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GEOPHYSICAL REPORT

ON A

VLF-EM SURVEY

OVER THE

P.C. CLAIM GROUP

ARGYLE CREEK, ST. MARY LAKE AREA

FORT STEELE MINING DIVISION

BRITISH COLUMBIA

PROPERTY	: 14 km S60°W of Kimberly, B.C. on north shore of St. Mary Lake : 49° 116° NE : N.T.S. 82F/9E
WRITTEN FOR	: TRANS-ARCTIC EXPLORATIONS LTD. #1807-1450 West Georgia Street Vancouver, B.C., V6G 1T8
SURVEYED BY	: TRANS-ARCTIC EXPLORATIONS LTD. #1807-1450 West Georgia Street Vancouver, B.C., V6G 1T8
WRITTEN BY	: David G. Mark, Geophysic GEOTRONICS SURVEYS LTD. #403-750 West Pender St Vancouver, B.C., V6C 2T
DATED	: May 14th, 1984

GEOTRONICS

GEOTRONICS SURVEYS LTD.
Engineering & Mining Geophysicists
VANCOUVER, CANADA

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SUMMARY

A VLF-EM survey was carried out over a portion of the P.C. Claim Group during the middle part of August, 1983. The property is located 14 km S60°W of the Town of Kimberly, British Columbia, straddling Argyle Creek on the north shore of St. Mary Lake. Access to the southern part of the property is easily gained by a two-wheel drive vehicle. The terrain consists of steep slopes forested with moderately dense coniferous trees. The purpose of the VLF-EM survey was to delineate geological structure and/or sulphides that are related to gold mineralization.

The property is mainly underlain by quartzites, argillites, and their metamorphosed equivalents of the Aldridge Formation. These rocks are intruded by meta-diorites and meta-quartz diorites of the Moyie Intrusives with which much sulphide mineralization in the area is associated with. The property has been staked mainly for the potential of gold mineralization, especially of the porphyrite type.

The VLF-EM readings were taken every 25 meters on 50-meter separated east-west lines. They were then Fraser-filtered, plotted and contoured.

CONCLUSIONS

The VLF-EM anomalies have reflected conductors that are probably geological structure such as faults, shears and contacts. Some or parts of these anomalies could also be reflecting sulphide zones directly. One anomaly within the northwestern part of the survey area is especially interesting.

RECOMMENDATIONS

The writer feels the priority is to explore for gold porphyrites recommended in the following manner:

1. Continue the VLF-EM survey over the remainder of the property.

2. Take large soil samples every 50 m along contour lines preferably about 100 m apart in elevation. In the lab, the total sample should be pulverized, and not screened at all in order to preclude the screening out of coarser gold. The anomalous samples should then be followed up by sampling on a tight grid, say 15 to 20 m. Centers on a grid, say 200 m square.

3. At the same time, careful geological mapping should be carried out preferably by a geologist familiar with gold porphyrites.

4. The defined soil anomalies in gold should then be 'cat' trenched.

5. Resistivity - IP mapping should also be carried out in order to optimize drill targets.

6. Diamond drilling should then be carried out using a large diameter drill and a face discharge bit.

Note: Much of the conclusions and recommendations as above have been reached as a result of personal communication with Marshall Smith, P.Eng., a geological engineer, who is the originator of the gold porphyrite model.

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INTRODUCTION AND GENERAL REMARKS

This report discusses the survey procedure, compilation of data and the interpretation of a VLF-EM survey carried out over a portion of the P.C. Claim Group on the north shore of St. Mary Lake from August 10th to 20th, 1983.

The survey was done by Trans-Arctic Explorations Ltd. under the field supervision of Richard Simpson with two helpers. A total of 2.75 line km of survey were done.

The primary purpose of the survey was to delineate faults, contacts and/or shear zones associated with any gold mineralization. The results would aid in any geological mapping and soil geochemistry surveys and other geophysics surveys that may be later carried out.

PROPERTY AND OWNERSHIP

The property consists of one 20-unit claim and four reverted Crown Grants staked within the Fort Steele Mining Division as shown on Sheet 2 and as described below. The Crown Grants are completely surrounded by the 20-unit claim. All are grouped together as the P.C. 1 Claim Group.

