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92L/12W

L50-127 NW.
M.P.M. and Larch Groups.
Western Mining & Development Syndicate.
Lundberg, Hans.: Engineer.

January, 1948.

92L/12W

L50-127 NWL

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REPORT ON
THE GEOPHYSICAL SURVEY OF
THE B.P.H GROUP of CLAIMS
VANCOUVER ISLAND, BRITISH COLUMBIA
FOR THE WESTERN MINING & DEVELOPMENT SYNDICATE

INTRO

During November and December, 1947, a geophysical survey, consisting of making magnetic observations with a vertical Variometer and electrical resistivity measurements with a Schlegeigh instrument, was made on the B.P.H Group of Claims held under option by The Western Mining and Development Syndicate.

Magnetic intensities are quite high over the north mineralized zone, but normal over the south mineralized zone.

Both zones show as being good conductors of electricity.

The geophysical survey indicates that drilling of both zones is justified and several locations are recommended.

RECOMMENDATIONS

Drilling

B.P. No.1. Vertical Hole collared at 76000, 0400, approximate depth of hole 400 feet.

D.D. No.2. Vertical hole collared at 6+50S, 2+00W, approximate depth of hole, 300 feet.

D.D. No.3. Inclined hole collared 9+50S, 2+00W direction North, dip at 45°. Horizontal section 150 feet.

D.D.No.4. Inclined hole collared at 2+00S, 6+00W direction North, dip at 45°, Horizontal section 150 feet.

D.D.No.5. Inclined hole collared at 3+00S, 8+00W direction North, dip at 45°, Horizontal section 200 feet.

D.D.No.6. Inclined hole collared at 2+00N, 12+00W, direction North, dip at 45°, Horizontal section 150 feet.

Geophysical

If the results of this drilling are good the geophysical work should be continued over a larger area.

[redacted]

The survey party left Vancouver on November 23rd and arrived back on December 11th, 1948.

The survey which consisted of taking magnetic and electrical measurements, was done in order to determine whether the showings of sulphides had any continuity along their strike and down their dip.

The area surveyed is located in the northern part of Vancouver Island near the east end of Babbitt Lake.

Access to the property from Vancouver is by boat to Port Hardy, a distance of 320 miles; from Port Hardy to Coal Harbour by automobile, a distance of 12 miles and from Coal Harbour to Babbitt Lake by air, a distance of 15 miles. The area surveyed was 2400 feet long and 1400 feet wide.

The topography of the area is hilly, the survey being made on a slope which faces north and the difference of elevation between the bottom of the slope and the top is about 330 feet.

The survey was made under adverse conditions, since fog and rain made working difficult and the dense foliage shut out light making it difficult to take the magnetic readings.

The geology was mapped by Mr. T. S. Davey, and we are using his map for the purpose of this report. His report on the geology has not been received by us but should be studied together with our report.

THE GEOPHYSICAL SURVEY

General

Geophysical methods may be successfully applied to the solution of geological problems only when measurable differences exist between the physical properties of the formations to be studied. Experiences in the various parts of Canada and the U.S.A. have shown that of the several methods developed to date, electrical and magnetic methods, when used together, furnish the most useful information.

The purpose of the various electrical methods is to locate electrical resistivity anomalies in the bedrock, because such phenomena are geologically significant. In regions of moderate precipitation, all rocks conduct electrical currents quite readily, although their constituent minerals are largely non conductive. Their ability to do so results from the presence of moisture in the minute pores between the constituent minerals, grains and crystals. Since all rocks are saturated in such climatic zones, the moisture content

is determined by the porosity which, in turn, is governed by the granularity, texture, type and degree of metamorphism, and by the shape and orientation of the component mineral crystals. A slight variation in any one of these factors produces an appreciable difference in conductivity; therefore, two rocks in a given district seldom possess identical resistivities. Very small variations may be detected by sensitive electrical apparatus, under normal overburden conditions, and consequently such methods may be successfully applied to the location and mapping of formational contacts.

Faulting, schisting, brecciation and fracturing produce marked local increases in the porosities of the rocks they traverse, so that such zones show up as strong conductors in an electrical survey. These structures are often of great economic importance because they form conduits and loci of deposition for ore bearing solutions.

