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CARMAC RESOURCES LTD.
and
SUNEVA RESOURCES LTD.
GEOPHYSICAL REPORT
on an
AIRBORNE VLF-EM AND MAGNETOMETER SURVEY

Kettle 1 and 2 claims, GREENWOOD MINING DIVISION
Lat. 49°35'N Long. 118°54'W N.T.S. 82E/7W

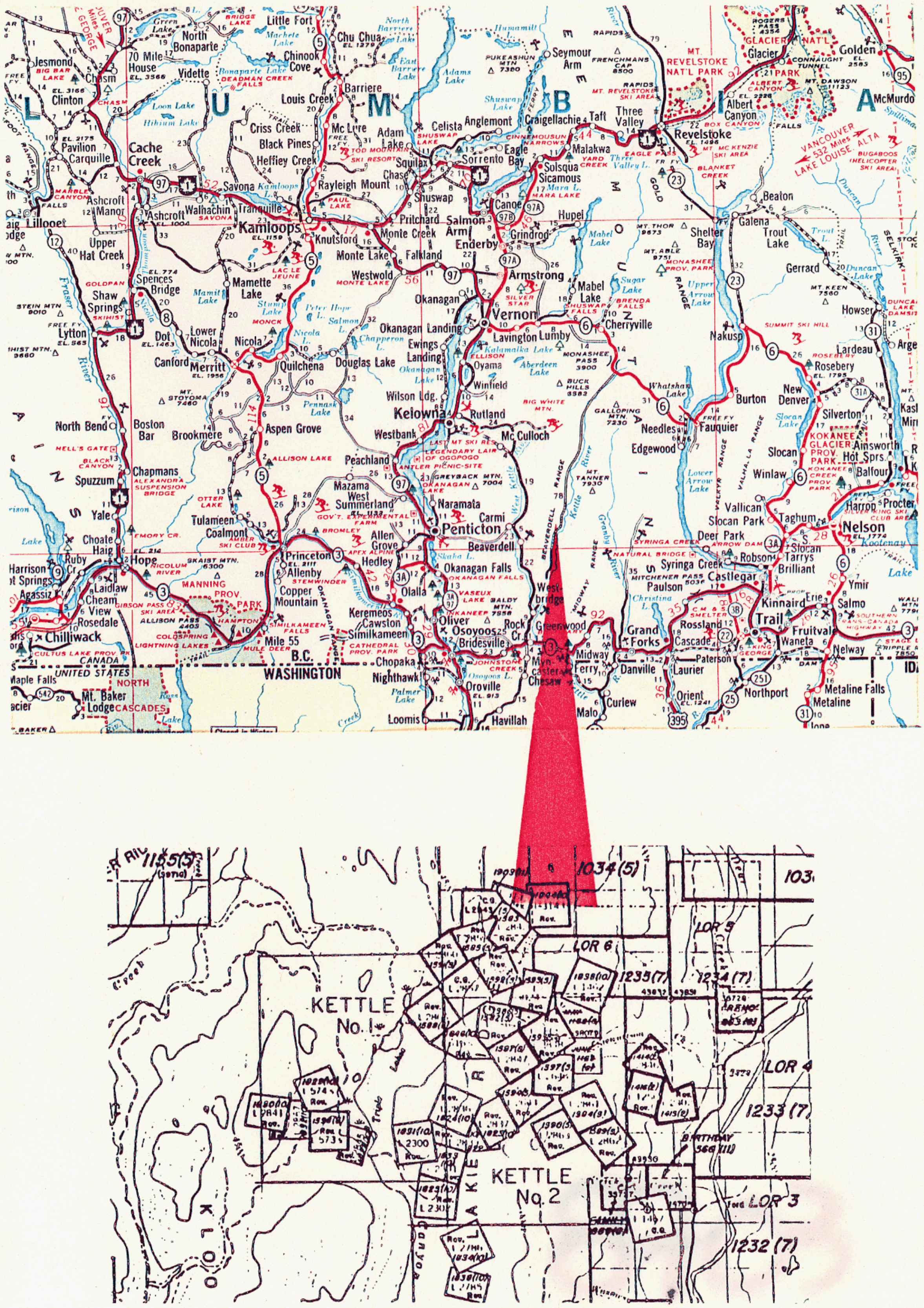
AUTHORS: E. Trent Pezzot, B.Sc., Geophysicist
Glen E. White, B.Sc., P. Eng.,
Consulting Geophysicist

DATE OF WORK: September 10 - 12, 1980

DATE OF REPORT: October 21, 1980

Part 2 of 2

WESTERN GEOPHYSICAL AERO DATA LTD.



