2817

Report to

Acaplomo Mining & Development Co. Ltd. (N.P.L.)

on a

Geophysical Survey

of the

Makelstin Claim Group

Merritt, B. C.

by

Sherwin F. Kelly, P. Eng.,

Geophysicist and Geologist

January 4, 1971

Report to
Acaplomo Mining & Development Co. Ltd. (N.P.L.)
on a
Geophysical Survey
of its Makelstin Claims

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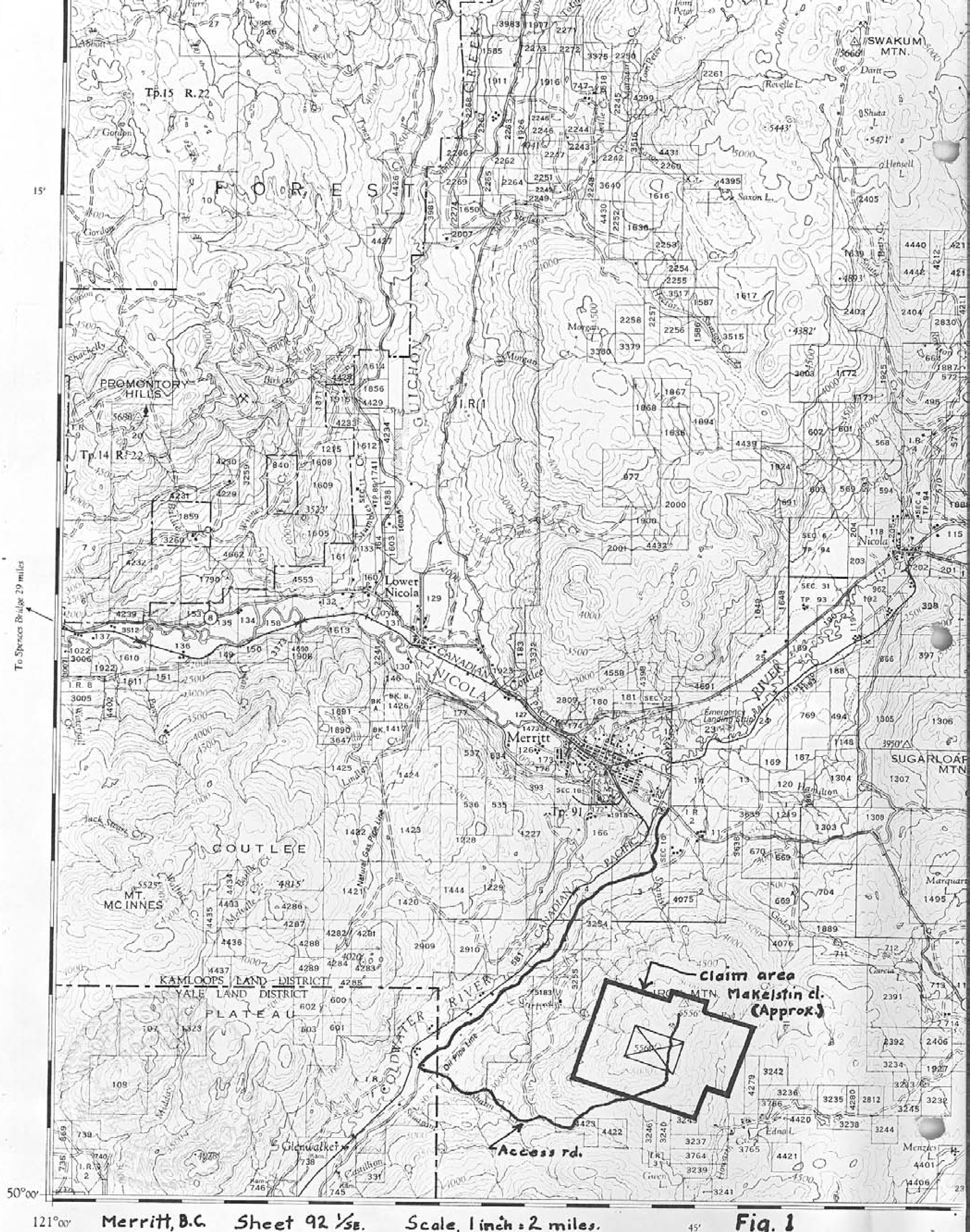
ILLUSTRATIONS

IN ENVELOPE IN BACK OF REPORT



Merritt, B.C. Sheet 92 I/SE. Scale, 1 inch = 2 miles. **Fig. 1**

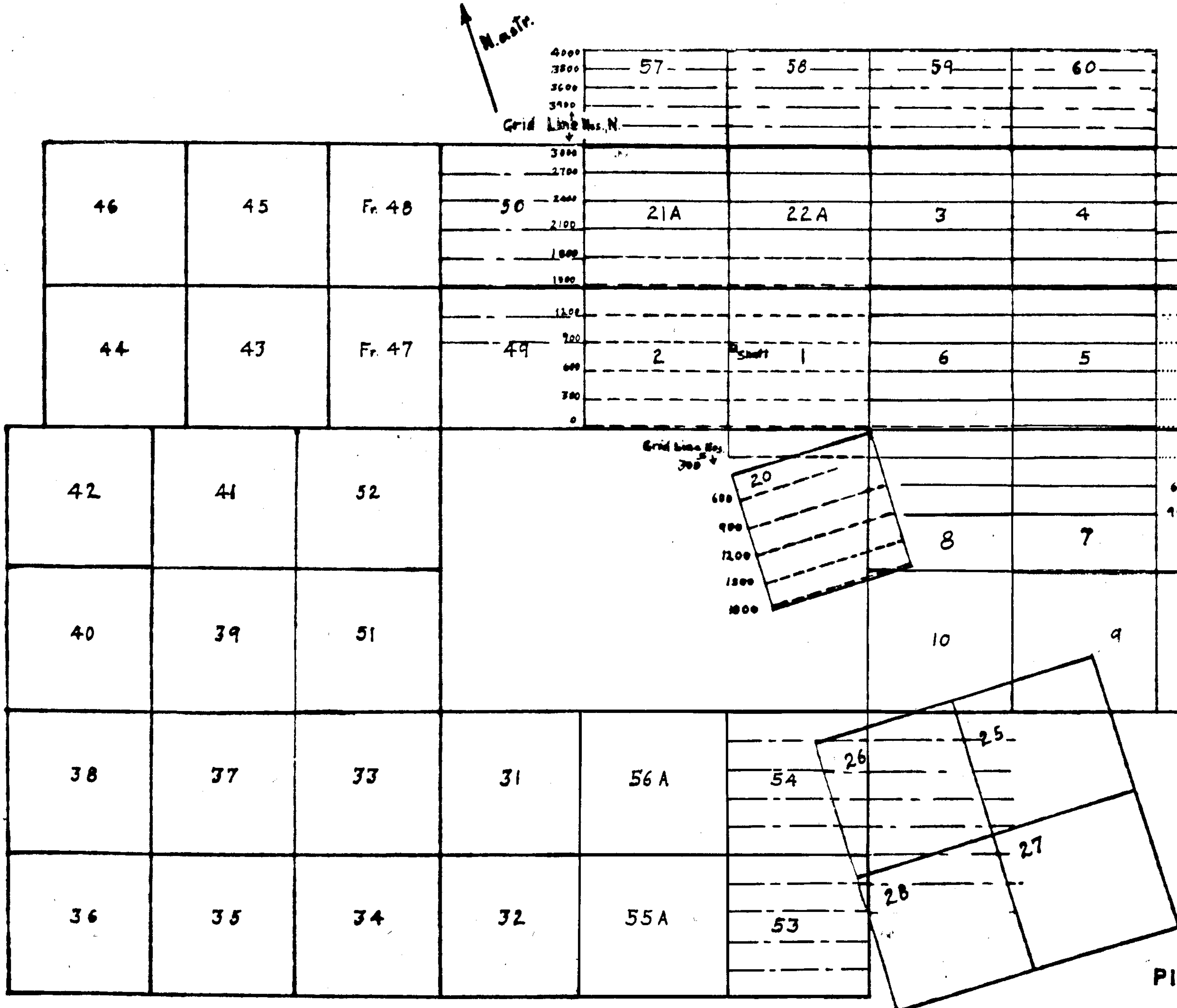
Report to
Acaplomo Mining & Development Co. Ltd. (N.P.L.)
on
Geophysical Surveys
of its Makelstin Claims

