

GEOPHYSICAL REPORT

6/86

ON

AIRBORNE MAGNETIC AND VLF-EM SURVEYS

OVER THE

PR CLAIM GROUPS

WHEATON CREEK, DEASE LAKE AREA

LIARD MINING DIVISION

BRITISH COLUMBIA

PROPERTY : Central area is 58 km S80°E of village of Dease Lake, B.C. on Wheaton and Two Mile Creeks
: 58° 21' North Latitude
: 128° 58' West Longitude
: N.T.S. 104I/6E, 7W

WRITTEN FOR : POWDER RIDGE RESOURCES INC.
2228 - 172nd Street
White Rock, B.C., V4B 5E7

SURVEYED BY : COLUMBIA AIRBORNE GEOPHYSICAL SERVICES (1984) LTD.
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DATED : September 18, 1985



GEOTRONICS SURVEYS LTD.
Engineering & Mining Geophysicists
VANCOUVER, CANADA

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GEOLOGICAL BRANCH
ASSESSMENT REPORT

14,000

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SUMMARY

Airborne magnetic and VLF-EM surveys were carried out over the PR Claim Groups owned by Powder Ridge Resources Inc. of White Rock, B.C., during June, 1985. The claims are located 58 km S80°E of the village of Dease Lake on Two Mile, Wheaton and Alice Shea creeks. Access is best by helicopter. The terrain consists of mainly moderate to steep slopes mostly above tree line. The treed areas are lightly forested with coniferous trees. The purpose of the surveys was to aid in the mapping of geology as well as to locate probable areas for exploration of gold mineralization.

The property is entirely underlain by the Mississippian to Permian Cache Creek Group. Most of the rocks within this group that are found on the property are ultra-basics that are commonly serpentized. Also occurring are basic volcanics and sedimentary rocks. The general trend of the contacts and bedding planes is N60°W which is also the trend of the Nahlin thrust fault occurring three to five km to the southwest.

Placer gold occurs in the creeks throughout and massive sulphides within place and within float have been discovered. The purpose of exploration on the property is to discover the source of the placer gold.

The airborne surveys were flown at about a 50-meter terrain clearance on contour lines with a separation of 100 to 200 meters. The instruments used were a Sabre Electronics proton precession magnetometer and a Sabre Electronics VLF-EM receiver. The magnetic data were picked from the strip charts and hand contoured. The contours were drawn on a survey plan on which the VLF-EM anomalies were plotted as well.

CONCLUSIONS

1. The magnetics verified that much of the survey area is underlain by ultra-basic rocks and basic volcanics.
2. The magnetic highs and lows are quite likely reflecting specific rock-types, some of which could be verified. However, most could not because of coarse mapping by the G.S.C.
3. A large area east of the PR 1 claim supposedly underlain by sediments has a high magnetic field. This indicates that the sediments may be relatively thin and are underlain by basic volcanics or ultra-basic rocks.
4. There is excellent correlation of most of the VLF-EM anomalies with magnetic lows. These areas are prime targets for exploration interest especially where the VLF-EM anomalies have good strength.
5. The stronger VLF-EM anomalies are more likely caused by graphitic horizons. Any part of any VLF-EM anomaly could be mineralized, but the stronger ones are more likely to be.
6. The magnetic highs and lows, VLF-EM anomalies and lineations all strike predominantly northwesterly. The causative sources are therefore likely geologic contacts as well as graphitic horizons along the contacts which are known to strike in this direction.

RECOMMENDATIONS

The airborne geophysics has revealed a number of target areas throughout the property, most notably the VLF-EM highs with magnetic lows. It is recommended to check these out by prospecting, geological mapping and possibly soil geochemistry. Soil geochemistry lines could be run in the areas of interest, such as across the VLF-EM conductors. Ground VLF-EM will be quite useful as well in finding and delineating more accurately the target areas. Special attention should be paid to those anomalies with greater strength.

It is not expected, however, that all gold-sulphide mineralization in the area will be reflected by the airborne geophysics. It is simply a start as far as defining target areas and helping to map the geology.

Some of the magnetic highs and lows should be checked out in the field to determine the causative source. This will enhance the geophysics interpretation.

GEOPHYSICAL REPORT
ON
AIRBORNE MAGNETIC AND VLF-EM SURVEYS
OVER THE
PR CLAIM GROUPS
WHEATON CREEK, DEASE LAKE AREA
LIARD MINING DIVISION
BRITISH COLUMBIA

INTRODUCTION AND GENERAL REMARKS

This report discusses the survey procedure, compilation of data and the interpretation of low-level airborne magnetic and VLF-EM surveys carried out over the PR Claim Groups belonging to Powder Ridge Resources Inc. The surveys were flown on June 22nd, 1985 and were carried out by Lloyd Brewer, instrument operator and project manager, and John Kime, navigator, both of whom are of Columbia Airborne Geophysical Services (1984) Ltd. A total of 182.6 line km of airborne surveys were done over the property and surrounding area.

