum 2 amps.
Input Signal:	3,0 - 100 mvolt DC signals 1,0 - 25 DC signals
Microprocessor:	Motorola MC-6800
CRT Controller:	Motorola MC-6845
Character Generator:	Motorola MCM-6670
Analogue/Digital Convertor:	Intersil 7109
Multiplexer:	Intersil IH 6208
Digital Clock:	National MM 5318 chip 9 volt internal rechargeable nickle-cadmium battery.
Fiducial Generator:	internally variable time set controls relay contact and audio output.
Dimensions:	30 cm X 30 cm X 13 cm
Weight:	3 kg.

iii) Digital Magnetic Tape

Type:	Hewlett Packard cartridge tape unit.
Model:	9875A
Power Requirements:	24 volt d.c.
Data Format:	HP'S Standard Interchange Format (SIF)

Tape Cartridge:	HP 98200A 225K byte cartridge compatible with HP Series 9800 desktop computers.
Tape Drive:	Dual tape drives providing up to 8 hours continual recording time.
Controller:	Internal micro-computer provides 23 built in commands External computer generated commands.

INSTRUMENT SPECIFICATIONS

SABRE AIRBORNE VLF SYSTEM

Source of Primary Field:	-VLF radio stations in the frequency range of 14 KHz to 30 KHz
Type of Measurement:	-Horizontal field strength
Number of Channels:	Two; Seattle, Washington at 24.8 KHz Annapolis, Maryland at 21.4 KHz
Type of Sensor:	-Two ferrite antennae arrays, one for each channel, mounted in magnetometer bird
Output:	-0 - 100 mV displayed on two analogue meters (one for each channel) -recorder output posts mounted on rear of instrument panel
Power Supply:	-Eight alkaline "AA" cells in main instrument case (life 300 hours) -Two 9-volt alkaline transistor batteries in bird (life 300 hours)
Instrument Console:	-Dimensions - 30 cm X 10 cm X 25 cm -Weight - 3.5 Kg

COST BREAKDOWN

This report detailing the results of the airborne magnetometer survey and VLF-electromagnetometer and a compilation of geological information was prepared for an all inclusive fee of $4,080.00. This total is based on a cost structure of $35/km for magnetometer data and $15/km for each VLF-EM frequency data set.

32 km magnetic, VLF-EM (Seattle) and VLF-EM (Annapolis) @ $65/km	$2,080.00
Geological Compilation	500.00
Interpretation & Report	1,500.00
TOTAL	**$4,080.00**

TOTAL ASSESSMENT VALUE OF THIS REPORT **$4,080.00**

STATEMENT OF QUALIFICATIONS:

NAME: HERMARY, Richard G.

PROFESSION: Geophysicist

EDUCATION: University of British Columbia -
B.Sc. - Major Geophysics

PROFESSIONAL
ASSOCIATIONS: Society of Exploration Geophysicist

EXPERIENCE: Six months as field geophysicist,
A & M Exploration Ltd.

Six months with Western Geophysical Aero Data

STATEMENT OF QUALIFICATIONS

NAME: WHITE, Glen E., P.Eng.

PROFESSION: Geophysicist

EDUCATION: B.Sc. Geophysics - Geology
University of British Columbia

PROFESSIONAL ASSOCIATIONS: Registered Professional Engineer, Province of British Columbia.

Associate Member of Society of Exploration Geophysicists.

Past President of B.C. Society of Mining Geophysicists.

EXPERIENCE:

-Pre-Graduate experience in Geology - Geochemistry - Geophysics with Anaconda American Brass.

-Two years Mining Geophysicist with Sulmac Exploration Ltd. and Airborne Geophysics with Spartan Air Services Ltd.

