

REPORT ON A
TURAM ELECTROMAGNETIC SURVEY
CUNI, ROSEBERY,
NORTH-WEST TASMANIA
ON BEHALF OF
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA

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S U M M A R Y

A turam electromagnetic survey carried out over the properties held by the Electrolytic Zinc Company of Australasia in the Cuni Area, near Zeehan, Tasmania delineated some two dozen electromagnetic conductors.

No drilling has been recommended on this data alone. However the variation of the conduction characteristics noted in the present survey together with the magnetics and follow-up geochemistry recommended in this report will provide the data required to plan a meaningful drilling programme for the next Summer season.

The results to date are considered encouraging.

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INTRODUCTION

At the request of Electrolytic Zinc Company of Australasia, Seigel Associates Australasia Pty.Ltd. executed a Turam electromagnetic survey at Cuni, Melba Flats, near Zeehan, North-West Tasmania.

The survey was executed between 1st and 19th December, 1970, and 6th to 17th January, 1971. Mr. E. Hope carried out the field survey with field hands provided by the E.Z. Company; Mr. A. W. Howland-Rose provided technical supervision.

The purpose of the survey was to attempt to define and extend known occurrences of nickel sulphide deposits associated with dolerite dykes.

The property is very accessible and can be reached by road conveniently from Zeehan - Renison Bell main road in dry weather.

The area is swampy and water-logged most of the year round and over most of the area the present water-table is at ground level.

EXPLORATION HISTORY

Nickel Reward, South Cuni, North Cuni - Gennets Winze and other small deposits have been worked from time to time. Self Potential, limited turam and induced polarization work was carried out by the Bureau of Mineral Resources in the late 1950's and early 1960's. The author was involved in the late phase of this work. In addition a 100-ft. or 50-ft. shallow auger geochemical sampling programme was carried out, which delineated anomalous copper and nickel over known deposits as

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well as at several new localities.

DISCUSSION OF RESULTS

The profiles are displayed on Plate-2. and are plotted on a horizontal scale of 1-inch - 200-ft., and vertical scales of 1-inch - 10° phase shift, and 1-inch = 0.2 field strength ratio.

The conductor axes with the maximum depths to the top of the conducting axis, together with their respective conductivity width (r/d) ratios are plotted on Plate-1. to a scale of 1-inch = 200-ft.

A typical set of r/d values together with maximum depths for most conductors are listed in Table -1.

All depths mentioned are maximum depths to the top of the conducting axis. Multiple conduction due to one or more conductors in close enough proximity as to prevent clear resolution with the coil-spacing used will often result in an over-estimate of depth. This is particularly so of the multiple conduction due to sediments.

Low r/d values are indicative of good conduction, particularly if they persist at lower frequency. However, it is important to realise that good conduction is not necessarily a sign of economic mineralisation. What is important is the correlation of the anomalies with geological and geochemical data. The mode of occurrence of the mineralisation - whether it is pod-like or occurs in an electrically continuous mode, has a greater bearing on the conductivity than does the actual composition or grade.

At Cuni the more interesting anomalies generally appear to have (i) limited strike length, (ii) moderate conductivity, and (iii) are clearly discernable at both the 200 cps and 400 cps frequencies employed on this survey.

DRILL SECTIONS

Previous drilling across known nickel sulphide occurrences at Cuni proved invaluable in evaluating the application of the method in the area.

1. Correlation between the Turam electromagnetic anomaly on section BH was excellent. The anomaly peaks some 40-ft. East of the outcrop where a depth of some 60-ft. (\pm 10%) is indicated to the conductor. From the known geology (surface and drilling) this is precisely where the source is located.
2. On line BF, the drill section is some 25-ft. North of the line, and this together with the uncertain strike of the nickel sulphide zone between lines BF and BG due to faulting makes comparisons somewhat difficult. However the anomaly appears to be in about the correct location.
3. Unfortunately between BN and BM the conductive body again strikes 45° to the traverse line and comparison is difficult. However as above, the electromagnetic indication appears to correlate well with the known position of nickel sulphides.
4. Section AA through drill holes BH3 and MFP111 show good correlation with the known sulphide position.

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Generally good correlation is seen between known sulphides and the electromagnetic conductors.

ZONE NI

This broad, weak indication is seen only on line CQ at 200E, and is considered to be due to either weak surface conduction or multiple conduction in sediments.

ZONE N2

Zone N2 trends NNW and is seen on lines CM, CK and CH at about 0, 050E and 150E. The r/d values indicate weak - moderate conduction, although only minor induction is seen on the 400 cps profile. The indicated depths are of the order of 100-ft.

ZONE 1

This anomaly strikes approximately North-South, from 00 on line CB to 170W on line BT, a minimum length of 800-ft. On lines BZ and BX, weak - moderate conduction is seen, whereas on CB, BV and BT only weak conduction was recorded. On most lines the anomaly was confirmed at 400 cps, and showed up well on BX.

The limited strike length of this zone together with the confirmation of anomalies at 400 cps. merits this zone receiving close attention.

ZONE 2

This zone shows a very broad profile on lines CF, CD and CB. The r/d value is very high on the 800 cps. frequency and, in addition, little to no response is seen at 400 cps. The mode of conduction is multiple, typical of sediments.

Approximately 200-ft. to 150-ft. East of, and parallel to Zone 2 there is a weak nickel geochemical anomaly. However, I consider it too far to the East to be related.

ZONE 3

This zone is interpreted to extend from CB (380E) Southwards to BV (120E) The conduction indicated is moderate with r/d values ranging from 8.0 to 10.4. Excellent anomalies are seen on all lines, and these also show up well on the 400 cps frequency where good - moderate conduction is indicated.

The indicated maximum depths to the top of the conductor are 80-ft. to 100-ft. on all lines.

The proposed conductors are not a unique solution, as the anomalies on CB and BZ at 380E and 370E respectively could be linked to 380E and 310E on BX and BV respectively, leaving the two anomalies at 160E and 120E on BX and BV as a short, highly conductive zone.

However, the proposed solution is favoured.

On BZ this zone is in close proximity to a geochemical high in nickel.

The conduction characteristics, together with limited strike length and the coincidental geochemistry on line BZ make this a prime target for follow-up.

ZONE 4.

This zone has been interpreted as extending from 540E on BZ sinuously southwards across lines CD, CB, BZ, BX and BV to 300E on line BT and possibly beyond into Zone 5, alternatively ending just South of 500E on BZ (see Zone 3 above).

The anomalous responses indicate weak to weak-moderate conduction throughout the Zone with r/d values ranging from 16 to over 22. The anomalies are clearly defined and show rather better conduction characteristics on the 400 cps frequency, for example on line CD.

The Northern portion of the Zone coincides with good soil nickel geochemistry, particularly on CD and CF. To the South the geochemical anomaly becomes weaker and shifts West at BZ, and on BV and BT corresponds with the electromagnetic anomaly.

