

R E P O R T

ON

MAGNETOMETER SURVEYING

MOYIE, B. C.

FORT STEELE M. D.

BRITISH COLUMBIA

by

ALEXANDER SMITH

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SUMMARY AND CONCLUSIONS:

Faults and dykes in the area can be traced with a magnetometer, and in addition the St. Eugene veins give distinct anomalies.

The following are the most important findings to date. (For location of these features see attached generalized Map Mo-29; for details, see Maps Mo-9, 10 and 11).

1. A strong northeast striking anomaly (6c) on the Moyie #6 Group.
2. A weak N.70°W anomaly (L3a) extending out under the lake on the projection of the St. Eugene veins.
3. Another parallel "break" (L3b) near the north end of the lake.
4. A N.30°E trend (L2) indicating that the Chubb fault may continue southwesterly to connect with the fault offsetting the sills in the

4. - contd.

Rudd Area.

5. A very strong anomaly (L4) over the tailings area but extending far beyond the known limits of the tailings. This may have some geological significance in addition to the effect of the tailings.

Those anomalies which might have economic importance should be traced out by additional magnetometer work. A dozen or so N.70°W draws that gave anomalies with the Brunton compass should be traversed with a magnetometer. This work would be followed up by some geochemical prospecting, and where indicated by trenching and drilling.

Results to date may warrant submitting these maps to a professional geophysicist for a more technical interpretation.

#### INTRODUCTION:

The Magnetometer Survey was undertaken to -

1. Prospect for the extension of the St. Eugene and Aurora veins out under the lake.
2. Test the possibility that the bedded replacement deposit lay under the lake on the axis of the Moyie anticline.
3. Test for other veins parallel to the St. Eugene veins.
4. Trace known or suspected faults under the lake or in areas of overburden.

The Survey of the Lake and Moyie 5 and 6 Groups has been completed. Except for four trial traverses across the St. Eugene veins, the balance of the Company's property has not been tested. The work done to date has been recorded as assessment.

GEOLOGY:

The Moyie area is underlain by the Aldridge formation which here consists of argillaceous quartzites and argillites. These sediments are folded into a broad open anticline whose axis strikes about N.20°E. This anticline plunges gently to the north at about 15°. At Moyie the general strike of the beds on the east side of the lake is northeasterly and on the west side of the lake northwesterly.

The various formations have different magnetic susceptibilities. In general higher readings were obtained over argillites areas than over beds of relatively pure quartzites. The variation here would be about 30 to 50 gammas. Purcell dykes and sills give still higher readings. They could readily be traced through areas of overburden by a magnetic survey.

METHOD:

First a series of 4 traverses were run across the St. Eugene veins in the area of the mine. Three out of the four showed decided anomalies of up to 200 gammas over the vein. (V1). These anomalies were sharp and of the type to be expected over a steeply dipping relatively narrow

vein. It was found that to be sure of detecting such anomalies it was necessary to have the Magnetometer stations along the traverse placed at no greater than 100 foot intervals, and that having obtained an indication of an anomaly intermediate stations were necessary to obtain an idea of its strength.

The work on Moyie Lake was done on the ice during the period December 1947 to April, 1948. A grid was laid out covering the entire lake. This consisting of lines 400 feet apart running N.10°E. with stations established every 100 feet along these lines. These stations were read with a Watts Vertical Component Askania type Magnetometer. At each station three readings were taken and averaged; then the instruments turned through 180° and another three readings taken. A light car used on the ice greatly speeded the work of checking and enabled one to return each time to a central checking station. This greatly increased the accuracy of the survey. When this work was completed intermediate lines were run in the central part of the area. On these lines only one reading was taken before turning the instrument through 180°.

Great care was taken as it was known that the anomaly to be expected on the lake from the vein type structures would be small.

Additional surveys were made on the Moyie No. 5 and No. 6 Groups. A Sharpe Instrument of the same type was used in this work. In each case a grid was laid out with lines 400 to 600 feet apart and stations every 100 feet along

these lines.

The results of these surveys are plotted on 200 scale maps (Mo-10-11-12) and generalized on the 1" = 1000' map Mo-29. The magnetic readings, after being corrected for diurnal changes, etc., were plotted on the maps without changing them over into gamma values. For the Watts instrument 1 scale division equals about 30 gammas and for the Sharpe instrument 1 scale division equals 15 gammas. On the composite 1" = 1000' scale, Mo-29, the Sharpe scale division readings have been converted into terms of Watts scale divisions. An idea of the relationship of the magnetic values to the geology can be obtained from superimposing these maps over the scale geological maps for the corresponding areas.

ANALYSIS OF RESULTS:

MOYIE GROUP 6 (Mo-12) - The following anomalies were found on this Group. The geology was shown on the Tradedollar Map Sheet:

(a) The course of the Purcell (diorite) dyke across the M.L. 15, 20 and adjoining Columbia claim can be traced by a magnetic high. To the southwest of M.L. 15 the dyke does not outcrop. Its course could probably be determined by a magnetic survey in this area.

(b) The magnetic high that extends south from the Columbia into the M.L. 20 and 16 is caused in part by a relatively flat lying Purcell sill about 8 to 10 feet thick that branches off the dyke. The sill does not outcrop to the south of the anomaly. It may die out in this area.

(c) The most interesting anomalies found on this Group are those in a zone extending northeast across the M.L. 16, 17 and 21 claims. On the M.L. 16 claim there are some outcrops along this zone. These show minor faults in the small quartz veins trending northeast parallel to the magnetic anomalies. These outcrops show no mineralization or indications that they would yield an anomaly of such strength, and the suggestion is that the lenses of sulphide mineralization may occur along this belt. These anomalies merit further study, possibly by geochemical methods followed by diamond drilling.

