GM 08327

REPORT ON MAG SURVEY

Documents complémentaires

Additional Files

Licence

License

Énergie et Ressources naturelles
Québec

11pp + 1pl

TECHNI-COUNSEL LIMITED

Geophysical and Geological Prospecting

REPORT ON THE MAGNETOMETER SURVEY COVERING PART OF THE PROPERTY OF VICOUR GOLD MINES, LIMITED.

LOUVICOURT TWSP., N-W. QUEBEC.

By - Th. Koulomzine, L.Sc., Ing. ENSP.

March - May 1941.

INTRODUCTION.

The area surveyed represents but a very small part of the large acreage belonging to Vicour Gold Mines, Ltd., The survey started the last days of March, and the work in the bush continued till April 30th. Calculations, drawing of maps, etc. were completed on May 20th. The area covered by the survey is of 333.2 acres and, in addition to that, five lines were continued outside of the ground closely surveyed.

Inasmuch as this report is made for Vicour Gold Mines and other Companies financing Vicour, we consider it unnecessary to give ample details as to the location of the property, facilities of access and power, and the work done up to date.

We wish to express our thanks to Mr. C. O. Stee, Consulting Engineer, and Mr. G. D. Goodfellow, Mine Manager, for supplying us with information helpful to the interpretation of the magnetometer survey results.

RESUME OF GENERAL GEOLOGY

AND CONDITIONS OF ORE DEPOSITION AT VICOUR.

The known ore deposits at Vicour are located within a dyke of coarse-grained quartz diorite. The latter has an average width of about 200 feet and, while the south contact of the dyke with the Keewatin greenstone tuffs is well defined, the north contact with different phases of fine-grained dioritic rocks is somewhat confused.

The same quartz-diorite is known to exist for some 8 miles west of Vicour and, although the continuity of the dyke is still to be proven, there seems little doubt that quartz-diorite encountered on the properties of Met-Mac, Goldore and Quebec Mining Explorers are genetically related to the Vicour quartz - diorite. The orebodies at Vicour are formed by a considerable number of short flat veins which are usually located in the middle of the dyke and, when sufficiently close together, form commercial orebodies. The laws governing the distribution of the ore-shoots within the vertical plane of the Vicour dyke are still unknown, but it is our opinion that subsequent geological studies will show that this distribution is structurally controlled and is due to the fracturing, under local stresses, of the hard dyke within softer walls.

Practically all the development work done to date is concentrated along the strike of the dyke, with but very little information gained from the intrusive rocks that are found north of same. It is not impossible that some interesting ore-shoots could be developed in the finer-grained intrusives located north, should more attention be given to the work in this section.

RESULTS OF THE SURVEY.

All the results of the survey are gathered on a 100ft. -to-the-inch- map attached to this report, and the geoligical interpretation of the results is described hereafter. Technical details of the magnetic survey and the topographical data are to be found in the two appendices.

Description Of The Wide Magnetic Zone:

Generally speaking, the whole wide zone located between α_1; α_2; α_3; α_4; α_5; α_6; ∂_1; ∂_2; ∂_3; & ∂_4 on the south, and B_1; B_2; B_3; B_4; B_5; B_6; B_7; B_8; & B_9 on the north, is underlain by a complex of strong magnetic rocks. Within this wide band we have distinguised a number of anomalies underlain by rocks which are more magnetic than the average rocks of the whole zone. These are numbered: Anomalies A_1, B_1, and B_2, D_1 to D_5 and E_1 to E_4

It is our opinion that most of the wide magnetic zone described above is underlain by a series of intrusive rocks genetically related and forming different phases of the same intrusive complex. As the content of magnetite in an intrusive rock, which is the factor governing the magnetic properties of the rocks, is not always related to the rock texture, it must be borne in mind that the various anomalies enumerated above do not necessarily correspond to the outline of different intrusive rock phases, although, on several occasions, such is probably the case.