The ore minerals which possess metallic lustre, as well as graphite, have very low resistivities, consequently slight concentrations of these minerals are sufficient to produce strongly conductive reactions in an electrical survey. The conductivities of deposits of such minerals, when present in concentrations of ore grade, together with the low resistivities of the fractured or sheared structures in which they usually occur, combine to give very pronounced reactions which may be readily detected even when buried under great thicknesses of overburden. Electromagnetic methods are also designed to detect anomalous resistivity conditions in the bedrock, but instead of attempting this by conductivity determinations it is effected by measuring the distortion produced in an artificially created, electromagnetic field. Such methods are suitable for rapid reconnaissance under certain conditions.

Deposits of metallic sulphides and graphite may sometimes be determined by

the electrical currents which they generate spontaneously when undergoing oxidation. These currents flow down through the deposit out into the country rock and up to the surface and complete the circuit by flowing in towards the apex of the mineralized body. The total potential of such a current may be one volt or slightly more. The apex of an oxidizing sulphide body has positive polarity, and consequently an area of negative potential (i.e. the "negative centre") exists over the upper portion of the deposit. Theoretically, an area of positive potential (the "positive centre") should occur over the apex of an oxidizing graphite body, but owing to many complex factors this condition does not always occur in the field. The positive or negative centres, and consequently the apexes of such deposits, may be located by measuring the potential differences of successive sections of ground along the profiles over the outcrops of oxidizing sulphide and graphite concentrations. This method of geophysical prospecting is known as the Self Potential method. It should be used with caution, however, since similar potential phenomena sometimes result from the rapid flow of meteric waters along fractures within the bedrock.

Rocks and minerals possess characteristic magnetic properties which result from their ability to attract or repel the lines of force of the earth's magnetic field. Thus, by means of an auxiliary magnetic survey it is often possible to confirm the results obtained by electrical and electromagnetic methods. Differences in magnetic susceptibility frequently permit the mapping of contacts between rocks of contrasting compositions and origins and, therefore, assist in outlining structural trends. Magnetic mineralization frequently occurs along faulted, sheared and silicated zones, thereby making such lines of weakness easy to trace by magnetic methods. The detection of certain sulphide ores is also possible because the presence of associated magnetic minerals such as magnetite, pyrrhotite

etc. imparts high magnetic susceptibilities to the deposits.

In brief, by using electrical and magnetic methods in combination, it is possible, under favourable conditions, to locate and trace geological contacts, sheared and fractured zones in addition to sulphide and metallic mineralization.

Land Survey

The lines shown on our maps were established on the ground by Mr. Titus Oates, Mining Engineer. A transit was used for the base line and a Brunton compass was used on the profile line. Elevations were taken with the Brunton compass.

Personnel

Harvey Brown conducted the geophysical survey.

Methods

The ratiograph method was used for the electrical resistivity survey. It functions by determining the ratio of the conductivities of successive 50 ft. sections of ground along each profile line. These ratios are not measured directly, but are obtained by observing the potential drop ratios and phase variations induced within an artificially created electrical field, by resistivity differences and by the inductive and capacitive characteristics of the ground between the points of observation. The artificial electrical field is produced by applying an alternating potential of audible frequency to the ground.

The ratiograph instrument, itself, consists of a sensitive bridge circuit, featuring the maintenance of constant impedance, in which provision is made for the elimination of ground contact resistance. By taking observations first with the power source at one end of the profile line and then with it at the other end, lateral changes in the conductivity of the subsurface only are obtained, the ex-

trans variable surface effects being eliminated. Only 9,400 ft. were surveyed by this method.

Intensity determinations of the vertical component of the earth's magnetic field were made with an (Askania Balance, Schmidt type) adjusted to a sensitivity of 25 gamma per scale division. Readings were taken at 50 foot intervals and the necessary corrections made for diurnal variation and other slight changes. Magnetic determinations were made along 6,750 feet of profile lines.

DISCUSSION OF THE RESULTS

The Maps Nos. 15-269-1; 15-269-2.

Two maps, drawn to a scale of 1 inch equal to 100 feet, accompany the report.