The object of the two surveys was to aid in the geological mapping of lithology and structure for the purpose of exploration of gold mineralization. It is expected that the magnetic survey will respond to the serpentinized rock in the area as well as the basic volcanics. The VLF-EM is expected to respond to graphitic horizons within the sediments as well as, possibly, veins of massive sulphides. It is felt in this area that the graphitic horizons are important indicators of gold mineralization. The VLF-EM should also map fault, shear and contact zones.

PROPERTY AND OWNERSHIP

The property consists of seven claims occurring in two groups that total 85 units as shown on Map 2 and as described below:

<u>Claim Name</u>	<u># Units</u>	<u>Record #</u>	<u>Expiry Date</u>
<u>PR 1 Claim Group</u>			
PR 1	9	3052	June 22, 1987
PR 2	2	3053	June 22, 1986
PR 3	<u>9</u>	3054	June 22, 1986
	20		
<u>PR 4 Claim Group</u>			
PR 4	20	3070	June 22, 1987
PR 5	9	3071	June 22, 1987
PR 6	18	3072	June 22, 1987
PR 7	<u>18</u>	3073	June 22, 1987
	65		

The expiry dates shown on the PR 4 Claim Group takes into account the surveys under discussion as being accepted for assessment credits. That is, the surveys have only been applied to the PR 4 Claim Group for assessment credits.

The claims are owned by Powder Ridge Resources Inc., of White Rock, B.C.

LOCATION AND ACCESS

The central part of the property is found 58 km S80°E of the village of Dease Lake, B.C. on Two Mile, Wheaton and Alice Shea creeks. The northeasterly flowing Turnagain River is located 9 km north of the PR 1 and 3 claims.

The geographical coordinates for the center are 58° 21' north latitude and 128° 58' west longitude.

Access is best by helicopter though there is a trail running along Turnagain River that leaves Highway 37, 2 km south of Dease Lake.

PHYSIOGRAPHY

The property lies at the southern end of the Stikine Ranges which is a physiographic division of the Cassiar Mountains. The terrain varies from moderate to steep slopes and trends, for the most part, northerly since the topography is dominated by the northerly-trending creeks.

Elevations on the property vary from 1,260 meters a.s.l. at Wheaton Creek at the northeast corner of the PR 4 claim to 2,002 meters a.s.l. on Mount Shea at the southwestern corner of the PR 7 claim to give an elevation difference of about 740 m. An unnamed mountain at the southwestern corner of the PR 3 claim reaches an elevation of 1,990 m.

The PR claims are drained by four northerly-flowing creeks, namely, Two Mile, Wheaton and its tributary, Alice Shea, as well as an unnamed tributary of Ferry Creek. Two Mile, Wheaton and Ferry creeks are all tributaries of Turnagain River.

About 60% of the area is above tree line which runs approximately between the 1,500 and 1,600 m contour lines. The remaining 40% is covered by lightly-forested coniferous trees.

HISTORY OF PREVIOUS WORK

The claims were staked in 1984. The only work known to the writer is some prospecting and heavy mineral sampling along some of the creeks during the current exploration season. In years past, the creeks have been worked for placer gold.

GEOLOGY

As of yet, no report has been written on the property, nor any geological map produced. The following is therefore taken from the G.S.C. map of the area by Gabrielse (1978). Some verbal information was also supplied by Marshall Smith, P.Eng., consulting geological engineer to Powder Ridge Resources.

The PR claims are entirely underlain by rocks of the Cache Creek Group which are Mississippian to Permian in age. The general trend of contacts and bedding planes in the area and through the property is N60°W, which is the same as the Nahlin thrust fault located three to five km southwest of the property.

By far the dominant rocks are a suite of ultra-basics that are commonly serpentized and include peridotite, dunite and pyroxenite. Basic volcanics also occur on the property as well as sedimentary rocks which include limestone, chert, slate and argillite.

Massive sulphides have been found in outcrop as well as within float in at least two locations, all within the southeast corner of the claim block, mostly the PR 7 claim. The sulphides are chalcopryrite and pyrite.

Placer gold occurs within several of the creeks with some nuggets reaching a significant size. It is believed that some of the sources of the placer gold occurs within the PR claims. Graphitic horizons occur along some of the contacts which is considered to be important for helping to locate the source.

INSTRUMENTATION AND THEORY

(A) Magnetic Survey

The magnetic data were detected using a nuclear free precession proton magnetometer, manufactured by Sabre Electronic Instruments Ltd. of Burnaby, B.C. The magnetometer measures the total count of the earth's magnetic field intensity with a sensitivity of one gamma. The data are recorded on magnetic tape and 12 cm analog strip chart.

The magnetic patterns obtained from a regional airborne survey are directly related to the distribution of magnetite in the survey area. However, the geology cannot be deduced from isomagnetic maps by simply assuming that all magnetic highs are underlain by gabbro or ultramafic rocks, and that all magnetic lows are caused by limestone or chert. The problem with such a simplistic approach is that magnetite is not uniformly distributed in any type of rock. Other problems arise from the fact that most geologic terrains have rocks of high susceptibility superimposed on less 'magnetic' rocks, and vice versa. Cultural features such as powerlines, pipelines and railways also complicate matters. So many variables can be involved that it may be impossible to make a strictly accurate analysis of the geology of an area from magnetic data alone. It is preferable to use other information such as geological, photogeological and electromagnetic in combination with magnetic data to obtain a more accurate geological analysis.

