VTCK. '79-#88-#7210

GEOPHYSICAL-GEOCHEMICAL REPORT

on

INDUCED POLARIZATION AND SOIL SAMPLE SURVEYS

OVER THE SANTA WESTSIDE ZONE

SANTA CLAIM GROUP

NORTHAIR AREA, VANCOUVER M.D., B.C.

Property	:	15 kms, N5W of the north end of Daisy Lake and 13 kms N55W of the south end of Alta Lake.
	:	50° 123° S.E.
	:	N.T.S. 92J/3E
Written by	:	David G. Mark, GEOTRONICS SURVEYS LTD Suite 420-890 W Pender Street, Vancouver, B.C. V6C 1J9
For	:	Lakewood Mining Co.Ltd 2245 West 13th Ave Vancouver, B.C.

November 3, 1978

GEOTRONICS SURVEYS L
Engineering & Mining Geophysic
VANCOUVER, CANADA

TABLE OF CONTENTS

SUMMARY	i
CONCLUSIONS	ii
RECOMMENDATIONS	iii
INTRODUCTION AND GENERAL REMARKS.....	1
PROPERTY AND OWNERSHIP.....	2
LOCATION AND ACCESS.....	2
PHYSIOGRAPHY.....	3
HISTORY OF PREVIOUS WORK.....	3
GEOLOGY.....	3
SOIL GEOCHEMISTRY SURVEY.....	5
1. Survey Procedure.....	5
2. Testing Procedures.....	5
3. Treatment of Data.....	5
INDUCED POLARIZATION SURVEY.....	7
1. Instrumentation and Theory.....	7
2. Survey Procedure.....	8
3. Compilation of Data.....	9
DISCUSSION OF RESULTS.....	12
1. Soil Geochemistry.....	12
2. I.P.- Resistivity.....	14
SELECTED BIBLIOGRAPHY.....	16
GEOPHYSICIST'S CERTIFICATE.....	17

7210

TABLE OF CONTENTS (continued....)

ILLUSTRATIONS

(at end of report)

	Sheet No.
LOCATION MAP	1
SOIL GEOCHEMISTRY - LEAD DATA AND CONTOURS	2
SOIL GEOCHEMISTRY - ZINC DATA AND CONTOURS	3
SOIL GEOCHEMISTRY - SILVER DATA AND CONTOURS	4
SOIL GEOCHEMISTRY - COPPER DATA AND CONTOURS	5
INDUCED POLARIZATION SURVEY FREQUENCY EFFECT DATA AND CONTOURS	6
INDUCED POLARIZATION SURVEY RESISTIVITY DATA AND CONTOURS	7
INDUCED POLARIZATION SURVEY METAL FACTOR DATA AND CONTOURS	8
COMPILATION MAP	9

SUMMARY

Soil geochemistry and induced polarization surveys were carried out over the Westside showing area within the Santa property of Lakewood Mining Co. Ltd. during September, 1978. The property is located on and around Wood and Powell Lakes 13 kms N55W of Alta Lake within the Vancouver Mining Division. Access is by the Callaghan Creek gravel road which leaves Highway No. 99 111 kms. north of Vancouver. The terrain is moderate with steep areas that are interspersed with rock bluffs and the forest cover is heavily coniferous.

The object of the surveys was to locate economic sulphide mineralization possibly similar to that occurring on the Northair Mines property, 5.5 kms to the southeast of the Westside Zone.

Prior work on the property has consisted of stream and sediment sampling, road building, 'cat' trenching, and diamond drilling.

The property for the most part is underlain by a metavolcanic roof pendant intruded by diorites. The southwestern corner of the property is covered by Recent volcanics and a few kilometers to the northeast is underlain by Coast Intrusives granodiorite. Pyritization occurs throughout the property with some lead, zinc, silver, copper and gold mineralization.

The soil sampling was done over a small area on a 25-by 50-meter grid. The samples were tested for lead, zinc, silver and copper and the results were plotted and contoured. Five anomalous zones were revealed.

The I.P. survey, frequency domain, was done with a dipole length, dipole separation, and reading interval of 50 meters on the 50-meter separated lines. The resistivity and metal factor values were calculated, and these, along with the frequency effect readings, were plotted and contoured. A compilation map was also drawn. The survey resulted in four anomalies.

CONCLUSIONS

1. The geology of the property appears to be favourable to the occurrence of economic sulphide mineralization for the following reasons:

   a) The property is underlain by a roof pendant of meta-volcanics that have been intruded by diorites causing significant alteration (including widespread pyritization) in both rock types.

   b) The property is crossed by a series of faults running northeasterly, northwesterly and northerly. The Westside showing occurs at a conjunction of two of these faults.

   c) The property is in close proximity to and on strike of one of the Northair veins.

   d) One of the diamond drill holes encountered copper, lead, silver and gold mineralization.

2. The soil geochemistry survey revealed four main zones that were anomalous in lead, zinc, silver and copper values. A fifth, 1-value zone was anomalous in zinc and highly anomalous in lead.

3. The main zone is that labelled A which has an average strike of east-west, is open on both ends and therefore has a minimum length of 200 meters.

4. The other four zones have smaller minimum sizes but are open in at least one direction.

5. The I.P. survey has revealed four anomalies lettered A to D. Anomaly A consists of several anomalous readings but anomalies B, C and D consist of only one anomalous reading each.

6. The I.P. anomalies essentially occur in between and adjacent to the soil geochemistry anomalies. This strongly suggests that the I.P. anomalies are reflecting pyritization that occurs adjacent to the causitive sources of the soil geochemistry anomalies, i.e. the lead, zinc, silver and copper mineralization. Gold values may very well be found within the pyritization.

RECOMMENDATIONS

The favourable geology as well as the correlative results of the soil geochemistry and I.P. surveys warrants further work as follows:

1. The soil geochemistry and I.P. surveys should be extended in all directions over a much wider area. This will result in a more accurate picture of what is anomalous as well as further delineating the presently known anomalies. This is especially true

of the I.P. survey since the writer suspects that the threshold values are significantly lower.

2. Magnetic and VLF-EM surveys should be done over the whole property principally for geological mapping purposes. The VLF-EM in addition may be useful in delineating sulphide zones.

3. The exploration to date has definitely resulted in diamond drill targets. These could be drilled at the present time, but in the writer's opinion, it is more preferable to wait until recommendations 1 and 2 are carried out. The targets are the soil geochemistry zones 1, 3, 2, and 4, listed in order of importance. One drill hole should be drilled on I.P. anomaly B because of its correlation with the soil anomaly 1. The exact location and dip of the drill holes would be more accurately determined by a geologist on the property who would take into account the geology as well as the terrain.

GEOPHYSICAL-GEOCHEMICAL REPORT

on

INDUCED POLARIZATION

AND SOIL SAMPLE SURVEYS

OVER THE SANTA WESTSIDE ZONE

SANTA CLAIM GROUP

NORTHAIR AREA, VANCOUVER M.D., B.C.

INTRODUCTION AND GENERAL REMARKS

This report discusses the survey procedure, compilation of data, and the interpretation of an induced polarization (I.P.) survey, and a soil sampling survey over a portion of the Santa Claim located a few kilometers northwest of Northair Mines in the Vancouver Mining Division.

The surveys were carried out during the month of September, 1978 by personnel of Lakewood Mining. The total number of samples picked up were 104 and these were subsequently tested for lead, zinc, silver and copper.

Two kms. of I.P. survey with 44 readings were carried out. The two surveys were done over a small grid on the Santa Westside Zone as shown on Sheet 1.

The purpose of carrying out the two surveys was to locate probable zones of economic sulphide mineralization. The soil sampling, hopefully, should reflect the mineralization directly.

The purpose of the I.P. survey was to locate fracture-filling or disseminated (i.e. non-massive) sulphides which could mean locating pyritization associated with the economic sulphide mineralization.

PROPERTY AND OWNERSHIP

The property is comprised of five claims composed of 35 units as shown on Sheet 1 and as described below:

Claim Name	No. Units	Record No.	Expiry Date
Santa	20	64(12)	Dec 22, 1979
Santa Southeast	2	75(3)	Mar 22, 1980
Santa North	6	76(3)	Mar 22, 1980
Santa East	3	77(.3)	Mar 22, 1980
Santa South	4	78(3)	Mar 22, 1980

The claims are owned by Lakewood Mining Co.Ltd of Vancouver, British Columbia.

LOCATION AND ACCESS

The property is centered along a south-trending valley about four kms. southeast of Callaghan Lake. It is located 15 kms. N5W of the north end of Daisy Lake and 13 kms. N55W of the south end of Alta Lake.

The geographical coordinates are 50° 10' north latitude and 123° 08' west longitude.

Access to the claims is gained by travelling north along Highway 99 about 111 kms. from Vancouver to where Callaghan Creek crosses the road (about 5 kms. past Brandywine Falls). A short distance northeast of Callaghan Creek, one turns north onto a fairly good gravel road and travels about 8 kms. to a fork. The Santa property access road (runs to the east) is about 5.5 kms. past the fork on the left road.

PHYSIOGRAPHY

The property is found within the physiographic unit known as the Coast Mountains, the terrain of which in general is quite rugged. The terrain of the property itself, however, is moderate with rough sections. The slopes vary from level to about 30° with rock bluffs occurring locally.

Two small lakes occur within the claims area and are drained by Alexander Creek and its tributary. Small creeks and small swamp-like lakes are found throughout the property.

The property is covered by a coniferous forest of large trees with moderate underbrush.

HISTORY OF PREVIOUS WORK

The Santa Claim was staked in 1976. Prior to this the ground was covered by the FASS Claim Group over which the Cultor Syndicate did some soil and stream sediment sampling in 1973.

Lakewood bulldozed in the access road, dug one trench and drilled three diamond drill holes during the exploration season of 1977.

GEOLOGY

The main points of the geology will only be mentioned here. For a more detailed description, see Sookochoff's reports.

The general area is underlain by plutonic rocks of the Coast Crystalline Complex of unknown age and northwest trending metamorphosed rocks. Within these rocks occur north-to northwesterly-trending pendants composed of metavolcanic and metasedimentary strata. The Northair mine occurs in one of these pendants.

