24. OFFICER HILL (EL 6938)

24.1 Introduction

Officer Hill is located approximately eighty kilometres south-west of The Granites within EL 6938. Access is via the Tanami Downs - Balgo track thence south along graded North Flinders Mines access tracks.

Initiated by a visible gold occurrence to the north of the Officer Hill ridge, geochemical coverage in 1988 targeted the fine grained sedimentary package coincident with a 2000 nT amplitude magnetic anomaly. Vacuum drilling in this area produced several anomalous (>0.1ppm Au) results, but the coverage was incomplete owing to unsuccessful bedrock penetration. Rotary air blast (RAB) drilling was used to overcome the limitations of the vacuum drilling program, but detected only sporadic mineralisation. Selective reverse circulation (RC) drilling confirmed the erratic narrow intersections of gold mineralisation, with grades of upto 33g/t over one meter.

Subsequent reverse circulation and rotary airblast drilling programs tested along strike extensions of the prospective lithology and a fold closure immediately east of Officer Hill without encouraging results. Recent studies have indicated that the patchy mineralisation is hosted by epigenetic quartz-tourmaline-sulphide veins at 5 to 20 degrees to drill traverses.

24.2 Work Undertaken

The objectives for the reporting period were as follows:

(i) to drill along the dolerite/meta-sediment contact to the east of the grid;

(ii) to surface sample and reconnaissance drill Davidson Beds with base metal anomalies cropping out to the north west of the Officer Hill;

(iii) to drill test three low amplitude magnetic features to the south east of Officer Hill which were inadequately reconciled by a previous RC drilling program;

(iv) to critically assess the data with a view to proposing viable alternative models for the distribution of gold mineralisation;

(v) to reassess the horizontal loop ground electromagnetic survey undertaken on lines 80,000E, 81,000E and 81,800E in July 1991.

Details of work carried out are summarised on the following page.

RAB Drilling

Most RAB drilling was confined to the dolerite/metasediment contact north and east of Officer Hill.

The drill hole spacing was 50m with holes angled at 60 degrees to the grid north. Hole depths varied depending upon geology, but averaged at 25m. Grid lines drilled were 82150E, 82300E,82500E, 82700E.

Smaller programs tested ground below Davidson Beds exposures with basemetal anomalies 3.5km north-west of Officer Hill and a magnetically anomalous area immediately east of the Officer Hill ridge.

Drill samples were composited into three metre samples on site and dispatched for analysis for gold by Analabs method 334 (30g aqua regius digest with carbon rod finish) and arsenic by method 115 (perchloric acid digestion/hydride generation with atomic absorption finish)

OFFICER HILL - SUMMARY OF WORK COMPLETED

VACUUM DRILLING										RAB DRILLING					RC DRILLING			
Later	Lag	CRC	Pet	Holes	Metres	Samples	BCL	Magnetics Km	EM Km	Metres	Samples	Holes	Metres	Samples	Holes	Metres	Samples	Period Ended
-	-	-	-	244	1126.8	389	-	-	-	-	-	-	-	-	-	-	-	Dec 88
-	-	-	-	-	-	-	-	-	-	-	-	481	4391	515	-	-	-	June 89
-	-	89	-	-	-	-	-	-	-	-	-	-	-	-	29	1464	1480	Dec 89
-	-	-	41	-	-	-	-	-	-	-	-	-	-	-	44	2281	2232	June 90
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dec 90
-	-	-	-	-	-	-	-	-	-	-	-	227	3977	1327	-	-	-	June 91
-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	Dec 91
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	June 92
-	16	18	30	-	-	-	-	-	-	-	-	104	2925	958	-	-	-	Dec 92
	16	**107**	**71**	**244**	**1126.8**	**389**			**3**			**812**	**11293**	**2800**	**73**	**3745**	**3712**	**TOTAL**

Representative samples were collected from each drill composite to assist geological interpretations and for petrological work if required.