Claim Name	No. Units	Record No.	Expiry Date
P.C. 1	20	1761	March 17, 1984
Matterhorn	1	1743	February 16, 1984
Minnie Ha Ha	1	1744	February 16, 1984
Hidden Treasure	1	1745	February 16, 1984
Columbia	1	1746	February 16, 1984
	24		

The expiry date shown does not take into account the surveys under discussion as being accepted for assessment credits.

The claims are owned by Trans-Arctic Explorations Ltd. of Vancouver, British Columbia, with the registered owner being Richard Simpson, manager of Trans-Arctic.

LOCATION AND ACCESS

The northeastern corner of the property is located 14 km S60°W of the mining town of Kimberly, B.C., on the north shore of St. Mary Lake. It straddles the southerly-flowing Argyle Creek.

The geographical coordinates are 49°37'N latitude and 116°11'W longitude.

Access to the southern part of the property is easily gained by travelling from Kimberly along a good secondary gravel road on the north side of St. Mary River. The property is about 22 km from Kimberly.

PHYSIOGRAPHY

The property lies to the west of the Rocky Mountain trench within the Purcell Mountains which are physiographic divisions of the Columbia Mountain System. The terrain consists of steep slopes throughout most of the property. It lies on the south stope of Bootleg Mountain with the St. Mary Lake valley.

Elevations vary from about 970 meters a.s.l. on St. Mary Lake to 2,010 meters a.s.l. on the northeast corner of the property to give an elevation difference of 1,040 meters.

The main water sources would be St. Mary Lake as well as Argyle Creek and Resort Creek which flow southerly into St. Mary Lake.

The forest cover consists of fir, spruce and hemlock(?) and varies from closely growing, immature stands to more widely spaced, mature stands.

HISTORY OF PREVIOUS WORK

Since the four Crown Grants have been acquired and since the P. C. 1 claim has been staked, no work has been done on the property. Probably, physical-type work has been done on the Crown Grants many years ago, but what type is unknown to the writer.

GEOLOGY

Most of the property is underlain by the basal Aldridge Formation of Proterozoic Age which is the oldest formation known to occur in the area. It is composed mainly of grey to brownish grey, rusty weathering argillite, siltstone and argillaceous quartzite and their metamorphosed equivalents.

Intruding into the Aldridge Formation are the Moyie Intrusions of Purcell or(?) later age. These rocks are composed of meta-diorite and meta-quartz diorite.

The contacts between these 2 rock groups run westerly across the property with several northerly-striking faults cutting across the contacts.

Much of the mineralization in the area is associated with the Moyie Intrusions and consist of quartz-calcite veins and lenses in diorite, in and adjacent to which occur pyrrhotite, pyrite and chalcopyrite, and, less commonly, minor amounts of galena and sphalerite. The present-day interest in the area, however, is principally for gold, especially the porphyrite type which could occur on the P.C. 1 claim.

INSTRUMENTATION AND THEORY

A VLF-EM receiver, Model 27, manufactured by Sabre Electronic Instruments Ltd. of Burnaby, B.C. was used for the VLF-EM survey. This instrument is designed to measure the electromagnetic component of the very low frequency field (VLF-EM), which for this survey is transmitted at 24.8 KHz from Seattle, Washington.

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 much lower 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 I.P.). However, its susceptibility to lower conductive bodies results in a number of anomalies, many of them difficult to exlain and, thus, VLF-EM preferably should not be interpreted without a good geological knowledge of the property and/or other geophysical and geochemical surveys.

SURVEY PROCEDURE

The base line was placed near the eastern part of the property on a bearing of 360° true. The cross lines were run perpendicular to the base line at a 50 m spacing with the instrument readings taken at a 25 m interval facing towards the transmitter at Seattle.

The survey consisted of 2.75 line km of VLF-EM reading.

It was planned to carry out much more VLF-EM surveying but due to rough terrain much of the time was spent in access to the survey area.

