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WRITTEN BY	: LLOYD C. BF	REWER		
	COLUMBIA AIRBORNE GEOPHYSICAL			
	SERVICES (1	1984) LTD.		
DATED	: August 3, 1	988		

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LIST OF ILLUSTRATIONS

At back of report

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Property Location Map	1:8,600.000	Map 1
Claim Map	1:50,000	Map 2

In back pocket

Airborne Magnetic & VLF-EM

1:10,000

Map 3 Fig 3 Mag Fig 4 VLF/Mag

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### SUMMARY

Airborne magnetic and VLF-EM surveys were carried out over the Gold Bridge property owned by Levon Resources Ltd. of Vancouver, B.C. in the months of December 1987 and Janurary 1988. The claims are located to the south and west of Gwyneth Lake. Access is easily gained by a two-wheel drive vehicle. The terrain consists of moderate to dense coniferous trees. The purpose of the surveys was to aid in the mapping of geology as part of the exploration program in locating probable areas of gold mineralization.

The Oro claims are located directly west from the former gold producing Bralorne and Pioneer Mines. Other smaller former gold producers are located along the northwesterly belt of metamortphosed sedimentary and volcanic rocks. A central structure, along the Cadwallader Creek Valley with which the gold bearing quartz fissure veins of the Bralorne Instrusives appear to be associated, is projected northwestward to the Levon property.

The Oro property is underlain by the Triassic Hurley Formation consisting of interbedded argillite, sandstone, limestone and greenstone. These units strike north to west and dip gently west to south. They are contact metamorphosed to hornfels when adjacent to quartz diorite stocks or horneblende porphyry dykes. These plutonics belong to the Cretaceous Coast Intrusions. Glacial overburden covers most of the property and is 1-10 meters in depth.

The airborne surveys were flown at about a 50 meter terrain clearance of contour lines with a separation varying from 100-200 meters. The instruments used were a Sabre Electronics VLF-EM proton presession 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.

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# CONCLUSIONS

These are as follows:

- 1. The airborne magnetic survey has mapped bodies of serpentine and volcanics as well as intrusive quartz and granodiorites.
- 2. The survey also has mapped sediments of the Hurley Group, some of which are possibly mineralized.

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3. Both the VLF-EM and magnetic surveys revealed lineations within the survey area that are likely caused by fault, shear and/or contact zones. These can be important indicators of sulphide and native gold mineralization especially where the lineations cross.

### RECOMMENDATIONS

These are as follows:

- Thorough prospecting and/or geological mapping in addition to what so far has been carried out. This will also greatly aid in the interpretation of any geophysics and geochemistry that have been or may be carried out, especially the airborne magnetic survey.
- Soil geochemistry sampling. The total sample picked up should be pulverized and not screened in order to preclude the screening out of coarser gold. (The writer considers porphyrite gold occuring on the Oro claims to be a good possibility).
- 3. Ground VLF-EM and magnetic surveys as well as possibly low frequency EM in selected areas (such as MaxMin II EM system). The VLF-EM method has proven to be very useful in this area for discovering gold mineralization, especially together with soil sampling. An induced polarization-resistivity survey should be considered since it may well prove to be one of the best tools available for this area.
- 4. Trenching and diamond drilling of promising targets resulting form the above work.

# - 1 -

# GEOPHYSICAL REPORT

ON

# AIRBORNE MAGNETIC AND VLF-EM SURVEYS

OVER THE

ORO CLAIMS

GWYNETH LAKE AREA

# LILLOOET 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 ORO claims in the Gwyneth Lake area in December, 1987. the surveys were carried out by Lloyd C. Brewer, instrument operator and project manager, and John Kime, navigator, both of whom are of Columbia Airborne Geophysical Services (1984) Ltd. A total of 81.5 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 the type of gold mineralization as is found in the Gold Bridge and Bralorne area. Magnetic surveys have especially been proven to be a good geological mapping tool.

