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INDUCED POLARIZATION AND RESISTIVITY SURVEY
FOR
NEW IMPERIAL MINES LIMITED
BY
CANADIAN AERO MINERAL SURVEYS LIMITED
Project No. 9658

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CANADIAN AERO *Mineral Surveys* LIMITED

REPORT ON

INDUCED POLARIZATION AND RESISTIVITY SURVEY

FOR

NEW IMPERIAL MINES LIMITED

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CANADIAN AERO MINERAL SURVEYS LIMITED

PROJECT NO. 9658

OTTAWA, ONTARIO,
August 13, 1969.

K. Hendry,
Geophysicist.

CANADIAN AERO *Mineral Surveys* LIMITED

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REPORT ON
INDUCED POLARIZATION AND RESISTIVITY SURVEY
FOR
NEW IMPERIAL MINES LIMITED

I. INTRODUCTION

During the period from June 25 until July 25, 1969, Canadian Aero Mineral Surveys Limited carried out an induced polarization and resistivity survey for New Imperial Mines Limited, on the Copperbelt near Whitehorse, Yukon.

Areas surveyed include Best Chance, Bear Cub, and Cowley Park Pie.

II. GEOLOGY

All of tne known deposits have been described as contact metasomatic and occur in the skarn zones of the Lewes River limestones in association with the coast range intrusives of the area. The main economic minerals are bornite and chalcopyrite. Other known mineralization in the area which is detected by the induced polarization method includes magnetite, pyrite and carbonaceous limestones.

III. SURVEY PROCEDURES

A three-array electrode configuration was used throughout the survey with electrode spacings (a) of 200', 400' and 800'. Several expanders were run to determine depth of overburden in the Best Chance area and depth to response at the Cowley Park Pie grid. The expanders employ variable spacings: 10', 15', 20', 30', 40', 60', 80', 120', 240', 320', 480'.

IV. COMPARISON OF 1968 - V.s. 1969 SURVEY

The 1968 survey done by Canadian Aero Mineral Surveys Limited employed a pulse type MARK V Sharpe transmitter-receiver combination with current on time of 1.5 seconds. Timing is achieved by direct coupling of the transmitter and receiver. Sensitivity is limited to about 30 millivolts of primary voltage. Chargeability is calculated by dividing the secondary voltage Vs. by the primary voltage Vp. Sp. corrections are done manually.

The 1969 survey employed the same transmitter. However, a Newmont type receiver built by Data Control Systems was used. Timing was changed to 2.0 seconds ON, 2.0 seconds OFF, 2.0 seconds ON current reversed, 2.0 seconds OFF. The integrator was adjusted to give values corresponding to a 3.0 seconds ON, 3.0 seconds OFF transmitter cycle to conform to a standard. Timing is accomplished by remote triggering via the primary voltage. The drop in primary voltage at the end of 2 seconds initiates the receiver timing. After a delay of 0.45 seconds to avoid coupling and transient effects, the integrator is turned ON for 1.10 seconds to automatically integrate and sum the area under the decay curve. This is read directly on a meter. Averaging is accomplished subjectively by taking several readings and objectively by the instrument.

A comparison of chargeability values from both surveys indicates a factor of about 1 to 3.5 old to new. The highest values in 1968 are about 15 milliseconds; 45 milliseconds (1969 survey)

would compare to this with the new equipment.

Lines 80 - 108 on Pie grid were repeated this year although on a larger spacing. Background values seem to be about 9 - 14 milliseconds. The 1968 survey values obtained were 2 to 4 units over the same area.

Apparent resistivity values are measured similarly and results are directly comparable (allowing for material changes over time due to water levels etc.). The sensitivity of the Newmont receiver is 0.3 millivolts of primary voltage.

V. DISCUSSION OF RESULTS

A. Best Chance

Due to extensive swamps and overburden, the geology of Best Chance is not known exactly. It is thought that several rock type changes occur in the area including an intrusive-limestone contact which could be of interest.