INTRODUCTION

Geophysical surveys by magnetic and electromagnetic techniques, were conducted in November, 1970, on the major portion of three claims in the group of Makelstin mineral claims, held by Acaplomo Mining & Development Company Ltd. (N.P.L.). In December, 1970, further work was carried out on part of the remaining portion of those claims and on an additional claim. The Makelstin group is located on the top of Iron Mountain, about five miles southeast of Merritt. The longitude is 120° 45' West and latitude is 50° 2' North. Fig. 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 is followed south from Merritt for six miles. At that point a gravel road turns off to the east and then swings north, to go to the top of the mountain. Microwave towers are located at the summit, eight miles along this road from the turn-off. The road passes through the middle of the Acaplomo holdings.

The surveys were by flux-gate magnetometer and by the electromagnetic technique utilizing the Ronka EM-16. The latter operates by tuning in on U. S. Navy radio shore-to-ship transmittors. In this area, the EM-16 instruments are usually tuned to receive signals from the U. S. Navy transmittor at James Creek, near Seattle, Washington. Both these techniques have already been applied on near-by or adjoining areas of the Makelstin claim group.



Acaplomo 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.
Jan. 4, 1971

Both surveys continued the coverage of claims in the general area of the shaft. The prior surveys were described in my reports dated December 28, 1968 and December 4, 1970. The claims previously covered by magnetic observations, consisted of Makelstin #1, #2, #3, #6, #8, #21A, #22A, and #30. The present surveys continue magnetic coverage to the north and east of the survey reported on December 4, 1970, and were carried out on claims Makelstin #57, #58, #59, #60, and part of #4. The four claims, #57 to #60, adjoin the north boundaries of Makelstin #21A, #22A, #3, and #4. Fig. 2 shows the claim group and the entire system of grid lines cut to date. Grid lines covered in the present surveys include lines 2700 N, 3000 N, 3200 N, 3400 N, 3600 N, 3800 N, and 4000 N, on the five claims mentioned. In addition, observations were made along roads trending northerly across claims #58 and #59.

The electromagnetic survey with the EM-16 instrument was conducted over the same grid lines. In this case, however, a gap remains to be filled in, between the area covered in this report and that covered in my report dated December 28, 1968, which was concerned with claims #1, #2, #6, #8, and #20.

MAGNETIC SURVEY

Instrument

The instrument used in this 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 as nearly as possible to 1/8 scale division, i.e., to the nearest 25 gammas.

Procedure

The grid lines prepared for geophysical and geochemical surveys on these claims, were run approximately magnetic east and west, turned off at 300 foot intervals from a base line running about magnetic north, through the old shaft on Makelstin #1. From line 3000 N, however, the grid was cut at 200 foot intervals, on claims #57 to #60. Observations were taken at 100 foot intervals along the grid lines, and along the roads running northerly across claims #58 and #59. Check readings were taken on a base station at the beginning of work in the morning, at noon, and at the end of observations in the late afternoon. The base station is located on the west edge of the access road on claim #58, where it crosses line N 3000 E, close to station 400 E. This latter station is on the east edge of that road. For the work on claims #60 and #4, however, station 2400 E on line 3200 N, was used as a sub-base station.

The present survey is a continuation of the work recounted in my report of December 4, 1970, utilizing the same instrument and the same base station. That prior work had been tied in to the 1968 survey, as described in the December 4, 1970 report. The results of all the magnetic work to date, are therefore compatible.

The instrument reading of 720, it was found, corresponded with the arbitrary datum, or "zero" value chosen for the 1968 survey. At a scale constant of 10K, this reading records a value of 7,200 gammas.

All readings were then plotted in gamma values, above and below this figure as datum, which is designated as "zero" for plotting the profiles. See Fig. 3 and Fig. 5.

Profiles

The profiles shown on Figs. 3 and 5, record the variations in magnetic intensity, above and below the arbitrarily assigned datum. They range from 1,000 gammas below datum to 1,800 gammas above it, for a total spread of 2,800 gammas. The gamma value at each and every station occupied in this survey, may be read off these profiles. The actual reading of the instrument in each case, can be obtained by adding 7,200 gammas (the datum value) to the value shown on the profile and dividing by 10 (the scale constant of the instrument). Thus, at the Base Line on line 3800 N, the profile value is 200 gammas above datum. Adding 7,200 gammas gives 7,400 gammas and dividing by the scale constant, 10, shows that the instrument reading, corrected for diurnal variation, was 740 at that point.

Contour Maps

The plotted magnetic profiles provided the basis for contouring the magnetic values on plan maps, Fig. 4 and Fig. 6. These maps depict the grid lines utilized in the present surveys and the claim numbers and boundaries. Fig. 4 herewith also appeared as Fig. 4 in my December 4, 1970 report, with the northern grid lines blank. That was to provide for adding to it, the results of this current survey. Thus, Fig. 4 herewith, now encompasses the magnetic work covered in both the December 4 report and this present one, presenting the results in a unified form.

East of the base line, at the south side of the grid in Fig. 4, two grid lines are shown by dashed symbols; they are line 1800 N extending 3000 feet east of the base line, and line 2100 N extending east from 1550 E to 3000 E. These were repeated from Fig. 3 of my report of December 28, 1968, on Fig. 4 of my report of December 4, 1970. They are shown merely to provide a tie-in and overlap with the contoured values on the 1968 map, since the area of the current surveys adjoins the area of that prior one.

Comments

The spread in magnetic values observed in the current survey, is the widest yet recorded in the magnetic work on this claim group. The values range from a high of 1800 gammas (on line 4000 N) to a low of 1000 gammas below datum, recorded on the road profiles near the east boundary of claim #59.

A large part of the area covered in this report is characterized by high peak values with abrupt variations and with low values extending well below datum in some cases. The trends of the highs and lows are predominantly north-south. The area of low magnetic relief, described in my report of December 4, 1970 as extending north of line 900 N and east of a line about 600 feet west of the base line and parallel to it, also continues a very short distance into this survey area. It extends north to the vicinity of line 3000 N.