Samples of quartz vein material were collected from several gold anomalous RAB and RC drill holes which contained primary (unoxidised) mineralisation at greater than 1ppm Au. This allowed the identification of any gold-quartz vein association mineralising the host lithology.

Lag and Composite Rock Chip Sampling

Surface sampling was undertaken on a north-south striking narrow ridge of Davidson Beds to the north-west of Officer Hill. Both rock chip and lag sampling were undertaken. Samples were analysed for gold by method 334 and arsenic by method 115.

Two east-west orientated lag traverses (10500N, 11200N) were sampled at a spacing of 200m with 500g of sieved -5mm+2mm fraction retained for assay.

The elemental suite and assay methods for the lag samples are detailed in the appendices.

Horizontal Loop Ground Electromagnetics

3 ground EM traverses were completed in July 1991 for a total of 3 line kilometers. Problems were experienced in interpreting results distored by conductivity variability in the surface layers of the weathering profile. The survey was not reported in 1992, but results are now presented in a May 1992 document provided by a consultant geophysicist (see appendices).

24.3 Results

RAB Drilling

Significant drilling results (>0.1ppm Au) are summarised as follows:

Hole No	Depth	Intersection (m)	Au (ppm)	Unit
ORB726	16-19	3	0.10	ser-(mag) sch, 2%qv
ORB751	22-25	3	0.11	dol,5% qv
ORB753	25-28	3	0.11	dol,0.1%qv
ORB754	19-22	3	0.72	ser-(q) sch,1% qv
ORB757	10-13	3	0.28	dol, weathered
ORB766	4-7	3	0.95	colluvium,qv
ORB779	4-7	3	0.25	colluvium,qv
ORB780	4-7	3	0.17	colluvium,qv

Mineralisation greater than 0.1ppm gold appears to be associated with quartz veining which is within the contact zone of the ?intrusive metadolerites and the quartz-sericite-biotite- +/- magnetite schists of the Blake Beds. The contact zone may be structurally controlled. Gold content was not affected by quartz vein volume.

Drilling of targets below base metal anomalies in Davidson Beds 3.5km north-west of Officer Hill failed to intersect mineralisation.

The RAB drilling of magnetic anomalies east of the Officer Hill ridge did not penetrate lithologies accounting for the features.

Lag & CRC Sampling

The results of the rock chip sampling were indicative of Davidson Bed lithologies, with peak gold and arsenic values of 19ppb and 70ppm respectively. Samples of banded cherts and graphite schists were not anomalous.

Lag sampling returned elevated values (>100ppm) of Cu,Pb,Zn, from areas of metadolerite.

The base metal anomalies were reconnaissance drill tested by RAB and were found to be not related to any mineralisation.

Horizontal Loop Ground Electromagnetics

Interpretation of the EM profiles identified two possible horizons which may be bedorck conductors. they lie parallel with mapped stratigraphy (see appendices).

Geology - Discussion

The Officer Hill area is topographically dominated by an elongate east-west strike ridge, which is composed of interbedded silicified graphitic schist, magnetite-rich pelitic schists and white vein quartz. This package represents the Davidson Beds.

Davidson Beds

The following observations can be stated from the outcropping lithologies:

(i) Banded Iron Formation

Three narrow, silicified, iron-rich pelitic beds are observed but only one unit has some continuity. This unit forms the prominent crest of Officer Hill and is composed of magnetite, amphibole and quartz. In the central part of the ridge, another iron-rich unit is enveloped by a massive white chert. These particular units display structures of high strain such as boudins, pervasive schistosity and brecciation.

(ii) Graphitic Schist

The massive graphitic beds are similar to the dominant unit of the Schist Hills Formation. These beds contain resistant silicified interbanded horizons.

(iii) Pelitic Schist

These are of limited extent and occur east of the Hill interbedded with the graphitic schist and cherts as thin units with "slatey" cleavage developed.

