92I/2W

REPORT TO
ACAPLOMO MIN. & DEV. CO. LTD.
ON MAGNETIC AND ELECTROMAGNETIC
SURVEYS OF MAKELSTIN CLAIMS
NEAR MERRITT, B. C.
BY
SHERWIN F. KELLY, P. ENG.
3/71

REPORT ON A
GEOPHYSICAL SURVEY

OF MAKELSTIN MINERAL CLAIMS
M.S. 568, 31, 33, 37 and 38

on

IRON MOUNTAIN, MERRITT, B. C.
50°, 120°, S.W.

by

SHERWIN F. KELLY, P. ENG.,
GEOPHYSICIST AND GEOLOGIST

to

ACAPLOMO MINING & DEVELOPMENT CO. LTD.
MERRITT, B. C.
OWNER OF THE CLAIMS

ON WORK DONE BETWEEN
FEBRUARY 8 and 23, 1971

92I/2W

2967

REPORT TO

ACAPLOMO MINING & DEVELOPMENT CO. LTD. (N.P.L.)

OF MERRITT, B. C.

on a

GEOPHYSICAL SURVEY

OF THE

MAKELSTIN CLAIM GROUP

near

MERRITT, B. C.

by

SHERWIN F. KELLY, P. ENG.,
GEOLOGIST AND GEOPHYSICIST

92 I /2W

MARCH 31, 1971

REPORT TO
ACAPLOMO MINING & DEVELOPMENT CO. LTD. (N.P.L.)
ON A
GEOPHYSICAL SURVEY
OF ITS MAKELSTIN CLAIMS

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IN ENVELOPE BOUND

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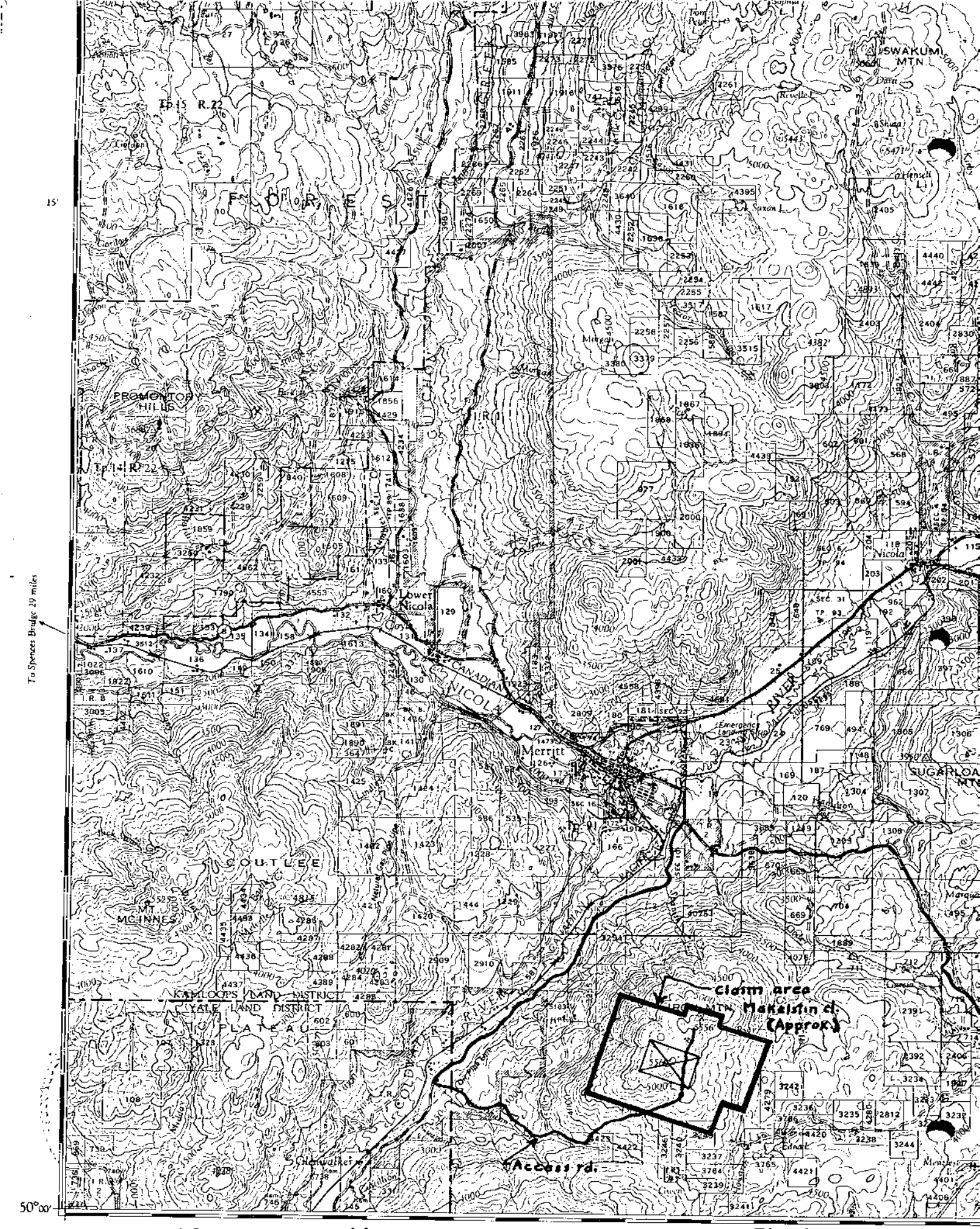