(B) VLF-EM Survey

A two-frequency omni-directional receiver unit, manufactured by Sabre Electronic Instruments Ltd., of Burnaby, B.C., was used for the VLF-EM survey. The transmitters used were Annapolis, Maryland, transmitting at 19.0 KHz and Seattle, Washington transmitting at 24.8 KHz. The measurement taken during the survey is the variation in the horizontal component of the signal strength.

The VLF (Very Low Frequency) method uses powerful radio transmitters set up in various parts of the world for military communications. These powerful transmitters can induce electric currents in conductive bodies thousands of kilometers away from the radio source. The induced currents set up secondary magnetic fields which can be detected at surface through deviations in the normal VLF field. The conductors are located at field strength maxima.

The VLF method is inexpensive and can be a useful initial tool for mapping structure and prospecting. Successful use of the VLF requires that the strike of the conductor be in the direction of the transmitting station so that the lines of magnetic field from the transmitter cut the conductor. Thus, conductors with approximately northeast to southeast strikes will respond to Annapolis transmissions, and those with southeast to southwest strikes will respond to Seattle transmissions.

It is impossible to determine the quality of conductors with any reliability, using field strength data alone. The question of linearity is in doubt if the conductor does not appear to cross the adjacent flight lines. The relatively high frequency results in a multitude of anomalies from unwanted sources such as

swamps, creeks and cultural debris. However, the same characteristic also results in the detection of poor conductors such as faults, shear zones, and rock contacts, making the VLF-EM a powerful mapping tool.

SURVEY PROCEDURE

A two-meter bird was fitted with a magnetometer coil and one omni-directional EM receiver and towed beneath the helicopter on a 10-meter cable. The terrain clearance for the bird was 50 m.

The surveys were contour-flown at a line spacing of 100 to 200 m. Navigation was visual, using 1:50,000 scale maps blown up to 1:10,000.

The aircraft used to conduct this survey was a Bell Jet Ranger helicopter. Airspeed was a constant 60 KPH so that creek valleys and canyons were penetrated thoroughly. The slow airspeed provided safety, detailed coverage of boxed-in areas, and consistency of data retrieval, which is critical in rugged terrain.

The number of line km flown as shown on Maps 3 and 4 is 182.6.

The project supervisor, Mr. Brewer, has over 4 years of experience in conducting aerial magnetic, electromagnetic and radiometric surveys from fixed-and rotary-wing aircraft, under all types of terrain conditions.

DATA REDUCTION AND COMPILATION

The observant magnetic total field was recorded on analogue

strip charts. These were played-back together with audio recordings containing fiducial markers, and the fiducial markers were transferred to the strip charts. The fiducial markers were identified with topographic features along the flightlines.

The magnetic data were taken from the strip charts and plotted on Maps 3 and 4 at a scale of 1:10,000 (1 cm = 100 m). The data were then contoured at a 500-gamma interval.

The VLF-EM anomalies were taken from the strip charts and plotted on the sheet with the magnetics by plotting their half-width. The anomalies have been identified as strong, medium, weak or very weak by intensity of hatching.

Because of rough topography, weak or very weak anomalies could be caused by terrain effects rather than a conductive source such as geological structure and massive sulphides. However, if such an anomaly occurs on more than one flight line, then this possibility decreases. Therefore, only weak or very weak anomalies occurring on more than one flight line have been plotted. Single-line anomalies considered to be strong or medium in strength are plotted as a bar along the flight line.

DISCUSSION OF RESULTS

(A) Magnetic Survey

The magnetic field over the survey area has a rather large range of at least 5,500 gammas. It runs from a low of less than 500 gammas within the PR 7 claim to 6,000 gammas within a large magnetic high a few hundred meters south of the southeast corner of the PR 7 claim. Another feature of the magnetic field is that it is very noisy (that is, in any lateral direction, it quickly

changes from very low values to very high values and vice versa), especially within the southeastern part of the survey area. The above-described magnetic signature is very typical of ultra-basic rocks and basic volcanics. As mentioned under 'Geology', the ultra-basics are, by far, the most dominant rock-type perhaps covering as much as 80% of the survey area, according to the G.S.C. map.

For the most part, there appears to be a poor correlation between the Gabrielse's G.S.C. map and the magnetic survey results. For example, in places where sediments have been mapped and magnetic lows are thus expected, there occurs magnetic highs. Also, magnetic highs sometimes occur with basic volcanics, and sometimes they do not. It should be remembered, however, that the G.S.C. only maps the areas with general classifications. Specific rock-types, except for the limestone, are not mapped, because of the small scale (1:250,000). Therefore, it is expected that once mapping is undertaken on the property magnetic highs and lows will be more easily explained and the airborne survey will become more useful.