Blake Beds

The other major stratigraphic unit at Officer Hill is the Blake Beds which lie to the north of the Hill and lie beneath a sand cover of one to two metres.

The drill derived bedrock geology has been broadly summarised as a sequence of fine grained, pelitic, non-magnetic and magnetic schists, with a series of intercalated fine to medium grained mafic rocks of which Coora Dolerite sill-like intrusives are the most prominent.

Narrow psammitic bands were occasionally recorded within this schist. They may correlate with the similarly described lithology at Callie. The lack of continuity of lithologies between drill holes implies a steep to near vertical bedrock dip.

The Blake Beds can be divided, as at Dead Bullock Soak, into the Upper and Lower Blake Beds. The Upper Unit is well bedded with thin interbeds of graphitic and pelitic schists. Whereas the Lower Beds are monotonous chlorite-biotite schists. At DBS these are the host lithology for the Callie deposit.

The northern-most sector of the grid is overlain by porphyritic basalt of the Cambrian Antrim Plateau Volcanics.

An extensive amphibolite exposure one kilometre west of Officer Hill has been variably described as a quartz amphibole-rich chemical sediment which is in contact with a metamorphosed amphibole-bearing chert or a metamorphosed intercalated chert and volcanogenic sediment.

Structure

In the northeast, two small low ridges of Davidson Beds lithologies were intersected in drilling although the sequence appears quite thin. The low ridges probably represent the approximate thickness and apparent distribution of Davidson Beds present.

The distribution of Davidson Beds in this area implies that locally and perhaps regionally the sequence may be lensoid in distribution and show considerable thickness variation where developed. Whether this is a primary depositional feature or related to boundinaging during the inferred regional shearing D1 event is uncertain.

The structural outline of the Officer Hill Prospect is a F3 overprint of a F2 anticlinorium, both essentially trending WNW and NW. There is evidence for a large scale NE F4 fold. Costean mapping of axial planal S4 schistosity would confirm that interpretation.

Mineralisation

The Davidson Beds sequence was proved to be unmineralised with only weak gold and arsenic anomalism.

Within the stratigraphically underlying units anomalous gold values are detected within the chloritic-biotite-quartz and graphitic lithologies but not within the mafics. The presence of coarse grained undeformed epidote-tourmaline and limonite (after pyrite) mineral assembleges are confined to the anomalous zones, but hosted in a variety of lithologies, implying that the gold is of an epigenetic origin.

Mineralisation at Officer Hill probably occurs in several distinct epigenetic settings apparently related to brittle structures. This setting was previously recognised by NFM but the concept was latter abandoned. The pathways are represented by quartz veins and rhyodacite porphyry dykes. The quartz veins can be classified as follows:-

Q1 quartz-tourmaline-sulphide +Au+Sn+?W (Q1)
Q3a quartz +Pb+/-Au (Q3a)
Q3b quartz only (Q3b)

Mineralisation (>1ppm Au) intersected by RC drilling is probably attributable to mineralised quartz-tourmaline-sulphide veins. The volume of the veins is approximately 1-5% of the rock volume. Resampling of vein quartz from these mineralised intervals produced anomalous results. However, no conclusive association between quartz veining and elevated gold values could be shown, except that every high gold assay contained quartz veining, although not every quartz vein sampled carried gold.

The quartz-tourmaline-sulphide style of veining is common to that noted within granite related tin-tungsten hydrothermal systems. From the limited multielement work done it appears these veins are anomalous in tin, 15-35ppm, against a background of less than the limit of detection. No tungsten determinations were undertaken. Significant assays are received from these veins, as well as occurrences of visible Au.

The rhyodacite porphyry dykes (Q2) are anomalous in gold up to 70ppb. It has been suggested that as at Chapmans-Bunkers Hill these dykes could be depleting gold from the contact wallrocks and do not represent original mineralisation pathways. They may represent a separate granitic body, or a late stage differentiate.