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KETTLE RIVER PROJECT

LOCATION AND CLAIMS MAP

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FIG. 1

C O N T E N T S

Illustrations

INTRODUCTION

Western Geophysical Aero Data Ltd. conducted an airborne VLF-EM and magnetometer survey on behalf of Carmac Resources Ltd. and Sunvea Resources Ltd. over their Kettle River Project on September 10-12, 1980. Approximately two hundred and two kilometers of pre-determined grid was surveyed with a proton precession magnetometer and two VLF-EM receivers towed beneath a Bell 206 Jet Ranger chartered from Okanagan Helicopters' Penticton base. The purpose of the survey was to define any regional geological trends or localized conductive zones which might be associated with gold mineralization observed in the area.

PROPERTY

The property surveyed covers two claims recorded on January 17, 1980 as Kettle 1 and 2 (record numbers 1969 and 1970). These claims include a number of reverted crown granted claims within their perimeter as illustrated in Figure 1.

The reverted crown granted mineral claims held at present in the name of G. Bleiler of 12750-54th Avenue, Surrey, B.C. are as follows:

CLAIM NAME	RECORD NO.	CLAIM NAME	RECORD NO.
Anchor	2866	Boston	2845
Barnato	2848	Boston	2301
Barnato Fr.	2865	Calcedonia	2836
Champion	2863	Highland Mary	1462
Denver	2862	Houston	2832
Hackla	2847	Ivanhoe	574S
Hunter	2859	Kingston	2300
Mame	2864	Kingston Fr.	2839
Monetor	2858	Mexico	2867
O. K.	5735	Mona	2841
Kaffir King	2646	Montana Fr.	2645
Rambler	2861	7:30	1836
Silver Bell	2644	Northstar	2837
Silver Dollar	2842	Utopia	2860
Yorkshire Lass	3024S		

LOCATION AND ACCESS

The Kettle 1 and 2 claims are located approximately sixty kilometers east of Penticton, B.C. in the Greenwood Mining Division, N.T.S. 82E/7W at latitude 49°35'N and longitude 118°54'W.

Access to the property is available via a steep road, suitable for pickups and four-wheel drive vehicles, which leaves the main Kettle River Road thirty-four kilometers north of Westbridge. Logging activity and numerous roads allow for relatively easy access to various locations in the project area.

HISTORY

Many of the claims were staked and considerable surface work was completed by 1878. A few tons of ore were shipped from the Mogul (which is in the area but not included in the above claims list) before 1933. Cominco diamond drilled the test pitted the Barnato in 1938. Amcana Mines improved access roads, surveyed claims, and completed a little surface trenching 1965, (approximately).

GEOLOGY

The following geological description of the area is copied from a report dated February 1, 1980 by R. H. Seraphim, P. Eng.:

> "Most of the exposures noted during the examination appear to be quartz diorite. Dacite and rhyolite volcanic rocks are more common in the immediate vicinity of the mineral deposits. Dykes of many varieties intrude the quartz-diorite and the volcanic rocks. The trend of the volcanic rocks is not well established, but would appear on the basis of regional geology and local topography to be northerly.
>
> Map 37A by L. Reinecke and Map 6-1957 by H. W. Little provide information on the area and show that the claims lie mostly within Anarchist or Wallace group, mostly volcanic rocks, of late Paleozoic or early Mesozoic age."

AIRBORNE VLF-ELECTROMAGNETIC AND MAGNETIC SURVEY

This survey system 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 50 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 Bonzer 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 two independent modes: an analogue strip chart recorder and a digital video recovery system. A three-pen analogue power recorder provides direct, unfiltered recordings of the three geophysical instrument output signals. Correlation between the strip chart and the video flight path recovery tape is controlled via fiducial marks common to both systems. 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 real time and terrain clearance upon the actual flight path video recording to allow exact correlation between geophysical data and ground location. An optional time-averaging filter of 1, 2 , 3, 4 or 5 seconds is available on the VLF-EM data to provide more easily contourable values in noisy areas. The continuous input magnetic signal is processed at the maximum A/D converter rate, averaged and updated on the video display every second. Line identification, flight direction and pertinent survey information are recorded on the audio track of the video recording tape.

