013586

REPORT ON
A TURAM ELECTROMAGNETIC SURVEY
CUB PROJECT, YUKON
ON BEHALF OF
ATLAS EXPLORATIONS LIMITED

by

P. J. Fominoff, B.A.Sc.

and

Jon G. Baird, B.Sc., P.Eng.

CLAIMS:

Name	Record Number
CUB 18	92280
CUB 20	92282
CUB 22	92284
ROG 1 - 4	Y 53030 - 33
ROG 9	Y 53039
ROG 33	Y 53062
ROG 51 - 58	Y 53554 - 61
BUC 2	Y 38258
BUC 4	Y 38260
BUC 6	Y 38262

LOCATION:

Eleven miles southeast of Kluane, Yukon
60°54' N latitude, - 138°13' W longitude
NTS 115-B-16
Whitehorse Mining District

DATES:

September 5 to September 15, 1970

TABLE OF CONTENTS

SUMMARY

The present Turam electromagnetic survey has revealed high background responses typical of low resistivity overburden or bedrock.

Two electromagnetic conductors have been distinguished, both of which have resistivity/thickness ratios higher than expected for massive sulphide conductors.

If geological opinion is such that diamond drilling of these conductors appears warranted, the locations for two drill holes, each 400' in length, are herein given.

REPORT ON
A TURAM ELECTROMAGNETIC SURVEY
CUB PROJECT, YUKON
ON BEHALF OF
ALTAS EXPLORATIONS LIMITED

INTRODUCTION

During the period from September 5 to September 15, 1970, a geophysical field party under the direction of Mr. Steve Bortnick executed a Turam electromagnetic survey near Kluane Lake, Yukon, on behalf of Atlas Explorations Ltd.

As shown on Plate 1, the property is located about 11 miles southeast of Kluane, Yukon. The topography of the property may be described as mountainous and is covered by glacial overburden.

The claims covered, in whole or part, by the present survey are listed on the title page of this report and are shown on Plate 2, on the scale of 1" = 200'. The present claims are held by Coranex Limited and were under option to Atlas Exploration Limited at the time of the survey.

The "Turam" fixed source compensation method was chosen for the electromagnetic survey since, in comparison with other electromagnetic techniques, it is relatively unaffected by orientation errors caused by rough topography, provides deep penetration and allows accurate interpretation of anomaly characteristics. The attached copy of a paper by R. A. Bosschart and H. O. Seigel entitled "Some Aspects of the Turam Electromagnetic Method" describes the equipment, the field procedures, the nature of results and the interpretative procedures involved in this type of survey.

The electromagnetic methods detect massive sulphide bodies by means of measurement of the secondary electromagnetic field produced by eddy currents. These secondary fields are measurable by a receiving unit. The Turam method employs a large closed loop of wire as transmitter, while the field strength ratio and phase difference at two nearby observation points are measured by means of two receiver coils.

The presence of a subsurface conductor will be indicated by abnormal field strength ratios and phase differences. A typical anomaly will show a correspondence between high values of the field strength ratio and negative phase difference. The depth of burial of the current axis is reflected in the shape of the anomaly, and the ratio of the maximum amplitudes of field strength and phase is a measure of the resistivity/thickness (r/d) ratio of the body.

Approximately 12.3 miles of profile were covered by Turam electromagnetic surveying. Readings were taken each 100' along lines oriented N 45° E and spaced 400' apart as well as three lines oriented N 45° W. Areas of special interest were detailed by taking readings every 50' and in one case an extra detail line was run between two lines reducing the spacing to 200'.

A Scintrex SE-71 instrument was employed with a receiving coil separation of 100'. Five transmitting loops as indicated on Plates 2 to 5 were used for the survey. The main frequency was 400 Hz, but some lines were also surveyed at 200 Hz and one at 800 Hz to further investigate some abnormal responses.

GEOLOGY

The geology of the area including and surrounding the present claims has been studied by several geologists, most recently by M.E. Coates of Atlas Explorations Limited whose report of September 1970 has been made available to the writers.

The survey area is extensively overburden covered and no detailed geology is available. Important regional thrust faults pass near or through the property so that the grid may be underlain by volcanic rocks of Triassic and Jurassic age or by younger volcanics and sediments of Tertiary age.

This survey was undertaken in an attempt to determine the origin of copper-bearing, laminated massive sulphide boulders found on the property as float in the overburden.

DISCUSSION OF RESULTS

Plates 2, 3, 4 and 5 show the results of the electromagnetic survey on the scale of 1" = 200'. The parameters plotted in profile form are the field strength ratios on a scale of 1" = 20% and the phase differences on a scale of 1" = 10°. The interpreted locations of conductor axes are shown. Well defined axes are shown with solid circles and less definite axes with open circles.

Field strength ratios ranging up to 110% and negative phase shifts up to -10° are common over most of the area surveyed. For many profiles gradually increasing field strength ratios and phase shifts are seen as the distance from the leading edge of the loop increases. These background departures from normal null response are indicative of a damping of the transmitted electromagnetic field by bedrock and/or overburden of low resistivity, possibly less than 100 ohm-meters.

Two conductive zones stand out from the high background. One zone, trending approximately east-west from 23 E on L 12 S off the grid at 29 E on L 24 S, is seen for the 400 Hz results on Plate 5. As the highest response is seen on L 24 S the conductor probably continues some distance to the east. The r/d ratio is about 12 ohm-cm/meter which is in the range of conductive bedrock rather than massive sulphide conductors. The depth to the current axis on L 24 S is about 250'.

The second conductor is seen for 200, 400 and 800 Hz profiles on Plates 3 and 4 at about 15 E on lines 16 S through 24 S. Allowing for some continuation along strike to the east, the r/d ratio of this conductor is at least 10 ohm-cm/meter which is higher than the normal range of massive sulphide conductors. The depth to the current axis of this conductor is about 250'.

CONCLUSIONS AND RECOMMENDATIONS

The present Turam electromagnetic survey has revealed high background responses typical of low resistivity overburden or bedrock.

Two electromagnetic conductors have been distinguished, both of which have resistivity/thickness ratios higher than expected for massive sulphide conductors.

If geological opinion is such that diamond drilling of these conductors appears warranted, the following locations would appear to be optimum from the present electromagnetic results.

COLLAR	ANGLE	DIRECTION	MINIMUM LENGTH
L 16 S, 13 + 00 E	- 45°	Northeast in line trace	400'
L 24 S, 26 + 50 E	- 45°	Northeast in line trace	400'

Respectfully submitted,

SEIGEL ASSOCIATES LIMITED

Jon G Baird

Jon G. Baird, B.Sc., P.Eng.
Consulting Geophysicist

Peter J. Fominoff

P. J. Fominoff, B.A. Sc.
Geophysicist

Vancouver, B.C.
January 21, 1971

Some Aspects of the Turam Electromagnetic Method

Robbert A. Bosschart
and
Harold O. Seigel

**Harold O. Seigel & Associates,
Geophysical Contractors and
Consultants,
Downsview, Ontario**

Transactions, Volume LXIX, 1966, pp. 156-161

ABSTRACT

Most electromagnetic methods presently used in mining exploration are of the moving source type; i.e., the primary field source is moved simultaneously and in a fixed configuration with the receiver.

Of the fixed-source methods, which employ a stationary primary field and a moving receiver, the Turam method is the most effective and has marked advantages over alternative electromagnetic methods.

The results are little affected by topographic relief, and a high degree of resolution can be obtained because of the constant relation between source field and investigation area.

Another inherent advantage of the Turam configuration is that it provides more favourable dimensional relations. Thus, the primary field attenuates at a much lower rate than in moving-source configurations and, secondly, the method is size sensitive; i.e., conductor size affects the strength of the response, which is not the case with moving-source methods.

These factors result in a considerably better potential depth penetration.

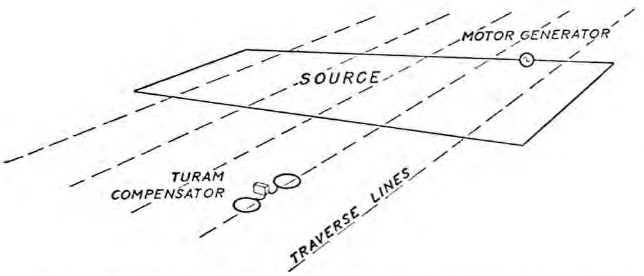


Figure 1.—General layout of the Turam method.

