92H/15E 7024

GEOPHYSICAL REPORT

on

VLF-EM SURVEY

AG CLAIM

MINER LAKE, NICOLA M.D., B.C.

AG CLAIM	:	2.7 kms S40°E of Aspen Grove,
	:	49° 120° NW
	:	N.T.S. - 92H/15E
Written for	:	Westward Energy & Resources Corp. 404-850 West Hastings Street, Vancouver, B.C.
by	:	David G. Mark, GEOTRONICS SURVEYS LTD., 420-890 West Pender Street, Vancouver, B.C.
Dated	:	November 25, 1978

GEOTRONICS SURVEYS LTD.
Engineering & Mining Geophysicists
VANCOUVER, CANADA

7024

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ILLUSTRATIONS

PROPERTY AND OWNERSHIP

The AG Claim consists of one claim of 12 units as shown on Figure 2 and as described below:

Claim Name	No. Units	Record No.	Tag No.	Expiry Date
AG	12	379 (2)	37137	February 6, 1979

The property is owned by Westward Energy and Resources Corp. of Vancouver, British Columbia, although the recorded owner at this time is L. Sostad, of North Vancouver, B.C.

LOCATION AND ACCESS

The legal post of the AG Claim is found about 0.65 km. due west of Alleyne Lake and about 2.7 kms S40E of Aspen Grove.

The geographical coordinates are 49° 55'N latitude, and 120° 35'W longitude.

Access to the property is quite good and can be gained by a passenger car providing the road is dry (See Figure 2). One travels along Highway 5 for 30 kms. south of Merritt or 5 kms. south of Aspen Grove and then turns east on a well-used gravel road. About 2 kms. on this road is a second turn-off to the northeast onto a dirt road. The southern boundary of the AG Claim is about 100 meters along the dirt road.

PHYSIOGRAPHY

The AG Claim lies in the southern part of the physiographic division known as the Thompson Plateau which is part of the Interior Plateau System. The terrain is generally that of flat or rolling hills over most of the property. The general trend of the topography runs north-south. Elevations vary from 1,050 meters a.s.l. in the northwest corner to 1,300 meters a.s.l. in the southeast corner to give a relief of only 250 meters.

The main water source is Miner Lake which sits within the center of the AG Claim. There are a few creeks which drain into and out of Miner Lake.

Vegetation on the property varies from a lightly dense forest on the western half to a moderately dense forest on the eastern half. It consists of pine, fir and spruce.

HISTORY OF PREVIOUS WORK

There is evidence of much physical work having been done on the property, but the writer is unsure of the dates. The trenches and several shafts, however, probably predate 1940.

GEOLOGY

The following is based upon the geology mapping and subsequent report done by L. Sookochoff in the middle of June, 1978.

The AG Claim is underlain by a sequence of Upper Triassic Nicola rocks. Preto, et al, has divided the Nicola Group into three basic belts; the Western Belt, the Central Belt, and the Eastern Belt. The AG Claim is found within the Central Belt which contains the majority of the mineral occurrences in the Aspen Grove area.

Much of the property is covered by red and green andesites, the matrix of which is comprised of a feldspar porphyry. "The red volcanic sequence occurs wholly along the eastern portion of the claim group. The green volcanic sequence occurs along the south and to the east along a northwesterly trending contact. A separate block of green volcanics is located in the north-east corner. Limited outcrops occur to the south and west of Miner Lake. An augite porphyry horizon bisects the southern green sequence along a northwesterly trend and terminates at Miner Lake and at a northeasterly trending fault structure. A continuation of the augite porphyry occurs to the north of the fault structure and to the north-west in contact with the red

sequence. Massive and amygdaloidal intense red volcanics are located in the north and east of the claim area."

Sookochoff has mapped an epidote alteration zone within the eastern central portion of the claim group. Within this zone is a northerly-trending alteration zone that extends south of the epidote zone.