COMPILATION OF DATA

The VLF-EM field results were reduced by applying the Fraser-filter and subsequently plotted on Sheet 3 at a scale of 1:2,500 (1 cm = 25 m). The filtered data was plotted between actual reading stations. The positive dip-angle readings were then contoured at an interval of 4°. The raw data is plotted on Sheet 4.

The Fraser-filter is essentially a 4-point difference operator, which transforms zero crossings into peaks, and a low pass smoothing operator which induces 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 crossover on the unfiltered data quite often shows up on the filtered data.

DISCUSSION OF RESULTS

The major cause of the 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 causative source. But generally in the western Cordillera, when VLF-EM anomalies correlate with sulphide mineraliztion, the anomalies are usually reflecting the structure associated with the mineralization rather than the mineralization itself. This is not true if the sulphides are massive enough.

There is some variation in intensity from one VLF-EM anomaly to the next. This is not only due to the conductivity of a causative 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 (S70W 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 is at too great an angle.

Those parts of the anomalies that are of greater amplitude are of greater economic interest since they may be reflecting sulphides, fracturing and/or alteration associated with sulphide mineraliza-

tion. The highs often are at points of intersection of two or three different directions. If the conductors are in fact geological structures, then the points of intersection become amenable to mineralizing fluids. A good example of this is the northwestern anomaly which, because of possible intersecting structure as well as its high intensity is the anomaly of greatest economic interest within the survey area.

Little else can be said about the VLF-EM survey since the survey area is small and there is no other work to correlate the results with.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.

David G. Mark,
Geophysicist

May 14, 1984

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Fraser, D.C., Contouring of VLF-EM Data, Geophysics, Vol. 34, No. 6 (December), 1969.

Leech, G.B., St. Mary Lake, Kootenay Dist., B.C. - Geology Map, Geol. Surv. of Can., Map 15-1957, Sheet 82F/9, 1957.

Smith, F. Marshall, P.Eng., Gold Porphyrite, G.A.C. Symposium, Victoria, B.C., May, 1983.

Sookochoff, L., P.Eng., Geological evaluation Report on the Leader A Mineral Claim, Fort Steele M.D., B.C., August 17, 1983.

GEOPHYSICIST'S CERTIFICATE

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 located at #403-750 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 16 years and have been active in the mining industry for the past 19 years.

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

4. This report is compiled from data obtained from a VLF-EM survey carried out by Trans-Arctic Explorations Ltd., under the supervision of Richard Simpson from August 10th to 20th, 1983.

5. I have no direct or indirect interest in the P.C. Claim Group, nor do I expect to receive any interest as a result of writing this report.

David G. Mark
Geophysicist

May 14, 1984

AFFIDAVIT OF EXPENSES

The VLF-EM survey was carried out on the P.C. Claim Group, St. Mary Lake Area, Fort Steele M.D., B.C. to the value of the following:

FIELD:

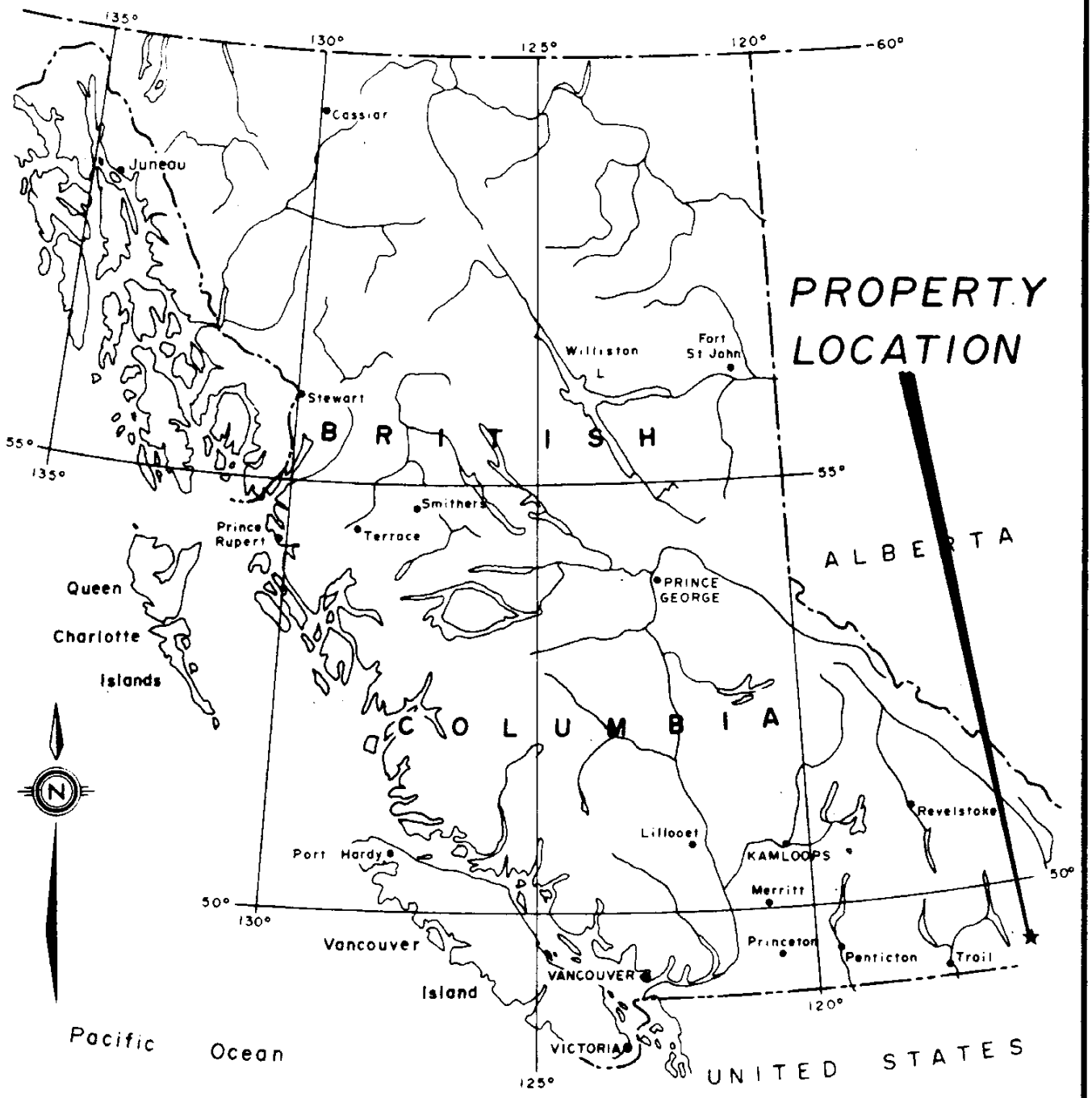
Geophysical technician and helper 41 hours at $35/hour	$1,435
Vehicle rental, 4 days at $100/day	400
Room and board, 2 men at $50/man day, 4 days	400
Survey supplies	40
VLF-EM instrument rental, 1 week at $100/week	100
	$2,375

REPORT:

Geophysicist, 7 hours at $40/hour	$ 280
Geophysical technician, 7 hours at $25/hour	175
Drafting and printing	350
Typing, photocopying and compilation	100
	$ 905
Total	$3,280

Respectfully submitted,
TRANS-ARCTIC EXPLORATIONS LTD.

