

General Rep No 11

421001

McPhor R.E.M. Unit

58-218

GEOPHYSICS

McPhor R.E.M. Unit
L.E.E. 24/4/58

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LYELL - E.Z. - EXPLORATIONS

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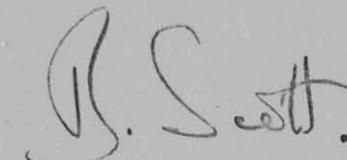
Memorandum to Mr. G.F. Hudspeth.

24th April, 1958

McPhar R.E.M. Unit

Attached is a brief report on recent work carried out by Paltridge and Rodda on this geophysical unit. The work was carried out in order to familiarise personnel with this equipment.

The findings are the same as in my previous report - GP8 of February, 1958.



Geologist-in-Charge.

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421002

GENERAL
GP8

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LYELL - E.Z. - EXPLORATIONS

GP9

421003

22nd April, 1958

To: Mr. G.F. Hudspeth.

Report on Testing of the McPhar R.E.M. Unit

This report includes results of six tests carried out with the McPhar R.E.M. unit on the 15th and 17th April. These tests were carried out around Queenstown at various localities described below. At the same time, experiments were carried out to determine the effect of orientation of the transmitter and receiver upon the dips recorded.

Attitude of the Instrument

As stated in the McPhar manual, the attitude of the transmitter is extremely critical, and unless it is held exactly horizontal, dip readings are obtained on the clinometer which are at least as great as any of the readings noted during these tests, i.e. 2° . This fact was checked by resting the transmitter in appropriate positions, although the bubble of the level was still within the scribe marks. Hence, a very slight inaccuracy in levelling the instrument will result in a greatly altered distortion of the induced field and consequently in the clinometer readings.

Results obtained at various localities

- (i) Culvert some 200 yards from Mount Lyell Substation.

Conditions at this locality were the worst of all. The culvert consists of a large steel or iron pipe (approximately 5'6" diam.) beneath about 3' of fill. Some 10' away is a second iron pipe (10" diameter) beneath about 4' of fill. The results of a traverse, using the

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broadside method, across these two pipes are shown in Graph 1. At station 4 no null point could be obtained on 5 kc. because of interference, but it has been assumed that the two graphs have the same form. The results of this traverse do not yield a graph of the standard form shown on Graph 1, but this may be due to the proximity of the Mount Lyell substation some 200 yards away and its associated wiring. This may be the reason for the anomaly curve being abnormal. In any case, the dip readings are far too small to give a precise location of such a good conducting body as a steel pipe.

(ii) Fuel installations, Lee Field.

At this place, traverses were made using both in-line and broadside methods. The installation consists of 2 x 850 gallon tanks buried 3 to 4' beneath the surface.

(a) The broadside method gave an excellent indication of the location of the tank and in this case, the graph obtained, 2a, conforms to the standard pattern shown on Graph 1. However, the maximum inclination of the resultant field was again very low, 2° , and this low value was the only shortcoming of the test.

(b) Three traverses were made using the in-line method and the results of these are shown on Graph 2b. Unfortunately, it was not possible in the confined space to make these traverses as long as desired, but they give results having the form of the standard in-line graph shown on Graph 3. Again the readings show but slight variations.

(iii) Pipeline on hillside just south of the Mine Office.

A broadside traverse run at this point gave the results shown on Graph 3. In this case, there is a difference in the form of the

graphs for 1 and 5 kc. The 5 kc. graph shows a pronounced southerly dip which has no counterpart in the 1 kc. graph. This is probably due to the greater penetration obtained with the 1 kc. transmission (which is not so much affected by surface conductors as the 5 kc. transmission) since, at this place, there was a small quantity of rusted iron on top of the ground. However, again the graphs are of the standard form.

