

86-764-15318

Assessment Report
on
Magnetometer Survey
VLF-EM Survey

conducted on the

SOPHIA CLAIM

NTS 92I/7E

Lat. $50^{\circ} 18.8'$ N

Long. $120^{\circ} 44'$ W

NICOLA M.D.

43.5'

Owned by

LAKWOOD MINING CO. LTD.

Operated by

LAKWOOD MINING CO. LTD.
(Charles Boitard)

Authors:

John P. La Rue

and

Charles Boitard

November 1, 1986

Lillooet, B.C.

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

15,318

FILMED

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INTRODUCTION

(i) The SOPHIA Mineral Claim is located at Lat. $50^{\circ}18.5'$ Long $120^{\circ}44'$, 22 air kilometers $N10^{\circ}E$ of the town of Merritt, B.C. within the Nicola Mining Division NTS Map 92I/7E.

Access to the property is gained by two wheel drive vehicle from the Merritt-Logan gravel road where a spur road is taken running easterly past Tolman Creek, some 20/2 km. out of Merritt. The SOPHIA property lies approximately 10 km. along this road. Several N-S sub-grade logging and mining roads facilitate access to the interior portions of the property itself.

The property is located within the Thompson Plateau, a physiographic division of the Interior Plateau System. Topography is typically gently rolling terrain with elevation relief of approximately 100 meters varying from 1,460 meters to 1,560 meters. Vegetation is primarily open to moderate jack pine cover with local areas of grassland; topographic depressions are commonly marshy. Water supply for all phases of exploration and development is adequate with Sophia and two smaller lakes and their drainage systems within the property boundaries.

- (ii) The SOPHIA Mineral Claim is a 12 unit Modified Grid Claim wholly owned by Lakewood Mining Co. Ltd. of Vancouver, B.C.:

<u>Claim Name</u>	<u>Units</u>	<u>Record No.</u>	<u>Expiry Date</u>
SOPHIA	12	176 (9)	Sept. 10/86

This expiry date does not take into account the surveys under discussion as being accepted for assessment surveys. Regionally, SOPHIA is located within the Nicola Volcanic belt which extends from the U.S. border south of Princeton north to Kamloops; this area has been the object of continued mineral exploration since the late 1800's. Following the discovery of gold and platinum placer deposits in the Similkameen and Tulameen Rivers, ongoing exploration led to the discovery of numerous viable copper-gold-silver occurrences within the Thompson Plateau among which number the more significant Copper Mountain, Craigmont and Afton deposits.

Local geologic history is centered around Swakum Mountain deposits which lie approximately two miles east of the Sophia property and were originally discovered in 1916. Several small high grade shipments of precious/base metal ore were shipped from the Last Chance (Lucky Mike), Thelma and Alameda Claims. Of geological interest, a scheelite showing averaging .25% over an average width of 34 feet, occurs on the Last Chance Claim.

The following information concerning a history of previous work on the SOPHIA and localized Geology is taken in context from a "Report on a Percussion Drill Program on the SOPHIA Claim" by L. Sookochoff, P. Eng. Dec '83:

" GEOLOGY AND MINERALIZATION

The Nicola map-sheet 886 A shows the claim area to be underlain by the Nicola Group of rocks comprised of greenstone, volcanics and tuffs intercalated with minor limestone, argillite and conglomerates. The northerly trending Nicola rocks are bounded to the east and west by intrusives of granite composition. An intrusive plug not indicated on the map-sheet, outcrops at Rey Lake. Regionally an asymmetrical anticline with the axis plunging to the south is indicated at the Swakum Mountain deposits. An aplite dyke and one outcrop of granitic rock was found near the Last Chance property.

Large scale northwesterly structures are indicated by the Hector Creek valley to the south and the Rey Creek Valley to the north. Northerly and east-west structures are suggested topographically or by smaller scale structures in the area.

On the property and east of Sophia Lake a 175 meter wide limestone bed trends northerly and forms a ridge over 600 meter strike length. The gray coarse granular limestone generally contains numerous random and fracture oriented

calcite stringers which average less than two m.m. Locally brecciated zones occur which contain angular fragments healed with calcite. Patchy red hematite, locally weathered increases in areas of heavier brecciation. From the northern ridge exposure, brecciation increases to an area adjacent to the south trench zone. The south trench zone, approximately 30 meters west of the limestone exposes a 10 meter wide band of highly fractured argillites with less obvious greywackes and conglomerates. The argillite strikes at 168° and dips at 70° north.