Mineralisation at Officer Hill is sporadic. It is suggested that this reflects occasional sampling of the gold carrying quartz veins. The gold veins are probably of a distinct orientation. Drilling to date has been orientated perpendicular to lithological strike. While the orientation of the quartz veins is not fully known, limited outcrop indicates it is probably between 5 and 20 degrees to the drill traverses.

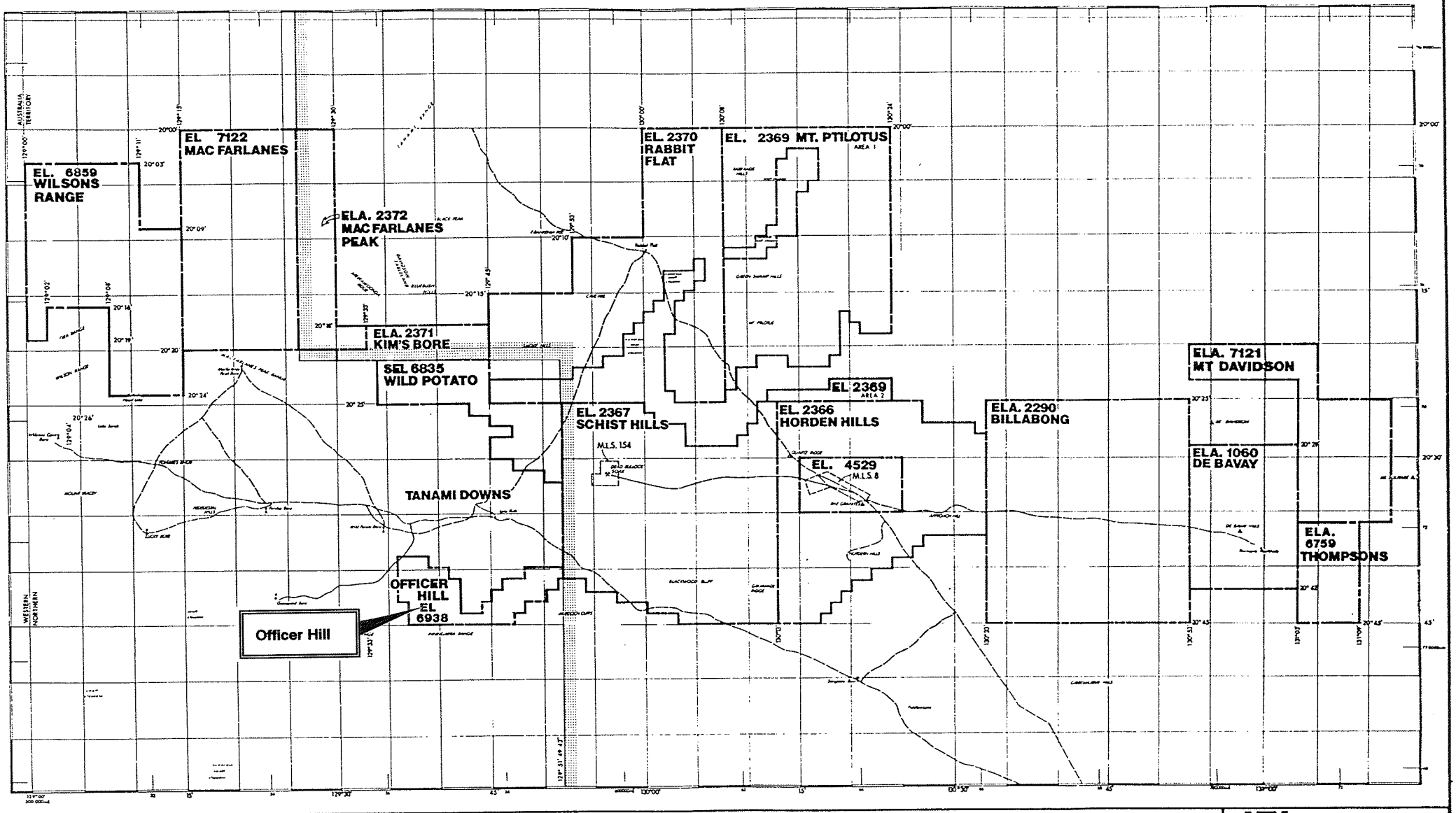
24.4 Plans

Drawing No.	Title	Scale
200-1245	Officer Hill RAB Geology and Assay 82300E Sheet 3	1:500
200-1246	Officer Hill RAB Geology and Assay 82500E Sheet 3	1:500