Eighty percent of the claims are underlain by a metavolcanic pendant of Upper Triassic to Lower Cretaceous Age. The main rock-type is greenstone with minor metasediments. The pendant has been intruded by diorites causing significant and widespread alteration. The southwest corner of the claims are underlain by Upper Tertiary to recent volcanics with the rock-types being dacite, andesite, and basalt breccias, tuffs, and flows. About 1.5 kms to the northeast occurs granodiorite of the Coast Intrusives(unknown age).

Many faults strike through the property, mainly in a north-easterly direction, and also northerly and northwesterly.

In discussing mineralization on the property, Sookochoff noted:-

> "In addition to pyrite which is found throughout the area, mineralization consists of: chalcopyrite occurring as disseminations and blebs in association with pyrite in metadiorites and metasediments; galena occurring in a quartz vein at the Westwood showing and also occurring in association with pyrite and chalcopyrite in D.D.H. #3 at the Westwood showing: scheelite occurring rarely as blebs within quartz and quartz-carbonate veinlets."

The Westside showing consists primarily of pyritization and occurs at a conjunction of two orthogonal faults.

Soil and stream sediment sampling done throughout the property other than the Westside area has revealed anomalies in lead, zinc, silver, copper, tungsten and nickel.

The three diamond drill holes all encountered pyritization in varying degrees with some disseminations of chalcopyrite. In addition, drill hole 2 encountered interesting values in copper, lead, silver and gold.

SOIL GEOCHEMISTRY SURVEY

1. Survey Procedure:

The soil samples were taken at 25-meter separations on lines 50 meters apart and running in a southerly direction. In addition, L-20S was sampled, which runs westerly. The samples were taken with an auger and the horizon sampled was B, the colour of which varied from brown to reddish brown. The depth the sample was taken from was about 30 cms. Samples were placed in brown wet-strength paper bags with grid co-ordinates marked thereon.

2. Testing Procedures:

All samples were tested by Vangeochem Lab Ltd. of North Vancouver, B.C. The sample is first thoroughly dried and then sifted through an -80 mesh screen. A measured amount of the sifted material is then put into a test tube with subsequent measured additions of a solution of perchloric and nitric acid. This mixture is next heated for a certain length of time. The parts per million (ppm) copper, lead, zinc or silver is then measured by atomic absorption.

3. Treatment of Data:

The writer usually applies statistics through graphical means to the geochemistry data in order to obtain the statistical parameters such as the anomalous threshold value. However, this geochemistry survey was carried out over a limited area with a limited number of samples, that it could be misleading to apply statistics. For example, it is possible that the whole survey area is anomalous in lead. Using statistics, one may obtain an anomalous threshold value that is higher than the actual value. Therefore, the sampling should be done over a much wider area with a greater number of samples being picked up in order to calculate more accurate statistical parameters.

In this case, therefore, it is felt the best method is to simply examine the data and estimate the various parameters. This method, however, will not entirely get away from the problem of a high percentage of the data being anomalous (if this in fact is the case).

The lead, zinc, silver and copper values were first plotted on sheets 2 through to 5, respectively, which are at a scale of 1:2500 (1 cm = 25 m). By examination the statistical parameters were then determined as follows: (values are in parts per million).

	Lead	Zinc	Silver	Copper
Mean background value	12	15	0.5	10
Sub-anomalous threshold value	20	30	0.9	25
Anomalous threshold value	30	50	1.5	50

The values were then contoured at an interval similar to being logarithmic beginning at the sub-anomalous threshold value. This contour was dashed in whereas the anomalous contours were drawn in solid.

INDUCED POLARIZATION SURVEY

1. Instrumentation and Theory:

The induced polarization equipment used was frequency-domain type manufactured by Sabre Electronic Instruments Ltd. of Burnaby, B.C. A 12-volt lead-acid battery was used for a power source to give a power potential of 500 watts.

The transmitter output voltage is 125, 250, 375, or 500 volts with selection by a switch. The transmitter current varies up to 1,000 milliamperes. The self-potential buckout is operated manually by a 10-turn precision pot with a range of $\pm$ 1 volt.

There are basically two methods of I.P. surveying, frequency-domain and time domain. Both methods are dependent upon a current flowing across an electrolyte-electrode interface or an electrolyte-clay particle interface, the former being called electrode polarization and the latter being called membrane polarization.

In time-domain electrode polarization, a current is caused to flow along electrolyte-filling capillaries within the rock. If the capillaries are blocked by certain mineral particles that transport current by electrons (most sulphides some oxides, graphite), ionic charges build up at the particle-electrolyte interface, positive ones where the current enters the particle, and negatives ones where it leaves. This accumulation of charge creates a voltage that tends to oppose the current flow across the interface. When this current is stopped the created voltage slowly decreases as the accumulated ions diffuse back into the electrolyte. Thus is produced the induced polarization effect.

In membrane polarization a similar effect occurs. A charged clay particle attracts opposite charged ions from the electrolyte in the capillary around the particle. If a current

is forced through the capillary, the charged ions are displaced.

When the current is stopped, the ions slowly diffuse back to the same equilibrium state as before the current flow. This explains I.P. anomalies where no metallic-type minerals exist.

Frequency-domain I.P. is based on the fact that the resistance produced at the electrolyte-charged particle interface decreases with increasing frequency. Two parameters commonly used for measuring frequency-domain induced polarization are frequency effect and metal factor (as in this survey). The one used for time-domain measurements is chargeability.

In the process of carrying out an I.P. survey, two other geophysical methods are used and measured. These are self-potential (S.P.) and resistivity. The S.P. must be nulled by the I.P. receiver in order to obtain accurate I.P. measurements and is a measure of the 'battery action' of the ground. The resistivity value is calculated from the voltage and current readings obtained while measuring the I.P. effect and therefore can be utilized to determine how resistive (or conductive) the ground is.

2. Survey Procedure:

The dipole-dipole array was used with an electrode spread (or dipole length) of 50 meters at only the first separation (n = 1). The two frequencies used were 0.3 Hz and 10Hz.

Non-polarizing, unglazed porcelain pots with a copper electrode and copper sulphate electrolyte were used for the potential electrodes. Stainless steel stakes were used for the current electrodes.

Readings were taken every 50 meters on the 50-meter separated lines trending south and on line 20S.

3. Compilation of Data:

The three types of data, described as follows, were plotted on survey plans at a scale of 1:2500.

1. Percent frequency effect (Sheet 6) - this is the actual measure of the induced polarization effect in a frequency domain survey. The term is derived from the percentage change in the electrode-electrolyte transfer impedance at the two different frequencies. A disseminated sulphide body would cause a large change. This property is measured directly in the field.

   The I.P. survey, like the soil geochemistry survey, was done over a limited area and therefore the threshold values were estimated by examining the survey plans.

   The values were determined as follows:

Mean background value	7.5%
Possibly anomalous level	10.0%
Probably anomalous level (or sub-anomalous)	12.0%
Definitely anomalous level	16.5%

The data were contoured with 10, 12, 16.5, 25 and 35% contours. The 10% contour was drawn in lightly, the 12% dashed, and the 16.5 to 35% contours drawn in solid.

It is not actually accurate to contour I.P, resistivity, or metal factor data since the data results from electrodes with a certain separation length along a certain direction. That is, a different value can be obtained from electrodes placed in a different direction since the electrodes are measuring over a different length of ground. Therefore, in this case, readings taken along line 20S could be different from readings taken along the south-trending lines for the same spot.

The writer does feel, however, that contouring of this type of data presents a convenient picture. The limitations of presenting contoured I.P. anomalies should be realized, nevertheless.

The profiling of I.P, resistivity, and metal factor data is more accurate, and it does have the added benefit of showing areas that may be locally anomalous that may not show up in a contoured presentation. However, profiling is much more expensive in drafting costs. As a result, the writer has contoured the I.P. data down to 10% which appears to be barely above background.

2. Resistivity (Sheet 7) - this is a measure of how resistive, or inversely, how conductive the overburden and/or bedrock is. Most often a disseminated sulphide body is expressed by a resistivity low. The resistivity values in ohm-meters were arrived at by dividing the receiving voltage by the transmitter current and multiplying by 942 (a geometric factor peculiar to the dipole-dipole array with a dipole length of 50 meters and a dipole separation of n= 1).

The resistivity data were analyzed in the same manner as the I.P. data. Unlike the I.P. data, the resistivity lows are primarily of importance. The parameters were determined as follows:

Anomalous threshold low value	80 ohm-meters
Sub-anomalous threshold low value	260 ohm-meters
Mean background value	440 ohm-meters
Sub-anomalous threshold high value	620 ohm-meters
Anomalous threshold high value	800 ohm-meters

The resistivity data were contoured with the 80 and 260 ohm-meter contours dashed in, and the 620, 800, 1200, 2000 and 4000 ohm-meter contours drawn in solid. The background contour was not drawn in.

3. Metal factor (Sheet 8) - this commonly used parameter was devised to show the correlation between I.P. results and resistivity results since often the causitive sources of I.P. anomalies such as disseminated or fracture-filling sulphide bodies have a low resistivity. This is caused by the sulphides themselves or electrolyte-filled fractures so often associated with a sulphide body.

It is arrived at by dividing the I.P. value by the resistivity value and multiplying by 1,000. As a result, it is not a measure of any one physical property but a combination of two.

The metal factor data were statistically analyzed the same way as the I.P. data to give the statistical parameters as follows:

Mean background value	16.6
Sub-anomalous threshold value	25.0
Anomalous threshold value	35.0

The data were plotted on Sheet 8 and contoured. The sub-anomalous contour of 25.0 was dashed in whereas the anomalous contours (35.0 and above) were drawn in solid.

4. Compilation Map (sheet 9) - This map was drawn to show the correlation of the different surveys. The lead, zinc, silver, copper, I.P. and resistivity anomalies are shown in outline by the sub-anomalous contours.