# PROPERTY AND OWNERSHIP

The property consists of 5 contiguous claims totalling 24 units as shown Map 2 and as described below:

<u>Claim Name</u>	<u># Units</u>	Record #	Expiry Date
ORO 1	4	657	August 25, 1988
ORØ 2	4	258	August 25, 1988
0R0 3	4	659	August 25, 1989
0R0 4	8	1592	November 11, 1991
<b>O</b> RO <b>5</b>	4	1629	November 11, 1991

The expiry dates shown does not take into account the surveys under discussion as being accepted for assessment credits.

The five claims are owned by Levon Resources Ltd., of Vancouver, B.C.

# LOCATION AND ACCESS

The property is located to the southeast of Gwyneth Lake, with some of the Lake just inside the Oro 1 claim. The Hurley River runs through the east part of the property.

The geographical coordinates are 50°47'N latitude and 122°51'W longitude.

Access can be gained by a 2-wheel drive road from the Lillooet/Gold Bridge road just north of Bralorne. The distance from Gold Bridge to the property is about 7 km.

#### PHYSIOGRAPHY

The property lies at the southeastern part of the Pacific Ranges which is a physiographic division of the Coast Mountains. The terrain is, in general, steep and mountainous.

Elevations vary from 1000 meters a.s.l. along the Hurley River to 1300 meters a.s.l. in the northwestern portion of the property.

The main water sources would be both the Hurley River as well as Gwyneth Lake.

The forest cover consists primarily of fir and spruce, moderate in density and with an undergrowth light to moderate.

# HISTORY OF PREVIOUS WORK

The Oro claims were originally staked around 1933 by Golden Mitt Mining Company Ltd. (the Bridge River Pacific Mines Ltd. as of 1934). They developed two small adits and did some trenching. Hurley River Mines Ltd. carried out some trenching and packsack drilling in 1959-60. New Congress Resources Ltd. did a small geochemical survey in 1979 and 1980.

In 1984 and 1985 Levon Resources implemented a line cutting, trenching, soil sampling and geophysical program. Three quartz veins and four stibnite veins returned significant assays although all are too small to have any economic value.

#### GEOLOGY AND MINERALIZATION

The Oro property is underlain by the Triassic Hurley Formation consisting of interbedded argillite, sandstone, limestone and greenstone. These units strike north to west and dip gently west to south. They are contact metamorphosed to hornfels when adjacent to quartz diorite stocks or horneblende porphyry dykes. These plutonics belong to the Cretaceous Coast Instrusions. Glacial overburden covers most of the property and is 1-10 meters in depth.

The Hurley Formation is for the most part unmineralized. Two exceptions are minor disseminated pyrite throughout the Hurley argillite and one zone of quartz and calcite veins near a homeblende prophyry intrusion.

Three narrow quartz veins are located on Oro 3 within a quartz diorite stock which retruned Au and Ag assays up to 0.35 oz/ton and 2.84 oz/ton respectively.

Two minor stibuite veins occur on Oro 2 also in quartz diorite. They returned antimony grades up to 16.9 %.

### INSTRUMENTATION AND THEORY

# a) Magnetic Survey

The magnetic data are 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) <u>VLF-EM Survey</u>

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 are NLK Arlington (Seattle), Washington, operating on 24.8 KHz, and Annapolis, Maryland, transmitting at 21.4 KHz. These signals are used due to their ideal orientaiton with respect to northwest and eastwest geological structures, and their good signal strengths. 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 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 northeast to southeast strikes will respond to Annapolis transmissions, while conductors striking north to west will respond to Seattle transmissions. Conductors striking east to northeast may respond to both stations, giving coincident field strength peaks.

The theory of VLF-EM interpretation is quite simple. Conductors are located at field strength maxima. In the Gold Bridge area, one may assume that a Seattle field strength peak represents a conductor with a generally north trend, and a Annapolis peak will be a conductor with an east-west trend. This, of course, only applies to conductors with clearly linear trends and cannot be assumed for single line anomalies.

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 frequencey 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.

The interpretive technique requires information from magnetic surveys, air photo analyses, and ground traverses to aid in discrimination between important and unwanted anomalies. Even armed with this information the interpreter can easily be misled.

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#### SURVEY PROCEDURES

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A two meter bird was fitted with a magnetometer coil and 2 omni-directional EM receivers 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 varying from 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 206 Jet Ranger, owned and operated by Bob Holt. Airspeed was a constant 60 kph so that creek valleys and canyons were penetrated thoroughly. The slow airspeed provided safely, detailed coverage of boxed-in areas, and consistency of data retrieval, which is critical in rugged terrain.