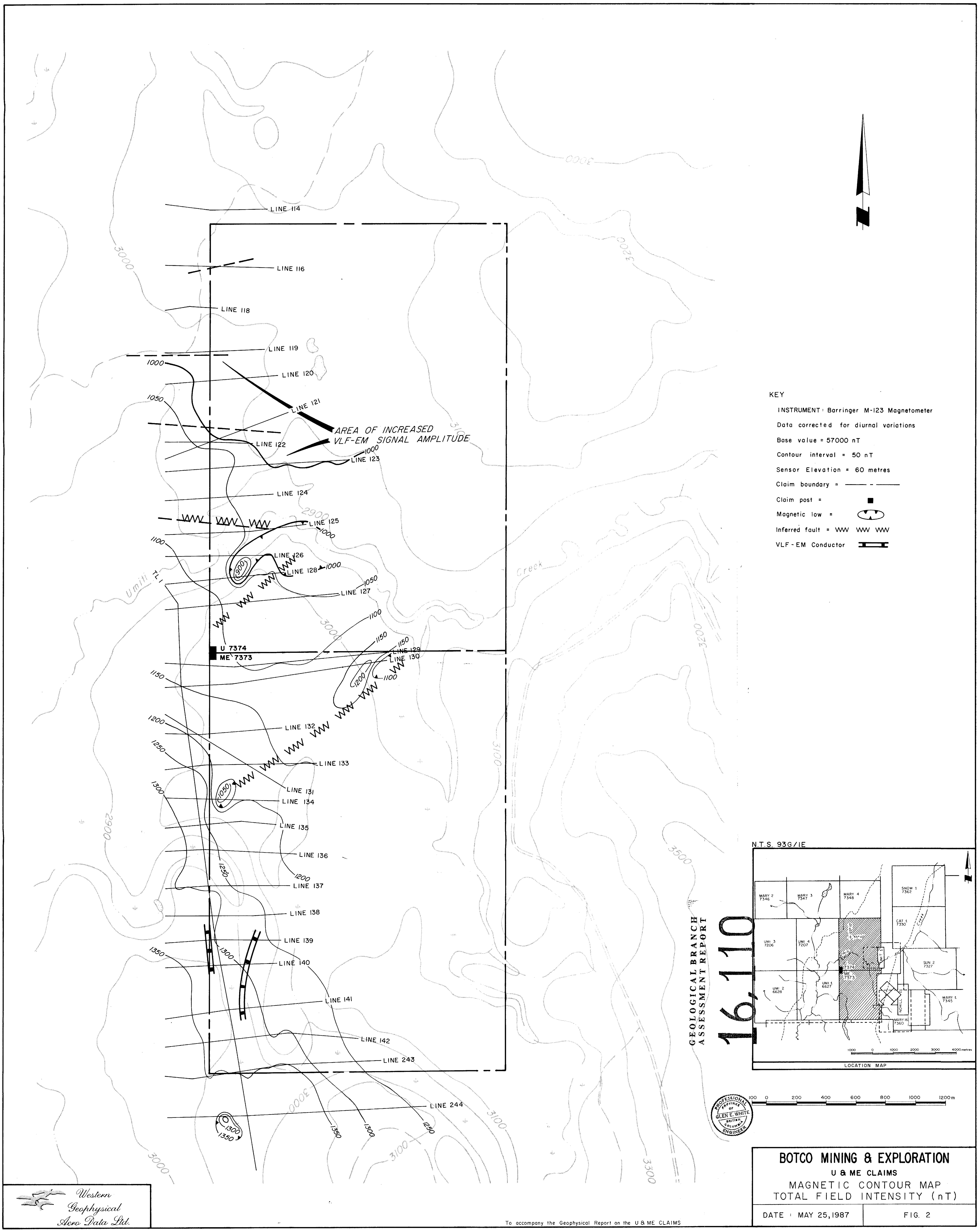
-One year Mining Geophysicist and Technical Sales Manager in the Pacific north-west for W.P. McGill and Associates.

-Two years Mining Geophysicist and supervisor airborne and ground geophysical divisions with Geo-X Surveys Ltd.

-Two years Chief Geophysicist Tri-Con Exploration Surveys Ltd.

-Fourteen years Consulting Geophysicist.

-Active experience in all Geologic provinces of Canada.