Although the conducting axes show only moderate conduction, their relationship with the geochemistry and the persistence of the anomaly at the lower frequency necessitates a close ground follow-up of this zone.

ZONE 5

Zone 5 shows rather better conduction characteristics than does Zone 4, immediately to the North along strike. For this reason Zone 5 has been differentiated from Zone 6, to the North. ?
from? 4?

The conductor axes show r/d ratios from 8.0 to 12.8, inferring good-moderate to moderate conduction. The conductivity thickness ratios almost invariably show a better response at the lower frequency. This, together with the apparent coincidence of weak nickel geochemistry on line BO marks this as one of the more important zones.

The maximum depths to the tops of the conductor axes lie in the range 50-ft. to 90-ft.

ZONE 6

This anomaly can be traced some 1600-ft. from line BS in the North to line BC in the South, and generally shows moderate conduction having r/d values of the order of 12.0. At four locations (BH, BO, BN and BF - BG) good to excellent correlation is seen between the known position of unoxidised nickel sulphides and the indicated source of the electromagnetic conductor.

A distinct swing is seen on line BG which position the North Cuni shaft is situated. This swing in the line of strike of the conductor is almost certainly due to local faulting in the North Cuni area.

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The indicated depths to the conductor range between 60-ft. and 100-ft. of course occur down dip (to the East) of the known outcrop of the lode.

To the North on lines BS to BO the anomalies are minor whereas from BN through to BF the anomalies are substantial. On lines BE and BC the anomalies are again minor. Similarly between BN and BF the conductors are clearly delineated at 400 cps.

ZONE 7

This zone is seen only on the Western extremities of lines BH, BG and BF and has a strike length of the order of 300-ft. The r/d values are of the order of 7, and the indicated depths range from 70-ft. - 130-ft. The anomaly is most clearly delineated at 475E on line BH, where the depth to the conducting axis is 90-ft. Only minor indications are seen on the 400 cps profile.

The indicated geology in the vicinity of this zone is pyrite black shales containing a narrow massive galena vein. This may in fact be the source material for the anomaly.

The lines to the North and South of Zone 7 were not cut, and therefore the anomaly is not definitely closed to the North or South.

ZONE 8

This short zone is seen only on two lines at 300E on AY and on AW at 280E. At 800 cps the indicated r/d ratios are just under 5 and the maximum depth to the top of the conducting axis is indicated to be of the order of 120-ft. Unfortunately little response is seen at 400 cps on this zone.

Zone 8 occurs some 300-ft. to 400-ft. South, along strike, from Zone 6, therefore, in spite of its non-appearance on the 400 cps frequency, this anomaly should receive close attention.

ZONE 9

This approximately North-South striking zone extends for some 2800-ft. from line AU in the North to T in the South.

Generally the zone shows only weak conduction as indicated by high r/d values. Over some sections clear cut anomalies are seen for example on lines AF to AK, whereas on Z the anomaly is wide and diffused. Little, and often no response is seen at 400 cps confirming the zone to be only a weak conductor.

The causative material is most likely to be due to multiple conducting sediments; this conclusion is based on (1) the high r/d values, (2) the strike length of the conductor, (3) the multiple conduction seen on some lines, and (4) the lack of response at 400 cps.

ZONE 10

This zone was recorded at 700E on line BC and extends at least a thousand feet South of this point to 720E on line AS.

The r/d ratios are high, and this together with the fact that little or no response is seen at 400 cps indicates the conductor to be a weak one. In addition several lines show evidence of multiple conduction for example BA. In addition, on lines AW, AY and BA a very weak conductor is located some 150-ft. West of the main zone.

The indicated maximum depths to the top of the conducting axis lie in the range 80-ft. - 120-ft.

ZONE 11

This zone is distinctly seen on line BS at 720E and perhaps at 650E on line BQ. On BR however, the anomaly is minor only, and similarly vague also on line BT. The response on the 400 cps is similar. However it is significant by its presence.

The r/d values of about 9, and its presence at the lower

frequency, together with the proximity of anomalous geochemistry to the East and South-West, make this a zone for careful follow-up.

ZONE 12(N)

This zone is seen on the Western flank of the area surveyed for 1800-ft. between lines AS and Z. The conductivity width ratio is large, varying from 16 to 32 indicating it to be a weak conductor only. A narrower source is inferred than for zone 9.

ZONE - 12(S)

This zone is probably a Southerly extension of 12(N). As for (12(N) a narrow source is inferred. Conductivities are still weak but better than for 12(N). The zone extends for some 1200-ft. from line X to N.

ZONE - 12 (SS)

This zone is only seen on two lines J and B. On the former it shows good conduction and on the latter, only moderate conduction.

This may form extension to 12(S), however the narrow, well formed profile together with better conduction characteristics single this zone out for further investigation.

ZONE 13

This zone shows up on lines AH, AF and AD at 100W, 140W and 100W. In addition a minor indication is seen on line AB at about 80W. The conductor shows weak-m oderate conduction at 800 cps and although present on the 400 cps it occurs as a weak conductor only. The maximum depths to the top of the conductor are of the order of 80-ft. The possibility that th conductor has a sulphide source should not be discounted. However, the most likely source is conductive shale.

ZONE 14

Zone 14 is recorded on lines AK, AH and AF at about 120E, 090E and 060E. The anomaly gives good - moderate conductive characteristics at 800 cps indicated by r/d values of the order 7 to 8. Although the r/d values at the lower frequency are better, the anomaly tends to be small, and therefore subject to error in evaluation.

Although there are no known geochemical indications in the vicinity the anomaly is on strike with zones 6 and 15/16 which are associated with known sulphides. This, together with the limited strike length of the anomaly, the persistence at the lower frequency and therefore the nature of conductor make this an important anomaly for follow-up.

ZONES 15 & 16

These zones are positioned from 160E on line Z to 180E on line X., with a possible extension towards 260E on line V. Zone 16 lies to the North East of Zone 15, and is seen on line AB at 300E only.

The indicated conduction of these two zones is good, with r/d values of the order of 5 at 800 cps in both cases. On line AB the anomaly appears to be two narrow zones situated at approximately 300E and 260E. At 400 cps the anomaly shows similar form and good conduction is indicated by the 3.6 r/d value whose centre is positioned at 260E. At 400 cps Zone 15 little, if any response is seen at 400 cps on line Z. However a good response is seen on X at about 180E.

Zone 16 is associated with the nickel deposit at South Cuni. As can be seen the strike length of this indication is limited.

Due to the proximity of Zone 15 to the known nickel sulphides at South Cuni a careful follow-up of this anomaly is warranted.

ZONE 17

This anomaly extends from 520E on line H to 420E on line N and perhaps to 350E on line P. The conduction over the whole 1500-ft. of strike length is weak only, with r/d ratios being of the order of 20. In addition little or no response is seen at 400cps. This anomaly would be considered to be due to conductive sediments, especially as on many of the lines traversed the anomaly shows distinct signs of multiple conduction. However, due to the known presence of nickel sulphides at Vaudeau, some 40-ft. east of, and 50-ft. south of, the conductor on line J, and also at Blowfly, 90-ft. north of the anomaly at 430E on N together with the proximity of NNW trending geochemical anomaly just west of zone 17 between lines R & L, the weak conduction of this zone cannot be attributed to conduction in sediments without careful examination. Therefore this zone should receive careful ground follow-up.

