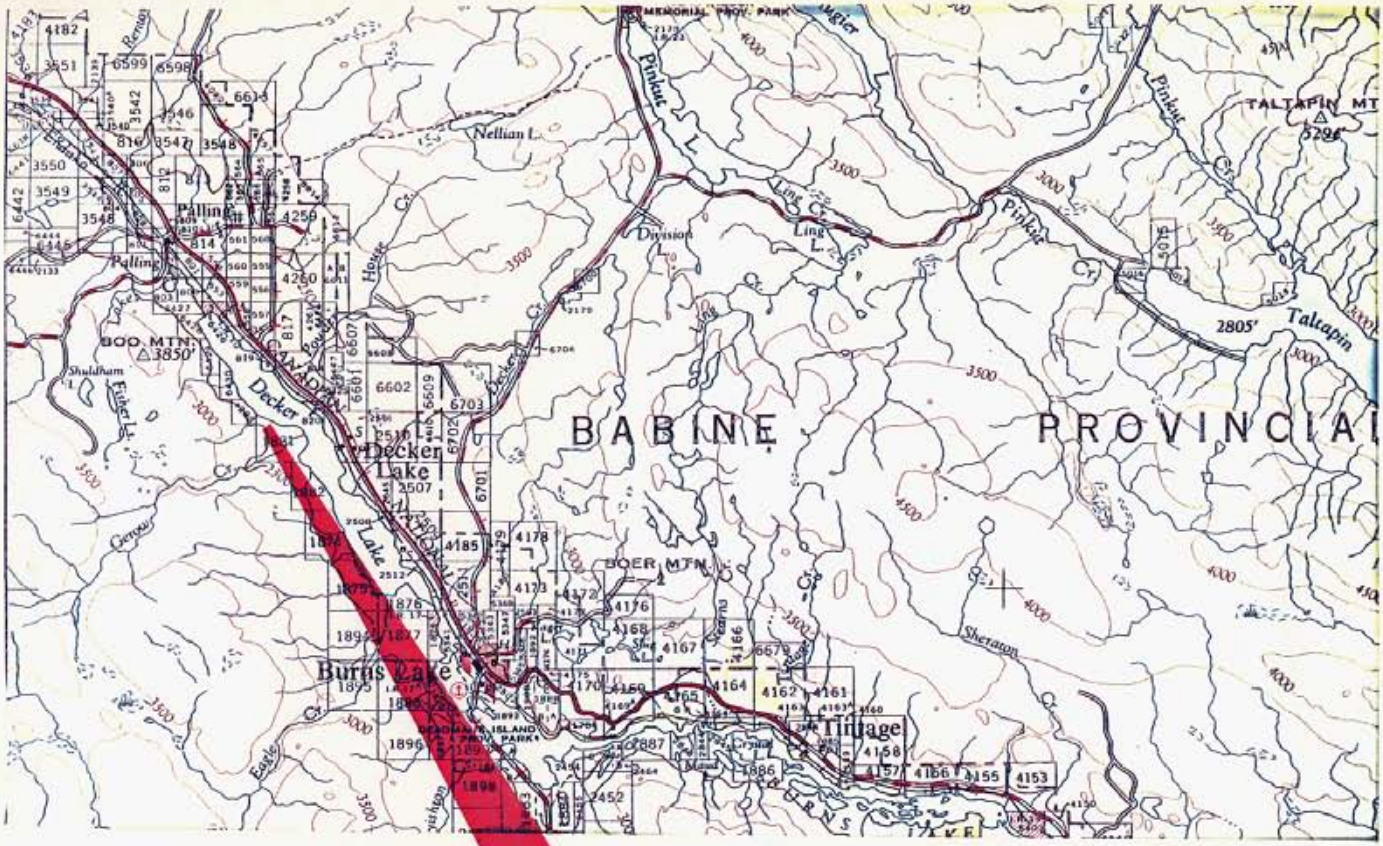
GEOPHYSICAL REPORT
On A '79-#11-#7114
VECTOR PULSE ELECTROMAGNETOMETER SURVEY
On Behalf Of
COMMONWEALTH MINERALS LTD.

Deck mineral claim 1, Decker Lake area,
Omineca Mining Division, B. C.
Lat. 54°17'N Long. 125°52'W N.T.S. 93K/5W

AUTHOR: Glen E. White, B.Sc., P. Eng.,
Geophysicist
DATE OF WORK: Nov. 12 - 22, 1978
DATE OF REPORT: December 18, 1978



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LOCATION AND CLAIM MAP

DECK COPPER-SILVER PROSPECT

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SCALE : 1" = 40 MILES

FIG. 1

C O N T E N T S

ILLUSTRATIONS

INTRODUCTION

During the month of November 1978, from the 12th to the 22nd, a program of vector pulse electromagnetometer surveying was conducted over a portion of the Deck 1 mineral claim, Decker Lake area, B. C. The survey was conducted by Glen E. White Geophysical Consulting & Services Ltd. on behalf of Commonwealth Minerals Ltd.

The purpose of the survey was to examine the area of the old mineral showings for a possible volcanogenic deposit such as the Sam Goosby, as discussed by J. H. Montgemery Ph.D., P. Eng., in his report dated June 15, 1978 on the Deck 1 mineral claim.

PROPERTY

The Deck 1 mineral claim consists of 9 units as depicted on Figure 1. It is record No. 33 with an expiry date of June 26, 1979.

LOCATION AND ACCESS

The property is located on the southwest side of Decker Lake some 10 km northwest of Burns Lake.

Latitude 54°17'N, Longitude 125°52'W, N.T.S. 93K/5W.

Access to the property is by a dirt road around the northwest end of Decker Lake for a distance of some 8 km.

GENERAL GEOLOGY

A summary of the previous work and Geology and Mineralization are best described by J. H. Montgomery PhD., P. Eng. in his report as follows:

HISTORY

Summary of Previous Work

The earliest published data concerning the claim area is recorded in the Annual Minister of Mines Report for the years 1926 to 1927. However, one reference is made to a short tunnel and a small shipment of ore in 1915.

The property was originally called the Golden Glory and, during the period 1921-1930, a number of tunnels and open cuts followed veins and shear zones in Hazelton volcanic rocks. In 1926 a chalcopyrite showing with "good silver values" was found. In 1927 a vein striking N55°E containing values in lead and zinc was found and in 1930, a shear zone 125 feet wide and striking N80°E mineralized with chalcopyrite was exposed. This early work was concerned mainly with gold and silver values in the mineralized veins and shear zones.