Merritt, B.C. Sheet 92 1/SB. Scale, 1 inch = 2 miles.

Fig. 1

REPORT TO

ACAPLOMO MINING & DEVELOPMENT CO. LTD. (N.P.L.)

ON GEOPHYSICAL SURVEYS

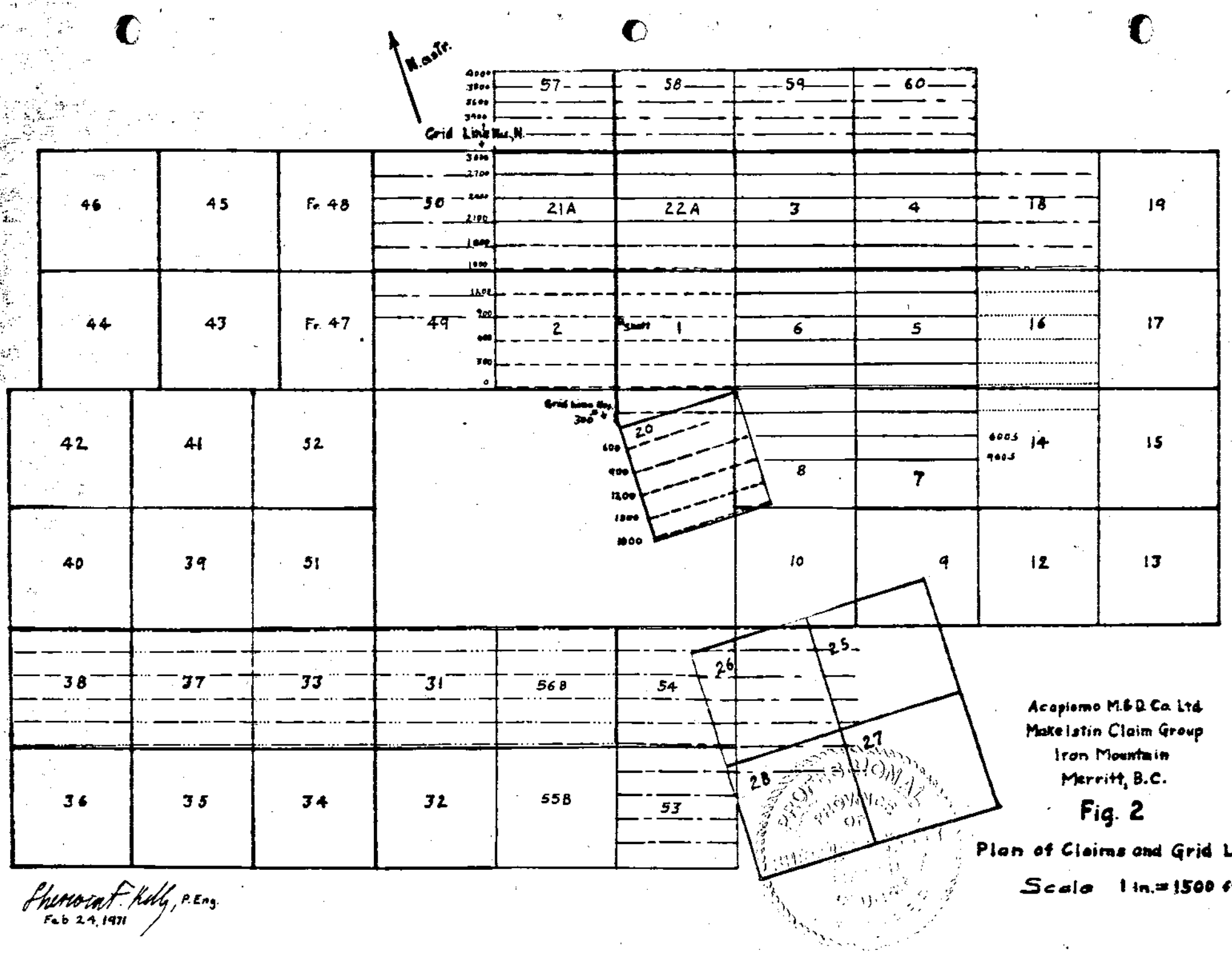
OF A PORTION OF ITS MAKELSTIN CLAIMS

INTRODUCTION

Geophysical surveys by magnetic and electromagnetic techniques were conducted in February, 1971, on five claims in the Makelstin group belonging to Acaplomo Mining & Development Co. Ltd. (N.P.L.). The claims thus surveyed were Makelstin #56B, #31, #33, #37, and #38. A grid of lines, running east and west (magnetic) spaced 300 feet apart was cut and picketed in preparation for this survey. The Acaplomo property is located at the top of Iron Mountain, about five miles southeast of Merritt. The longitude is 120° 45' west and latitude 50° 2' north. Figure 1 shows the approximate outline and location of these claims on the Merritt topographic sheet, 92 I/SE.

