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**MICROFILMED**

79-1361

PROGRESS REPORT

ON

RECONNAISSANCE GEOPHYSICS

ELLIOTT BAY, E.L. 27/76

TASMANIA

S.T.Mudge

June, 1979.

**OPEN FILE**

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ACCOMPANYING PLANS

	<u>PLAN NO.</u>
VOYAGER PROSPECTS - LOCATION DIAGRAM	3964 S/A
AEM 43/44 PROFILE OF VLF-EM	4563 S/B
AEM 36 PROFILE OF VLF-EM	4564 S/B
AEM 45/46 PROFILE OF VLF-EM	4565 S/B
AEM 62 PROFILE OF VLF-EM	4566 S/B
AEM 40/41 PROFILE OF VLF-EM & SP	4567 S/B
AEM 45/46 PSEUDOSECTIONS OF DIPOLE-DIPOLE IP	4568 S/B
AEM 62 PSEUDOSECTIONS OF DIPOLE-DIPOLE IP	4569 S/B

INTRODUCTION

E.L. 27/76 (Elliott Bay) is an area of approximately 300 square miles in south-west Tasmania. Its location is shown in drawing no. 3964 S/A.

The area is held under licence by Geopeko as part of a base metal exploration tenement.

A combined aeromagnetic and electromagnetic (AEM) survey (Geoex-Lewis River Area) was flown over the area for the previous tenure holder (BHP Co. Ltd.) in 1975. The EM system used was the McPhar H400 helicopter system.

Data from the survey was presented as a recovery plan with the EM anomalies plotted, aeromagnetic contour map and a detailed report clarifying each AEM. An attempt was made to locate several of the AEM's during March 1977 (Deakin, 1977).

During March 1979 the reconnaissance geophysical survey was extended north of the Lewis River.

Very Low Frequency EM (VLF-EM) was used to locate the AEM anomalies. Induced polarisation (IP) and self potential (SP) surveys were then conducted where significant VLF anomalies were detected.

GEOLOGY

The area is located on a belt of north-south striking acid pyroclastics. These rocks are believed to be the southern part of the Cambrian Mt. Read volcanic suite.

The central northern portion of the E.L. is covered by the Ordovician Owen Conglomerate.

The Cambrian Mainwaring and Dundas groups of intermediate pyroclastics, volcanics and argillites lie to the west of the E.L. They have a prominent magnetic character, as shown by the Geox Survey.

Quartzites of the Proterozoic Arthur Group lie to the east of the E.L.

The area is chiefly flat, covered mainly by a button grass. The topography and access local to each AEM is discussed later in this report.

A massive sulphide deposit, similar to those found elsewhere in the Mt. Read volcanics is the exploration model.

RESULTS OF AEM GROUND LOCATIONS

Ground work was conducted over the area of AEMs 16 and 35. This work is reported elsewhere (Mudge 1979) as part of the Voyager 10 and 12 surveys respectively.

An attempt was also made to locate and test AEMs 36, 40, 41, 43, 44, 45, 46 and 62.

A Geonics EM 16 VLF receiver was used in conjunction with the signal from the North West Cape (NWC) transmitter. NWC is the only transmitter having sufficient signal strength in the area.

Readings were taken at 25 metre intervals. Plotting of the profiles is such that an easterly dip of the in-phase component indicates the presence of a conductor.

Dipole-dipole IP surveys were conducted on lines where a significant VLF response was observed.

A 50 metre dipole length was used, considered a suitable compromise between resolution and depth sought. A Hunttec 2.5 KW 2 second time domain transmitter was used in conjunction with a Scintrex IPR-8 receiver.

Results are presented as pseudosections of apparent resistivity, chargeability and metal factor. Chargeabilities are those for the  $M_{232}$  portion of the Scintrex IPR-8 decay curve.

AEM 36

The area of the anomaly is located in dense forest. Three east-west traverses were surveyed with VLF-EM, drawing number 4564 S/B. A weak but distinct response was detected on line 00N indicating a conductor at about 150E.

Line 100S shows a narrow but strong response indicating a conductor at about 215E. Difficult access and time prevented an IP survey being conducted on lines 00N and 100S.

Further work on the area will depend upon the results of geology and geochemistry.

AEMs 40, 41, 43, and 44

The area of the anomalies is dense forest.

A single east-west traverse of VLF-EM was conducted over each anomaly. One traverse included AEMs 40 and 41. No significant responses were obtained from AEMs 40, 41 and 44. There is an in-phase response on AEM 43, indicating a conductor at about 125W. It exhibits no significant quadrature response and is as such considered of little importance. See drawing numbers 4563 S/B and 4567 S/B. AEMs 40 and 41 were also surveyed with SP. No anomalies were detected.

The VLF and SP results did not warrant testing with IP.

Any further work on the AEMs will depend upon the results of geology and geochemistry.

AEMs 45 and 46

These two anomalies are part of a linear AEM crossing four flight lines. They are located in open country; access is good.

Six east-west traverses of VLF-EM were conducted on a 200 metre spaced grid.

The VLF results are shown in drawing number 4565 S/B. The profiles are noisy, the only significant response being on line 00N at about 500E. A weak though definite trend can be seen running from this point to 300E on 200N and 220E on 400N.

A dipole-dipole IP survey was conducted on line 00N. The array was centred at 350E. The results are shown in drawing number 4568 S/B.

No significant IP anomaly was detected.

