Geophysical Survey

Report of the Magnetic Survey at
Alleyne Lake, B.C. of the Bounty Group
Mineral Claims
Location 49° 55' north
120° 34' west
Date completed Feb. 18, 1957

92H/15E

Signed by .....

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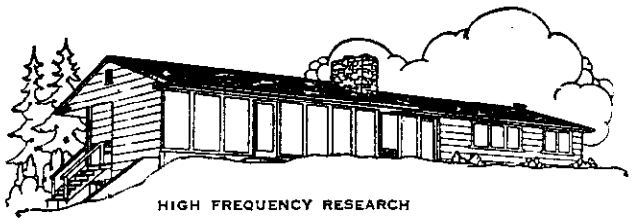
161



HIGH FREQUENCY RESEARCH
DESIGN ENGINEERING
CERTIFIED RADAR SERVICE AGENCY
PATENT DEVELOPING AND LICENSING
ELECTRONIC CONSULTANTS

TELEPHONE GLENBURN 1494

281 NORTH HOWARD AVENUE
VANCOUVER, B.C.

February 18, 1957

REPORT ON THE MAGNETIC SURVEY MADE AT ALLEYNE LAKE, B.C. ON THE BOUNTY GROUP OF MINERAL CLAIMS.

A geophysical survey utilizing special magnetic directional detecting equipment was instagated by Mr. G.S. Eldridge who also instructed the area in which the survey was conducted.

Preliminary work on samples from the vicinity indicated sufficient magnetite was present in the ore to warrant that the instrument would be beneficial in determining relative zones for drilling and development work. The winter conditions on Alleyne Lake permitted an accurate survey and measurements to be taken on the ice.

The accompanying plan indicates the directional measurements and strengths taken from 22 stations. The directional results are derived by vectors from combined vertical and horizontal readings. These dual readings dictate the direction and strength of deviation created by distortion of the earths magnetic field off a basic zero for the area, as shown in the plan.

INSTRUMENTATION:

Normally vertical and horizontal readings require two instruments set up alternately at the same station and

as the time difference will call for diurnal corrections the readings are subject to considerable error unless a third instrument at a fixed station is simultaneously read to give a corrective figure.

The dual measurements were made possible by the use of an earth inductor instrument operating on the voltage null plane, analogous to a direction finding loop antenna operating on the null signal position. This zero potential operation does not require a specified magnetic intensity and is not affected by changes in magnetic intensity, but only by the direction of the lines of force. The geological structure and magnetic susceptibility of the formations create the distortion of the lines which may be anywhere off normal in a 360° radius.

The instrument must be equipped for close tolerance setting on lines and level to enable detection of variations greater than two minutes of a degree, in both the horizontal and vertical planes.

It should be understood that the maximum distortion will occur on the sides of the zone of maximum intensity and that there will be little or no distortion directly over the center of maximum intensity. In this manner the instrument will give maximum results on the perimeter of the zone of maximum intensity and the gradient of the perimeter will indicate a profile as well as directional indication of this center of maximum intensity.

RESULTS:

Referring to the accompanying plan the first traverse on Bounty 5 claim commenced at station 1. The readings here were very close to normal on stations 1 and 2 with only local

formation distortion of approximately 5 minutes. The remainder of the traverse indicated a northerly trend with increasing intensity. The stations 6 and 7 vary up to approximately 1 degree with a northwest directional indication. This is further confirmed by stations 8 and 9 on the northern traverse of similar strength and directional readings.

The second east-west traverse produced more positive northwesterly results, all in excess of 30 minutes deviation and station 15 a deviation of 2 degrees in a westerly direction. This traverse indicated positively the center of intensity to be approximately in the direction indicated by station 14. The direction of station 15 being influenced by its closer proximity to the center of intensity which is not necessarily the center of the main body.

The third traverse on Bounty 3 shows very strong results on stations 16, 17, and 18 indicating their relatively close proximity to the centre of a westerly maximum.

The fourth traverse on Bounty 1 indicates a definite westerly trend, even on the lower readings of 19 and 20.

SUMMARY:

The strong readings of stations 18 and 22 would indicate that drilling should be done on claims Bounty 2 and 4.

The reliability of consistency of the readings for distances of 1,000 ft. or more from a possible center of formation would indicate justification for drilling and development work on the Bounty claims 2, 4 and 6. There is a possibility of a north-south formation with a westerly dip that would project further east on the Bounty 3 claim near the third traverse due to projection of the topography at this point.

The entire survey required four days and included a geophysical engineer, an instrument man and two assistants. The calculating and plotting of the information required an additional day. The equipment was powered by batteries, carried in packs, along with electronic amplifiers. The tripode was equipped with snowshoes.

ELECTRONIC LABORATORIES OF CANADA LIMITED.

D.L. Hings,
President.

DLH:dcp

Enclosure.

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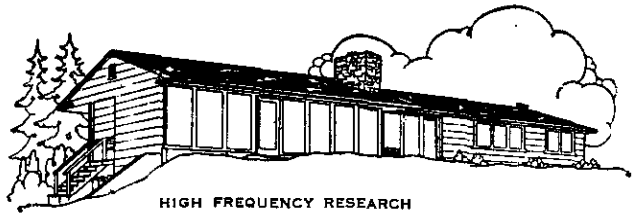

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A GEOPHYSICAL SYSTEM FOR MEASUREMENT OF DISTORTION IN THE EARTH'S MAGNETIC FIELD.