DISCUSSION OF RESULTS

1. Soil Geochemistry

The soil geochemistry data, especially by examining the compilation map, can be seen to occur in four, and possibly five, distinct zones. These have been labelled by the numbers 1 to 5. All zones, except for 5 are correlative in all four metals, that is, lead, zinc, silver and copper.

Zone 1 is the largest and the most interesting zone. In the order of importance, it reaches a high of 197 ppm in zinc, 97 ppm in copper, 44 ppm in lead and 1.2 ppm in silver. There are only sub-anomalous values in silver, and these occur in isolated anomalies throughout the zone.

It appears to strike east-west with it being open on both the east and west ends. Its minimum length is therefore 200 meters. On lines 25 and 30W, the zone appears to split into two different directions, northwesterly and southwesterly.

It should be pointed out that within Zone 1 occurs one soil sample that appears to have been taken in the middle of the lake. From what the writer has learned, most likely this

sample was taken on the north shore.

Zone 2 occurs only on lines 25 and 30W and is open towards the west. The strike is difficult to determine, but it appears to be westerly.

The order of importance of its metals with the highest value in brackets are silver (2.4 ppm), lead (31 ppm), zinc (52 ppm) and copper (36 ppm).

Zone 3'S strike direction appears to be most likely north-easterly, though it could be easterly as well. It is open to the south as well as the east. It is the only anomaly with anomalous values in all four metals. In order of importance, the highest value in each metal is 174 ppm copper, 1.8 ppm silver, 175 ppm zinc, and 36 ppm lead.

Zone 4 consists of three soil samples with anomalous or sub-anomalous values in all four metals. The highest values are 143 ppm zinc, 72 ppm copper, 28 ppm lead, and 1.4 ppm silver. The zone appears not to have a strike though it possibly could extend in a west to northwesterly direction, and/or in an east to northeasterly direction. Its minimum size is a diameter of 55 meters.

Zone 5 consists of one soil sample on the eastern end of Line 20S and is, therefore, open to the north, south and east. It is very highly anomalous in lead with the value being 365 ppm. This indicates the sample was taken probably within a few meters of the causitive source. The correlating anomalous value in zinc was 66 ppm. The sample was not anomalous in either silver or copper.

An anomalous value in zinc of 109 ppm occurs on line 15W near the trench.

2. I.P. - Resistivity

The I.P. data (otherwise known as frequency effect) as shown on Sheet 6 can be divided into four different zones that have been labelled by the leters A to D. Anomalous Zone A consists of many anomalous readings, whereas anomalies, B, C and D consist only of one anomalous reading each.

Zone A appears to be striking westerly with a leg striking possibly south, is open on the east, west, and south ends, and has two very highly anomalous readings of 50%.

As can be seen on the metal factor map, the correlation of Zone A with resistivity low values is moderate. The metal factor anomaly could be considered the most interesting part of Zone A, because of the high I.P. values correlating with the low resistivity values.

Zone B, consisting of a highly anomalous value of 50% also has a correlating resistivity low value resulting in a metal factor high.

Zone C has a value of 17% and doesn't correlate with a resistivity low.

Zone D consists of only a sub-anomalous value of 12.5% which, nevertheless is high relative to the values around it. It also correlates with a resistivity low resulting in a metal factor high.

It is felt necessary to point out that metal factor anomalies can be misleading since they can be caused solely by resistivity lows. A resistivity low may simply be caused by conductive overburden such as a swamp area, or by relatively conductive bedrock with no associated sulphides.

Correlative to this, resistivity highs may simply be a result of shallow overburden and, therefore, resistivity results may only be reflecting the changes in thickness of the overburden.

It is known that diorite intrusives occur throughout the property and, therefore, it is quite possible that the resistivity highs are reflecting the diorite intrusives.

The most interesting aspect in correlating the I.P. data with the soil geochemistry data is that the I.P. anomalies, A, B, C and D, occur, by and large, in between and adjacent to the soil anomalous zones. The strong indication is therefore that the I.P. results are a reflection of pyritization that occur adjacent to the causitive sources of the soil geochemistry anomalies. Pyritization is always of strong exploration interest since it is an indication of economic mineralization possibly occurring nearby. Of further interest in this case is that significant gold values apparently occur with pyrite in the Northair area.

I.P. anomaly B does correlate directly with geochemistry Zone 1. However, the correlating metal values are only sub-anomalous.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.,

David G. Mark, Geophysicist

November 3, 1978

SELECTED BIBLIOGRAPHY

Roddick, J.A. et al. Summary of Activities, G.S.C. Coast Mountains Project - Pemberton Map Area, B.C. Paper 75-1, Part A, pp.32-40, Geol. Surv. of Can., 1975.

Roddick, J.A. et al. Pemberton (east half) Map-Area, British Columbia (92 JE½), Paper 73-17, Geol. Surv. of Can. 1973.

Roddick, J.A. Vancouver North, Coquitlam and Pitt Lake Map-Area, British Columbia, Memoir 335, Geol.Surv. of Can. 1965.

Sookochoff, L. Geological Report on the Santa Property for Lakewood Mining Co. Ltd. (NPL), October 16, 1978.

Woodcock, J.R. Geochemical Report on the Fass Mineral Claims, October 4, 1973.

Woodsworth, G.J. et al. Geology (Map), Pemberton (92J) Map-Area O.F.482, Geol. Surv. of Can. 1977.

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 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 in 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 soil sampling and from an induced polarization survey carried out during September 1978 by Lakewood personnel. None of the surveys were under my supervision.

5. I have no direct or indirect interest in the properties or securities of Lakewood Mining Company Ltd. (NPL) Vancouver, B.C. nor do I expect to receive any interest therein.

David G. Mark
Geophysicist

November 3, 1978

123°00'

123°08'

50°10'

SANTA NORTH

SANTA

Powell Lake

WESTSIDE ZONE

SANTA EAST

Wood Lake

SANTA SOUTH

SANTA SOUTH-EAST

LAKEWOOD PROPERTY

NORTHAIR MINES

CALLAGHAN CREEK

Fork

VAN SILVER

EXPL.

Brandywine Creek

BRANDYWINE

Dorsy Lake

ALTA LAKE

HIGHWAY 99

P.G.E.

6000

5000

4000

3000

Pemberton

Lillooet Lake

Daisy Lake

SQUAMISH

VANCOUVER

N

2.5°

7210

LAKEWOOD MINING CO. LTD. (N.P.L.)

SANTA PROPERTY

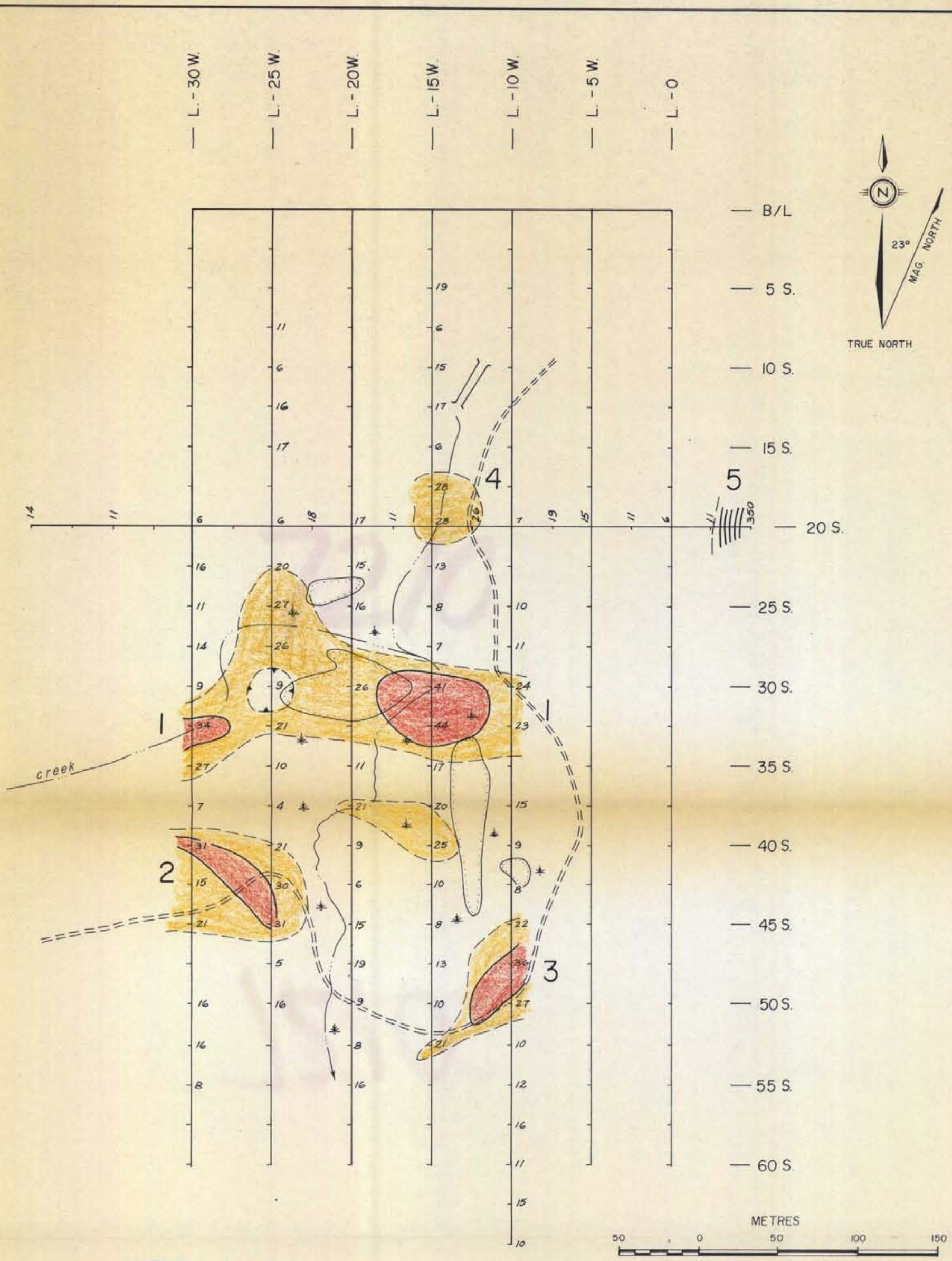
LOCATION MAP

VANCOUVER M.D., B.C.