Any further work on the AEM will depend upon the results of geology and geochemistry.

AEM 62

This AEM lies close to the Owen conglomerate. It is located in open country, access is good.

Three 100 metre spaced traverses were surveyed with VLF-EM over the anomaly.

A significant VLF anomaly was detected on line 00N; see drawing number 4566 S/B. This indicates a conductor

at about 125W.

A dipole-dipole IP survey was conducted on line OON to test the VLF anomaly.

The array was centred at 100W. The results are shown in drawing number 4569 S/B. No IP anomaly was detected, however, a large contrast in resistivities was detected in the area of the VLF anomaly.

The source of the anomaly may be the Owen conglomerate contact or an ionic conductor in the peat.

As the anomaly has no IP response associated with it, no further work is recommended.

CONCLUSIONS

The lack of a significant VLF response in the area of AEMs 40, 41, 44, and 46 indicates that the AEMs have not been detected. The AEMs may be "terrain clearance" anomalies and not due to true bedrock conductors.

AEMs 45 and 62 have significant VLF responses. The anomalies had no significant IP response associated with them.

AEM 36 may require testing with IP if geological and geochemical results can identify mineralisation as the source of the weak VLF response.

RECOMMENDATIONS

If the results of geology and geochemistry over the following AEMs is not favourable, then no further work is recommended on them:

AEMs 40, 41, 43, 44, 45, 46 and 62.

If geological results indicate that other AEMs of the Geox Survey are worthy of locating it is recommended that VLF-EM, SP and IP be used to locate and test them.

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APPENDICES

IP Metal Factors

Metal factors for the IP survey were calculated using:-

$$MF = \frac{M_{232}}{\rho_a} \times t \times 2000 \left[ \frac{-1}{\sim m} \frac{-1}{\sim m} \right]$$

where

$M_{232}$  =  $M_{232}$  portion of the Scintrex IPR-8 decay curve [ $m VV^{-1}$ ]

$\rho_a$  = apparent resistivity [ $\sim m$ ]

t = integration period for the Scintrex IPR-8 M232 component, 520 ms.

2000 is a scaling factor to obtain the units

$\sim^{-1} m^{-1}$ .

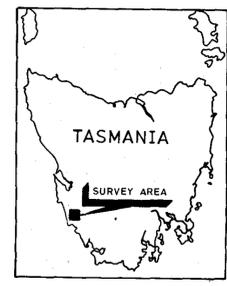
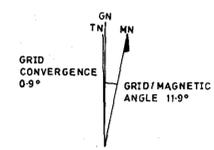
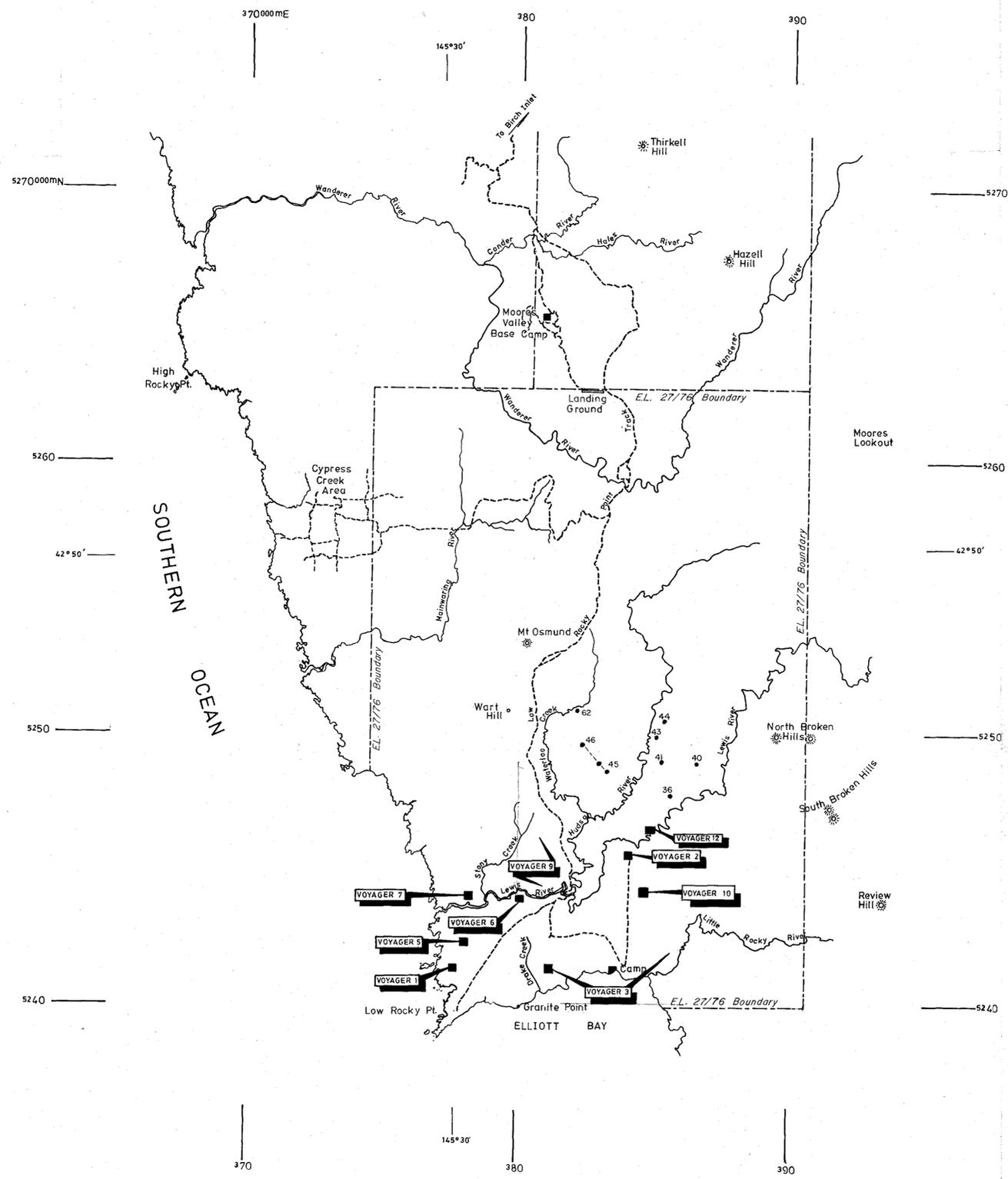
REFERENCES

