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SOME COMMENTS ON GEOPHYSICAL SURVEYS
 CARRIED OUT IN THE MT. LYELL AREA, 1967 TO 1971
 BY McPHAR GEOPHYSICS AND
 COMPAGNIE GENERALE DE GEOPHYSIQUE
 ON BEHALF OF
 THE MOUNT LYELL MINING AND RAILWAY COMPANY LIMITED

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SYDNEY, N.S.W.

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S U M M A R Y

The present brief report lists the conclusions and recommendations of a study of the geophysical data acquired by the Mount Lyell Mining and Railway Company Ltd. between 1967 and 1971.

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INTRODUCTION

At the request of Mr. K. Reid, Chief Geologist for the Mount Lyell Mining and Railway Company Ltd., Mr. A.W. Howland-Rose, Geophysicist of Scintrex Pty. Ltd. revised the Induced Polarization data from surveys in the general Mt. Lyell area acquired during exploration programmes from 1967 to 1971.

After an initial study it was decided that the most meaningful approach would be a geophysical review with an emphasis placed on those areas of greatest geologic interest. Therefore the data was reviewed by the author together with Mr. K. Reid in Queenstown on the 19th and 20th October, 1973.

As a result of this review, additional processing was carried out in Sydney and the conclusions and recommendations are the subject of this brief report.

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McPHAR DATA - MT. TYNDALL

The data reviewed was contained in two reports signed by Phillip. G. Hallof dated 9th January, 1967 and 4th June, 1968.

The McPhar data displays only the apparent resistivity expressed in ohm-feet/2 γ and the apparent metal factor. In the present circumstances the target mineralisation is essentially disseminated within a broad halo around a core of economic mineralisation which may be somewhat more conductive. The large resistivity contrasts between the non-oxidised geologic units in the area and the glacial moraine and button grass swamps which often overlay them make a purely metal factor approach unsatisfactory. The frequency effects have been therefore calculated for the dipole-dipole n=1 spacing for 300 feet and for all zones considered to be of interest. This data has been marked in red on the pseudo-sections.

The method employed in the McPhar reconnaissance survey was dipole-dipole at 300 feet spacing for n=1 to n=4 which gives effective spacings from 300 feet to 1200 feet. This spacing of course averages out a large volume at depth and for shallower bodies the readings to depth are very much influenced by the shallower sources. For this reason limited gradient array surveys are recommended to detail

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these areas. In addition gradient lines have been recommended where ambiguity as to source position arises due to multiple sources.

The zones referred to below are defined on McPhar drawing IPP 4402 dated May, 1968. Each zone is described separately below:

EASTERN GRID

Zone A

The highest frequency effect readings of 5 times background were located between 2W to 2E. There is some general reduction in the local bulk resistivity to 20% background, but the inferred interconnection between grains is minimal. Certainly much narrower massive zones would not be readily delineated in this zone, but conduction seems near surface on both the a=300 and a=200, n=1 spacings.

The following gradient detail is proposed. Current dipole at 10W and 10E on line 6 with a 100 foot potential read:

Line 6 + 00	6W - 3E
Line 6 + 400S	0 - 8E
Line 6 + 400N	2E - 5W

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Zone B

PFE values of over 3 times background centred at 52.5E on line 4 coincide with a material reduction in apparent resistivity. A single gradient line with current dipoles at 66E and 46E is recommended with 100 foot potential readings at 49.5E to 59.5E to investigate the target zone centred at 52.5E.

Zone C1

The Tyndall No. 1 drill hole on line 12 appears to have intersected the source of the anomaly in this zone.

Zone C3

The surface conductivity on line 22 over this anomalous zone is considered encouraging therefore additional gradient lines are recommended as follows:

Line 22 + 00 18W - 26W

Line 22 + 200S 18W - 26W

Line 22 + 200N 18W - 26W

Using a current dipole at 8W and 22W

Zone C4

The McPhar data shows a high metal factor anomaly between 30W and 33W on line 28. However, the 100 foot dipole shows the highest induced polarization response to be between 29W

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and 31W. The estimated depth is of the order of 120 feet at 30W. This zone is recommended for gradient array detail on line 28 with current electrodes at 25W and 35W. A potential 100 foot dipole should be used to investigate the resultant potential field.