Km 0 1.6 3.2 4.8 Km.

1: 50,000

SHEET 1



CONTOURS

Sub - anomalous (20 ppm)

Anomalous (30, 50, 90, 150, 250 ppm)

PARAMETERS

Mean background value 12 ppm

Sub - anomalous threshold value 20 ppm

Anomalous threshold value 30 ppm

7210

To accompany geophysical/geochemical report by DAVID G. MARK, geophysicist, dated Nov. 3/78

GEOTRONICS SURVEYS LTD.

LAKEWOOD MINING Co. LTD. (N.P.L.)

SANTA CLAIM GROUP

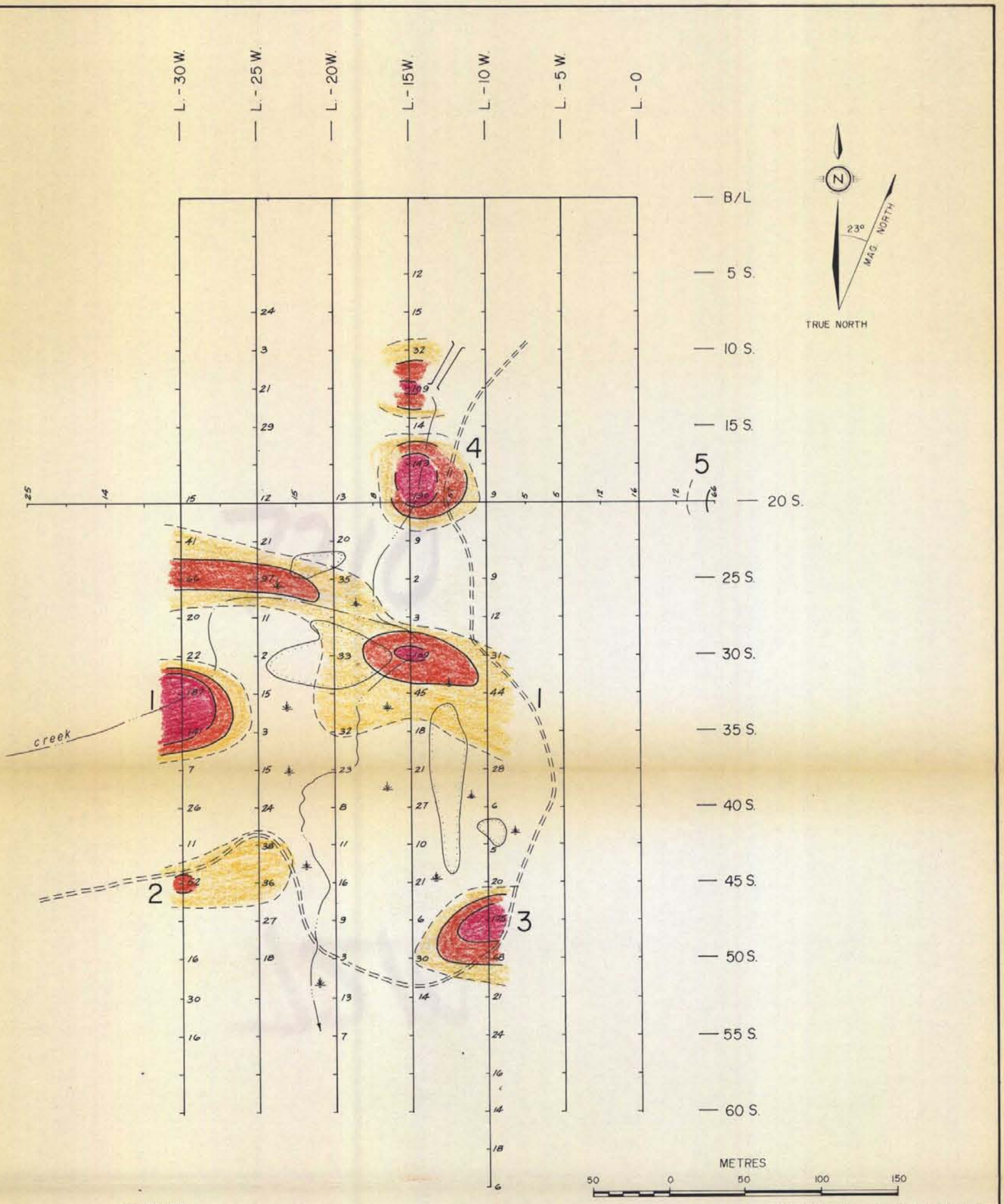
NORTHAIR AREA, VANCOUVER M.D., B.C.

SOIL GEOCHEMISTRY SURVEY

LEAD

DATA & CONTOURS

DRAWN BY:	JOB No.	DATE:	SCALE:	SHEET No.
D.G.M.	78 - 52	NOV. '78	1 : 2500 (1cm = 25m)	2



CONTOURS

Sub - anomalous (30 ppm)

Anomalous (50, 100 ppm)

PARAMETERS

Mean background value 15 ppm

Sub - anomalous threshold value 30 ppm

Anomalous threshold value 50 ppm

7210

To accompany geophysical/geochemical report by DAVID G. MARK, geophysicist, dated Nov.3/78

GEOTRONICS SURVEYS LTD.

LAKEWOOD MINING Co. LTD. (N.P.L.)

SANTA CLAIM GROUP

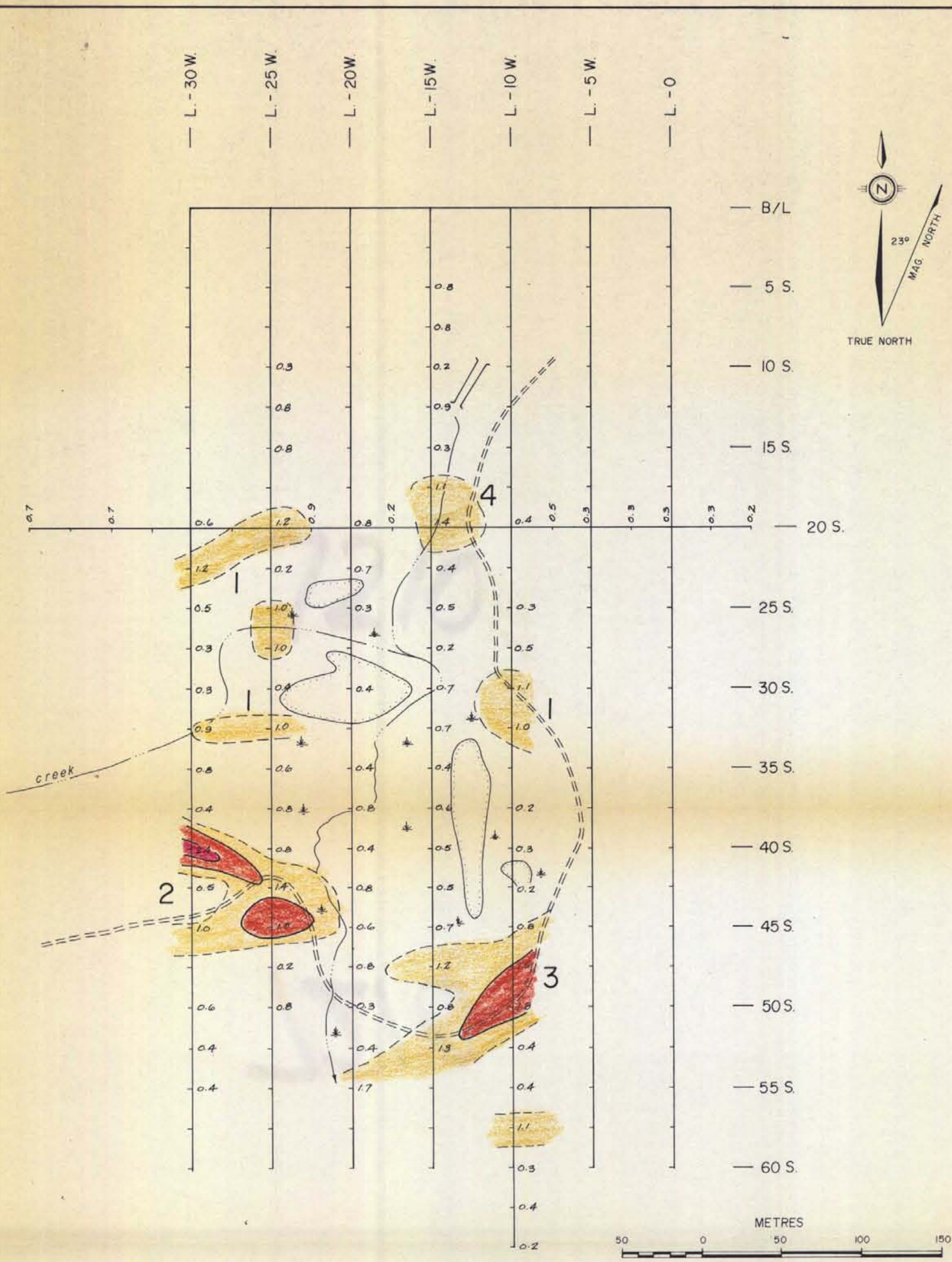
NORTHAIR AREA, VANCOUVER M.D., B.C.

SOIL GEOCHEMISTRY SURVEY

ZINC

DATA & CONTOURS

DRAWN BY:	JOB No.	DATE:	SCALE:	SHEET No.
D.G.M.	78 - 52	NOV. '78	1 : 2500 (1cm = 25m)	3



To accompany geophysical/geochemical report by DAVID G. MARK, geophysicist, dated Nov.3/78

CONTOURS

— — — — — — Sub - anomalous (0.9 ppm)

——————— Anomalous (1.5 , 2.0 ppm)

PARAMETERS

Mean background value 0.5 ppm

Sub - anomalous threshold value 0.9 ppm

Anomalous threshold value 1.5 ppm

7210

GEOTRONICS SURVEYS LTD.

LAKEWOOD MINING Co. LTD. (N.P.L.)

