Geophysical Survey (I. P.) of
FALCON EXPLORATIONS LIMITED
X and Claire Claims
Optioned from Owner Action Exploration Ltd.
10 miles south of Princeton
120°, 49° NW

by:
J. Lloyd, P. Eng.

from April 13 to May 7, 1971

EAGLE GEOPHYSICS LIMITED

3037

A REPORT

ON A TIME DOMAIN

INDUCED POLARIZATION SURVEY

FOR

FALCON EXPLORATIONS LIMITED

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BY

EAGLE GEOPHYSICS LIMITED

VANCOUVER, BRITISH COLUMBIA

MAY 1971

A GEOPHYSICAL REPORT ON A TIME DOMAIN INDUCED POLARIZATION SURVEY OF A COPPER PROSPECT AT KENNEDY LAKE, NEAR PRINCETON, B. C. FOR FALCON EXPLORATIONS LIMITED

BY

John Lloyd, M.Sc., P.Eng.

SUMMARY

During the period April 14th to April 28th, 1971, Eagle Geophysics Limited carried out an Induced Polarization (IP) survey on parts of a copper prospect, at Kennedy Lake, near Princeton, British Columbia on behalf of Falcon Explorations Limited.

Four geochemically anomalous copper areas were checked by IP methods. In only one case was an IP anomaly approximately coincident with a geochemical soil anomaly. A detailed geological field investigation is recommended for this anomaly prior to considering the selection of a drill target.

A small, weak, poorly regarded IP anomaly located within the main geochemically anomalous copper area is not the cause of the high copper soil survey values and is not recommended for drilling.

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1. INTRODUCTION

At the request of Mr. R. Jury of Alrae Engineering Limited an Induced Polarization (IP) survey was carried out by Eagle Geophysics Limited on a copper prospect at Kennedy Lake, near Princeton, British Columbia for Falcon Explorations Limited. This survey was completed during the period April 14th to April 28th, 1971.

One potentially interesting area of the property directly adjoins the property of the Similkameen Mining Company, a subsidiary of Newmont Mining Corporation, on which a 15,000 ton per day concentrator is presently being built.

The property is located about 10 miles south of Princeton. The main Hope-Princeton highway passes through claims X309 and X311. A good gravel road, suitable for two wheel drive vehicles, leading to vacation cabins on Kennedy Lake has been extended to the northwest for a distance of several thousand feet. This allows adequate access to the northern claim group. The southern claim group, the Claire claims, lie about 2,000 feet west of the road leading to Kennedy Lake.

The purpose of the IP survey was to evaluate the significance of four geochemically anomalous copper zones located by previously completed soil sampling techniques.

2. INSTRUMENT SPECIFICATIONS

The IP equipment used to carry out this work was a time domain measuring system manufactured by Huntec Limited of Toronto, Ontario.

The system consists basically of three units, a receiver, a transmitter and a motor generator. The transmitter, which provides a maximum of 7.5 kw d.c. to the ground, obtains its power from a 7.5 kw 400 cycle, three phase generator driven by a gasoline engine. The cycling rate of the transmitter is 1.5 seconds current "ON" and 0.5 seconds current "OFF" with the pulses reversing continuously in polarity. The data recorded in the field consists of careful measurements of the current (Ig) in amperes flowing through C_1 and C_2, the primary voltage (V_p) appearing between the potential electrodes P_1 and P_2 during the current "ON" part of the cycle, and a secondary or overvoltage (V_s) appearing between P_1 and P_2 during the current "OFF" part of the cycle.

The apparent chargeability (M_a) is calculated by dividing the secondary voltage by the primary voltage and multiplying by 400, which is the sampling time in milliseconds of the receiver unit. The apparent resistivity (ρ_a) in ohm-metres is proportional to the ratio of the primary voltage and the measured current; the proportionality factor depending on the geometry of the array used. The chargeability and resistivity obtained are called apparent as they are values which that portion of the earth sampled would have if it were homogeneous. As the earth sampled is usually inhomogeneous, the calculated apparent chargeability and resistivity are functions of the actual chargeability and resistivity of the rocks.

