GEOCHEMICAL REPORT
LAR & CHUCK GROUPS OF MINERAL CLAIMS
CARIBOO M.D., B.C.

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for
MOLLUSCA OILS LTD.
by A.G.HODGSON P.ENG.

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GEOCHEMICAL REPORT

ON

LAR & CHUCK GROUPS
OF
MINERAL CLAIMS

CARIBOO MINING DIVISION, B.C.

(51° - 121° N.W.)

by

A.G. Hodgson P.Eng.

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ON
THE LAR AND CHUCK GROUPS OF MINERAL CLAIMS
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(51° - 121° N.W.)

by

A.G. Hodgson P. Eng.

February 15, 1967

INTRODUCTION

This report outlines the methods used, results and conclusions of a pedogeochemical survey of the LAR and CHUCK groups of mineral claims south of Morehead Lake in the Quesnel Lake district, Cariboo Mining Division, B.C.

The claims are held under option by Mollusca Oils Limited, 215 Maclean Block, Calgary, Alberta, on whose behalf the work was carried out.

The survey was undertaken as a preliminary means of surface exploration to determine if the dispersion pattern of trace copper in the surface mantle would point to favorable mineral exploration targets for more intensive investigation. Samples from the soil cover were collected on a controlled grid, assayed in the laboratory for their copper content, and the results compiled on the accompanying geochemical plan.

This report is concerned primarily with the application of geochemistry to the property, and other aspects are discussed only insofar as they affected the conduct or results of the survey.

THE PROPERTY

The LAR group of 19 claims is as follows:

Claims	Registered Nos.	Anniversary Date
LAR #1 - #6	32012 - 32017	February 4,1966
CHUCK #21 - #28	32820 - 32827	February 21,1966
DOLL #3 - #7	35906 - 35910	May 26,1966

The CHUCK group is comprised of the following claims:

Claims	Registered Nos.	Anniversary Date
CHUCK 1 & 2	32343 & 32344	February 15,1966
CHUCK 5 - 20	32846 - 32861	February 22,1966
CHUCK 29 - 38	32862 - 32871	February 22,1966

The two groups total 47 claims and form an inverted - "U" shaped block south of Morehead Lake and approximately 45 line miles south-east of Quesnel, B.C. The area is readily accessible by highway and logging road from the two main supply centers of Quesnel and Williams Lake.

REGIONAL DESCRIPTION

The climate is humid - continental with wet summers and 3 or more feet of snow-pack in the winter. The area supports a heavy stand of good, commercial timber and logging is its main industry.

The country is a rolling, upland area with elevations ranging from 3000 to 4300 feet above sea level. Rock exposure is not abundant, although in the higher areas outcrop occasionally becomes quite plentiful.

A few low-lying areas are wet and swampy with sluggish drainage.

Principal lithologic units are Mesozoic volcanic rocks, Jura - Cretaceous intrusives and Miocene lavas. These rocks follow north-westerly lines and are disrupted my faulting on a regional scale.

Current mining interest in the region is focused on the exploration of a potentially large tonnage of low - grade copper ore on the Cariboo Bell property which lies immediately east of the CHUCK group. The copper lodes are spatially related to acidic phases of the intrusive rocks, although some copper mineralization is known to occur in minor quantity in the volcanics

CHARACTER OF PROPERTY

No economic mineralization is known to be present on the property; however, it has been neither prospected nor mapped so the chances of finding surface mineralization are not known.

Outcrop is extremely rare on the LAR and western part of the CHUCK groups but becomes more abundant on the eastern part of the latter.

Continental glaciation left till and related deposits covering most of the terrain; derived, in large part, from rocks below and near-by, and consequently varying in composition with the parent rock. Recent stream erosion, surface run-off, frost action etc have modified the local character of the overburden and the heavy vegetation has added a considerable quantity of humus and organic material to its upper layer.

GEOCHEMICAL SURVEY TECHNIQUE

General:

Field work was carried out by Cariboo Claimstakers of Quesnel, B.C. and supervised by the writer. The program commenced on December 8, 1966 and finished on February 4, 1967. The winter conditions prevailing resulted in slower-than-normal progress with attendant higher costs.

Transportation was provided by a 4-wheel drive Bronco vehicle augmented by a Ski-Doo snow toboggan. The latter's usefulness proved limited, and most of the routine field work was carried out on snowshoes.