Access to the claims is via the Coldwater road, which runs south from the east boundary of the town of Merritt. This road is followed south for about six miles to a gravel road which turns off to the east. This latter road then swings north and goes to the top of the mountain, where some microwave towers are located. The distance from the turn-off to the summit of the mountain is about 8 miles. This access road passes through the middle of the Acaplomo holdings.

The surveys on these claims were conducted by using a flux-gate magnetometer and a Ronka EM-16 VLF electromagnetic instrument. Both of these techniques have already been applied on other portions of the Makelstin group, specifically on some 15 claims lying to the north and east of the present survey area. Those prior geophysical surveys were described in my reports dated December



Acapiomo M.& D. Co. Ltd.
Makelstin Claim Group
Iron Mountain
Merritt, B.C.

Fig. 2

Plan of Claims and Grid Lines

Scale 1 in. = 1500 ft.

Sherwood F. Kelly, P.Eng.
Feb 24, 1971

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. 2967 MAP #2

28, 1968, December 4, 1970 and January 4, 1971. The present survey places the geophysical work in a different area of the claim holdings, south and west of the areas described in those reports. It is planned, however, to expand the coverage and eventually complete the survey of the entire block of claims. Figure 2 shows the claims and the grid lines which have been cut to date. Nearly all the grid lines thus far cut, have been utilized for geophysical surveys, although there are a few minor areas still to be completed.

GRID

The base line from which the grid lines were turned off for this survey, was cut north and south (magnetic) along the boundary line between claims Makelstin #54 and #56B. This base line is south of, and on the same course as the first base line cut, which runs magnetic north through the shaft area. That first base line lies practically along the location line of claims Makelstin #1 and #2 and continues north, through the boundary between claims #57 and #58, to the north property boundary.

Grid lines were turned off magnetic west from the new base line, at 300 foot intervals. They extend about 7,200 feet, to the west boundary of the property. The claims involved are a little short, or the lines would have been 7,500 feet long. The line extending westerly along the north boundary of claims #56B, #31, etc., was designated line 3000 S. The line extending west along the south boundary of the same claims, was therefore line 4,500 S.

The grid lines were chained, ribboned, and at 100 foot intervals the stations were marked either by pickets or by marked blazes on trees. The relationships of these grid lines to the claim boundaries are indicated on the map of magnetic contours, Fig. 4, and on the map of electromagnetic profiles, Fig. 5.

MAGNETIC SURVEY

INSTRUMENT

The instrument used in this magnetic survey, was a Scintrex MF-1 Fluxgate Magnetometer, serial no. 811377, manufactured by Scintrex Ltd. of Concord, Ontario. It measures the vertical component of the earth's magnetic field. The sensitivity chosen was the 10K scale constant, which gives a range of 10,000 gammas for full scale deflection. The sensitivity is then 200 gammas per scale division. Readings were taken to the nearest 1/4 scale division, i.e., to the nearest 50 gammas. Observations were made by A. Chenier, between February 19 and 23 inclusive, 1971.

PROCEDURE

A new base station was established for the survey on these newly-cut grid lines. To tie this work to the surveys previously run in the northern portion of the area, it was necessary to relate the magnetic value at the new base station to that established for Base Station #1. The location of the latter, as described in my report of December 4, 1970, is on the west side of the access road where it crosses line 3000 N. Readings taken when that base was set, were used to assign to it an instrument reading of 760 as its base value. To establish the new base, a reading was taken at Base Station #1, whereupon the operator proceeded to the new base and took a reading there. He then returned to Base #1 to record a second reading on that station. Applying the observed diurnal variation between those two observations, to correct the reading at the new base, showed that the base reading there would be 756.

The new base station is located on the north side of the access road, southwest of where it crosses line 4500 S. This Base Station #2 is approximately 50 feet south of station 2800 W on line 4500 S. A log lying beside the road has been notched and ribboned to indicate the position of this base. Checks were made on Base #2 for diurnal variation at commencement of work in the morning, at the noon hour and at completion of work for the day. Diurnal corrections were made with reference to a base reading of 756.