ZONE 18

This anomaly runs south from 080E on line L to 040W on line HF, a strike length of over 1500-ft. The r/d values are all of the order of 20, and this together with the limited response at the lower frequency and evidence of multiple conduction infers the source to be conduction due to sediments. Therefore this anomaly is not considered to be of prime importance, except on line HF

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at 050W where there is coincident nickel geochemistry. It is also important to note that this is the only line on this anomaly where there is a significant response on the 400 cps frequency. Therefore, this line should receive careful ground follow-up.

ZONE 19

This is a single, conductive axis which has no response at the lower frequency. This zone is considered to form an extension of zone 12(SS) or/and zone 21, and be due to conduction in sediments.

ZONE 20

This zone extends from line N at 480E to 450E on line HF, a total strike length of over 1800-ft. The anomalies are substantial and show r/d ratios of the order of 17 to 20 indicating weak conduction only. The maximum depths to the conducting axis are of the order of 80-ft. to 100-ft. in most cases.

One of the most interesting features of this zone is that although it shows weak conduction only, a distinct response was also recorded on the 400 cps frequency, but is displaced some 30-ft. to 50-ft. to the East. This is unusual and probably due to differential conduction. The 400 cps anomaly shows a particularly good r/d value on line H at 530W, indicating good conductor at a depth of about 90-ft. Geochemical sampling should be carried out over this zone with particular attention being paid to line H.

ZONE 21

Lines HB, HD And HF at 180W, 230W and 340W show substantial moderate conductors in a conducting background at 800 cps. At the lower frequency of 400 cps line HB shows a minor response only, and lines HB and HF a broad, mainly phase response.

The characteristics of the conduction infer multiple conducting sediments only. In the absence of additional information this zone is not rated highly.

ZONE 22 (A & B)

This group of anomalies on lines HC, HD, HE and HF at 250E, 270E, 320E and perhaps 400E. makes up zone 22A. Of these lines HD and HE give the best responses on both frequencies. The inferred depths to the moderate conductor are 80-ft. and over 100-ft. (at 400 cps)

Minor indications on lines HC and HE at 250E and 320E on both frequencies were recorded at inferred depths of the order of 100-ft. and 80-ft. respectively. These indications are not seen on HD (the line between HC and HE). This zone has been designated 22B.

The position of the Nickel Reward shaft is just North of line HD at 180E, and the new find about 30-ft. North of line HD at 190E. The relationship of the Nickel Reward with 22A and 22B is unknown, However both zones should receive careful geochemical follow-up.

ZONE 23

A single anomalous indication is seen at 510E on line HD at 800 cps. There are possible indications at 550E on HF and perhaps 500E on HB. There is a minor, but never-the-less significant anomaly at 550 on HF, but unfortunately line HD was not surveyed at 400 cps over this section. The r/d ratio indicates moderate conduction only, and this zone probably represents a Southerly extension of zone 17.

ZONE 24

On lines BF, AW, AY and BA there is a conductor on the extreme end of the line or just to the East of the last observations made. Only on lines AS and AU is the zone recorded. The r/d ratio, and thus the conductivity is difficult to judge as insufficient information is available. However responses are seen at 400 cps on AS and AU. The inference is that this conductor has good to moderate conduction.

CONCLUSIONS & RECOMMENDATIONS

1. The correlation between the known occurrences of nickel sulphides in the area with Turam electromagnetic anomalies is good. The response indicates moderate to good-moderate conduction at both frequencies.
2. Generally multiple conduction is not noted over known sulphide zones.
3. The above results fit in with the picture of discontinuous sulphides along the dolerite contact. Should the sulphides be disseminated in part or be locally extensively faulted, then continuous conduction may not always be present, therefore it is quite conceivable that moderate to weak conduction characteristics could also represent the presence of nickel sulphides. For this reason the conduction characteristics of the anomaly should not be taken as an indication of grade.
4. With the exception of zone 6 the majority of the more interesting zones are of limited strike length.
5. Those zones having greater or lesser interest are listed below:
Greater Interest: Zones 1, 3, 4, 5, 6, 7, 8, 11, 14, 15, 16, 17, 18(HD), 20, 22A and 22B.

Lesser Interest: Zones N1, N2, 2, 9, 10, 12S, 12SS, 12N, 13, 18, 19, 21, 23, and 24.
6. No percussion or diamond drilling has been recommended at this stage as it is felt that further detailed auger geochemical sampling over the zones of interest would help in a selection of conductors to be made. All auger samples should be of residual soils and should be analysed for nickel and copper.

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7. The indicated depths to the conductors vary from 50-ft. to over 100-ft., however most lie in the range 80-ft. to 100-ft. Therefore as the dips of the structures are generally East, careful attention should be paid to the ground over and to the West of the conductors.

8. A suggested auger programme would be samples taken at 20-ft. or 25-ft. intervals for 150-ft. East of and 200-ft. West of the indicated position of the conductor.

9. I recommend that at least two geochemical lines should be run over the smaller conductors and one line every 400-ft. to 600-ft. over the longer conductors as an absolute minimum.

10. These geochemical lines should include lines run over the following zones for 200-ft. West of and 150-ft. East of the following positions:-

<u>ZONE NO.</u>	<u>LINE</u>	<u>STA</u>
N2	CK	050E
1	BX	130W
2	CD	00
3	BZ	370E
-	BX	160E
4	CD	500E
-	BX	400E
5	BR	230E
-	BP	130E
7	BH	450W
-	BF	450W
8	AY	100E
8	AW	080E
10	AY	800E
11	BS	720E

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<u>ZONE NO.</u>	<u>LINE</u>	<u>STA</u>
-	BQ	650E
13	AF	140W
14	AH	090E
15	Z	160E
16	AB	280E
18	HF	050W
20	H	525W (+ 250-ft)
22	HD	270E
-	HE	320E
23	HD	500E
24	AS	1050E
-	AU	1020E

11. A magnetic survey has been run over the area but unfortunately the results are not yet available to the author. This survey may help to delineate the weakly magnetic dolerites and therefore better define the zones of greatest interest.

I would be pleased to review the above results in the light of additional information as it becomes available. I certainly look forward to reviewing all the available data prior to next seasons drilling programme.

