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# REPORT OF A GEOPHYSICAL SURVEY OF THE CAROLINE CLAIMS

KAMLOOPS MINING DIVISION

ADAMS LAKE AREA

LATITUDE 50°59'N
LONGITUDE 119°50'W
NTS MAP 82L/13



for

United Leader Resources Inc.

by

R.R. Culbert, Ph.D., P.Eng.

December, 1985

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## SUMMARY AND CONCLUSIONS

The Caroline Property, which straddles Bush Creek to the west of the southern part of Adams Lake, is underlain by a series of metamorphic rocks (dominantly phyllite, shales and lime or graphitic rocks) and by greenstones. A combined magnetic and VLF-EM survey was carried out over the property to test for massive sulphide bodies. Coincident anomalies of the two methods were few and of only moderate strength. As with the preceding geochemical survey, results do not define a drill target or warrant a more detailed program. This report summarizes results of the 1985 field program.

## INTRODUCTION

A magnetometer and VLF Electromagnetic survey was carried out over the Caroline property by Beaty Geological Ltd., under contract to, and at the request of, United Leader Resources Inc. This work was started in the latter part of November, 1985 and hampered by unusually cold temperatures and deep snow. The primary objective of the survey was to develop drill targets for precious metal-rich volcanogenic ore occurrences or other styles of gold/silver deposit. Field work was done by geophysicist R.R. Culbert and technician A. Ghabrial. Report preparation and project organization was by R.R. Culbert and R.J. Beaty.

## LOCATION AND ACCESS

The Caroline Property comprises two claims totalling 40 units, covering the central and southeastern portions of the Bush Creek Valley. Bush Creek flows into Adams Lake just 5 km north of Adams Lake town and millsite, with the property itself located between 1 and 6 km east of the lake. On a broader scale this is 20 km north-northwest of the town of Chase on the Trans-Canada Highway, and just over 50 km northeast of Kamloops. The co-ordinates are 119° 50' west longitude, and 50° 59' north latitude, placing it in the extreme northwest corner to NTS quadrant 82L and map 82L 13W.

The property is reached by taking the Adams Lake Road from Squilax on the Trans-Canada Highway up the west side of Adams Lake to the mouth of Bush Creek. From here a four wheel drive road up the valley floor gives access to both claims. The upper portions of Caroline 2 claim are better reached by two logging grades which branch from the Adams Lake Road farther south, one of them switch-backing westward from the town and millsite itself. Most of the property has been logged and is served by old skid roads, although the majority of these are no longer passable to vehicles.

## CLAIM DATA

The Caroline Property consists of two claims of twenty units each. These are the Caroline 1 and the Caroline 2 claims, both recorded on December 15, 1983 with record numbers 5265 and 5266 respectively. Both claims are reported to be held in the name of United Leader Resources Inc. The writer verified the positions of the legal corner posts on the claims and believes staking to have been carried out in compliance with the B.C. Mineral Act.

## DESCRIPTION

The property covers the central section of Bush Creek valley on both sides, and the lower (eastern) portion of the valley on its southern side. Elevations range from 2200 to over 4500 ft. Almost all of the property has been logged at one time or another. Logs were extracted by skidding, with the result that old roads tend to be closely spaced, contouring the valley slope. Most of these have bushed in with alder, but their cuts frequently expose outcrop. Between roads, the new growth tends to make travel difficult.

## GEOLOGY

### RESUME OF GOVERNMENT REGIONAL MAPPING

The claims lie at the boundary between the Adams Lake geological mapsheet on the north and the Vernon mapsheet. The geology of the former was mapped during 1962 and 1963 by R.B. Campbell and published as G.S.C. Map 48-1963. In this analysis the relevant terrain west of Adams Lake was simply classed as "Permian or Earlier", and roughly divided into a dominantly volcanic and dominantly sedimentary unit, with the Rea Gold discovery falling into the former division.