The readings corrected for diurnal variation were then plotted in the form of profiles along the grid lines to which they referred. The same regional datum, or "0" value that was originally adopted in the 1970 survey was utilized in preparing the present results. As set forth in my report of December 4, 1970, it was found that a reading of 720 corresponded well with the arbitrary datum, or "0" value which had been assigned to the results obtained in the survey of 1968.

In the profiles shown on Fig. 3, the readings are plotted against a "0" line which corresponds to the reading of 720 on the instrument. With a scale constant of 10K, that reading indicates a vertical component field strength of 7,200 gammas. The profiles then indicate observed gamma values, above and below this figure which was utilized as the datum.

Consequently, the instrument reading at any point, corrected for diurnal variation, can be obtained from the profiles. The gamma value read off the profile at a given station, is added to 7,200 gammas to give the field strength at that station. As the scale constant of 10K was utilized, the resultant figure is divided by 10 to give the actual instrument reading (corrected for diurnal variation).

The profiles shown on Fig. 3 were used to construct the contour map of magnetic intensities, shown on Fig. 4.

RESULTS AND INTERPRETATIONS

The magnetic contours of the survey results on these five claims, Fig. 4, present a contrast with the appearances of those in the northern part of the area. As pointed out in my reports of December 4, 1970 and January 4, 1971, the magnetic results there indicate two areas of distinctive types of magnetic reaction. One of these is characterized by strong and abrupt variations between high and low readings. The variations are strong and occur in generally north-south alignments, forming a series of ridges and troughs. The other type of reaction occurs in an area surrounded on the north, west and south by the above-described pattern. This second area is characterized by weak variations in magnetic strength and which occur in no distinctive pattern. In this case, the magnetic values are neither as low nor as high as they are in the first-described area.

The area of the present survey falls in a category intermediate between the two described above. A distinctive pattern is, in general, lacking and the variations in strength are not as abrupt nor as strong as those described in the first-mentioned pattern. The values are, however, higher than in the second area described above and the variations are generally greater.

The maximum contrast in the present survey, is only slightly over 1000 gammas. This is between a high, almost tangent to 1000 gammas, at station 5700 W on line 3000 S and a low of 30 gammas below zero on station 2300 W on line 4500 S. This contrasts with a total spread of 2800 gammas

recorded in the northern part of the survey area in my report of January 4, 1971. On the other hand, the area of low magnetic relief described in that report, yielded a spread of only about 700 gammas, between a low of about 200 gammas below zero and a high of a little over 500 gammas.

Although a distinctive pattern of magnetic lows and highs is not evident in the present grid system, there are nevertheless a few places where trends are indicated. Near the eastern end of the grid there is a narrow zone of low magnetic intensities, extending northeasterly from station 2300 W on line 4500 S, to station 1200 W on line 3000 S. Near the northern side of the grid, this low becomes considerably less distinctive. Its strike is nevertheless close to the prolongation of a low in the northern part of the area, mentioned in my report of December 4, 1970. On page 4 of that report, it is mentioned that two zones of high magnetic relief are separated by one of low relief, about 600 feet wide, which crosses the base line south of the shaft. It is mentioned again on page 6, that this zone of low relief on the south end of the base line might mark the trace of a fault structure. The zone of low magnetic values in the present survey area, might also correspond to a fault structure. It is possibly a continuation of the one mentioned above. A narrow zone of relatively high magnetic values, strikes southeasterly from station 2400 W on line 3000 S and ends abruptly against the zone of low values just described. It is not evident on the other side of the band of low values. The trend of this magnetic high appears to be almost perpendicular to the general structural trend, which is northeasterly, at least as far as is evident from the magnetic results in the northern portion of the property. The magnetic high might conceivably correspond to a cross-cutting dike terminating at, or considerably displaced by, the postulated fault.

Farther west, at station 4600 W on line 4500 S there is a zone of magnetic highs, with a northeasterly trend. Like the nearly parallel zone of lows, this one also becomes weak and diffuse where it meets the north border of the survey area at station 3700 W on line 3000 S. This zone of magnetic highs is paralleled on the west by some small, generally narrow zones of lesser highs and lows. The zone of these reactions has a more northeasterly trend than the general structural direction in the northern part of the area, but might nevertheless correspond to a formational strike slightly different in this area. The higher values could be due to a somewhat more basic volcanic flow, up-tilted and striking northeasterly.

Aside from the few, noticeable bands of reaction as described above, there seems to be no general trend or pattern in the overall picture. There are several small areas of highs or lows, some with a northeasterly trend, some with a northwesterly one, others trend north and south, and there are a few with an east-west alignment. In general, it may be observed that the magnetic values are stronger at the western end of the survey area than at the eastern one and that the northern border tends to show higher values then the southern one.

The irregularity of the magnetic pattern developed in this survey, indicates that if there is a form or trend, to be observed in this area, its detection will have to await an expansion of the survey to take in a larger area. About all that can be said at the present time is, that the geological formations and their structure probably present something different from the situation obtaining to the north, in the vicinity of the shaft.