DISCUSSION OF RESULTS

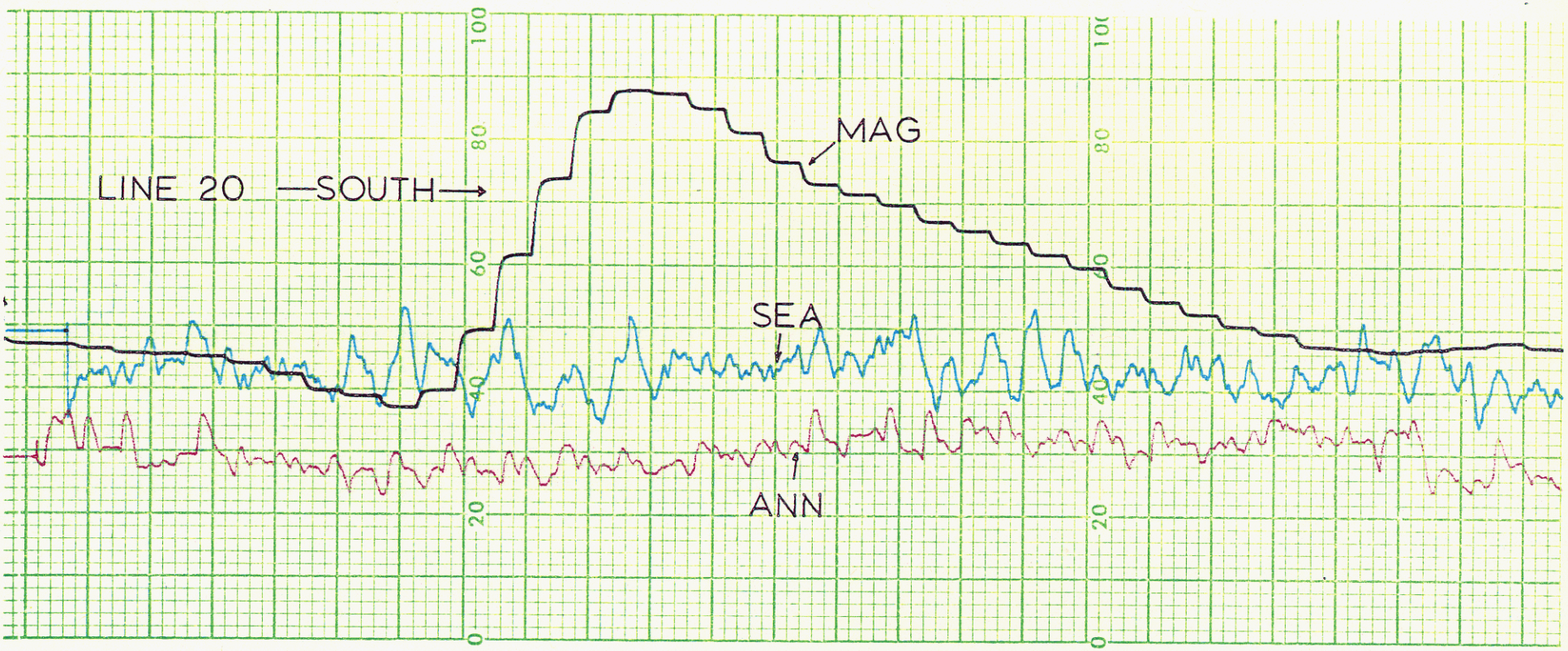
The two hundred and two kilometers of actual survey flight lines, as recovered on the video flight path tapes, are displayed on the interpretation map Figure 2. Lines 9 and 10 were very nearly coincident with line 6 and, although all data was used in the interpretation, they have been omitted from the map.

I Magnetic Survey

The magnetic data accumulated during this survey can be considered very reliable since character and amplitude readily distinguished any noise spikes from geologically induced anomalous responses. The relative magnetic field intensity across the grid, as measured in this survey, is displayed in contour form on Figure 2. The earth's total magnetic field intensity can be determined by adding 54,200 gammas to the relative values listed.

The survey defines one major field increase (approximately 600 to 800 gammas above background) which extends east-west across the northern portion of the survey grid (see Figure 3). Erratic lows across this high are observed on lines 5, 6, 7, and 8 but do not correlate on a line to line basis and are interpretted as near surface inhomogenieties. A weak magnetic low is observed on the northern flank of this feature.

Another weaker (500 gamma) magnetic high is observed across the southern portions of lines 3 and 4, and a corresponding low is observed immediately southwest on lines 4 and 5 (see Figure 4). The remainder of the survey grid shows background values of approximately 600 to 1000 gammas. No strong anomalies are observed but the data does exhibit a weak lineament trending south-west from the northernmost magnetic