3. SURVEY SPECIFICATIONS

The pole-dipole array was used for this IP survey. In this array the current electrode C_1 and the two potential electrodes P_1 and P_2 are moved in unison along the lines to be surveyed. The second current electrode C_2 is grounded an "infinite" distance away, which is in fact ten times or more the distance between C_1 and P_1. The dipole length (x), that is the distance between P_1 and P_2 determines mainly the sensitivity of the array being used with respect to the size of the body being sought. The electrode separation, that is the distance (nx) between C_1 and P_1, is equal to or some multiple of the distance between P_1 and P_2. This distance determines mainly the depth of penetration of the array being used with respect to the size of the body being sought.

The survey lines on this property are 400 feet apart. Selected lines were surveyed with the dipole length (x) equal to 200 feet and measurements were made for the first and second electrode separations, that is for n=1 and n=2. Additional detail surveying on the Valley grid, with x equal to 100 feet was also carried out on line 1 from 43+50NE to 51+50NE; measurements were made for n=1 and n=2. Similar detail surveying, on the Claire 1 and 2 grid, with x equal to 100 feet was completed on line 4 from 15+50S to 26+50S; measurements were made for the first electrode separation only, that is for n=1.

The use of a 200 foot dipole length for the reconnaissance survey and a 100 foot dipole length for the detail work, along with the appropriate electrode separations, has adequately tested the four geochemically anomalous zones on the property. This work has not however pin-pointed the source of the copper as indicated by the geochemical soil survey. In this respect further geological studies are required.

4. PRESENTATION OF DATA

The data obtained from the IP survey of the area described in this report are presented on three map sheets which are folded into the map pocket at the end of the report.

Map sheet number E159-1 (scale 1"=400 feet), shows the location of the IP survey lines and their relation to the geochemically anomalous zones.

Map sheet number E159-2 (scale 1"=200 feet), shows the profiles of apparent chargeability and corresponding apparent resistivity obtained from surveying the Valley grid. The apparent chargeability profiles are plotted at a scale of either 1"=5 milliseconds, 1"=10 milliseconds or 1"=20 milliseconds, as indicated on each individual line. The apparent resistivity profiles are all plotted at a scale of 2 inches equals 1 logarithmic cycle.

Map sheet number E159-3 (scale 1"=200 feet), shows the profiles of apparent chargeability and corresponding apparent resistivity obtained from surveying the Claire 1 and 2 grid. The apparent chargeability profiles are plotted at a scale of either 1"=5 milliseconds or 1"=10 milliseconds, as indicated on each individual line. The apparent resistivity profiles are all plotted at a scale of 2 inches equals 1 logarithmic cycle.

5. DISCUSSION OF RESULTS

Induced polarization interpretation procedures have been most completely developed in situations of mineralized horizontal layering where the electrode separations used are small compared with the lateral extent of the mineralized bodies. Geologically the porphyry coppers of large lateral extent are practical examples where such interpretation procedures can be used to best advantage.

In the case of more confined bodies, where the electrode separations used are often large compared with the lateral extent of the bodies themselves, the complex problem of resolving the combined effects of depth, width, thickness, dip and true chargeability of such bodies together with the physical characteristics of the overburden and country rocks have only recently been studied in detail. The results from much of this work remain, as yet, unpublished. Interpretation must therefore be based on empirical solutions, type curves obtained from theoretical investigations, the results obtained from computer and tank model studies plus experience gained from surveys over known orebodies in similar geological environments.

5.1 Geology

At the time of writing no detailed geological mapping of the property has been undertaken by the present owners.

Briefly the property is underlain by volcanic tuffs and argillites. Limestones, sandstones and more strongly metamorphosed argillites have also been observed.

5.2 The Valley Grid

The main portion of this grid is underlain by the most extensive geochemical soil anomaly on the property. The soil anomaly is about 2,000 feet long and a few hundred feet wide. It appears to be underlain by volcanic tuffs.