The number of line km flown covering the area as shown on Map 3 is 81.5.

I have over 7 years of experience in conducting aerial magnetic and electromagnetic 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 flight lines.

The magnetic data were taken from the strip charts and plotted. It was then contoured at a 100 gamma interval onto Map 3 at a scale of 1:10,000 (1 cm = 100 M).

The VLF-EM anomalies were taken from the strip charts and plotted on Map 3 with the magnetic contours. For each anomaly, a heavy line along the flight line was drawn showing its half-width. An 'S' or an 'A' designated the anomaly as being from the Seattle transmitter or the Annapolis transmitter.

A question mark on the anomaly indicates that it could be caused by terrain. The survey area was somewhat rugged causing numerous VLF-EM anomalous responses most of which was easily sorted out as being caused by terrain. However, some were difficult to sort out and they were therefore plotted with a question mark.

Strong anomalies were plotted with exclamation marks, and anomalies without any marks indicated average responses. Other symbols are explained on the sheets.

#### DISCUSSION OF RESULTS

# a.) Magnetic

The magnetic field over the entire survey area is quite variable. The field ranges from a low of 2200 gammas in a northerly trending zone in the north central edge of the survey area to 3600 gammas at the southeastern corner of the Oro #4 claim. The background would appear to be about 2400 gammas.

The magnetic anomalies greater than 2500 gammas occur within the areas mapped as Bralorne Intrusions, Pioneer Formation and Bridge River Group mafic units.

Areas of magnetic readings of less than 2500 gammas correlate closely to mapped Hurley Formation sediments.

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There is, however, more magnetic variances than directly correlates with mapped geology in the area. Therefore, it is reasonable to assume that the Hurley Formation sediments are in part underlain by either Pioneer Formation or Bridge River Group units.

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

- 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.
- Gulleys and valleys are often caused by faults or shear zones which are often reflected by magnetic lows.

# b.) VLF-EM

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 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 causitive source, but also the direction it strikes relative to the direction to the transmitter.

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In other words, those conductors lying close to the same direction as the direction of 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.

A number of VLF-EM conductors (or anomalies) occur throughout the survey area. These have been labeled. There are a total of 8 main conductive zones with numerous single line anomalies. The zones are labeled on Fig. 3 using letters 'a' to 'b' respectively.

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

As mentioned above, any VLF-EM conductor is indicative of geological structure. However, the longer conductors are much more indicative. These include conductors 'b' and 'h' where lengths vary from 2000 to over 3200 meters. As previously mentioned, any parts of these anomalies could be reflecting mineralization that is associated with geological structure.

Conductor 'a' strikes northwesterly and is somewhat offset along its 1200 meter strike length. Within this zone are two magnetic highs.

Conductor 'b' is the longest anomaly in the survey. It has a west northwesterly strike length of over 3000 meters being open on the east. This conductor is most likely caused by a fault or shear as it crosses the geological contact between the Noel and Pioneer Formations at a perpendicular angle. It is of considerable exploration interest as it runs through areas of substantial magnetic variation. This possibly leading to the mobilization of mineralized fluids into this fault/vein conductive source. Conductor 'c' is over 900 meters long, strikes northwesterly, and is weak in intensity. The most notable feature of this anomaly is that it is offset in its center by some 200 meters. This is most likely caused by faulting.

Conductor 'b' has a northwesterly strike length of 700 meters and a width of 50 meters. It occurs in an area of quiet magnetics and crosses perpendicular to the northeasterly running Hurley Creek Valley.

Conductor 'e' is a strong anomaly and has a northwest strike for a length of 350 meters and a width of 50 meters. It occurs within the area mapped as Hurley Formation sediments and could be caused by possible mineralization within these sediments.

Conductor 'f' is a strong anomaly occuring in conjunction with a slight magnetic high. It is possibly reflecting mineralized metasediments or is an expression of a sub-surface mafic body.

Conductor 'g' has a northerly strike of 1200 meters. It is a medium strength anomaly. It is possibly indicating a fault as it crossed the Hurley River at a point of 300 meter offset in the rivers course.