An intrusive with euhedral feldspar crystals set in a matrix of seriate textured feldspathic ground mass outcrops in the center trench. Occasional sericite up to 10 mm. long and secondary quartz eyes occur throughout the matrix. A light dusting of sericite on the feldspar is obvious.

Three trenches 500 meters to the northwest of the south zone expose an eight meter wide heavily pyritized shear zone. The shear zone strikes at 220° , dips at 30° to 60° south. Andesite porphyry in addition to a breccia predominate. Calcite and quartz occur as random stringers and cement the breccia fragments. Pyrite in addition to sphalerite, galena and chalcopyrite occurs in association with the calcite and quartz. A gray aphanitic micropegmatite occurs discordantly with the andesite porphyry

and is weakly mineralized."

"Portions of the SOPHIA property were previously known as the sunshine Lee and Lo claim groups which were worked by Vastlode Mining Co. Ltd. Mineralized shear zones within Nicola volcanic rocks were the focal point of interest.

In 1976, prior to the acquisition of the property by Charles Boitard, an E.M. and Magnetometer survey in addition to a preliminary geochemical survey was carried out over localized areas of the property.

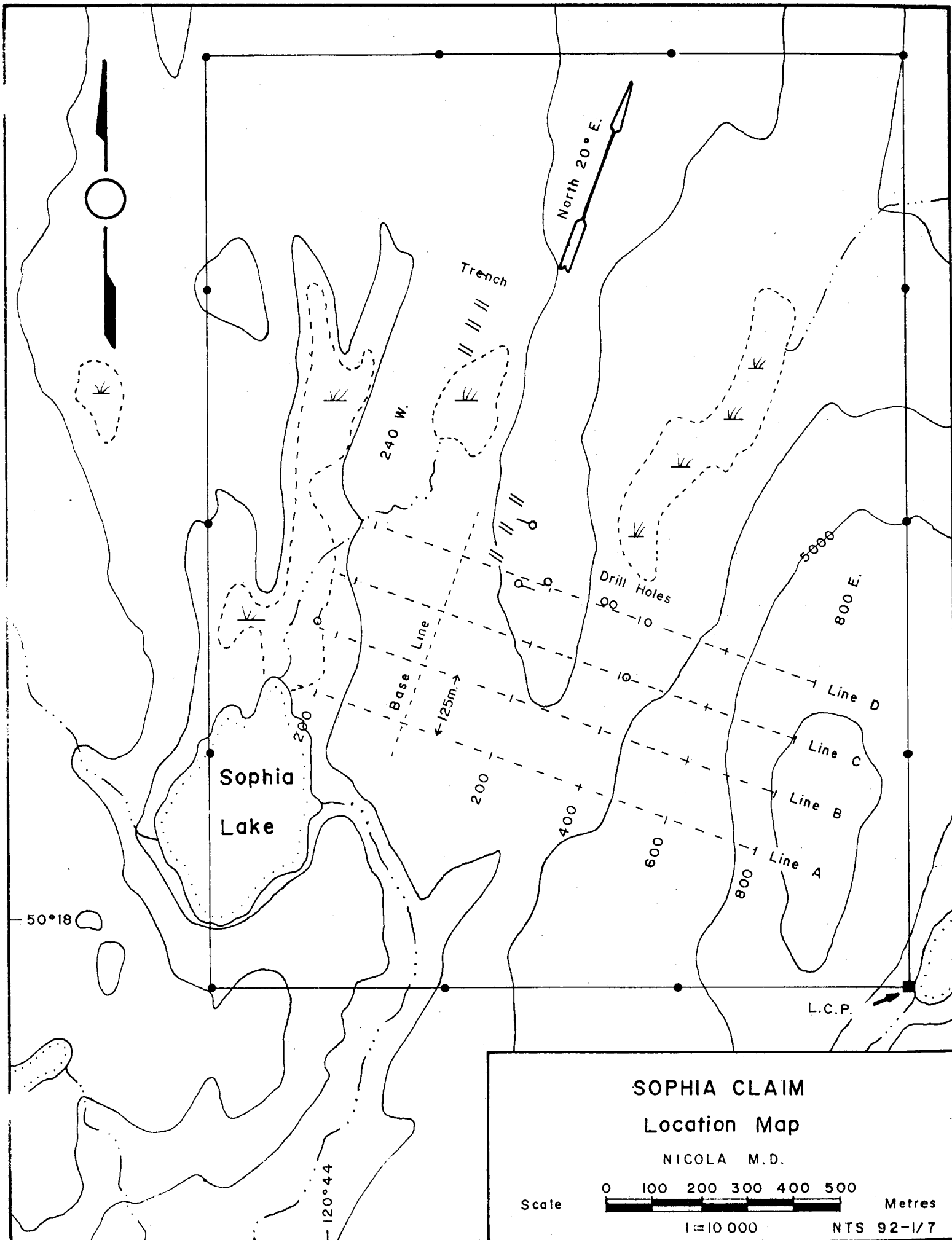
In 1978 a localized I.P. survey and "587 feet" of diamond drilling in three holes was completed on the property.