A striking feature of Fig. 4 is the marked change in magnetic character which occurs close to line 3000 N, the south boundary of the present survey area. East of the base line, bands of high magnetic intensity extend south from near the north claim boundaries but terminate abruptly just north of line 3000 N.

West of the base line, or more properly west of a line parallel to it and 300 feet west of it, the usual pattern of abrupt magnetic highs and lows continues all the way across the area, with its generally north-south trend. There is, however, a noticeable fragmentation of the highs and the interposition of a nest of lows, between lines 3000 N and 3400 N, in the area from 400 feet to 1200 feet west of the base line.

The pattern of strong and abrupt highs and lows, evident in the western and northern parts of the area just discussed, tends to weaken and fade out in the eastern portion of the study area. This takes place on claims Makelstin #60 and #4, as is evident from Figs. 5 and 6. The prevailing north-south trend is still evident, but there is some contortion of the pattern in the vicinity of stations 3200 E to 3600 E, on lines 3000 N to 3400 N.

The abrupt termination of the patterns of strong magnetic relief is still evident in this eastern area, but here it occurs between lines 2700 N and 3000 N. Thus, it lies some two or three hundred feet south of its location in the vicinity of the base line.

The work in the eastern area, shown on Figs. 5 and 6, was conducted a few weeks later than that shown on Figs. 3 and 4. Check readings were therefore taken on the final stations at the east ends of the earlier profiles. Some checked well and others not very closely, but still acceptable. In one case (line 3800 N), however, the discrepancy was great enough to lead to the supposition that one of the readings was incorrect. In all cases the average of the two readings was utilized, as shown on the profile in Figs. 3 and 5. This procedure resulted in quite unimportant modifications of the contours involved. An exception is the case at the juncture of the 2 segments of line 3800 N. Nevertheless, the acceptance of the average reading produces a profile that is consonant with the appearances of the profiles (and the contours) immediately to the south and to the north.

Interpretations

The two types of strongly contrasting magnetic patterns were pointed out in my report of December 4, 1970. In that report, I discussed some of the possible causes for this contrast and suggested that the zones of strong highs and lows with northerly trends, were probably caused by bands of basic rocks, possibly basaltic, steeply tilted and with north-south strikes bent gently into open, sinuous folds. To this may be added the possibility that some of the apparent bending might actually be due to minor dislocations, by cross-cutting faults. The fragmentation and dislocation of the bands of magnetic highs and lows, centered about 800 feet west of the base line on lines 3000 N to 3400 N, strongly suggest the possibility of a major fracture or fault zone cross-cutting the formations in this vicinity. A less drastic deformation of the pattern between lines 3000 N and 3400 N, around station 3400 E, suggests the same possibility.

Similarly, the abrupt termination of the zones of high magnetic intensity east of the base line, in the vicinity of lines 3000 N and 3200 N, is probably symptomatic of a major fault striking easterly through this location. In the eastern part of the study area on claim #60 the terminus of the zone of high magnetic relief lies slightly to the south of that position. There it lies between lines 2700 N and

3000 N, so the presumed fault strikes at a very small angle to the grid lines. Such a fault contact was also postulated in my report of December 4, 1970, as forming the boundary at a similar magnetic transition in the vicinity of line 900 N. Thus, between these supposed faults there lies a zone of low magnetic relief approximately 2100 feet north and south, which has been interposed in an area of high magnetic relief. Its western boundary is in the neighbourhood of a north-south line about 600 feet west of the base line, but its eastern boundary has not yet been determined.

The boundary between the two zones of magnetic relief which extends east from the base line, close to line 3000 N, presents a striking correlation with a zone of soil anomalies very high in silver. Line 3000 N is, thus far, the northern boundary of the geochemical soil survey on these claims. From the base line east for a distance of 4500 feet along this line, there is a series of silver anomalies showing values in the range of 5 ppm to 12 ppm. With a background value of 0.5 ppm, these represent anomalies as high as 24 times background. If the magnetic pattern is indicative of an east-west fault break, as postulated, then that break would present many intersections with north-south bedding structures. Such a situation is quite important, as it offers many favourable loci for mineral deposition. Consequently, the coincidence of the silver anomalies with this magnetic indication may be considered highly significant and very favourable.

South of line 3000 N, there is a group of strong silver anomalies just east and west of the base line. These are located principally in an area of low magnetic relief. An exception is the soil anomaly centered at 900 feet west of the base line on line 2100 N. The peak of the silver anomaly lies on the east flank of a magnetic high centered 1,000 feet west of the base line, but the main body of the anomaly does spread westerly across the magnetic peak. There is also a case of a silver anomaly coinciding with a magnetic high, at station 3300 E on line 3000 N. In general, however, the silver anomalies tend to occur in the areas of low magnetic relief and on the flanks of the magnetic highs. This may be significant as to the type of bed rock favourable as a host for silver mineralization. As the areas of low magnetic relief are presumably underlain by weakly basic or acidic rocks, it appears that silver mineralization favoured rocks of that type. Where basic rocks were encountered, as shown by prominent magnetic peaks, silver deposition seems to have occurred, in the main, along the contacts of such basic rocks with formations less basic or acidic in character, and also where such basic rocks may have been altered, at least to some extent, by hydrothermal solutions.

The silver anomalies referred to are depicted on map 7A, (replacing map 7) in my report of December 28, 1968.

ELECTROMAGNETIC SURVEY

Instrument Used

The electromagnetic survey, covering approximately the same grid area as the magnetic one, was conducted with the Ronka EM-16 instrument, manufactured by Geonics Ltd. of Toronto, Ontario. The serial number of the instrument used is No. 78. It utilizes low frequency (VLF) broadcast waves emitted by shore-to-ship radio stations of the U. S. Navy.

This type of instrument is designed to tune in on one or more chosen radio stations of the U. S. Navy, set up to communicate with ships at sea, especially submarines. The antennae in such stations are vertical and therefore generate electromagnetic waves in a horizontal plane. Where these waves encounter conductive formations, especially such metallic conductors as sulphide bodies, secondary fields are set up in such conductive formations. These secondary fields distort the total field and it is this distortion which the EM-16 is designed to record. The major distortions occur when such conductive bodies as metallic veins, have strikes pointing in the general direction of the transmitting station being utilized. This provides a maximum coupling with the emitted electromagnetic waves.

The prevailing strike of the vein formations on Iron Mtn., as far as known, is generally north-south, which makes the radio station at Jim Creek, near Seattle, Washington, a particularly favourable one on which to tune. This station radiates 250 Kw of power at a frequency of 18.60 kHz.

The Ronka EM-16 consists of a small box containing batteries, amplifiers, dials, etc., with a tubular stem extending about 1 foot from the bottom. A short cross bar on the end of this stem contains the receiving and reference coils.