Conductor 'h' has a northwesterly strike, with a length of over 2000 meters. It occurs on the contact of the Hurley Formation to the east and granodiorites to the west.

There are also some single-line anomalies within the property, any of which could easily be reflecting bedrock conductors associated with mineralization. For each anomaly, the strike of the causative source is unknown.

# c.) Lineations

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

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

Several lineations that are indicative of faults and contacts have been mapped across the property striking in different directions. Some or parts of the lineations correlate directly with known lithologic contacts and/or faults.

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

> Respectfully submitted, COLUMBIA AIRBORNE GEOPHYSICAL SERVICES (1984) Ltd.

LLOYD C. BREWER PRESIDENT

August 03, 1988

- British Columbia Mineral Exploration Review 1985, Information Circular 1988-1.
- Cooke, B.J., Assessment Report #14725 for Levon Resources Ltd., January 1986.
- Levinson, A.A. (editor) Precious Metals in the Northern Cordillera, 1982; Published by the Association of Exploration Geochemists.
- McCann, W.S., Geology and Mineral Deposits of the Bridge River Map-area, British Columbia, 1922; memoir 130, Geological Survey of Canada.

Geological Survey of Canada, Summary Report for the year 1912.

### CERTIFICATION

I, Lloyd C. Brewer, of the city of Vancouver, in the Province of British Columbia, Canada, do hereby certify:

That I am owner and president of Columbia Airborne Geophysical Services (1984) Ltd., with offices located at #611-470 Granville Street, Vancouver, B.C.

I further certify:

- I am president of Columbia Airborne Geophysical Services (1984) Ltd., and have been employed full time in the mineral exploration industry for the past 7 years, both in Canada, U.S.A. and Mexico.
- 2. I was project manager and instrument operator for the Levon Group property aerial survey program, which covered over 1800 line kilometers.
- This report was compiled from data obtained from the airborne survey carried out by Columbia Airborne Geophysical Services (1984) Ltd., under my direct supervision, during December 1987 and January 1988.