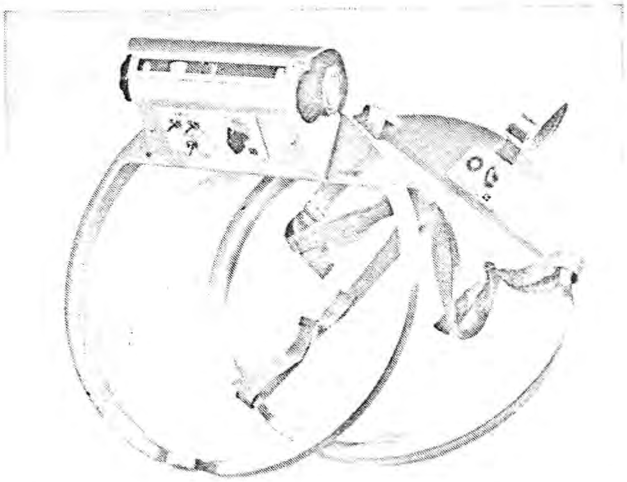


Figure 2.—Three-frequency Turam receiving system (Sharpe SE-700).

Introduction

IN the period following the first world war, Scandinavia became the cradle of geo-electrical prospecting. The Swedish "Tvaram" (Sundberg, 1931) and "Compensator" (Sundberg & Hedstrom, 1933) were the forerunners of the large majority of present-day electromagnetic methods. From the Compensator method were derived, in quick succession, the "Turam" (Hedstrom, 1937) and the "Slingram" (Hedstrom, 1945) methods. Both techniques are still being used in virtually unmodified form, although the "Slingram" has been adapted to a variety of airborne applications and has, in the course of time, assumed a confusing array of pseudonyms, such as "Loop Frame," "Horizontal Loop," "E.M. Gun," "Minigun," "Ronka," "Magniphase," etc., as well as a number of names for the airborne adaptations. The Slingram-derived methods are characterized by a constant transmitter-receiver configuration, which is moved over the target area. They are called "Moving Source Compensation Methods."

The Turam method has been in active use since its development in 1932. In principle, it comprises a fixed transmitting layout of large dimensions and a moving receiver system which measures the gradients of phase and amplitude of the induced electromagnetic field. The coupling between the field source and a conductor, which is variable in the moving-source systems, is constant in the Turam or related configurations, resulting in a response of a somewhat different character. Therefore, a distinction is made between "Fixed Source" and "Moving Source" Compensation methods.

A typical Turam layout (*Figure 1*) consists of a rectangular transmitting loop of insulated wire with sides several thousand feet long, to which alternating current of one or more frequencies between 10^2 and 10^3 c.p.s. is fed by a gasoline-engine-driven alternator. The receiver system embodies two induction coils, carried at a constant separation (e.g., 100 ft.) and connected to a compensator which measures the intensity ratio and the phase difference between the fields received by the two coils.

As a rule, profiles are measured outside the transmitting loop, perpendicular to the long axis of the loop and not exceeding the length of the short axis.

The intensity of the induced primary field depends on the size and shape of the transmitting loop and the location of the observation point. The free air field strength ratios between stations successively occupied by the receiving coils are determined by calculation, and the observed ratios are normalized through division by these values. The presence of secondary fields is characterized by abnormal field strength ratios and phase differences.

Although in practice Turam measurements are, because of the light, mobile receiving system (*Figure 2*), made rapidly (at the rate of 3 to 6 miles per day), a change of primary layout at least each alternate day is required under average conditions. In order to maintain this rate of coverage, a crew of four men is employed—two to measure and two to lay out and recover loops. In terms of line miles per man-day, the Turam method is therefore rather less efficient than the moving-source methods. On the other hand, it has specific advantages in results over the latter, as will be shown below.

Quantitative Interpretation

When a block of ground is energized by means of an alternating electromagnetic (E.M.) field, the resulting field at the surface is, when conductors are present, elliptically polarized. This is because the secondary fields are phase-shifted relative to the primary field. With methods measuring a geometrical component (e.g., Vertical Loop E.M. methods), field ellipticity has the effect of blurring the observations; i.e., instead of a precise angle of zero induction a "null width" of minimum induction is obtained, and this null width widens with increasing phase shift. As a result, such methods may become less definitive in the presence of medium to poor conductors, such as conductive overburden or relatively disseminated mineralization.

A major advantage of Compensation methods is that phase shifts are compensated and field components can be measured accurately, independent of the degree of field ellipticity. Moreover, two related components are usually measured (either phase and amplitude, or in-phase and out-of-phase components), which greatly diminishes the possibility of obtaining spurious anomalies, and, more importantly, because the relation between these components depends on the conductor characteristics, renders possible a quantitative interpretation of the obtained data.

In recent years, much work has been done to investigate the response of mathematical or reduced-scale models of geological conductors in moving-source or fixed-source configurations and so provide a basis for the quantitative interpretation of field data (Wait, 1952, '53, '60; West, 1960; Hedstrom & Parasnis, 1958; Paterson, 1961; Bosschart, 1961, '64). As a result, some conductor characteristics can often be closely enough determined to discriminate between anomalies arising from potential ore conductors and those arising from electrolytic conductors (overburden, weathered shear zones, etc.) and the conducting bodies, even at considerable depth, can be accurately located for diamond drilling. The possibility of assigning significance to anomalies on the basis of amplitude ratios rather than on amplitude strength, and giving precedence to weak anomalies among larger and stronger ones, in itself signifies a considerable extension of the capabilities of these methods.

The response of conductors, calculated theoretically or observed in model experiments in a particular measuring configuration, are usually presented in the form of response diagrams showing a set of two curves which represent the variation of peak amplitudes of the in-phase and out-of-phase components with the variation of a response parameter. The latter includes, in some form, the exciting frequency and the relevant conductor characteristics. For instance, for an infinite sheet the response parameter may be written as $\lambda = 10^3 \frac{r}{fd}$, in which r = resistivity in ohm-cm, f = frequency, and d = thickness in m.

Such a diagram, representing the response of a medium-size tabular conductor (1000 ft. strike length) in a Turam configuration, is shown in *Figure 3A*. The straight line marked Q is the in-phase to out-of-phase ratio. This ratio varies with the response parameter and the strike length and thus gives, for a determinate frequency, a value for the resistivity/thickness ratio of the conductor. The validity of this particular diagram is limited to the specified strike length, but it illustrates the general relations. As they show the relation between the relative amplitudes of the response and the frequency, an important function of such diagrams is to indicate how anomalies caused by bodies of different conductivity can be emphasized or de-emphasized by changing the exciting frequency. An example of this application is described below.

In some areas, the overburden is both conductive and of irregular configuration and thickness. At standard prospecting frequencies, the strong field distortion arising from this condition could mask the response of underlying conductors, even when these would have appreciably better conductivity. In *Figure 3B-1*, an example of extreme overburden distortion at a frequency of 800 c.p.s. is shown, with anomalies as strong as 40 per cent field strength ratio (R) and a 24-degree phase difference (P). The same traverse at a frequency of 200 c.p.s. is shown in the bottom profile. The field strength anomaly has almost disappeared; from 40 per cent it has decreased to 4.5 per cent. The phase difference is down to 7.5 from 24 degrees. When these results are compared with the response diagram (*Figure 3-1*) they appear to be entirely predictable. The overburden anomalies have a r/d value of approximately 50 ohm-cm./m. and thus λ equals 62 ohm-cm.sec./m. at 800 c.p.s. and 250 ohm-cm.sec./m. at 200 c.p.s. As the curves show, the in-phase component drops 80 per cent and the out-of-phase component 60 per cent with the change of λ from 62 to 250 ohm-cm.sec./m. This example shows that the overburden response can be drastically reduced by lowering the frequency. The process would, however, be futile if the response from underlying better conductors would be proportionally decreased. With the use of properly selected exciting frequencies, however, this is not the case; for a good conductor with, say, an r/d value of 1.5, the change in frequency would represent a change from λ = 2 to λ = 8, with a corresponding drop of the in-phase amplitude of only 25 per cent and an actual gain in out-of-phase amplitude of 75 per cent (*Figure 3A-2*).

Under 200 ft. of cover, this conductor might (subject to size and over-all geometry), at a frequency of 800 c.p.s., give rise to a 22 per cent in-phase and a 4 per cent out-of-phase anomaly (approximately 20 per cent field strength ratio, 2.5 degree phase diference) (*Figure 3B-2*), and would be difficult to distinguish from the 800-c.p.s. overburden noise shown in *Figure 3B-1*. At the lower frequency, the anomaly would be 17 per cent in-phase and 7 per percent out-of-phase (15 per cent field strength ratio, 5-degree phase difference), and it would stand out clearly from the reduced overburden response.

Potential Depth Penetration

In assessing the capabilities of electromagnetic methods, the effective depth penetration is among the most important factors to consider. It can be defined as the maximum depth at which the response of conductors of potential economic interest can be clearly distinguished from electromagnetic fields arising from other sources.

