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# REPORT ON
# INDUCED POLARIZATION SURVEY
# OF THE PROPERTY NEAR
# IRON MASK LAKE, KAMLOOPS, B.C.
FOR
AFTON MINES LTD.
BY
CANADIAN AERO MINERAL SURVEYS LTD.
Project No. 7002.

REPORT ON

INDUCED POLARIZATION SURVEY

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CANADIAN AERO MINERAL SURVEYS LTD.

Project No. 7002.

OTTAWA, Ontario.
September 22, 1966

W. Schuur,
Geophysicist.

CANADIAN AERO *Mineral Surveys* LIMITED

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Accompanying this Report:-

- Profile Presentation of apparent chargeability and apparent resistivity (2 sheets)

- Chargeability contour plan (a = 200 feet)

  Scale 1" = 200 feet.

## SUMMARY

During the period August 4, 1966 till August 17, 1966, Canadian Aero Mineral Surveys Limited conducted an induced polarization survey for Afton Mines Limited on their property near Iron Mask Lake, Kamloops, B.C.

The survey outlined four anomalous zones, of which two are recommended for immediate follow up. Four drill hole locations are given to check the source of these anomalies. The third anomalous zone must probably be explained as caused by magnetite and so must the moderate anomaly on line 156 East.

# REPORT ON INDUCED POLARIZATION SURVEY OF THE PROPERTY NEAR IRON MASK LAKE, KAMLOOPS, B.C. FOR AFTON MINES LTD.

## I. INTRODUCTION

During the period August 5, 1966 to August 17, 1966, an induced polarization survey was carried out by Canadian Aero Mineral Surveys Limited in the area near Iron Mask Lake, Kamloops, B.C. on behalf of Afton Mines Limited.

A total of approximately 94,000 feet was covered during the survey, including some 10,000 feet detailing over anomalous areas.

High sensitivity D.C. pulse-type equipment was used for the survey. A current on-time of 1.5 seconds and a measuring time of 0.5 seconds were employed. Attached to this report is a copy of a paper by Robert W. Baldwin entitled "A Decade of Development in Overvoltage Surveying". This paper gives a good description of the basic theory of induced polarization, the phenomena involved, measuring techniques and the interpretation methods.

At each observation point both primary voltages (steady state voltages) and secondary voltages (polarization voltages) are measured. The primary voltages are converted by formula to apparent resistivities expressed in units of ohm meters. The transient voltages are measured by integration, in units of millivolt seconds and divided by the corresponding primary voltages to obtain the apparent chargeabilities. The chargeability expressed in units of millivolt seconds per volt, or milliseconds, is the IP charaeteristic of that particular region.

Secondary voltages arise from the discharge of overvoltages which occur on interfaces where there is a transition from electronic to ionic conduction. This is the reason why the IP method of geophysical prospecting is particularly well suited for the detection of disseminated metallic sulphides. Certain other rock building minerals like graphite, serpentines and magnetite can give rise to overvoltage effects as well. At present, there is no way in which these latter effects can be distinguished from the effects caused by metallic sulphides using the IP data alone.

Throughout the survey a standard equispaced three-electrode array was used. With this electrode configuration one current electrode is placed at "infinity" (a distance more than 5 times the largest survey electrode spacing from any survey point) while the second current electrode and the two potential electrodes are equally spaced in line along the survey traverses.

An electrode spacing of 200 feet was employed and readings were taken at 200 foot intervals along the lines. In areas of interest this interval was decreased to 100 feet and in certain anomalous areas readings were taken using an electrode spacing of 100 feet and 50 feet as well, to provide additional information with regard to the change of electrical properties with depth.

The results are presented as combined apparent resistivity and apparent chargeability profiles at a scale of 1" = 200 feet. Apparent resistivities are plotted at a logarithmic scale of 2" = 1 cycle (100 - 1000 ohm meters) and apparent chargeabilities are plotted at a scale of 1" = 5 m. seconds. For the sake of clarity of presentation of the profiles, the lines are not spaced to scale.

The IP data obtained with the 200 foot spacing is also presented on a contour map, at a scale of 1" = 200 feet. The contour interval used is 2.0 milliseconds.

## II. SURVEY PERSONNEL AND EQUIPMENT

The personnel associated with the IP survey are as follows:

| | | |
|---|---|---|
| J. Irvine<br>Merritt, B.C. | - | Geophysicist (Field) |
| W. Schuur,<br>Ottawa, Ont. | - | Geophysicist |
| H. Stolz,<br>Ottawa, Ont. | - | Helper |
| W. Tschaikowsky<br>Ottawa, Ont. | - | Helper |
| N. Neale,<br>Lower Nicola, B.C. | - | Helper |
| G. Horne<br>Merritt, B.C. | - | Helper |
| R. Paradela<br>Ottawa, Ont. | - | Draughtsman |

The equipment used for the survey was a Seigel Mark V-A time domaine unit, built by Sharpe Instruments of Canada Limited.

## III. GEOLOGY

The geology of the area is described in Geological Survey Memoir 249 of the Canadian Department of Mines and Resources.

The area surveyed is underlain mainly by the Iron Mask batholith, varying in composition from syenite to ultrabasic types. Evaporites occur in a large portion of the area, probably as part of the Kamloops group. In the southwestern part of the property the presence of the Nicola group is indicated by the Geologic Map No. 886A, Nicola.

In various places in the Iron Mask Batholith are found indications of copper mineralization and in the cases of the Pothook Claim and the Iron Cap Claim, copper mining has been reported. The copper occurrences appear to be related to intrusives of picrite - olivine basalt - which is largely altered into talc. The assumed dip of the picrite is approximately $45^{o}$ to the south. A deposit of approximately $6x10^{6}T$ of magnetite is said to occur in the area. The magnetite is present as a series of veins of varying thickness, in the Iron Mask Batholith.