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MAGNETIC ANOMALY

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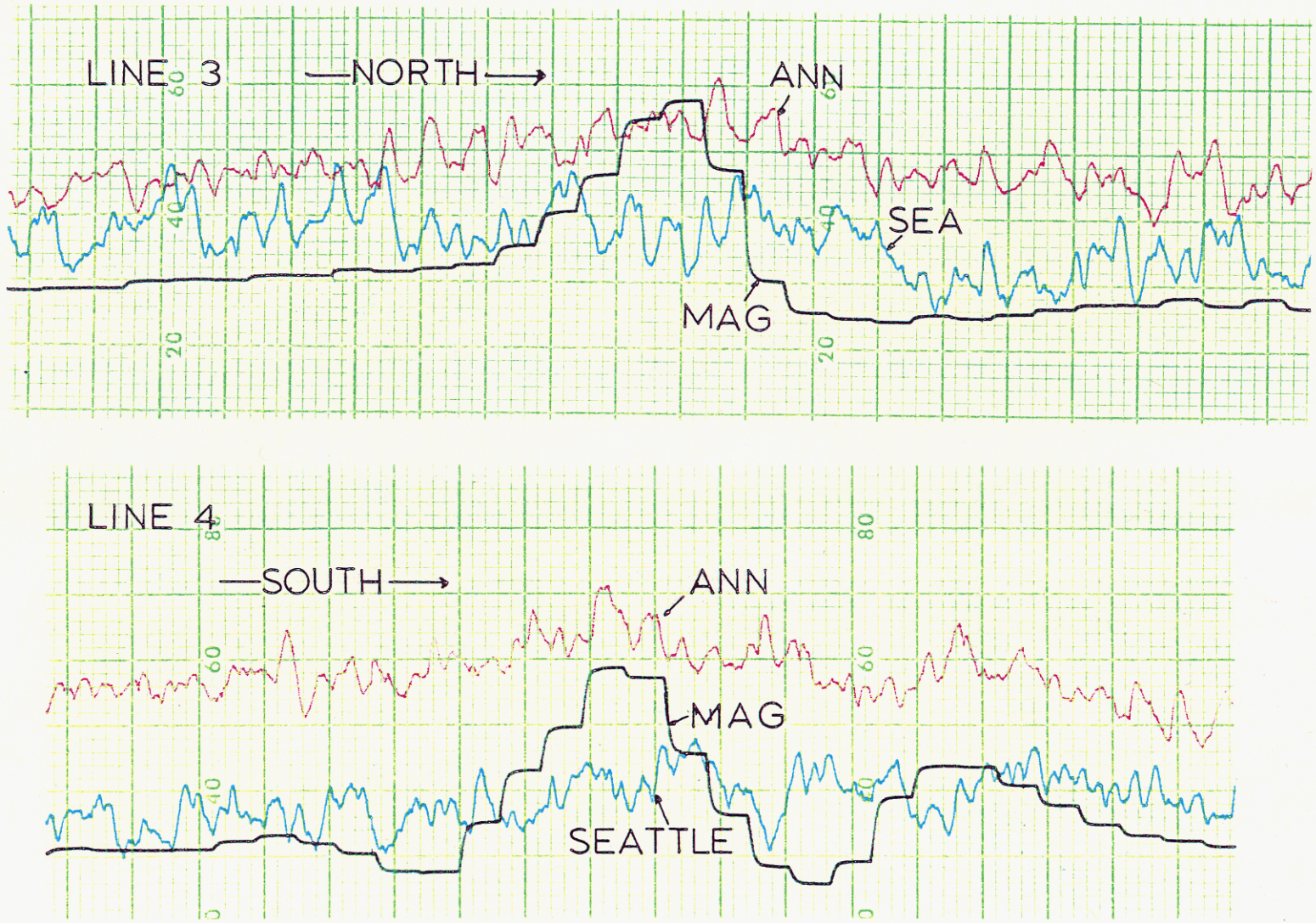
FIG. 3



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MAGNETIC ANOMALY

WESTERN
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LTD.