In 1955, the property was called Kerr Copper. Seven drill holes totalling 386 feet showed the presence of a "zone of sheared and altered volcanics partly mineralized over a length of 120 feet with chalcopyrite, sphalerite and galena". At this time, the property was optioned by Trico Explorations Limited and Moneta Porcupine Mines Limited. An additional six holes were drilled totalling 1000 feet, but no mineralization was cut at depth and the option was dropped.

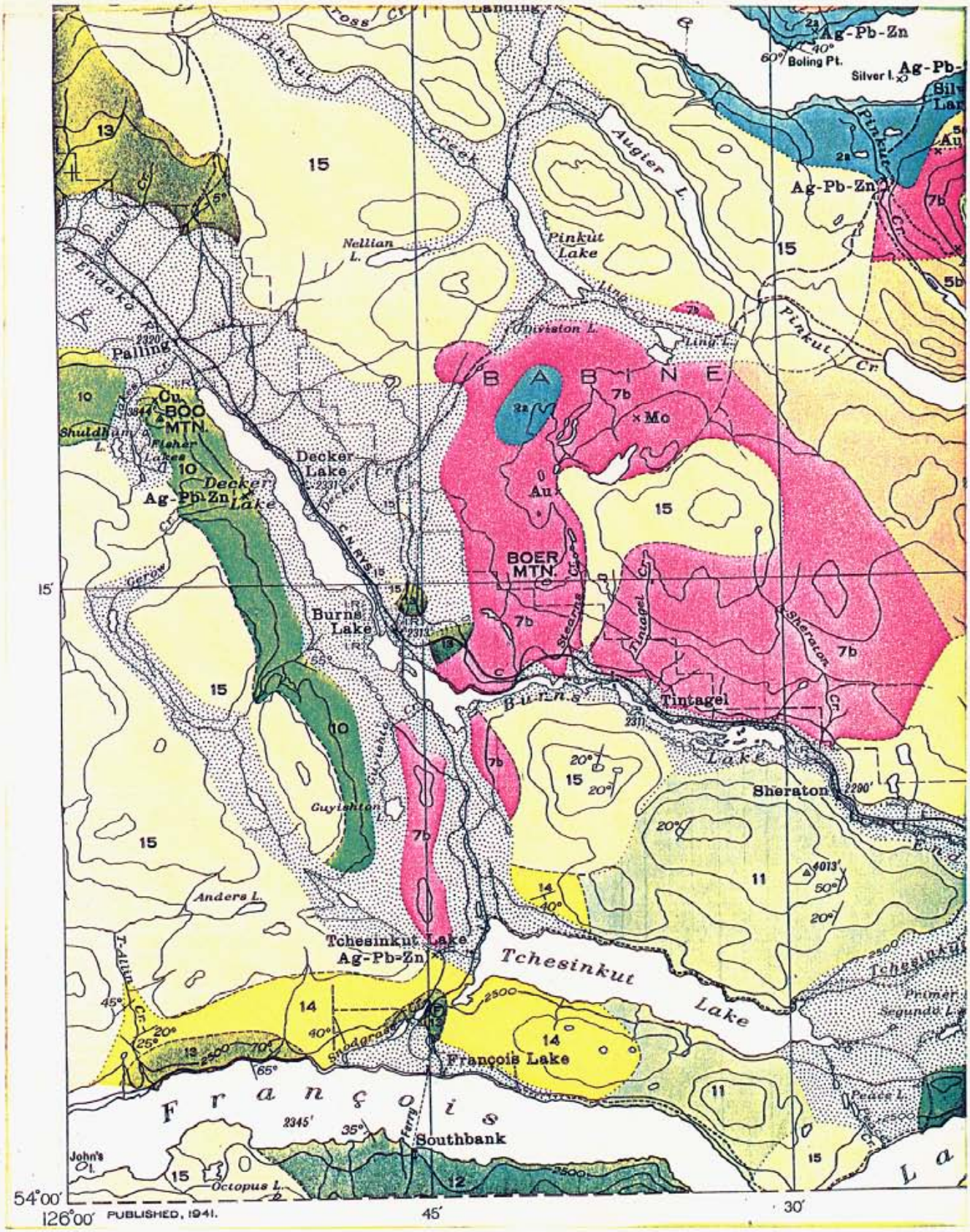
In a later report (1968) Dr. R.M. Seraphim observed the widespread alteration in the volcanic rocks and recommended reconnaissance geophysical and geochemical work.

In 1971, an electromagnetic survey was conducted over an area of about 8000 feet by 4400 feet (Assessment Report 3065) by P.P. Nielsen and G.C. Gutrath, P. Eng. Four low amplitude anomalies were detected by the survey and the authors recommended additional investigation consisting of an induced polarization survey, a magnetometer survey and an air-photo interpretation of the claim area.

In 1973, Hudson's Bay Oil and Gas Company Limited under the supervision of Mr. A.J. Schmidt, P. Eng., conducted a geochemical and induced polarization survey (Assessment Report No. 4849). Their objective was to determine whether or not a porphyry copper deposit existed on the property. No such deposits were found.

Discussion of Previous Work

The present objective is to determine whether or not a volcanogenic, massive sulfide deposit is present on the DECK 1 mineral claim. The reasons for considering this possibility are outlined in Section 6.0 (Geology and Mineralization).



MAP 631A

FORT FRASER

Scale, 1/253,440 or 1 Inch to 4 Miles

Miles 4 0 4 8 12

Approximate magnetic declination, 29°15' East.