Ground Control:

Three base lines were established at suitable places, and at 400-foot intervals cross lines were turned off at right angles. Bearings along cross lines were carried by compass, and distances by chaining from station to station. Each 100-foot interval was marked by a ribbon "flag" inscribed with the appropriate line number and footage.

Property boundaries were tied to the grid system by compass and chain. Unfortunately, this work lagged behind the sampling, which resulted in some areas outside the property being gridded and sampled and others within the property being missed.

Sampling Method:

Samples were taken at 200-foot intervals along each cross line. They were obtained by digging through the snow cover and organic layer and attempting to reach below the leached horizon in the soil profile where it could be recognized.

Frost presented little or no problem, but isolated areas of swamp, marsh or black, mucky soil were not sampled, thus resulting in some gaps in the pattern. At a few sites uprooted trees provided easy access to good mineral soil and the bared area was utilized where it was near-by a sample location.

Samples were collected from depths ranging from 10 to 40 inches, with the average probably about 24 inches.

Sample Preparation:

Samples of $\frac{1}{4}$ to $\frac{1}{2}$ lbs. were collected in paper bags designed for the purpose, and each bag was marked with the sample location, depth, and a note on any unusual topographic feature at the site. Bags were stored in boxes and shipped in batches of 2 or 3 hundred to Vancouver for assay.

Assay Technique

Samples received by TSL Laboratories Limited in Vancouver were dried, screened on nylon mesh to -80 and the oversize rejected. One gram of the -80 was digested in hot nitric acid and the solution tested by atomic absorption for copper content. Results were reported in parts per million copper for each sample.

Treatment of Results:

The parts per million copper reported by assay were plotted on a plan scaled at 400 feet to one inch. A "background" value was calculated and the plan contoured in multiples of this background.

"Isograds" representing average "background", 2, 3 and 4 times average "background" were drawn.

The results appear on the geochemical plan that accompanies this report. It will be noted that contours show a pronounced bias in a direction normal to that of the cross lines. This stems from the unequal spacing of samples (200-foot intervals on lines 400 feet apart). However, this should not materially affect the basic results of the survey.

ANALYSIS OF RESULTS

A total of 1197 samples of soil were collected and assayed. Copper content in parts per million (ppm) ranged from a low of 2ppm to a high of 420 ppm.

An average "background" was deduced by rejecting all values over 100 ppm and calculating the arithmetic average of the remainder.

In summary:

(a) No. of samples less than 100 ppm=1127 - 94%
(b) No. of samples 100 ppm or more = 70 - 6%

The arithmetic average of (a) works out to approx. 27 ppm.

Assuming 27 ppm to be an average "background" than samples falling above and below this norm are:

No. of samples 27 ppm or less = 707 - 59%
No. of samples over 27 ppm = 490 - 41%

An analysis of the frequency distribution of the 1197 samples ranging between 2 and 420 ppm breaks down as follows:

(1) 59% - 27 ppm copper or less
(2) 25% - 27 to 54 ppm copper
(3) 8% - 54 to 81 " "
(4) 3% - 81 to 108 " "
(5) 5% - over 108 ppm copper

If 54 ppm or less be considered as a "background" range and 54 to 81 ppm a thresh-hold range then from 81 ppm upwards (i.e. anything over 3 times average background) may be considered to be in the "anomalous" category. The above analysis reveals that 8% of the samples fall in this category.

The 81 ppm "isograd" on the accompanying geochemical plan is accentuated, and areas above 81 ppm (i.e. possible anomalies) are colored in red.

INTERPRETATION OF RESULTS

General Considerations:

With respect to the present survey on the LAR and CHUCK groups the following factors which can have an important influence on the result cannot be properly applied to the interpretation of results at the present time:

(1) Bed-rock geology, copper content of the rocks and its ease of release for dispersion in the overburden.

(2) Depth of overburden.

(3) Types of overburden and their detailed distribution; whether glacial, alluvial, residual etc.

(4) Localized effects of frost action, run-off, weathering etc.

(5) Dispersal of mineralized float in the overburden and its possible fortuitous proximity to sample sites.

The influence of the following factors is believed to have been eliminated by sampling technique or allowed for by field observations:

(1) Contamination

(2) Uniformity of material sampled i.e. the same horizon in the soil profile in each sample

(3) Topography, especially as it affects drainage.

Details:

Numerous relatively high areas, many of them "spot" readings, are erratically disposed on the property and, for the most part, show no well-defined pattern; nor are they restricted to any particular area.