LLOYD C. BREWER PRESIDENT

JUNE 30, 1988

AFFIDAVIT OF COSTS

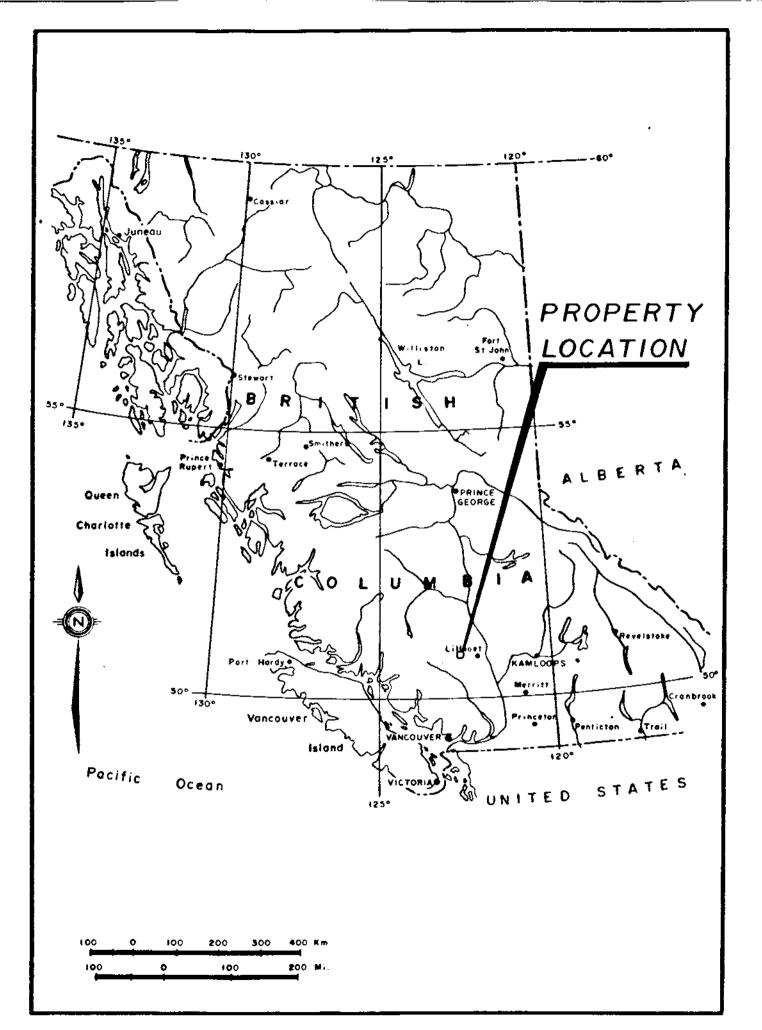
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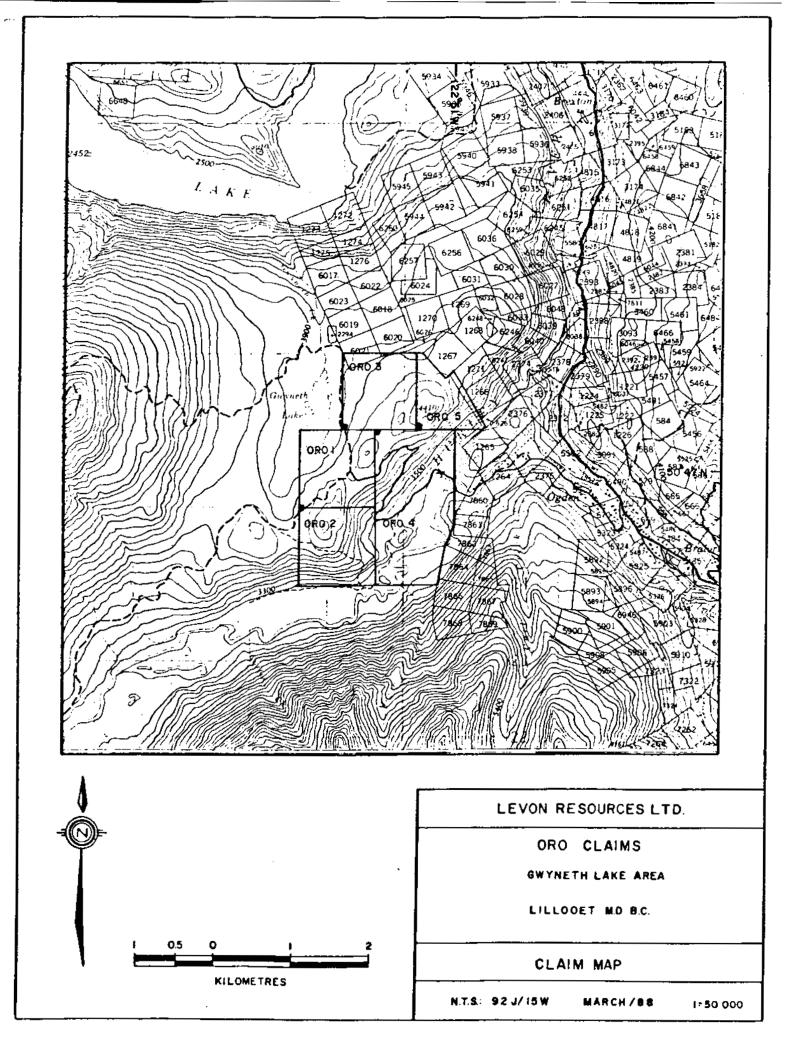
I, Lloyd C. Brewer, president of Columbia Airborne Geophysical Services (1984) Ltd., certify that the airborne magnetic and VLF-EM surveys were flown in December 1987, and January 1988 and that they were flown at a cost of 100/km, the total number of km being 81.5 to give a total cost of \$8,150.00.