GEOEX PTY. LTD. 1975: Report on Helicopter Magnetic and Electromagnetic Survey in the Lewis River area, Tasmania (for B. H. P. Company Ltd).

DEAKIN, R., 1977: Geophysical Progress Report on Elliott Bay, E.L. 27/76 Tasmania, (L.A.R. company report)

MUDGE, S., 1979 Induced Polarisation Survey Voyager 10 Elliott Bay, Tasmania, (L.A.R. company report)

MUDGE, S., 1979: Geophysical Surveys Voyager 12, Elliott Bay, Tasmania, (L.A.R. company report).



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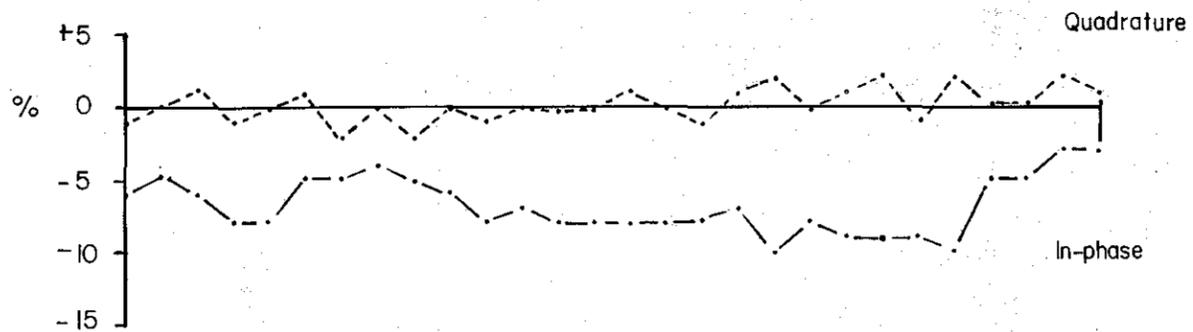
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Geophysical Surveys  
Plan No. 3964 S/A

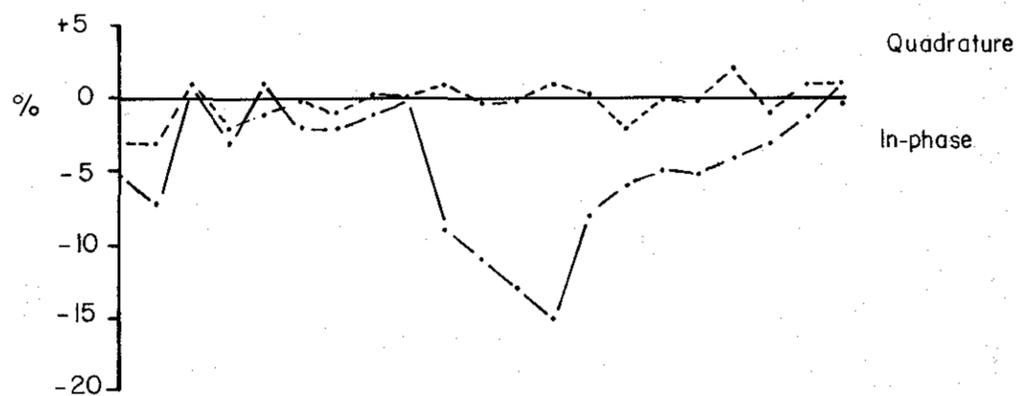
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Amended:- May 1979  
KEY: ■ Prospect  
● Airborne Electromagnetic Anomaly

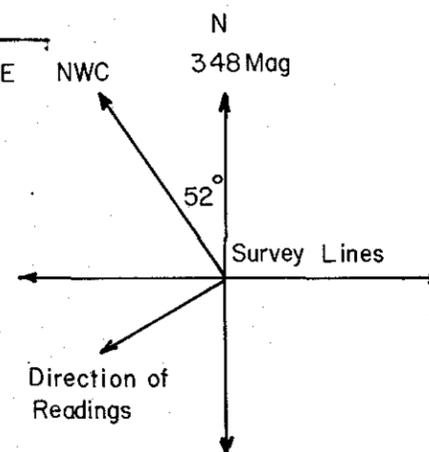
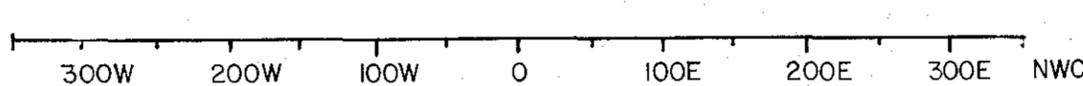
Instrument	Observer	Date	Scale	Area	Location
	S. Mudge	September 1978	1:100 000	ELL 27/76	Elliott Bay - Tasmania
Scale Factor	Base Peg	Cont Int		PROSPECT	VOYAGER PROSPECTS
	Date			PLAN SHOWS	Location Diagram