Procedure

For the various steps involved in taking readings with the Ronka EM-16, the indicative orientation of the receiving and reference coils is defined by a null or minimal audio signal. The readings are taken by first 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 headphones. The tilt of the instrument is read on a dial which gives the tangent of the angle of tilt, expressed as a percentage. The angle of tilt is designated as positive when the stem of the instrument is pointed forward and away from the body. The angle is negative if the stem is pointed back towards the body of the operator. A strong positive tilt indicates a conductor ahead of the operator; a negative tilt indicates it is behind him. It is therefore essential to know the direction in which the operator was facing when taking the readings. To avoid confusion, the operator always faces in one direction throughout the survey. For the surveys on the Acaplomo property, the operators faced west.

Readings are 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 were taken along the grid lines at 100 foot intervals as well as on the two roads crossing the grid lines. One of these, is the access road near the west boundary of claim #58; the other is a logging road near the east boundary of claim #59. The results are depicted on Fig. 7.

Comments

The wild gyrations in the readings near the base line should be ignored. They are due to a power line, serving some radio and TV antennae west of the base line and south of line 3000 N. This is an overhead power line, suspended in the trees. Its influence appears to extend about 200 feet each side of the line and for the out-of-phase (quadrature) component, it may extend as much as 400 feet.

The electromagnetic responses in this present survey area, present a contrast with those recorded to the south and shown on Fig. 8 in my report of December 28, 1968. The contrast is not unlike the magnetic one already discussed. The VLF results reported in 1968 showed rather flat responses and, although there were some interesting reactions, they did not exhibit the strong character shown by many on Fig. 7 of this present report.

Two road profiles, each run nearly north and south, were measured more as a matter of interest than in the expectation of obtaining significant data. The one which followed the access road, about 400 feet east of the base line, shows the influence of the power line in the quadrature component where the road swings closer to the power line, between stations 3400 N and 3800 N. The profile along the logging road, in the vicinity of stations 2400 E, indicates that there is probably a zone of moderately strong reaction to be expected between lines 3600 N and 4000 N. Here, the road actually lies about 50 feet east of 2400 E, so that the reactions at this intermediate point on line 3800 N, are probably stronger than actually recorded on the profile. In the interval between stations 2400 E and 2500 E, the in-phase component appears to go lower and the quadrature higher than at station 2400E. It will be interesting to see the data in this vicinity on line 4000 N, when the present gap is closed.

North-south profiles, such as the ones mentioned on the two roads, could advantageously be run occasionally as spot checks for possible veins striking east and west. For such profiles, however, provisions should be made to tune the instrument to a station lying east of the survey area. Station NAA at Cutler, Maine, would be suitable.

Interpretation

For a complete interpretation of the results in this area, it will be necessary to fill in a few gaps in both the geophysical and the geochemical surveys. In the first place, the soil survey needs to be continued north from its present terminus on line 3000 N, to the boundary of the property on line 4000 N. This will permit correlating soil anomalies with the electromagnetic ones now under discussion. In the VLF work, a short gap exists on line 4000 N, but the principal area to be filled in lies to the south. There, the gap to be closed lies between lines 3000 N and 2100 N, inclusive.

The important indicators in the VLF results, consist primarily of changes in the in-phase observations from strong positive tilts to weak ones, or better yet to negative tilts. Since all readings were taken facing west, the changes in the profiles must be read from east to west. When the quadrature component goes from a low positive or a negative reading to a strong positive one at the same location, a good conductor is indicated. The plotted results show a steeply rising, dashed line (quadrature component) crossing a down-trending solid line (in-phase component). A good example is found in the anomalies recorded on lines 2700 N to 4000 N near the eastern ends of those profiles, where such "cross-overs" and near cross-overs are prominent.

A strong anomaly is observed on line 2700 N, between stations 3200 E and 3300 E. It strikes northeasterly to the interval between stations 3900 E and 4000 E, on line 3400 N. Between this line and the next one to the north, the anomaly is abruptly shifted nearly 200 feet to the west on line 3600 N, where it is found between stations 3700 E and 3800 E. This conforms to, and substantiates the implications of just such a shift, found in the magnetic contours in this area, on Fig. 6.

A strong silver anomaly, located between stations 3200 E and 3400 E on line 3000 N, lies alongside the strike of this VLF anomaly. The implication is, that there is a metallic sulphide vein with a northeast strike, indicated by the course of the VLF anomaly, which may carry silver mineralization.

Similar, but weaker electromagnetic reactions are recorded about 500 feet east of those described above, on line 2700 N. These follow a course nearly parallel to the first described ones, but with diminished intensity; they apparently fade out between lines 3600 N and 3800 N. Again, near the east end of line 2700 N, there is yet another reaction, between stations 4300 E and 4400 E. It is found again on line 3000 N but 200 feet further east; it then strikes out of the survey area.

Both of the above VLF indications correspond with strong silver anomalies on line 3000 N, at 3800 E and at 4500 E. Again there is implied a sulphide vein probably carrying silver, striking north-easterly.

Electromagnetic reactions similar to those described, are prominent on this grid at numerous other locations to the west. They all present a similar appearance and form a repetitive pattern, indicating numerous causative geological structures or formations of a consistent type. There are several such VLF anomalies, and with the numerous silver anomalies along line 3000 N, it is to be expected that at least some of the VLF indications will correspond with some of the silver anomalies. Nevertheless, it is interesting to note such coincidences.

"Cross-overs" of in-phase and quadrature profiles occur, for example, between stations 2300 E and 2700 E, on lines 3200 N to 3600 N and continue, but weakened, across line 3800 N. These line up with strong silver anomalies at stations 2500 E and 2700 E on line 3000 N. Strong VLF anomalies extend from line 3200 N across line 3800 N, between stations 1000 E and 1400 E. Strong silver anomalies lie at 900 E and 1200 E on line 3000 N. VLF profiles such as recorded here, are often indicative of two closely spaced conductors whose reactions interfere with each other. Cross-overs in the vicinity of 600 E to 800 E seem to stem from a high silver anomaly at 700 E on line 3000 N, which extends south across line 2700 N. A strong silver anomaly lies at 200 E on line 3000 N, but the proximity of the suspended power line negates any attempt to check it with VLF equipment.

West of the base line, there is a northeasterly-trending reaction extending from station 800 W on line 3200 N to 600 west on line 3400 N. From this station it continues north across line 4000 N. The trend of the southern segment is on strike with a silver anomaly extending from station 1400 W on line 2100 N to 900 W on line 3800 N.

The VLF technique responds not only to metallic conductors, such as sulphide veins and graphite, but also to formations and structures of somewhat better conductivity than the enclosing rocks, but still not of metallic conductivity. Some examples are, wet faults and shear zones and wet bedding contacts. In such cases, however, the quadrature component is usually weak. Cases in point are readily observed on the profiles depicted on Fig. 7. For example, weak quadrature responses on line 3200 N at stations 2400 E and 2600 E appear to correspond with markedly stronger ones on the next line north. This could readily be due to stronger sulphide mineralization appearing in the vein structure to the north, where it crosses lines 3400 N, 3600 N and 3800 N.

A fault fissure, or formational contact, with reduced sulphide content, is probably responsible for the weak electromagnetic responses extending from station 2000 E on line 3400 N to station 1900 E on line 3800 N. This series of responses nevertheless lines up with a strong silver anomaly on line 3000 N, extending from station 2000 E to 2200 E. This serves to emphasize the point that indicated structures may vary in their metallic content, along strike and down dip as well.