Respectfully Submitted,
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TABLE 1

TYPICAL r/d VALUES

ZONE NO.	LINE	STA	DEPTH	r/d VALUE	
				800cps	400cps
N1	CH	180E	120	12.8	
N2	CK	50E	80	13.6	Not Significant
1	BX	150W	100	12.8	6.4
1	BV	150W	140	20.0	Significant
2	CD				
3	BZ	375E	80	11.2	6.4
3	BV	125E	80	8.0	6.0
4	CD	500E	130	22.4	8.0
4	BZ	500E	100	16.0	12.0
5	BR	220E	80	12.8	5.6
5	BP	120E	80	11.2	6.4
6	BQ	440E	120	12.8	8.0
6	BM	200E	80	8.8	12.0
6	BN	320E	70	12.8	8.8
6	BG	180E	120	11.2	12.0
7	BG	450W	90	8.8	6.0
8	AW	80E	120	5.6	Just Significant
9	AU	560E	120	21.6	Present
9	AM	600E	90	32.0	Significant
9	AF	700E	100	20.8	12.0
9	T	640E	80	16.0	-
10	BA	800E	100	23.2	8.0
10	AW	780	90	21.6	6.4
11	BS	725E	80	8.8	Present
12N	AO	300W	120	16.0	Not Surveyed
12N	AN	280W	120	22.2	12.0
12S	V	280W	60	12.8	
12S	P	300W	120	12.8	Significant
12SS	J	300W	90	16.0	12.0
13	AF	140W	80	11.2	6.0

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ZONE NO.	LINE	STA	DEPTH	r/d VALUE	
				800cps	400cps
14	AH	80E	80	7.2	4.4
15	Z	180	120	4.8	
16	AB	300E	40	5.6	3.6
17	N	430	100	23.0	-
17	B	420	80	19.2	-
17	F	500	100	20.0	-
18	B	100E	80	19.2	9.6
18	HB	50E	80	24.0	
19	F	250W	80	7.2	
20	L	400W	100	16.8	12.0
20	D	450W	80	12.0	
20	HB	420W	120	24.0	12.0
21	HD	260W	120	11.2	7.2
22	HD	275E	60	10.4	10.0
22	HE	320E	120	11.2	5.2
	HD	500E	60	8.8	Visible

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APPENDIX "T"

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APPENDIX "T"
BRIEF DESCRIPTION OF THE
TURAM ELECTROMAGNETIC SYSTEM

GENERAL

The Turam method can be classified as a fixed source compensation method. The primary or source field consists of a large energizing layout in the form of a long wire or a large loop laid out on the terrain, to which an audio frequency alternating current is fed by means of a motor generator. The resulting current pattern is investigated inductively, with two identical receiving coils connected to a bridge compensator which compares the signal received in each coil in relative phase and amplitude. When grounded cable is used, the energization is both galvanic and inductive; when the primary layout consists of a closed loop, the energization is purely inductive. Under most conditions the presence of galvanic current is undesirable and inductive energization is, as a rule, preferred.

Although the system allows the comparison of any two components of the resultant field, it is standard procedure in systematic surveys to measure the gradient of the vertical component.

The pattern for a typical Turam survey is shown in Fig. 1. A large rectangular loop is used as primary layout and the field gradients are measured with horizontal receiving coils along profiles perpendicular to a long side of the transmitting loop.

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DATA REDUCTION

The relative strength of the undisturbed primary field is dependent on the loop dimensions and the location of the observation points, and can be determined by calculation. The measured field strength ratios are normalized through division by these calculated free space ratios.

The primary field causes eddy current to flow in subsurface conductors. As a result the resultant field will be distorted in both amplitude and phase. The presence of conductors will thus be indicated by abnormal strength ratios and phase differences.

PRESENTATION

The measuring results are usually presented in profile form as (reduced) field strength ratio and phase difference curves, with the observed values plotted at the midpoint between coil positions.

Occasionally one of the two parameters is presented in contour form, but contour plans are generally inadequate to express the full significance of the data.

INTERPRETATION

Where field distortion occurs the curves indicate the location and the depth of burial of the main current flow. The "current axis" is well defined when the current is concentrated as, for instance, in thin, steeply dipping conductors. In wide, banded conductors or in horizontal conductors such as, for instance, overburden, the current is usually more dispersed and the anomalies will yield less positive information.

As a rule the current axis is located right below the maximum field strength ratio deflection or the maximum negative phase shift. Its depth under the traverse is indicated by the shape of the anomaly.

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The relative amplitudes of field strength and phase distortions are a measure of the conductivity of the conducting bodies, i.e. good conductors are characterized by field strength distortion combined with relatively little phase shifting, whereas poor conductors affect the phase, rather than the strength of the resultant field.

For an accurate grading the resistivity thickness (r/d) ratio of the individual conductors can be derived from the calculated in-phase and out-of-phase components, taking further into consideration the exciting frequency and the strike length of the conductor. The relations are shown in Fig.2 and Fig.3. The obtained r/d values are marked on the upper right side of the anomalies, in units of ohmcm/m. On the lower left side the depth of the current axis (ft.) is marked. It is normally located 30-40 ft. within the body and the indicated depth should be regarded as the maximum depth to the upper surface of the conductor.

To obtain the projection of the current pattern, the anomalies are connected between lines, whereby depth and r/d values, as well as other characteristics of the curves are used as criteria. The strike of the formations, if known, is also taken into consideration.

Fig. 4 and Fig. 5 show a plan and section of a typical Turam survey and interpretation.

- REFERENCES: 1937 Hedstrom, E.H. Phase Measurements in Electrical prospecting. AIME Techn. Publ. 827.
- 1964 Bosschart, R.A. Analytical Interpretation of Fixed Source Electromagnetic Prospecting data. Delft.

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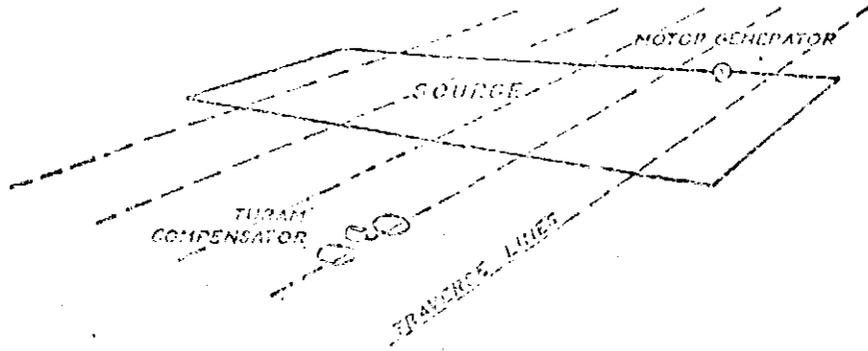