**AEM 44**  
**Line OON**



**AEM 43**  
**Line OON**



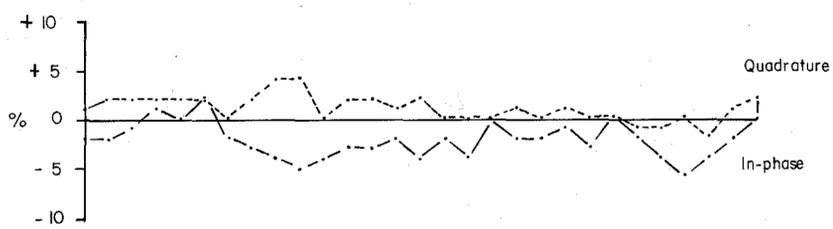
Transmitter North West Cape ( NW C )

79-1361

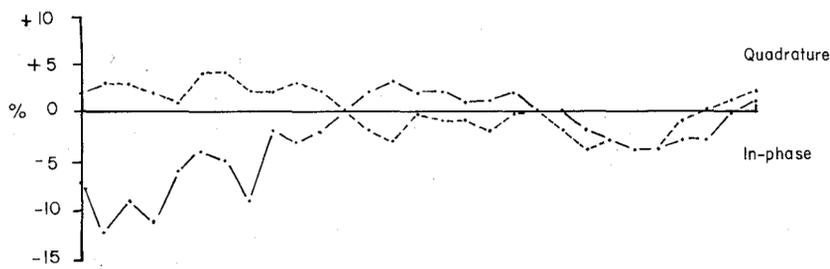
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GEOPEKO LTD. Geophysical Surveys Plan No. 4563 S/B	Instrument	EM16	Datum		Hor Scale	1: 5 000	AREA	Elliott Bay Tasmania
	Observer	S. Ilton	Base Peg		Vert. Scale	5% / cm	PROSPECT	AEM 43 and 44
	Scale Fact		Date	March 1979	Cont Int		PLAN SHOWS	Profiles of VLF - EM

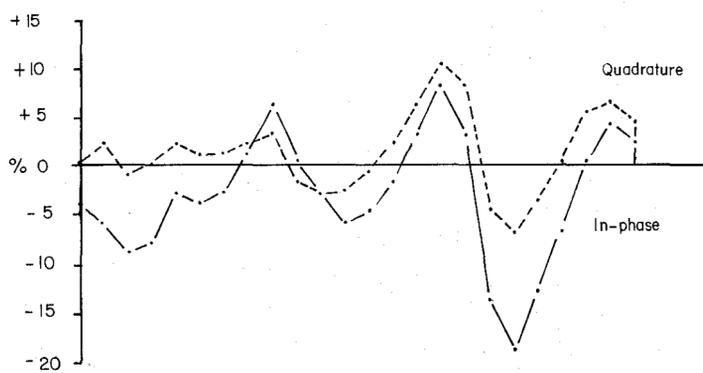




Line 200N

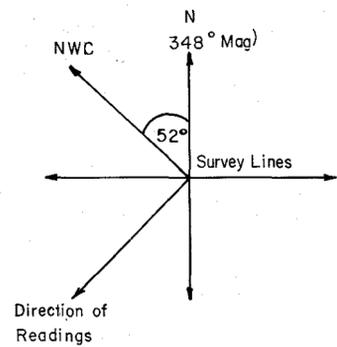


Line 00N



Line 100S

300W 200W 100W 00 100E 200E 300E 400E



159015

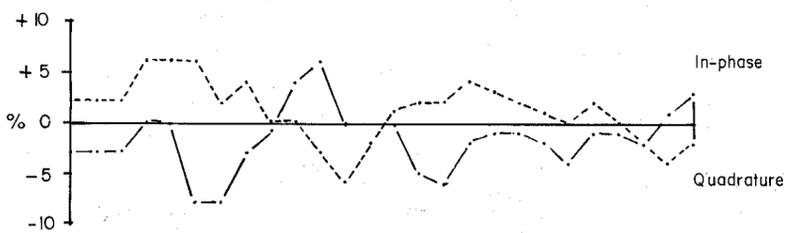
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Note: Transmitter - North West Cape (NWC)

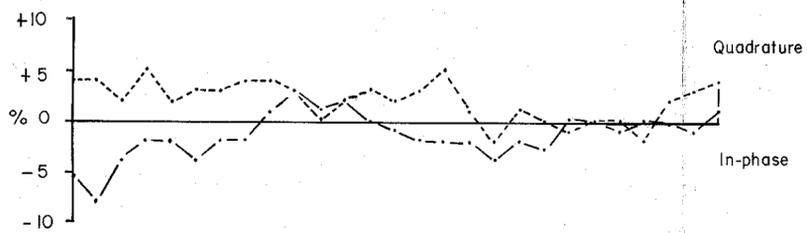
GEOPEKO LTD.  
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Plan No. 4564 S/B

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Scale Fact		Date	March 1979	Cont. Int.		PLAN SHOWS	Profiles of VLF-EM