An examination of the descriptions of some fifty producing orebodies on the Canadian and Baltic Precambrian shields shows that the large majority are steeply dipping, lenticular or tabular bodies of concentrated sulphides, with strike lengths varying from 300 to 3,000 ft. *(see Figure 4A)* and depth extensions, where known, of a comparable order of of magnitude. An example of the response of good conductors within this size range in typical moving-source and fixed-source configurations is shown in the same diagram *(Figure 4B)*. The conductor is a tabular body of good conductivity ($\lambda = 10.3$ ohm-cm.sec./m.) at a depth of 60 ft. The strike length and height have been increased simultaneously from 10^2 to 10^4 feet. It can be seen that, up to a strike length of 400 ft.,

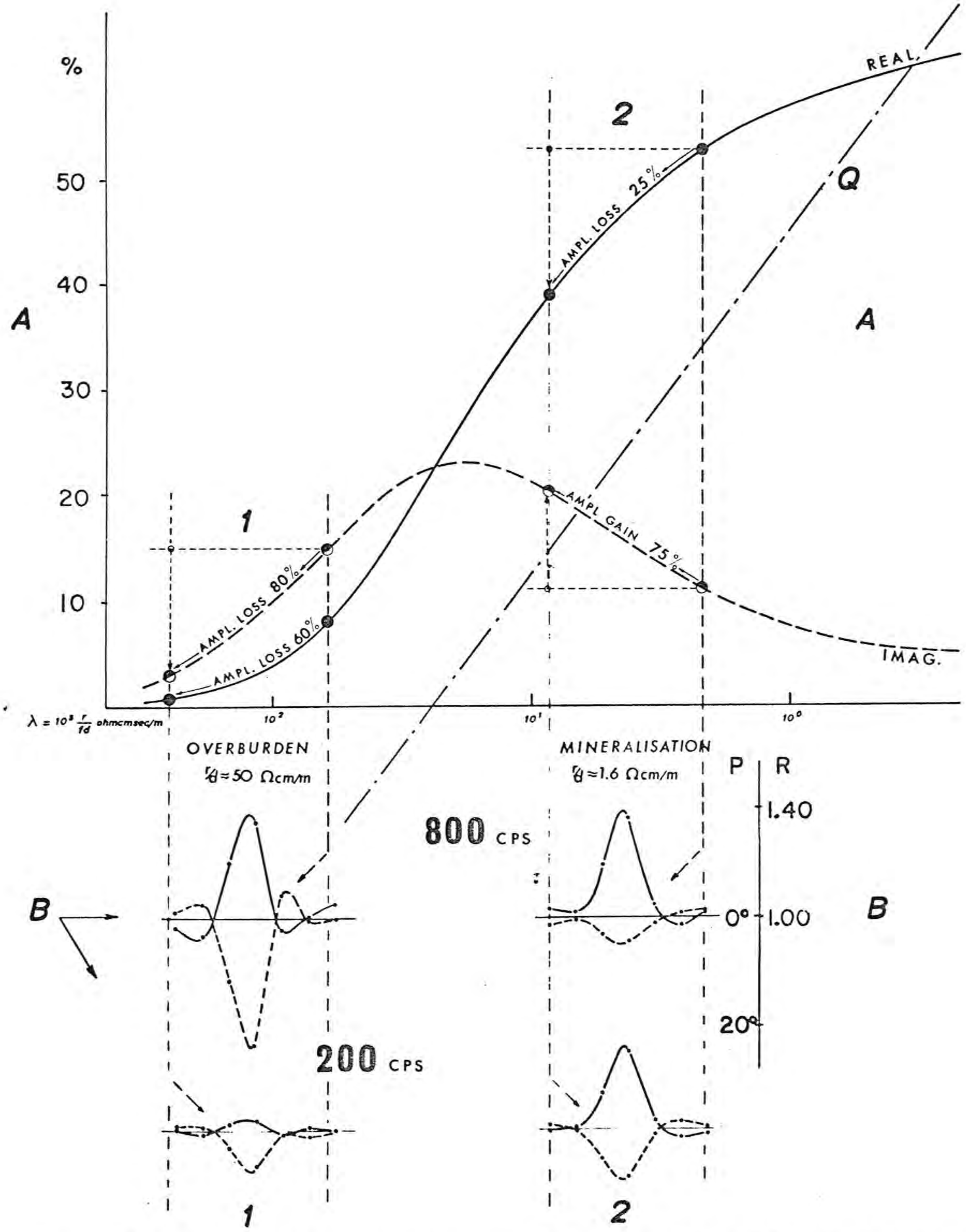


Figure 3.—Response of a thin, medium-size tabular conductor (1000-ft. strike length) in a fixed-source measuring configuration.

the response in both configurations is comparable. In the moving-source configuration (Horizontal Loop), a further increase in size results in very little gain in the response. Saturation is reached at a strike length of 600 to 800 ft.

In the fixed-source (Turam) configuration, the response shows its steepest gain where the moving-source response flattens off; for an increase in strike length from 300 to 3,000 ft., the fixed-source response increases from 6 per cent to 80 per cent, or

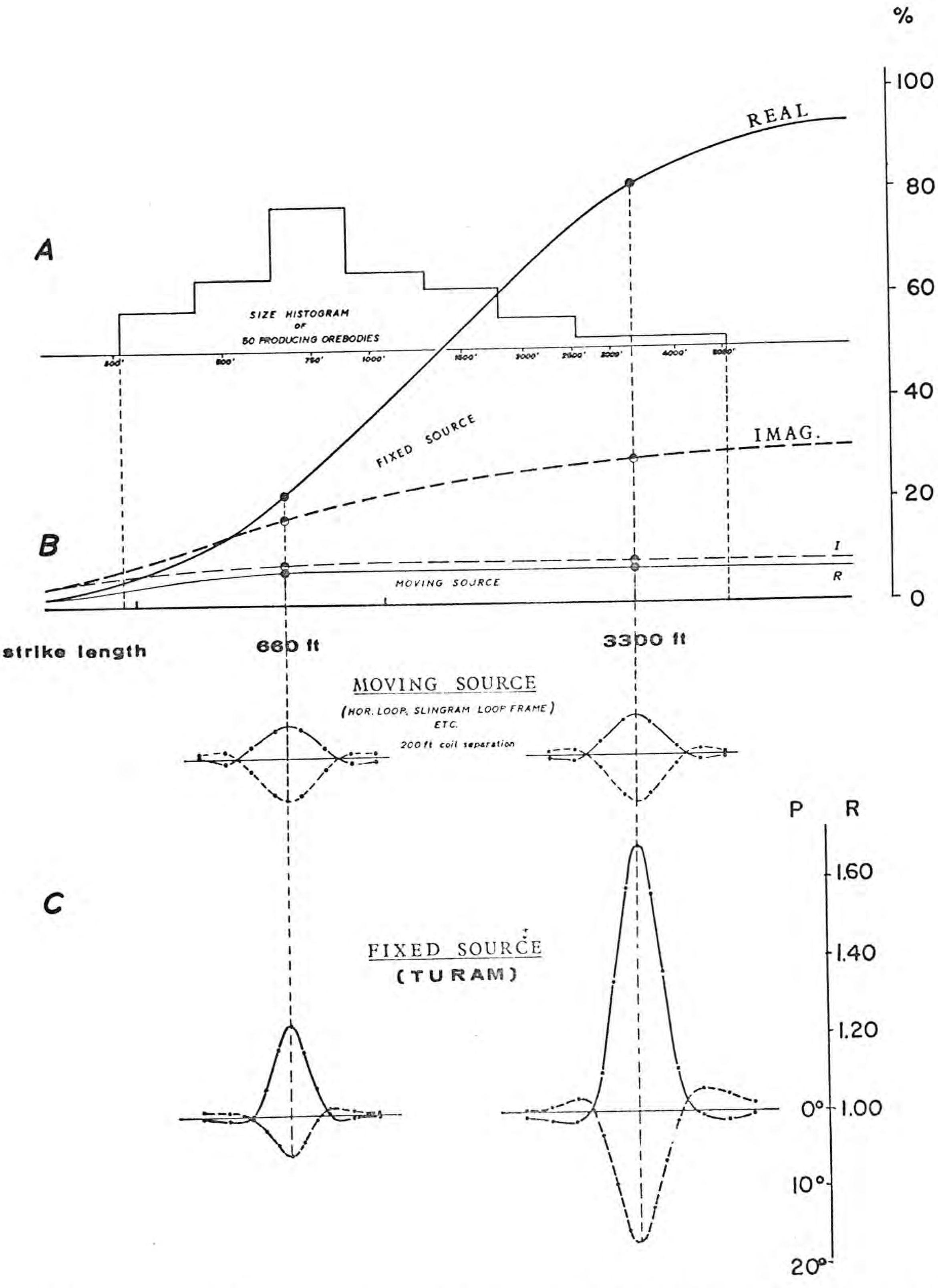


Figure 4.—A comparison of the response of conductors of varying size in moving-source and fixed-source measuring configurations.

more than 13 times, whereas the moving source response increases from 4 per cent to 7.5 per cent, or by a factor of less than 2.