The ultra-high magnetic anomalies (say, above 4,000 gammas) with the associated lows occur throughout the survey area. They probably indicate a specific rock-type within the ultra-basics that is particularly more magnetic than the other rocks. Ultra-highs also occur where the G.S.C. has mapped basic volcanics. This is not unusual either since basic volcanics often have a magnetic field of very high amplitude.

However, what is unusual is that a high to ultra-high magnetic anomaly occurs to the north of PR 7 claim and to the east of PR 1 claim. This area is supposedly underlain by sediments. (The G.S.C. description says minor basic volcanics as well occurs

within this group, but the anomaly is too large to be caused by basic volcanics). If the area is in fact underlain by sediments then the only explanation is that the sediments are relatively thin and underlain themselves by ultrabasic rocks or basic volcanics. This interpretation is supported by the fact that the high is broad and relatively quiet indicating that the causative source is deep. This apparent contradiction appears elsewhere, as well. However, many of the lows can be correlated with mapped sediments.

One feature of the magnetic survey that does correlate with the mapped geology is the fact that the magnetic highs and lows trend northwesterly. This is the same direction as the trend of the bedding planes and contacts. In addition, as will be discussed below, this is the same direction as the VLF-EM anomalies and the lineations.

An aspect of the magnetic field that is of intriguing interest is the fact that it becomes decidedly more quiet towards the northwestern part of the survey area. Part of this may be caused by deeper overburden around Two Mile Creek which appears to be flowing through a broader valley than the other creeks. Another possible cause that is similar is that relatively thin sedimentary bedrock may be overlying basic and ultra-basic rock-types, as has been mentioned above.

Magnetic lows often occur along creek valleys, and/or areas of low topography. The reasons for this are as follows:

1. Valleys almost always contain deeper overburden which means the detecting element is further from the bedrock causing the magnetic field.

2. If the survey is flown across the valley or gully, then the detecting element is also further from the bedrock.
3. Gullies and valleys are often caused by faults or shear zones which are often reflected by magnetic lows.

(B) VLF-EM Survey

The major cause of VLF-EM anomalies, as a rule, are geologic structure such as fault, shear and breccia zones. It is therefore logical to interpret VLF-EM anomalies to likely be caused by these structural zones. Of course, sulphides may also be a causative source. But in the writer's experience, when VLF-EM anomalies correlate with sulphide mineralization, the anomalies are usually reflecting the structure associated with the mineralization rather than the mineralization itself.

There is some variation in intensity from one VLF-EM anomaly to the next. This is not only due to the conductivity of a causative source, but also the direction it strikes relative to the direction to the transmitter. In other words, those conductors lying close to the same direction as the direction to the transmitter can be picked up easier than those that are lying at a greater angle. Depending upon its conductivity, a conductor may not be picked up at all if it is at too great an angle.

Some of the conductors, are drawn as dashed lines. This occurs simply because the conductor was not picked up on all flight lines. In other words, wherever there is a space within the line marking the axis of a conductor is where a flight line did not respond to the conductor.

An unusually large number of conductors have been picked up by

the VLF-EM survey. The general trend of almost all of the conductors is northwesterly. This suggests the causative source of many of them could quite likely be the lithological contacts.

The conductivity of some is probably further enhanced by graphitic horizons. This is more likely the case with anomalies of a strength that is medium or strong. Many of these are relatively short, or, occur as a short part of a longer anomaly. This indicates greater conductivity and thus a greater amount of graphite. Therefore these areas are prime targets for the exploration of gold.

There is a very strong correlation within the survey area of the VLF-EM anomalies with magnetic lows. This is of strong exploration interest since the magnetic lows are likely reflecting sedimentary rocks and the VLF-EM anomalies, graphitic and/or contact zones. If this geophysics feature occurs within the basics or ultra-basics, then the magnetic low may be reflecting an alteration zone and the VLF-EM anomaly, mineralization within the alteration.

Four medium-strength, one-line anomalies have been mapped within the survey area. These are considered to be of good exploration interest and should not be overlooked because of occurring on only one flight line. Because the causative source is likely short, it is less likely to be geological structure and more likely a zone of mineralization.

Only weak or very weak anomalies occur within the northwest survey area (Map 4). This indicates the area has less exploration interest, though part of the cause may be deeper overburden. Alternately, there is a strong VLF-EM response southeast of the property indicating this area has good exploration potential.

Some float was discovered at the south end of a narrow, northerly-trending lake south of the southeast corner of the PR 7 claim. The float probably has not travelled far, though there are no VLF-EM anomalies in the immediate area. The reason for this may be one or both of the following:

1. The mineralization is relatively short and occurs between survey lines.
2. The mineralization trends in a low optimum direction for the VLF-EM to respond to it.

(C) Lineations

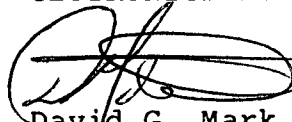
Lineal trends considered to be indicative of geological structure have been drawn on Maps 3 and 4 taking into account:

- a) Magnetic lows which are often caused by the magnetite within the rocks being altered by geological structure processes.
- b) VLF-EM anomalies which more often than not are reflecting structure.
- c) Topographic depressions such as creek valleys which are usually caused by structure.