ELECTROMAGNETIC SURVEY

INSTRUMENT USED

An electromagnetic survey was made which covered the same grid that was utilized for the magnetic survey. The instrument employed was the Ronka EM-16, manufactured by Geonics Ltd. of Toronto, Ontario, with the serial number 78. Electromagnetic instruments of this type utilize the low frequency (VLF) broadcast waves emitted by shore-to-ship radio stations of the U. S. navy.

The Ronka EM-16 instruments are designed to tune in on one or more radio stations of the U. S. Navy, set up to communicate in particular with submarines. The antennae of these stations are vertical and consequently radiate electromagnetic waves in a horizontal plane. These waves suffer distortion wherever they encounter conductive formations in the ground, such as metallic sulphide bodies. The EM-16 instruments measure the resultant distortion produced, in both the in-phase and out-of-phase, or quadrature, components of the electromagnetic field.

Readings are made by orienting the instrument with respect to the transmitting station and then observing the tilt required to produce a minimum, or null audio signal.

PROCEDURE

For surveys in the southern interior of British Columbia, it is usually convenient to tune in on the Jim Creek Radio Station near Seattle, Washington. This station operates with 250 Kw of power at a frequency of 18.60 kHz; it is particularly useful in areas where the prevailing strikes

are nearly north and south, as on Iron Mtn., as such orientations of the metallic conductors give the best coupling with the emitted waves from Jim Creek. For veins with an east-west strike, a station on the east coast would provide a better coupling.

Observations are made by orienting the instrument with respect to the transmitting station and then tilting the instrument forward or back, to detect the position of minimum, or null audio signal in the head phones. The tilt is indicated on a dial, which reads in percentage, i.e. percent slope, which is equivalent to the tangent of the angle of tilt. The tilt angle is designated as a positive one when the downward-protruding stem of the instrument is pointed forward and away from the operator. It is negative if the stem is pointed backwards towards the operator. A strong positive tilt indicates a conductor ahead of the operator, and a negative one indicates it is behind him. Consequently, it is necessary to know the direction in which the operator was facing when taking the readings. In the previous work on the Acaplomo holdings, it has been the convention for the operator to face west. In the present survey, however, the operator happened to face east. To make the results compatible with those previously recorded, all the signs in this survey have been reversed, so that the results have been made equivalent to the readings taken by a west-facing operator.

Readings were taken on both in-phase and out-of-phase components of the electromagnetic field. The tilt angles of the in-phase component, are the angles of inclination of the ellipses of polarization of the electromagnetic field; the tilt gives a directional indication of the location of the causative conductive body. The reading on the out-of-phase

component gives an approximation of the ratio of the vertical, out-of-phase component of the secondary field, to the horizontal primary field; this provides an approximate indication of relative conductivity. For maximum information both components are observed and recorded, in order to obtain the greatest possible benefit from the data available.

Readings as above described, were taken along the east-west grid lines from Line 3,000 S to Line 4500 S. The reading interval was 100 feet and observations extended from the Base Line on the east boundary of claim #56B, to the west boundary of claim #38, which is the west boundary of the property. The results were plotted on a plan map of the grid lines, which forms Figure 5 of this report.

RESULTS AND INTERPRETATION

As in the case of the magnetic work the appearance of the VLF profiles in this survey area is different from that of the earlier profiles. They are intermediate in character between the earliest profiles plotted in the vicinity of the shaft and those later ones in the northern part of the old survey areas. The profiles shown on Fig. 8 in my report of December 28, 1968, are, in general, fairly flat for both the in-phase and quadrature components. There are a few cross-overs which are not very pronounced and may be indicative of the presence of only weak conductors.

The VLF profiles shown on Fig. 7 of my report of January 4, 1971, on the other hand, exhibit stronger variations in both components, with the quadrature response becoming quite pronounced in numerous places. There are quite a few cross-overs in which the responses in the two components are of strongly opposite signs, implying the presence of buried formations of good conductivity. There are several alignments of this character.

In the present survey area, the variations in value of both components are not as strong as in the area mentioned immediately above. They are stronger, however, than in the first mentioned area, around the shaft. Nevertheless, in the present survey area, there are no striking cross-overs which could be considered indicative of strong conductors. The cross-overs which do occur, are generally weak and of uncertain significance. In general, they may be due largely to surface effects, residing in the overburden, or close to the bed rock surface. There are a few such phenomena, usually with a generally north-south trend. Cases in point may be observed in the vicinity of stations 1200 W, on lines 3000 S to 3900 S; in the vicinity of stations 3300 W on lines 3000 S and 3300 S. Cross-overs of slightly greater significance, but still of doubtful importance, may be observed on lines 4200 S, 3900 S and 3600 S, between stations 3800 W and 4000 W; and on lines 3300 S and 3000 S between stations 4000 W and 4100 W. Similarly, weak responses also are found in the vicinity of stations 5800 and 6000 W on lines 3000 S to 3600 S; on line 3300 S between stations 6300 W and 6400 W; on line 3600 S between 6200 W and 6300 W; and again on line 4200 S between stations 6100 W and 6200 W.