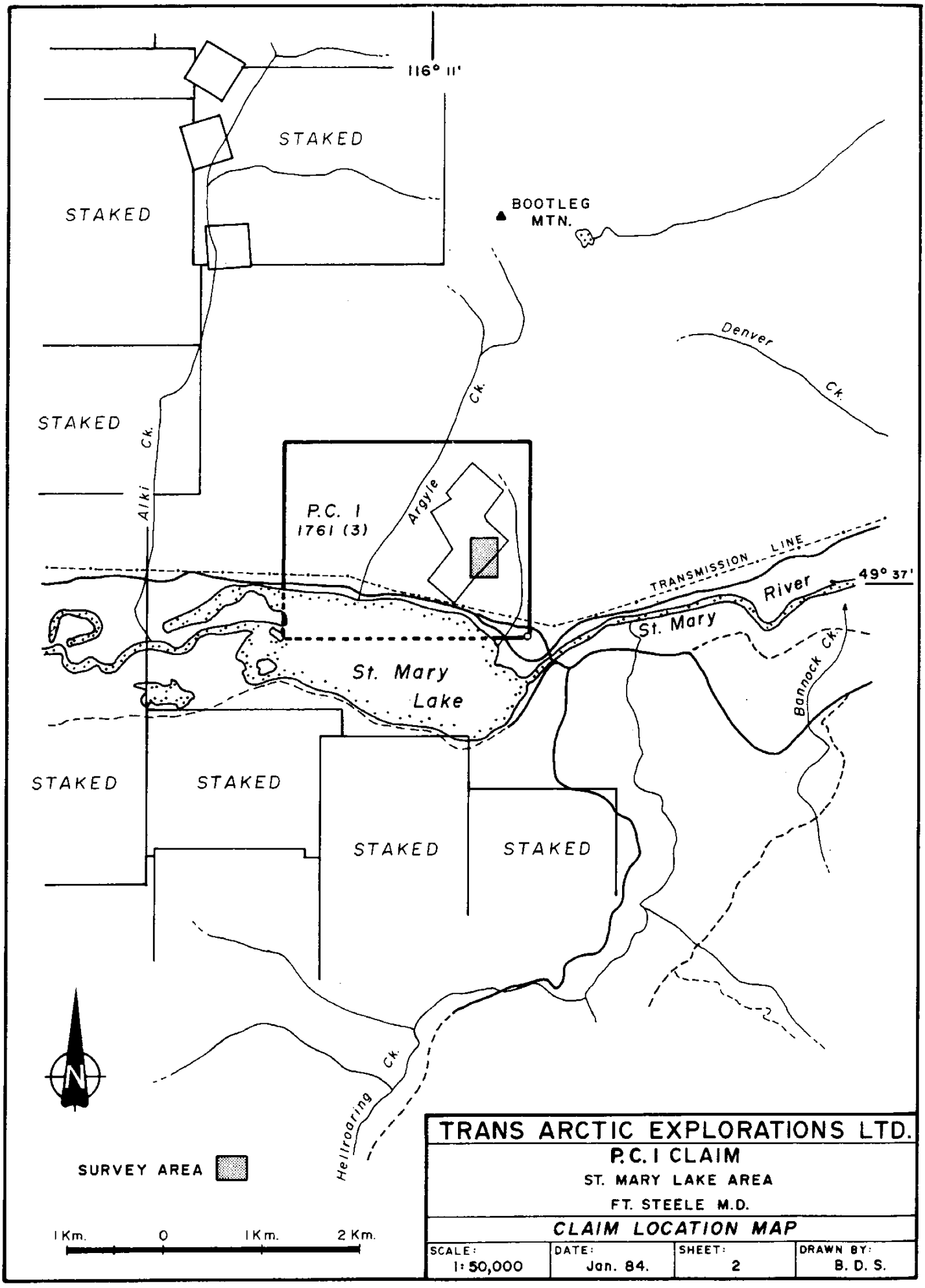
Richard S. Simpson
Manager



P.C. 1 CLAIM

SHEET 1

BRAD'S DRAFTING SERVICE



TRANS ARCTIC EXPLORATIONS LTD.

