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REPORT ON A RESISTIVITY SURVEY

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REPORT ON A RESISTIVITY SURVEY OF THE PROPERTY OF ATLAS CHIBOUGAMAU MINES LIMITED, ROY TOWNSHIP, NORTHWEST QUEBEC.

INTRODUCTION:

The following report is based upon the results of the resistivity survey carried out by Sharpe Geophysical Surveys Limited on a property of Atlas Chibougamau Mines Limited, Roy Township, Northwest Quebec. The survey was initiated on March 10th and completed on April 25, 1956.

Traverse lines were cut at 300 foot intervals oriented East-West astronomic, and the readings for the resistivity measurement were taken at station intervals of 50 feet.

The field procedure employed in resistivity determination consists in passing a measured current through a selected portion of the earth and measuring the potential drops associated with this flow of current. This is usually accomplished by passing the current between energizing electrodes placed at two selected points and measuring the potential difference between two auxilliary electrodes placed at other points in the area under investigation. From the observed values of the current and potential, the apparent resistivity of the material included within the zone of measurement can be calculated for any given electrode configuration. Accordingly, the following technique was employed in the present investigation: A 60-cycle per second alternating current was introduced into the

ground by means of two electrodes placed at a distance of 1½ to 3 miles apart in a direction parallel to the traverse lines. Measurement of potential differences were made by means of a vacuum tube voltmeter between two electrodes placed 50 feet apart along these lines, with readings at 50-foot intervals. These were converted, by formula, to a factor expressing the average, or "apparent" resistivity of the material between the measuring electrodes. This "apparent" resistivity is expressed in units of ohm centimeters. It is a measure of the electrical resistance offered by the material between and beneath the measuring electrodes.

The apparent resistivity depends upon the thickness of overburden and the nature of the underlying rock. It is of the order of 500,000 ohm centimeters or more for normal Paleozoic and Precambrian formations, but can be considerably decreased by an increase in porosity due to brecciation or fracturing, by the presence of graphite, particularly in shear or fault zones, and by metallic sulphide mineralization. Ordinarily a decrease in resistivity not lower than 50,000 ohm centimeters can be due to any one, or a combination of the above causes, whereas a decrease to a value lower than that figure usually implies the presence of graphite or sulphides. It is not possible from the resistivity data alone, to determine which of the above sources may be causing an observed resistivity "anomaly".

LOCATION:

The property belonging to Atlas Chibougamau Mines Limited consists of the following group of 55 claims:

License Nos. - 88311 to 88317 - claims 1 to 5 each
" " - 88320 to 88323 - claims 1 to 5 "

The above claims group is located at the extreme northwest corner of Roy Township, just south of Waconichi Lake, Northwest Quebec.

GENERAL GEOLOGY:

The property is underlain primarily by volcanic rocks that are part of a greenstone belt that extends through Opemisca and Chibougamau Lake map areas to the south. The lavas are pale to dark green, altered, andesitic to basaltic rocks, and include both massive and schistose type. Some of the flows show a distinct change in grain from coarse at the base to fine at the top. Pillow lavas are common, but as the rocks are closely folded, the pillows are distorted. *

Outcrops are rather plentiful in this region. Structurally, the region is characterized by steeply dipping to vertical formations, exhibiting, in general, an easterly trend. Evidence of a certain amount of folding is present. Fracture and shear zones containing a certain amount of pyrite mineralization seem to occur in this area.

DISCUSSION OF RESULTS:

The resistivity survey carried out over this property has revealed the presence of several zones of decreased resistivity. These, in general, show easterly trend in conformity with the regional strike, with the exception of a very few localities where these zones seem to strike east-north-east. The majority of these are possibly associated with the shear and fracture zones in the greenstone within which a certain amount of sulphide mineralization may occur. One of these decreased resistivity zones, which lie on the

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* Descriptive Notes: Map #593A
Abitibi, Waconichi and Mistassini Territories, Quebec, 1941.
Geological Survey of Canada.

west side of Lake Lemoine on the northwest corner of this property seems to exhibit an apparent continuity over a considerable distance. This zone seems to pass through Lake Lemoine and terminate at a distance of several hundred feet on the northeast corner of this lake. Part of this zone could be associated with a fault. Apart from these, a couple of decreased resistivity zones have been indicated over small areas that are covered with swamps and it seems quite probable that their cause lies in these.

It will be noted that the northeast section of this property is distinctly underlain by formations that have much higher resistivity than those underlying the rest of the property. This zone of high resistivity seems to extend along the extreme north part over the rest of the northern half of this property. It could be indicative of a contact zone that may lie on the northern part of this property. The high resistivity zones in the southern half of the property are located on its central and western section and in general exhibit lesser resistivity contrast compared to those exhibited by the northern section.

GEOPHYSICAL INTERPRETATION AND CONCLUSIONS:

The accompanying plan map on a scale of one inch equals 200 feet, shows the distribution of apparent resistivity data and the contours based thereon. It will be observed that the contouring has been done up to resistivity value of 200,000 ohm cm. This has been done so as to represent the structural feature better.

