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COMMENTS ON
GRADIENT ARRAY EIP SURVEYS
GOOSENECK GRID
NEAR QUEENSTOWN, WEST COAST TASMANIA
ON BEHALF OF
MT. LYELL MINING & RAILWAY COMPANY LTD.

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PRIVATE AND CONFIDENTIAL

COMMENTS ON
GRADIENT ARRAY ELECTRICAL INDUCED POLARIZATION SURVEYS
OVER SECTIONS OF FOUR LINES ON THE GOOSENECK GRID
NEAR QUEENSTOWN, WEST COAST TASMANIA
ON BEHALF OF
THE MOUNT LYELL MINING AND RAILWAY COMPANY LTD.

BY

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GEOPHYSICIST

SYDNEY, NSW

MAY, 1977

TAS-035A

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CONTENTS

Summary	
Introduction	Page 1
Method and Equipment	Page 1
Data Presentation	Page 2
Discussion of Results	Page 2
Conclusions	Page 5
Plate 1 - Data Profiles	

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SCINTREX PTY. LTD.

GEOPHYSICAL CONSULTANTS AND CONTRACTORS

SUMMARY

Significant electrical induced polarization responses were recorded on lines 80S and 86S, both of which are recommended for further careful ground follow-up. These responses are due, for the most part, to a disseminated chargeable source (either graphite or sulphides), but significantly, both contain relatively conductive sections which imply an interconnection between the chargeable grains.

Lines 92S and 98S gave no anomalous responses.

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INTRODUCTION

As part of the Mt. Lyell Mining & Railway Company's 1976/77 field programme, Chief Geologist Mr. K. Reid requested Scintrex Pty. Ltd. to survey sections of four lines over the Gooseneck grid using the electrical induced polarization method in the gradient array configuration.

The work was carried out over about 3 days including 24th and 25th November, 1976, by Scintrex operators R. Lindberg and N. Montgomery BSc., assisted by field hands L. Jones, O Saeck and G. Price. On site geological supervision was undertaken by Senior Geologist P. Brophy, while A.W. Howland-Rose provided geophysical supervision.

The objective was to ascertain the electrical induced polarization and apparent resistivity signature over those lines.

METHOD AND EQUIPMENT

These are described in reports TAS-035C and TAS-035D and the reader is referred to those reports for details.

DATA PRESENTATION

The data profiles are displayed on Plate 1 at the horizontal scale of 1:2400 and vertical scales of 1 inch = 10 milliseconds, and 2 inches = 1 logarithmic cycle for apparent resistivity expressed in ohm-metres.

DISCUSSION OF RESULTS

Each line is separately discussed below.

LINE 80S.....Between about 00 and 1400E, background chargeabilities remain a low 5 to 10 milliseconds, while apparent resistivity varies between 5000 and 11000 ohm-metres. The rocks which underlie this section are most likely to be acid and low in mafic minerals.

Between 1400E and 2150E, the chargeability *doubles* to 20 milliseconds, while the apparent resistivity falls from about 10,000 ohm-metres to less than 2500 ohm-metres. This rock unit is obviously different to those seen to the west of 1400E, but it should be noted that the boundary is gradational.

Centred at 2450E is a most significant response of about 40 milliseconds superimposed on a 15 to 20 milliseconds background with a dramatic fall in apparent resistivity to 500 ohm-metres from 5000 ohm-metres, 100 feet to the east, and 2000 ohm-metres 120 feet to the west. Now although the peak value is recorded at 2450E, the anomaly source *may* be centred at 2400E.

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The maximum depth to source is considered to be less than 100 feet, while the source width may also be of the same order. Now it is considered that both the high chargeability and the low resistivity (of 500 ohm-metres) both *understate* the *actual* properties of the zone, the latter by perhaps one order of magnitude. The *form* of the response *suggests* a major source centred between 2400E and 2450E with minor sources centred between 2250E to 2300E and at 2550E.

The source of this response is clearly due to chargeable material which has a conductive core. As such this response has obvious interest as a "Henty Fault Type" zone, as its characteristics are very similar.

LINE 86S.....This line is situated approximately 600 feet south of line 80S, and 00 on line 86S is approximately equivalent to 3000E on line 80S.