Two distinct chargeability backgrounds were observed on each of the five main lines which traversed the soil anomaly. The southwest portion of the grid is underlain by rocks having an apparent chargeability of approximately 25 milliseconds. These rocks are most probably argillites. The northeast portion of the grid is underlain by rocks having an apparent chargeability of approximately 4 to 5 milliseconds. Extensive outcrops of volcanic tuff occur on this portion of the grid. The interpreted geological contact between the argillites and volcanic tuffs is shown on map sheet number E159-1. Further evidence for the existence and location of this contact is shown by a strong linear resistivity low which coincides with the contact as interpreted from the chargeability data alone. This contact is roughly parallel to the valley floor but is some 800 to 1,000 feet southwest of it.

There is no distinct change in the resistivity pattern directly over the valley floor which may indicate the existence of a fault through the valley. Such a fault may exist however since the array used is not optimum for the detection of faults.

The strong resistivity low along the interpreted geological contact may indicate a water filled, sheared contact zone or a strong alteration of the mineral assemblage within the contact zone itself. Based on the chargeability data alone there is no recognizable anomaly along the contact. However in view of the high (about 25 milliseconds) inherent chargeability of the argillites, a significant mineral deposit could conceivably remain undetected if it occurred within the argillites or along the contact between the argillites and the volcanics. In the present geological environment the existence of a mineral deposit at either of these locations is not considered a strong possibility.

There is little difference in the apparent resistivities as measured over the argillites or the volcanic rocks. In both cases the apparent resistivities vary from about 300 to 1000 ohm-metres.

There is a weak anomaly near the northeast end of line 1. This anomaly was detailed with x=100 feet and taking measurements for n=1 and n=2 (see map sheet number E159-2). From a study of the four electrode separations across the zone it is clear that the source of the anomaly is narrow, probably less than 50 feet wide, and very shallow. It was not possible to trace this anomaly along strike in a southeasterly direction, since work in progress on re-routing of the Hope-Princeton highway made it hazardous to both geophysical personnel and equipment. A very slight increase in chargeability was observed on line 2, on strike with the anomaly on line 1.

The anomaly has its strongest expression where the source appears to sub-outcrop beneath shallow overburden directly under the valley floor at station 48+00NE on line 1. A good deal of outcrop was observed on line 2 at the location where a slight (on strike) increase in chargeability was measured.

This anomaly is not the source of the copper soil anomaly and is regarded by the writer as a very low priority target for any additional form of exploration.

The profiles obtained from checking two smaller copper soil anomalies are also shown on map number E159-2. These profiles extend from station 11+00NE to station 37+00NE on line 7 and from 15+00SW to 9+00NE on the southwest portion of line 5. On line 7 the chargeability readings are uniformly high, indicating the presence of argillites on this part of the property. The chargeability readings are uniformly low on the southwest portion of line 5, where several small outcrops of a reddish rock of volcanic origin were observed. No significant IP response, worthy of further investigation, was detected over either of the small copper soil anomalies which were checked by these two lines.

5.3 The Claire 1 and 2 Grid

Initially line 5 was surveyed on this grid to test a long, narrow copper soil anomaly approximately coincident with a swamp. An IP response, coincident with the copper soil anomaly, was measured on line 5. In view of this, lines 3, 4 and 6 were surveyed to determine the strike length of the anomaly.

The IP response has a strike length of about 800 feet and is caused by a fairly narrow, shallow source which is parallel to or along a possible contact between two rock types having different apparent chargeabilities. The higher chargeability rocks to the north of the swamp are most probably argillites. However the seemingly lower chargeability rocks to the south of the swamp may also be argillites since here the apparent resistivity readings indicate an increase in depth of overburden which also tends to decrease the apparent chargeability response.

Several geological situations could produce this anomaly. If the argillites dip gently to the south, or the overburden thickness increases towards the south, and argillaceous rocks have been exposed or almost exposed by erosion in the swampy creek bottom, then such an anomaly could result. On the other hand, if the argillites dip very steeply then a band of argillaceous rocks lying directly below the swamp and contained within a much lower chargeability rock unit could also produce such an anomaly.

Prior to carrying out any drilling on this anomaly a detailed geological investigation of the rocks in the immediate vicinity of the anomaly is necessary.