Nearly two thirds of the property exhibits apparent resistivity values between 400,000 and 1600,000 ohm cm, which may be taken as a normal range for the volcanics in the area. There are, however, 10 or more less sharpely defined resistivity depressions which exhibit values of less than 100,000 ohm cm, and even as low as 20,000 ohm cm. These have been marked alphabetically from

A to J in the accompanying plan map and will be discussed in turn below

Anomaly "A":

This is characterized by a long conducting zone that extends from the extreme west line i. e., L-87W to the northwest corner of Lake Lemoine i. e., to L-54W, exhibiting a total strike length of about 4,000 feet. It seems that this zone continues through this lake and terminates at a distance of about 800 feet past this lake on its northeast corner. The most highly conducting section of this anomaly occurs on L-81W, where the apparent resistivity drops to as low a value as 20,000 ohm cm. This could be possibly due to sulphide mineralization in fracture zone in the greenstone. Part of this conductor could be associated with a fault. It will be observed that this conductor becomes very broad between L-66W and L-57W. This broad conductive zone appears to be made up of two separate conductive zones - one comparatively narrow zone occupying the northern section of the anomaly and the other comparatively broader zone occupying the southern section. The narrow zone seems to be the continuation of the original conductor marked "A", while the broad zone seems to be caused by topographic features. The strike changes towards northeasterly in this section of the conductor. The more promising part of this anomaly is the section lying between L-84W and L-72W. Considering the very low value of the apparent resistivity that has been obtained over part of this section, the possibility of the presence of sulphide mineralization here cannot be ignored.

Anomaly "F":

This conductor is situated about 1400 feet north of the most conducting section of the conductor "A" and extends between L-87W and L-81W. This could be associated with the fracture zone in the greenstone.

Anomaly "C":

This conductor extends over a distance of about 800 feet and is situated at the northeast corner of Lake Lemoine. It appears to represent the continuation of the anomalous zone represented by "A". Its most highly conducting section occurs on L-18W, where the apparent resistivity drops to 30,000 ohm cm. This could be associated with a fault zone. However, there is a certain amount of possibility of this being caused by sulphide mineralization in shear zone.

Anomaly "D":

This represents a comparatively broad conducting zone lying just north of the east arm of Lake Lemoine. It has a strike length of about 1200 feet and shows its apparent continuity over four adjacent lines, i. e., from L-18W to L-9W. Its most highly conducting section occurs over two adjacent lines i. e., L-18W and L-15W, where it demonstrates a minimum resistivity value of 30,000 ohm cm. This could probably be due to sulphide mineralization in fractures in the greenstone.

Anomaly "E":

This is located just south of the anomaly "D" and shows its continuity over two adjacent lines, its most highly conducting section appearing over L-18W. Its strike length is about 600 feet and could be attributed to the similar cause as that of the conductor "D".

Anomaly "F":

This is characterized by a narrow conductor that extends over three adjacent lines, i. e., L-3E to L-9E and shows a total strike length of about 900 feet. The lowest resistivity along this conductor is exhibited over L-3E. This is most probably due to shear zone with a section of it being mineralized.

Anomaly "G":

This conductor exhibits its apparent continuity over two adjacent lines, its more conducting section appearing over L-18E. It is most probably associated with a shear zone.

Anomaly "H":

This anomalous zone extends from L-33E to L-45E over a total strike length of about 1200 feet, its broader section being situated over L-33E and L-36E. Considering the resistivity value that has been obtained for this conductor, its cause could be attributed to fracture zone in the greenstone.

Anomaly "I":

This conductor extends from L-39E to L-54E striking more towards northeast between L-39E and L-45E. Small sections of it show a considerable decrease in resistivity value. These could be attributed as being caused by localized sulphide mineralization in fracture zone. Such mineralized sections along this conductor occur over L-42E and L-54E.

Anomaly "J":

This anomaly is characterized by a broad zone of resistivity low that extends over three adjacent lines, i. e., from L-51W to L-45W. It attains a markedly decreased resistivity value over L-48W. Considering the magnitude of this resistivity, it could be attributed to sulphide mineralization. However, this zone of resistivity depression happens to coincide with the area that is covered with swamps and it seems more likely that the cause of this anomaly lies in this rather than sulphide mineralization.

In the foregoing discussion, the cause of the various anomalies has been attributed to zones of shearing and fracturing that may occur in the greenstone and the possible presence of sulphide mineralization in them. However, the conductors characterized by marked decrease in resistivity value, i. e., 20,000 ohm cm could, in all probability, be attributed to sulphide

mineralization that could be of economic importance provided these are not wholly being caused by variable amounts of sulphide mineralization associated with fracture and shear zones. To test this, it is suggested that a certain amount of drilling be carried on over more important of these conductors.

RECOMMENDATIONS:

The results of the resistivity survey have indicated the presence of several conductors, the more important of which warrant drilling. Accordingly, drilling is recommended for conductors "A", "C" and "D". Specific drill holes have been suggested in the appendix to explore these conductors. One hole has been proposed for each of these conductors. This is to be regarded as a minimum program, of course, in the event of any one of the holes giving rise to interesting intersections.

Respectfully submitted,

A. K. Mousuf, Ph. D.,
Geophysicist

Dated at Toronto, Ontario,
this 7th day of May, 1956.

A P P E N D I X

The following are the necessary data covering the recommended diamond drill holes:

Hole No.	Cond. No.	Location	Dip	Bearing	Total Length	Horizontal Projected Length
1	A	100' north of base line on L-81W	45°	0°	600 ft.	420 ft.
2	C	1900' north of base line on L-18W	45°	0°	600 ft.	420 ft.
3	D	300' north of base line on L-15W	45°	0°	700 ft.	500 ft.

APPENDIX from the report of Sharpe Geophysical Surveys Limited, Dated May 7, 1957.