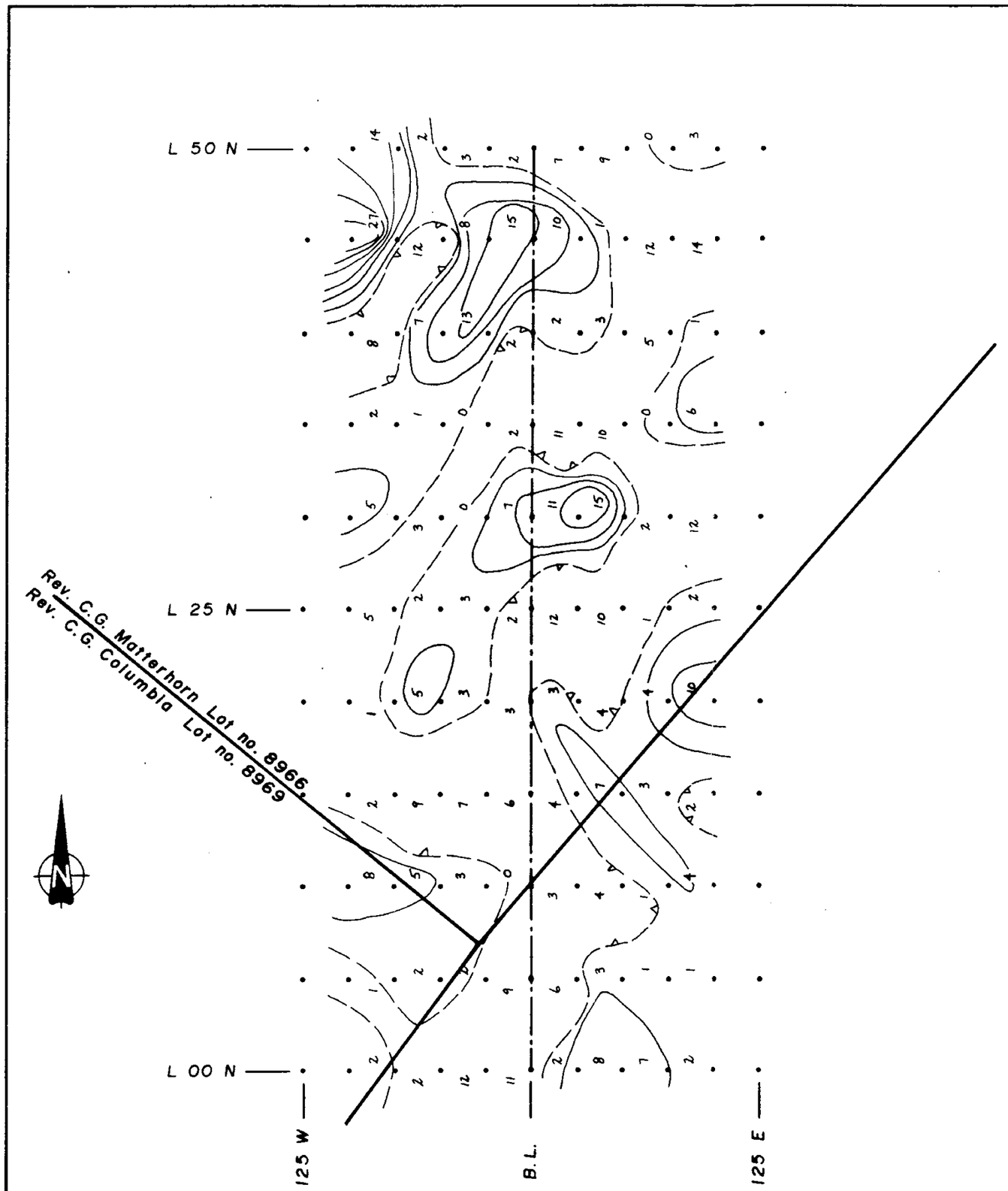
P.C. 1 CLAIM

ST. MARY LAKE AREA

FT. STEELE M.D.

CLAIM LOCATION MAP

SCALE:	DATE:	SHEET:	DRAWN BY:
1:50,000	Jan. 84.	2	B. D. S.



LEGEND

- Baseline
- Sample station.
- Magnetic depression.

Contour interval: 4°

- 0 degree.
- 4 degrees and up.

Seattle 24.8 KHz.

50 25 0 50 100 m.

TRANS ARCTIC EXPLORATIONS LTD.