SANTA CLAIM GROUP

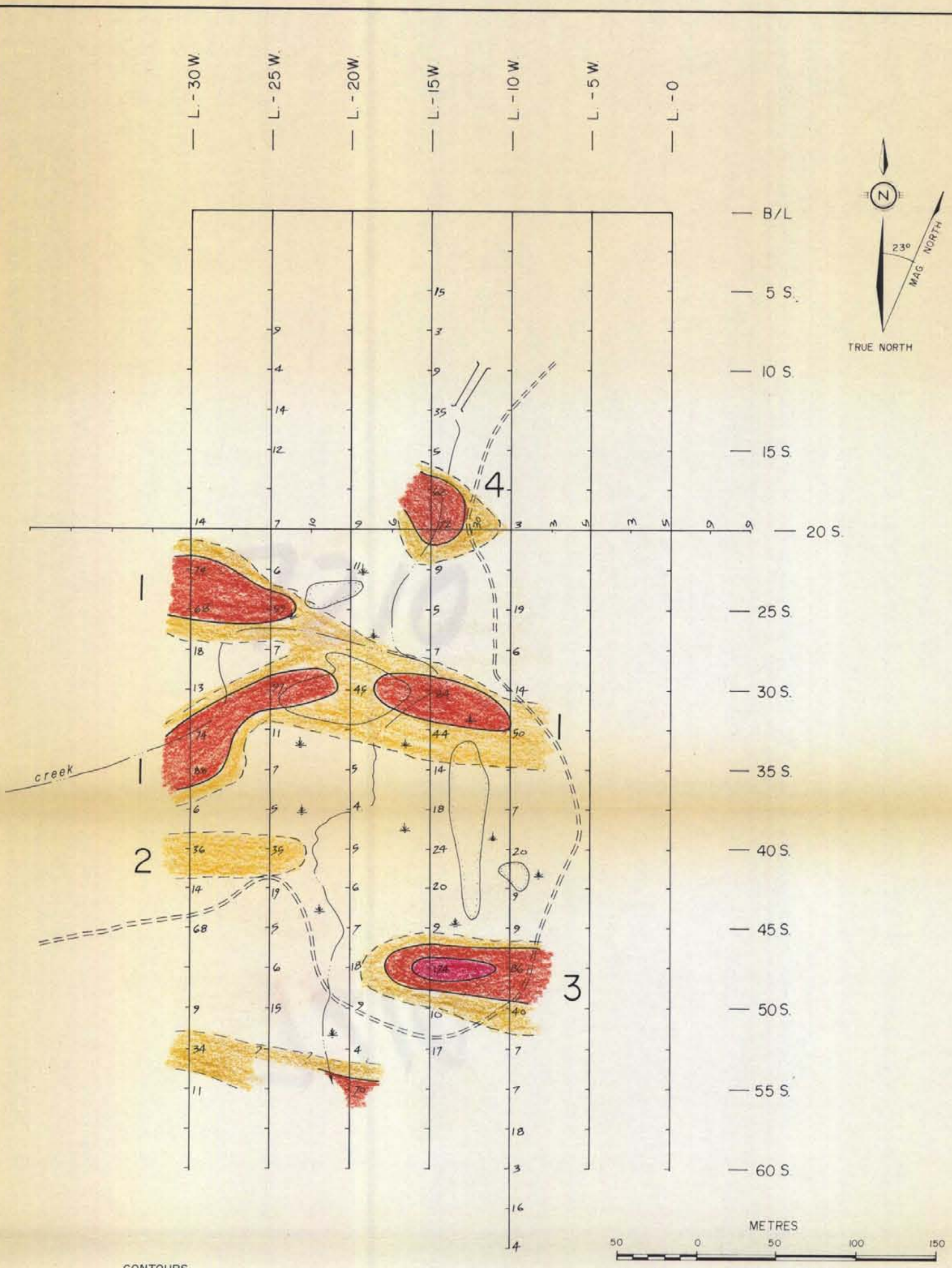
NORTHAIR AREA, VANCOUVER M.D., B.C.

SOIL GEOCHEMISTRY SURVEY

SILVER

DATA & CONTOURS

DRAWN BY:	JOB No.	DATE:	SCALE:	SHEET No.
D. G. M.	78 - 52	NOV. '78	1 : 2500 (1cm = 25m)	4



To accompany geophysical/geochemical report by DAVID G. MARK, geophysicist, dated Nov. 3/78

CONTOURS

— — — — — — Sub - anomalous (25 ppm)

——————— Anomalous (50, 100 ppm)

PARAMETERS

Mean background value 10 ppm

Sub - anomalous threshold value 25 ppm

Anomalous threshold value 50 ppm

7210

GEOTRONICS SURVEYS LTD.

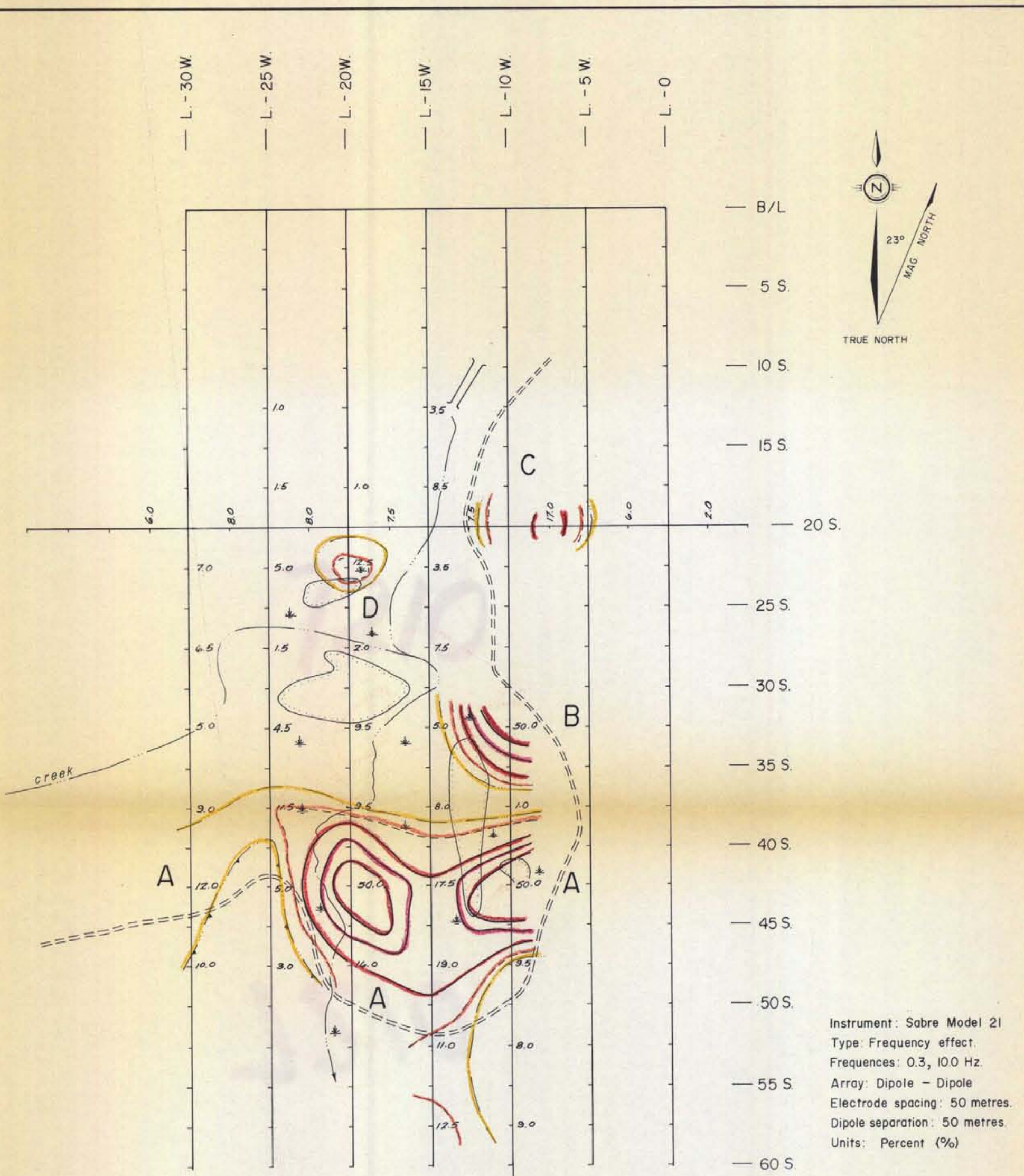
LAKEWOOD MINING Co. LTD. (N.P.L.)

SANTA CLAIM GROUP

NORTHAIR AREA, VANCOUVER M.D., B.C.

SOIL GEOCHEMISTRY SURVEY
COPPER
DATA & CONTOURS

DRAWN BY:	JOB No.	DATE:	SCALE:	SHEET No.
D.G.M.	78 - 52	NOV. '78	1 : 2500 (1cm = 25m)	5



CONTOURS

Possible anomalous (10.0 %)

Probable anomalous (12.0 %)

Anomalous (16.5, 25, 35 %)

PARAMETERS

Mean background value 7.5 %

Sub-anomalous threshold value 12.0 %

Anomalous threshold value 16.5 %

7210

Instrument: Sabre Model 21
Type: Frequency effect.
Frequences: 0.3, 10.0 Hz.
Array: Dipole – Dipole
Electrode spacing: 50 metres.
Dipole separation: 50 metres.
Units: Percent (%)

To accompany geophysical/geochemical report by DAVID G. MARK, geophysicist, dated Nov. 3/78

GEOTRONICS SURVEYS LTD.

LAKEWOOD MINING Co. LTD. (N.P.L.)