FIG. 4

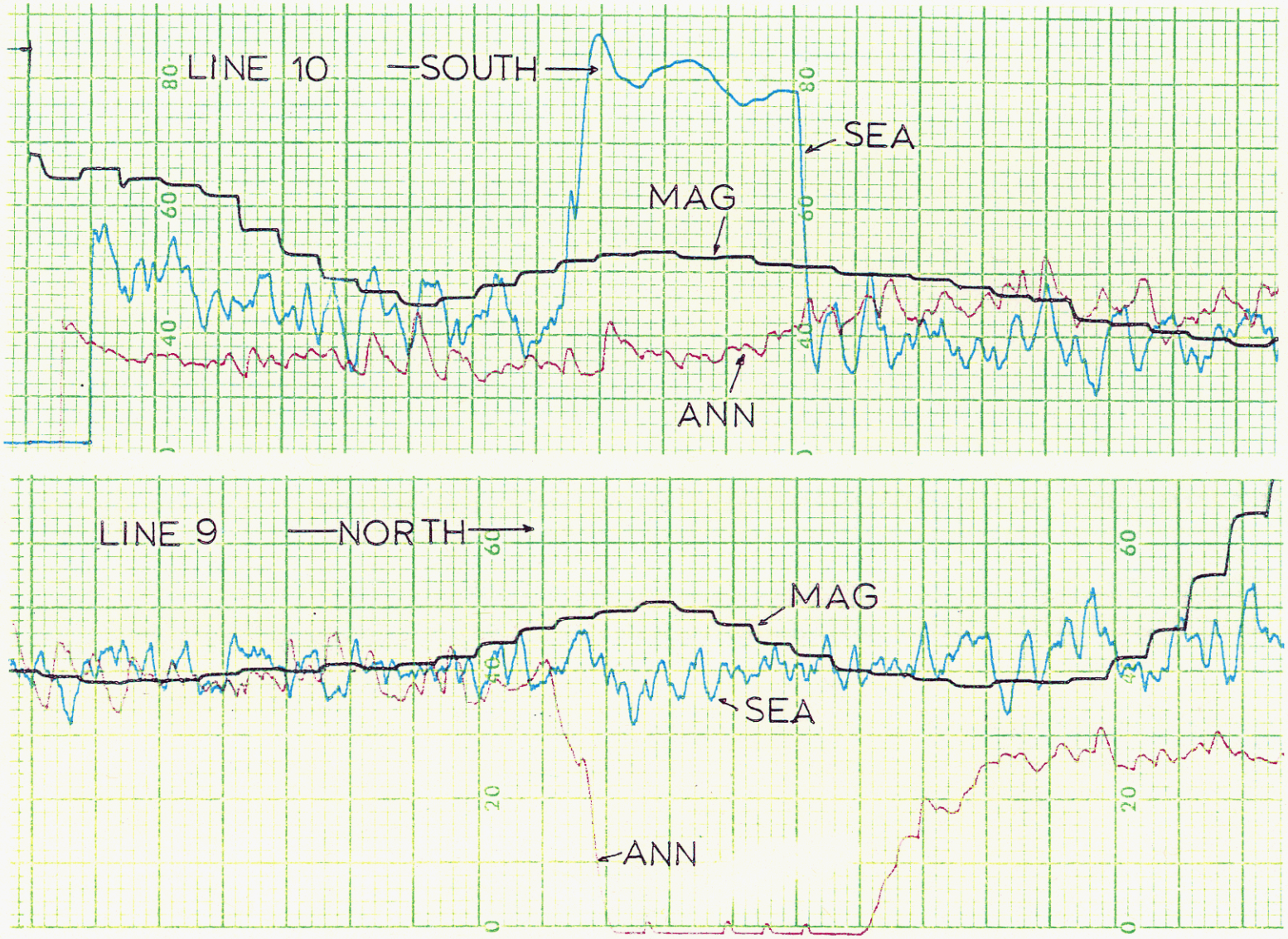
high. The low observed on the north end of line 1 is coincident with steep, easterly dipping slopes and believed to be a terrain effect in the data.

II VLF-EM Survey

Both the frequency of the Seattle transmission station (18.6 KHz) and that of the Annapolis transmission station (21.4KHz) were monitored during this survey. Neither data set displays any regional trends, similar to the magnetic data, which could be considered reflections of contacts between any geological units.

Two moderate to strong electromagnetometer anomalies were observed which warrant further ground investigation. The stronger of the two features responds on the Annapolis frequency on line 9 as a 40% field intensity decrease and on line 10 as a corresponding 40% increase on the Seattle frequency (see Figure 5). The anomaly is located in an area of past exploration activity as evidenced by numerous cat trails, an old adit and trenching (or possible blast pit). The second anomaly was a 15% decrease observed on both the Seattle and Annapolis frequencies on the southern end of line 9 (see Figure 6). The anomaly directly correlates to a road as shown on Figure 2.

All other anomalous electromagnetometer responses are extremely weak and small in areal extent. They originate from minor topographic variations, streams or marsh areas and do not warrant further investigation.