West of 1100W the chargeability level of 10 milliseconds and the resistivity level of about 4000 to 5000 ohm-metres is similar to that seen west of 1400E on line 80S, and the underlying rocks are therefore considered to be similar. Of note *within* this unit, a low resistivity of 1500 ohm-metres was recorded at 1350W compared to 4000 ohm-metres resistivities to the east and west of this point. There is no material change in chargeability so this change is due wholly to resistivity and therefore

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compositional change within the rocks. (as opposed, say, to oxidation).

Between 1100W and 00, chargeabilities rise from the low background of 10 milliseconds to over 35 milliseconds. This change is accompanied by material changes in apparent resistivity, which are not entirely sympathetic. The lowest resistivities of 400 ohm-metres were recorded at 600W, and while the coincidental chargeabilities are some 15 milliseconds above background at this point, they *do not* reach their maximum value until 200 feet east of this low. Now, this could be due to the interconnected chargeable material having a *lesser surface area* and therefore a *lesser induced polarization effect*.

The maximum chargeability on this line was recorded between this resistivity low feature at 600W and 00 the sub-baseline. Two broad but distinct peaks of about 25 milliseconds *above* background were noted at 350W and 150W. The former is associated with *rising* resistivities of about 1000 ohm-metres, while the latter has coincident resistivities of about 2500 ohm-metres. The eastern boundary of the zone is sharp and is situated at 00.

The maximum depths of the above responses are difficult to gauge with accuracy due to their not having sharp boundaries (with the exception of the eastern boundary). However, they are *guesstimated* to be of the order of 200 feet at most. This zone probably

008

represents the southerly extension of the anomaly seen to the north on line 80S, but in this case there is a more extensive disseminated sulphide (or graphite?) halo on the eastern flank. The continuation between lines is *probably* the resistivity low i.e., 80S/2400E to 86S/600W.

LINES 92S and 98S.....The background resistivities of about 2000 and 4000 ohm-metres and the apparent chargeability background of between 8 and 14 milliseconds are indicative of acid to acid-intermediate rocks only. There are no significant responses on either line.

CONCLUSIONS

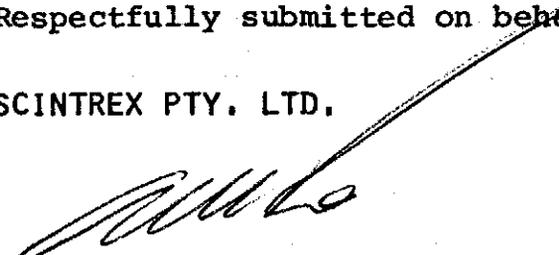
- 1 - It is considered that the sharp, significant chargeability response on line 80S centred at 2400E/2450E is due to interconnected chargeable material surrounded by a fairly limited disseminated halo, the source of which is at a maximum depth of about 100 feet. This response is considered worthy of detailed ground follow-up as a "Henty Fault Type" zone.

- 2 - On line 86S three significant events were recorded, within a zone whose limits were from 00 in the east to approximately 1000W in the west. Conductive chargeable material centred at 600W is the most significant, with disseminated chargeable material centred at 400W and 150W.

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- 3 - It is considered likely that the resistivity low at 600W on line 86S is the correlative of the resistivity low at 2400E on line 80S. As both are chargeable (see above) the source is considered to be weakly interconnected chargeable material.
- 4 - No significant events were recorded on either line 92S and 98S, although the low apparent resistivities indicate both lines to be underlain by geological units different from those observed to the west of the major anomaly on lines 80S and 86S.

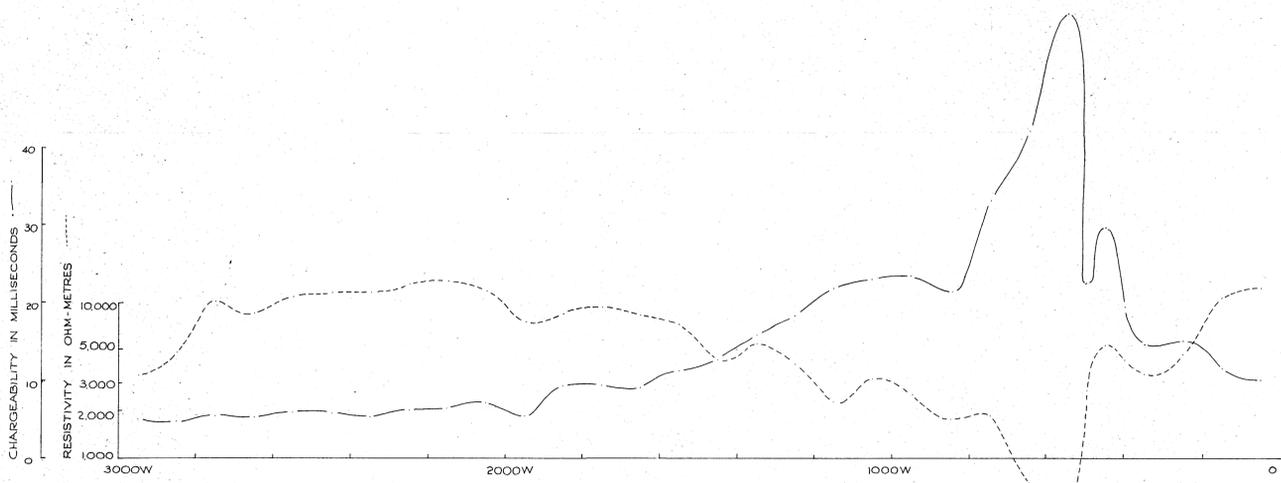
Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