Some areas higher than normal are spatially related to low, wet, poorly drained ground; and the copper concentration is likely the result of poor drainage and hence of no significance. The main such areas are:

(1) North sides of DOLL #6, CHUCK #27 and #28
(2) LAR #1 and #6 and CHUCK #2
(3) CHUCK #12
(4) CHUCK #13, #15 and #17 and ground to the north

Other restricted high areas of minor interest, going from west to east are on LAR #5, CHUCK #23, CHUCK #7 and #9, CHUCK #38, CHUCK #16 and CHUCK #17. Each of these has two or more values exceeding 3 times "background" on one ore more line, and none is obviously related to inferior drainage. However, they are not considered to be attractive targets for further investigation with the information at present available.

On the east side of the CHUCK group, on CHUCK #19, #20 and #29 & #30 a series of higher than normal readings are contained in an area about 3500 feet long (northwesterly) by 1500 feet wide. On these 4 claims over 18% (21 out of 114) of the samples exceed 3 times background (as compared to 8% for the property as a whole) and one reaches 420 ppm, the highest obtained by the survey.

The ground in this area is high and well drained and showed most of the bedrock encountered during the field work. The area is of sufficient interest to merit further investigation, and more work should be undertaken here after the snow has melted and more favorable working conditions prevail.

SUMMARY

A total of 1197 soil samples returned a copper content ranging between 2 and 420 ppm.

A mean "background" of 27 ppm was calculated. Many random highs with no discernible pattern are likely "erratics" or attributable to poor drainage.

Of seven anomalous or pseudo-anomalous areas identified one, on the east side of the property, shows a sufficiently orderly pattern and is of enough areal extent to justify additional investigation.

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A.G. Hodgson P. Eng.

1338 Walnut Street
Vancouver, B.C.
15 February, 1967

SUPPLEMENTARY REPORT
ON
GEOCHEMICAL SURVEY

LAR & CHUCK GROUPS OF MINERAL CLAIMS
CARIBOO M.D., B.C.

INTRODUCTION

For the purpose of recording assessment work the writer prepared a report on a geochemical survey carried out for Mollusca Oils Limited on the LAR and CHUCK groups of mineral claims located in the Cariboo Mining District, B.C.This report conformed with government requirements for fulfilment of assessment requirements and consequently, in large part, dealt with the techniques employed by the survey.

The present report is intended as an expansion of the conclusions deduced from the survey and outlines suggested additional investigations that should be carried out. It does not purport to repeat in any detail what has already been discussed.

To recapitulate briefly, the survey was conducted by Cariboo Claimstakers of Quesnel, B.C. under the writer's supervision and covered the LAR group of 19 claims and the CHUCK group of 28 claims located south of Morehead Lake and some 45 air miles southeast of Quesnel, B.C. A total of 1197 soil samples were taken at 200-foot intervals along lines 400 feet apart. Each sample was analyzed for its trace copper content expressed in parts per million (ppm) and the results, which ranged from 2 to 420 ppm, were plotted and contoured on a plan of the property scaling 400 feet to 1 inch.

An average "background" of 27 ppm was calculated and it followed that approximately 92% of all samples fell within the range of 2 ppm to 3 times this average "background". The remaining 8% (3 times average "background"or more) were above normal and classed in a possible anomalous category.

After rejecting scattered highs as spot erratics, or as reflecting poor drainage, a total of 7 anomalies or pseudo-anomalies were established, of which one is considered to possess superior characteristics.

DISCUSSION OF RESULTS

The plot of the geochemical results (see 400-scale plan) shows that above - background highs are erratically distributed about the property without any definite overall pattern being apparent. For the following reasons many of these highs are dismissed as spurious and 7 are selected as possessing superior qualities worthy of further consideration:

Erratics: a soil anomaly, unless it reflects a very restricted and hence probably unimportant source, should be comprised of several

high elements that appear on more than one line and its validity should be reinforced by an area of above upper "background" surrounding the apex and of greater extent than the high area itself. Such generalities are not always necessarily true, but their association with a possible anomaly does strengthen its validity.

It is for the lack of the above characteristics that the highs on CHUCK 5, CHUCK 8, CHUCK 30 and CHUCK 32 (and many more) are dismissed as spot "erratics" of little or no probable importance.