This system is based on an earth inductor cancellation method for direct readings of the absolute axis of the earth's field. It is referred to as a magnetic D.F. instrument.

1. GENERAL

The application of instruments in the measurements for magnetic geophysical purposes commenced with the use of horizontal polar magnets, such as a compass. Then to vertical rotating bars, such as dip needles, and later the earth inductor coils. In more recent years the reactance coil or flux-gate magnetometer has been applied to airborne surveys with considerable success. All these methods have one common function, based on magnetic intensity measurements. The coil type magnetometers do not have the sensitivity of the precise super dip balance type of instrument.

In all these instruments there are large variations due to diurnal changes, temperature, unknown proximities, etc., which must be accounted for before geological information is available. There are many ways in which corrections are made, but all require time and equipment with detail griding or interlocking flight patterns.

The usual reference made in determining the capabilities of the magnetic instrument is in gamma sensitivity for measurement of intensity. The super dip instruments claim a sensitivity of one gamma for tripod operation. Mobile instruments may be classed as airborne, waterborne, or quick-reading hand operated instruments. In this class of mobile instruments the coils excel the magnetic bar. This is principally due to the maximum voltage axis of the coil being so broad that the deviations of angle from mobility are not critical, in relation to the voltage derived from the magnetic field.

2. NEW CONCEPT

The information that is being sought, is to determine variations in the earth's field caused by structural changes and susceptibilities within the earth's surface. When these magnetic intensity methods are used, the measurements do not only involve earth's structure but also include terrestrial geophysics.

The deviations in the inclination and declination occur wherever magnetic intensity changes occur from structure or susceptibility. To isolate what is usually termed distortion of the earth's field for measurement purposes an instrument is required to indicate the exact angle of the earth's field regardless of intensity. This may be done with an inductor coil type instrument with precise axis control, and an exceptionally sensitive electronic bridge for measuring the angle that provides zero voltage, instead of maximum voltage.

The interpretation of the earth magnetic distortion patterns become almost direct reading without correction, compensation or periodic calibration. However, the tolerance is too close for mobile operation and must be used with transit and tripod.

The problems of finding points of maximum intensity and polarization generally are no longer of interest. If the earth's field is treated as a source of energy with normal angles, in accordance with a geographic location, then variations from this direction will indicate a change in magnetic intensity in the direction in which the deviation has occured.

If zones of intensity or anomolies are considered to be dipoles with a magnetic moment towards the earth's pole, then bearings may be taken to determine the relative horizontal direction of the anomoly, and the vertical angle indicating size and depth.

The advantage in this technique of direction finding is that the maximum sensitivity occurs at a lateral point on a radius from the anomoly, and at a distance approximately equal to the depth of the lowest pole of the dipole causing the anomoly. Readings may be observed many times the lateral distance over the depth of the earth's pole-seeking lower dipole. This characteristic affords considerable information on the structural shape, strike and dip of the magnetic susceptible zone, and by field application of nomogram charts, readings are interpreted on sight to guide the geophysicist in setting up additional survey lines. In addition, the sensitivity of this method permits readings spaced up to 1,000 feet or more to render information on the existance of any reasonable large anomoly.

3. INSTRUMENTATION

The instrument is based on a direction finding system wherein the earth's magnetic field is treated as an emitted signal. The zone of magnetic intensity is treated as a secondary signal. A coil is utilized with an electronic detection and receiver means, to take a bearing on the angle of reception resulting from the relation of the earth's primary signal and the secondary signal. By rotation of the transit, the coil may be used to give the strength of the earth's field, or inversely, the point of cancellation in the direction of the earth's field. It is found the intensity or strength of the earth's field measurement is of little value, as this is subject to variations from sources other than the area of interest, it greatly clouds interpretation of lateral field results.

The measurement of angle by cancellation with a very sensitive electronic detector permits a tolerance of plus and minus 2 minutes of a degree to be maintained, even on alternate days and times in the same location. This provides three dimensional vectors. Periodic calibration is not necessary.

The determination of polarization from the anomoly which is normally referred to as plus or minus, and quoted in strength by gammas, are completely ignored during the operation of the instrument. However, interpretation from the vectors, derived from the readings, give the polarization, and the centre of the magnetically susceptible zone.

The equipment weight does not exceed 5 lbs. and is in addition to the transit. There are batteries suitable for several days work. The average station set-up time is approximately 20 minutes.

The operator derives all his readings from the transit by adjusting the verniers to the voltage null, which is heard in an earphone. The two readings from the vertical and horizontal planes are the deviations that are plus or minus the normal axis. The resultant vector is derived to produce a plan view of an arrow indicating the direction of deviation, which may range through 360°, and the length of the arrow is proportional to the degree of deviation.

This presentation gives direct information for each station and a grid for anomolies is not necessary. However, traverses are necessary to tie in the survey and should be made in locations that will convey the most information and not in areas of little interest, thereby reducing cost and time of the survey.