6. CONCLUSIONS AND RECOMMENDATIONS

From a study of the IP data obtained from surveying four areas of anomalous copper soil values it has been concluded that:-

(a) In view of the extremely small dimensions of the weak anomaly located at approximately 48+00NE on line 1 of the Valley grid no further exploration in the form of drilling is warranted.

(b) The source of the copper soil anomaly on the Valley grid was undetected by the IP survey.

(c) A number of geological situations of no economic importance could cause the anomaly detected most clearly at station 20+00S on line 4 of the Claire 1 and 2 grid. A geological field study of this anomaly is definitely warranted.

(d) Interpretation difficulties arise when using IP methods to search for sulphide deposits in areas where some of the rock types encountered have high intrinsic chargeability responses. Under these conditions sulphide deposits in high chargeability rocks may remain undetected by IP methods.

Based on a review of the geological and geochemical data available and the geophysical data collected, it is recommended that the following programme of work be carried out on the property:-

(1) Carry out a detailed geological field investigation of the anomaly located on the Claire 1 and 2 grid. If this work is encouraging drill a hole, based on dip and strike attitudes determined by the

geological field work, to intersect a point 75 feet vertically below station 20+00S on line 4. The total length of this hole should be not less than 250 feet.

(2) Carry out a brief geological examination of the volcanic rocks located in the immediate vicinity of the small anomaly detected on line 1 of the Valley grid. Base any additional exploration work mainly on the findings of the geological examination.

Based on the IP survey alone, no further work is recommended at the present time on any of the remaining geochemically anomalous areas investigated by the IP survey.

Respectfully submitted,

EAGLE GEOPHYSICS LIMITED

John Lloyd, M.Sc., P.Eng.
Geophysicist.

May 1971

APPENDIX

CERTIFICATION

I, John Lloyd, of 1505 - 2045 Nelson Street, in the City of Vancouver, in the Province of British Columbia, do hereby certify that:-

1. I am a graduate of the University of Liverpool, England, in 1960 with a B.Sc. in Physics and Geology, Geophysics Option.

2. I obtained the Diploma of the Imperial College of Science and Technology (D.I.C.) in Applied Geophysics from the Royal School of Mines, London University, in 1961.