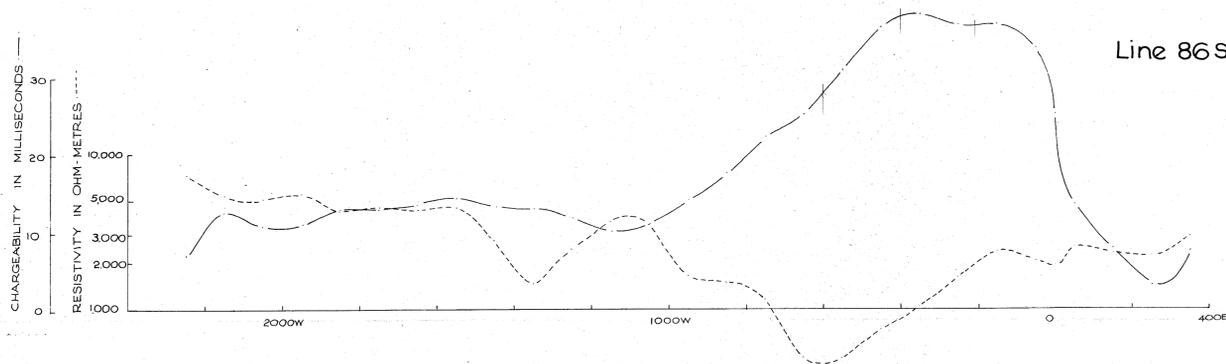


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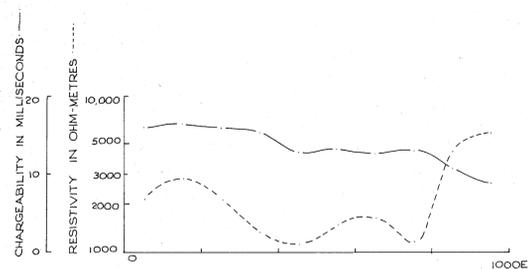
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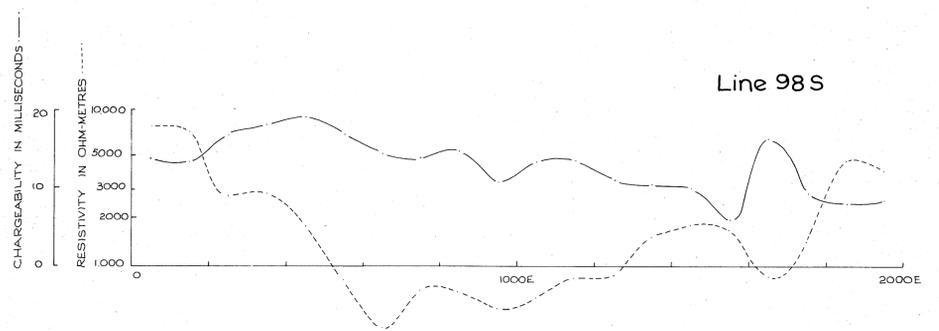
Line 80S



Line 86S



Line 92S



Line 98S

MOUNT LYELL MINING & RAILWAY COMPANY LTD.

GOOSENECK GRID

(Nr.) QUEENSTOWN - WEST COAST - TASMANIA

ELECTRICAL INDUCED POLARIZATION SURVEY
GRADIENT ARRAY
DATA PROFILES



SURVEYED & COMPILED BY
SCINTREX PTY. LTD.

NOVEMBER 1976



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