Although none of the above may be considered important indications, it is nevertheless advisable to check these results carefully against the results of soil sampling when this area is covered by that technique.

The weak VLF responses in this area indicate that there are probably no pronounced, well-mineralized vein structures in the bed rock. They cast no light on the possibility of the occurrence of wide-spread, disseminated mineralization. Therefore, if any encouragement is found in soil analysis results,

an induced polarization survey would be the logical technique to use as a follow-up method in this vicinity.

As in the case of the magnetic survey, there is no clear-cut and distinctive overall pattern in the VLF profiles in this portion of the property. Continuation of the geophysical work to the north and to the south may, however, develop a more distinctive one. This will be particularly useful in locating and defining the transitions between this type of geophysical response and those recorded in the two areas in the northern part of the property.

CONCLUSIONS

The magnetic and VLF surveys on these five claims, #56B, #31, #33, #37 and #38 apparently indicate an area in which the underlying geological formations produce a reaction intermediate between those around the shaft and those in the area north and west of the shaft. The implication is that the rock formations in this area are not in such strongly contrasting bands as they are in the areas of strong magnetic reaction. It seems probable that they are slightly stronger in contrast, with an as-yet undefined pattern, than those underlying the area of weak magnetic relief south and east of the shaft. In the present survey area, the work has not yet covered a large enough territory to permit attempting to define the probable causative structures. It is therefore advisable to continue the survey to the north and south, in order to gain more information about typical reactions to be recorded. Coverage of this area by soil sampling and possibly also by induced polarization, is also recommended.

Respectfully submitted,

Sherwin F. Kelly, P. Eng.,
Geologist and Geophysicist

Box 325
Adelphi Hotel
March 31, 1971

Appendix No. 1

Declaration of Expenditures
Disbursed According to
Affidavit on Application for
Certificate of Work, Filed February 24, 1971

Line-cutting and electromagnetic surveys, were carried out by a crew of Jerald Johnston's on a contract basis. This work was done between February 8th and 23rd, 1971, by a crew consisting of Jerald Johnston, Andre Chenier and Lorne McClelland. The work was performed on claims Makelstin #56B, #31, #33, #37 and #38, but was to be applied to claims Makelstin #31 to #48, inclusive, totalling 18 in number; all are grouped in Aca No. 1 Group.

Line cutting

Six grid lines, between 7,000 and 7,200 feet long, with total length of 42,600 feet plus 1500 feet of base line, cut, measured and flagged. Total lineage on claims Makelstin #56B, #31, #33, #37 and #38 = 44,100 ft. or 8.3 miles, @ $125/mi. = ...	$ 1,037.50
Electromagnetic survey by VLF method, 8 miles @ $50/mi.....	$ 400.00
Rental of snowmobile, 4 days @ $25/day.....	$ 100.00
Towards preparation of geophysical report.....	$ 300.00
	$ 1,837.50

I hereby certify that the above sums were properly incurred for the performance of the work specified, as set forth in this report.

Sherwin F. Kelly, P. Eng.

Appendix No. 2

Declaration of Expenditures
Disbursed According to
Affidavit on Application for
Certificate of Work, filed April 6, 1971

Magnetic surveys were carried out by a crew of Jerald Johnston's, on a contract basis. Work was done between February 19th and 23rd, 1971, by a crew consisting of Jerald Johnston and Andre Chenier. The work was performed on claims Makelstin #56B, #31, #33, #37 and #38, but was to be applied to claims Makelstin #21A, #22A, and #49 to #52 inclusive, and #55B and #56B, totalling 8 in number; all are grouped in Aca No. 1 Group.

Magnetic survey over 8.3 miles of grid lines, on claims Makelstin #56B, #31, #33, #37, and #38, @ $50/mile	$ 415.00
Rental of snowmobile, 5 days @ $25/day	$ 125.00
Towards preparation of report	$ 300.00
	$ 840.00

I hereby certify that the above sums were properly incurred for the performance of the work specified, as set forth in this report.

Sherwin F. Kelly, P. Eng.

CERTIFICATE OF QUALIFICATIONS

I, Sherwin F. Kelly, P. Eng., residing at the Adelphi Hotel in Merritt, B. C., certify that:-

(1) I am a registered Professional Engineer in the Province of British Columbia.

(2) I received the degree of B. Sc. in Mining Engineering from the University of Kansas in 1917.

(3) I pursued graduate work in geology and mineralogy at the Sorbonne, Ecole des Mines and Museum d'Histoire Naturelle in Paris and at the University of Kansas and the University of Toronto. I also taught those two subjects at the two latter universities. I received my training in geophysics from Prof. Conrad Schlumberger of the Ecole des Mines, in Paris.