In 1979 Lakewood carried out a six hole percussion drill hole program on the property. There was no work on the property from 1979 to the 1983 percussion drill hole program reported on herein".

In 1983 a percussion drilling program consisting of two holes totalling 560 feet of drilling were completed to test anomalous areas indicated in previous surveys.

(iii) A Summary of Work performed on the SOPHIA Property for assessment purposes during the '85-'86 exploration season is as follows:

A total of 4.2 km of survey grid and 375 meters of baseline were established in preparation for the VLF-EM and



SOPHIA CLAIM

Location Map

NICOLA M.D.

Scale 0 100 200 300 400 500 Metres

1=10 000 NTS 92-1/7

Magnetometer surveys, with stations marked at 40 meter station intervals.

4.2 km. of Magnetometer survey was performed over the gridded area for a total of 106 readings.

4.2 km. of VLF-EM was performed over the grid area for a total of 106 readings.

- (iv) Work for assessment purposes during the '85 - '86 exploration season was performed over approximately 15% of the claim area.

DETAILED TECHNICAL DATA

A total of 4.2 km. of survey grid and 375 meters of baseline were established with hip chain and compass. Gridding consisted of a re-establishment of a survey grid converted to the metric system. Nearly all indication of the existing previous gridding from the 1978 surveys and later exploration had vanished; whereas many of the original blazes were distinguishable out of the myriad of other blazes abounding in the forests, ribbons bearing location markings could be found. Distances in the old gridding were also measured in feet, and the new '86 gridding represents a conversion to the metric system. Blown up air photos, the numerous roads and prominent landmarks were used to establish control for accurate gridding. The old I.P. baseline from the previous surveys was used with orientation of $N20^{\circ}E$. Survey lines are oriented perpendicular to the baseline or $110^{\circ}E / 290^{\circ}W$ and are located 125 meters apart. All grid lines are marked by thorough blazing and flagging; stations are designated by marked flagging

ribbon at 40 meter station intervals. The new gridding also extends the survey area 100 meters to the east for all four lines over the previous established grid system.

VLF-EM Survey

A total of 4.2 km. of VLF-EM electromagnetic survey was completed over the SOPHIA Claim for a total of 106 readings taken at 40 meter station intervals. As all indications of previous gridding had vanished, it was necessary to re-define and delineate the VLF-EM anomalies that had been discovered in previous surveying, in preparation for anticipated detailed geo-exploration in the near future.

Focus of the electromagnetic (VLF-EM) surveys was a search for conductive zones which might be related to economic mineralization such as is found on the nearby Swakum Mountain property.

A Sabre Electronics Model 27 VLF-EM receiver was used in the survey. VLF-electromagnetics operate indirectly through VLF (very low frequency) military radio communication transmissions. These electromagnetic transmission waves set up measureable secondary electromagnetic fields in certain geologic structures such as fault zones (which are also sometimes mineralized) and/or heavily mineralized "conductors" such as concentrations of massive sulphide mineralization. It is this secondary generated electromagnetic field which is measured by a VLF-EM receiver. To provide maximum coupling, a Military transmission station is selected whose geographical location is in the same direction or as nearly

parallel as possible to the strike of the expected conductor. Seattle was deemed the overall best station to use for this survey not only for the strength and stability of it's signal, but also to provide the maximum coupling for an expected north-northeast striking conductor.

Using the VLF-EM method, results are plotted as dip angle (relative angle from the receiver to the source of the secondary field) and field strength (relative measurement of the comparative strength of the secondary field) components. By design, conductors are located at field strength maxima simultaneous with a favourable dip-angle crossover from positive to negative (or vice-versa depending on the orientation of the receiver to the station). An additional interpretation is obtained by "Fraser Filtering" the dip angle results according to the method described by D.C. Fraser (Geophysics, Vol 34 No. 6, Dec '69) in which dip angle readings are averaged with their neighbour readings $(a + b) - (c + d)$ to reduce some of the surface "noise" caused by running surface water, topographic variations, etc. Resultant positive values are plotted and together with associated field strength highs and favourable dip angle crossover, should reflect the conducting anomaly.