The major structure on the property is a northeasterly-trending fault zone that extends from south of Miner Lake to off of the property at line 36S, 90E. Preto noted a major fault running northwesterly across the northern end of Miner Lake which Sookochoff was unable to verify. Otherwise, the second major trend appears to be northerly as both Sookochoff and Preto have mapped major faults striking in this direction.

The mineralization on the property occurs as chalcopyrite, chalcocite, and malachite generally associated with a high degree of fracturing and with carbonate and/or quartz veinlets.

GOVERNMENT AEROMAGNETIC SURVEY

The survey was flown for the Federal and Provincial governments by Geoterrex Limited from October 1969 to April 1972 with a terrain clearance of 300 meters.

The Westward Energy property sits on the western flank of a northerly-trending series of aeromagnetic highs. One of these highs is found on the eastern part of the AG Claim and has an intensity of over 58,060 gammas.

In correlating with the geological map of Preto, et al, the anomalous highs have previously been interpretted to be reflecting dioritic rocks (an intrusive or a dioritic phase of the Nicola volcanics). However, on the property to the east of Miner Lake, Preto shows no dioritic rocks, but mainly green sequence volcanics.

Ground magnetic highs have been interpretted to be caused by green sequence volcanics by the writer in another report on a property in the same area. Therefore, these rock-types are quite possibly the cause of the aeromagnetic high on this property. Alternately, the high could be caused by diorites, but at a shallow depth below the rock-types mapped by Preto.

The writer has interpretted two major north-trending aeromagnetic lineations with one occurring through Kentucky Lake and the other just west of Highway No. 5. A third lineation, striking northwest, is found to run through the southwestern part of the AG Claim. These lineations, especially the north-striking ones, very likely reflect major faults. They are shown on Figure No. 2.

VLF-EM SURVEY

1. Instrumentation and Theory:

A VLF-EM Receiver, Model 27, manufactured by Sabre Electronic Instruments Ltd. of Burnaby, B.C. was used for the survey. This instrument is designed to measure the magnetic component of a very low frequencey (VLF) electromagnetic field. The U.S. Navy submarine transmitter located at Seattle, Washington and transmitting at 18.6 KHz. was used.

In all electromagnetic prospecting, a transmitter produces an alternating magnetic field (primary) by a strong alternating current usually through a coil of wire. If a conductive mass such as a sulphide body is within this magnetic field, a secondary alternating current is induced within it which in turn induces a secondary magnetic field that distorts the primary magnetic field. It is this distortion that the EM receiver measures. The VLF-EM uses a frequency range from 16 to 24 KHz. whereas most EM instruments use frequencies ranging from a few hundred to a few thousand Hz. Because of its relatively high frequency, the VLF-EM can pick up bodies of a

low conductivity and therefore is more susceptible to clay beds, electrolyte-filling fault or shear zones and porous horizons, graphite, carbonaceous sediments, lithological contacts as well as sulphide bodies of too low a conductivity for other EM methods to pick up.

Consequently, the VLF-EM has additional uses in mapping structure and in picking up sulphide bodies of too low a conductivity for conventional EM methods and too small for induced polarization (in places it can be used instead of IP). However, its susceptibility to lower conductive bodies results in a number of anomalies, many of them difficult to explain and, thus, VLF-EM preferably should not be interpreted without a good geological knowledge of the property and/or other geophysical and geochemical surveys.

2. Survey Procedure:

The VLF-EM survey was run on a grid in which the lines run east-west at 120-meter intervals from a baseline running due south from the legal claim post. Dip angle readings were taken every 30 meters with the instrument facing towards the transmitter at Seattle. Fluorescent pink flagging was placed at each 30-meter station with the grid coordinates marked thereon.

Readings could not be taken on all lines centered at 63W because of the power line.

3. Compilation of Data:

The readings were reduced by applying the Fraser Filter. Filtered data, as shown on Sheet 1, are plotted between the reading stations. The positive filtered values were contoured at intervals of 4^{o} starting at 4^{o}.