200-1247	Officer Hill RAB Geology and Assay 82700E Sheet 3	1:500
200-1517	Officer Hill RAB Geology and Assay 82150E	1:500
200-1539	Officer Hill RAb Geology and Assay 11200N	1:500
200-1540	Officer Hill RAB Geology and Assay 10500N	1:500
200-1541	Officer Hill RAB Geology and Assay Oblique Section from 83284E, 8225N	1:500
200-1542	Officer Hill RAB Geology and Assay Oblique Sections, various	1:500
200-1594	Officer Hill RAB Geology and Assay Oblique Section from 84244E, 6314N	1:500
200-1602	Officer Hill RAB and RC Drilling Location Plan	1:10000

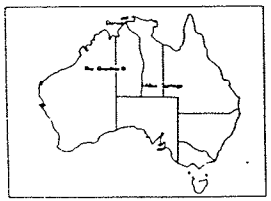
APPENDIX ONE

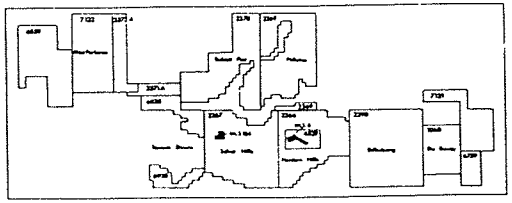
REPORT ON MAX-MIN E.M.