(4) I have practised as a geologist and geophysicist in Europe, North Africa, United States, Canada, Mexico, Central America, South America and the Caribbean, since 1920. Since 1936, my work has been principally as a consultant.

(5) This report of a geophysical survey conducted on a portion of the Makelstin group of mineral claims, held by Acaplomo Mining & Development Co. Ltd. (N.P.L.), is based on field work carried out under my direction.

Respectfully submitted,

Sherwin F. Kelly, P. Eng.,
Geophysicist and Geologist

Adelphi Hotel
Merritt, B. C.
March 31, 1971

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. 2967 MAP

N astr.
N mag.

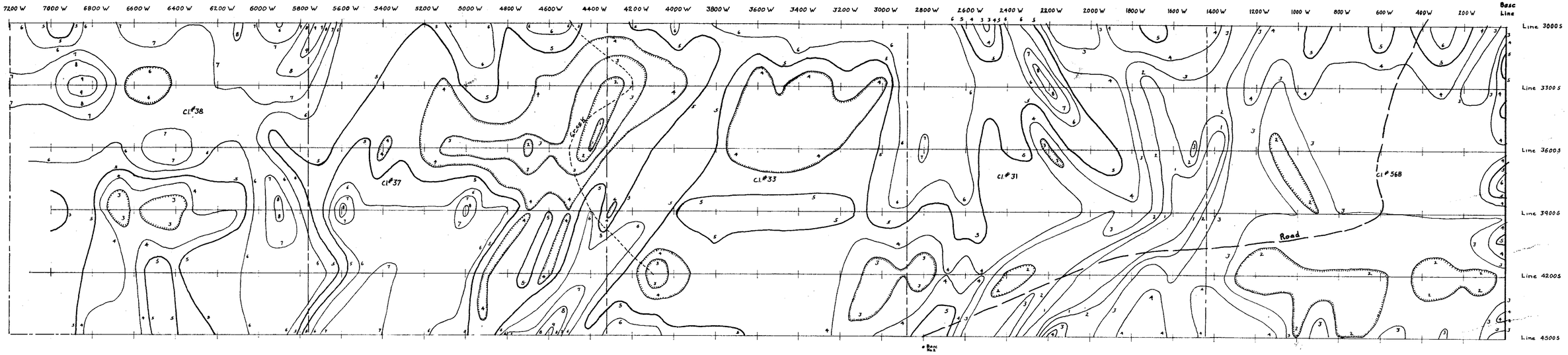
Acaplomo M. & D. Co. Ltd.
MaKelstin Claim Group
Merritt B.C.

Scale
1 in. = 200 ft.
0 100 200 ft.

Fig. 4
Magnetic Contours

Contour interval=100 r
Contours numbered
in
hundreds of gammas

To accompany geophysical report by
Sherwin F. Kelly, P.Eng., geophysicist
and geologist, on the MaKelstin group,
Iron Mtn, Nicola Mining Division,
dated March 31, 1971.
Sherwin F. Kelly, P.Eng.



2967 M-4

Acaplomo M. & D. Co. Ltd.
Makelstin Claim Group
Merritt, B.C.

Fig. 3
Magnetic Profiles

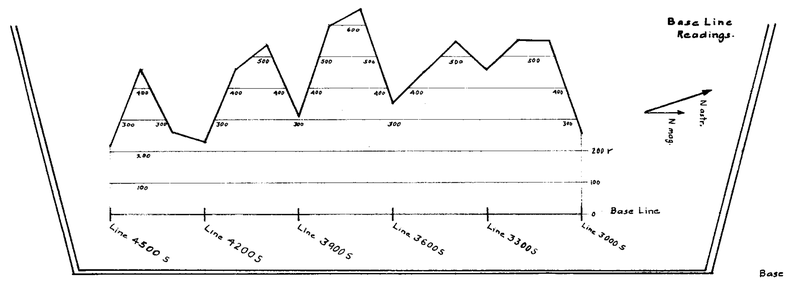
N astr.
N mag.