The Fraser filter is essentially a 4-point difference operator which transforms zero crossings into peaks, and a low pass

smoothing operator which reduces the inherent high frequency noise in the data. Therefore, the noisy, non-contourable data are transformed into less noisy, contourable data. Another advantage of this filter is that a conductor that does not show up as a cross-over on the unfiltered data quite often will show up on the filtered data.

DISCUSSION OF RESULTS

The major cause of VLF-EM anomalies, as a rule, are geologic structures such as fault, shear and breccia zones. It is therefore logical to interpret VLF-EM anomalies to likely be caused by these structural zones. Of course, sulphides may also be a causitive source. But in the writer's experience, when VLF-EM anomalies correlate with sulphide mineralizaton, the anomalies are usually reflecting the structure associated with the mineralization rather than the mineralization itself.

The anomalies are also very long and linear in shape which is also suggestive of structure being the causitive source.

The major trend of the VLF-EM anomalies, as seen on Sheet 1, is primarily north and secondarily northeast. Considering the VLF-EM anomalies are likely reflecting structure, the major strike of structure on this property is concluded to be in both these directions. This is in agreement with the geological maps produced by Preto, et al, and Sookochoff which show faults and contacts trending north and northeasterly across the property.

There is considerable variation in intensity from one VLF-EM anomaly to the next. This may not only be due to the conductivity of a causitive source, but also the direction it strikes relative to the direction to the transmitter. In other words, those

conductors lying closer to the same direction as the direction to the transmitter (S25W in this case), can be picked up easier than those that are lying at a greater angle. Depending upon its conductivity, a conductor may not be picked up at all if it's at too great an angle. For example, the VLF-EM survey has shown few conductors striking northwesterly, a low optimum direction for the VLF-EM using the Seattle transmitter. Yet Preto and Sookochoff show structure strike in this direction.

For ease of identification, the VLF-EM anomalies have been lettered by the small letters, a to j.

Anomaly a runs from the southern to the northern boundary of the property west of the powerline striking in a northerly direction (that is, on an average). The anomaly is rather complex looking appearing to be caused by several conductors striking in different directions rather than just one. The most interesting part is that between lines 48S and 96S. It is within this section that the anomaly reaches its highest intensity of 28^{O} on Line 60S. This point appears to be a crossing zone of structure striking in two or three different directions. Two of these directions correlate with Sookochoff's mapping of the structure (faulting or strong fracturing)within this area.

However, the most interesting point is that this area appears to correlate excellently with a molybdenum anomalous zone as shown on a map within a report by Lorimer. It is quite difficult to correlate the molybdenum zone directly, but it seems to have within it anomalies striking in the same directions. The molybdenum zone reaches a high of 5.5 ppm with several values above 3.0 ppm against a background of about 0.4 ppm.

Anomalies b and d as well as an unnamed one at the southern end all strike towards Miner Lake. Considering that these anomalies

probably reflect structure, and that Sookochoff shows several faults and contacts striking towards the lake, it appears that the lake was formed because of weakness within the bedrock caused by it being a zone of cross-structure. It is these zones that are most amenable to mineralizing fluids.

Anomaly b strikes northerly and is open towards the south onto Miner Lake.

Anomaly d is more complex having one arm striking north-northeast to north-northwest to north, and the other arm, northeasterly, with it being open at the southwest end onto Miner Lake. These two arms cross on Line 36S. The northeast-striking arm correlates with a fault mapped by Sookochoff, and has been projected to cross the lake and reappear at its southwest end.

Anomaly c strikes northerly and is open at its northern end. It has a fairly high value of 39° on line 0 where it appears to consist of two conductors.

Anomaly e, shown only on line 144S, is open to the south, and to the west where readings weren't taken because of the power-line. It correlates with a northerly-striking fault mapped by Sookochoff.

Anomaly f, consists of two arms with the one arm striking north to northeast to north-northeast. It is open to the south at its southern end. The other arm strikes north-northwesterly and joins the main arm on line 108S.

Anomaly g is a very high intensity anomaly that appears to be caused at least partly by a barbed wire fence. However, there is only a partial correlation between the fence and the anomaly, and part of the anomaly correlates with faulting and strong fracturing as mapped by Sookochoff. The writer feels, therefore, that the causitive source of the anomaly is primarily geological structure with its intensity being increased by the fence.