Impressive silver anomalies correspond closely to the major VLF reactions described. The extent to which such soil anomalies will actually follow the VLF indications northwards, remains to be ascertained by further geochemical work.

CONCLUSIONS

The geophysical and geochemical surveys to date on this portion of the Acaplomo claim group, are developing significant, closely related patterns of magnetic, electromagnetic and geochemical reactions. The characters of the causative geological formations are yet to be defined, but certain generalized deductions may nevertheless be made. Two different types of magnetic reactions have been recorded, one exhibiting striking highs and lows and the other presenting a relatively flat magnetic relief. The electromagnetic results showed parallel characteristics in the same areas. The zones of strong magnetic relief are ascribed to underlying, up-tilted volcanic flows, probably basic in character. These are believed to have a slightly sinuous, north-south strike and occasionally to be dislocated by minor folds or cross faults. The zones of low magnetic relief are thought to correspond with areas of less basic rocks, separated on the north and south by fault contacts from the areas of strong magnetic relief.

The copper soil anomalies are associated with both types of magnetic reaction, but the geochemical silver anomalies seem to favour the zones of low magnetic relief. Nevertheless, the assemblage of strong silver anomalies along line 3000 N, coincides with the location of the presumed fault contact separating the area of low magnetic relief on the south from the area of strong magnetic relief on the north. The VLF indications of probable vein structures, extend northerly from this presumed fault contact, into that zone of high magnetic relief. Many of these indications of vein structures coincide with strong silver anomalies on the contact boundary. This phenomenon implies that silver veins possibly do extend into the zone of strong magnetic relief. From the evidence thus far available, it appears that the silver anomalies which do occur in such areas, favour the magnetic lows, or the flanks of the magnetic highs. From this, it is presumed that the causative veins probably occupy contacts between basic flows and less basic ones, or occur in areas underlain by rocks of more acidic character.

RECOMMENDATIONS

The results obtained to date in the geophysical and geochemical surveys on Iron Mountain, are producing highly significant data which could be, of great value in further exploration by trenching and drilling. It is therefore most desirable to continue the surveys. Top priority should be given to completion of the geochemical survey from line 3000 N to the north boundary of the property at 4000 N. Next in importance, is closing the gap in the VLF survey from line 3000 N to line 2100 N, and extending it at least 1500 ft. eastwards in the area south of line 2700 N. All three types of survey should then be extended easterly to the east boundary of the property. When this has been completed, attention should be given to applying the same surveys to the balance of the claim holdings.

Respectfully submitted,

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

Box 277
Merritt, B. C.
January 4, 1971

Appendix -1-

Declaration of Expenditures
Disbursed According to
Affidavit on Application for
Certificate of Work, Filed November 30, 1970

Line cutting and magnetic and electromagnetic surveys, were carried out by a crew of W. A. McClelland's on a contract basis. Work was done between November 14 and 27, 1970. The crew consisted of W. A. McClelland, Lorne McClelland and Arlin McClelland.

Line-cutting

Six grid lines, each 1500 ft. long, cut, picketed and flagged, on claims Makelstin #14 and #16. Total of 9000 ft. or 1.7 mi. of line, at $140 per mi. = $ 238.00

Geophysical Surveys

Five grid lines on claims Makelstin #57 to #59:-

Lines 3200 N to 3800 N, from 1500 W to 2600 E (4 x 4100 ft.)=	16,400 ft.	
Line 4000 N, from 1500 W to BL=	1,500 ft.	
	17,900 ft.	
2 N-S roads, 1000 ft. and 900 ft. =	1,900 ft.	
	19,800 ft.	
19,800 ft. = 3.7 miles		
Magnetic survey @$ 50/mi		
Electromagnetic survey @$ 50/mi		
@$100/mi =		$ 370.00
Rental of geophysical instruments, one for two days and one for three days @$10/day=		$ 50.00
Towards preparation of this geophysical report by Sherwin F. Kelly, P. Eng.		$ 400.00
		$1,058.00

I hereby certify that the above sums were properly incurred for the performance of the work specified.

Sherwin F. Kelly, P. Eng.

Appendix -2-

Declaration of Expenditures
Disbursed According to
Affidavit on Application for
Certificate of Work, Filed January 15, 1971

Magnetic and electromagnetic surveys were carried out by a crew of W. A. McClelland's, on a contract basis, on December 28, 1970. Crew consisted of Lorne McClelland and Arlin McClelland.

Geophysical Surveys

Seven grid lines on claims
Makelstin #59, #60, #4

Four lines, 3400 N to 4000 N, from:-		
2600 E to 4500 E, magnetic survey =	7,600 ft.	
2700 E to 4500 E, electromag. survey =	7,200 ft.	
Aver.	7,400 ft.	= 7,400 ft.
Line 3200 N, from 2500 E to 4500 E =		2,000 ft.
Lines 2700 N and 3000 N, from 3000 E to 4700 E =		3,400 ft.
		12,800 ft.

12,800 ft. = 2.4 miles

Magnetic survey	@$ 50 per mi.	
Electromag. survey	@$ 50 per mi.	
	$100 per mi.	

2.4 miles @ $100 per mile =	$ 240.00
Rental of two geophysical instruments @ $10 each per day	$ 20.00
Rental of snowmobile, one day	$ 30.00
Towards preparation of this geophysical report by Sherwin F. Kelly, P. Eng.	$ 100.00
	$ 390.00

I hereby certify that the above sums were properly incurred for the performance of the work specified.

Sherwin F. Kelly, P. Eng.

Appendix -3-

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.