The VLF-EM electromagnetic survey on SOPHIA, in addition to re-defining proximity of the conductors outlined in the 1978 survey, has also resulted in the discovery and delineation of a new conductor lying to the east of the survey area in the new grid extension. (Anomalies 1 - 3).

The new anomaly extends northerly through all four lines from Line A + 660E through Line D + 620E of the survey area, is open to strike length both north and south.

MAGNETOMETER SURVEY

A total of 4.2 km. of magnetometer survey was performed over the SOPHIA Claim for a total of 106 readings taken at 40 meter station intervals. The purpose of the survey was to determine the presence/absence of concentration of magnetically susceptible mineralization in the underlying host rock, and to delineate the magnetic highs apparent from the government aeromagnetic publications data available on the property. It should be noted that the deposits on Swakum Mountain are associated with local aeromagnetic highs and also occur with pyrrhotite mineralization; it is inferred that the highs might possibly reflect the presence of localized intrusive plugs, and/or possibly concentrations of magnetic minerals themselves, such as pyrrhotite or magnetite. A Geotronics Model G-110 Magnetometer was used in the survey. Results were not corrected for diurnal variation since "looping" reproduced results with negligible variation. Overall, the magnetometer data did not produce readily contoured lineations, and for this reason was presented in an uncounted format for reference. It is suggested that thorough geological mapping might aid in the interpretation of the data.

DATA INTERPRETATION

Survey data has been presented in two plan maps inside the back cover. VLF-EM data has been contoured with corresponding Fraser Filter Anomalies indicated; Magnetometer data has been presented in line format, uncounted for reference only. Additional surveying and geological mapping will be necessary before a detailed technical interpretation of the survey results will be possible, and hence are beyond the scope of this report. With the data thus far obtained, however, it is possible to make limited observations that may prove useful in future exploration.

VLF-EM Anomaly 2 shows an interesting correlation with a local mag. high in conjunction with geochemical soil anomalies for lead, copper, zinc and silver. Neither the VLF-EM anomaly or the mag. high is felt to be the result of topographic expression; both are quite strong, and of interest is the fact that the mag. high occurs at an elevation depression where one might expect to find (topographically" lower readings. It is possible that the local high may be expressing the presence of an intrusive, or reflecting the presence of underlying magnetically susceptible mineralization directly.

VLF-EM Anomaly 3, the new conductor delineated in the '86 survey, is a moderate to strong conductor with broad coincidental Fraser Filter anomaly, and similar to Anomaly 2 occurs at a topographic depression. Associated with the anomaly is a local mag. low in conjunction with an adjacent local I.P. Frequency Effect High.

It is suggested that geochemical soil sampling be extended in future surveys to test this anomaly for associated favourable geochemical indicators.

STATEMENT OF COSTS

The Magnetometer and VLF-EM Surveys were carried out over the SOPHIA CLAIM from September 12 through September 14, 1986, to the value of the following:

Truck rental	\$350.00
E.M. rental	100.00
Mag. rental	100.00
2 men, 2 days	500.00
Food, board and room, supplies and gas	250.00
Mapping	500.00
Report	250.00
Typing and copies	<u>150.00</u>
	\$2,200.00

Respectfully submitted;



Charles Boitard

MALASPINA COLLEGE

Statement of Course Completion

JOHN P. LARUE

has

Successfully Completed 180 Hours of Instruction
in

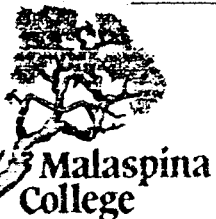
MINERAL EXPLORATION FOR PROSPECTORS

PRESENTED BY B.C. MINISTRY OF ENERGY, MINES AND PETROLEUM RESOURCES
B.C. MINISTRY OF EDUCATION

APRIL 16 to 30, 1983 - MESACHIE LAKE, B.C.

MAY 2, 1983

Dated at Nanaimo,
British Columbia, Canada



Director / Dean

Registrar

Instructor

REFERENCES

Sookochoff, L, P. Eng.