Between anomalies d, f and g occur east-west faulting which suggest that anomaly f is faulted away from either anomaly d or anomaly g.

Anomaly h correlates excellently with two different faults. The northern part of the anomaly correlates with a major north-east-striking fault, and the southern part correlates with a north-striking fault. The anomaly is open to the south.

Anomaly i strikes northerly, on an average, is open to the south and consists of two arms. The western arm appears to be reflecting a contact between green volcanics and red volcanics, and the eastern arm, faulting and strong fracturing. The two arms correlate with pyritization as well and, therefore, could well be reflecting the boundaries of the pyrite zone as mapped by Sookochoff.

Anomaly j strikes northerly along the eastern boundary of the AG Claim and appears to be a complex anomaly caused by several different conductors. Contacts, faulting, and strong fracturing are found to correlate quite well with the anomaly along its whole length. In addition, at its center and its northern end, it is found to correlate with copper mineralization.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.,

David C. Mark
Geophysicist

November 25 , 1978

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Sookochoff, L. Geological Report on the Miner Lake Property, AG Claim) of Westward Energy and Resources Corp. Pan-American Consultants Ltd. Nov. 1978.

GEOPHYSICIST'S CERTICIATE

I, DAVID G. MARK, of the City of Vancouver, in the Province of British Columbia, do hereby certify:

THAT I am a Consulting Geophysicist of Geotronics Surveys Ltd., with offices at 420-890 West Pender Street, Vancouver, British Columbia.

I further certify:

1. I am a graduate of the University of British Columbia (1968) and hold a B.Sc., degree in Geophysics.

2. I have been practising my profession for the past ten years and have been active in the mining industry for the past thirteen years.

3. I am an active member of the Society of Exploration Geophysicists and a member of the European Association of Exploration Geophysicists.

4. This report is compiled from data obtained from a VLF-EM survey carried out under the supervision of myself during the last part of May, 1978.

5. I am a director of Westward Energy and Resources Corp. and hold no shares at this time. However, I do intend to purchase 5000 shares, none of which will accrue to me as a result of writing this report.

David G. Mark
Geophysicist

November 25, 1978

AFFIDAVIT OF EXPENSES

The VLF-EM survey was carried out on the AG Claim, Miner Lake, Nicola M.D., B.C. to the value of the following:

FIELD

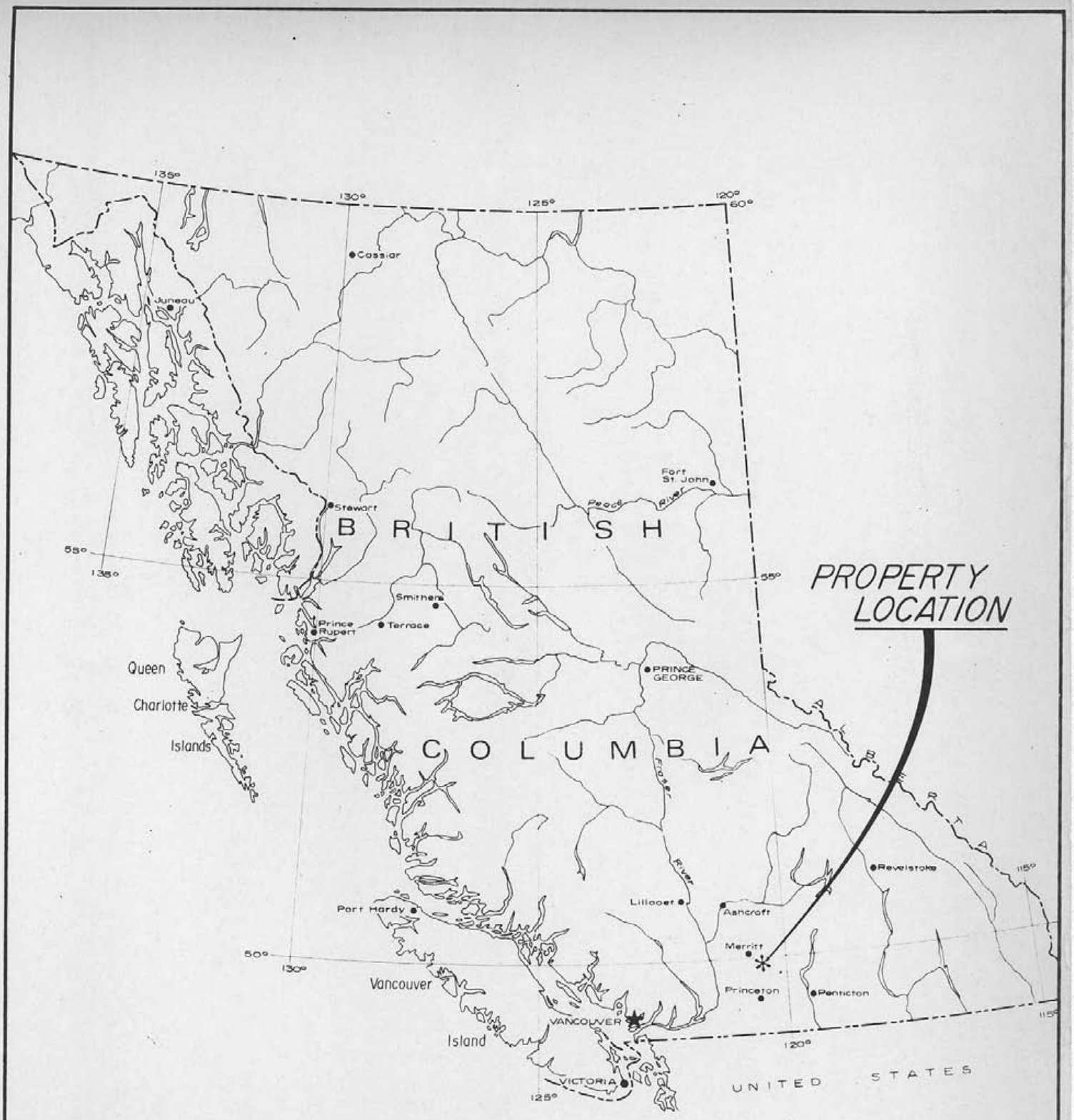
Geophysical Technician and helper 60 hours at $35/hour	$2,100.00
Vehicle rental, 9 days at $60/day	540.00
Room and board, 2 men at $30/man day, 9 days	540.00
Survey supplies	90.00
VLF-EM instrument rental, 2 weeks at $75/week	150.00
	$3,420.00

REPORT

Geophysicist, 10 hours at $30/hour	$ 300.00
Office Assistant, 15 hours at $15/hour	225.00
Drafting and printing	350.00
Typing, xeroxing and compilation	120.00
	$ 995.00
TOTAL	$4,415.00

Respectfully submitted,
GEOTRONICS SURVEYS LTD.,

David G. Mark, Manager



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WESTWARD ENERGY & RESOURCES CORP.

AG CLAIM

ASPEN GROVE AREA, NICOLA M.D., B.C.