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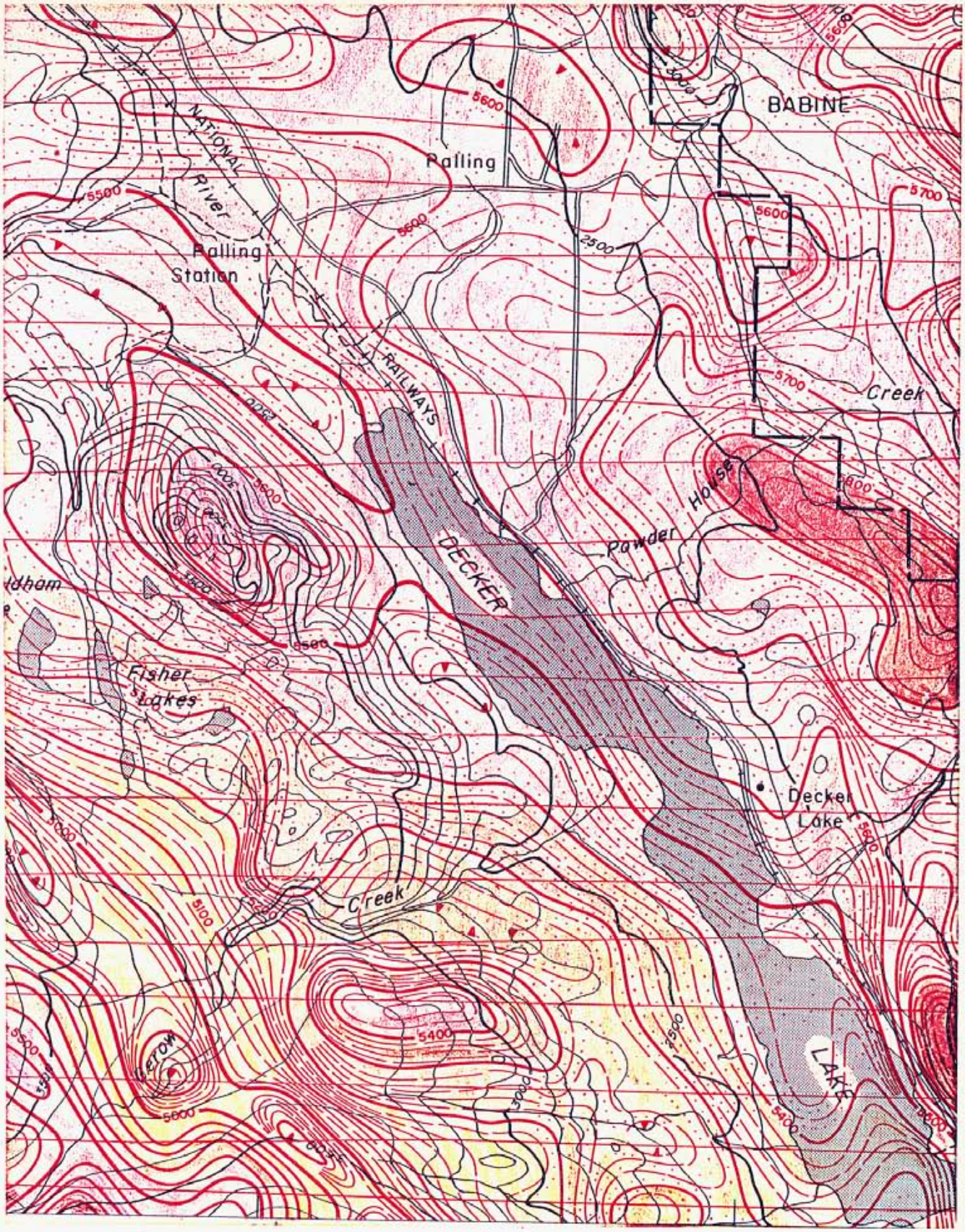
Plate 1



GEOPHYSICS PAPER 5306

DECKER LAKE

BRITISH COLUMBIA

SHEET 93 $\frac{K}{5}$

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Plate 2

GEOLOGY AND MINERALIZATION

The regional geology of the area has been mapped by Armstrong (1965) and more recently by Church (1972). Armstrong mapped the west side of Decker Lake as Hazelton Group andesite, trachyte, basalt and related breccias of Jurassic and Cretaceous age. He describes these rocks as follows:

"The andesitic flows south of Decker Lake are generally dark greenish-grey, rusty weathering, and massive, and exhibit little flow structure. In places they are porphyritic, and the phenocrysts, which are rarely more than 1/8th inch long, consist of white feldspar or dark green pyroxene. Calcite amygdules up to several inches in diameter are fairly common. Thin sections of these green andesites are composed of saussuritized andesine and chloritized augite phenocrysts embedded in a groundmass consisting of feldspar, augite, devitrified glass and alteration products, chlorite, epidote and secondary quartz predominating. Near Gerow Creek the Hazelton group rocks dip steeply and strike about northeast. South of Decker Lake they are unconformably overlain by Endako lavas of Tertiary age."

Church classifies the rocks west of Decker Lake as Early to Middle Mesozoic acid and intermediate lavas and pyroclastic rocks, some argillite, sandstone and conglomerate. A portion of his map is reproduced in Figure 3. He reports similar rocks, dacitic tuff, tuff breccias and cherty conglomerates, as host rocks for the Goosly Lake copper-silver deposit about 27 kilometres to the southwest. Here, a shattered dacite hosts a mineralized zone about 175 feet thick consisting of disseminated chalcopyrite, pyrite, pyrrhotite and tetrahedrite.

On the DECK mineral claims, outcrop is restricted to a narrow belt of rock along Gerow Creek, the site of most of the previous work.

Mineralization on the DECK property consists of chalcopyrite, pyrite, galena and sphalerite. These minerals occur disseminated and in fractures in a light colored, brecciated, intermediate volcanic rock. The altitude of the mineralized structure is uncertain. The original drilling on the property has indicated copper values in the range 1.3 to 5.4 per cent and silver values in the range 0.5 to 5.4 oz./ton over thicknesses of 3 to 19 feet. The present exposure extends about 100 feet along the north bank of Gerow Creek.

The possibility that a copper-silver volcanogenic deposit exists on the DECK claim is suggested by the following:

1. Mineralization appears to be stratabound.
2. It is associated with acid to intermediate volcanic flows and pyroclastic rocks.

SURVEY SPECIFICATION

Survey Grid

The survey grid was completed previous to the geophysical survey and consist of lines spaced 100 m apart orientated at right angles to a S60°E directed baseline. Some 13 km traverse grid were covered by the VEM survey.

Vector Pulse Electromagnetometer Survey

The pulse electromagnetometer system is a time domain E.M. system which can be used in the standard horizontal loop mode or deep penetrating vector mode.

The primary field for the horizontal loop survey is obtained from a transmit loop 6 meters in diameter laid out horizontally on the ground and energized by a pulse of 20 amps at 24 volts with an on-off time of 10.8 ms. The receive coil is generally spaced 25 - 100 meters from the transmit loop. Both are moved simultaneously from station to station. The secondary field signal on the receive coil is sampled and averaged for 10 seconds and then stored for read-out. Eight samples of the secondary field are obtained with increasing window widths during the primary field off time. Time synchronization is by radio link or cable.

The eight channels of secondary field information are equivalent to a wide spectrum of frequencies from approximately $2KH_Z$ to $16H_Z$ which allows for determination of overburden effects and penetration of conductive overburden. Since the secondary field is measured directly during the primary field off time, the pulse method is relatively free of geometrical restricitions between the transmit and receive coil positions, such as topography interference and coil alignment.