Map No. 15-269-1 shows the results of the magnetic survey. The corrected value of each observation is shown in gamma units at each point of observation. The interpretation is shown by iso-dynamic lines. Areas of normal intensity are coloured blue and low intensity are coloured red. Deeper shades show greater deviation from normal.

Map No. 15-269-2 shows the results of the electrical survey together with the geology as mapped by Mr. Davey. The mean curve of the rutilograph results is shown. Areas coloured red, represent conductive sections and green represents sections of poor conductivity.

The interpretation of the trends of the conductive zones is shown by means of iso-intensity lines. Conductive zones are coloured orange and more intense colouring is used to indicate the better conductors.

The locations of recommended drill holes are also shown on this map.

The Magnetic Results.

There such a small area is surveyed magnetically it is difficult to be certain of the zoning of the various zones of magnetic intensity. However, it would appear that the magnetic intensity over the granodiorite is low, and over the limestone it is somewhat higher than normal.

One zone which extends from 24+00S, 10+00W to 0+00, 0+00 is over 1000 gamma above normal. There are ore outcrops along this zone and it is suggested that here a small amount of magnetite will be found associated with the sulphides.

The mineralized zone along the contact of the limestone and granodiorite does not have any magnetic characteristics which differ from the host rocks.

The Electrical Results.

Two conductive zones cross the property. The north zone starts at 24+00S, 14+00W, and extends to 0+00, 0+00. Lines 14+00W, 12+00W and 0+00 should have been extended further north in order to determine the degree of intensity of the conductivity along this portion of the zone.

There are several outcrops of ore material along the zone and the conductivity tests indicate that the mineralization should go to depth, therefore, two holes, Nos. 4 and 6 have been recommended to test this possibility.

The south zone extends from 04+00S, 14+00W to line 22+00S. Within this zone are very good conductive sections, which probably contain sulphides.

There are mineralized outcrops along a portion of this zone and the strongest part of the section should be tested by hole Nos. 3 and 5.

Two vertical holes Nos. 1 and 2 are recommended to test two conductive indications over the granodiorite. These are broad but only medium strength con-

ductors, and it is thought that they may be caused by mineralization on the lower contact of the granodiorite. If the dip of the granodiorite contact is 45° as it appears to be at the surface, the depth of No. 1 hole will be 400 feet and depth of No. 2 hole will be 300 feet. However, both of these holes should be drilled through the granodiorite and the felsite porphyry into the limestone.

CONCLUSION

The geophysical survey indicates that electrical surveys are useful in tracing the mineralized zones. The drill holes recommended are located to test the electrical indications at the most favourable places. If mineralization of ore grade and bodies of mineable size are intersected, the electrical survey should be extended to cover a larger portion of the area both to the east and to the west of the area surveyed.

The results of the drilling should be forwarded to this office so that location for other drill holes can be selected within the area surveyed.