In 1980, however, the relevant area on the north side of the claims was remapped by V. Preto in considerable detail, and his results compare poorly to those of the 1963 work. In both interpretations, both sedimentary and volcanic units trend southeast into the claims, but the two units tend to be reversed in position. An updated and more detailed version of Preto's map was published in September of 1984 as Preliminary Map No. 56 of the Ministry of Energy, Mines and Petroleum Resources. This indicates that detailed geological work was not extended as far south as the property. The Rea gold deposit is marked as a thrust fault between two phyllitic members of the Paleozoic Eagle Bay formation, one of which appears to have been derived in large part from acid volcanic rocks.

On the Vernon mapsheet (accompanying G.S.C. Memoir 296 by A.G. Jones, 1956), the rocks are considered to be part of the Shuswap metamorphic terrain, with some argillites of the Cache Creek group on the west. Jones tends to place the more volcanic members of the Shuswap metamorphic terrain above Bush Creek Valley to the south, and define most units at lower elevations as schists. He also considers virtually all boundaries here as fault controlled, while Preto emphasized folding and stratigraphy, with one large fault accompanied by serpentine.

A regional compilation of the Thompson, Shuswap and Okanagan region by A.V. Okulitch has been released in preliminary form as Geological Survey of Canada Open File #637. This compiled both known mineral deposits and geology in a generalized fashion. Bush Creek valley is shown as a center of complexity caused by the mutual termination of a northwest-trending thrust fault (with serpentinized ultrabasic bodies) and a major north-south fault. Okulitch classifies rocks to the west of this thrust as Upper Triassic, and those to the east as Carboniferous members of the Milford Group.

## PROPERTY GEOLOGY

The Caroline claims are underlain almost entirely by a suite of metamorphic rocks which appear to be members of the Eagle Bay Formation. The Eagle Bay Formation is a very diverse group, dominantly phyllites derived from varied sedimentary and volcanic units. It has been subdivided by Preto, but most of these divisions contain a considerable variety of lithologies. In general, although lithological units may be defined on this property, it is often difficult to classify individual beds or outcrops.

Structurally, the foliation and bedding both tend to trend to the northwest and dip at moderate to steep attitudes to the northeast. Starting from the southwest, structurally lower, corner of the property the geology may be approximately divided as follows:

1. Black to grey phyllites. The phyllites are locally schistose and widely crenulated. They grade into slates and shales and seem to be generally of pelitic origin, although some sectors appear to have a tuffaceous component. Beds of green phyllite (metavolcanic) and of coarser metasediments also occur.

2. Graphitic and limey phyllites. These are friable black rocks, except for some discontinuous cherty horizons. Slates and shales are common, and the units vary widely in both graphite and limestone content. Some beds would best be described as black limestones. VLF electromagnetic response to this group of rocks proved fairly strong.

3. Greenstone. These are clearly metavolcanic rocks, dominantly flows. Although they have developed some phyllitic cleavage, the outcrops are more massive than the other lithologies, and hence this is a more prominent and visible unit than its thickness would warrant. Colour is dark, dominantly a drab, olive green.

4. Silicous metasediments. A group of metasiltstones, fine quartzites, quartz-mica schists and silicous phyllites, cuts through the northern part of the property, and may still be identified to the southeast where it crosses the Bush Creek Canyon. It was not identified beyond, where it may grade into the next unit.

5. Banded phyllites. This unit is marked by the interbanding of dark phyllites, slates and shales with more silicous horizons of corresponding lighter colour. Some of these are clearly detrital in origin, while others appear cherty.

6. Quartz diorite. One outcrop of quartz diorite is exposed by a road-cut in the southern portion of the property. It does not appear related to the major felsitic intrusion lying father west.