(d) In addition to the strong northeast trending anomalies discussed under (c), there is apparently a broader area of low magnetic intensity extending northeast across the group. This is shown by the larger areas of plus 55 contour which lie on the northwest and southeast sides of this wider zone.

MOYIE GROUP 5 (Mo-11) - This area lies at the northeast corner of Lower Moyie Lake. The magnetic results in the central part are badly distorted by the railway and highway and their telephone and power lines. The surface geology is shown on the Barkshanty map (Mo-1). The principal features are:

(a) A northeast belt of low intensity cutting across the M.L.38 and M.L. 37 claims. This follows what is apparently a fault zone. The fault does not outcrop at any place but had been deduced from stratigraphic offsets. The

magnetic survey strengthens the evidence.

(b) At the northeast end of the belt described under (a) there is a N.70°W draw which is followed by a magnetic low area. To the northwest there are outcrops of small quartz veins striking N.70°W parallel to the St. Eugene veins.

(c) A second fault zone, striking about due north across the M.L.37, 43 and 39 claims was shown on the Barkshanty map. An anomaly follows this fault but is modified by the nearby paralleling power and telephone lines.

(d) A northwest trending "high" extends between the railway and the highway and continuing easterly just north of boundary between M.L. 38, M.L. 39 and M.L.43, M.L. 37.

(e) If the readings adjacent to the railway and highway are disregarded a "high" area shows arching around the northerly part of the group paralleling the stratigraphy. This marks the upper argillite horizon of the Aldridge formation which occurs just below the Creston contact.

MOYIE LAKE SURVEY (Mo-10) - To avoid confusion claim boundaries have been left off this map. In addition to the magnetic contours profiles were made of these traverses. These profiles show up small variations more clearly than do the contours. Accuracy of the order of 5 gammas was obtained on the ice.

The effect of the depth of the lake on the magnetic is not very apparent on the contour map. Moyie Lake has been sounded. The depths are shown on Mo-31 and in "Geology of the Cranbrook Map Area" S. J. Schofield, Geolog-



ical Survey of Canada, Memoir 76 (Map on page 129). The lake is in places 200 feet deep. In the deeper areas, as is to be expected, the variations were smaller and more gradual. On approaching the shore line, i.e., within 100 feet of the shore, some irregularity was usually apparent. This may in part be due to presence of numerous Purcell diorite boulders in the gravels and glacial drift.

The effect of stratigraphy can be seen on the contours and on the profiles; in the latter case the trend of the sediments shows as broad curves. North of the St. Eugene veins the sediments trend northeasterly across the lake. In the southern part of the lake the axis of the anticline lies under the lake.

The following are the principal types of anomalies noted:

L1. North-south trending lows and highs of about 30 gammas intensity. These occur near the western side of the lake, principally to the north of the St. Eugene and Aurora veins. It is thought they may represent a north-south zone of faulting; the so-called Moyle Lake fault. It is to be realized that on north-south traverses weak north-south anomalies may be more apparent than real. However, every effort was made to eliminate this fact by returning hourly to a central check station.

L2. Anomalies trending N.30°-40°E. are found on the lake south of the St. Eugene mine. On the geological maps (Mo-9, Mo-3 and Mo-6) a postulated fault known as the Chubb

fault and having this orientation is shown extending for over four miles. The anomalies of this trend lie near the projection of this fault out under the lake. Part of the northeasterly trend may result from stratigraphy. In the southern portion of the lake the N.20°E axis of the anticline is under the lake.

L3. Anomalies trending N.70°W:

(a) A break or irregularity in the magnetic contours can be traced westerly from the projection of the St. Eugene veins out under the lake nearly to the north-south anomaly described under (1) above. The feature is weak but apparently is of sufficient continuity to show up on the contours.

(b) Near the north end of the lake another N.70°W zone is more clearly marked. It lines up with the vein structure on the east side of the lake, (Cut in D.D.H. #10.)

L4. Tailings: By far the strongest anomaly recorded is that south of the St. Eugene mine near the old mill-site. Here variations of up to 350 gammas were found. This is probably due to the iron content of the tailings from the St. Eugene mill. The anomaly, however, appears to extend westward across the lake, beyond the deepest part of the lake and 800 feet or so beyond the area where the tailings are known to have accumulated. This effect may be due to the tailings, but there is a possibility, not to be overlooked, that some other factor may be present. Lying as it does beneath the Chubb fault and near the axis of the anticline, the area should be structurally favourable for

ore deposition.

Map Mo-30 gives information on the lake bottom contours and disposition of the tailings from the retreatment plant. Probably a large part of the magnetic effect of the tailings is from 40,000 tons of low grade ore from the Sullivan Mine put through the retreatment plant as a test run just before the operation was closed down. This ore was high in pyrrhotite.

The extent and tonnage of the tailings should be determined; if they are found to be much more restricted in area than the anomaly, further testing is warranted.

*A.S.*

Alexander Smith.

Vancouver, B. C.

June, 1949.

MOYIE RIVER

50' DYKE

NORTH



COMPANY *ST. EUGENE MINING CORP*  
 PROPERTY *ST. EUGENE*  
 LOCATION *MOYIE*

WORKING PLACE *SURFACE*  
 COMPOSITE OF *Mo-10, 11 & 12*  
 TYPE OF MAP *MAGNETOMETER SURVEY*

DATE *1949*  
 DRAWN BY *A.S.*  
 MAP NO. *Mo-29*