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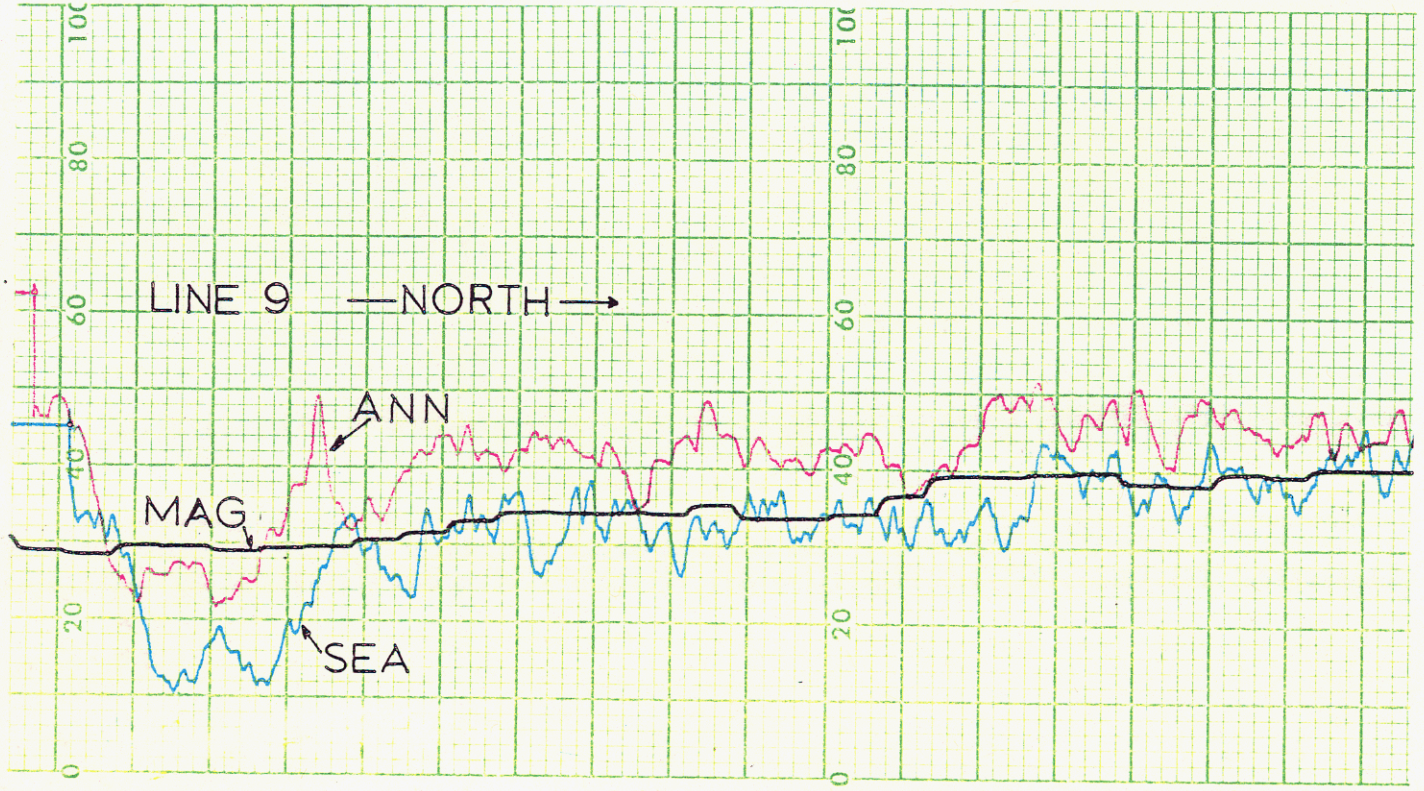
VLF-EM ANOMALY

WESTERN GEOPHYSICAL AERO DATA LTD.

FIG. 5



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VLF-EM ANOMALY

WESTERN GEOPHYSICAL AERO DATA LTD.

FIG. 6

SUMMARY AND RECOMMENDATIONS

On September 10 and September 12, 1980,Western Geophysical Aero Data Ltd. conducted two hundred and two kilometers of airborne VLF-EM and Magnetic survey on behalf of Carmac Resources Ltd. and Sunvea Resources Ltd. over their Kettle River project area.

A contoured magnetic map delineates a high total magnetic field intensity zone trending east-west across the northern portion of the survey grid. Another strong but smaller magnetic high is observed in the south-east quadrant of the area. These responses likely originate from inclusions of a high susceptibility material (such as magnetite or pyrrhotite) in the rocks. Both zones should be examined to identify the geologic unit(s) responsible and determine if it (or they) might be a host or identifier for an economic play in the area.

A relatively strong VLF-EM anomaly was observed on lines 9 and 10 in an area of past exploration activity and a second weaker anomaly occured along a road on the south end of line 9. Both of these zones warrant further work in the form of detailing geochemistry and ground electromagnetometer surveying.