On line 34 the 200foot dipole-dipole data infers a maximum depth of the order of 160 feet and the zone has a width of the order of 100 feet at 20W. A disseminated zone is suggested in spite of some decrease in apparent resistivity.

WESTERN GRID

Zone VII

Further gradient array detail is recommended on line 26 to investigate zone VII as follows: Current dipole should be set out with one electrode on the road (0) and one at about 20W. A 100 foot potential should be used to investigate the field between 9W and 18W:

Zones IV and VI

Also on line 26 the above zones should be further investigated from a current dipole placed at 10W and 30E. The potential field should be read between 0 and 24E at 100 foot intervals, and should results warrant, lines 24 and 28 should also be

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investigated over this interval using the same current dipole.

C.G.G. DATA

The method adopted by CGG of pole-dipole of high 'n' values is considered entirely valid and very little can be added to the conclusions that Mt. Lyell personnel have already reached as a result of their study of the data. Some additional drilling targets are suggested as is additional induced polarization surveying.

On Red Hills anomaly 'A1' is recommended for additional drilling to investigate a significant chargeability high of some 40 milliseconds above background centred at 22E. The maximum depth is considered to be less than 150 feet, the width of the source about 80 feet and essentially of a disseminated nature, in spite of some reduction in apparent resistivity over the section. A second chargeability peak at 28E was also defined and should receive further attention. The relevant data is presented on CGG Plate 8.

In the Rolleston survey a number of minor chargeability peaks coincide with significant geochemical anomalies. A re-contouring of the chargeability has been attempted on Plate 8 on the western ends of lines 114S to 144S. The zone of the 8 millisecond contour should be carefully

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investigated and drilled if considered of interest. The chargeability is best defined on lines 114S and 120S. The offset of a pole-dipole array may warrant gradient array detail over this zone prior to drilling in order to locate a precise target. Attention is drawn to Plate 7 of the Red Hills area for the varying position of the pole-dipole data in contrast to the clear, unambiguous positioning afforded by the gradient array data on the same line.

One additional area at Rolleston also warrants further careful investigation. This is a 12 millisecond zone 500 to 70 feet east of the presumed baseline on line 144S (Plate 7). This anomaly is coincident with a geochemical response and additional geological mapping and soil sampling should be considered. If results warrant, a small gradient set-up over this zone may be considered prior to investigation by diamond drilling.

GENERAL RECOMMENDATIONS

1 - All $n=1$ frequency effect values have been calculated for $a=300$ for the McPhar data. It is recommended that a contour map of these values should be drawn up by Mt. Lyell and in addition a contour map of the resistivity data also be prepared. This data, in conjunction with the outcrop map and magnetic contour map should enable an improved geological map to be

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compiled for the area in the same fashion as was done on the Henty Fault area.

2 - A small blind zone in the Tyndall area between and including lines 38 to 40 should be surveyed using a gradient array and the data incorporated into the existing contour maps for the area.

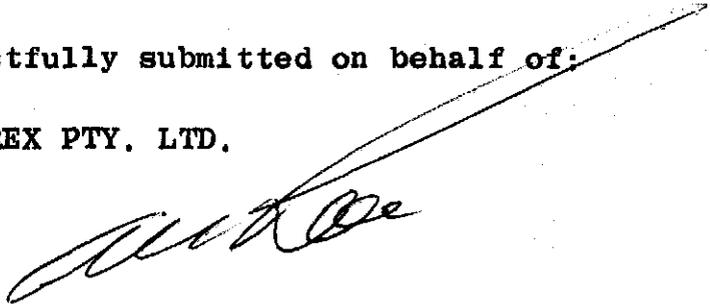
COMMENT

The above notes form only the conclusions recorded after a study of the data in conjunction with Mr. K. Reid of the Mount Lyell Mining and Railway Company Ltd. Detailed reasoning is not given.

I look forward to discussing the results of the additional geological, geochemical, geophysical and drilling work recommended as a result of this review.

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.


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GEOPHYSICIST