In practical terms, this means that size has a negligible effect on the detectability of a conductor in a moving-source configuration, but contributes materially to its detectability in a fixed-source system. The larger the body, the greater the depth at which it can be found with the Turam method. A major reason for the observed difference in potential depth penetration of the two types of configuration is the different rate of fall-off of the response of bodies of the shapes and dimensions discussed above.

For moving-source configurations, this question has been examined by Hedstrom & Parasnis (1958). In a diagram, for instance, they show the variation of the response of a 2,000 by 2,000 ft. sheet conductor of good conductivity ($\lambda = 4$ ohm-cm.sec./m.) with the depth. *(Figure 5)*. Between depth to coil separation ratios of 0.2 and 0.8 the rate of fall-off increases from the 1st to the 5th power of the depth. In ground surveys, where the in-phase noise level is, under average conditions, rarely less than 2 per cent, a discernable anomaly will thus have to have an in-phase amplitude of at least 4 per cent. As the diagram shows, the response falls below this value at a depth to coil separation ratio of 0.57. At 300 ft., which is the largest separation practical, the potential depth penetration is therefore less than 170 ft.; at the standard 200 ft. separation, it is less than 115 ft.

The variation with depth of the response of a smaller conductor (1,000 by 1,000 ft) of comparable conductivity ($\lambda = 3.5$) in a Turam configuration is shown in *Figure 6*. To a depth of 200 ft. the response falls off at a rate of less than the 1st power; to depths of well over 600 ft., it falls off at a rate of less than the 2nd power.

At a 600-ft. depth, the in-phase amplitude is still better than 4 per cent. For a 2,000 by 2,000-ft. body, it would be approximately 6 per cent, and, with a further increase in size, it could reach 8 per cent. The potential depth penetration can thus be conservatively estimated to be 600 ft.

Figure 7 is a field example of a 400-c.p.s. Turam traverse over two steeply dipping mixed graphite and sulphide conductors under 340 ft. of overburden (Timmins area). The field strength ratio anomaly of the strongest conductor is 23 per cent, which is approximately three times stronger than the field strength ratio anomaly of the smaller conductor shown in *Figure 6* at the same depth of burial. This example indicates that the present body could be found at much greater depth and that the estimate of the potential depth penetration, based on the smaller body, is indeed conservative. It may be noted that the in-phase response in a moving-source system (300 ft. coil separation) would be less than 1 per cent and that the body would be undetectable with such a method.

Effect of Topographic Relief

Neglecting external sources, the noise level of moving-source compensation methods is strongly dependent on the coupling between transmitter and receiver; i.e., if the configuration is not rigidly maintained during operation, spurious in-phase anomalies result. For instance, an error of 5 per cent in the

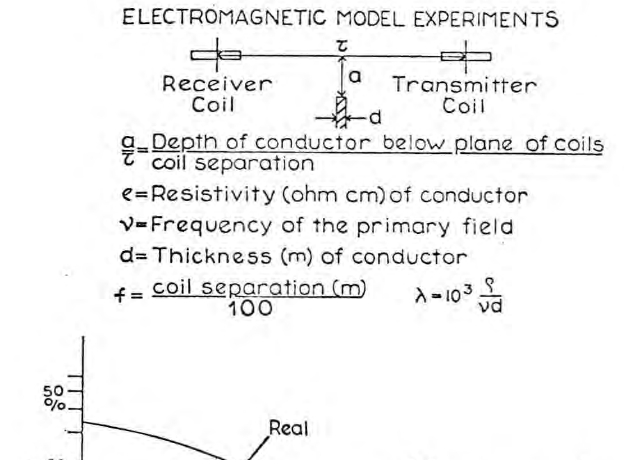


Figure 5.—Variation of the response with depth of a thin tabular conductor of infinite strike length in a moving source configuration.
(Hedstrom and Parasnis, 1958).

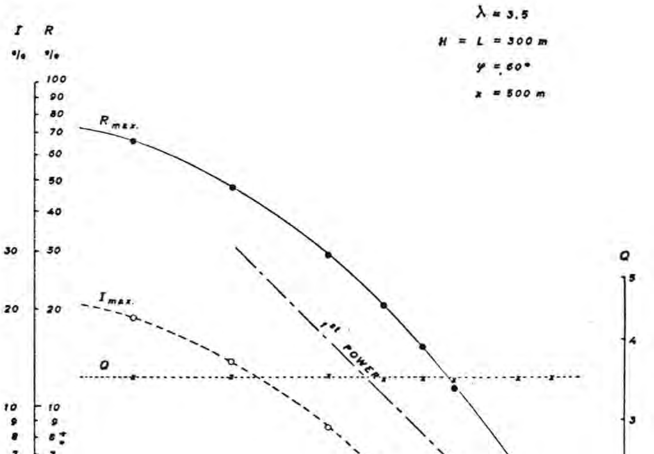


Figure 6.—Variation of the response with depth (a) of a thin tabular conductor of finite strike length (1000 ft.) in a fixed-source measuring configuration.

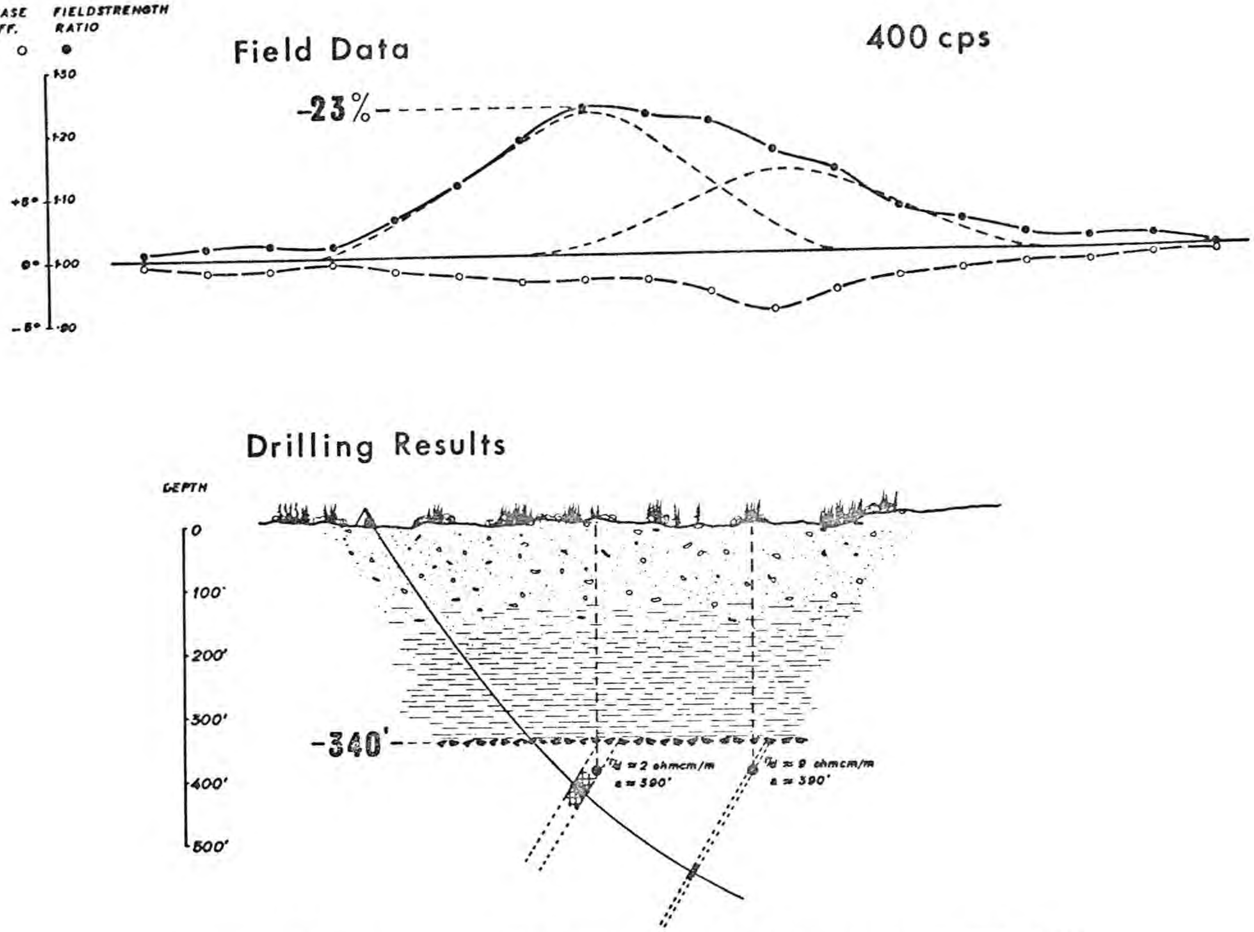


Figure 7.—Turam traverse over deeply buried conductors in the Timmins area.

coil separation causes a change of 15 per cent in the in-phase component. In the presence of secondary fields, both components are affected. Elevation differences between the coils produce a comparable effect. As a result, these methods become impractical in areas of appreciable topographic relief.