The primary field for the vector EM technique is obtained from a small turam type loop of 152 m (500 Ft.) per side which is energized with a current of some 25 amps at 24 volts. A scalar vector is obtained by determining the horizontal and vertical components of the secondary field. A right angle to this resultant vector points to the eddy current position. See Appendix for diagrams.

DISCUSSION OF RESULTS

The vector electromagnetometer responses over the Deck 1 mineral claim are of a complex nature. Thus, the horizontal and vertical components have been presented individually rather than the regular vector section plots as illustrated on Figure 34.

Dr. Montgomery, in his report, mentions that the property may have considerable depths of glacial till and lacustrine deposits; this would appear to be the case as both the horizontal and vertical component profiles show large amplitude background responses. The vertical component profiles, Figures 18 - 33, show a broad crossover on each channel which moves away from the loop with decreasing frequency; i.e. channel 1 to 8.

The lacustrine formation may possibly be in the order of 70 m deep in places and contain conductive sections in the order of 1 - 10 ohm-meters. The crossovers are termed the half-space response for the system and are a function of the conductivity and depth of overburden and/or type of bedrock. The patterns formed by the half-space responses can also be a function of overburden distribution and/or lithologic attitudes. The half-space responses obtained by this survey are illustrated on Plates 3 and 4 for loop A and B respectively. These conductive responses follow the topography contours and thus likely reflect the laying of the lacustrine sediments. Note only channel 1 gives a half-space crossover on lines 0 to 2E. This likely reflects materials of poorer conductivity such as glacial till and/or shallower overburden depths. Plates 3 and 4 show the Channel 1 horizontal component data for loops A and B and Plates 5 and 6 for channel 4 (every other number has been plotted). See appendix for channel window sampling widths. Channel 1 shows a steep gradient response to some 150 m around each loop position which indicates electromagnetic coupling to the flat lying conductive overburden. Channel 4 shows a much smoother gradient. However, some massive sulphide minerals are also not conductive enough to respond down to channel 4.

The loop position for each of the profiles is shown on the horizontal component data, Figures 2 - 17. Figures 2 and 18 show a weak channel 1 and 2 conductor response at 2100N. Figures 3 and 19 show a stronger response at 1900N. A similar conductor is shown on Figures 5 and 21. The large amplitude responses near the ends of the lines away from the loop are caused by small signals at large receiver gains. Also the lower channels, 6, 7 and 8, will tend to show more noise oscillation since they are integrated over longer window widths.

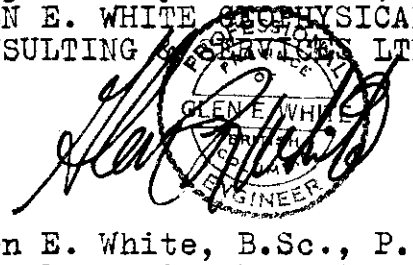
The eastern portion of the grid was examined from loop B., Figures 10 - 17 and 26 - 33. Plate 4 shows a steep gradient in channel 1 traversing the survey area along 1600N. This gradient is very evident on profiles 10, 11 and 12. However, no vertical component crossover was detected. Figures 14 and 30 show the best conductor effect obtained by the survey. It is located at 950N and shows a slight basin-like response in the horizontal component and a gain amplified crossover in channels 4, 5, 6, 7 and 8. The basin-like response is shown clearly on Plate 6, the plan view of the channel 4 horizontal component data. Plates 5 and 6 illustrate the more conductive portions of the conductor trends on plates 3 and 4.

CONCLUSION AND RECOMMENDATIONS

A program of vector pulse electromagnetometer surveying was conducted over the Deck 1 mineral claim Decker Lake area, during November 1978 on behalf of Commonwealth Minerals Ltd.

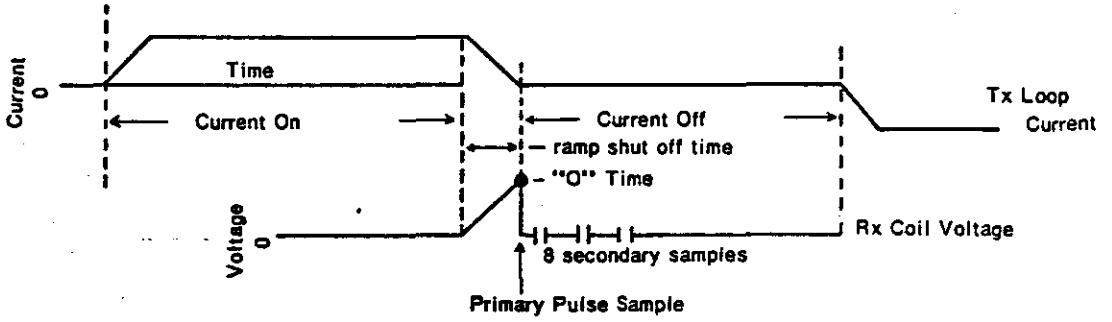
The VEM survey indicated that a large portion of the survey area would appear to be covered by deep lacustrine sediments and glacial till. However, several weak electromagnetic trends were delineated which should be further examined. The strongest response detected was on line 400E at 950N. This however, is a weak conductor response relative to a conductive massive sulphide zone and may possibly be caused by graphite or clay minerals, such as in a fault zone, as well as sulphide mineralization. It is recommended that this conductor be considered a near vertical source and diamond drilled such that it will be intersected at a vertical depth of some 300 feet.

Respectfully submitted,
GLEN E. WHITE GEOPHYSICAL
CONSULTING SERVICES LTD.



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

PEM SPECIFICATIONS



Current Off time: 9.4 ms
Current on time: 10.8 ms
Current shut off (ramp) time: 1.4 ms
Sample times (zero to centre of sample): .15ms, .45ms, .85ms, 1.45ms, 2.45ms, 3.75ms, 5.85ms, 8.85ms.