Respectfully submitted
WESTERN GEOPHYSICAL AERO
DATA LTD.,

E. Trent Pezzot, B.Sc.
Geophysicist

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

Instrument Specifications

SABRE AIRBORNE MAGNETOMETER

Type:	Proton Precession
Range:	20,000 gammas to 75,000 gammas
Repetition Rate:	Approximately 1 second or 3 seconds selected by toggle switch
Output:	Designed to operate into any potentiometric chart recorder with 0 to 0.1 volt scale
Display:	Digital dial plus analogue meter
Period:	Meter records last 1000 λ, 2000 λ, 5000 λ, of total field depending on scale selected. Zeroing system allows chart recording pen to be positioned anywhere on paper, so that if the pen is centred, the resulting scales that can be selected are $\pm$ 500 λ, $\pm$ 1000 λ, or $\pm$ 2500 λ. These scales are standard but virtually all others can be provided.
REsolution:	Resolution of the instrument itself is better than 1 gamma. Ultimate resolution depends on the accuracy of the chart recorder.
Detector:	Kerosene filled coil approximately 9 cm x 8 cm in diameter. Inductance - 60 millihenries Resistance - 7.5 ohms Weight - 2.2 Kg.
Operating Temperature:	Instrument - -10°C to $+60^{\circ}$C Detector - -40°C to $+60^{\circ}$C
Dimensions:	Instrument Console - 30 cm x 10 cm x 25 cm Towed Bird - 1.7 m x 21 cm diameter
Weight:	Instrument Console - 3.5 Kg. Towed Bird - 30 Kg. (VLF-EM antennae system housed in bird with magnetometer detector)
Power Source:	Two 12 volt, 28 amp-hour lead acid batteries (gelled electrolyte)

Instrument Specifications

SABRE AIRBORNE VLF SYSTEM

Source of Primary Field:	VLF radio stations in the frequency range of 14 KH_z to 30 KH_z.
Type of Measurement:	- Horizontal field strength
Number of Channels:	- Two; Seattle, Washington at 18.6 KH_z
	- Annapolis, Maryland at 21.4 KH_z
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 100 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.

Instrument Specifications

DATA RECORDING SYSTEM

i) Chart Recorder

Type: Esterline Angus Miniservo III Bench AC Ammeter - Voltmeter Power Recorder
Model: MS 413 B
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 2-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 H_z (Approximately 30 VA)
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 d c signals
1, 0 - 25 volt d c signal
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

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 to housing
- housing bolted to helicopter skid

ii) Video Recorder:

Model: Sony SLO - 340
Power Supply: 12 volt dc / 120 volt AC (60 H_z)
Tape: Betamex ½" 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, 75 Ω unbalanced, sync negative from camera

iii) Altimeter:

Model: Bonzer Mk 10 Radar Altimeter
Power Supply: 12 - 25 volts dc
Output: 0 - 25 volt (1 volt / 1000 feet) dc signal split to microprocessor and analogue meter
Mounting: fixed to T.V. camera housing, attached to helicopter skid

COST BREAKDOWN

Personnel	Field Work	Office	Wages	Total
J. Behenna	Sept. 10-12/80		$175	$ 525.00
N. McGarry	Sept. 10-12/80	Sept. 29-Oct. 3	$155	$1240.00
P. Athayde		Sept. 29-Oct. 3	$145	$ 725.00

Vehicle expenses @ $65.00 / day	$ 325.00
Meals and accomodation	$ 350.00
Photomosaic and materials	$ 675.00
Drafting and reproduction	$ 150.00
Instrument lease	$ 850.00
Interpretation and report	$ 660.00
Helicopter 5.7 hrs.	$2321.00
Total.....	$7821.00

STATEMENT OF QUALIFICATIONS

NAME: PEZZOT, E. Trent

PROFESSION: Geophysicist - Geologist

EDUCATION: University of Brisish Columbia - B.Sc. - Honors Geophysics and Geology

PROFESSIONAL ASSOCIATIONS: Society of Exploration Geophysicists

EXPERIENCE: Three years undergraduate work in geology - Geological Survey of Canada, consultants.

Three years Petroleum Geophysicist, Senior Grade, Amoco Canada Petroleum Co. Ltd.

Two years consulting geophysicist, Consulting geologist - B.C., Alberta, Saskatchewan, N.W.T., Yukon, western U.S.A.

Two years geophysicist with Glen E. White Geophysical Consulting & Services Ltd.

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.