Fig. 1 The Turam method. General layout

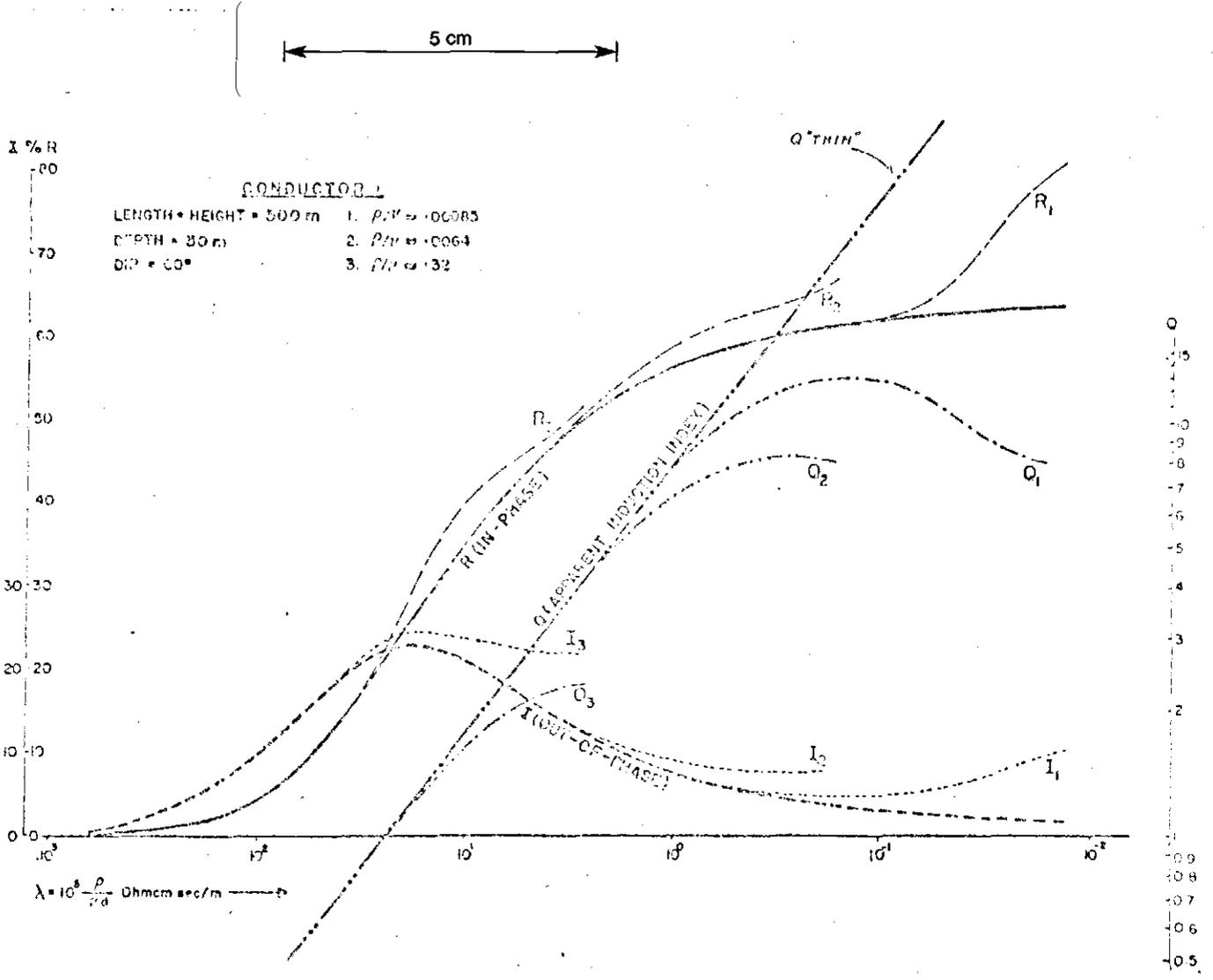
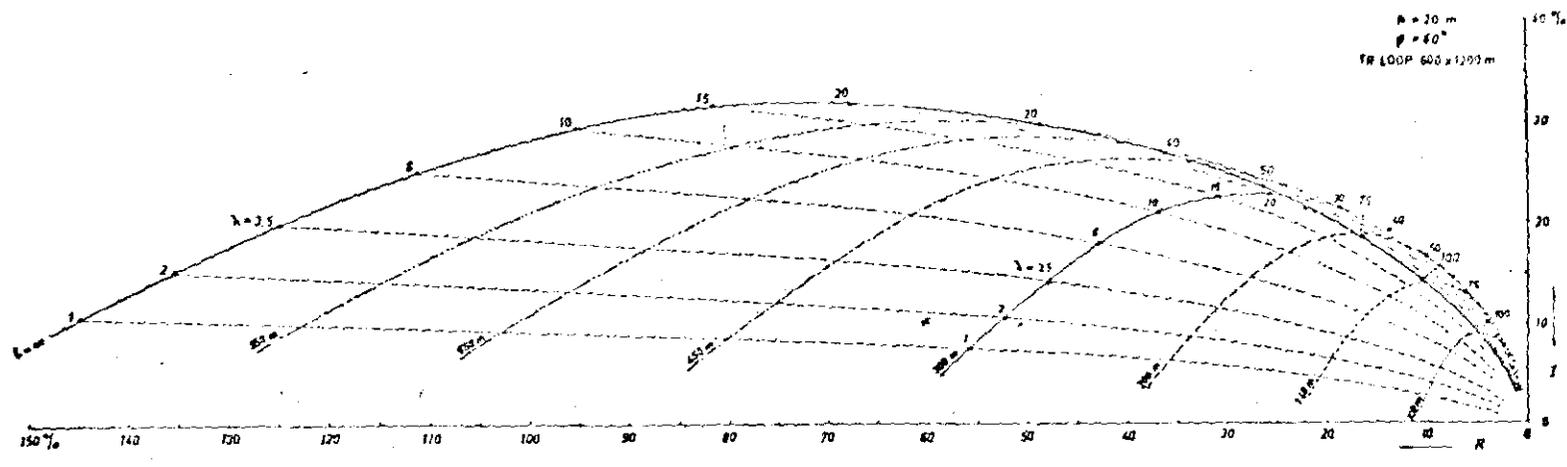


FIG. 2 RESPONSE OF A FINITE TABULAR CONDUCTOR. (R.A. Bosschart 1964)