Anomaly A_1 apparently corresponds fairly well to the outline of the coarse quartz-diorite dyke which contains the known Vicour orebodies. It is located on the south contact between the magnetic zone and the non-magnetic greenstones that are found to the south. The south contact of the dyke is easily detected because we are in presence of a contact between the strongly magnetic diorites and the non-magnetic tuffs, On the other hand, the north contact of the dyke is difficult to establish magnetically as, in this case, the contact is located between the magnetic quartz-diorite and the fine-grained dioritic rocks which are also magnetic. It seems that at least part of anomaly B_1 and the space between B_1 and A_1 are actually underlain by quartz-diorite. East of Line 14 the strong magnetic reaction, which characterizes the dyke on the south contact of the wide magnetic zone, disappears. There is no positive evidence to date to the effect that this disappearance of the anomaly should be considered as a proof that the quartz-diorite dyke itself does not continue further east.

Anomaly D_1, as can be seen in the long trench following Line 2, is underlain by a massive fine-grained dioritic rock which seems to be definitely intrusive. It is likely that not only most of the anomalies D_2, D_3, D_4, D_5 and B_2 are underlain by the same rock, but whatever trenches can be seen north of the quartz-diorite dyke seem to indicate that most of the wide magnetic zone is underlain by similar phases of intrusive fine grained dioritic rocks.

The group of anomalies marked E_1, E_2, E_3, and E_4 magnetically and structurally resemble very much anomaly A, and there is a fair chance that this anomaly E is actually underlain by coarse quartz-diorite similar to the dyke A where the orebodies known at present are found. The fact that anomaly E lies in the north contact of the magnetic zone, just as A lies in the south contact of the zone, can also be considered a favorable factor because it could indicate that the intrusive forming anomaly E is one of the youngest in the complex; moreover, the contact between soft greenstone and usually more brittle intrusives is a particularly favorable location for fracturing under local stresses and, therefore, for ore-deposition.

Dislocations and bending of the dyke and the magnetic zone.

A particularly interesting result of the survey is the fact that both south and north contacts of the magnetic zone were found to be distorted.

The south contact of the quartz-diorite dyke, as outlined by the line α_1; α_2; α_3; α_4; α_5 + α_6 shows a sharp bend between α_2 + α_3 and another, less pronounced, between α_4 + α_5 At present, there is no positive geological evidence to decide whether the displacements are due either to bends in the formation, or faulting of the dyke, or both. The fact that both displacements of the quartz-diorite south contact have their counterpart in the north, along anomaly E_1 and E_2, must be interpreted as an indication that the displacement took place after the intrusion and could therefore have occurred about the time when the ore deposition was going on. It is possible that the particularly good values encountered in vertical diamond drill holes 18-S. 19-S and 20-S are due to the intense fracturing which took place near the bending of the dyke, during the time of ore deposition.

Anomaly X :

A weak negative anomaly, having a strike of N 15°E and an averagewidth of 250 feet, is found between Lines 21 and 22 and is well outlined by cross lines A. B. C. and D.

The anomaly cuts right across all the other formations and can, therefore, be produced only by young intrusives rocks or a very strong fault. The width of the negative zone X seems to indicate that it is due to an intrusive dyke rather than to a fault zone. Readings along lines A and D show furthermore that the rocks underlying anomaly X are even less magnetic than the Keewatin greenstone and should, therefore, be richer in feldspar.

The strike, size and location of anomaly X seem to indicate that it could be due to a younger diabase dyke, perhaps the continuation of the big diabase dyke of Tiblement. On the other hand, our experience shows that younger diabase dykes, whenever studied magnetically, always give well defined moderately strong positive magnetic anomalies, and this would suggest that anomaly X, which is negative, could hardly be due to a younger diabase dyke.

In any case, should anomaly X be produced by a fault, a diabase dyke or other intrusive dyke, the area where, the magnetic zone is cut by a cross fracture of such amplitude ought to be considered a very favorable location for ore deposition, and would warrant a certain amount of exploratory diamond drilling.

RECOMMENDATIONS.

The results of the survey indicate that it would be advisable to make a certain amount of exploratory diamond drilling outside of the already closely drilled area around the shaft.

After careful study of all the results of the survey, we recommend the following minimum program that could be revised, if necessary, in the course of execution:

1. If possible, opening up, by a continuous trench, of a cross section along line 2, which follows high ground from the quartz-diorite till station 6 N.