3. I obtained the degree of M.Sc. from the Royal School of Mines, London University, in 1962.

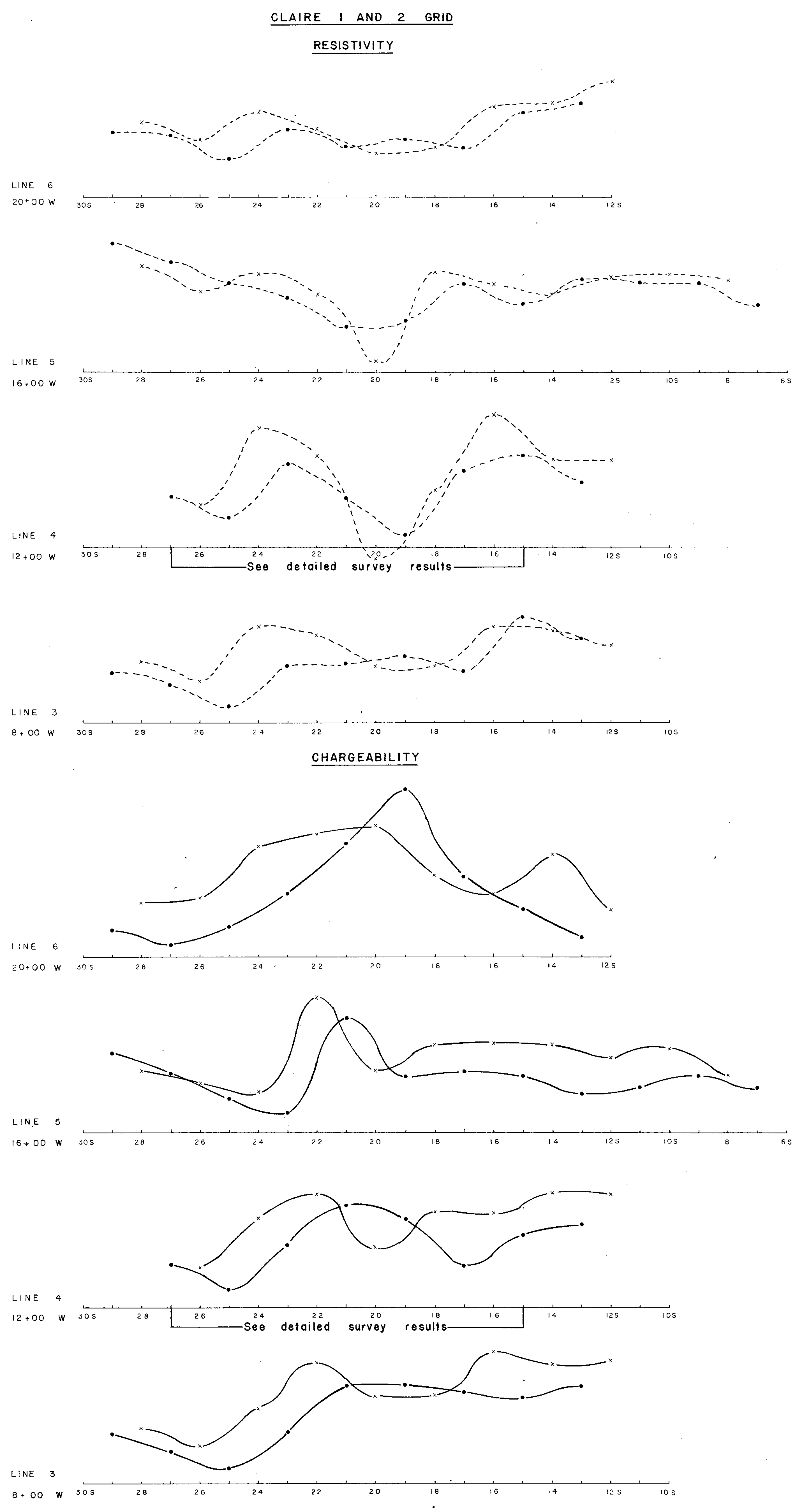
4. I am a member of the Association of Professional Engineers in the Province of British