Poor Drainage: a poorly drained area and its accompanying chemical environment is known to frequently act as a depository for trace elements such as copper in circulating surface waters. Consequently, a high or series of highs spatially related to low, wet, or swampy ground are not considered favorable when, these same highs in a different topographic setting would constitute an interesting anomaly. The following areas on the property are considered to be in this category:

(1) highs along the north boundary of DOLL 6, CHUCK 28 and 27.
(2) LAR 1 and 6
(3) CHUCK 13 and 15

It should be added that this conclusion is based mainly on the field-worker's descriptions of sample sites and is subject to revision after a personal inspection of the ground.

Possible Valid Anomalies: On the accompanying 1000-scale plan 7 areas are shown diagrammatically (by cross-hatching) that are interpreted as valid anomalies. Of these, six are considered to be weak, and one (NO.?) is interpreted to possess characteristics that definitely indicate further investigation to be warranted.

No. 7 Anomaly: It will be noted that the number of readings above 3 times "background" (small figure circled on the plan) varies from 2 for the No. 5 anomaly to 18 for No. 7, and it is this spread of highs (mainly on CHUCK 29) that lends considerable strength to the probable validity of the No. 7 as a genuine soil anomaly.

Its importance is weakened by the absence of any excessively high readings as are frequently associated with soil anomalies (15 times "background" is the best) but this is partly countered by the following favorable factors:

(1) probable good drainage on relatively high ground
(2) proximity to Cariboo Bell property on the east where potentially economic copper deposits are currently being explored.
(3) apparent long-axis trend in the northwest quadrant, which is the prevailing structural trend in the region (though not necessarily of any particular mineralized zone.

The role of bed-rock proximity in the area of the anomaly as reported at the soil sample sites cannot be evaluated until the ground has been examined in the field. However, it may be significant, that of 5 sites where bed-rock was reported, at one locality only (on CHUCK 31) was an above - normal value returned.

CONCLUSIONS & RECOMMENDATIONS

The No. 7 anomaly has sufficient positive features to warrant further investigation to determine if it is a surface reflection of underlying copper mineralization. The other 6 anomalous areas - along with other highs on the property - could likewise be reconnoitred for any meaningful significance at the same time as the No. 7 is investigated.

The following is a suggested sequence that such investigations should follow:

(A) 1. Examine topographic settings of anomalous areas, especially as it pertains to drainage and depth of overburden.

2. Prospect closely and obtain geologic data from those areas where bed-rock is exposed (especially No. 7 anomaly area) and sample bed-rock at or near any soil sample where above-normal ppm copper was obtained.

3. Fill in soil samples on closer lines and spacing where the results of 1. and 2. above indicate its desirability.

4. Extend the sampling in those areas on the property where 'isograds' are not closed e.g. on CHUCK 19 and CHUCK 23.

5. Compare the above assembled data with that of others in the area whose efforts have sucessfully outlined mineralized target zones.

6. Define and stake any open ground existing around the No. 7 anomaly and the mutual boundary with Cariboo Bell on the east.

(B) Should (A) above be favorable and the information obtained indicates it would be feasible, trenching by ripper-equipped bulldozer in an attempt to reach bedrock in anomalous areas should be employed as a more-advanced step in the program.

PRELIMINARY COST ESTIMATE

A preliminary budget to cover the foregoing work should include provision for the following basic items:

(1) Prospecting, geologic investigations, rock sampling, ground examination, fraction staking and related costs	$1200.00
(2) Soil sampling - fill-ins and extensions say 250 samples	1000.00
(3) Bulldozing	2500.00
(4) Engineering & supervision	750.00
(5) Provision for contingencies	550.00
	$6000.00

The above program, properly organized, should be completed in about a month and, if encouraging, would lead to a considerably higher requirement of funds for followup exploration, which might include additional soil sampling or bull-dozing, I.P. or magnetometer work, and testing by overburden or diamond drill.

The writer recommends that, with the possible exception of staking fractions, any work program be deferred until the ground is bare and it can proceed at greater speed and less cost than is possible under the present winter conditions (the foregoing cost estimates are postulated under summer conditions). On or about May 1 is believed to be, in a normal year, about the time when snow has melted and roads are returning to a passable condition.

In the meantime, developments by other operators in the area, in particular on the Cariboo Bell property to the east, should be kept under continuing review for any possible implications they might have for the LAR - CHUCK property.

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A.G. Hodgson P. Eng.