With the Turam system, a 5 per cent error in coil separation causes a change of 2 per cent at a distance of 300 ft. from the source, 0.5 per cent at 500 ft. and 0.2 per cent at 1000 ft. The effect of elevation differences between coils is, because the field at the surface is predominantly vertical, even smaller.

The effect of terrain relief on the measurements is therefore negligible, except in areas of very rugged topography. Moreover, where corrections are required, they can be made, because of the fixed relation between source and terrain, in a simple and straightforward manner.

Conclusions

In the foregoing, those aspects of the Turam method that have marked advantages over alternative methods have been stressed. It is, at present, the most powerful electromagnetic prospecting tool at our disposal.

It is also a rather elaborate method and therefore does not necessarily represent the most efficient approach under all circumstances.

In areas of thin cover and level topography, systematic surveys may, for instance, be done more economically with moving-source compensation methods. Also, for fast ground follow-up of airborne electromagnetic surveys, where the problem is usually confined to determining the accurate location of preselected anomalies, methods measuring geometrical components will yield the desired information more rapidly and at less expense.

The proper field of application of the Turam method lies where conditions are more difficult and the requirements severe; in particular in cases where a high degree of discrimination between conductors is desired, where the depth of overburden limits the use of other methods or where appreciable topographic relief occurs.

References

(1931) Sundberg, K., "Principles of the Swedish Geo-Electrical Methods," *Erganzungshafte fur Angewandte Geophysik*, Vol. I.

(1933) Sundberg, K., and E. H. Hedstrom, "Structural Investigations by Electromagnetic Methods," *World Petroleum Congress.*

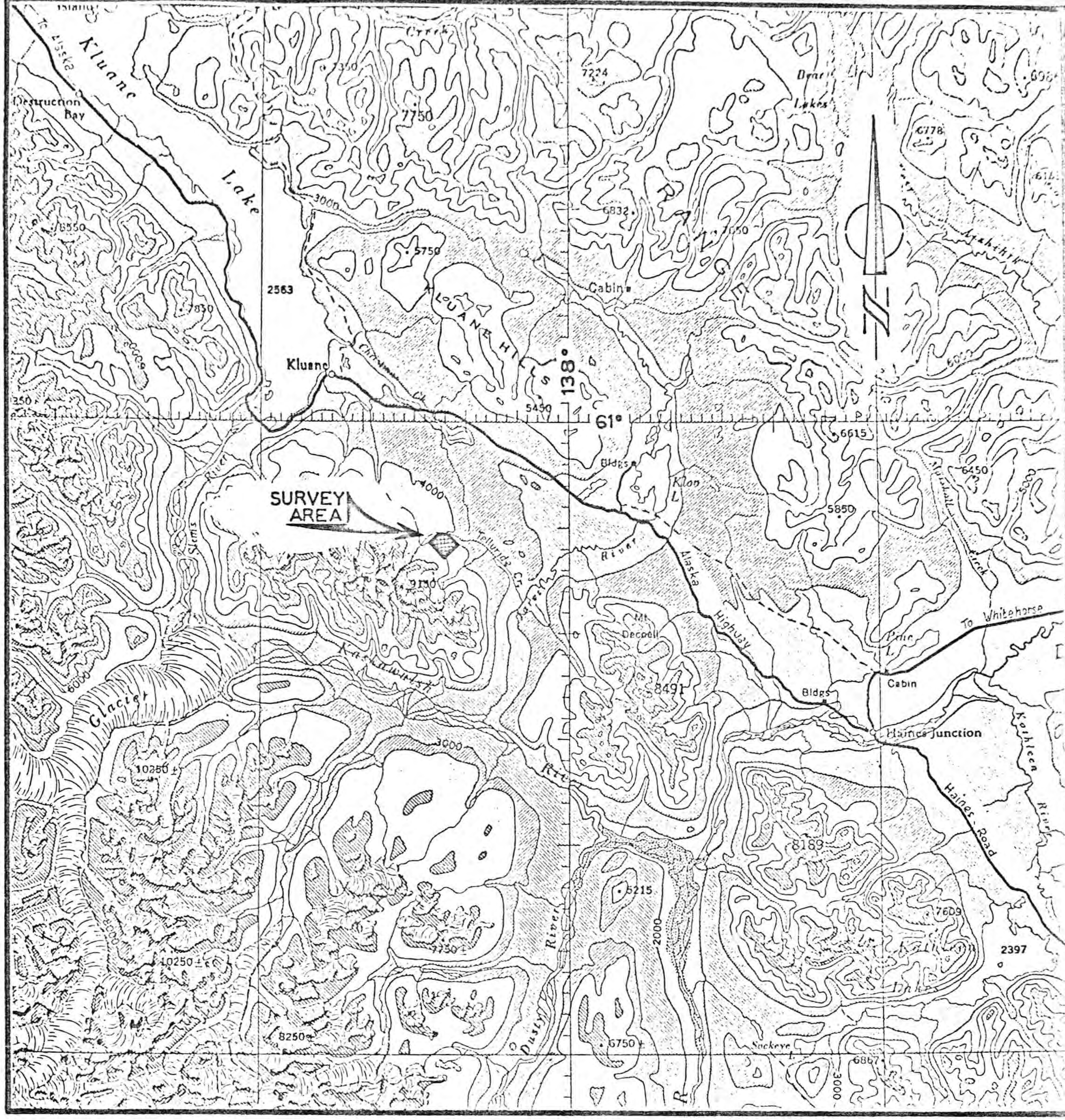
(1937) Hedstrom, E. H., "Phase Measurements in Electrical Prospecting." *A.I.M.E. Techn. Publ. 827.*

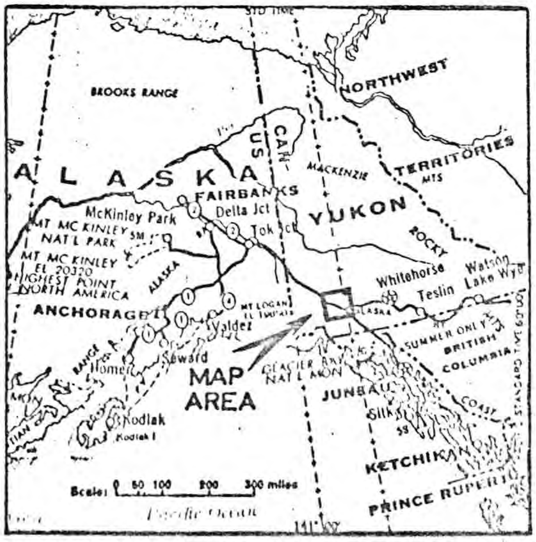
(1945) Hedstrom, E. H., and Nordstrom, A., "Malmletningsteknikens Nuvarande Standpunkt," Uppsala.

(1958) Hedstrom, E. H., and Parasnis, D. S., "Some Model Experiments Relating to Electromagnetic Prospecting with Special Reference to Airborne Work," *Geophys. Prosp.*, Vol. VI, 4.

(1964) Bosschart, R. A., "Analytical Interpretation of Fixed Source Electromagnetic Prospecting Data," Delft.