Summary and Conclusions

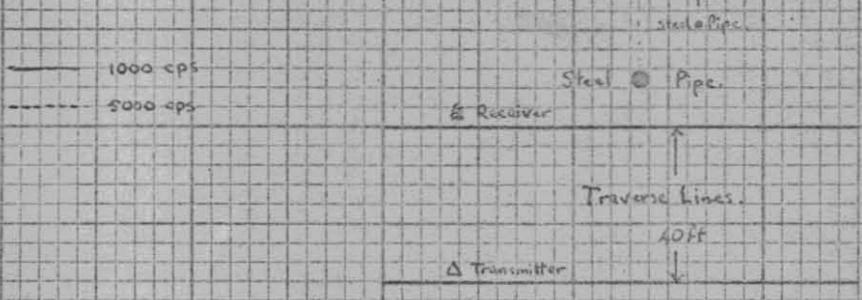
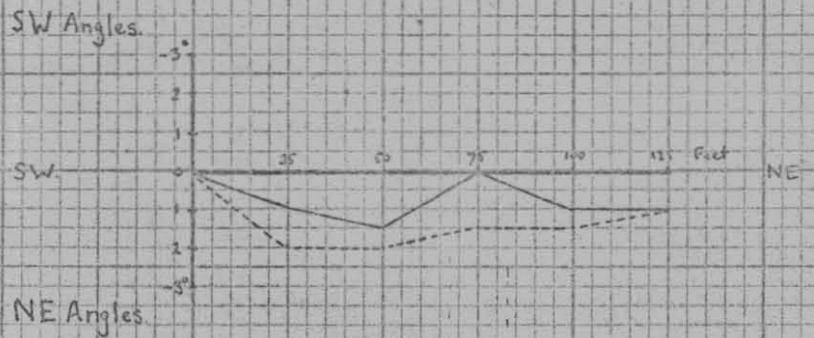
In most cases, the instrument functioned correctly, the only exception being near the substation where the anomalous results could be due to the proximity of several conducting masses. In all other cases, the curves are of the appropriate form and correctly situated along the traverse with respect to the conductor.

The only failing of the instrument is the lack of sensitivity. A reading of 2° could quite easily be due to mislevelling of the transmitter and in no case was an inclination of greater than $2\frac{1}{2}^{\circ}$ found. This lack of sensitivity is apparently due to some malfunctioning of the instrument as tests carried out by the manufacturers on the same type of instrument show that it should be capable of much higher sensitivity. If the sensitivity cannot be improved, fitting the transmitter with some form of easily transported support would probably result in much more satisfactory results.

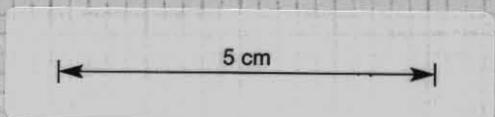
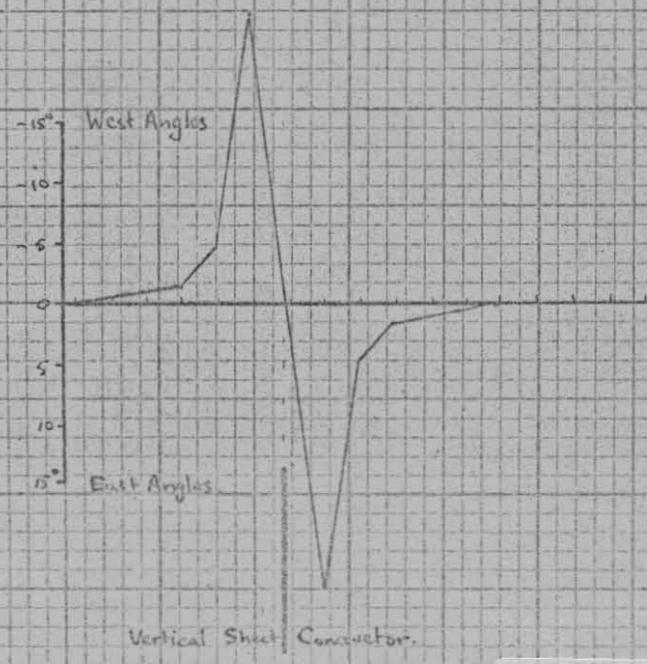
P. Rodola.

Michael Partridge

R.E.M. TRAVERSES - GRAPH No 1



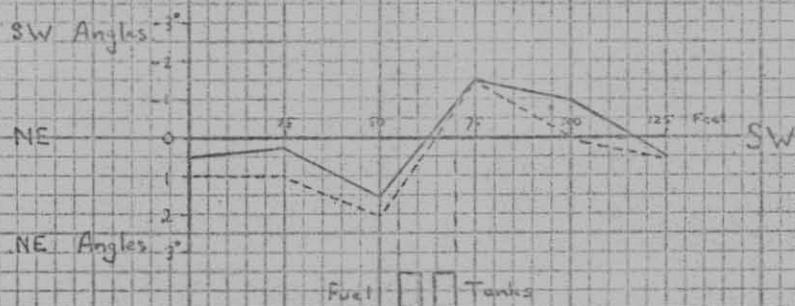
Theoretical Curve for Broadside Method



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R.E.M TRAVERSES - GRAPH No. 2