Several lineations that are indicative of faults have been mapped across the property striking in virtually all directions but, predominantly northwesterly. The lineations are therefore quite likely reflecting contact zones and/or graphitic horizons. This is not surprising since there is a strong correlation of VLF-EM anomalies with magnetic lows. Lineations are drawn along both features.

The lineations cross each other on the property in different areas. Structure is often important for the emplacement of mineralizing fluids especially where structures intersect. Thus those areas where lineations intersect may have greater exploration interest.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.



David G. Mark,
Geophysicist

September 18, 1985

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GEOPHYSICIST'S CERTIFICATE

I, DAVID G. MARK, of the City of Vancouver, in the Province of British Columbia, do hereby certify:

That I am a Consulting Geophysicist of Geotronics Surveys Ltd., with offices located at #403-750 West Pender Street, Vancouver, British Columbia.

I further certify:

1. That I am a graduate of the University of British Columbia (1968) and hold a B.Sc. degree in Geophysics.
2. I have been practising my profession for the past 17 years and have been active in the mining industry for the past 20 years.
3. That I am an active member of the Society of Exploration Geophysicists and a member of the European Association for Exploration Geophysicists.
4. This report is compiled from data obtained from airborne magnetic and VLF-EM surveys carried out by Columbia Airborne Geophysical Services (1984) Ltd., under the supervision of Lloyd Brewer on June 22nd, 1985.
5. I have no direct or indirect interest in Powder Ridge Resources Inc., However, Geotronics will receive shares in Powder Ridge, number as yet unknown, as payment for carrying out the survey and interpretation.


David G. Mark
Geophysicist

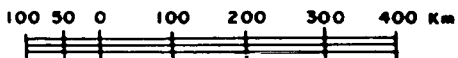
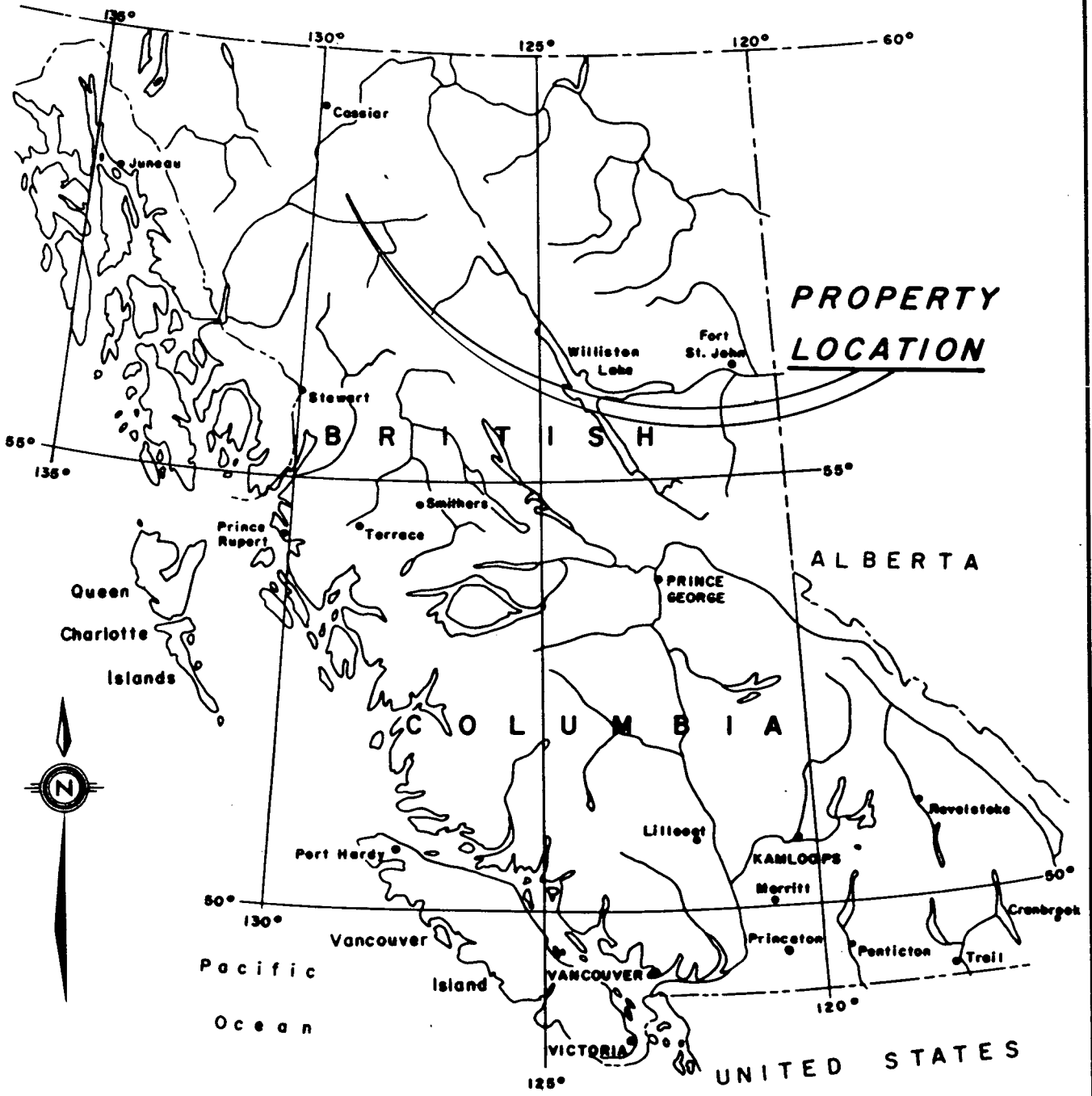
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AFFIDAVIT OF COSTS