SANTA CLAIM GROUP

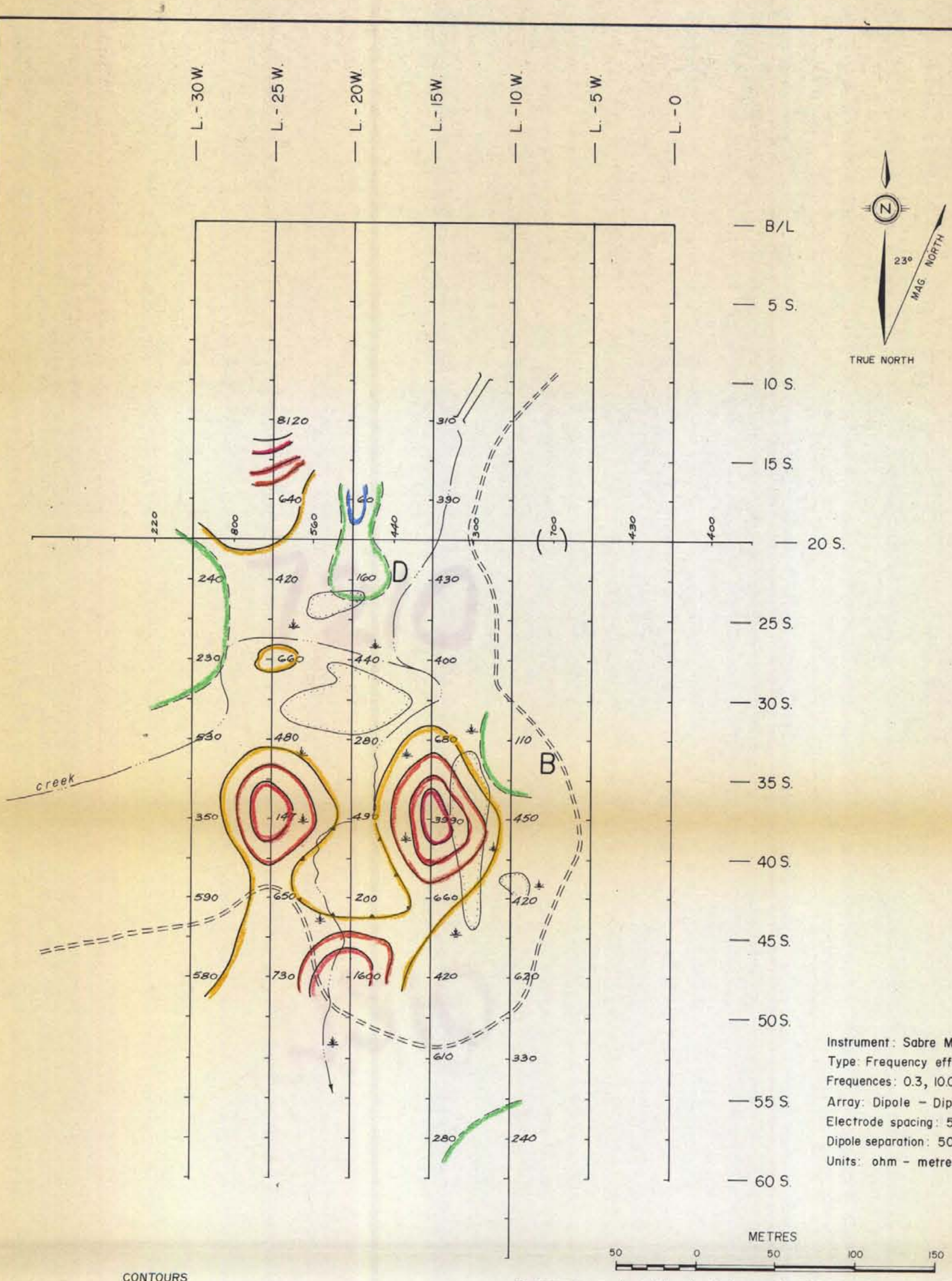
NORTHAIR AREA, VANCOUVER M.D., B.C.

INDUCED POLARIZATION SURVEY

FREQUENCY EFFECT

DATA & CONTOURS

DRAWN BY:	JOB No.	DATE:	SCALE:	SHEET No.
D.G.M.	78-52	NOV. '78	1:2500 (1cm = 25m)	6



Instrument: Sabre Model 21
Type: Frequency effect.
Frequences: 0.3, 10.0 Hz.
Array: Dipole - Dipole
Electrode spacing: 50 metres.
Dipole separation: 50 metres.
Units: ohm - metres

To accompany geophysical/geochemical report by DAVID G. MARK, geophysicist, dated Nov.3/78

CONTOURS

Anomalous low (260, 80)

Anomalous high (620, 800, 1200, 2000, 4000.)

PARAMETERS

Anomalous low threshold value 80

Sub-anomalous low threshold value 260

Mean background value 440

Sub-anomalous high threshold value 620

Anomalous high threshold value 800

7210

GEOTRONICS SURVEYS LTD.

LAKEWOOD MINING Co. LTD. (N.P.L.)

SANTA CLAIM GROUP

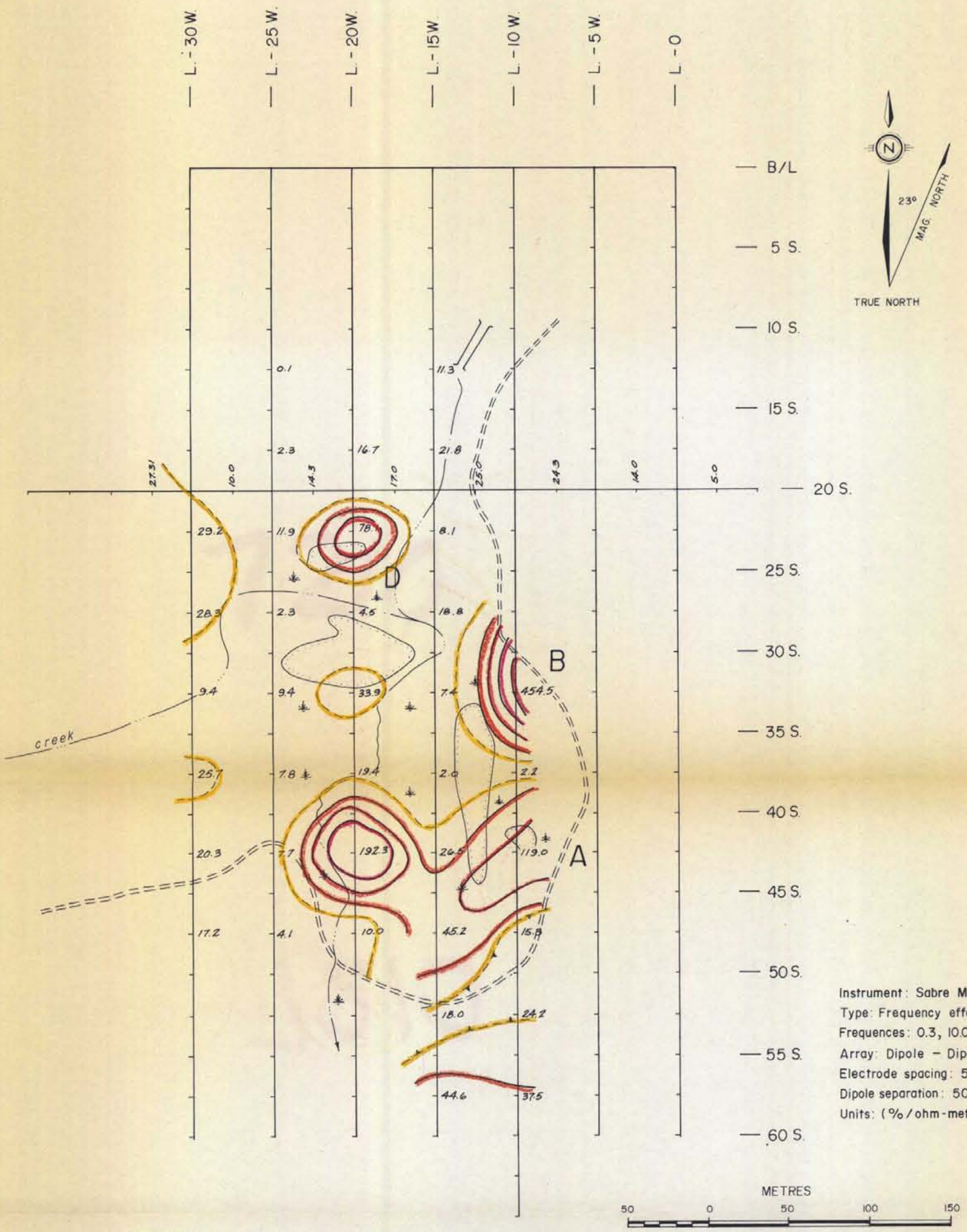
NORTHAIR AREA, VANCOUVER M.D., B.C.

INDUCED POLARIZATION SURVEY

RESISTIVITY

DATA & CONTOURS

DRAWN BY:	JOB No.	DATE:	SCALE:	SHEET No.
D. G. M.	78 - 52	NOV. '78	1: 2500 (1cm = 25m)	7



CONTOURS

Sub - anomalous (25.0)

Anomalous (35.0, 50.0, 100.0, 200.0, 400.0)

PARAMETERS

Mean background value 16.6

Sub - anomalous threshold value 25.0

Anomalous threshold value 35.0

7210

Instrument: Sabre Model 21
Type: Frequency effect.
Frequences: 0.3, 10.0 Hz.
Array: Dipole - Dipole
Electrode spacing: 50 metres.
Dipole separation: 50 metres.
Units: (% / ohm-metres) x 1000

To accompany geophysical/geochemical report by DAVID G. MARK, geophysicist, dated Nov.3/78

GEOTRONICS SURVEYS LTD.