(*Reprinted from The Canadian Mining and Metallurgical Bulletin, April,* 1966)
Printed in Canada





ATLAS EXPLORATIONS LIMITED

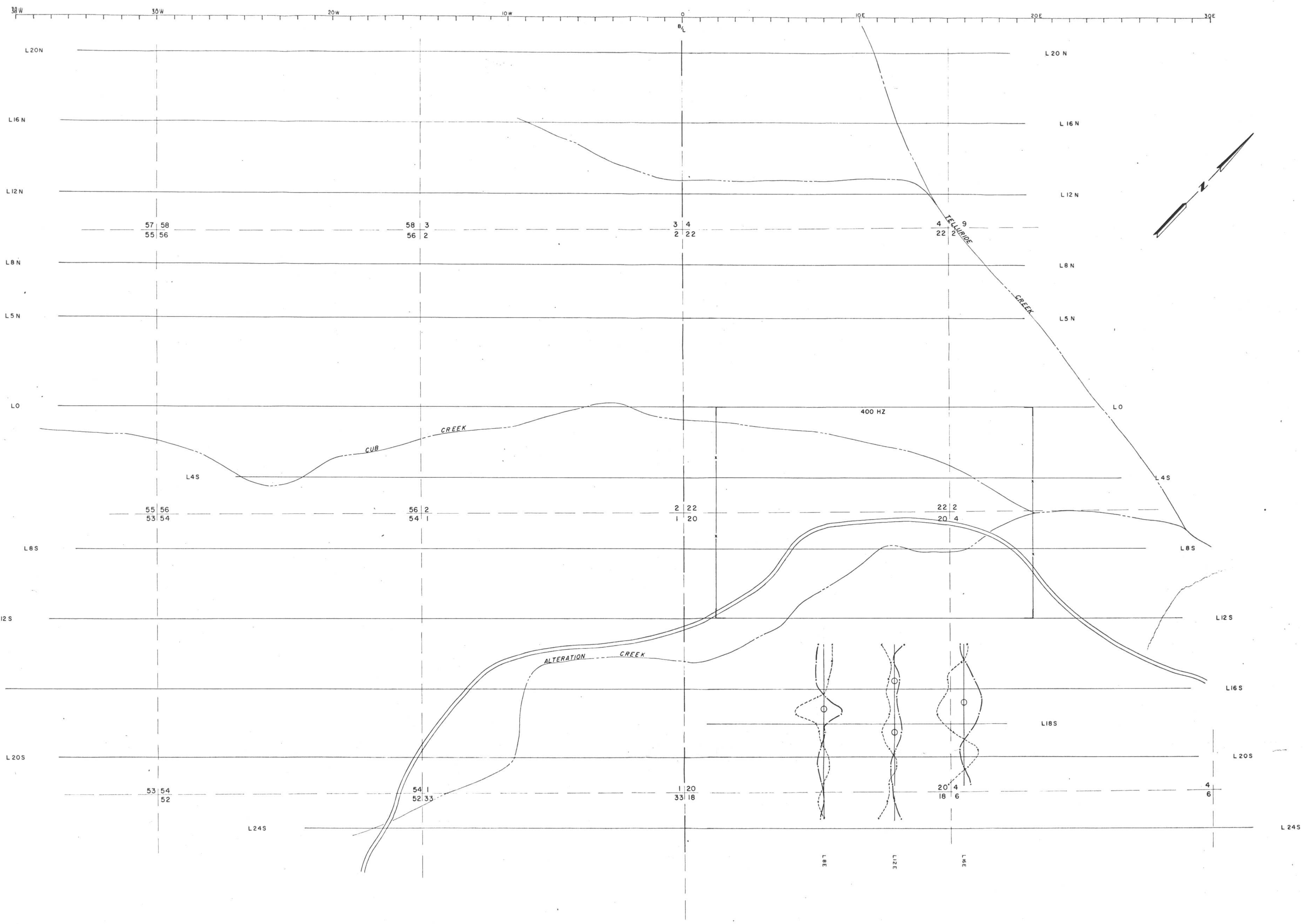
LOCATION MAP
TURAM ELECTROMAGNETIC SURVEY

KLUANE LAKE AREA, YUKON TERRITORY

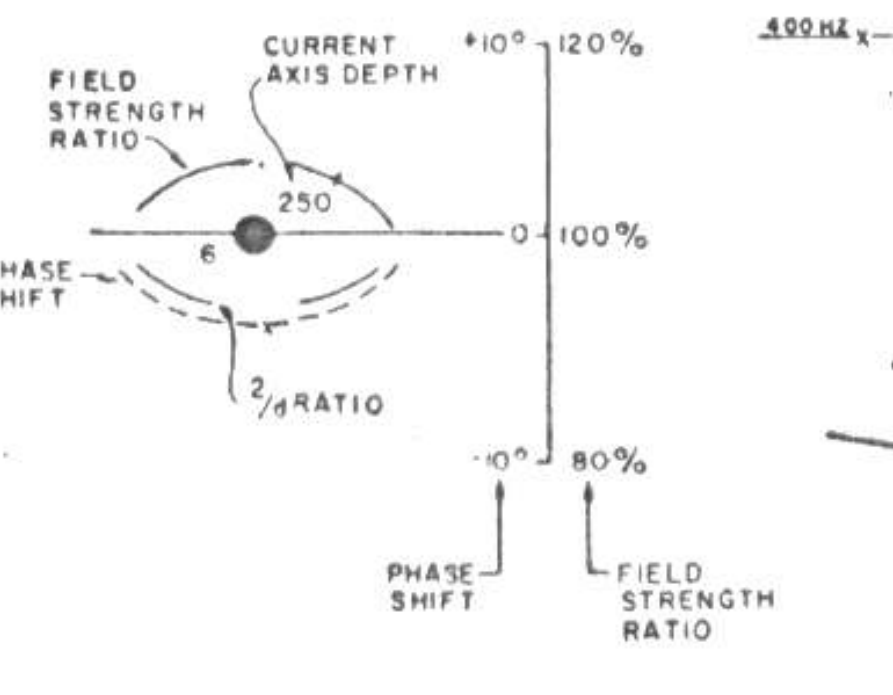
8 miles 0 8 miles

Survey by
SEIGEL ASSOCIATES LTD.
September 1970

PLATE 1



LEGEND



400 HZ x—— LOCATION OF LEADING EDGE OF TRANSMITTING LOOP AND FREQUENCY USED

● WELL DEFINED CONDUCTOR AXIS INTERSECTION

○ LESS WELL DEFINED CONDUCTOR AXIS INTERSECTION

◇ REVERSE CURRENT AXIS

— — LOCATION OF INTERPRETED CONDUCTOR AXIS

TO ACCOMPANY A GEOPHYSICAL REPORT BY
P.J. FOMINOFF AND J.G. BAIRD DATED JANUARY 21, 1971

inches
0 1 2
0 1 2 3 4 5
centimetres

YUKON
GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

PLATE 2

ATLAS EXPLORATIONS LIMITED

YUKON TERRITORY

TURAM ELECTROMAGNETIC SURVEY

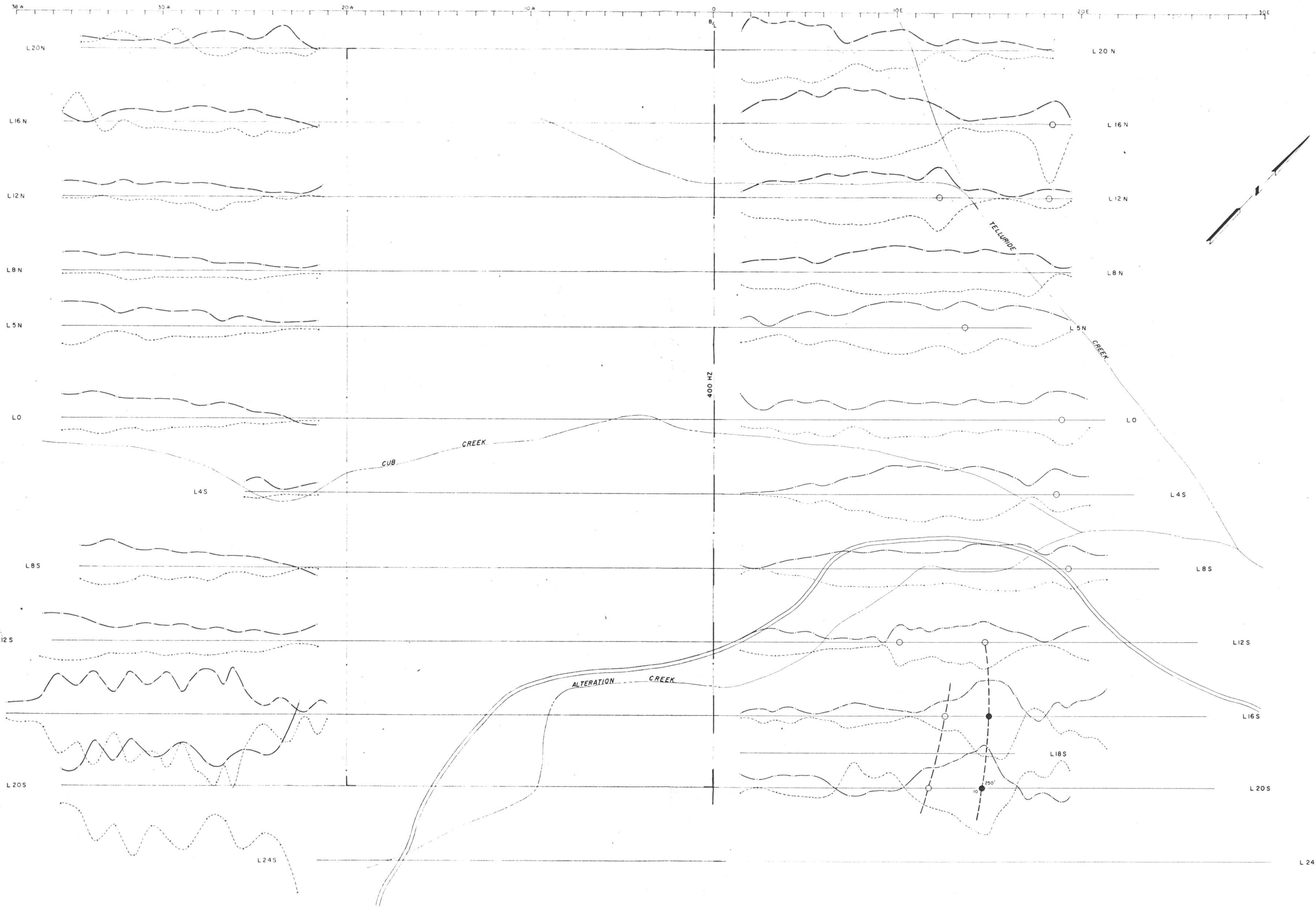
1" = 200'