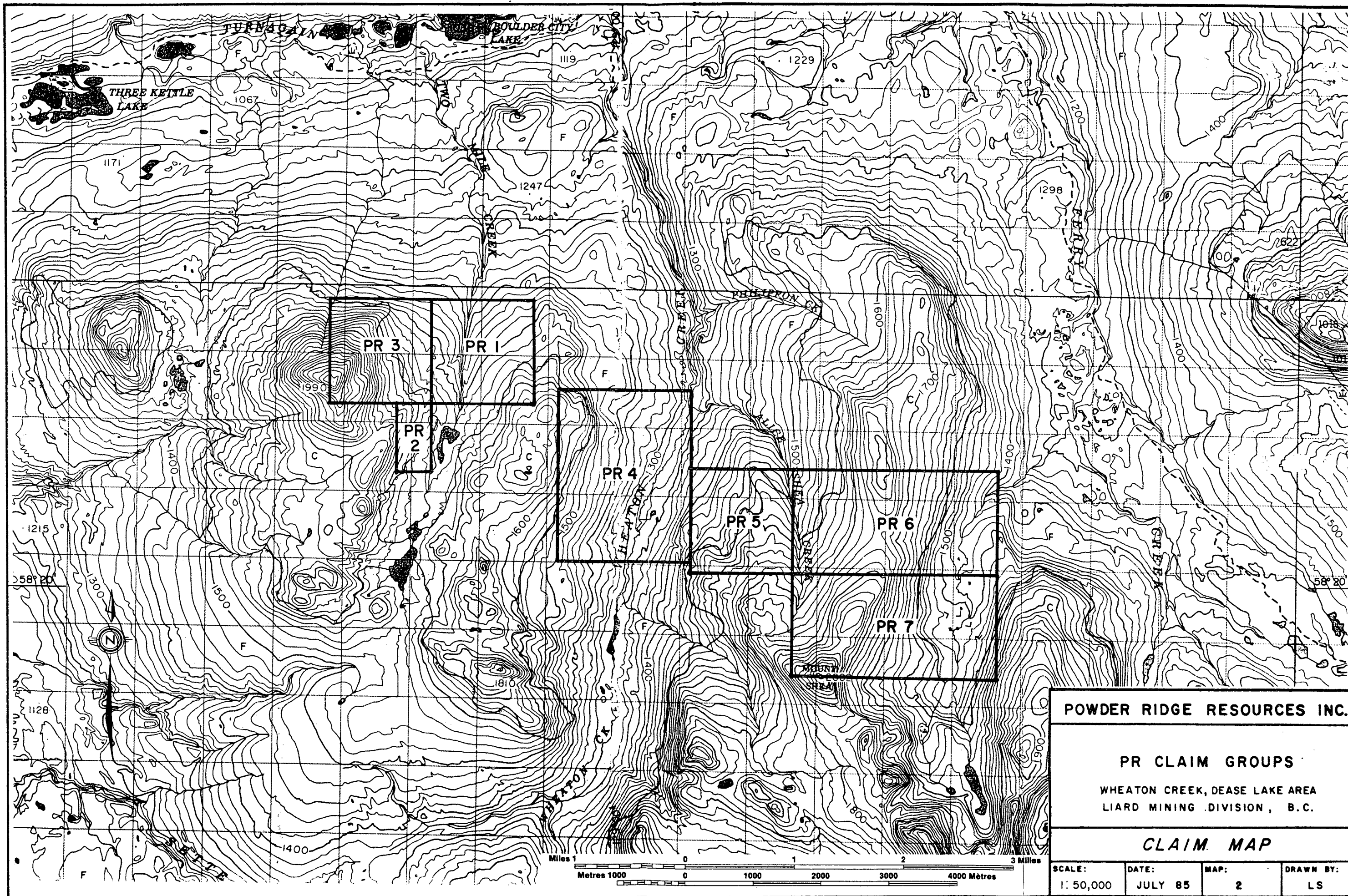
I, Lloyd Brewer, president of Columbia Airborne Geophysical Services (1984) Ltd., certify that the airborne magnetic and VLF-EM surveys were flown on June 22nd, 1985 and that they were flown at a cost of \$100/km, the total number of km being 182.6, to give a total cost of \$18,260.00.