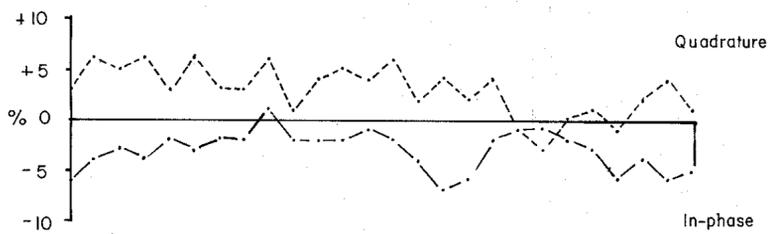




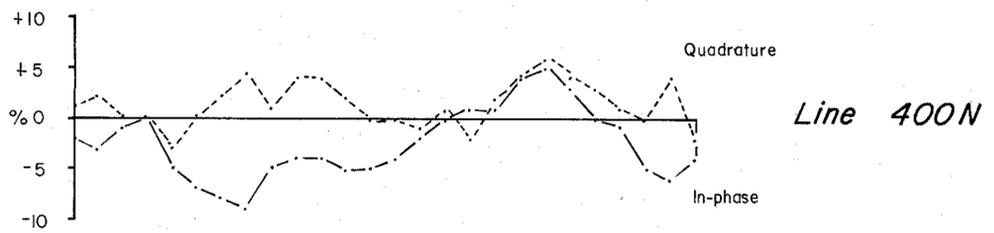
Line 1000N



Line 800N

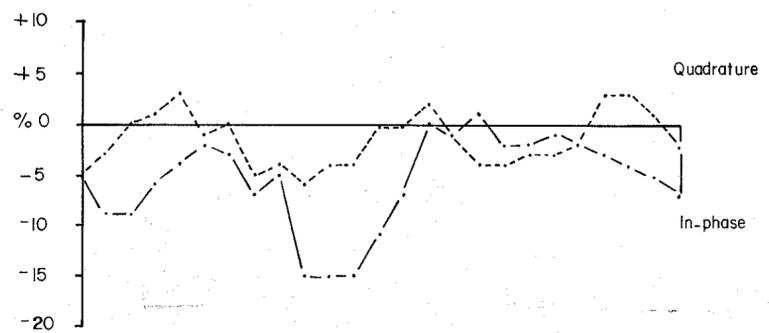


Line 600N

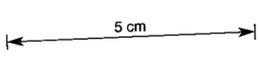
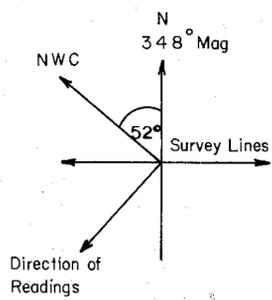
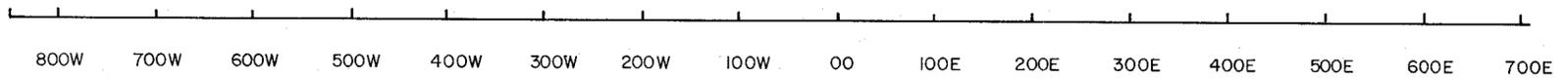
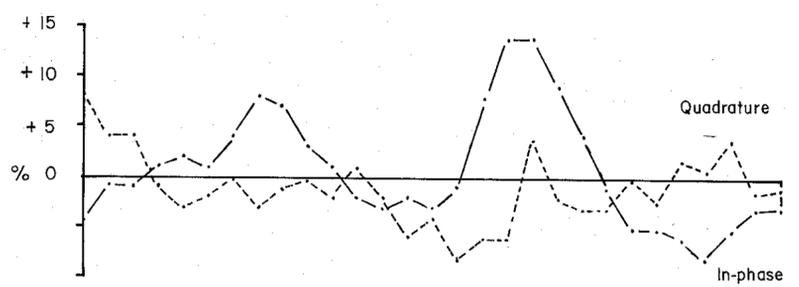


Line 400N

Line 200N



LINE 00N



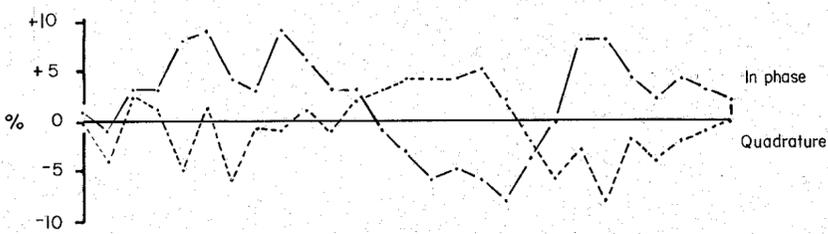
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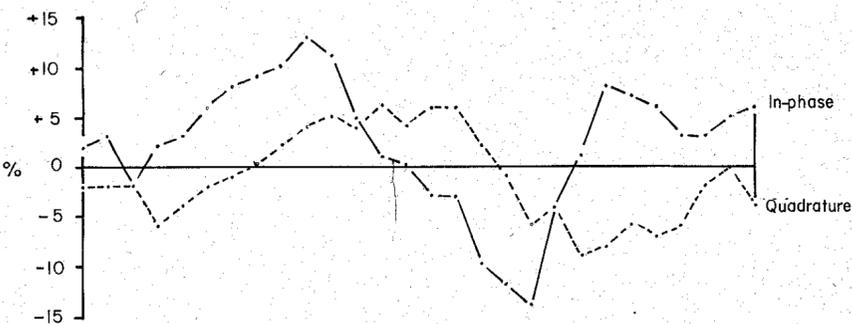
GEOPEKO LTD.  
Geophysical Surveys  
Plan No. 4565 S/B