2. Drilling of two series of inclined diamond drill holes that would make complete geological sections through the entire magnetic zone:

   (a) Along line 4, from station 0 to station 10 North,

   (b) Along line 9, from station 2 South to station 12 North.

   This would explore anomalies A. and E in sections where bends of the formation are indicated by the magnetometer survey.

3. Several vertical diamond drill holes should be drilled close to line 9, in anomalies A and E, to explore the possibilities of flat fracturing in these areas.

4. At least one hole should be drilled to obtain information on the nature of the rock underlying anomaly X. The best location for such a hole seems to be station E_2 of line B, with a diamond drill hole heading S 73° E along line B.

5. Several diamond drill holes should be placed after that to explore the possibilities of extensive fracturing on both sides of X, where this anomaly intersects anomalies E_2 and E_4 and the south contact at ∂_2 and ∂_3.

TECHNI-COUNSEL LIMITED.

Th Koulomzine

per: Th. Koulomzine. (Signed)

COPY

APPENDIX 1.

TECHNICAL DETAILS OF THE MAGNETOMETER SURVEY.

Network of Measurement Stations:

The magnetic measurements were made along a series of picket lines established on the ground. There are two kind of pickets along the lines: high pickets used only for sighting and cutting the lines straight, shorter ones indicating the measurement stations and bearing the numbers of the line and station (in hundreds of feet, north or south from the base line). Whenever feasible, the same numbers were marked on a neighboring tree blaze. When 50 ft. stations were made along the line, these were not marked on the ground.

The base line has a direction of S 73 deg. E. The other picket lines are more or less at a right angle to the base line. The stations were placed along the lines by actual chaining, and the intersections of the lines with claim boundaries and government Louvicourt twsp. East-West center line were carefully chained in to known survey posts. All possible causes of error taken into consideration, the location of individual survey stations on the map must be considered accurate within ± 5 feet.

In addition to the main network of picket lines 300 feet apart, one intermediate line was made between lines 26 & 27, and 4 cross lines between lines 20 & 23, the latter in order better to outline anomaly X which is perpendicular to the other dykes and anomalies. Five lines were stretched out far beyond the area closely surveyed to locate possible parallel structures.

The measurement stations can be classified as follows:

Regular 300 x 100 ft. network	523
Intermediate 50 ft. stations	203
	726
Lines stretching out of the main network	79
Cross lines around Anomaly X	40
Intermediate 15 ft. stations near L7,0	24
GENERAL TOTAL of measurement stations	869

Magnetic Survey:

The survey started on March 30th and finished on April 30th 1941. The measurements were performed with an Askania magnetometer measuring the variations of the vertical component of the natural magnetic field.

The magnetometer was especially set for making precise measurements, with the scale and temperature coefficients greatly reduced. A number of other precautions were taken to obtain accurate results.

All measurements were referred to an arbitrary base station located at L9 S4, considered to have a zero value. The results plotted on the map accompanying this report are expressed in gammas (1 gamma (γ) = 1/100,000 Gauss CGS).

The sensitivity of the magnetometer is of about $\pm$ 3 gammas, but, due to unusually active daily variations (magnetic storms) during the time the survey was made, the accuracy of the survey, as checked by 41 double measurements, is of $\pm$ 16 gammas, still a very small figure compared with the size of the anomalies encountered. We wish to point out that the sensitivity of ordinary dip needles and needle magnetometers varies from $\pm$ 300 to $\pm$ 1500 gammas. The total value of the vertical component of the natural magnetic field in the district is of about 59,000 gammas, the total intensity being of 60,000 gammas and the inclination of about 78 deg.

The results of the magnetic measurements are concentrated on a 100 ft.-t0-the-inch map attached hereby. Graphically, the results are presented in the form of magnetic profiles projected on the map and drawn to a scale of 2,000 gammas to the inch. The contacts of the magnetic rock belts and dykes were established by the application of the inflexion point rule and comparison with master curves computed at different scales from values obtained from theoretically established formulae for typical anomalies.

COPY

APPENDIX II

TOPOGRAPHICAL DATA ON COORDINATES &c.