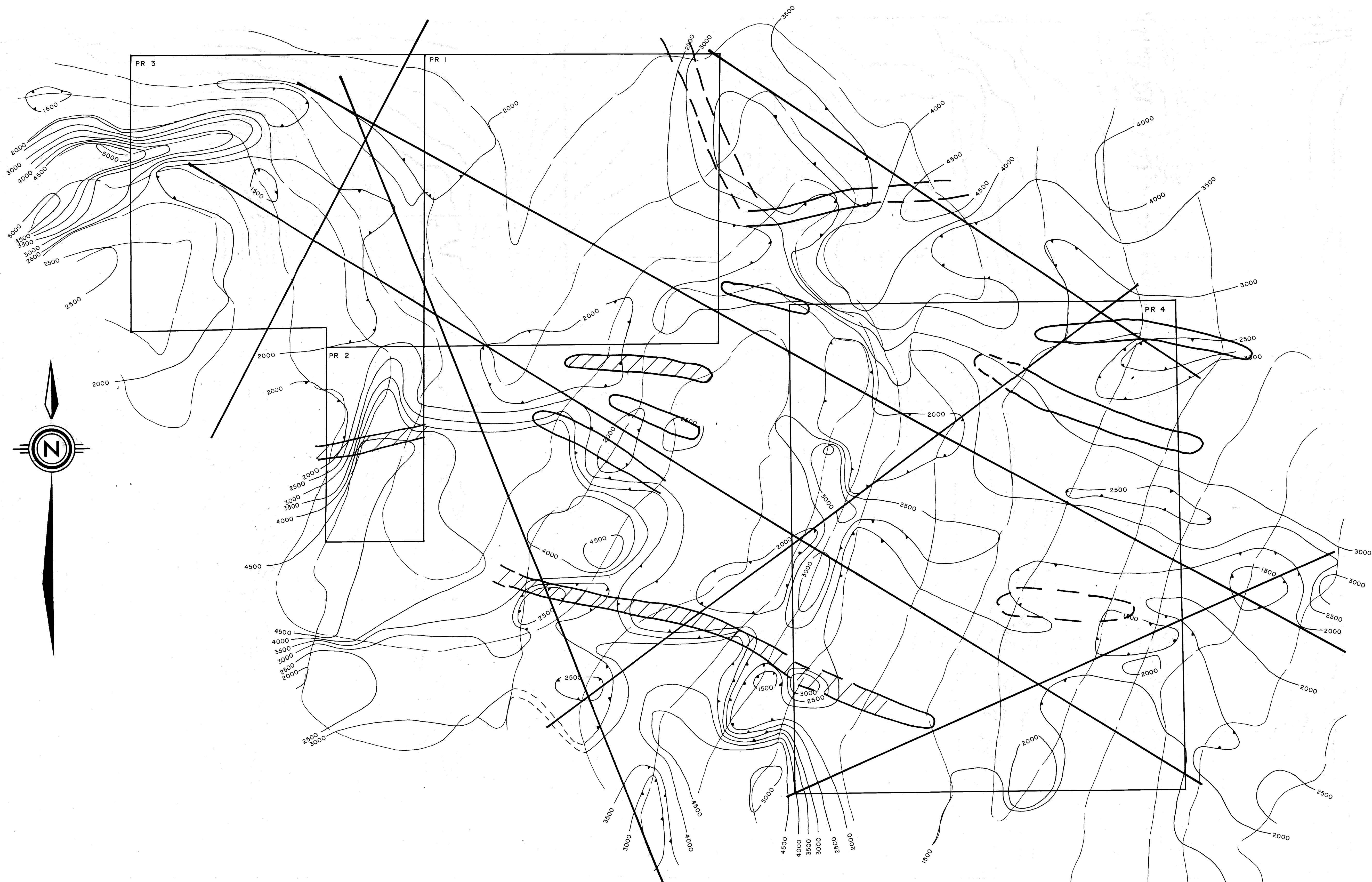

Lloyd Brewer

September 18, 1985





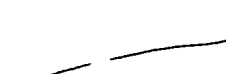


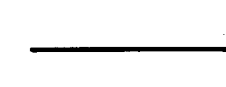


PR CLAIM GROUPS

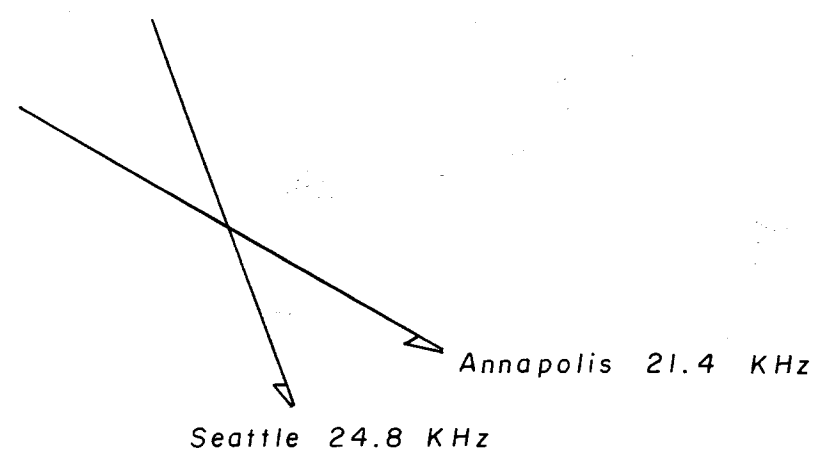




LEGEND

-  Lineation produced from magnetic and EM results suggesting geological structure
-  Very weak VLF-EM anomaly
-  Weak VLF-EM anomaly
-  Magnetic depression
-  Flight line
-  500 gamma contour
-  Contour assumed
-  Property boundary

TRANSMITTER DIRECTION



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

14,000

To accompany report by: DAVID G. MARK, Geophysicist

POWDER RIDGE RESOURCES INC.

PR CLAIM GROUPS

NORTHWEST GROUP

WHEATON CREEK, DEASE LAKE AREA

LIARD MINING DIVISION, B. C.








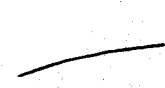
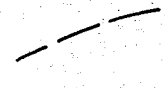


**AIRBORNE SURVEY
MAGNETIC CONTOURS & VLF-EM ANOMALIES**

SCALE: 1:10,000	N.T.S. 104-1/8 E. 104-1/7 W	DATE: JULY 85	MAP: 3	DRAWN BY: LS