Sample width: 100 μs
Zero time set at drop off point of primary pulse

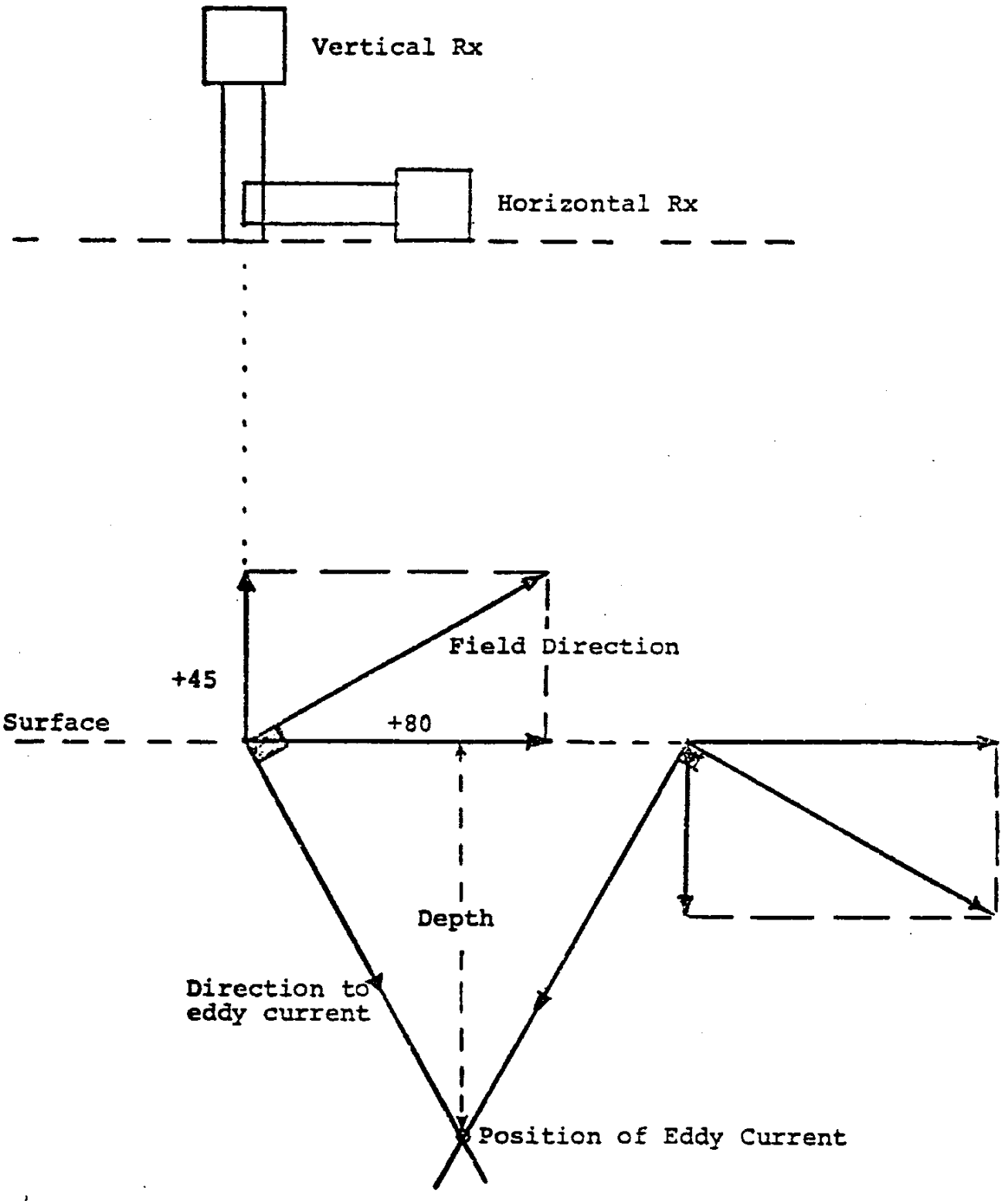
TRANSMITTER – Transmitter power and loop size may be increased to obtain increased penetration. Weight, portability and power capabilities of the control instrument are the limiting factors. The standard transmitter is designed to be carried by two men.

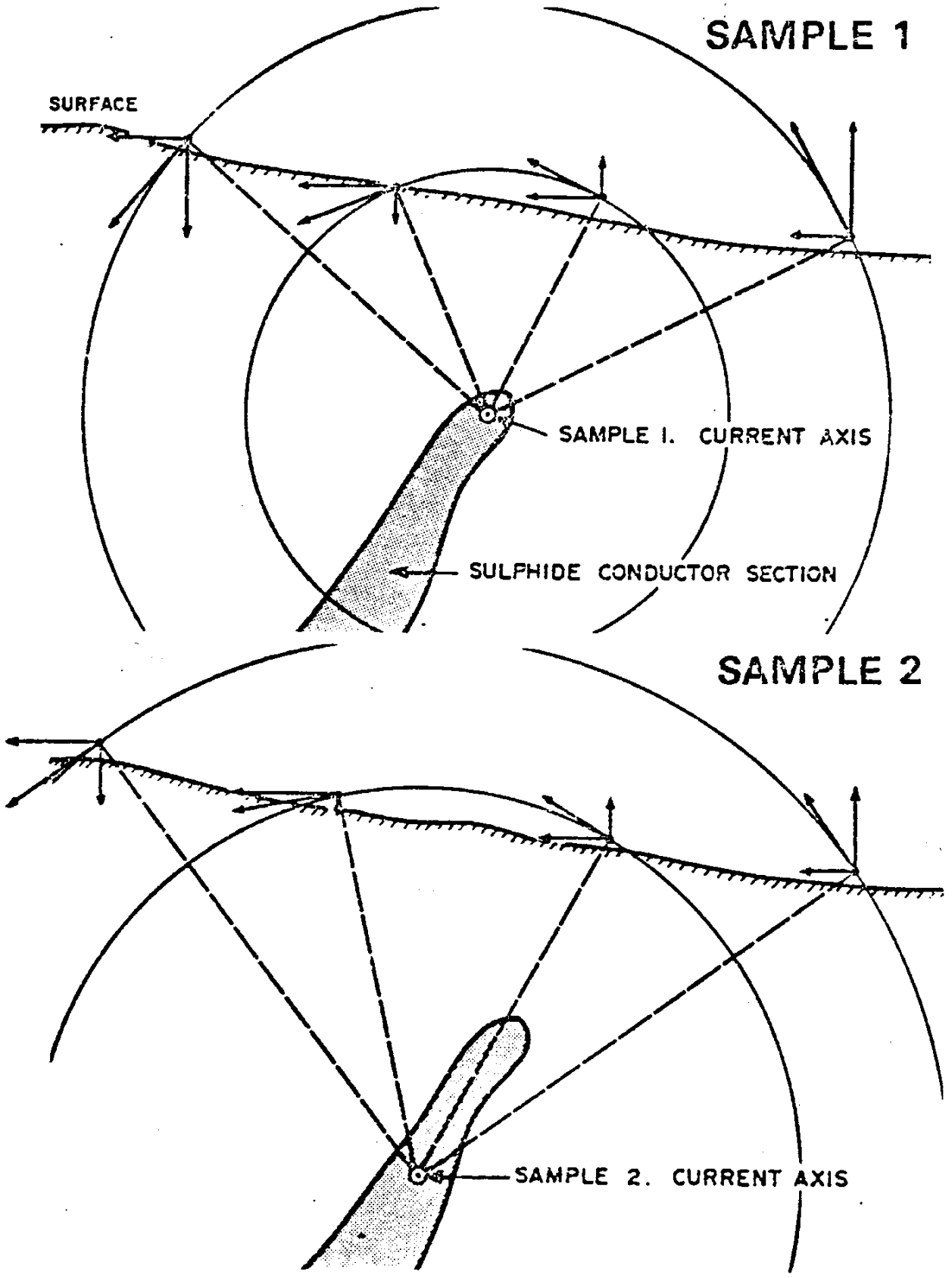
Loop diameter	– minimum 4 meters (13 feet)
Loop current	– 15 to 20 amps
Loop applied voltage	– 24 volts
Loop output	– minimum 4500 amps x meter ^{2}
Loop weight	– 11.8 kilos (26 lb)
Control unit weight	– 10 kilos (22 lb)
Control unit dimensions	– 20.5cm x 25.5cm x 36.5cm (8" x 10" x 14.5")
Battery supply weight	– 18.1 kilos (40 lb)
Battery supply	– 2 of 12 volt, 14 to 20 ampere hour