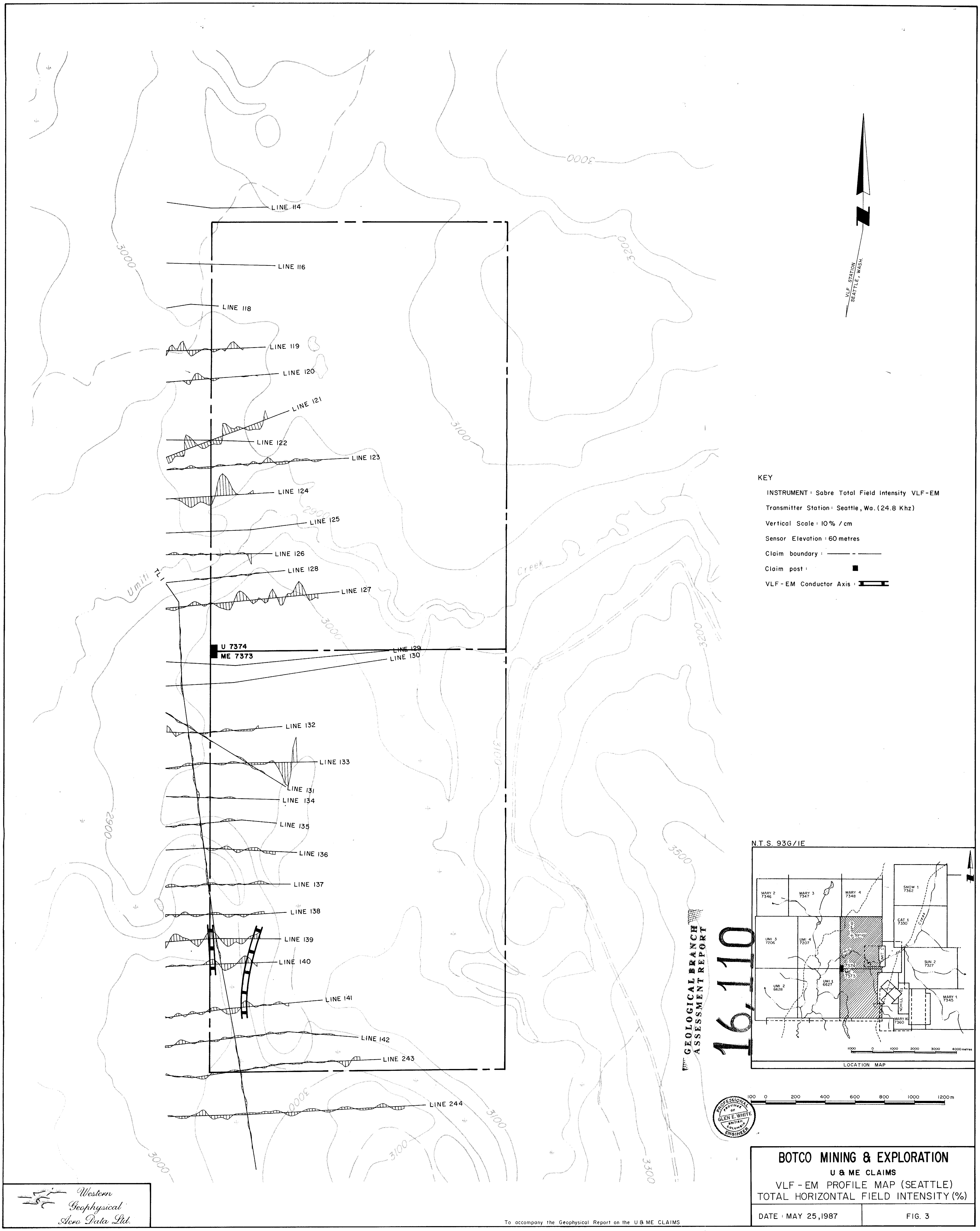


BOTCO MINING & EXPLORATION

U & ME CLAIMS

MAGNETIC CONTOUR MAP
TOTAL FIELD INTENSITY (nT)