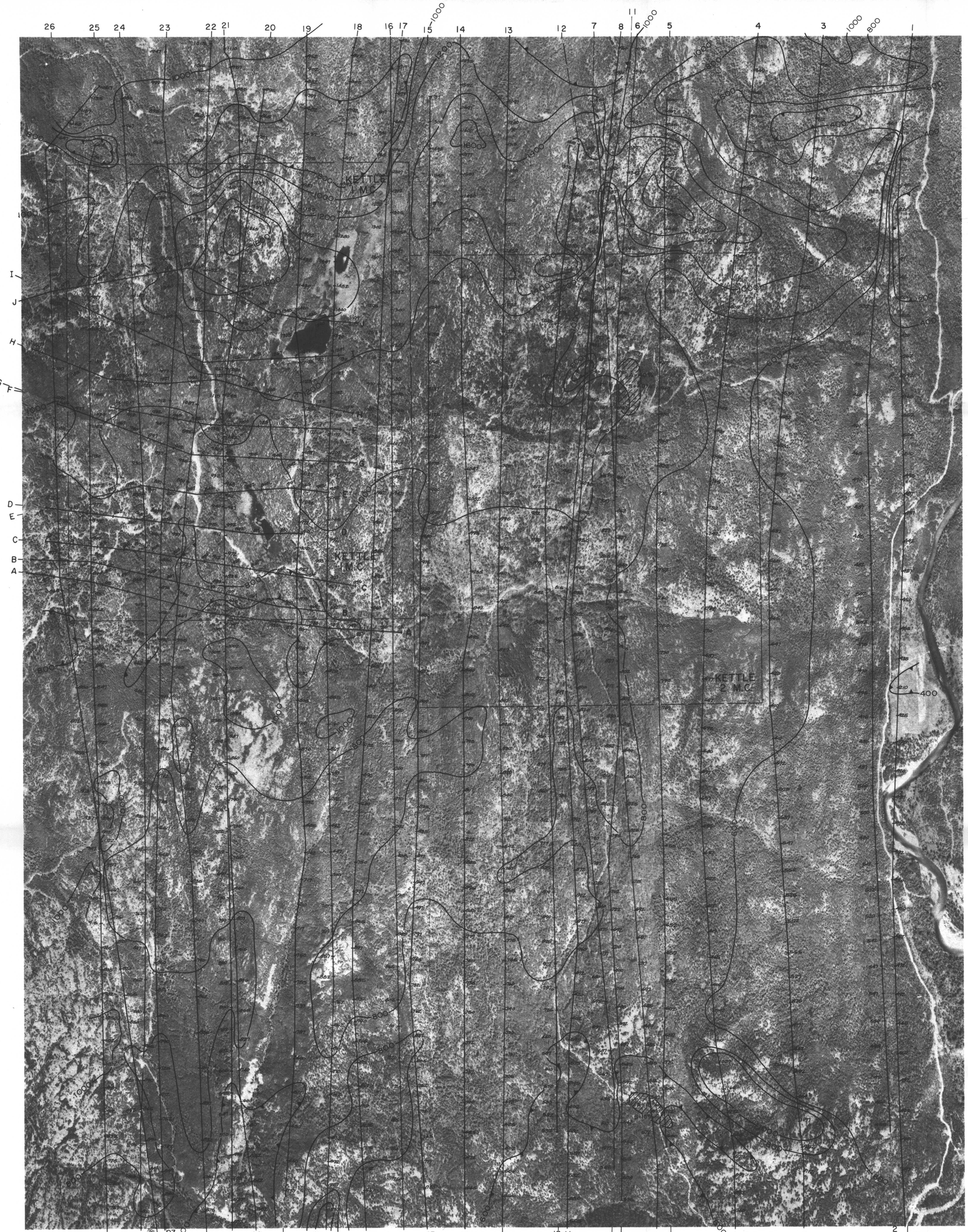
One year Mining Geophysicist and Technical Sales Manager in the Pacific north-west for W. P. McGill and Associates.

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.

Ten years Consulting Geophysicist.

Active experience in all Geologic provinces of Canada.



MSEL Ref No - 06764-0

AERIAL PHOTOGRAPHY - 1974

LEGEND:

Flight line

Timing marks

Approximate claim line

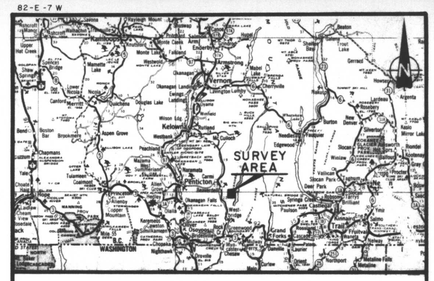
To obtain total Magnetic Field Intensity add 54,200 gammas to values listed.

VLF-EM anomaly

A = Annapolis Transmission Station
S = Seattle " Response
±5% = relative change from background response

INSTRUMENT: Sabre Airborne VLF-EM and Magnetometer.

82-E-7 W



LOCATION MAP

0 40 MILES

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT

Part 2 of 2

8703

NO.

0 200 400 600 800 1000

SCALE 1:10,000

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GREENWOOD MINING DIVISION-B.C.

TOTAL MAGNETIC FIELD INTENSITY
AND VLF-EM CONDUCTOR MAP
(CONTOUR INTERVAL 200 GAMMAS)

Western Geophysical Aero Data Ltd.

INTERPRETED BY:	E.T.P.
DRAWN BY:	T.W.F.
CHECKED BY:	
DATE:	OCTOBER 20, 1980
FIGURE NO.	- 5 -

To Accompany Geophysical Report on Kettle Claims of Carmac Res Ltd.

Date: _____

By GLEN E. WHITE _____ GEOPHYSICIST

PROFESSIONAL ENGINEERING PROVINCE OF BRITISH COLUMBIA GLEN E. WHITE ENGINEER