In order to locate permanently the network of measurement stations, we tied same to Government survey lines and to officially surveyed claim boundaries. The coordinate system used on our map is based on the center post of Louvicourt township which is considered to have a coordinate value of :

10,000 N.
0.0 E.

The position of all claim posts was calculated in this system, and the corresponding values are reported on the map.

The intersections of all the picket lines of the magnetic survey network with the Louvicourt township center line and the boundaries of surveyed claims were carefully chained, and the results of these chainages are reported on the map. Therefore, even if the picket lines get invisible owing to brush growth, it would be possible to re-establish them from the results of these chainages.

The coordinate system used at the mine is based on reference point BP_1 considered to have a value of :

10,000 N.
10,000 E.

The system is oriented along line $BP_1 - BP_2$. We have made necessary measurements to establish the relationship between the two coordinate systems. The results of these measurements can be summarized as follows :

1. Line $BP_2 - BP_1$ has a strike N 88 deg. 07' E.

2. Coordinates of point BP_1 in the Louvicourt center post coordinate system are :

   B = 10,004.9' N.
   A = 1,915.4' E.

The formulae for changing from the mine coordinate system to the Louvicourt center post system and vice-versa are as follows:

Let: 1. N, E be the coordinates of a given point in the center post system;

2. n, e be the coordinates of the same point in the mine coordinate system;

3. α = 1 deg. 53', the angle between the two coordinate systems;

4. A & B be respectively the departure and latitude of Point BP_1 in thecenter post coordinate system.

Then:

$$N = B + (n - 10{,}000) \cos\alpha + (e - 10{,}000) \sin\alpha$$

$$E = A + (e - 10{,}000) \cos\alpha - (n - 10{,}000) \sin\alpha$$

or, substituting numerical values of A, B & α,

$$N = +0{,}99946\ n + 0{,}03286\ e - 318.3$$

$$E = +0{,}99946\ e - 0{,}03286\ n - 7{,}750.6$$

or, inversely :

$$n = +0{,}99946\ N - 0.03286\ E + 63.4$$

$$e = +0.99946\ E + 0.03286\ N + 7{,}756.9$$

For the convenience of locating diamond drill holes and underground workings, the mine coordinate system was drawn (in broken lines) on the map in the shaft area.

COPY

APPENDIX 111

RESULTS OF TESTING OF THE MAGNETIC PROPERTIES OF ROCK SAMPLES.

Sample Number	Location and Description	Relative Value of the induced magnetization of the rock sample.
1	From a small outcrop 30' east of 275' north of line 2. Massive basic fine-grained, probably intrusive, rock	5.0
2	Same place. Acid volcanic rocks immediately north of No. 1	0.3
3	375' north on old Line 2. Massive basic, fine-grained rock, probably intrusive	10.0
4	South end of long trench along Line 2. Strongly mineralized quartz	40.0
5	Line 2, 5 north, massive, basic fine-grained intrusive	15.0
6	Line 2, 6 north. same	15.0
7	From a small rock trench 100' west of Line 3, 650 N. Fine-grained, carbonated and mineralized intrusive	1.0
8	250' east of L9, 15N. Volcanic agglomerates and tuff.	0.0
9	125 west of L14, 13N. same	0.1
10	150' east of L4, 11N. same	0.1
11	150' east of L3, 11.50N. Volcanic rocks	2.0
12	L13, 12N. Volcanic tuffs near contact with anomaly E	3.0
13	25' north of No. 12. A small shear N70°W	0.0
14	From underground. Unaltered typical quartz diorite.	20.0

(continued next page)

(Appendix 111 continued)

Sample Number	Location & Description	Relative value of the induced magnetization of the rock sample tested.
15	From underground. Bleached quartz-diorite with considerable pyrrhotite.	6.0
16	From underground. Altered quartz-diorite.	20.0
17	From underground. Fine-grained rock from north crosscut	3.0

All the above samples tested were properly tagged and left at the mine for further examination, if necessary.

It is important to note that the so-called "bleached quartz-diorite", containing a large amount of fine disseminated pyrrhotite, is less magnetic than the unaltered quartz-diorite. This is probably due to a partial transformation of magnetite of the unaltered quartz-diorite into pyrrhotite during the alteration of the rock.

P. Kowalowy