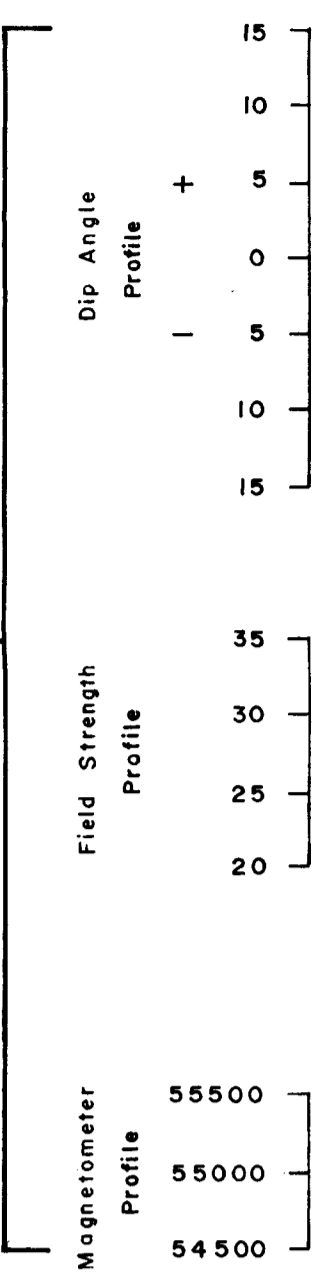
Report on a Percussion Drill Program
For Lakewood Mining Co. Ltd. December
7, 1983.

Fraser, D.C.

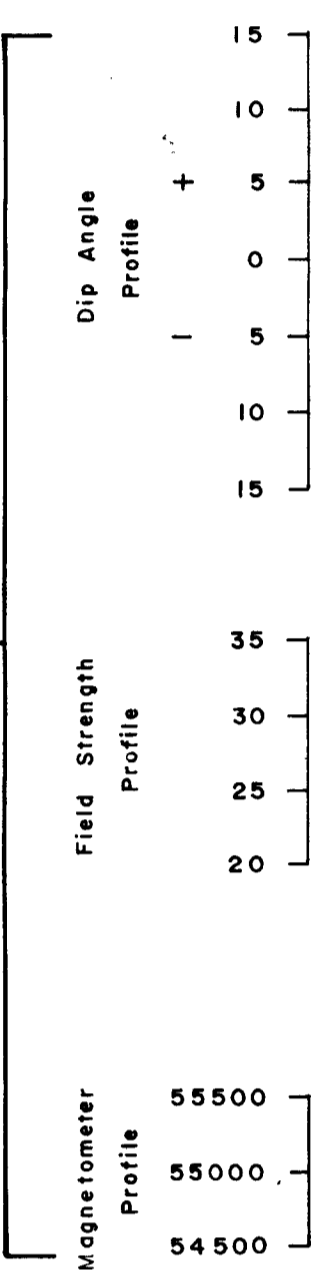
Geophysics, Vol 34 No. 6 December '69

240 W 200 W 160 W 120 W 80 W 40 W 0 40 E 80 E 120 E 160 E 200 E 240 E 280 E 320 E 360 E 400 E 440 E 480 E 520 E 560 E 600 E 640 E 680 E 720 E 760 E 800 E