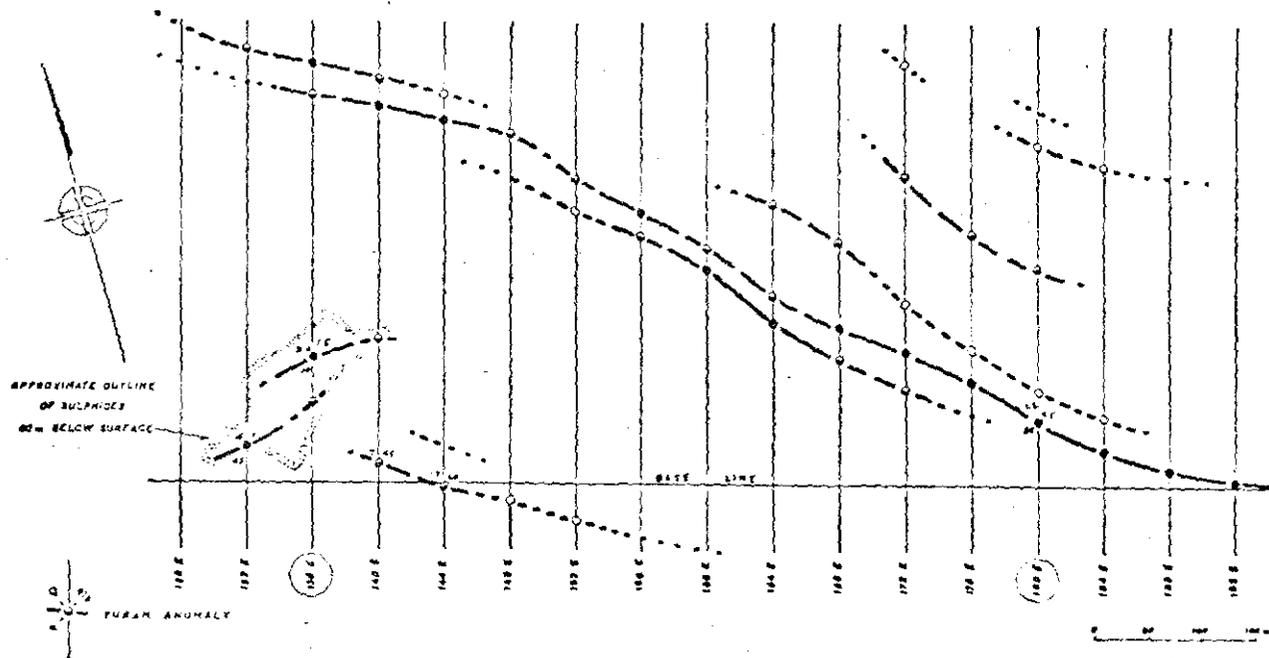


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FIG. 3 RESPONSE DIAGRAM FOR CONDUCTORS OF VARYING STRIKE LENGTHS.

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FIG. 4 TURAM SURVEY ON THE MURRAY GROUP, NEW-BRUNSWICK. (R.A. Bosschart 1964)



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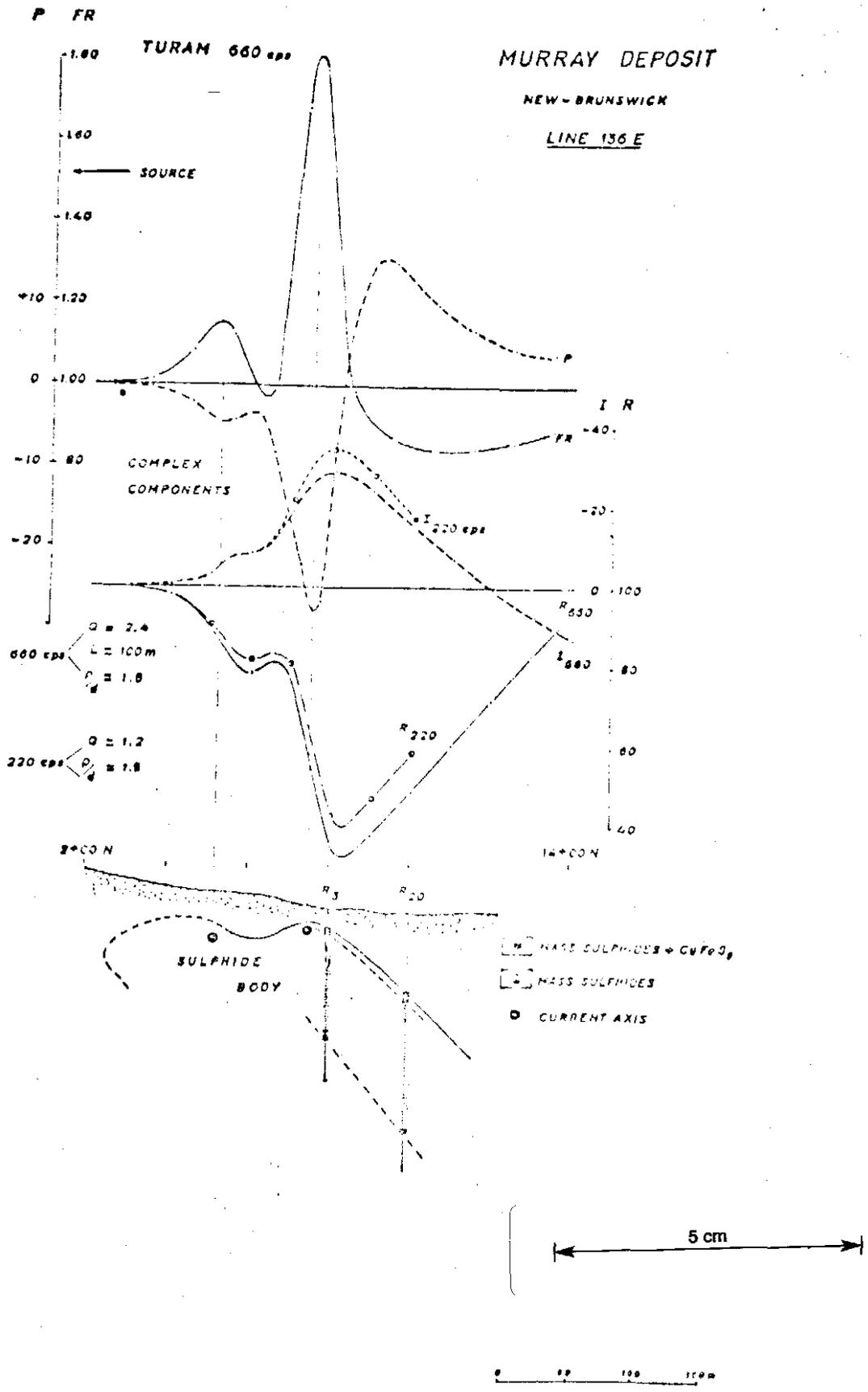
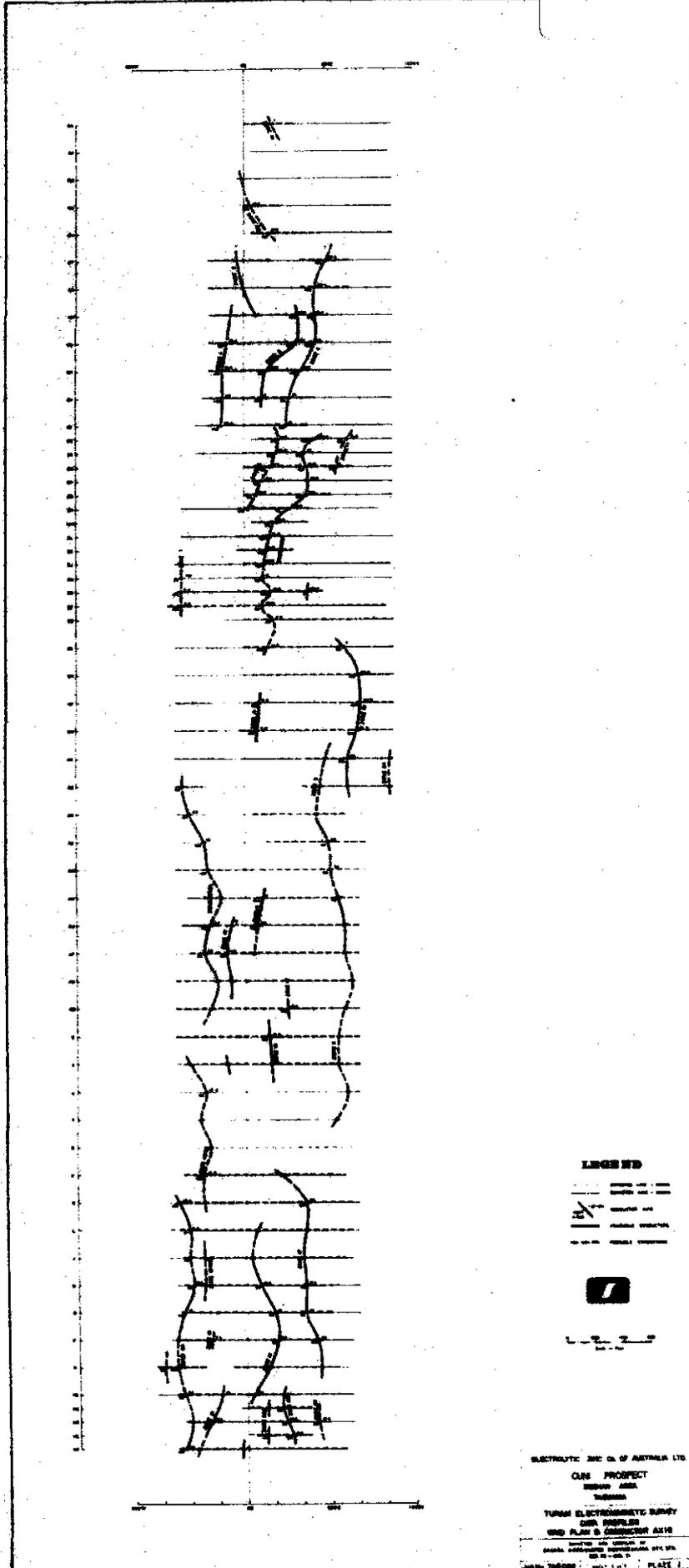