(a) Broadside Method

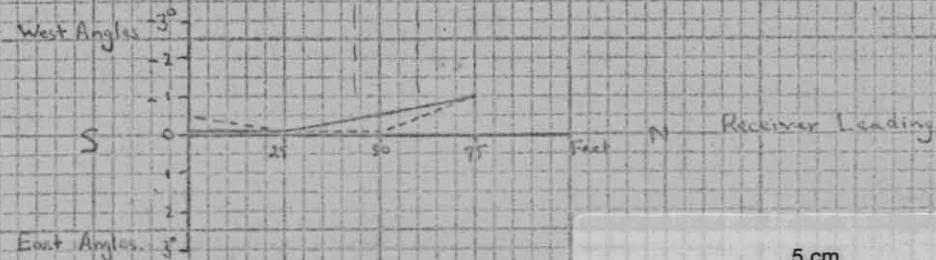
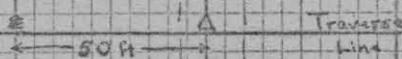
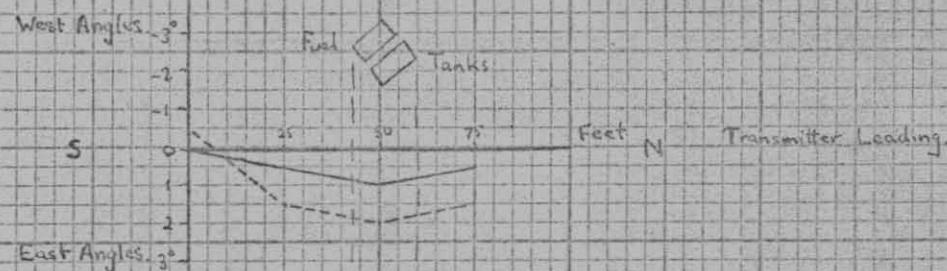


1000 cps
 5000 cps



Receiver
 Transmitter

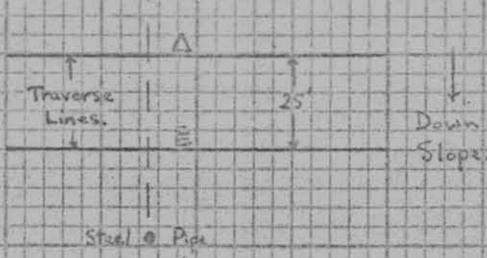
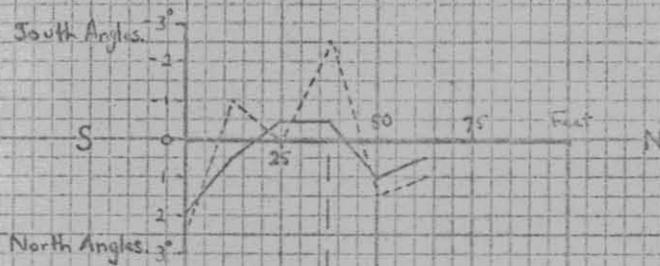
(b) In-line Method



5 cm

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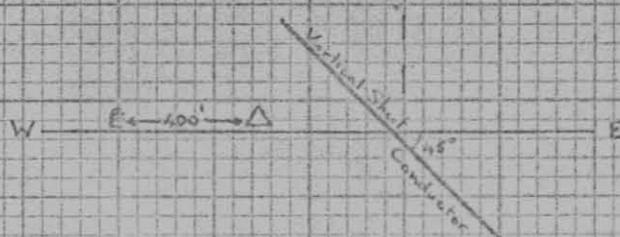
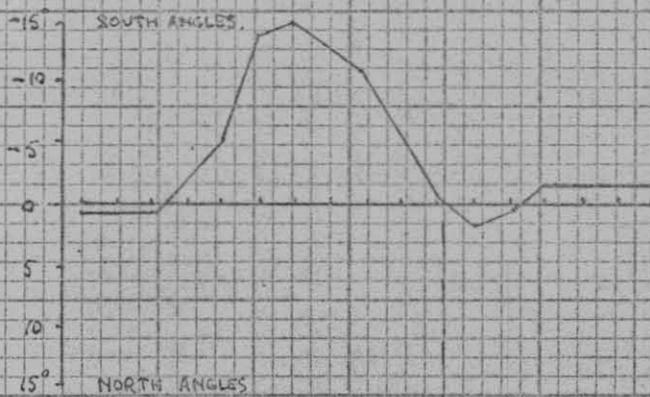
R.E.M TRAVERSES - GRAPH No. 3.



— 1000 cps.
- - - 5000 cps.

△ Transmitter.
⊗ Receiver

Theoretical Curve for In-line Method.



5 cm