Timing control by radio synchronization

RECEIVER

- Receive coil dimensions: 55cm x 15cm (22" x 6")
- Receive coil weight: 4.5 kilos (10 lb)
- Preamplifier in coil
- Preamplifier batteries: 2 of 9 volt
- Receive coil tripod mounted
- Receiver measuring instrument dimensions: 28cm x 18cm x 21.5cm (11" x 7" x 9")
- Receiver measuring instrument weight: 6.3 kilos (14 lb)
- Timing control by radio synchronization
- Primary sample width: 100 μs
- Primary sample can be swept through primary pulse by means of a time calibrated pot
- Zero time set at primary pulse drop-off
- Secondary samples (eight of them) width: 100 μs
- Secondary samples time (zero to middle of sample): (1) .15ms (2) .45ms (3) .85ms (4) 1.45ms (5) 2.45ms (6) 3.75ms (7) 5.85ms (8) 8.85ms
- Automatic sampling for 5 seconds then all samples automatically stored
- Sample read out by means of meter
- Continuous sampling possible by switching function switch to "Continuous"
- Noise can be monitored by switching function switch to "Noise"
- Battery supply: 24 volt rechargeable, 2 of 12 volt Gel GC 12-15


Vertical Rx
Horizontal Rx
Field Direction
+45
Surface
+80
Depth
Direction to
eddy current
Position of Eddy Current



Location of the Current Path in the Conductor

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 Explorations 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.

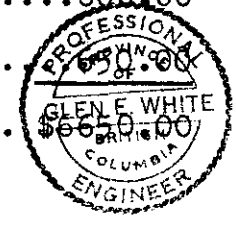
Two years Chief Geophysicist Tri-Con Exploration Surveys Ltd.

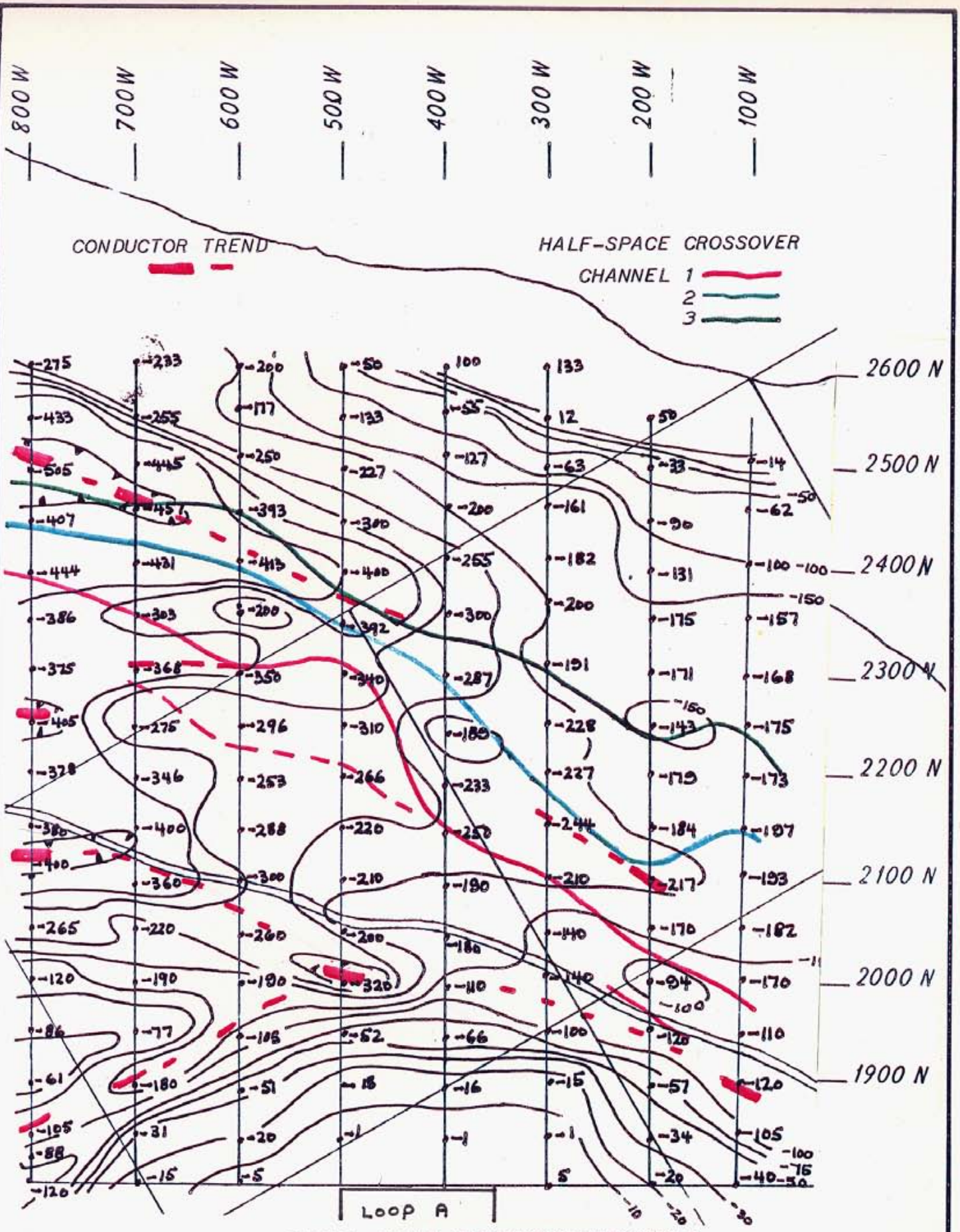
Eight years Consulting Geophyicist.