1338 Walnut Street
Vancouver, B.C.
17 February, 1967

QUESNEL FORKS

CARIBOO DISTRICT
NORTH CENTRAL
BRITISH COLUMBIA

HOLDINGS OF
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MILESTONE MINES

MADRONA

ACE

NEW JERSEY ZINC

CARIBOO BELL

HOGAN

CHATAWAY

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55'
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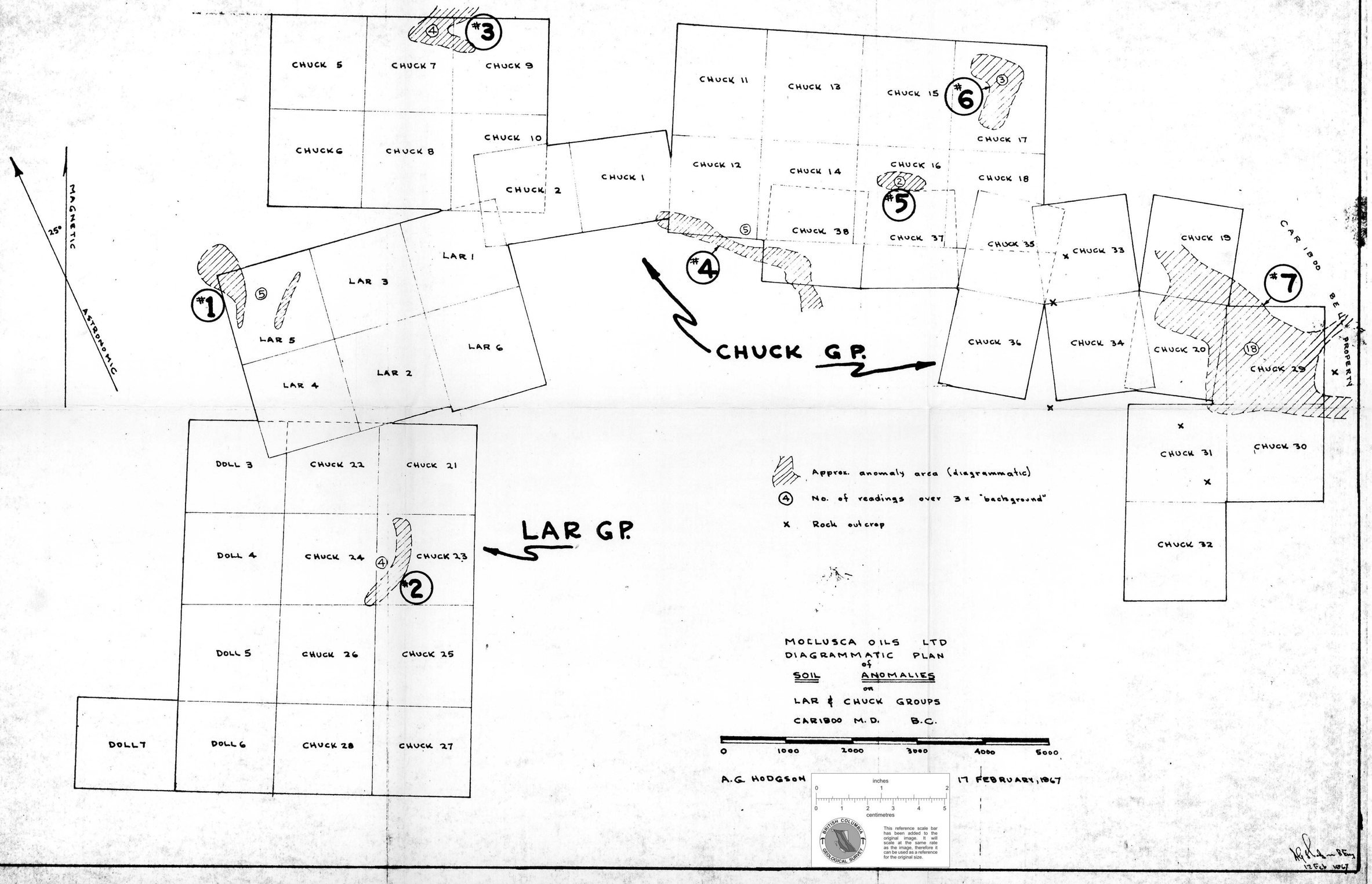

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DIAGRAMMATIC PLAN
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A.G. HODGSON

17 FEBRUARY, 1967

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