Instrument	EM16	Datum		Hor. Scale	1:5 000	AREA	Elliott Bay Tasmania
Observer	S. Ilton	Base Peg		Vert. Scale	5% / cm	PROSPECT	AEM 45 and 46 003
Scale Fact		Date	Feb. 1979	Cont. Int.		PLAN SHOWS	Profiles of VLF-EM

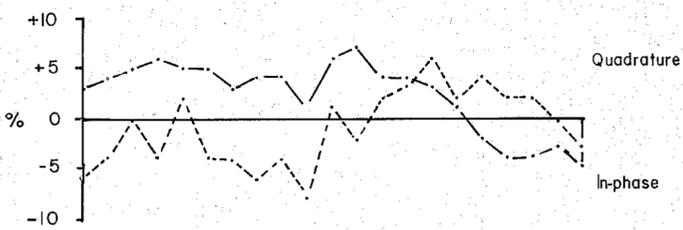




Line 100N

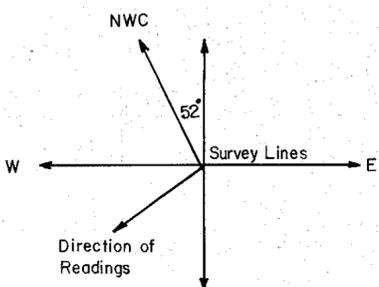


Line 00N



Line 100S

400W 300W 200W 100W 00 100E 200E



Note: Transmitter—North West Cape (NWC)

159017

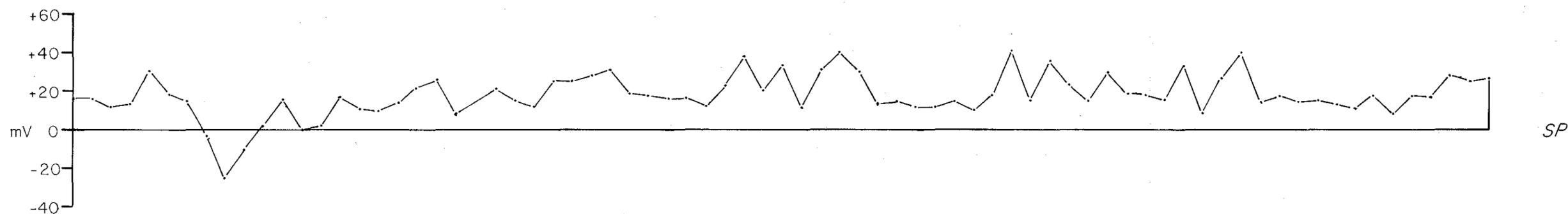
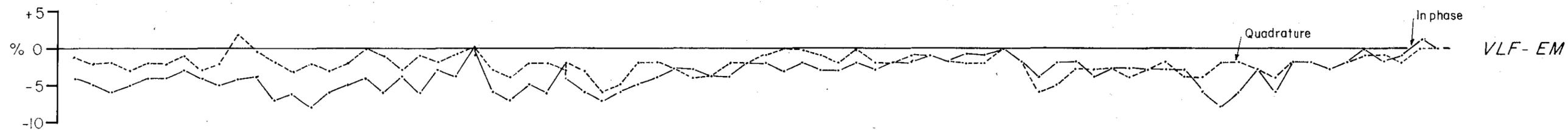
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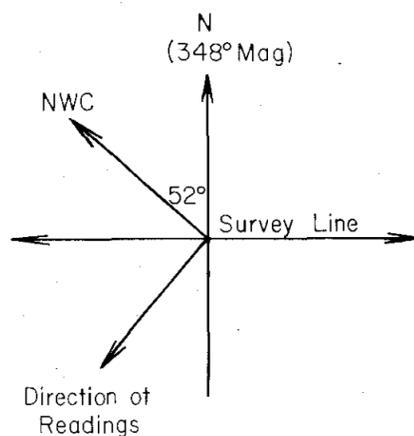
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Plan No. 4566 S/B

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Observer	S. Ilton	Base Peg		Vert. Scale	5% / cm	PROSPECT	AEM 62 004
Scale Fact		Date	March 1979	Cont. Int.		PLAN SHOWS	Profiles of VLF-EM





300W 200W 100W 00E 100E 200E 300E 400E 500E 600E 700E 800E 900E 1000E 1100E 1200E 1300E 1400E 1500E



159018

5 cm

Note Transmitter North West Cape (NWC)

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GEOPEKO LTD.