## MINERAL DEPOSITS

The Bush Creek valley lies approximately 17.5 km south of the Rea Gold massive sulphide discovery of 1983 which generated considerable interest in the region. Some 5 km closer to Bush Creek is the Homestake Mine, which has been producing silver, gold, copper, lead and zinc periodically since the 1920's and contains estimated ore reserves of 877,734 tons averaging 6.03 oz/t silver and 0.028 oz/t gold. This deposit occurs in altered schists which grade into greenstones, and contains massive bodies of barite. It is classed by Okulitch as volcanic concordant.

Two deposits have been recorded within the Bush Creek valley itself and are placed by Okulitch and by the B.C. Department of Mines as within or bordering the Caroline claims. These both originate with the Okulitch compilation, and are listed as concordant deposits in volcanic rocks, with copper as the major mineral. No other references have been found, and no evidence of workings was discovered during the field exploration.

Some 2.5 km south of the property on the edge of Bush Creek valley are a number of reported showings on the Cahil claims, described as lead, zinc, copper, gold and silver mineralization in a folded and silicified series of mixed volcanic and sedimentary units. On the other side of the valley mouth is the Pat 2 showing, classed as volcanic concordant and displaying massive pyrrhotite with chalcopyrite in greenstones within what is generally a sedimentary sequence. A showing of somewhat similar appearance occurs across Adams Lake from this (the Glen deposit), with gold, silver, lead, zinc and copper mineralization being recorded from a concordant zone in chlorite schists of volcanic origin.

No evidence of massive sulphide mineralization was observed during mapping of the property. Disseminated pyrite was noted at a few sites.

## GEOPHYSICAL SURVEY - OVERVIEW

Magnetometer and very low frequency electromagnetic (VLF-EM) readings were taken on several approximately east-west lines across the Caroline property, with stations at 50 meter intervals. All readings were taken facing west, using separate operators for the two instruments to avoid interference. In view of the known existance of greenstone units, likely to affect the magnetometer, and shales with a graphitic content likely to affect the electromagnetic readings, it was felt that only a coincident anomaly in the two methods could be considered meaningful in searching for massive sulphide bodies.

## MAGNETIC SURVEY

The instrument used was a Scintrex MP2 portable proton precission magnetometer. At each station the central of three successive readings was taken, and this sequence repeated if one or more of the numbers was incongruent. Due to the difficulty of the terrain and conditions, it was only possible to close loops to correct for drift once or twice each day, but the background proved unusually steady, never drifting by more than 22 milligals.

## DISCUSSION OF MAGNETOMETER RESULTS

The magnetometer readings were surprisingly flat. Even the greenstone body did not give very pronounced readings, especially in the south. This suggests that either its magnetite has been destroyed by metasomatism, or that it is really a more acid unit than its dark colour would suggest.

Results of the magnetometer survey are shown on Figure 2, and in general they are disappointing. Some moderately anomalous high or low sectors were encountered and a few of these correspond with unexplained VLF-EM anomalies as marked, but the responses are not those which would be expected of a sizeable body of massive sulphide with pyrrhotite

## VERY LOW FREQUENCY ELECTROMAGNETIC SURVEY

The instrument used was Model #27 VLF-EM of Saber Electronics Instruments Ltd. All readings were taken across the northwest quadrant, using the Pennsylvania transmitting station, which was the only one clearly received in Bush Creek Valley. Both field strengh (horizontal plane maxima) and dip angle (of vertical mimima) readings were taken. The latter were averaged from a scale marker rather than the less accurate alternative of trying to judge a minimum.

The usual problem was encountered of field strength varying somewhat from one day to the next, and while scale adjustments were made for this each morning, it is best to interpret those readings by picking anomalies on each line as opposed to contouring results as if they were a continuous field.

## DISCUSSION OF VLF-EM RESULTS

Moderately strong anomalies were observed in the areas of graphitic shales as might be expected. Elsewhere there were few really strong responses, especially combining both dip angle and field strength.