Active experience in all Geologic provinces of Canada.

COST BREAKDOWN

Personnel	Date	Wages	Total
C. Candy Geophysicist	Nov.12-22/78	$175/day	$1925.00
T. Allman	"	95/day	1045.00
Meals and accomodations @ $35/man/day			770.00
Vehicle 4x4 mileage plus gas			660.00
Instrument lease			990.00
Materials			10.00
Drafting and data processing			600.00
Interpretation and report			650.00
Total			$6650.00





VECTOR PULSE ELECTROMAGNETOMETER
HORIZONTAL COMPONENT CHANNEL 1

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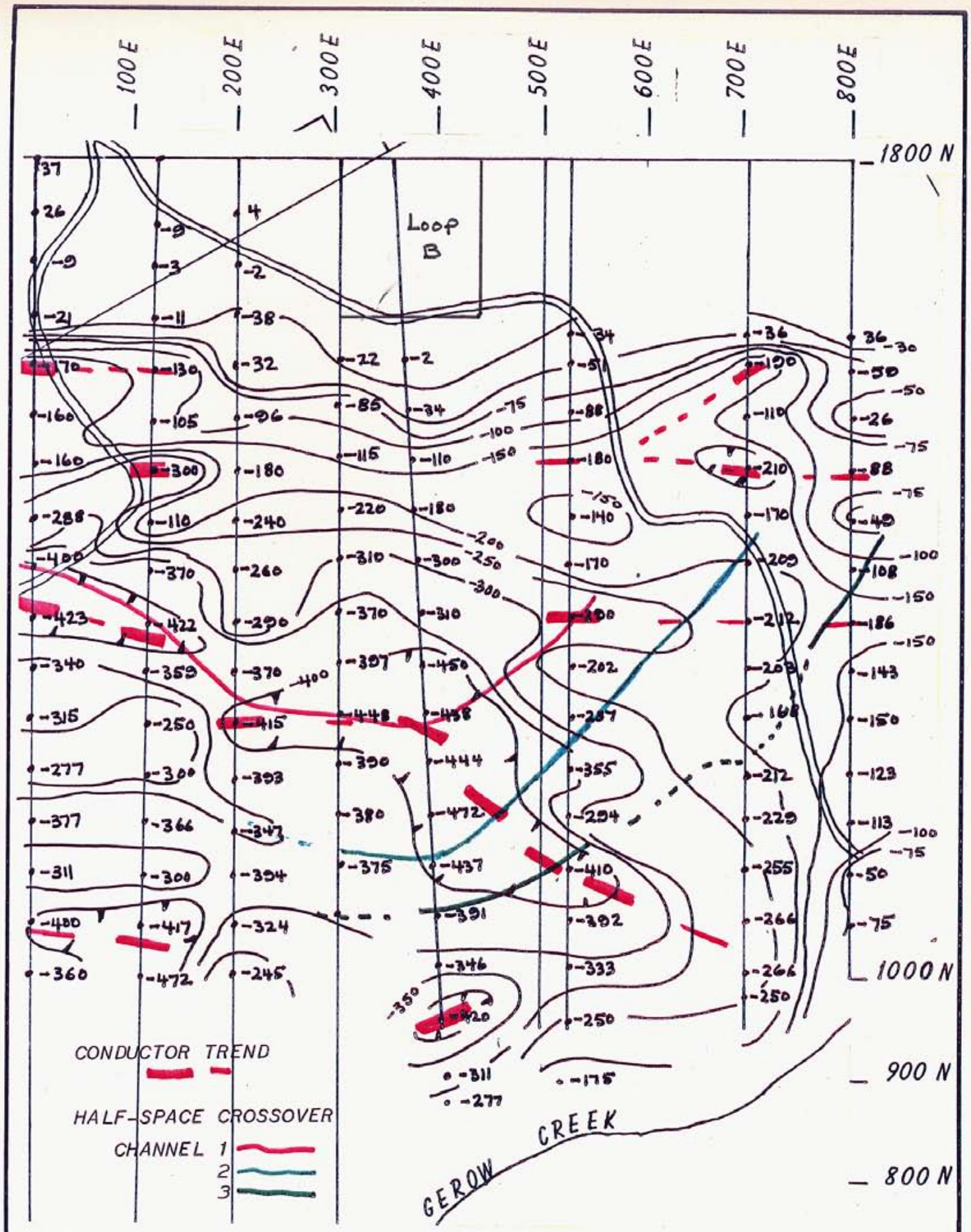
Plate 3