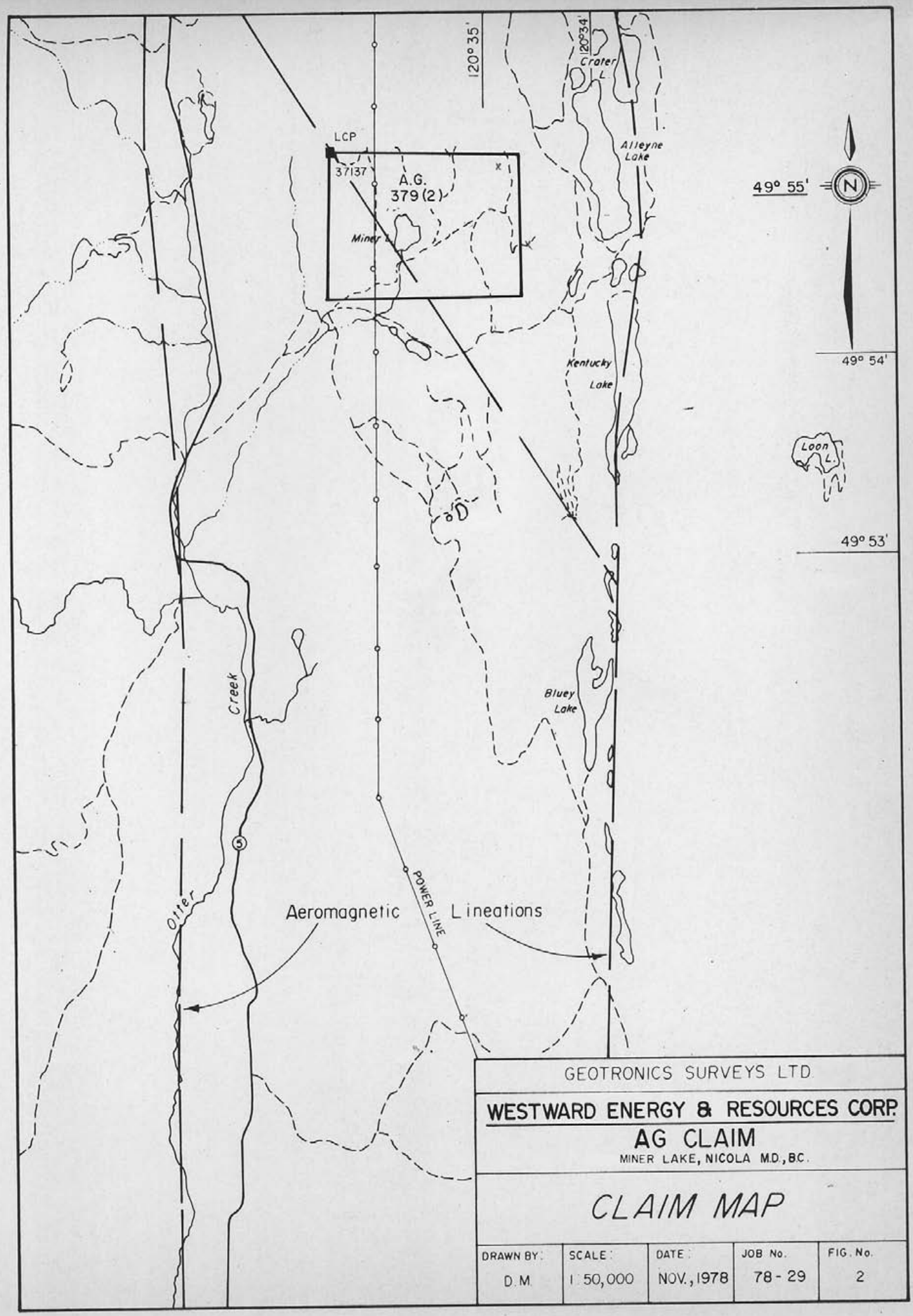
LOCATION MAP

SCALE

Miles 100 50 0 100 200 Miles

ALTAIR drafting services ltd.

FIG. 1



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WESTWARD ENERGY & RESOURCES CORP.

AG CLAIM

MINER LAKE, NICOLA M.D., B.C.

CLAIM MAP

DRAWN BY:	SCALE:	DATE:	JOB No.	FIG. No.
D.M.	1:50,000	NOV., 1978	78-29	2

GEOPHYSICAL REPORT

on

VLF-EM SURVEY

AG CLAIM

MINER LAKE, NICOLA M.D., B.C.

INTRODUCTION AND GENERAL REMARKS

This report discusses the survey procedure, compilation of data, and the interpretation of a very low frequency electromagnetic (VLF-EM) survey carried out on the AG Claim over the last half of May, 1978.

This survey was done as a result of the recommendations of an engineering report by L. Sookochoff written for another company on the same property.