Columbia, the Society of Exploration Geophysicists of America and the European Association of Exploration Geophysicists.

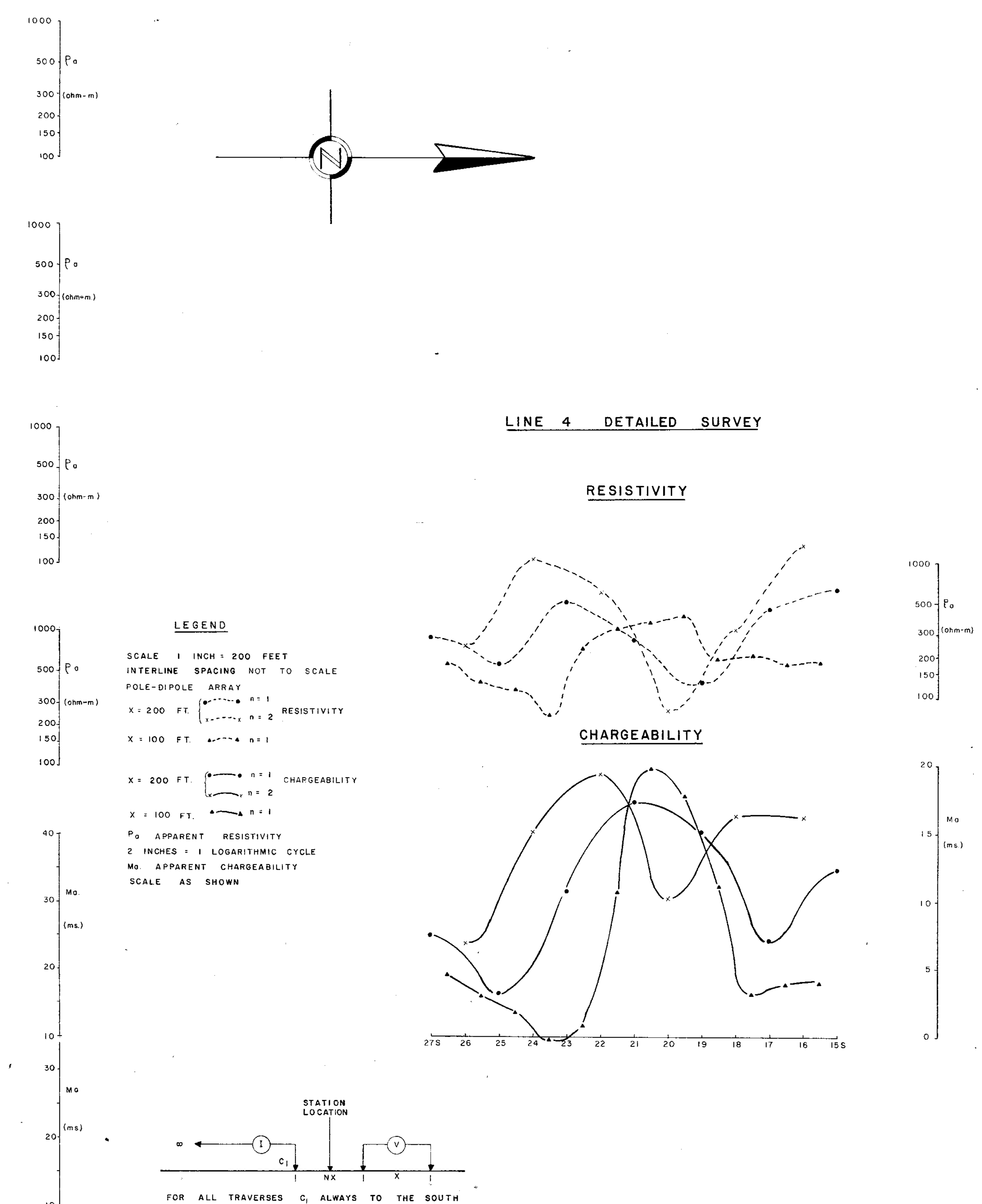
5. I have been practising my profession for the last ten years.