SURVEY AT OFFICER HILL



LOCATION MAP





LEGEND

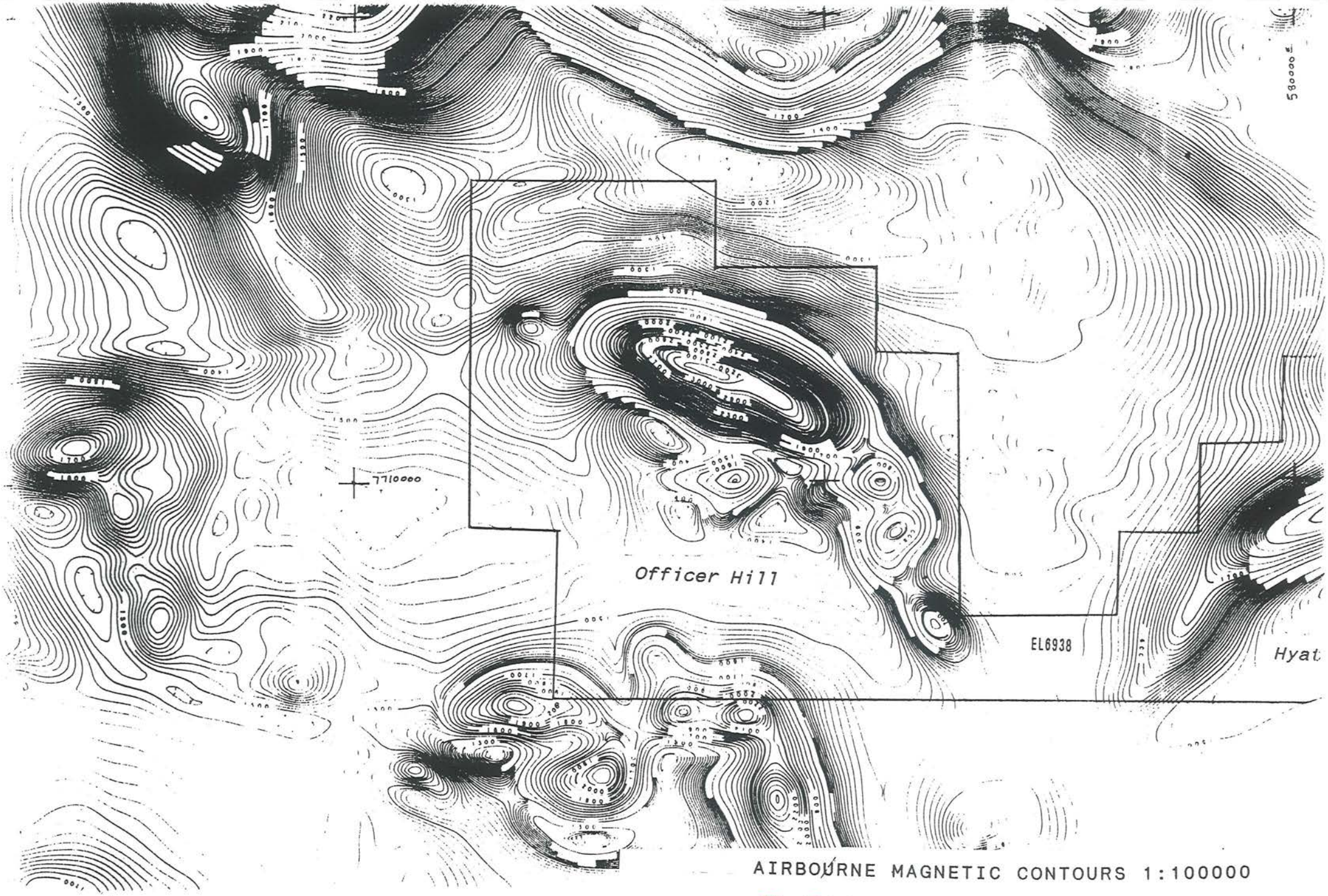
NORTH FLINDERS MINES LIMITED

Tanami Reconnaissance : Northern Territory

EL LAYOUT

Fig. 24.1

Dwg No. 20-1



AIRBOURNE MAGNETIC CONTOURS 1:100000

Fig. 24.2

OFFICER HILL

Fact Geology

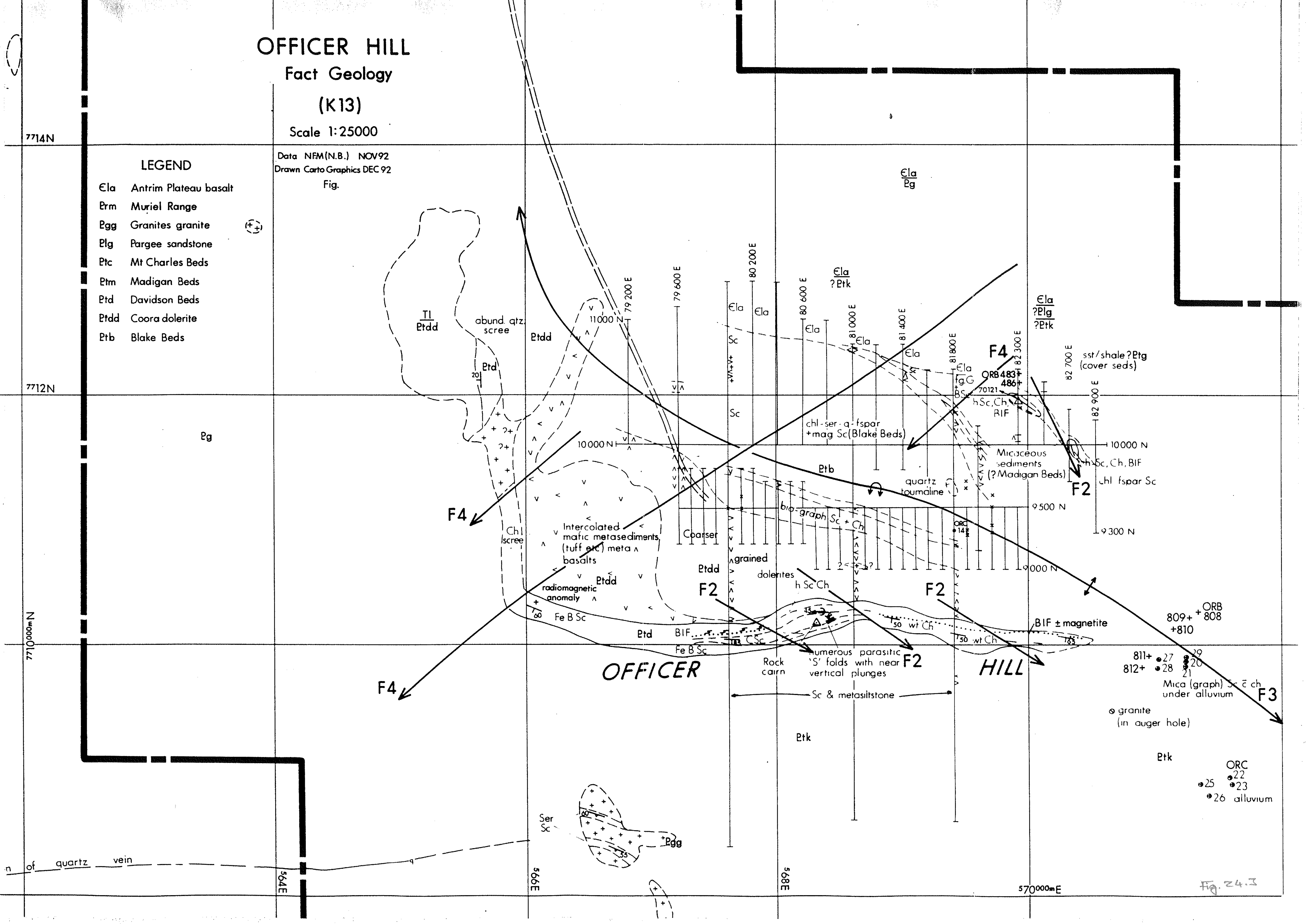
(K13)

Scale 1:25000

Data NFM(N.B.) NOV92
Drawn Carto Graphics DEC 92
Fig.

LEGEND

Єla	Antrim Plateau basalt
Ƥrm	Muriel Range
Ƥgg	Granites granite
Ƥlg	Pargee sandstone
Ƥtc	Mt Charles Beds
Ƥtm	Madigan Beds
Ƥtd	Davidson Beds
Ƥtdd	Coora dolerite
Ƥtb	Blake Beds



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CENTRAL FILE COPY

FILE Nº: 07-805

4 May, 1992

Mr R Chadwick
North Flinders Exploration
C/- The Granites
P.O. Box 3674
ALICE SPRINGS NT 0871

"Report on Max-Min E.M. Survey at Officer Hill."

Dear Rob,

The ground conditions at Officer Hill are not the best for a simple EM system such as Max-Min. It is the variability in the surface layer which causes the problem. Most of the anomalies which are evident in the higher three frequencies have a low conductivity and appear to have a source in the top 15m - 20m with very little if any depth extent.