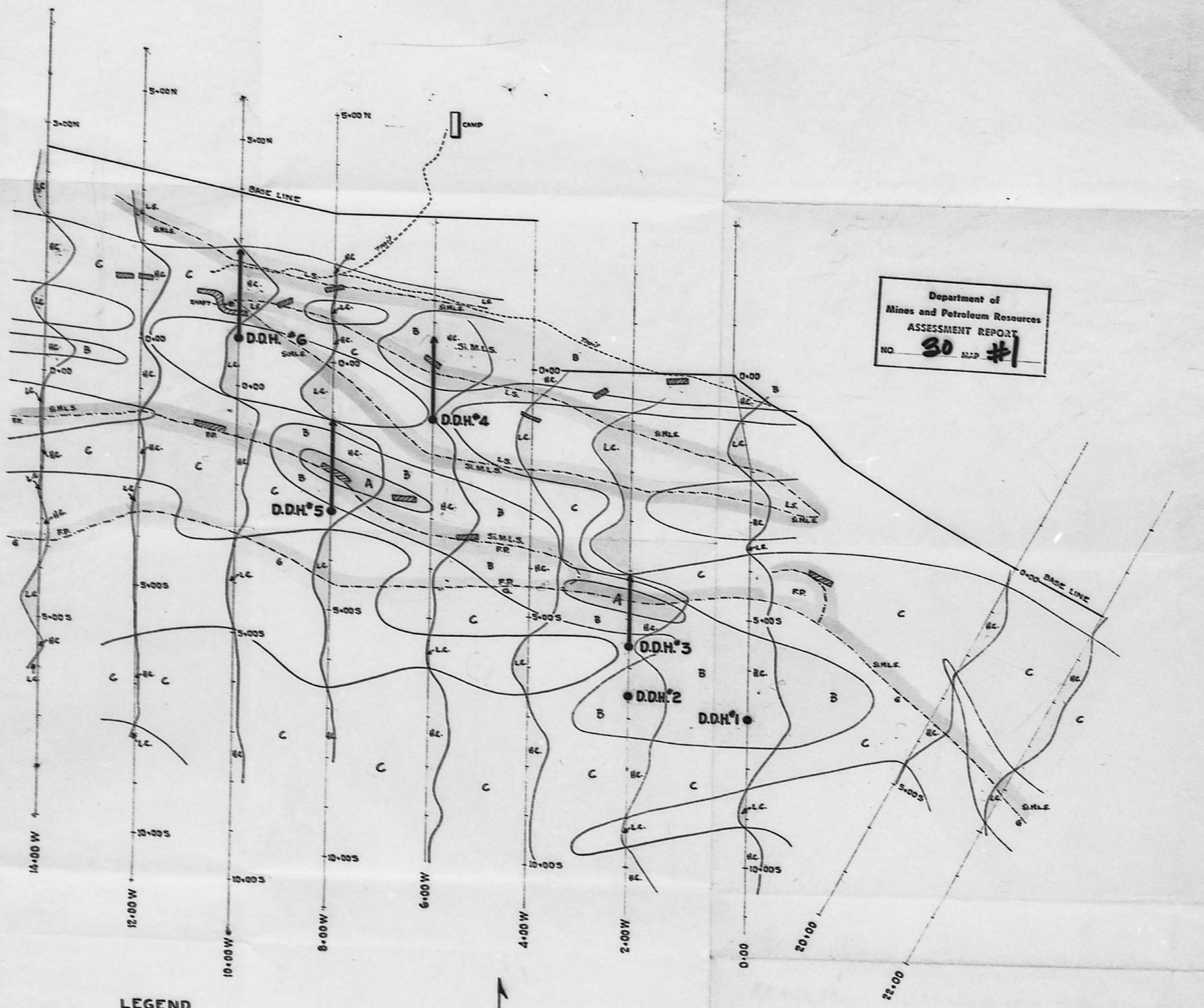
This report is respectfully submitted.

HANS LUNDBERG

Basil T. Wilson P. Eng.
Basil T. Wilson P. Eng.

Toronto, Ontario
January 6th
1945

Approved Hans Lundberg
Hans Lundberg.



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 30 MAP #1

LEGEND

- Ore outcrop.
- Silicified metamorphosed limestone.
- Fresh limestone
- Felsite porphyry.
- Granodiorite.
- Approximate contact.
- Iso-intensity lines of electrical indication.
- Electrical anomalies { Red indicates high conductivity. HC / Green indicates low conductivity LC
- Recommended Drill Holes - Vertical - Inclined.

MAP SHOWING

RESULTS OF THE RATIOGRAPH SURVEY
ON H.P.H. CLAIMS
NAHWITTI LAKE
VANCOUVER ISLAND B.C.