FIG. 5 TURAM SURVEY ON THE MURRAY GROUP, NEW BRUNSWICK. INTERPRETATION OF A TYPICAL SECTION. (R.A. Bosschart 1964)

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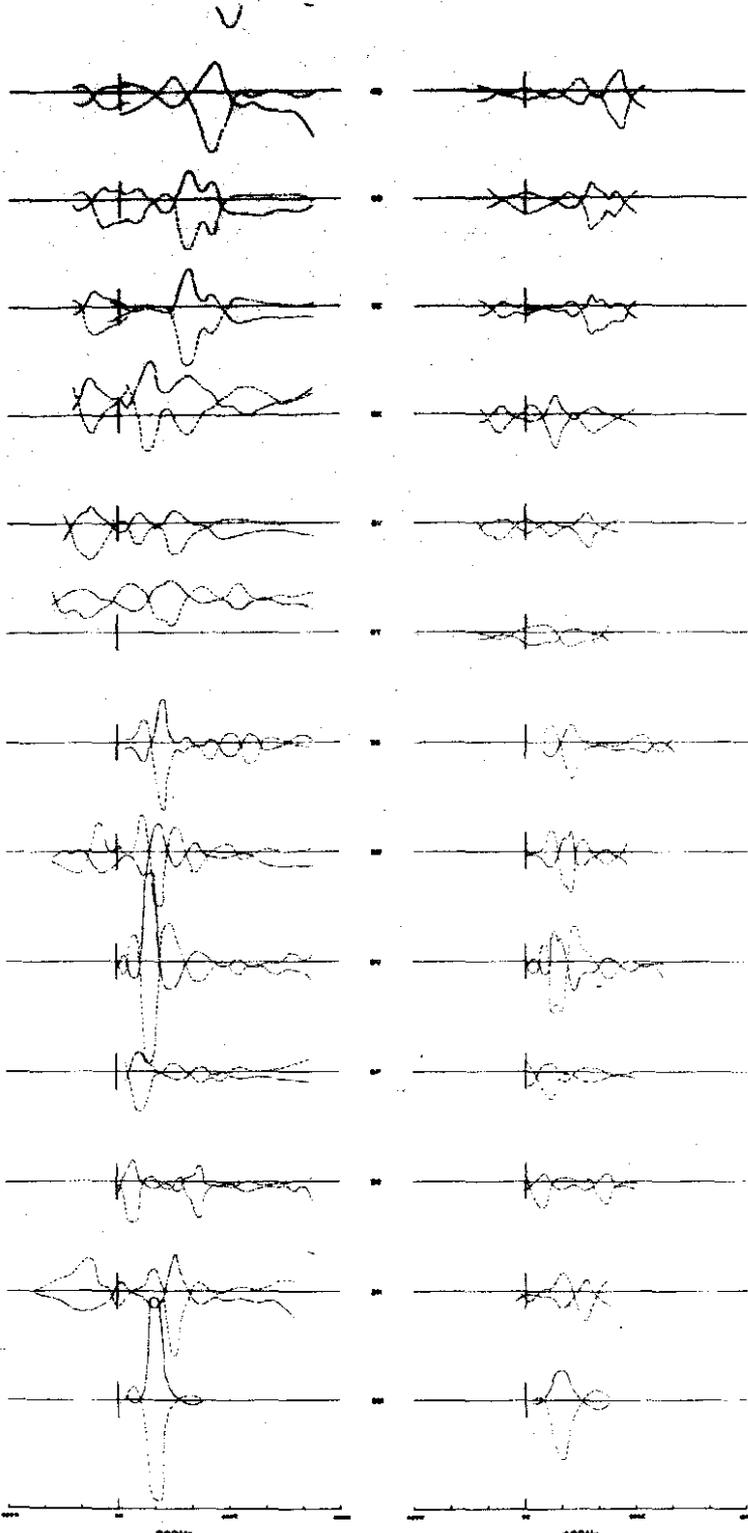