6. I have no interest or shares in any property or securities of Falcon Explorations Limited nor do I expect to receive any.

John Lloyd, P. Eng.

Vancouver, B. C.
May 11, 1971





3037 M-3

FALCON EXPLORATIONS LIMITED

KENNEDY LAKE AREA

PRINCETON, B.C.

INDUCED POLARIZATION SURVEY

Scale as shown

CLAIRE 1 AND 2 GRID

EAGLE GEOPHYSICS LIMITED

MAP NUMBER E 159-3

To accompany a report by

APRIL, 1971

John Lloyd M.Sc., P.Eng.

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3037 MAP #3

FALCON EXPLORATIONS LIMITED

KENNEDY LAKE AREA

PRINCETON, B.C.

INDUCED POLARIZATION SURVEY

Scale as shown

VALLEY GRID

EAGLE GEOPHYSICS LIMITED

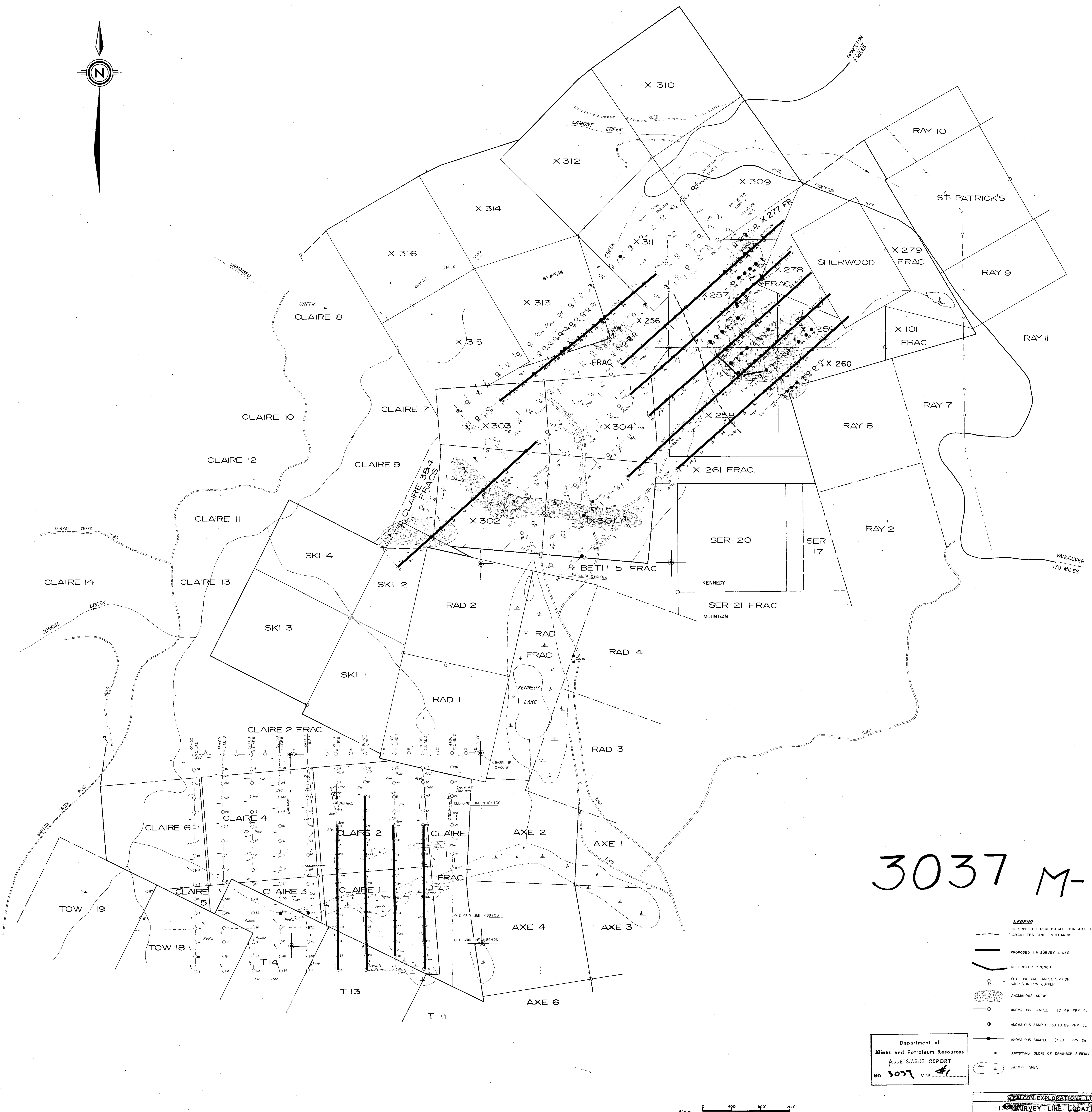
MAP NUMBER E159-2

To accompany a report by

John Lloyd M.Sc., P.Eng.

APRIL 1971

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3037 MAP #2



3037 M-1

LEGEND

– – –	INTERPRETED GEOLOGICAL CONTACT BETWEEN ARGILLITES AND VOLCANICS
▬	PROPOSED I.P. SURVEY LINES
‿	BULLDOZER TRENCH
–o– 20	GRID LINE AND SAMPLE STATION VALUES IN PPM COPPER
(stippled)	ANOMALOUS AREAS
–o–	ANOMALOUS SAMPLE 1 TO 49 PPM Cu
–◑–	ANOMALOUS SAMPLE 50 TO 89 PPM Cu.
–●–	ANOMALOUS SAMPLE > 90 PPM Cu.
→	DOWNWARD SLOPE OF DRAINAGE SURFACE
(swamp symbol)	SWAMPY AREA

NOTE:– CLAIMS & TOPOGRAPHY AFTER R.CHAPMAN & ASSOC. PRINCETON, B.C.

TO ACCOMPANY REPORT
BY JOHN LLOYD M.Sc., P.Eng.
APRIL, 1971

FALCON EXPLORATIONS LTD.

I.P. SURVEY LINE LOCATIONS

ALRAE ENGINEERING LTD.
GEOLOGISTS AND ENGINEERS
VANCOUVER, B. C.

DESIGNED	SCALE. HOR. VERT.
DRAWN	
CHECKED	DWG. No E 159-1
DATE	