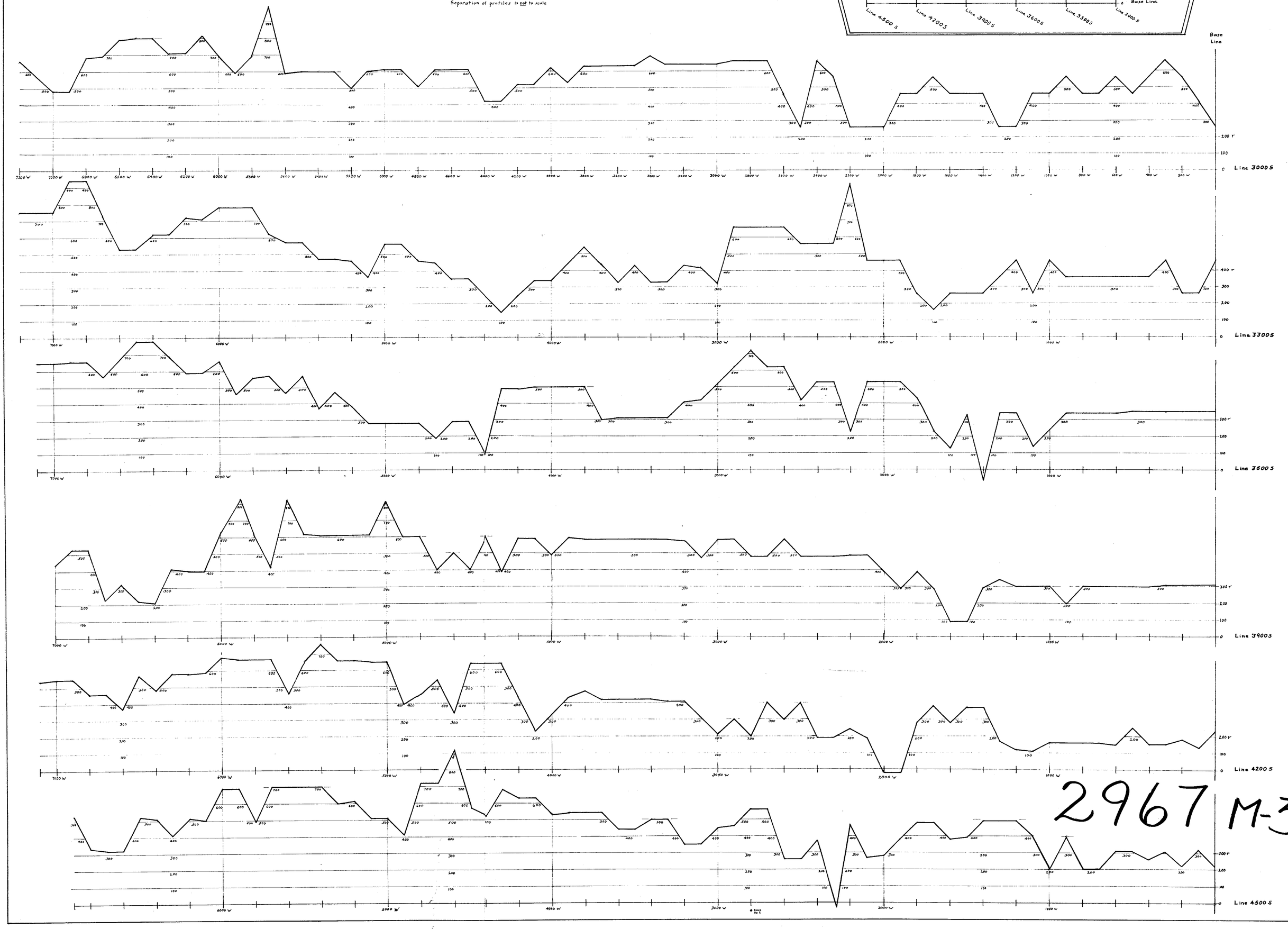
Scale
1 in. = 200 ft. horizontally
0 100 200 ft.
1 in. = 200 gammas vertically
200 γ
100 γ
0

Separation of profiles is not to scale

To accompany geophysical report by
Sherwin F. Kelly, P.Eng., geophysicist
and geologist on the Makelstin Group,
Iron Mtn, Nicola Mining Division,
dated March 31, 1971.

Sherwin F. Kelly P.Eng.





2967 M-3

Acaplomo M. & D. Co. Ltd.
Makelstin Claim Group
Merritt, B.C.

Fig. 5
VLF Profiles

Scale
1 in = 200 ft horizontally
1 in = 20% tilt vertically

To accompany assessment report by Sherwood F. Kelly, P.Eng., geophysicist and geologist on the Makelstin Group Iron Hill, Nicola Mining Division dated March 31, 1971.

Sherwood F. Kelly P.Eng.

N astr
N mag

2967 M:5

7000 W 6800 W 5000 W 4000 W 3000 W 2000 W 1000 W

creek road

Line 3000S
Line 3300S
Line 3600S
Line 3900S
Line 4200S
Line 4500S

Cl.38 Cl.37 Cl.33 Cl.31 Cl.56B

+10% -10%

7200 W 7000 W 6800 W 6600 W 6400 W 6200 W 6000 W 5800 W 5600 W 5400 W 5200 W 5000 W 4800 W 4600 W 4400 W 4200 W 4000 W 3800 W 3600 W 3400 W 3200 W 3000 W 2800 W 2600 W 2400 W 2200 W 2000 W 1800 W 1600 W 1400 W 1200 W 1000 W 800 W 600 W 400 W 200 W Base Line