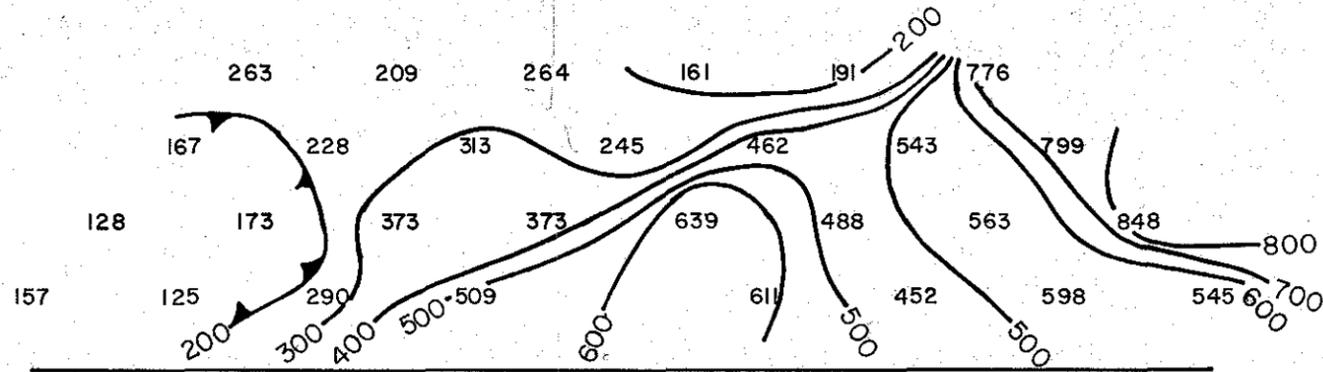
Geophysical Surveys

Plan No. 4567 S/B

Instrument	EMI6, Fluke 8020A	Datum	(SP) 00E (0mV)	Hor. Scale	1:5 000	AREA	Elliott Bay Tasmania
Observer	S. Ilton	Base Peg		Vert. Scale	5 %/cm 20mV/cm	PROSPECT	AEM 40/41 005
Scale Fact.		Date	March 1979	Cont Int		PLAN SHOWS	Profiles of VLF-EM and SP

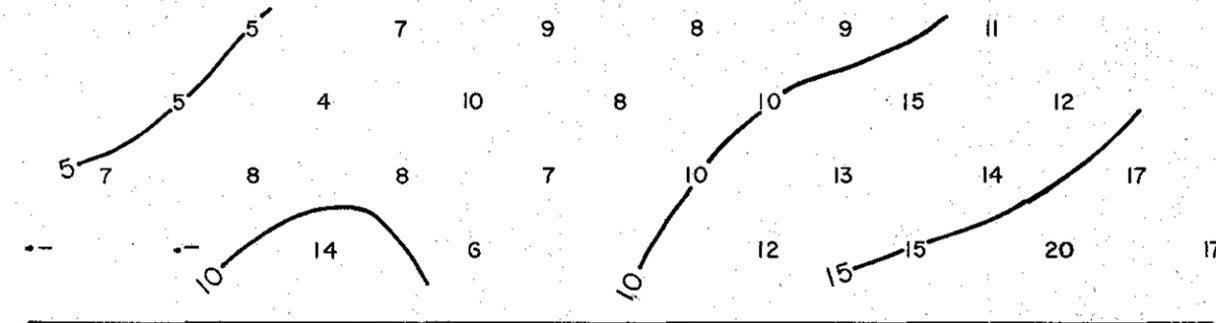


150E 200E 250E 300E 350E 400E 450E 500E 550E



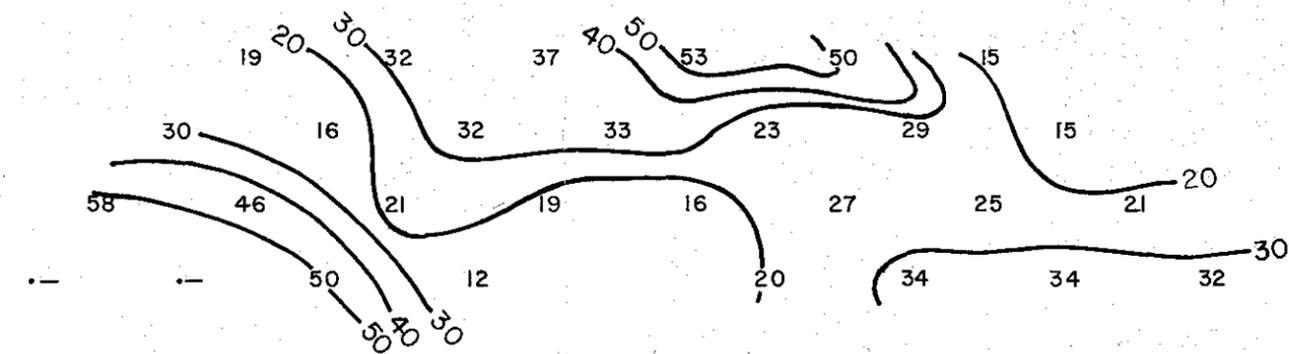
n=1  
n=2  
n=3  
n=4

Apparent Resistivity ( $\rho_a$ )  $\Omega m$   
Contour Interval = 100  $\Omega m$



n=1  
n=2  
n=3  
n=4

Apparent Chargeability  $mVV^{-1}$   
Contour Interval = 5  $mVV^{-1}$



n=1  
n=2  
n=3  
n=4

Apparent Metal Factor  $\Omega^{-1} m^{-1} (M_{232})$   
Contour Interval = 10  $\Omega^{-1} m^{-1}$