200 0 200 400

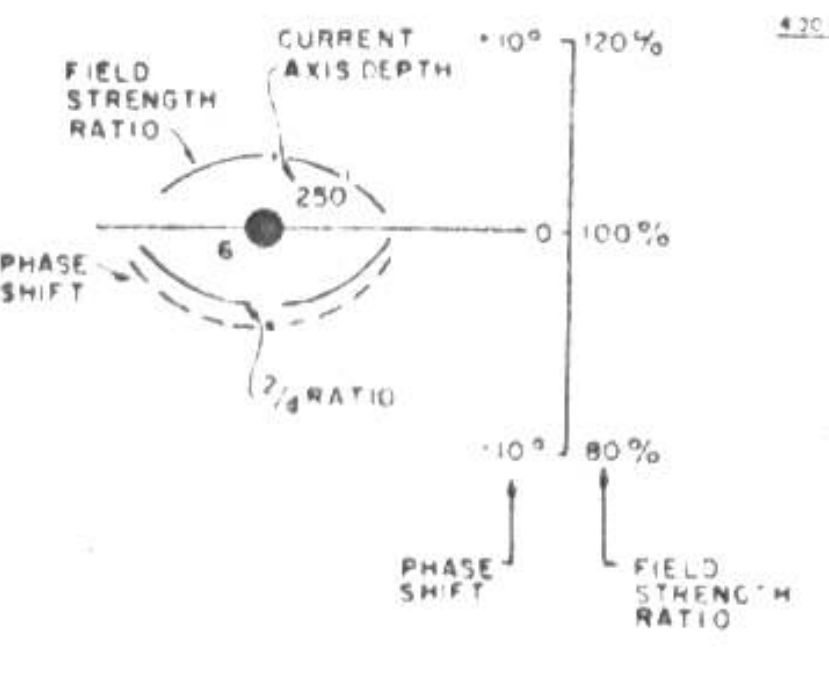
SCALE IN FEET

SURVEY BY SEIGEL ASSOCIATES LIMITED
SEPTEMBER, 1970

2



LEGEND



420 HZ. —— LOCATION OF LEADING EDGE OF TRANSMITTING LOOP AND FREQUENCY USED

● WELL DEFINED CONDUCTOR AXIS INTERSECTION

○ LESS WELL DEFINED CONDUCTOR AXIS INTERSECTION

◇ REVERSE CURRENT AXIS

— — LOCATION OF INTERPRETED CONDUCTOR AXIS

TO ACCOMPANY A GEOPHYSICAL REPORT BY
P.J. FOMINOFF AND J.G. BAIRD DATED JANUARY 21, 1971

inches
0 1 2
0 1 2 3 4 5
centimetres

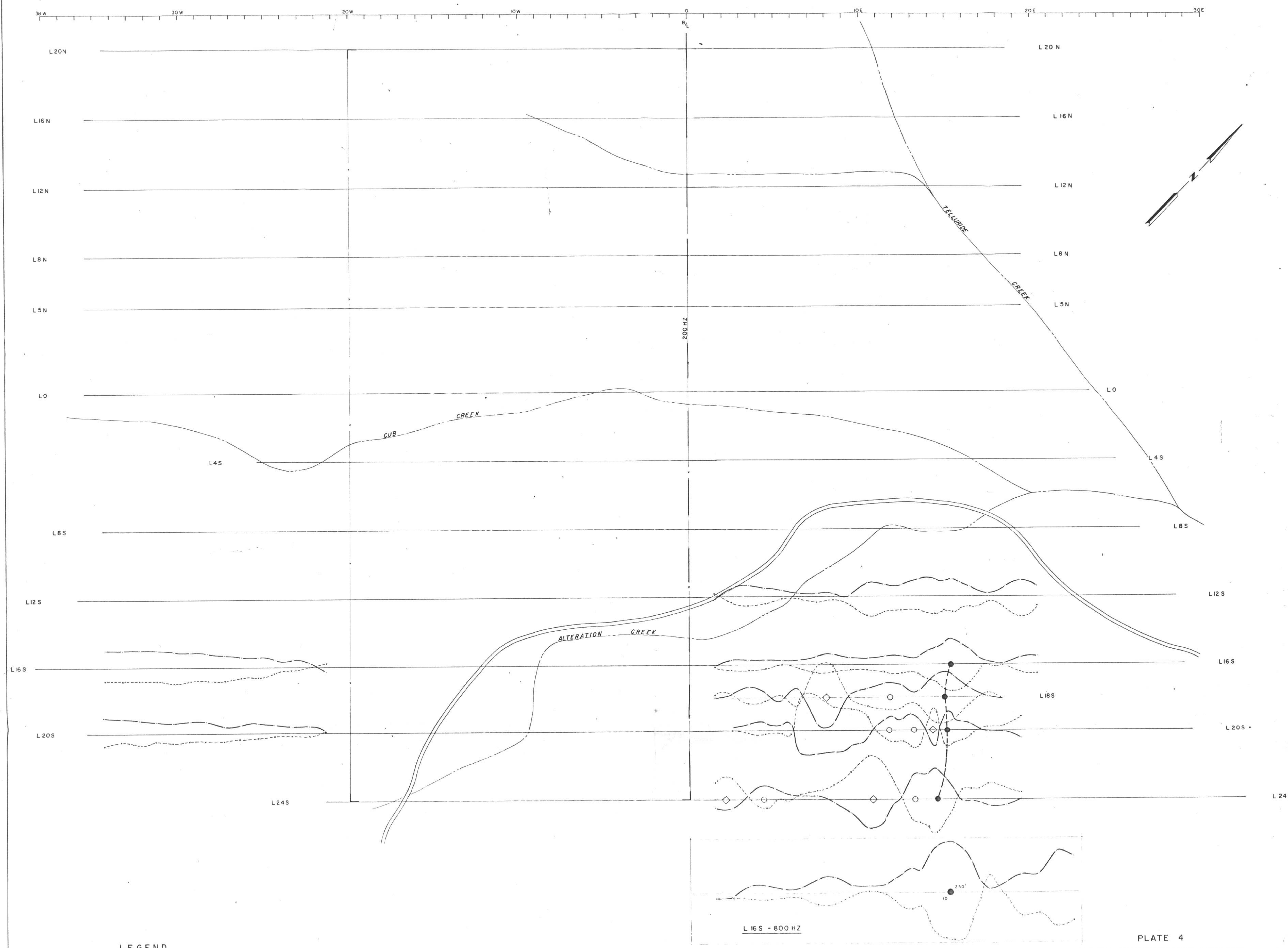
YUKON GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