DATE : MAY 25, 1987 | FIG. 2



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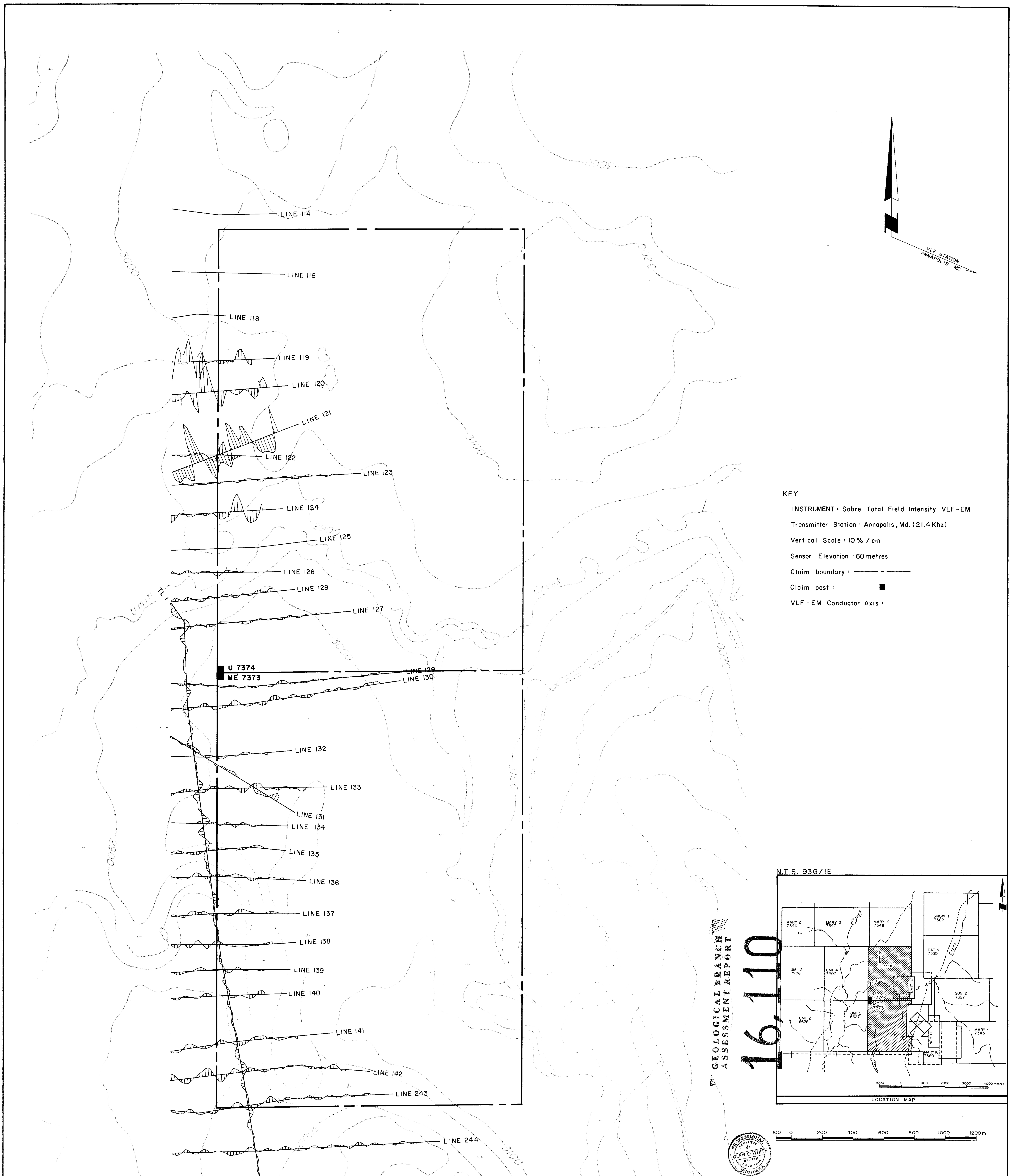
U & ME CLAIMS

VLF-EM PROFILE MAP (SEATTLE)

TOTAL HORIZONTAL FIELD INTENSITY (%)

DATE : MAY 25, 1987 | FIG. 3

To accompany the Geophysical Report on the U & ME CLAIMS



BOTCO MINING & EXPLORATION

U & ME CLAIMS

VLF-EM PROFILE MAP – ANNAPOLIS
TOTAL HORIZONTAL FIELD INTENSITY (%)

DATE : MAY 25, 1987	FIG. 4

To accompany the Geophysical Report on the U & ME CLAIMS