Results are shown in Figure 3. In interpretation it must be recalled that dip angle readings respond to slope, hence they are positive on the south side of the valley, negative to the north and near zero along the valley axis. A good VLF-EM anomaly is characterized more by a sudden change in dip-angle values than by their magnitude, preferably accompanied by a field strength anomaly. Although no site of special interest was found, locations of moderately strong VLF-EM response not explained by graphite or slope changes and accompanied by unusual magnetic readings are marked on the accompanying maps.

# CERTIFICATE OF QUALIFICATIONS

I, R.R. CULBERT, hereby certify that:

1. I am a practicing Professional Geological Engineer with offices at 208 - 2786 West 16th Avenue, Vancouver, British Columbia.

2. I am a graduate of the University of British Columbia, B.Sc. (1964), Ph.D. (1971).

3. I have practiced mining exploration for twenty-three years, most of which was based in British Columbia.

4. I am a member in good standing of the Association of Professional Engineers of the Province of British Columbia.

5. I have no interest, directly or indirectly, in the properties or securities of United Leader Resources Inc.

6. I personally supervised and largely carried out the field work on which this report is based.

DATED at Vancouver, British Columbia, this 10th day of December, 1985.

Dick Culbert

R.R. Culbert, Ph.D., P.Eng.

# APPENDIX I

## Itemized Cost Statement - Caroline Property

1. Personnel

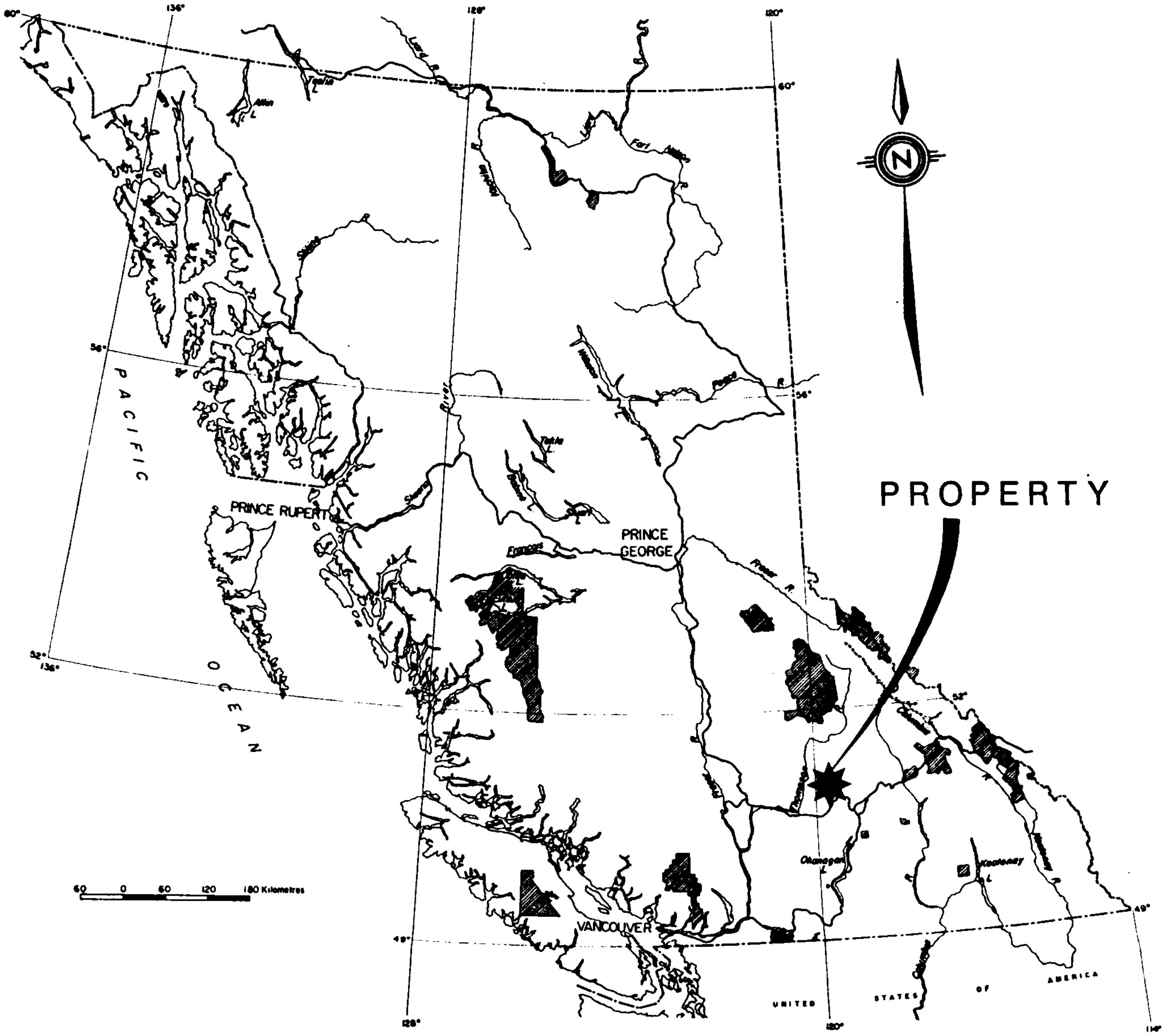
| | | |
|---|---|---|
| R.R. Culbert Dec.05-09, 4.5 days @ $250 | 1,125.00 | |
| A. Ghabrial Dec.03-08, 6.0 days @ $105 | 630.00 | |
| R.J. Beaty Dec.06-10, 1.5 days @ $250 | 375.00 | |
| Contract expenses & benefits (UIC,CPP,WC,etc.) | 639.00 | $2,769.00 |