The eastern part of lines 16 and 24 are in intrusive with the contact at 1300E on line 16S. The low resistivity to the west of the intrusive and on many other lines may be a conductive greywacke or "dirty" limestone.

A high resistivity feature (100 ohm meters) trends south-east along the base line and loops west and then east from lines 84S to 120S. The contrast from the conductive material (40 ohm meters) to this rock (100 ohm meters) is not sufficient for a typical limestone-intrusive contact (400 ohm meters - 1000+ ohm meters) nor are the values typical of an intrusive which usually

is greater than 1000 ohm meters.

This trend also approximates a feature found by the EM-16 survey.

The apparent chargeability does not aid in the interpretation as it is without significant features. Background values pre-dominate (M = 6-10 milliseconds). The 400' spacing values are slightly higher whicn is normal as the masking effect of the overburden is less. Very little sulphide mineralization is present in this area.

Expanders

3 expanders were run: No. 1 at line 72S - 7W, No. 2 at line 120S - 2W, No. 3 at line 32S - 2W. They were oriented north-south to avoid swamps and hillside effects. The main purpose was to obtain depth to bedrock and the results show No. 1 - 23' deep, No. 2 - 35' deep, No. 3 - 20' deep.

B. Bear Cub

This area is near the Gem deposit and the purpose of the survey was to find and outline a body trending NW along the base line near the center of the grid.

Anomaly "A" lies along the lake and at the west end of lines 4N to 16N. The limestone outcrop in this area contains visible carbonaceous material which is probably responsible for the magnitude of the chargeability (40 milliseconds on line 8S).

The carbonaceous material at surface suggests that the response is not due to sulphides. This anomalous area also extends southwards (zone "A") to the south end of the grid.

Apparent polarization values of 55 milliseconds are found at the west end of line 28S. This zone is also in an area of limestone and except for a break (lines 4N to 2S) seems to be the same feature as zone "A".

C. Cowley Park Pie

This area has been mapped as intrusives. Several test pits in the area contain visible copper sulphides as "porphyry" type mineralization in contrast to the skarns. However, the bodies must be small as the 1968 survey with 200' spacing did not detect anomalous readings. Expanders run in the area of one of the pits L106E - 5S, detected M = 50 ~~90~~ milliseconds over a background of M, = 4.2 milliseconds at a depth of about 20 feet. This suggests that the bodies are small and narrow. Short spacings (50') would pick up the zones as they are fairly close to the surface.

Other than on lines 112E and 120E, few significant features appear. Lines 112E and 120E extend 4800'S of the base line and use an 800' spacing to test for contacts. The resistivity does not seem to change significantly but there is a chargeability contact at 22S on line 112E and 26S on line 120E. Background to the north of this is 10 - 15 units at this spacing while anomalous values 24-26 units occur to the south.

This change may be due to rock-type change or a change in polarizable material. The latter is more probable as there is no significant resistivity change.

The anomaly found on line 80E 1968 survey, does not appear using the larger spacing. This may mean the response was at surface.

VI. CONCLUSIONS AND RECOMMENDATIONS

Absence of anomalous response on the Best Chance area suggest little of economic interest. However, the survey outlined a resistivity feature which coincides with a EM-16 feature. Tne significance of the feature is unknown but as there seems to be no sulphides, interest is only academic.

The Bear Cub area is favourably situated on a limestone-intrusive contact. However, it is thought that most of the response is due to carbonaceous content in the limestones. If this is true then no further work is necessary.

Cowley Park Pie area is situated on an intrusive with porphyry-type copper occurrences. The size of the bodies seems to be small as neither the 200' nor 400' spacings used, revealed anomalous results. However, the expander run perpendicular to the line direction revealed high chargeability values at 50'. As the deposit appears very small, interest may be only academic.

A drill hole if desired should be placed 107 + 00E, 5 + 00N on the Cowley Park Pie grid. Response is not evident below 150'.

Respectfully submitted,

K Hendry

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August 13, 1969.

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