150E 200E 250E 300E 350E 400E 450E 500E 550E

159019

5 cm

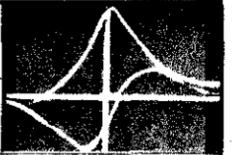
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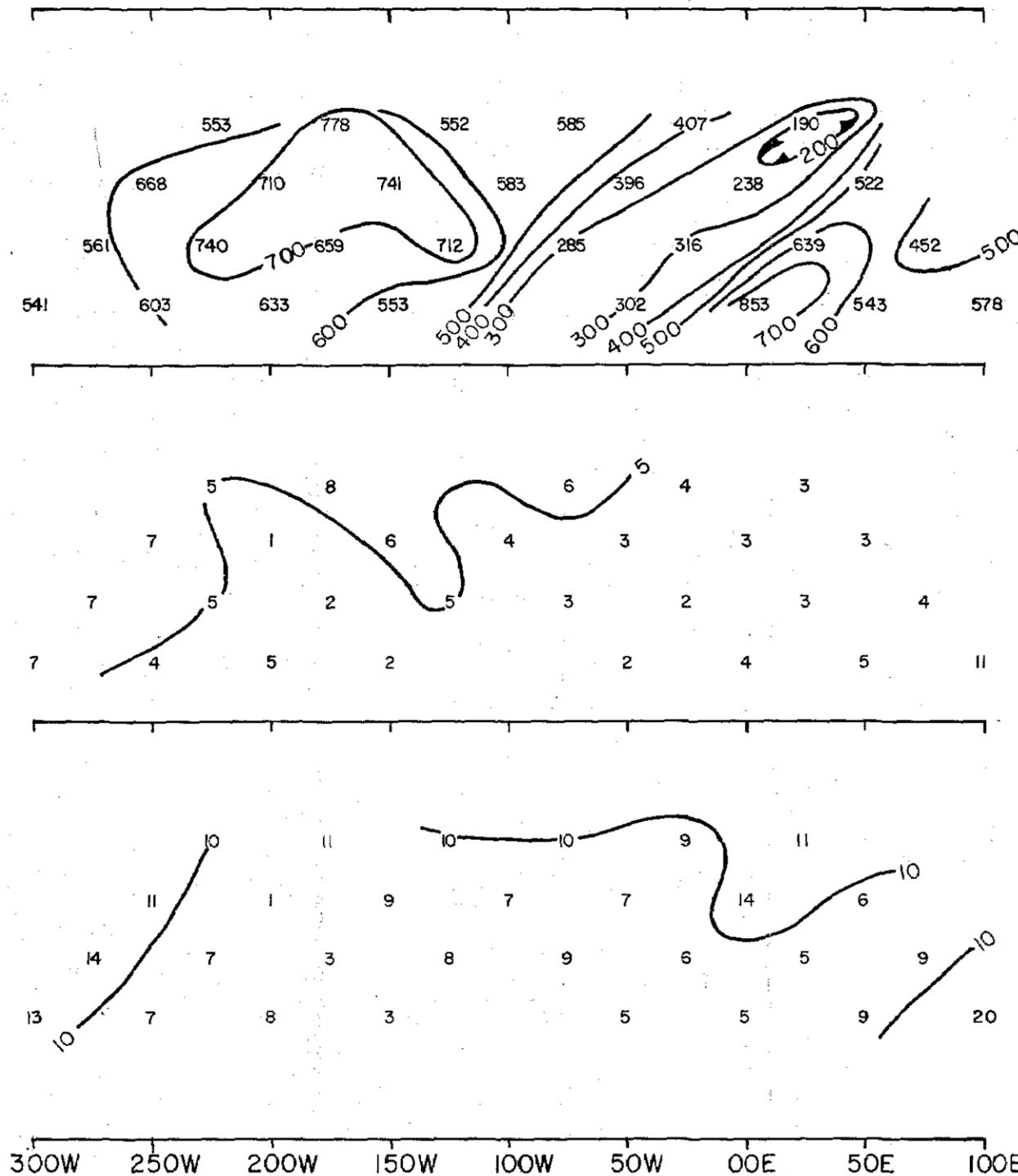
Note: Dipole Length=50metres

GEOPEKO LTD.  
Geophysical Surveys.  
Plan No. 4568 S/B

Instrument	IPR 8	Datum		Hor. Scale	1:2500
Observer	S.Iltton	Base Peg		Vert. Scale	
Scale Fact		Date	March '79	Cont. Int.	

AREA	Elliott Bay Tasmania
PROSPECT	AEM 45/46 Line 00N
PLAN SHOWS	Pseudosection of Dipole-Dipole IP





n=1  
n=2  
n=3  
n=4

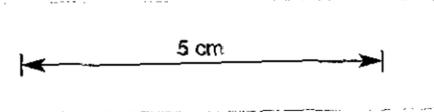
Apparent Resistivity ( $\rho_a$ )  $\Omega m$   
Contour Interval = 100  $\Omega m$

n=1  
n=2  
n=3  
n=4

Apparent Chargeability  $mV V^{-1}$   
Contour Interval = 5  $mV V^{-1}$

n=1  
n=2  
n=3  
n=4

Apparent Metal Factor  $\Omega^{-1} m^{-1}$   
Contour Interval = 10  $\Omega^{-1} m^{-1}$



Note: Dipole Length = 50 metres

159020

GEOPEKO LTD. Geophysical Surveys. Plan No. 4569 S/B	Instrument	IPR-8	Datum		Hor. Scale	1:2 500	AREA	Elliott Bay Tasmania
	Observer	S. Ilton	Base Peg		Vert. Scale		PROSPECT	AEM 62 Line 00N
	Scale Fact		Date	March '79	Cont. Int.		PLAN SHOWS	Pseudosections of Dipole-Dipole IP