VECTOR PULSE ELECTROMAGNETOMETER
HORIZONTAL COMPONENT CHANNEL 1

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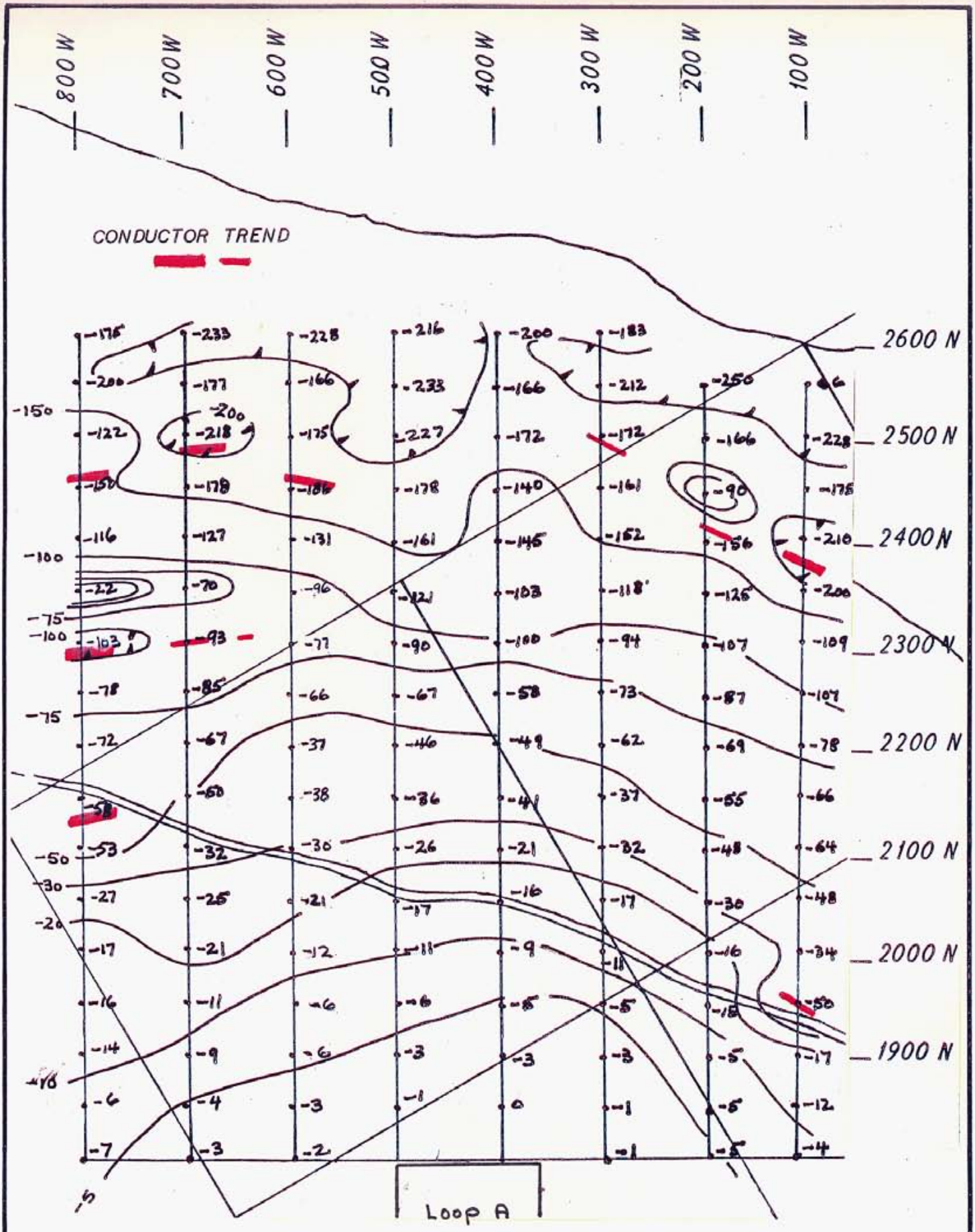
Plate 4



VECTOR PULSE ELECTROMAGNETOMETER

HORIZONTAL COMPONENT CHANNEL 4

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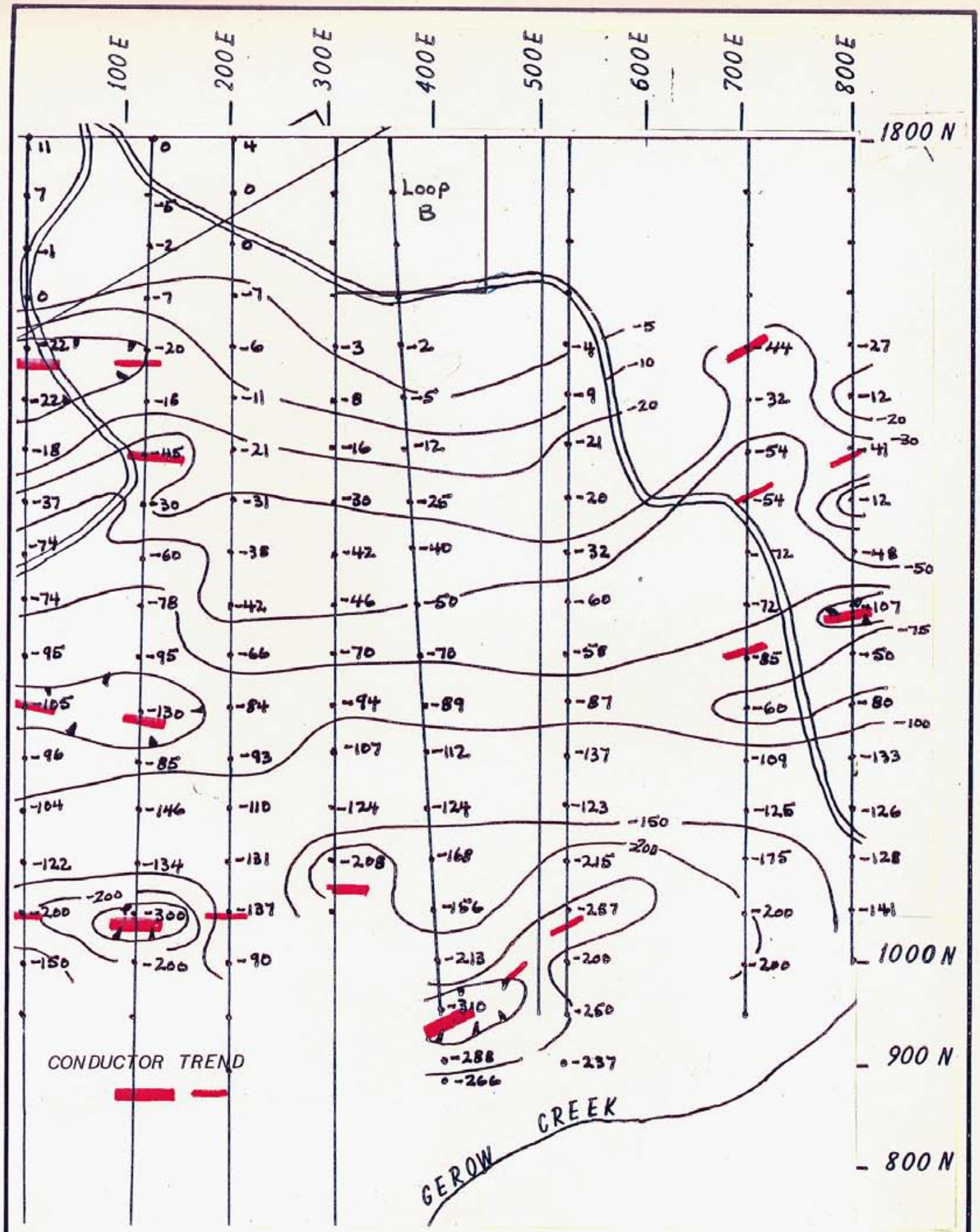
Plate 5



VECTOR PULSE ELECTROMAGNETOMETER

HORIZONTAL COMPONENT CHANNEL 4

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Plate 6