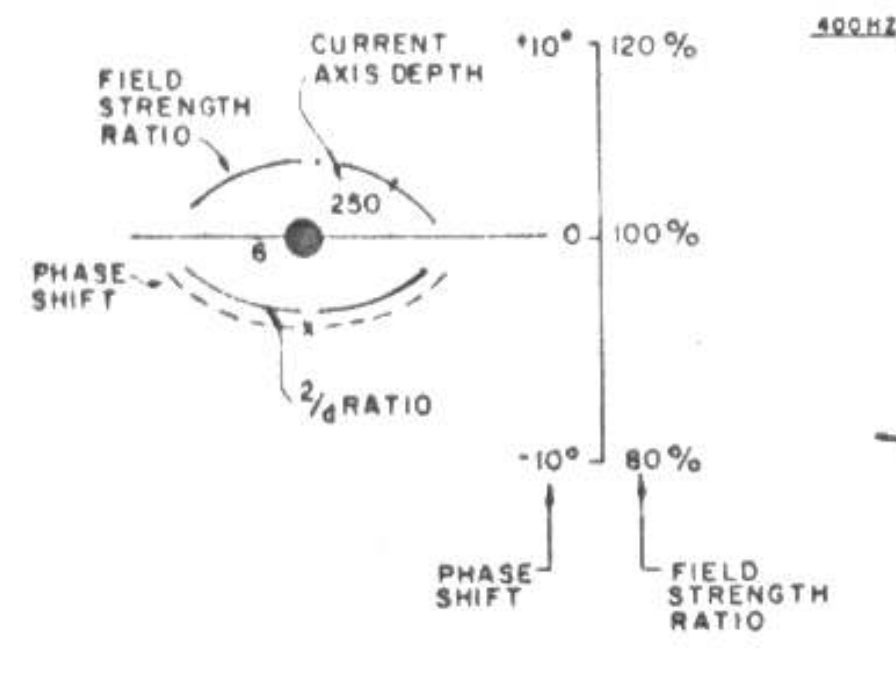
PLATE 3
ATLAS EXPLORATIONS LIMITED
YUKON TERRITORY
TURAM ELECTROMAGNETIC SURVEY

1" = 200'
200 0 200 400
SCALE IN FEET

SURVEY BY SEIGEL ASSOCIATES LIMITED
SEPTEMBER 1970



LEGEND



400HZ x —— LOCATION OF LEADING EDGE OF TRANSMITTING LOOP AND FREQUENCY USED

● WELL DEFINED CONDUCTOR AXIS INTERSECTION

○ LESS WELL DEFINED CONDUCTOR AXIS INTERSECTION

◇ REVERSE CURRENT AXIS

— — LOCATION OF INTERPRETED CONDUCTOR AXIS

TO ACCOMPANY A GEOPHYSICAL REPORT BY
P.J FOMINOFF AND J.G.BAIRD DATED JANUARY 21, 1971

inches
0 1 2
0 1 2 3 4 5
centimetres

YUKON
GEOLOGICAL SURVEY

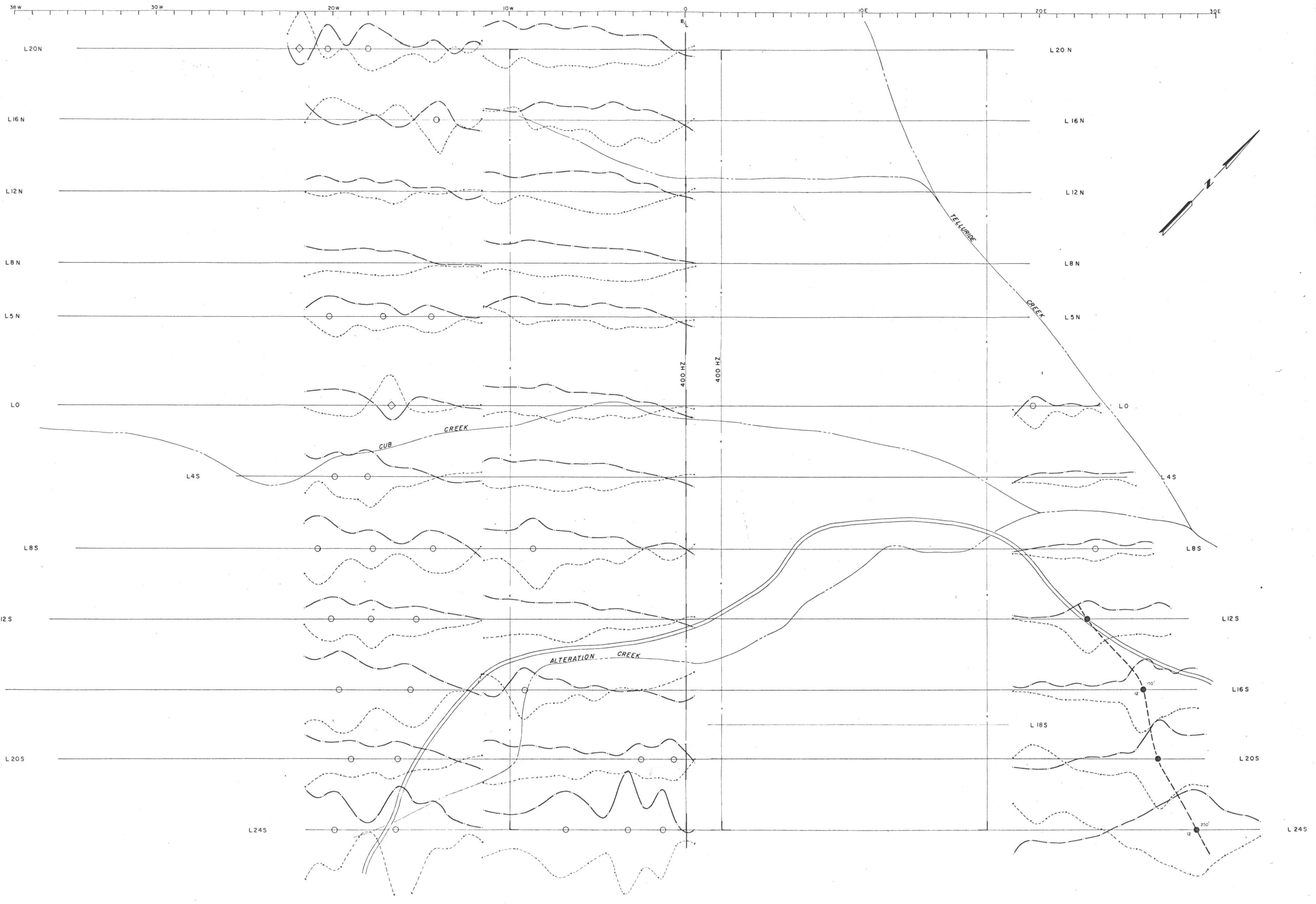
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

PLATE 4
ATLAS EXPLORATIONS LIMITED
YUKON TERRITORY
TURAM ELECTROMAGNETIC SURVEY

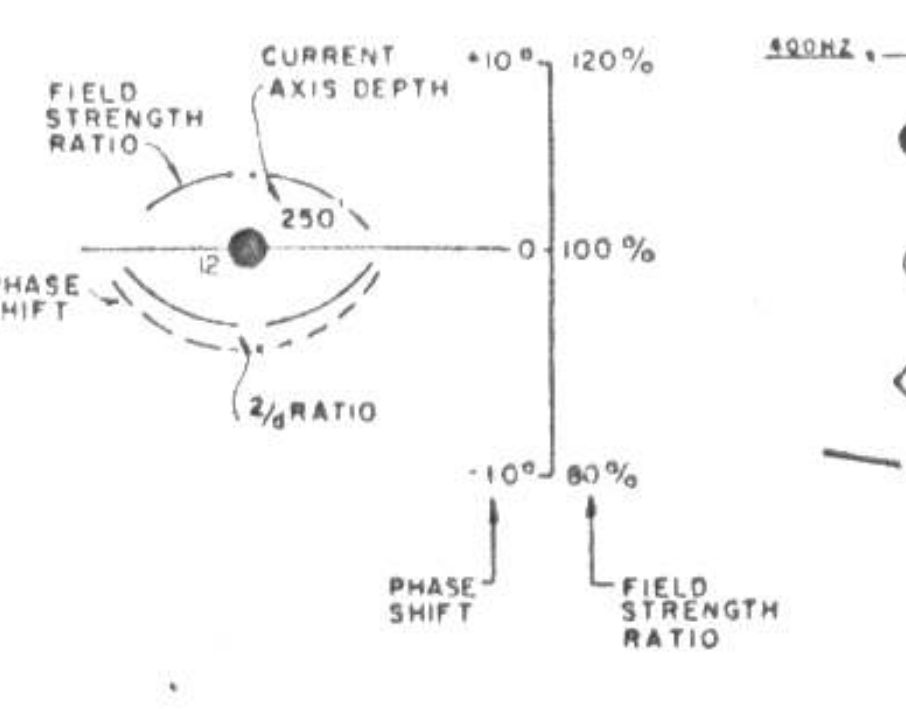
1" = 200'

200 0 200 400
SCALE IN FEET

SURVEY BY SEIGEL ASSOCIATES LIMITED
SEPTEMBER, 1970



LEGEND



400HZ LOCATION OF LEADING EDGE OF TRANSMITTING LOOP AND FREQUENCY USED

● WELL DEFINED CONDUCTOR AXIS INTERSECTION

○ LESS WELL DEFINED CONDUCTOR AXIS INTERSECTION

◇ REVERSE CURRENT AXIS

— — LOCATION OF INTERPRETED CONDUCTOR AXIS

TO ACCOMPANY A GEOPHYSICAL REPORT BY
P J FOMINOFF AND J.G BAIRD DATED JANUARY 21, 1971

PLATE 5

ATLAS EXPLORATIONS LIMITED

YUKON TERRITORY

TURAM ELECTROMAGNETIC SURVEY

1" = 200'

200 0 200 400
SCALE IN FEET

SURVEY BY SEIGEL ASSOCIATES LIMITED
SEPTEMBER 1970