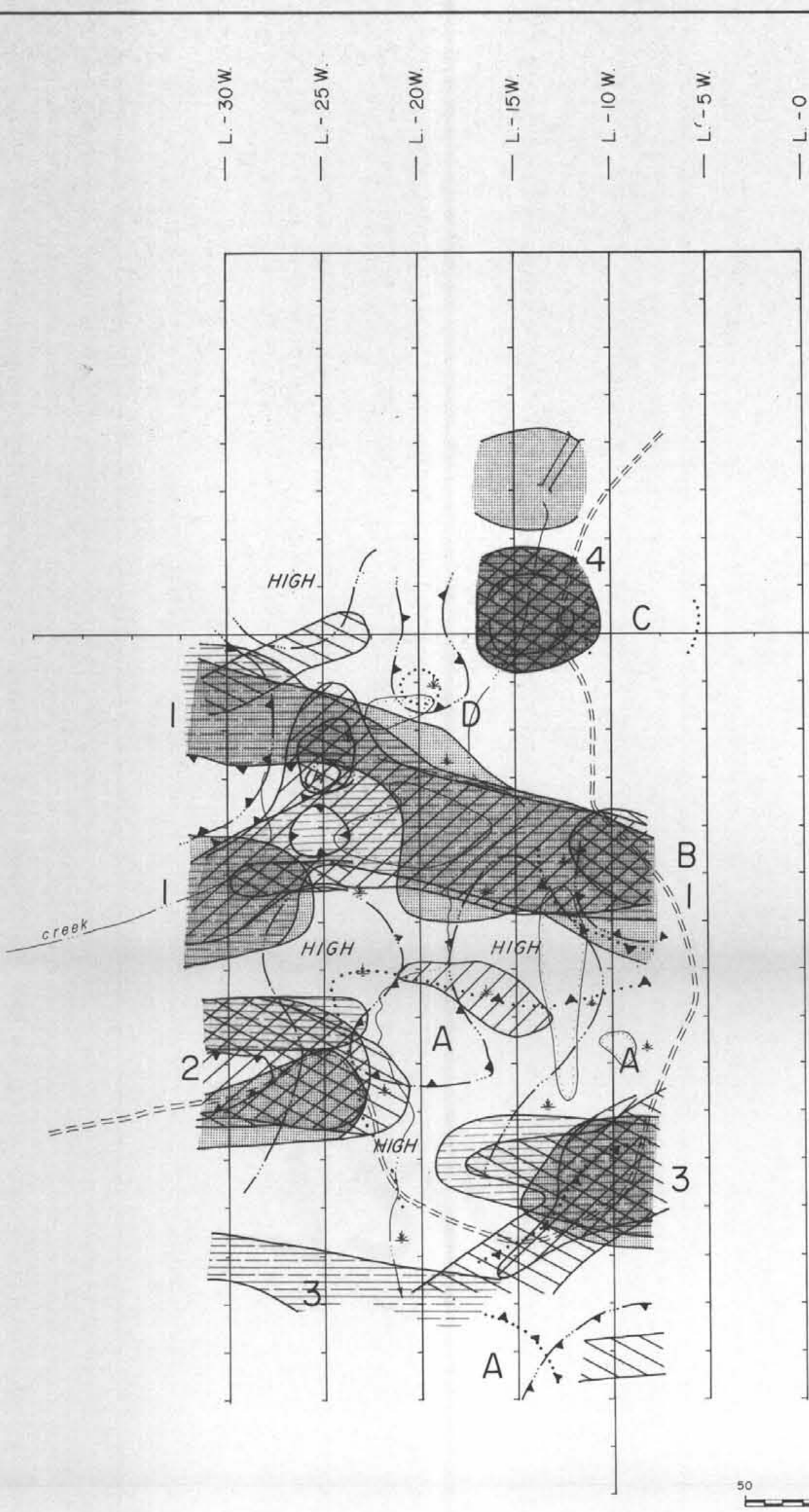
LAKEWOOD MINING Co. LTD. (N.P.L.)

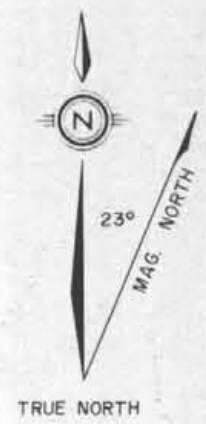
SANTA CLAIM GROUP

NORTHAIR AREA, VANCOUVER M.D., B.C.

INDUCED POLARIZATION SURVEY
METAL FACTOR
DATA & CONTOURS

DRAWN BY:	JOB No.	DATE:	SCALE:	SHEET No.
D. G. M.	78 - 52	NOV. '78	1: 2500 (1cm = 25m)	8





LEGEND

SUB - ANOMALOUS CONTOURS

- Lead
- Zinc
- Silver
- Copper
- Induced Polarization
- Resistivity Low
- HIGH — Resistivity High

METRES

50 0 50 100 150

To accompany geophysical/geochemical report by DAVID G. MARK, geophysicist, dated Nov.3/78

7210

GEOTRONICS SURVEYS LTD.

LAKEWOOD MINING Co. LTD. (N.P.L.)

SANTA CLAIM GROUP

NORTHAIR AREA, VANCOUVER M.D., B.C.

COMPILATION MAP

DRAWN BY:	JOB No.	DATE:	SCALE:	SHEET No.
D.G.M.	78 - 52	NOV. '78	1 : 2500 (1cm = 25m)	9

Do not film

MINING CO. LTD. N.P.L.

2245 W. 13th AVE.,
VANCOUVER, B.C.
V6K 2S4
TELEPHONE: 733-2408

March 3, 1979

Dear Shareholder:

We are pleased to inform you that your company has negotiated the financing of our drilling program with Bond Street International Securities Ltd., pending approval of the regulatory authorities.

Your company has two potential silver-gold-lead-zinc properties ready to be drilled. The Sophia property in the Merritt area and the Santa property in the Brandywine area, north of Northair Mine, which is mainly a gold producing mine. This year the snow pack is very light in the Brandywine area, so we anticipate an early start. On the westside zone of our Santa property, there are four distinct anomalies which could be drilled from the existing road. Here are the conclusions and results of the survey taken from our geologist's and geophysicist's reports: (se the compilation map).

The property is crossed by a series of faults running northeasterly, northwesterly and northerly. The westside showing occurs at a conjunction of two of these faults, and is in close proximity to and on strike of one of the Northair veins.

The soil geochemistry data, especially by examining the compilation map, can be seen to occur in four, and possibly five distinct zones. These have been labelled by the numbers 1 to 5. All zones except for 5 are correlative in all four metals, that is, lead, zinc, silver and copper.

Zone 1 is the largest and most interesting zone. In the order of importance, it reaches a high of 197 ppm in zinc, 97 ppm in copper, 44 ppm in lead and 1.2 ppm in silver. It appears to strike east-west with it being open on both the east and west ends. Its minimum length is therefore 200 metres.

Zone 2 occurs only on lines 25 and 30W and is open towards the west. The strike is difficult to determine, but it appears to be westerly. The order of importance of its metals with the highest value in brackets are silver (2.4 ppm), lead (31 ppm), zinc (52 ppm) and copper (36 ppm).

Zone 3's strike direction appears to be most likely northeasterly, though it could be easterly as well. It is open to the south as well as the east. It is the only anomaly with anomalous values in all four metals. In order of importance, the highest value in each metal is 174 ppm copper, 1.8 ppm silver, 175 ppm zinc and 36 ppm lead.

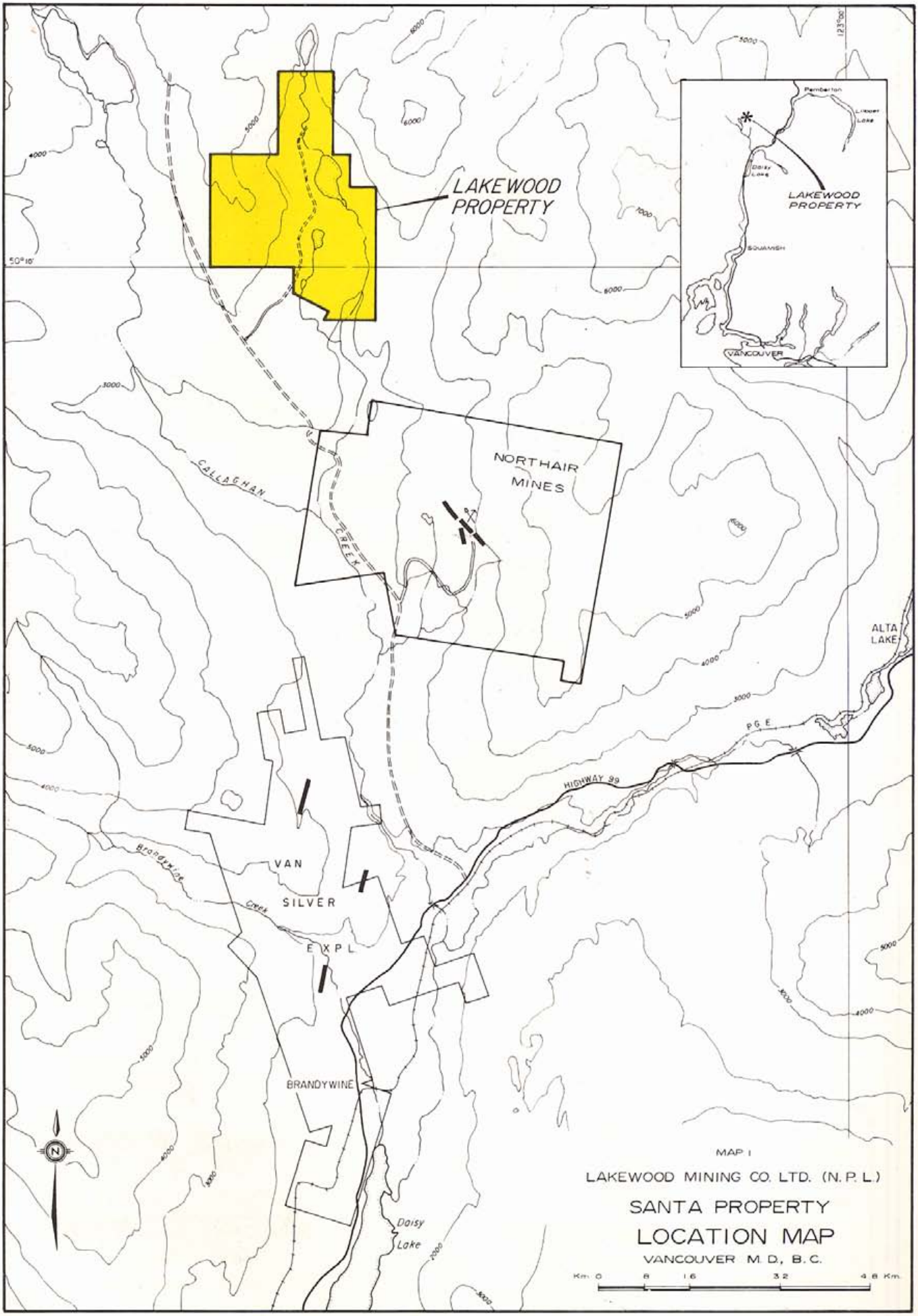
Zone 4 consists of three soil samples with anomalous or sub-anomalous values in all four metals. The highest values are 143 ppm zinc, 72 ppm copper, 28 ppm lead and 1.4 ppm silver. Its minimum size is a diameter of 55 metres.