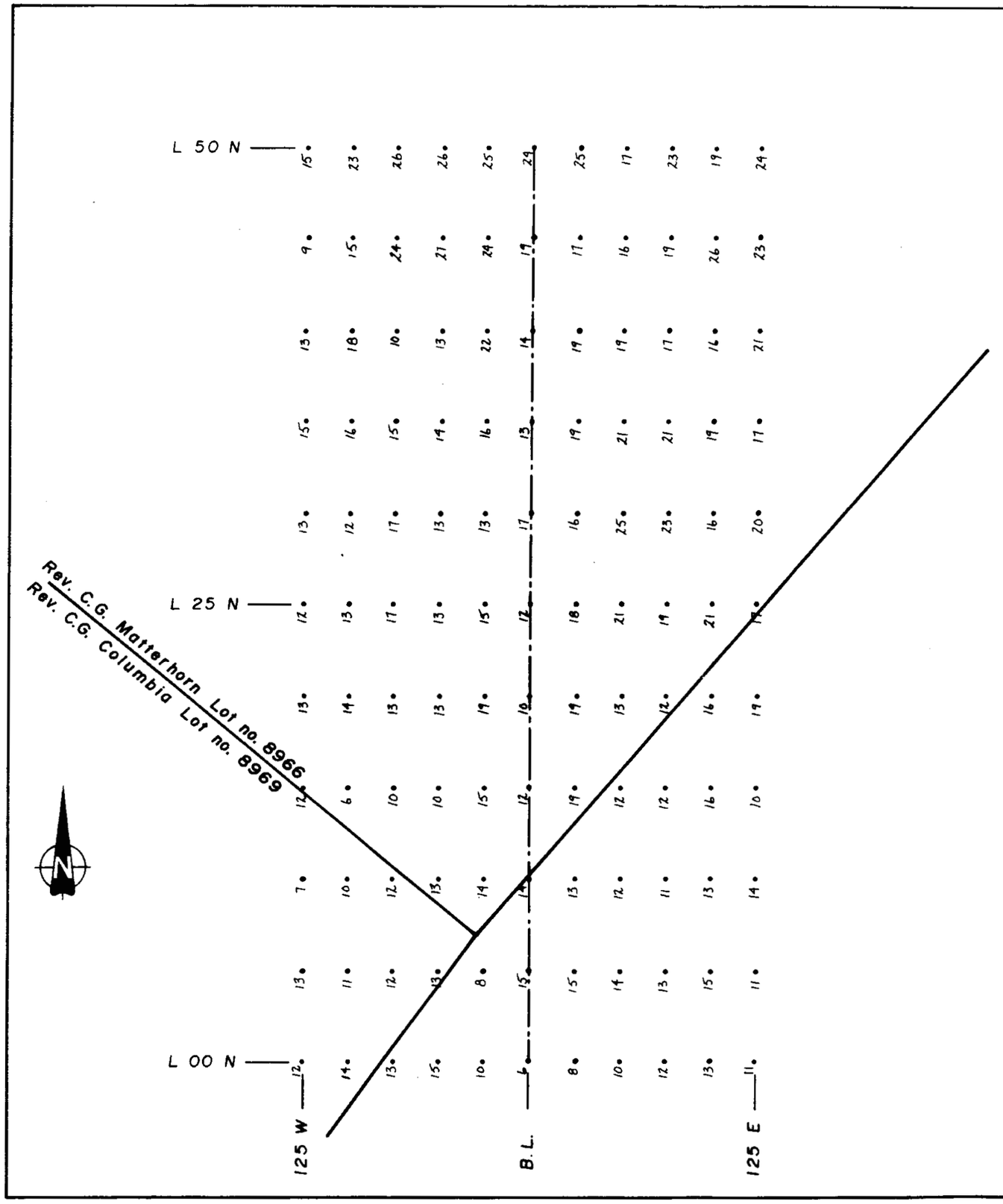
P.C.I CLAIM

ST. MARY LAKE AREA

FT. STEELE M.D.

VLF-EM FRASER FILTER

SCALE	DATE:	SHEET:	DRAWN BY:
1:2500	Jan. 84.	3	B. D. S.



LEGEND

——·—— Baseline

• Sample station

Seattle 24.8 KHz.

50 25 0 50 100 m.

TRANS ARCTIC EXPLORATIONS LTD.

P.C. 1 CLAIM

ST. MARY LAKE AREA

FT. STEELE M.D.

VLF-EM RAW DATA

SCALE:	DATE:	SHEET:	DRAWN BY:
1:2500	Jan. 84.	4	B. D. S.