4. FIELD APPLICATION

The instrument consists of a complete transit and detector coil, on the axis of the telescope, so that simultaneous and accurate line sighting may be accomplished, along with the geophysical readings in one set-up.

The information derived by detection of the direction of the earth's field, or deviation therefrom, either in the horizontal or vertical plane permits the operator to determine the most likely location for the next traverse.

The detection system, based on magnetic nulls, is not influenced by magnetic intensity or diurnal changes. Therefore, all readings are relatively permanent and may be checked at any time.

The major information supplied is derived from the distortion of the anomoly flux in the horizontal perimeter of the zone of susceptibility and not the area directly over this zone, thus a much greater detectable working area is available for a given ore zone size.

These lateral readings of the earth's magnetic distortion provides information on the shape and depth of the anomoly and does not depend upon local attraction over a projected portion of the anomoly near the surface, such as an outcrop. It is common to obtain readings for a thousand feet in a radius from the centre zone of anomolies in igneous formations.

5. INTERPRETATION

Lateral interpretation of the resulting vectors is usually applied to advantage during the survey.

The interpretation from the field notes and resulting vector plans, should be made on the basis that all anomolies are made up of one or more dipoles suspended in the earth's field. These dipoles will have the north seeking or positive pole below the negative pole on a plane with the local inclination.

The vectors are made up of the variations or deviations from normal, therefore the earth's field has geen removed and only the anomoly field is being considered. If this anomoly is considered as a dipole then the polarization will be

observed instantly by the influence from the earth's field upon the lines of force or indicating vectors.

The curvature of these lines into cardioid patterns around the anomoly show the centre of the cardioid over the negative pole and lines attracted south, for normal dipoles in the northern hemisphere. Variations in the shape of the cardioid patterns indicate the relative locations of the dipole and shape of the anomoly.

The earth's north field influences the lower positive pole or bottom of the anomoly creating the cardioid depression on the northern half of the anomoly. Depth estimates to the bottom of the dipole should be made from the information north of the anomoly.

The earth's south field influences the upper negative pole of the anomoly creating the cardioid bulge or attraction of lines to the south.

Depth estimates to the top of the dipole should be made from the south of the anomoly. The lines of least distortion are in a north-south plane through the middle of the dipole. Distortion of these lines indicate polar outcroping or dipole stoping away from the centre of the main body.

6. PRELIMINARY SURVEYS

The reliability of the readings permits preliminary surveys with well spaced stations up to a thousand feet or more to locate zones of interest. This can be considered a means of geophysical prospecting and when a more detailed survey is indicated for development work, the same readings will tie in to the more closely spaced traverse stations.

Requested Information:-

The coil is mounted on the telescope of an engineering transit with its rotational axis parallel to the plane of the telescope. When this axis is set on the exact inclination and declination of the earth's magnetism no voltage is derived from the rotating coil. Any other position will produce voltage from cutting the lines of force by the coils rotation.

As referred to in this amendment, page 5, paragraph 2 - the angle of the earth's field in inclination and declination is read directly off the transit verniers. This exact point is determined by the absence of a tone or null in the earphone. This eliminates the need of a meter or recording instrument.

This geophysical instrument is not a stock model and was developed in British Columbia. This instrument, in its present form, consists of a coil and clock driving mechanism. The diameter of the movable coil is 3½" and has an inductance of 175 Henrys.

The voltage detecting unit is a 3 tube electronic instrument consisting of a micro volt detector and tone balancing unit for oral reproduction.

It should be understood that this is not a method of measuring magnetic intensity and is a method for determining the absolute angle of the earth's magnetic field and utilizes a technique that is generally confined to observatory measurements.

ELECTRONIC LABORATORIES OF CANADA LIMITED.

D.L. Hings, P. Eng.,
President.

1930 - 1940 - Mr. Hings in Charge of Geophysical exploration for the Consolidated Mining & Smelting Co.
1940 - 1945 - Supt. of Research, Can. Signal Corp., National Research Council, Ottawa.
1945 - 1957 - President, E.L.C.


BOUNTY-6
BOUNTY-4
BOUNTY-2
BOUNTY-5
BOUNTY-3
BOUNTY-1
X TREE BLAZE
X TREE BLAZE
100'
100'
600'
2000'
1500'
BOUNTY GROUP
ALLEYNE LAKE
MAGNETIC GEOPHYSICAL SURVEY
BY D.L. HINGS P.ENG.
FEB. 15-57
DEVIATION TO 30 MINS.
DEVIATION FROM 30' TO 2 DEGREES
DEVIATION MORE THAN 2 DEGREES
Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 161 MAP #1
ELECTRONIC LABORATORIES OF CANADA LTD
DRAWN BY K.K.
CHECKED BY D.L.H.
SURVEY BY D.L.H.
SCALE - 1" = 100'
DATE - FEB. 17 - 57
METHOD - EARTH INDUCTION
DEVIATION BASE —
VERTICAL ZERO 72° 45'
HORIZONTAL ZERO 24° 20'
LOCATION - 49° 55' N. — 120° 34' W.