The I.P. anomaly B does correlate directly with geochemistry zone 1.

We will be keeping you informed of all developments in the affairs of your company. For any further information, please call the undersigned or Bob Klein 687-7521.

On behalf of the Board of Directors,

Charles Boitard, President



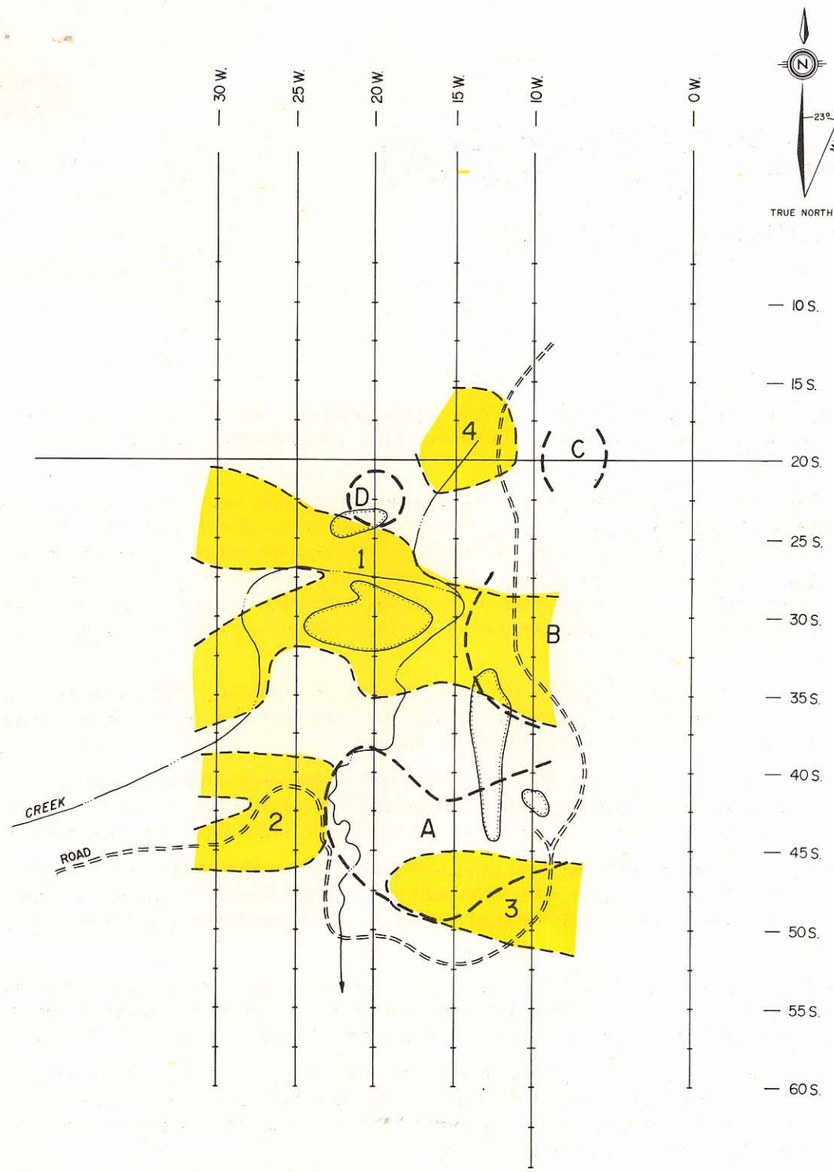
MAP I

LAKEWOOD MINING CO. LTD. (N.P.L.)

SANTA PROPERTY

LOCATION MAP

VANCOUVER M.D., B.C.



LEGEND

A,B,C,D — INDUCED POLARIZATION ANOMALIES

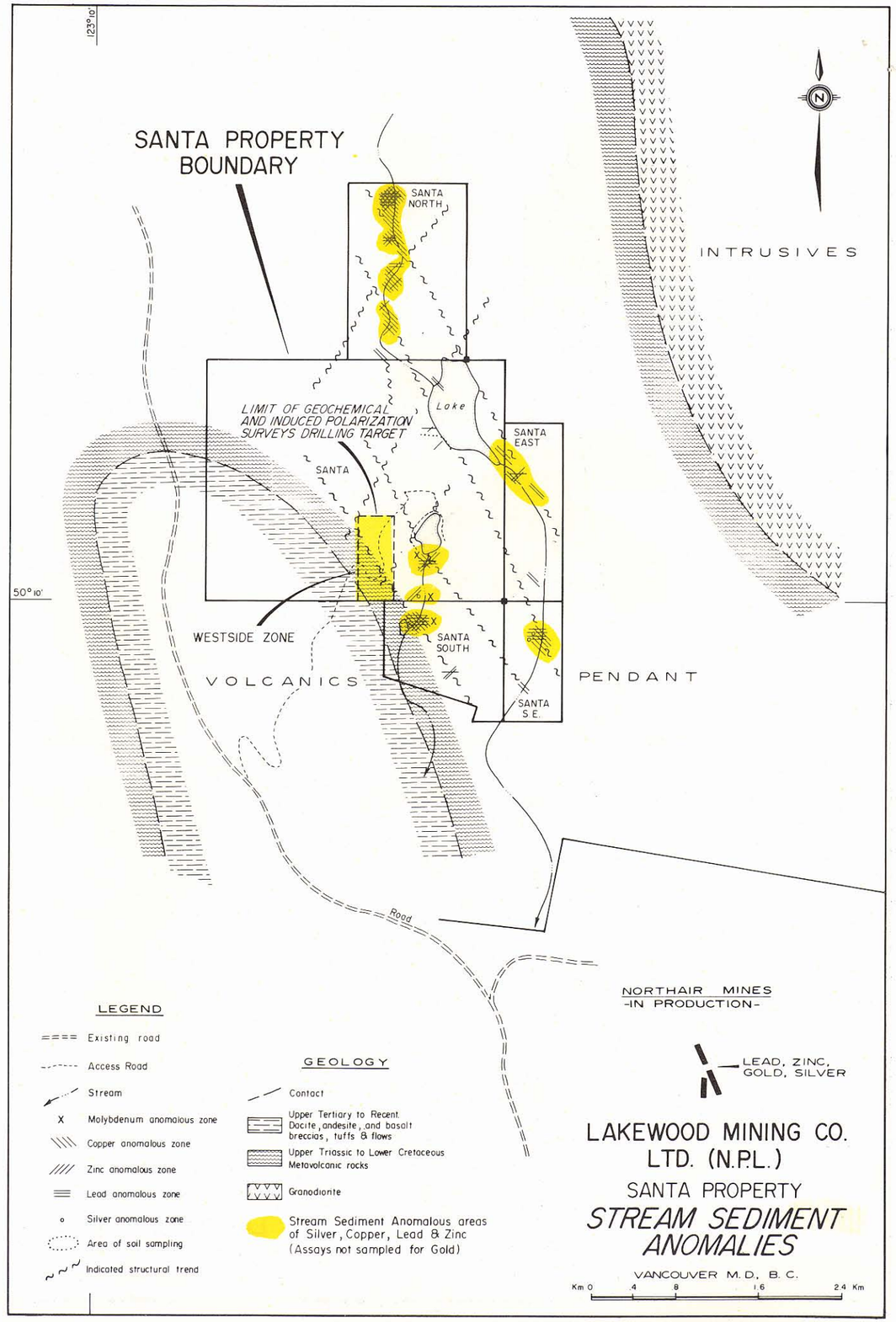
1,2,3,4 — GEOCHEMICAL ANOMALIES (LEAD, ZINC, COPPER, SILVER)

LAKEWOOD MINING Co. LTD. (N.P.L.)

SANTA PROPERTY
WESTSIDE ZONE
VANCOUVER M.D., B.C.

GEOCHEMICAL & GEOPHYSICAL ANOMALIES MAP

METRES
50 0 50 100 150



LAKEWOOD MINING CO. LTD. (N.P.L.)

SANTA PROPERTY

STREAM SEDIMENT ANOMALIES

VANCOUVER M.D., B.C.

Km 0 4 8 1.6 2.4 Km

7210

LAKEWOOD
MINING CO. LTD. N.P.L.

2245 W. 13th AVE.,
VANCOUVER, B.C.
V6K 2S4
TELEPHONE: 733-2408

May 12, 1979

5668

MINISTRY OF MINES AND
PETROLEUM RESOURCES

MAY 16 1979

MINERAL TITLES FILE ROOM

Mr. E. J. Bowles,
Chief Gold Commissioner,
Parliament Buildings,
Victoria, B.C.
V8V 1X4

Dear Sir:

Re: SANTA NORTH, SANTA EAST, SANTA SOUTHEAST, SANTA SOUTH Mineral Claims
Geochemical and Geophysical Report '79-#88

As requested in your letter dated May 1, 1979. Please find enclosed details of the cost of the work pertaining to the above claims.

Line marking, soil sampling and I.P. Survey (labour by contract)	$1,350.00
Truck rental (4 wheel drive)	390.00
Gas and expenses(board & room)	208.13
Assay	322.40
Report and drafting	922.61
	$3,193.14

179

REFERRED TO	DATE	INITIAL
C.G.C.	May 17	EJB.
D.C.G.C.		
G.C.		
FILE NO.		
FILING CLERK		

Yours truly,

Charles Boitard