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Scale 1:1000

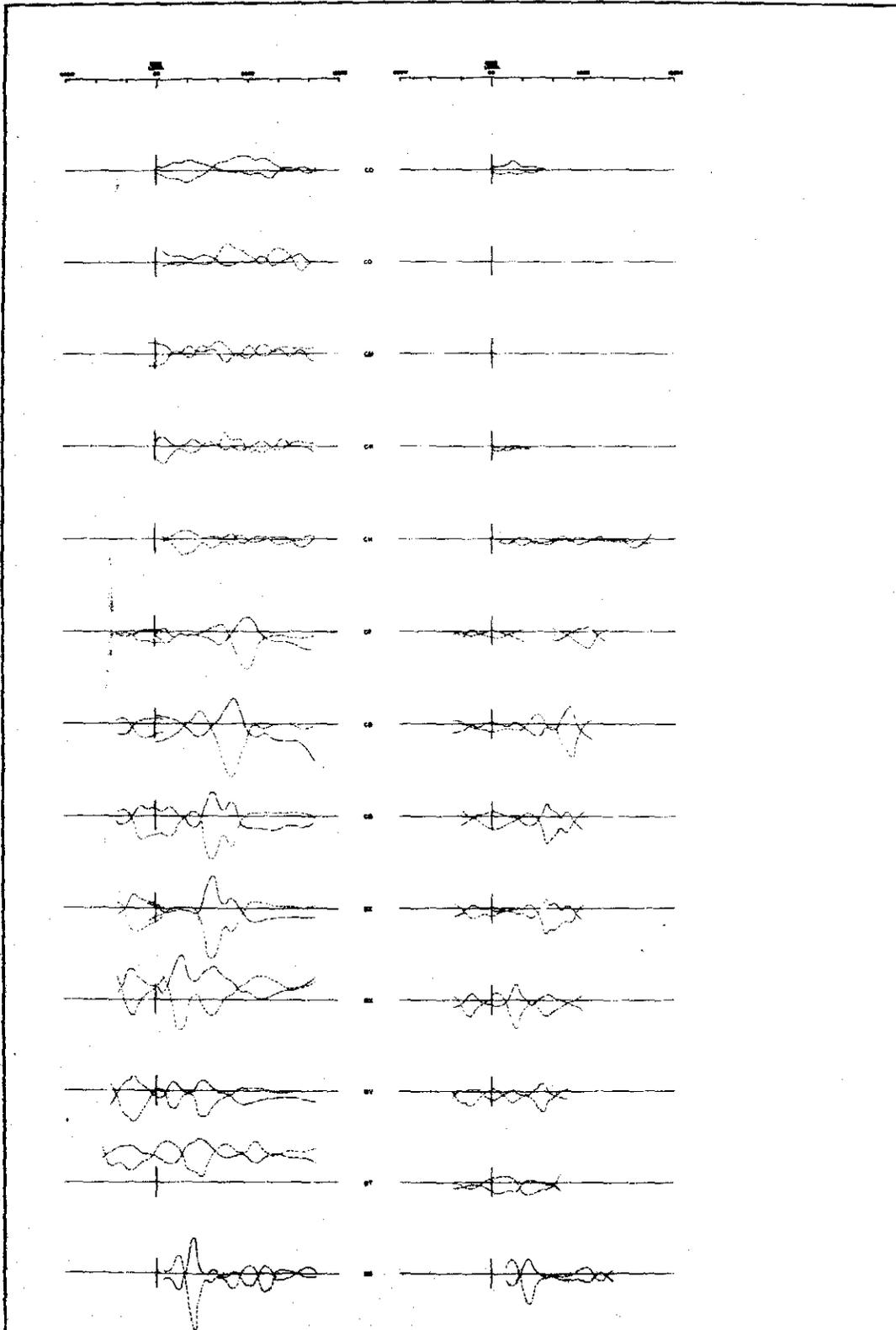


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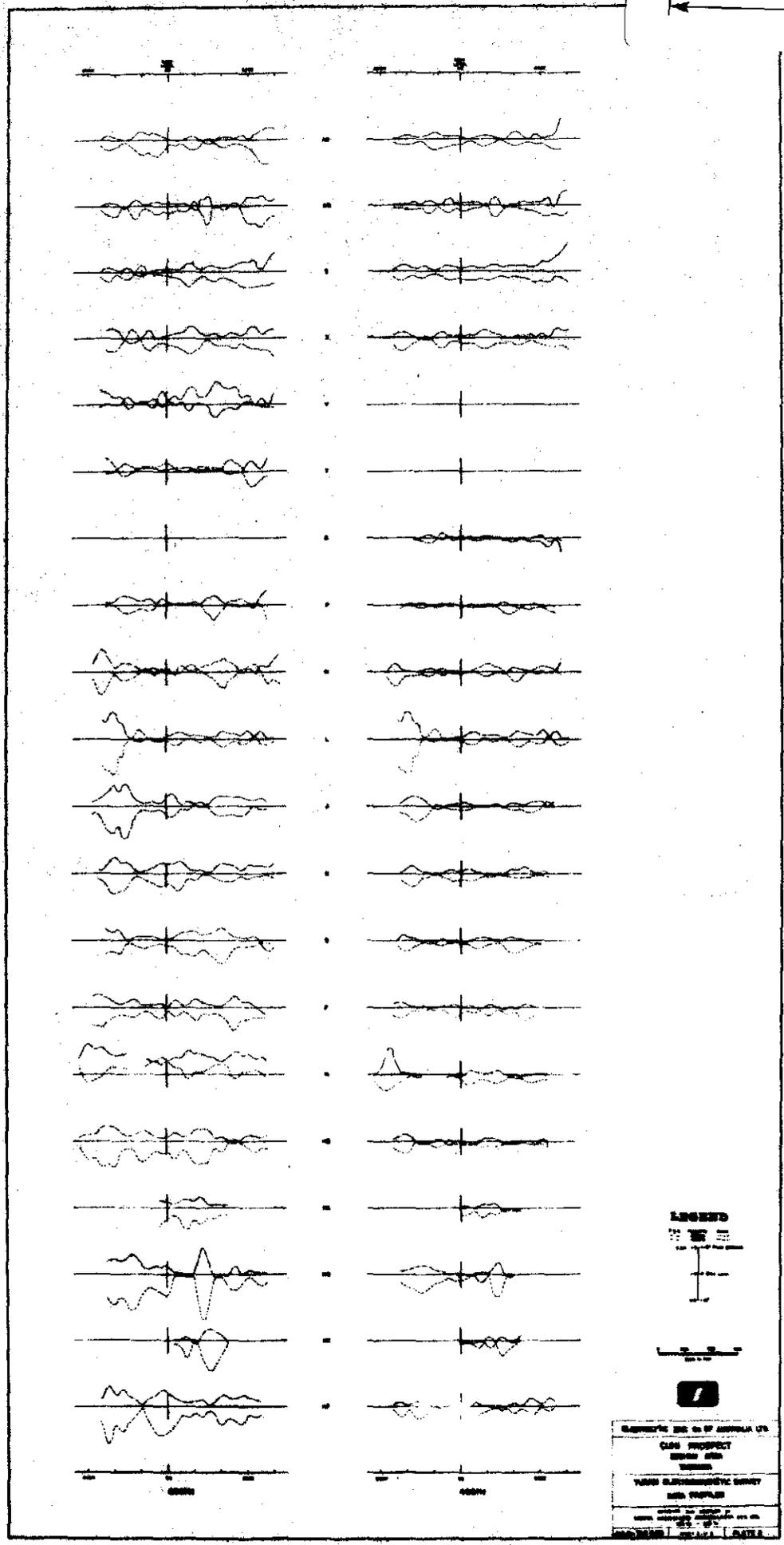
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