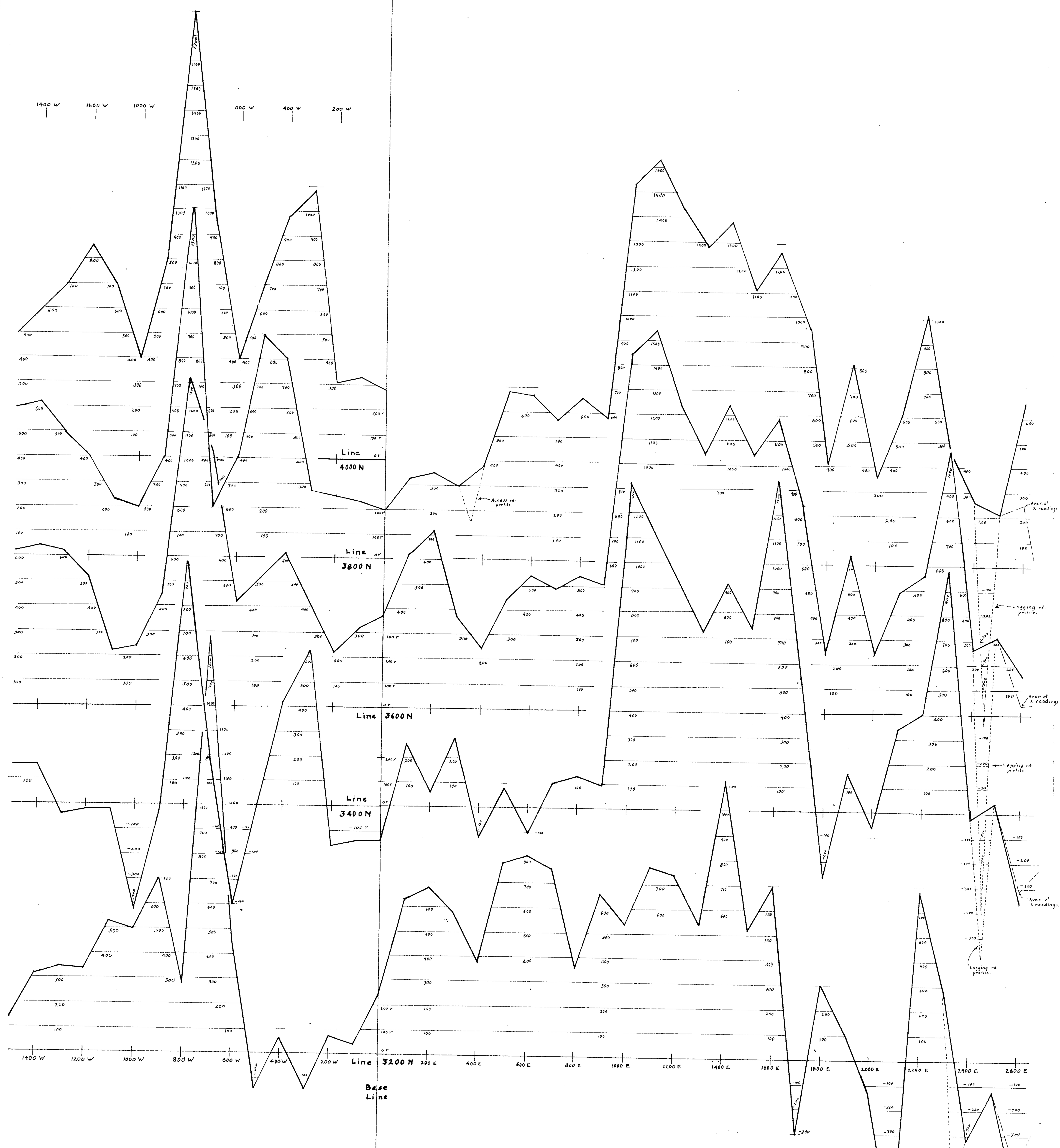
(4) I have practised as a geologist and geophysicist in Europe, North Africa, United States, Canada, Mexico, Central America, South America and the Caribbean, since 1920. Since 1936, my work has been principally as a consultant.

(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.
January 4, 1971



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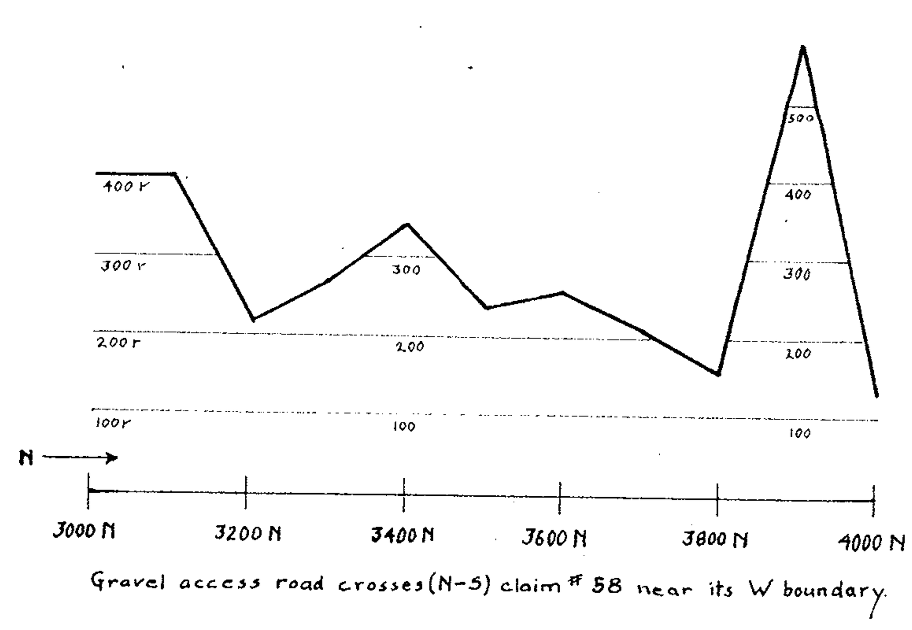
Merritt, B.C.

Fig. 3
Magnetic Profiles

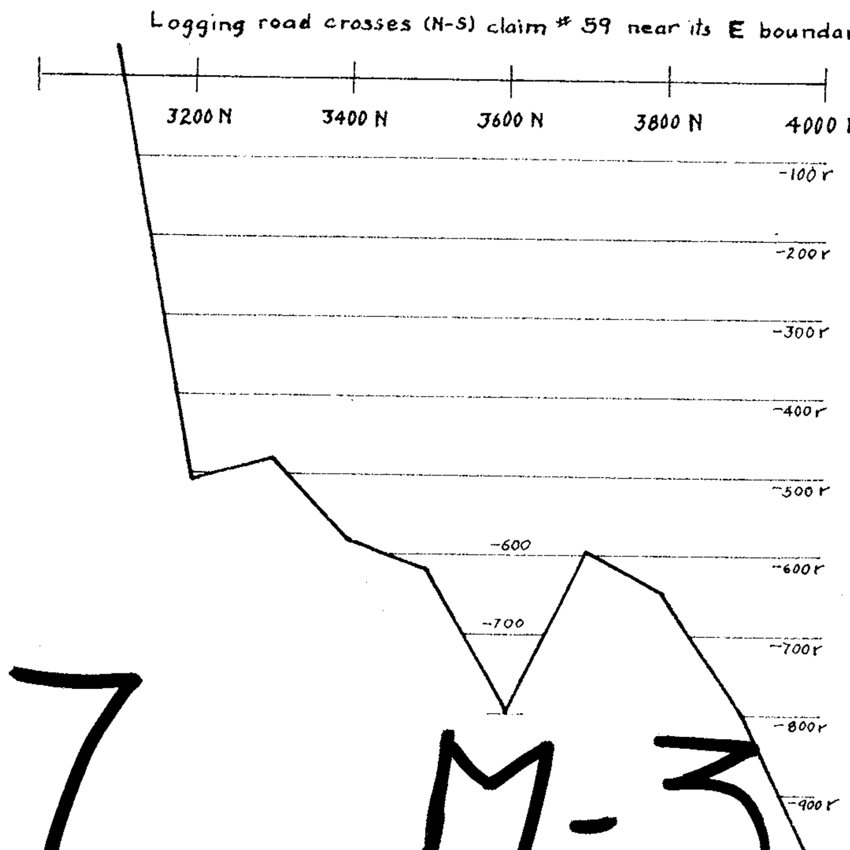
Grid lines numbered in feet N. of Line O. Stations numbered in feet E. and W. of Base Line.

Vertical component was measured with a Scintrex MF1 Flux-gate Magnetometer.



Gravel access road crosses (N-S) claim # 58 near its W boundary.

Logging road crosses (N-S) claim # 59 near its E boundary



Scale

1 in. = 200 ft.