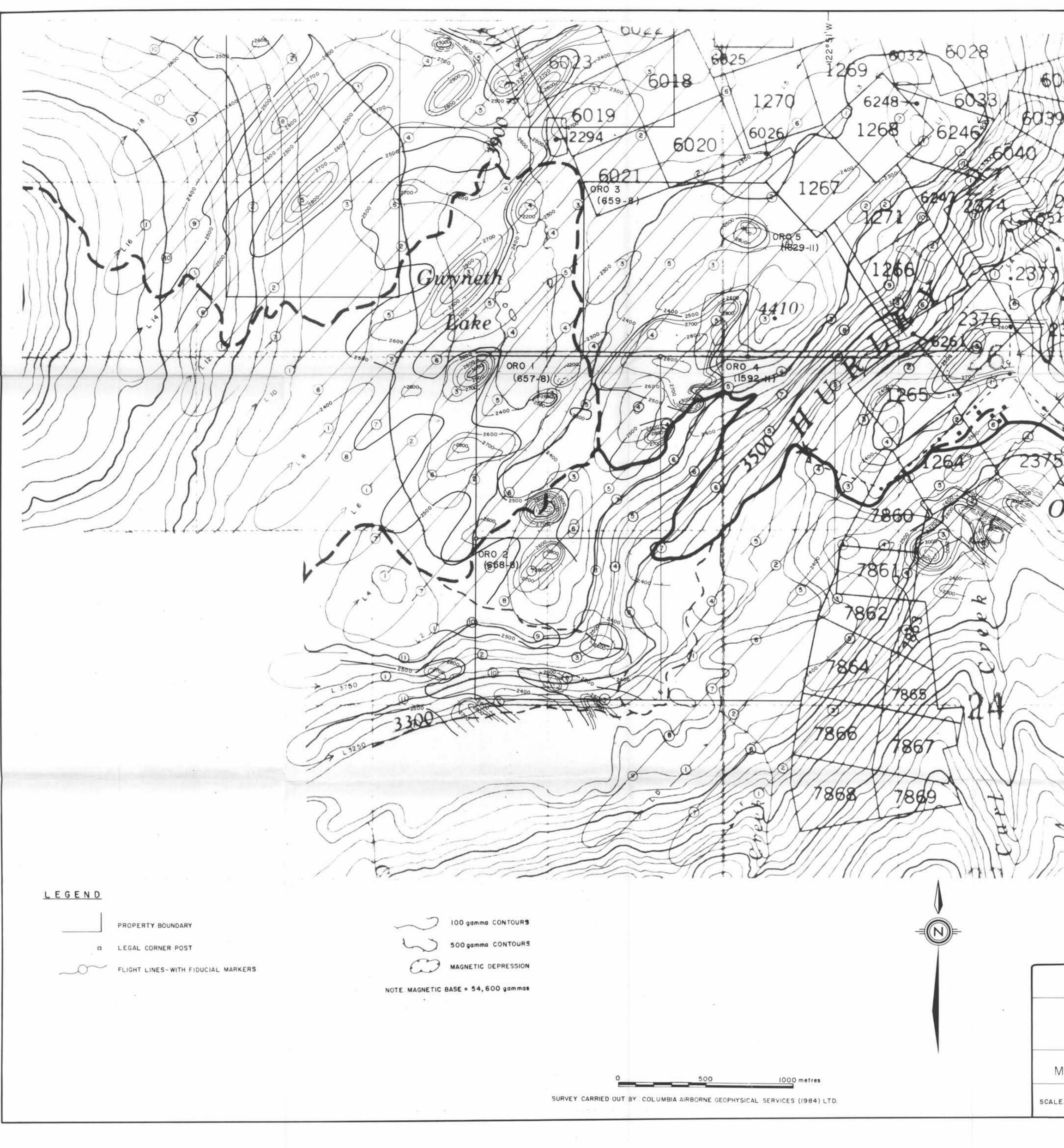
Respectfully submitted,

LLOYD C. BREWER PRESIDENT

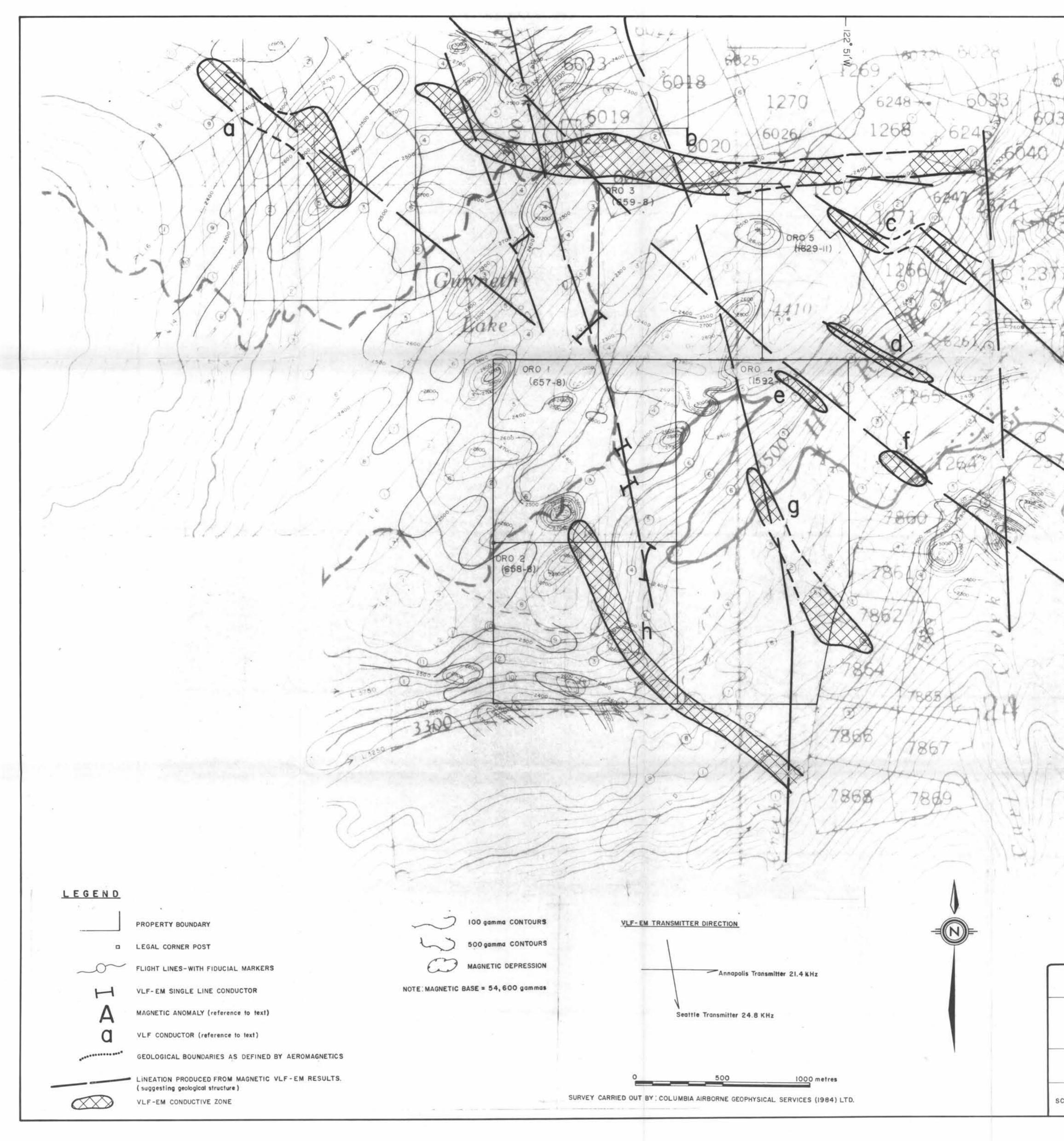
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6048 6 23884 309 6038 604 . 13gg 239 23 8 1,224 600 5482 225 1222 1226 3091 0°47 N 5480 Jgde A.6. -A. 589 5896 5895 5893 5894+ 694 5901 5900 5 17,689 FIG. 3 LEVON RESOURCES LTD ORO CLAIMS GWYNETH LAKE AREA LILLOOET M.D. B.C. AIRBORNE SURVEY MAGNETOMETER CONTOURS SCALE. 1:10 000 N.T.S. 92 J/15W DATE: DEC./88 KC



39 50°47' N 5893 5894 694 FIG. 4 17,689 LEVON RESOURCES LTD. ORO CLAIMS GWYNETH LAKE AREA LILLOOET M.D. B.C. AIRBORNE SURVEY VLF-EM ANOMALIES SCALE. 1:10 000 N.T.S. 92 J/15W DATE: DEC. /88 K.C.