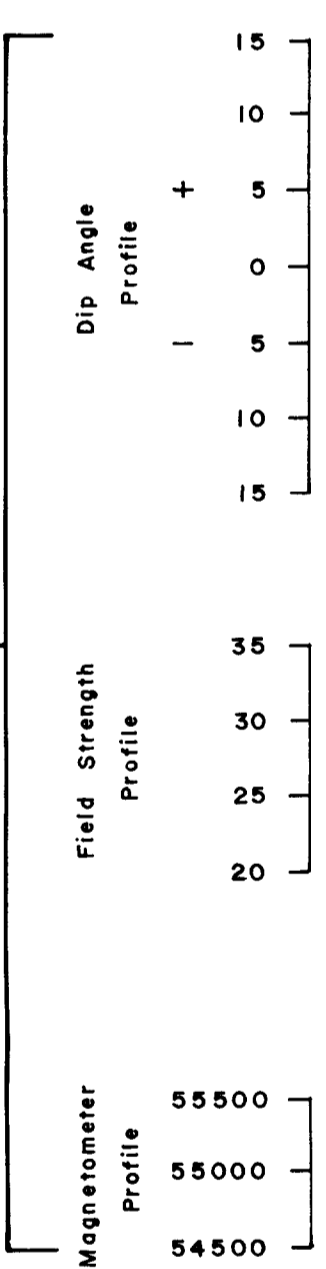
Line D



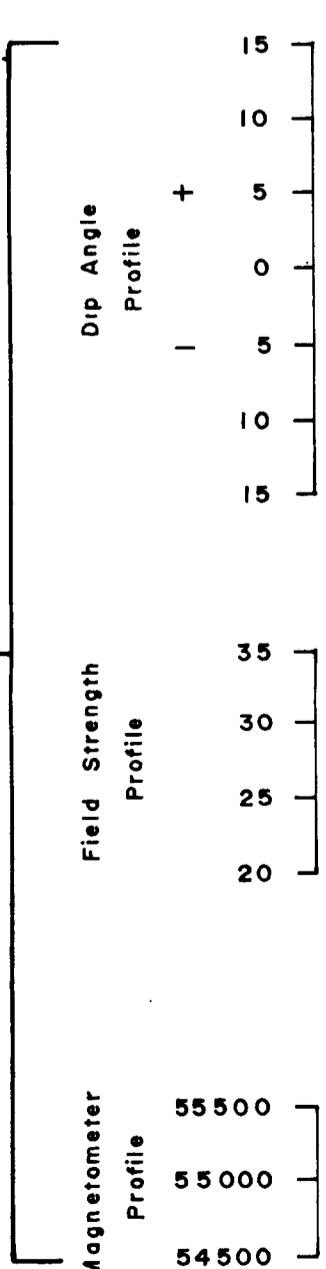
Line C