1 in. = 200 gammas (r)

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 Min. Div. dated January 4, 1971.

Sherwin F. Kelly, P. Eng.

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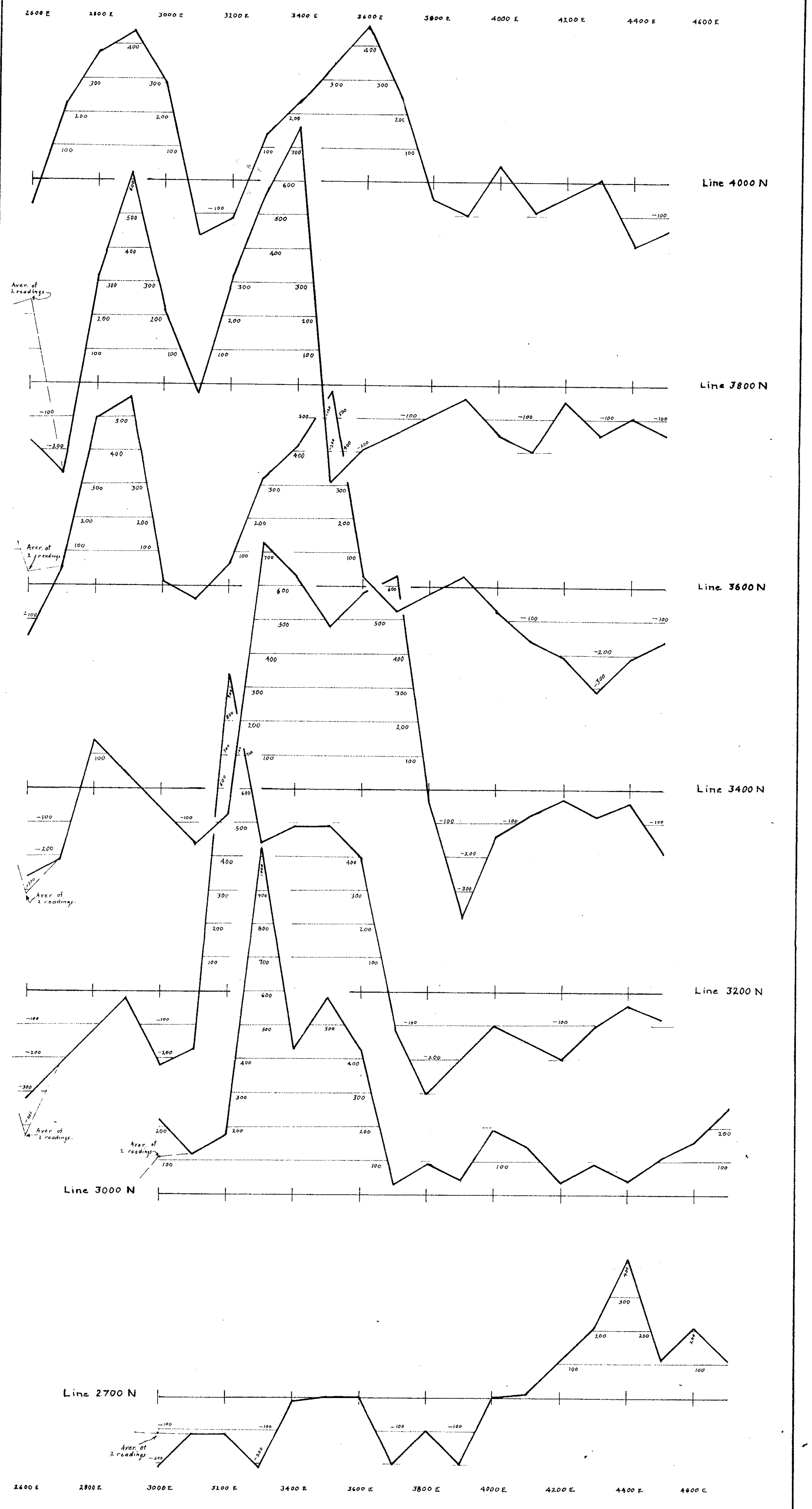

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Makelstin Claim Group
Merritt, B.C.

Fig. 5
Magnetic Profiles.

Grid lines numbered in feet N. of Line O
Stations numbered in feet E of Base Line.

Verticl component was measured with a Scintrex MF-1 Fluxgate Magnetometer.

Scale

1 in = 200 ft.

0 100 200 ft.

1 in. = 200 gammas (r)

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 Min. Div. dated January 4, 1971.

Sherwin F. Kelly, P. Eng.

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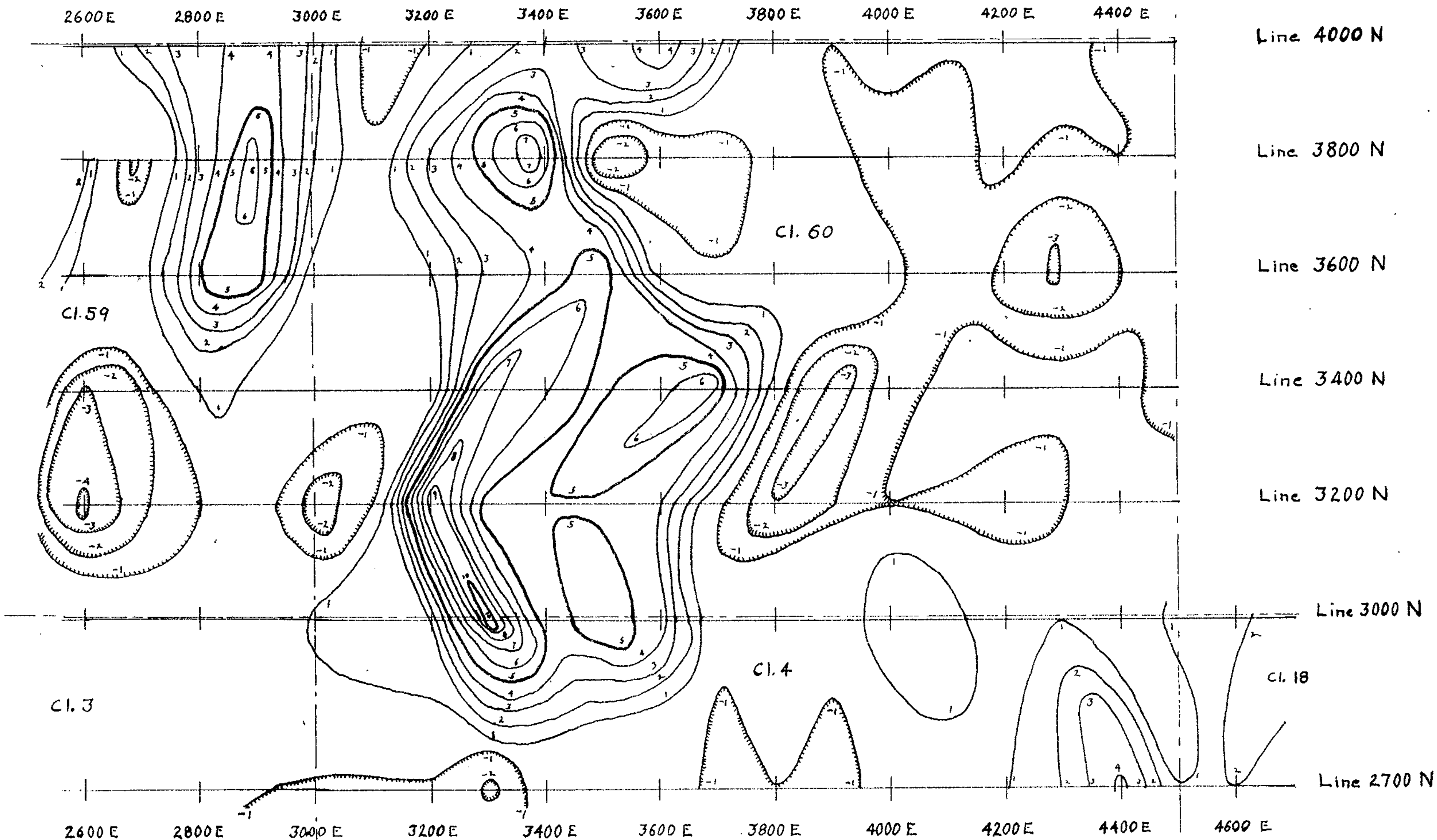