## IV. DISCUSSION OF RESULTS

The area surveyed can be roughly divided in two parts; a southwestern zone, characterised by overall extremely low resistivities of average 25 ohm meters, and with minimum values as low as 6 ohm meters and a northeastern half with resistivities in the order of 100 ohm meters. The southwestern half corresponds probably with the Kamloops Series which in this case appear to consist at least partly of evaporites. No significant anomalies were detected in this part of the survey area. The northeastern half probably corresponds with the Nicola Series and the Iron Mask Batholith. No distinction between these two formations could be made on the base of the IP data.

The main anomalous feature in this northeastern half is a long, more or less continuous zone of high chargeability readings, which extends from 117 North on line 84 East to 103 North on line 140 East and is still open to the East. The amplitude of the anomalies, however, is considerably less in the eastern part of the zone than in the remaining part. The zone itself appears to be built up by various smaller anomalous areas, situated in echelon along a strike of approximately N 110° E. In a number of cases the presence of two separate bands of anomalous readings is indicated. The northern most band normally corresponds with copper stains on the surface and in one instance previous drilling proved the presence of considerable copper mineralization: the area around 108 North on line 116 East and line 120 East. The southern most bands do not appear to have any surface indications of copper mineralization.

Iron stains at 105 North on line 120 East might indicate that pyrite is the main source of the anomaly.

IP data indicates a definite dip to the South of the source material of both the northern and the southern anomalous bands. A series of drill holes is suggested to investigate the structures to be collared respectively at 117 North on line 100 East, at 119 North on line 92 East and at 101 North on line 116 East. Drilling in these cases should proceed over 250 feet North along the line at an angle of -45°. Since the area around the shaft, corresponding with the northern anomalous band at line 116 East and 120 East has been extensively drilled, no further follow-up is recommended here.

Corresponding to rather intensive copper staining at the east side of the lake on line 88 Eaet is another strong multiple anomalous zone, with maximum readings on line 92 East of over 20 m. seconds on the 100 foot spacing. A rather shallow dip is indicated by the IP data. The best location to collar a drill hole to check the nature of this anomalous zone is at 129+50 N on line 92 East, to be drilled North along the line over 250' at an angle of -45°. This anomalous zone, II, appears to fall in line with a third zone of anomalous readings located around 126 N on line 110 E and possibly extending to 117 N on line 140 E. The anomaly on lines 112 East and 116 East presumably relates to a confirmed occurrence of magnetite. This is stressed moreover by the fact that the moderate anomaly, IV, at 116 North on line 156 East coincides with magnetite showings. In case the drill results on anomalous zone II prove the presence of substantial copper mineralization it is recommended to check anomalous zone III as well, to determine whether magnetite is the sole cause of the high chargeability readings or whether some sulphide mineralization is present as well. The best location for an eventual drill hole appears to be at 125 North on line 116 East, to be drilled over 200' North along the line at an angle of -45°. The moderate chargeability values observed on line 156 East around 116 North together with the presence of several small veins of magnetite appear to discard the possibility of sulphide mineralization as the source material of the anomalies.

## V. CONCLUSIONS & RECOMMENDATIONS:

The survey outlined four anomalous zones, two of which are almost certainly caused by magnetite. The main anomaly, I, extending for approximately 5000 feet across the property, corresponds in various locations with copper stains on surface and in one location - around 108 North on line 120 East - an appreciable amount of copper sulphides was detected by previous drilling. The other zone is located around a lake in the northwestern part of the property. Here, also, copper stains are present on the surface. The average percentage of sulphides indicated by the IP data is from 2½ - 6% by volume. Initial drilling is recommended on three difference locations on Zone I and on one location on Zone II:

ZONE I

(1) At 117 North on line 100 East, to be drilled over 250 feet North along the line at an angle of -45°.

(2) At 119 North on line 92 East, to be drilled over 250 feet North along the line at an angle of -45°.

(3) At 101 North on line 116 East, to be drilled over 250 feet North along the line at an angle of -45°.

ZONE II

(4) At 129+50 North on line 92 East, to be drilled North along the line at an angle of -45° over 250 feet.

Since the contour map suggests a relationship between Zone II and Zone III, the presence of sulphides can not be excluded for Zone III and in case of favourable results over anomaly II, a hole should be warranted to check the source of Zone III, which should be collared

(5) At 125 North on line 116 East, to be drilled North along the line at an angle of -45° over 250 feet.

Respectfully submitted,

W. Schuur,
Geophysicist.

OTTAWA, Ontario,
September 22, 1966.

# A P P E N D I X   I

The following Canadian Aero Mineral Surveys Limited personnel were necessary to the completion of the IP survey carried out from August 4 to August 17, 1966:

| | | No. of Man Days |
|---|---|---|
| W. Schuur, Geophysicist<br>Ottawa, Ontario. | (Field)<br>(Office) | 8<br>3 |
| J. Irvine, Geophysicist<br>Merritt, B.C. | (Field) | 3 |
| R. Paradela, Draughtsman<br>Ottawa, Ont. | | 3 |
| H. Stolz, Helper<br>Ottawa, Ont. | | 8 |
| W. Tschaikowsky, Helper<br>Ottawa, Ont. | | 8 |
| N. Neale, Helper<br>Lower Nicola, B.C. | | 3 |
| G. Horne, Helper<br>Merritt, B.C. | | 3 |
| | Total | 39 |

OTTAWA, Ontario.
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