2. Disbursements

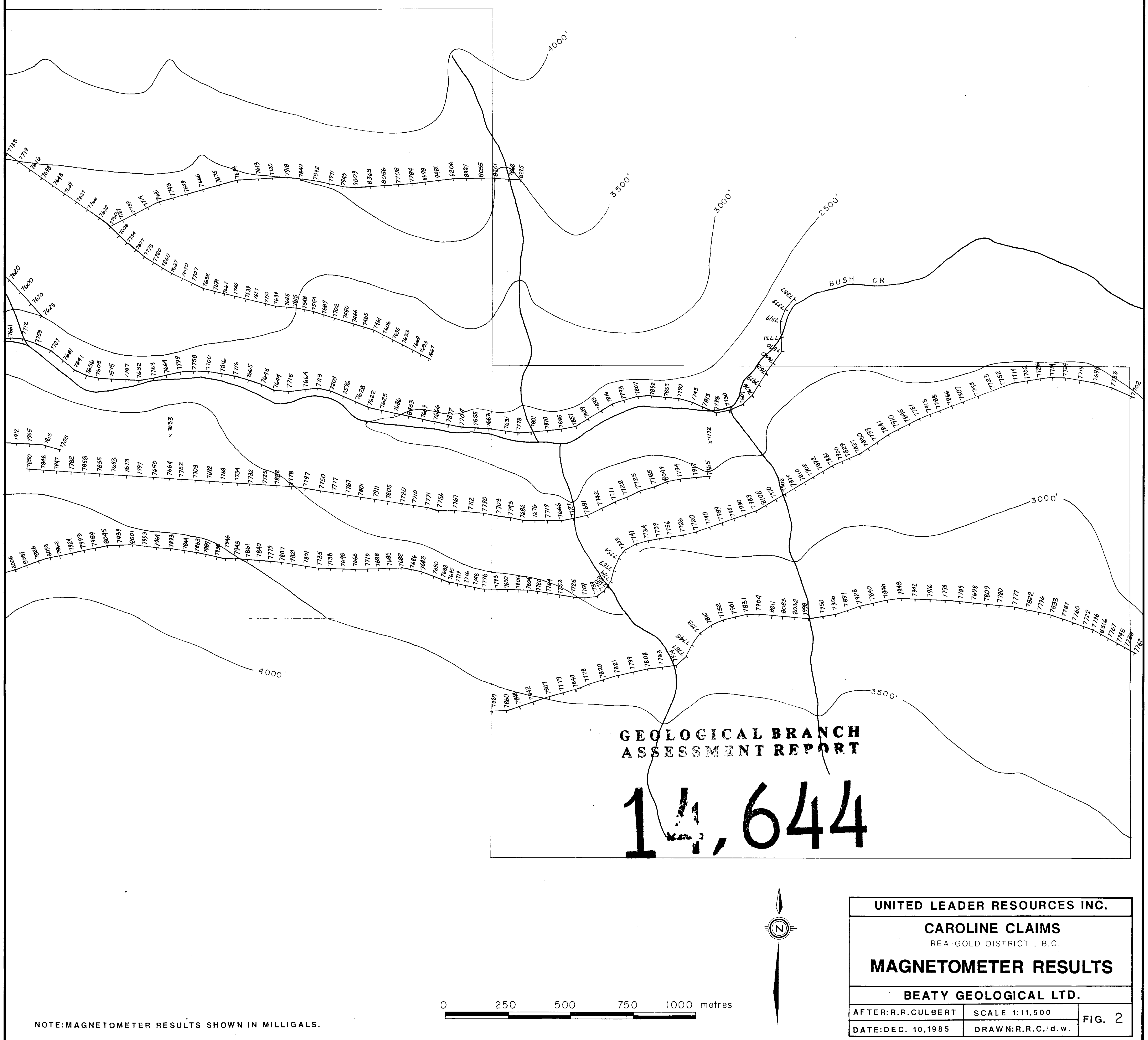
| | | |
|---|---|---|
| Meals | 124.92 | |
| Accommodation | 112.36 | |
| Gas, oil, repairs | 89.87 | |
| Airfare | 41.43 | |
| Taxi, bus | 7.00 | |
| Photocopies | 32.00 | |
| Telephone, telex | 4.46 | |
| Secretarial | 130.00 | |
| Accounting | 96.00 | |
| Report binding | 22.00 | |
| Drafting | 78.00 | 738.04 |