N (astr.)

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Makelstin Claim Group
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Fig. 6
Magnetic Contours

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

Contour interval: 100 γ
Contours marked in hundreds of gammas.

Grid lines numbered in ft. N of Line 0
Stations numbered in ft. E of Base Line.

To accompany geophysical report by Sherwin F. Kelly, P.Eng., geophysicist and geologist, on the Makelstin group, Iron Mtn., Nicola Min. Div. dated January 4, 1971.

Sherwin F. Kelly P.Eng.

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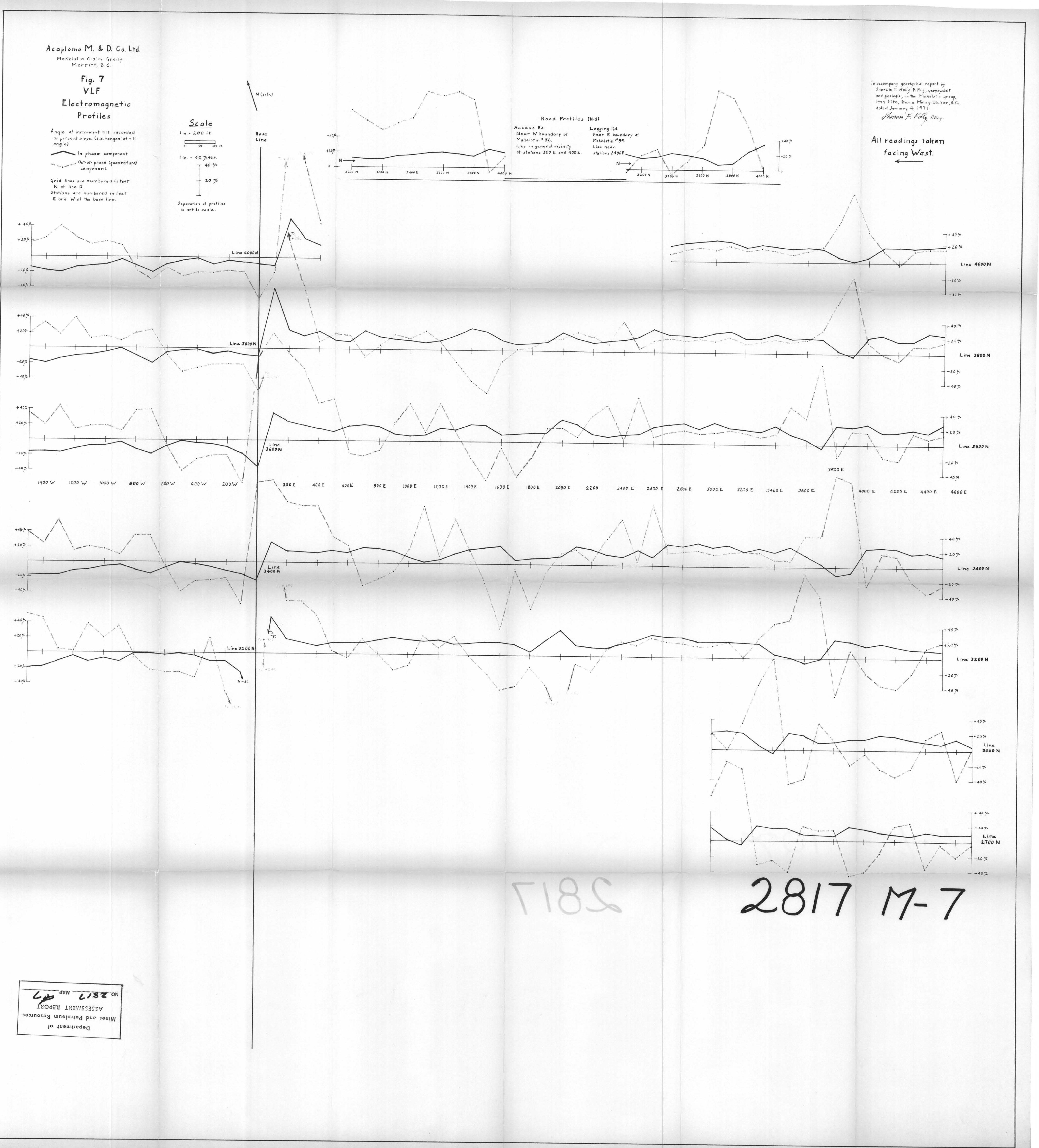

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Merritt, B.C.
Fig. 7
VLF
Electromagnetic
Profiles
Angle of instrument tilt recorded as percent slope (i.e. tangent of tilt angle).
In-phase component.
Out-of-phase (quadrature) component.
Grid lines are numbered in feet N of line 0.
Stations are numbered in feet E and W of the base line.
Scale
1 in. = 200 ft.
0 100 200 ft.
1 in. = 40 % tilt.
40 %
20 %
Separation of profiles is not to scale.
N (astr.)
Base Line
Road Profiles (N-S)
Access Rd.
Near W boundary of Makelstin # 58.
Lies in general vicinity of stations 300 E and 400 E.
Logging Rd.
Near E boundary of Makelstin # 59.
Lies near stations 2400 E.
3000 N
3200 N
3400 N
3600 N
3800 N
4000 N
To accompany geophysical report by Sherwin F. Kelly, P. Eng., geophysicist and geologist, on the Makelstin group, Iron Mtn., Nicola Mining Division, B.C., dated January 4, 1971.
Sherwin F. Kelly, P. Eng.
All readings taken facing West.
Line 4000N
Line 3800N
Line 3600N
Line 3400N
Line 3200N
Line 3000 N
Line 2700 N
+40%
+20%
-20%
-40%
1400 W
1200 W
1000 W
800 W
600 W
400 W
200 W
200 E
400 E
600 E
800 E
1000 E
1200 E
1400 E
1600 E
1800 E
2000 E
2200
2400 E
2600 E
2800 E
3000 E
3200 E
3400 E
3600 E
3800 E
4000 E
4200 E
4400 E
4600 E
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