Line B



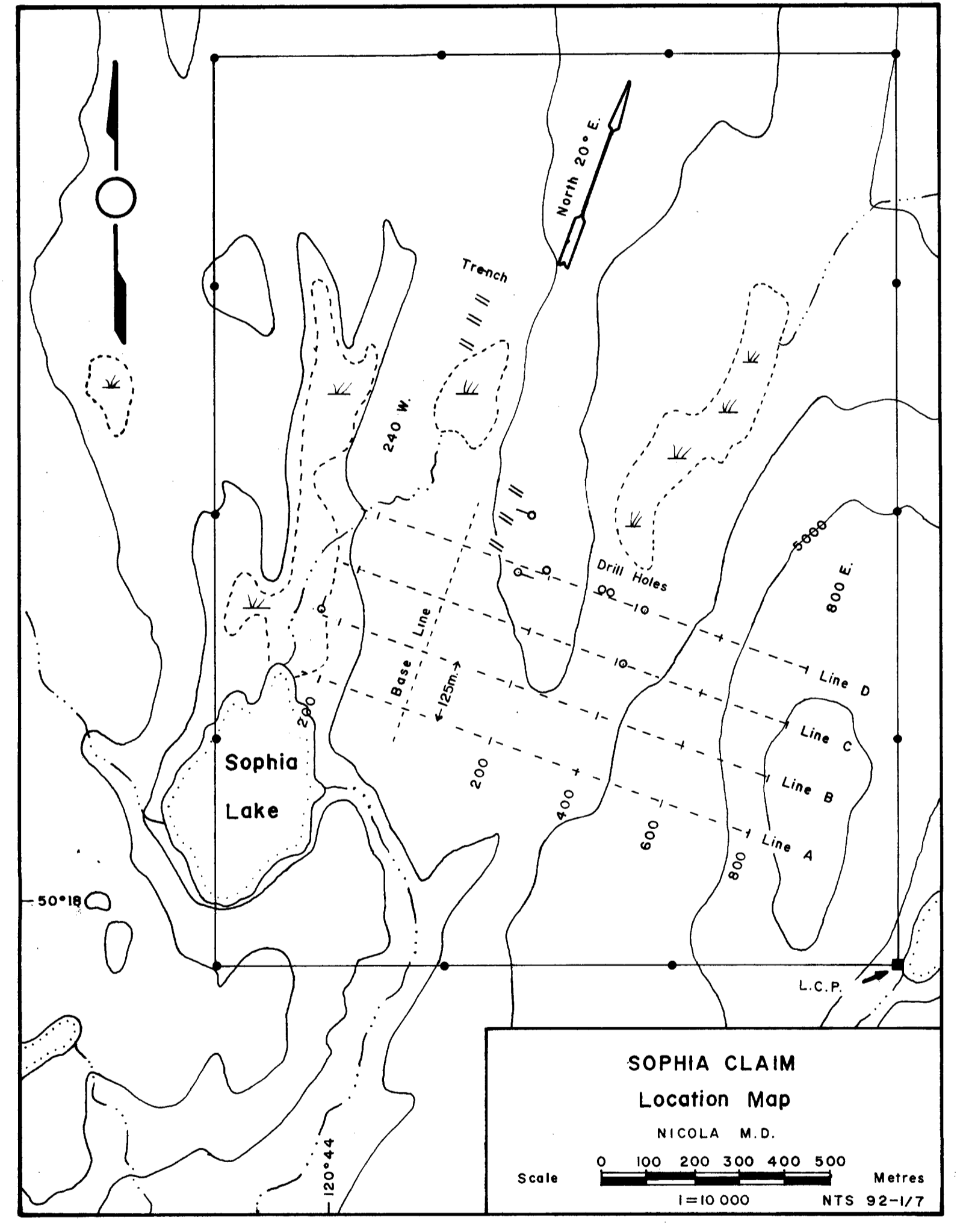
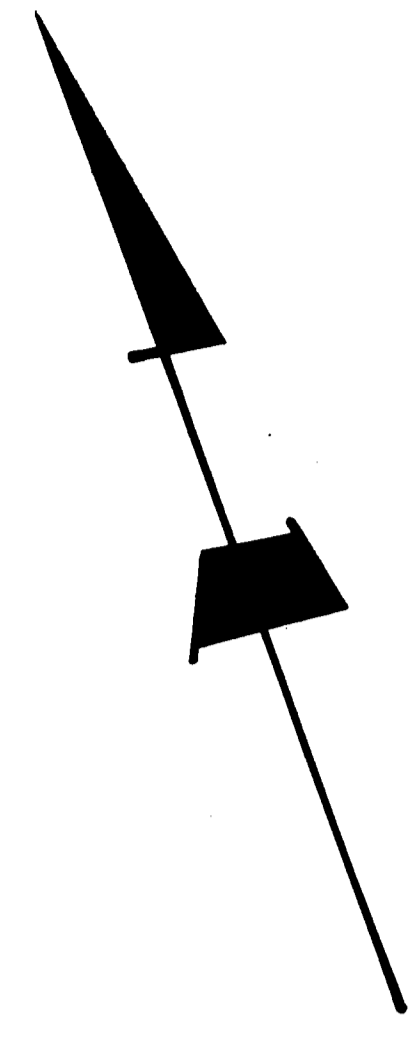
Line A



