REPORT ON
ELECTRICAL RESISTIVITY SURVEY
and
MAGNETOMETER SURVEY
on Property of
ZULAPA MINING CORPORATION LIMITED
PIC TOWNSHIP
PORT ARTHUR MINING DIVISION, ONTARIO

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PLAN NO. 1 ........................................... Electrical Resistivity Contours
Contours of Magnetic Intensities
and Geological Interpretation.
(Drawing Ref. No. 65-5-56)

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Gentlemen:

The following report describes the results of electrical resistivity and magnetometer surveys carried out over a portion of your property situated in Pic Township, Port Arthur Mining Division, Ontario. These surveys were conducted by Geo-Technical Development Company Limited during the period from April 26th to May 2nd, 1956. The purpose was to locate anomalous conditions which would possibly be correlated with geological structures in order to facilitate further exploration on the property. The results of the surveys are shown on Plan No.1 accompanying this report.

CONCLUSIONS AND RECOMMENDATIONS

The geophysical results over the surveyed part of your property show a definite change both in electrical resistivity and magnetometer readings in passing from north to south. The northern part of the area, with generally high resistivity readings and somewhat lower magnetic readings, has been interpreted as gabbro underlain, while the southern part generally has lower resistivity and higher magnetic values and is interpreted as being underlain with augite-syenite. A low magnetic anomaly near the western boundary of the area is probably caused by greenstone.

Three diamond drill holes are recommended to test the economic possibilities of the more interesting anomalies.

D.D. Hole No. 1a on Line 3S. will test Anomaly "A" eastward through a zone of low resistivity readings combined with high magnetic readings.
2. P.P. Hole No. 1b will complete the cross section of the "A" Anomaly by drilling westward from the same setup. This hole crosses low resistivity readings showing sharp contrast with their neighbours.

D.D. Hole No. 2 is designed to cross a very low resistivity area near the interpreted syenite-gabbro contact. If this hole is successful, it is strongly recommended to continue the surveys southward and westward.

Exploration work on Anomaly "C" should be postponed until results of drilling Anomaly "A" are known. If good results are obtained in D.D. Holes Nos. 1a and 1b, it would become urgent to investigate Anomaly "C" by drilling.

PROPERTY, LOCATION AND ACCESS

The portion of the property of Zulapa Mining Corporation Limited which was covered by the surveys comprises a group of five claims all situated in Pic Township. These claims are further described as follows:

No. 73890
No. 73891
No. 73892
No. 73893
No. 73896

The Trans-Canada Highway passes through the claim group in a north-west direction and branching roads lead to Heron Bay and Marathon which is only 3 miles west of the surveyed area.

TOPOGRAPHY AND GENERAL GEOLOGY

The area adjoining the Pic River is one of the most rugged in Ontario. In the vicinity of Marathon, however, there is an abrupt change westward from the Pic River and an extensive sand plain north of the Zulapa property has been chosen as an airport site. Within the area surveyed, outcrops occur atop a few mounds and while the topography is
somewhat more irregular than in the sand plain lying north, it is not rough.

Information on the geology of the area is obtained mostly from Map 41J published in 1932 by the Ontario Department of Mines, and from recent prospecting and diamond drilling on the Kinasco property adjoining the present surveyed area to the north. There are three main types of rocks in the vicinity of the Zulapa property and it is very likely that these main rock types underlie the Zulapa property also. The greenstones which are usually quite basic in composition probably occur as remnants; augite-syenite stretches northward from the Zulapa property for a distance of about 8 miles forming a great intrusive body with a maximum east-west width of about 5 miles; gabbro intrusives observed in recent drilling operations are believed to be a marginal phase of the syenite intrusive. Within the surveyed part of the area, gabbro and syenite are believed to be the dominant rocks with possibly a few minor greenstone remnants.

Not much is known about the structural geology of the area; the strike and dip of the greenstone beds seem in general to be controlled by the syenite-gabbro intrusion, all evidence pointing to a parallelism with the intrusive contact. On the Zulapa property the contact likely has an easterly direction and some geophysical evidence favours an easterly strike of the schistosity within the surveyed area.

Copper mineralization associated with the gabbro and greenstone has been known to occur in the Marathon area for quite some time. Recent geophysical surveys followed by drilling through interesting anomalies have resulted in the discovery of massive sulphide intersections which have given a new impetus to prospecting in the area.
INTERPRETATION OF GEOPHYSICAL SURVEY RESULTS

The geophysical survey results show definite trends and sufficient contrasts in some parts of the surveyed area to definitely conclude that the underlying rocks are not of uniform composition. Tentative contacts between augite-syenite, gabbro and greenstone are here inferred from the results and should be interpreted as lines separating areas of mainly one type of rock but not exclusively containing that type. The syenite-gabbro contact is believed to be gradual while the greenstone remnant in the western part of the area is represented by a very sharp low magnetic anomaly which indicates a probable sharp contact with the intrusive rocks.