3. Rentals

| | | |
|---|---|---|
| Dodge 4x4 truck, 6 days @ $50 | 300.00 | |
| Magnetometer, 6 days @ $35 | 210.00 | |
| VLF-EM, 6 days @ $25 | 150.00 | 660.00 |
| | | $4,167.04 |




| UNITED LEADER RESOURCES INC. | | |
|---|---|---|
| CAROLINE CLAIMS<br>REA GOLD DISTRICT , B.C.<br>LOCATION MAP | | |
| BEATY GEOLOGICAL LTD. | | |
| AFTER: R.R. CULBERT | SCALE AS SHOWN | FIG. 1 |
| DATE: DEC. 10, 1985 | DRAWN: R.R.C./d.w. | |

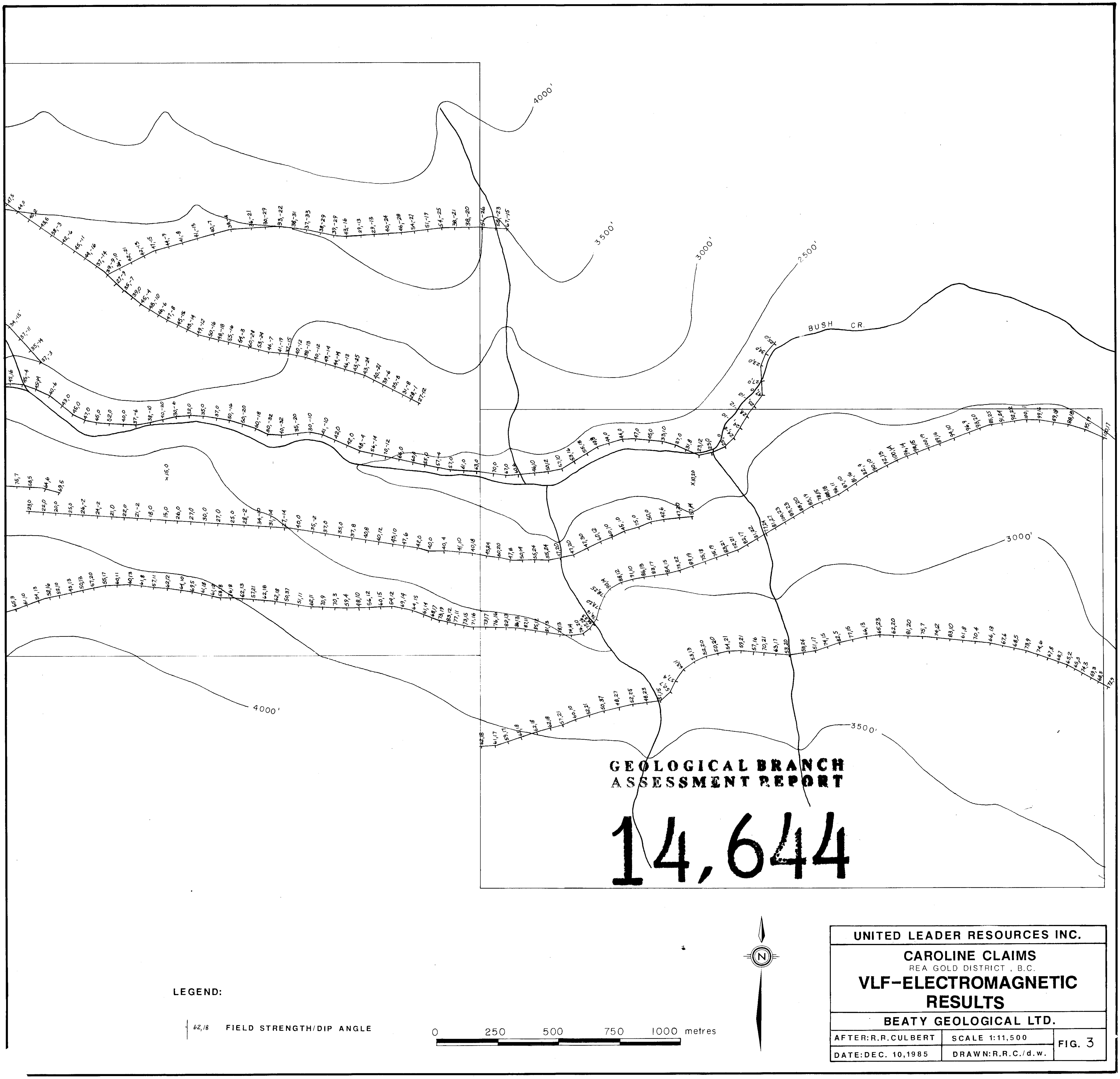





NOTE: MAGNETOMETER RESULTS SHOWN IN MILLIGALS.

| | |
|---|---|
| UNITED LEADER RESOURCES INC. | |
| CAROLINE CLAIMS<br>REA GOLD DISTRICT, B.C. | |
| MAGNETOMETER RESULTS | |
| BEATY GEOLOGICAL LTD. | |
| AFTER: R.R. CULBERT | SCALE 1:11,500 |
| DATE: DEC. 10, 1985 | DRAWN: R.R.C./d.w. |

FIG. 2




LEGEND:

62,18 FIELD STRENGTH/DIP ANGLE

UNITED LEADER RESOURCES INC.

CAROLINE CLAIMS

REA GOLD DISTRICT, B.C.

**VLF-ELECTROMAGNETIC RESULTS**

BEATY GEOLOGICAL LTD.

| | | |
|---|---|---|
| AFTER: R.R. CULBERT | SCALE 1:11,500 | FIG. 3 |
| DATE: DEC. 10, 1985 | DRAWN: R.R.C./d.w. | |