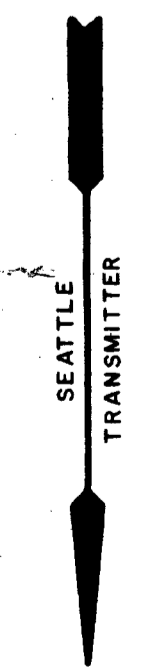
Line

Base

N o R e a d i n g (F e n c e)



Instruments - SABRE Fluxgate Magnetometer
- SABRE Model 27 V.L.F.-E.M.

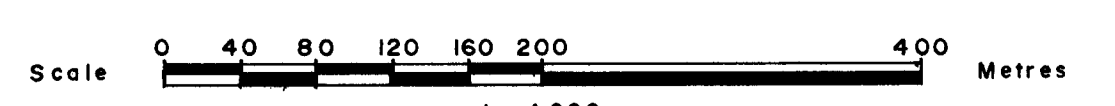


GEOLOGICAL BRANCH
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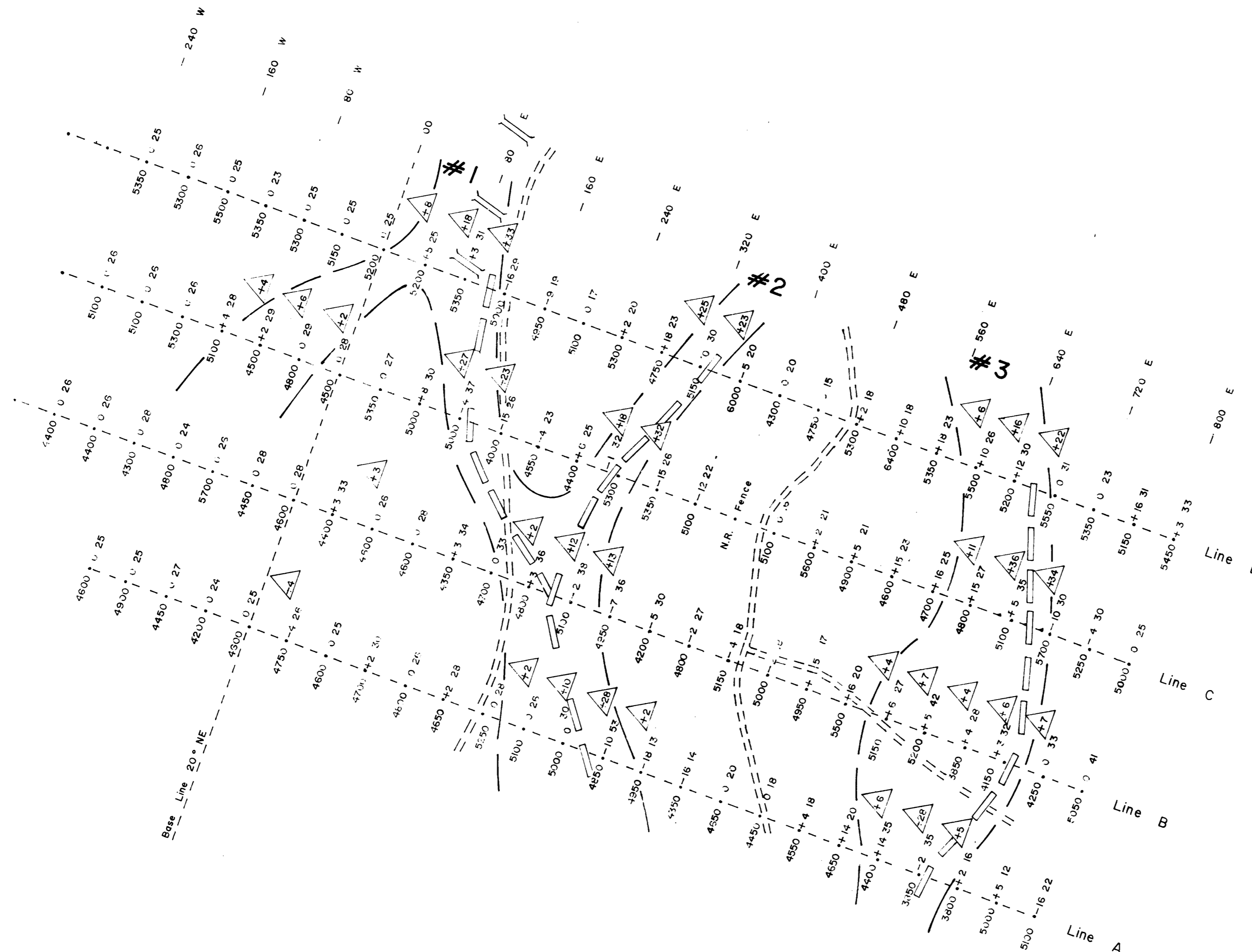
15,318
LAKEWOOD MINING CO. LTD

SOPHIA CLAIM
SWAKUM MTN. AREA
NICOLA MINING DIVISION, B.C.

MAGNETOMETER
And
V.L.F.-E.M. PROFILE



DATE SEPT. 1986 NTS 92-1/7 FIGURE 2



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

SOPHIA MINERAL CLAIM

NICOLA M.D.

15,318

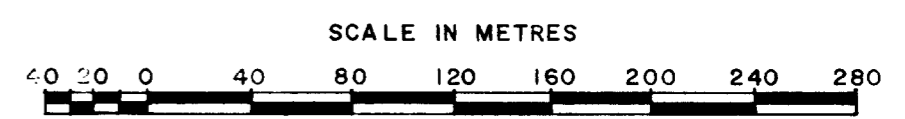
VLF-EM & MAGNETOMETER

SURVEY DATA

	MAG.	VLF-EM Dip Angle	VLF-EM Field Strength	VLF-EM Fraser Filter Anomaly
MAG READING SHORTENED FOR EASE IN RECORDING (DATA + 50,000 GAMMAS = FINAL ADJUSTED READINGS) READINGS NOT ADJUSTED FOR DIURNAL VARIATIONS.	5150	+6	27	
	5200	+5	42	

ONLY POSITIVE FRASER
FILTERED ANOMALOUS
DATA RECORDED.
SEATTLE TRANSMITTER
USED IN SURVEY 200°SW

VLF-EM CROSSOVER (CONDUCTOR)
FRASER FILTER ANOMALY BOUNDARY



SCALE IN METRES
SCALE 1 = 3 000
1 Cm. = 30 METRES

DATA COMPILATION
BY
J. LaRUE
INTEREX