ELECTRICAL RESISTIVITY SURVEY RESULTS

Electrical resistivity readings ranging from under 25 ohm/cms. $\times 10^3$ to over 1,000 ohm/cms. $\times 10^3$ have been registered over the surveyed claims. In general, the readings are quite low throughout the area but they tend to be on a lower level south of the interpreted syenite-gabbro contact. Three anomalies stand out as possible sulphide zones; they are lettered "A", "B" and "C" on Plan No.1.

Anomaly "A" lies within the interpreted gabbro area; low resistivity readings line up in a north-south direction for a total distance of about 1,000 feet; the contrast with neighbouring areas to the east and west is quite sharp with readings outside the anomalous area four or five times higher than within the anomaly. High magnetic readings occur to the west of the anomaly adding interest to this zone which in the writer's opinion should be investigated by drilling.

Anomaly "B" lies near the interpreted syenite-gabbro contact. Readings as low as 5 ohm/cms. $\times 10^3$ have been registered in this zone.
which lies within an area of general low resistivity interpreted as being underlain by augite-syenite.

Anomaly "C" is quite similar to Anomaly "A" but the contrast with readings to the east and west of the anomaly is not quite so sharp. However, this anomaly should be investigated by drilling if good results are obtained from drilling Anomaly "A".

RESISTIVITY SURVEY METHOD

The method used by Geo-Technical Development Company Limited is a form of the early resistivity or "mapping" methods, modified by some ten years of experience in the field.

In short, a known current is introduced into the ground, by means of two screen contacts which are separated by a distance approximately equal to three times the width of the property, at right angles to the base line. The contacts are spaced equi-distant from the central base line, and are on the opposite side of it. Readings are then taken at 50-foot intervals along the picket lines, by means of a sensitive vacuum tube voltmeter which measures the potential drop across the interval. The apparent resistivity is then calculated from the potential readings and current, in terms of ohm/centimeters.

MAGNETOMETER SURVEY RESULTS

High magnetic readings, nearly everywhere higher than 3500 gammas, were observed throughout the area surveyed. The only exception is in the west central part of the area where a sharp low magnetic anomaly exists which is possibly due to the presence of a greenstone remnant. Within the interpreted gabbro area the magnetic readings vary little above 3800 gammas and below 3600 gammas, a few readings above 4000 gammas were registered.
near Anomalies "A" and "C". Near the southern boundary of the area a more extensive zone of readings above 4000 gammas corresponds in position to a low resistivity area interpreted as being underlain mainly by augite-syenite.

INSTRUMENT DATA

A Canadian Research Institute type Vacuum Tube Voltmeter, Model E-9008A, with 100 microvolt full-scale deflection, together with a Canadian Fairbanks-Morse Onan Motor Generator Plant 115V., 400W., was used for the electrical resistivity survey.

For the magnetometer survey, a Wolfson type Magnetometer, with a sensitivity of 21.3 gammas, was used.

SURVEY DATA

Electrical resistivity and magnetometer surveys were carried out by Geo-Technical Development Company Limited, over part of your property in Pic Township, Fort Arthur Mining Division, Ontario. These surveys were conducted during the period from April 26th to May 2nd, 1956.

A north-south base line was established near the centre of the surveyed area and picket lines were turned off at right angles to the base line at intervals of 300 feet. The surveys were conducted along these established picket lines.

The millivoltmeter readings were taken at 50 foot intervals along the picket lines. These were converted to ohm/cms. x 10^3 and are plotted on Plan No.1 on the south side of the picket lines. A total of 6.4 miles of line was surveyed by the electrical resistivity method involving 675 readings.
The magnetometer survey was conducted over the same area with readings being taken at 100-foot intervals along the picket lines. These are shown on Plan No.1 on the north side of the picket lines. A total of 370 readings were taken along 7.0 miles of line.

The number of eight-hour man-days required to complete this work over the claim group is as follows:

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<th>Description</th>
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<tr>
<td>Operating Magnetometer Survey</td>
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<tr>
<td>Calculation and Interpretation</td>
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Respectfully submitted,

GEO-TECHNICAL DEVELOPMENT COMPANY LIMITED.

O.D. Maurice, Ph.D.,
Prof. Eng. & Geologist.

Toronto, Ontario
May 28th, 1956.
GEOPHYSICAL SURVEY DATA ON PROPERTY OF
ZULAPA MINING CORPORATION LIMITED
ELECTRICAL RESISTIVITY CONTOURS
CONTOURS OF MAGNETIC INTENSITIES
AND GEOLOGICAL INTERPRETATION
PIC TOWNSHIP
MARATHON AREA
ONTARIO

GEOPHYSICAL SURVEY BY
GEO-TECHNICAL DEVELOPMENT COMPANY LIMITED
PLN No. 1
APRIL 1956