FOR

WESTERN MINING AND DEVELOPMENT SYNDICATE

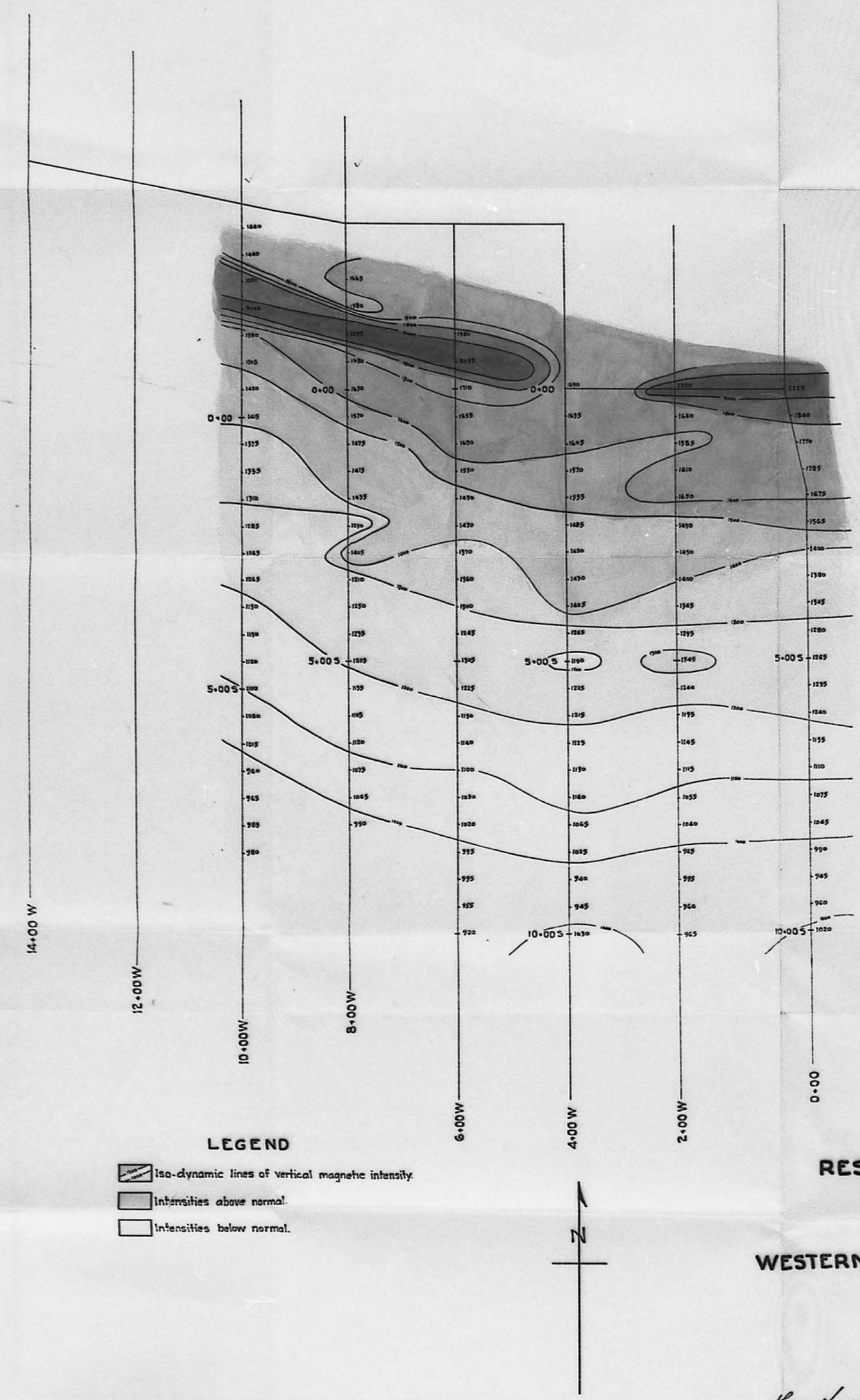
SCALE 1 INCH = 100 FEET

TO ACCOMPANY REPORT BY
HANS LUNDBERG
TORONTO, JAN. 1948

REPORT #30
MAP #1

Hans Lundberg

15-269-2



LEGEND

- Iso-dynamic lines of vertical magnetic intensity.
- Intensities above normal.
- Intensities below normal.

MAP SHOWING

RESULTS OF THE MAGNETIC SURVEY
ON H.P.H. CLAIMS
NAHWITTI LAKE
VANCOUVER ISLAND B.C.
FOR
WESTERN MINING AND DEVELOPMENT SYNDICATE

SCALE 1 INCH = 100 FEET

TO ACCOMPANY REPORT BY
HANS LUNDBERG
TORONTO, JAN. 1948

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REPORT #30
MAP #2

15-269-1