The survey was done under the supervision of the writer and under the field supervision of R.R. Fassler with the aid of a helper. A total of 24.6 line kms. of VLF-EM were done.

It was intended at the same time to carry out a ground magnetic survey but magnetic storms were so frequent that it was impossible to carry out. Storms were checked for each day.

The primary purpose of the VLF-EM survey was to extend the known zones of copper mineralization found on the property. A secondary object of the VLF-EM survey was to delineate faults and/or shear zones.

SUMMARY

During the last half of May, 1978, a VLF-EM survey was carried out on the AG Claim. The AG Claim is located 2.7 kms. S40E of Aspen Grove and about 0.7 km due west of Alleyne Lake. Access to much of the property is easily gained by a two-wheel drive vehicle. The terrain consists of mainly moderate slopes forested with moderately dense coniferous trees. The purpose of the survey was to extend the known zones of copper mineralization through mapping the structure.

Previous work on the property consists of several trenches and two or more shafts dug out some years ago.

The property is mainly underlain by Upper Triassic Nicola Group volcanics. The rock types are gray feldspar porphyry, red augite porphyry, amygdaloidal and massive red andesite, and lahar deposits with a division into a red sequence and a division into a green sequence. Faulting on the property is predominantly north-south, and northeast. Mineralization occurs as chalcopyrite, chalcocite, malachite and pyrite within fracture or shear zones within the green and red volcanics.

The VLF-EM readings were taken every 30 meters on 120-meter separated east-west lines. They were then Fraser-filtered, plotted and contoured.

CONCLUSIONS

1. The VLF-EM anomalies have reflected mainly faults and some lithologic contacts.

   Some of the most interesting parts of the VLF-EM anomalies are those that appear to indicate cross-structure since these would be prime areas to look for sulphide mineralization. All of the anomalies except b, c, and g are indicative of cross-structure.

2. The central part of anomaly a is considered to be of prime importance because of its complex nature. It appears to reflect two or three conductors striking in different directions and correlates excellently with a strong molybdenum anomaly from a soil survey done in 1972.

3. The upper part of anomaly j is also of major interest because of its appearing to reflect several conductors in different directions and its correlation with copper mineralization.

4. The VLF-EM and geological mapping show several faults and contacts striking towards Miner Lake. Therefore, the bedrock below the lake, because of it being a cross-structural zone, may have been amenable to mineralizing fluids.

RECOMMENDATIONS

1. A soil geochemistry survey should be carried out over the whole property using the same grid. The samples should be tested for molybdenum and copper. The soil survey done in 1972 cannot be used on this property since it covers only the northwestern corner and since it cannot be correlated very accurately to the present grid.

2. A magnetometer survey over the property would aid in geological mapping.

3. Further work that may be recommended is an induced polarization survey and a diamond drilling program but these are contingent upon the results of the soil geochemistry and magnetic surveys.


MINER LAKE
Contour interval = 8°
Instrument: SABRE MODEL 27
Contour interval = 4°
SEATTLE TRANSMITTER 18.6 KHz
BASELINE
LCP
prob. BANK OF ENGLAND 92H/NE-83
prob. CINCINNATI 92H/NE-84
to Hwy. 5 25 kms.
To accompany geophysical report by DAVID G. MARK, geophysicist.
GEOTRONICS SURVEYS LTD.
WESTWARD ENERGY AND RESOURCES CORP.
A.G. CLAIM
MINER LAKE, NICOLA M.D., B.C.
VLF-EM SURVEY
FRASER FILTER
DATA & CONTOURS
DRAWN BY: R.R.F.
JOB No. 78 - 29
DATE: JUNE, 1978
SCALE: 1:3000
SHEET No. 1
LEGEND
Fence
Claim line showing claim post
Center of power line
Creek
Intermittent stream
Logging road
Swamp
Shaft
Open Cut
mal Malachite
cc Chalcocite
cpy Chalcopyrite
py Pyrite
SCALE
METRES 0 50 100 150 200 250 METRES
7029