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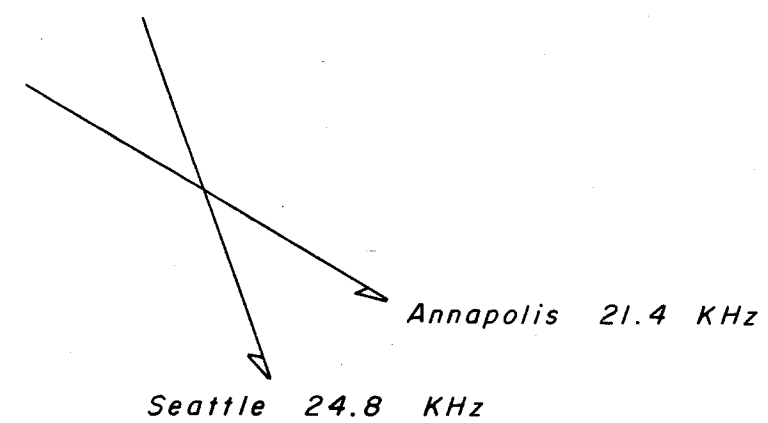
Survey carried out by: COLUMBIA AIRBORNE GEOPHYSICAL SERVICES (1984) LTD.



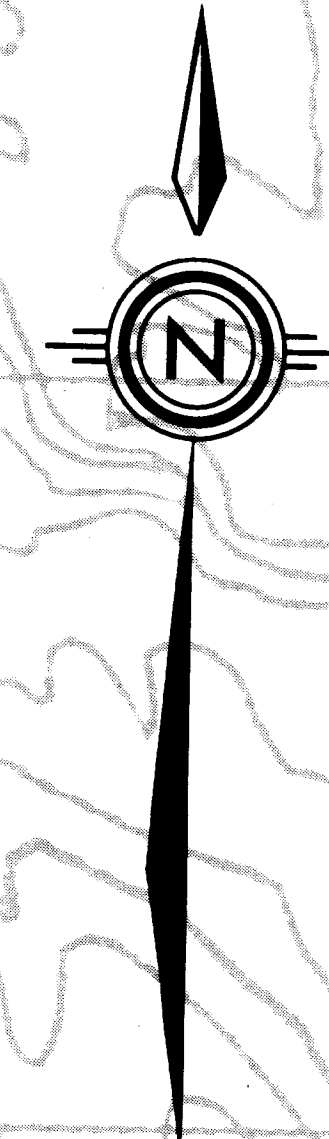
LEGEND

-  Lineation produced from magnetic and EM results suggesting geological structure
-  Very weak VLF-EM anomaly
-  Weak VLF-EM anomaly
-  Medium VLF-EM anomaly
-  Strong VLF-EM anomaly
-  Single line VLF-EM anomaly - medium strength
-  Magnetic depression
-  Flight line
-  500 gamma contour
-  Contour assumed
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ASSESSMENT REPORT**

14,000

To accompany report by: DAVID G. MARK, Geophysicist

POWDER RIDGE RESOURCES INC.

PR CLAIM GROUPS
SOUTHEAST GROUP

WHEATON CREEK, DEASE LAKE AREA
LIARD MINING DIVISION, B.C.

**AIRBORNE SURVEY
MAGNETIC CONTOURS & VLF-EM ANOMALIES**

SCALE: 1:10,000	N.T.S. 104-176 E. 104-177 W	DATE: JULY 85	MAP: 4	DRAWN BY: LS
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