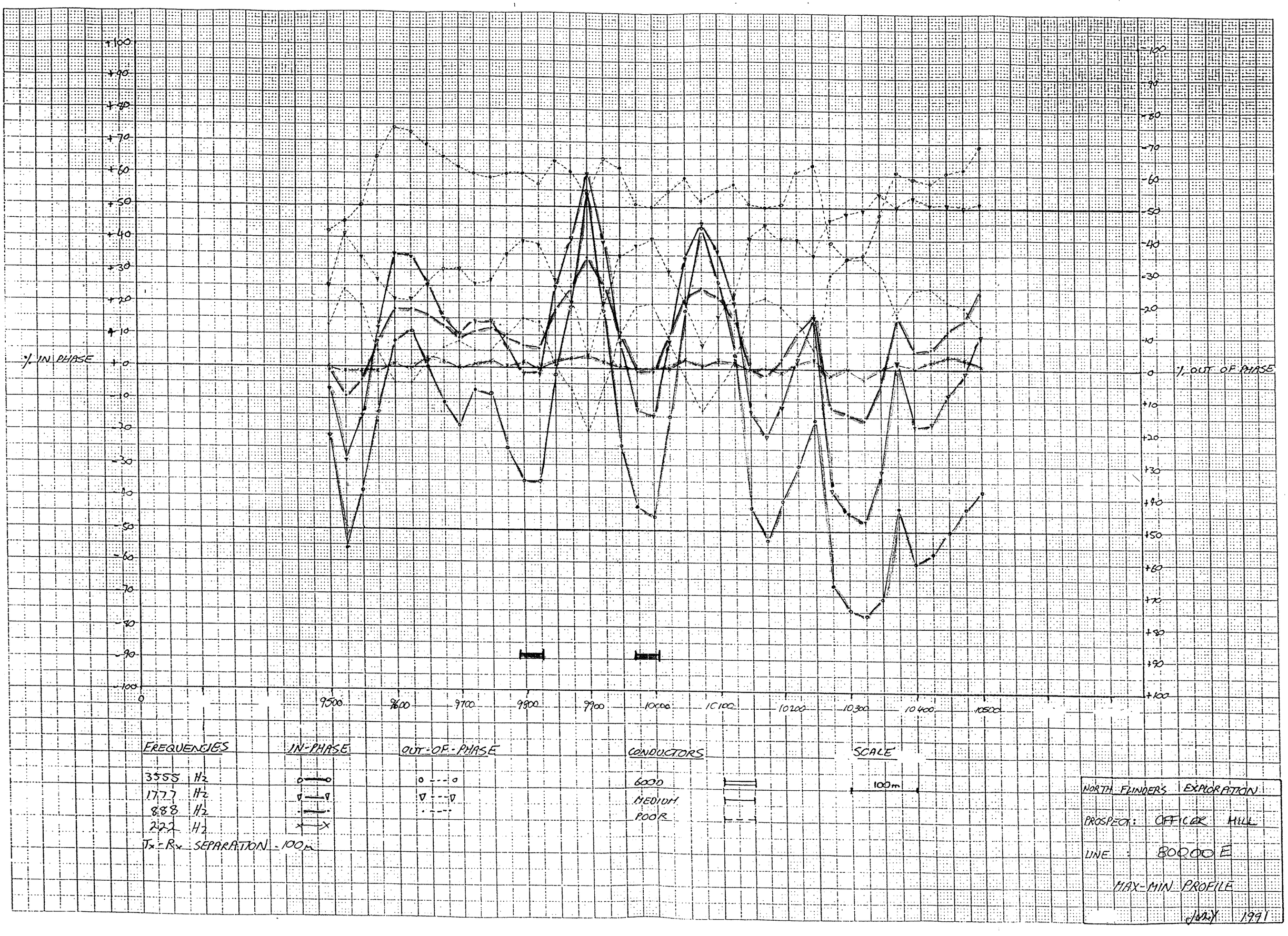
I have identified two horizons which I think are bedrock conductors. The first occurs on 80,000E at 9,800N and 81,000E at 9,500N; it coincides with the mapped volcanic horizon. The second horizon is about 200m north occurring on 80,000E at 10,000N, 81,000E at 9,700N and 81,800E at 9600N. It appears to have a southerly dip. The conductivity is high suggesting a high component of graphite in the source unit. I have marked these anomalies on the Max-Min profiles. In an environment like Officer Hill it would be better to use a more powerful EM system which has greater discriminating ability such as GEOTEM or SIROTEM. However, in the short term a few deeper holes in to the Max-Min horizon might be worthwhile.

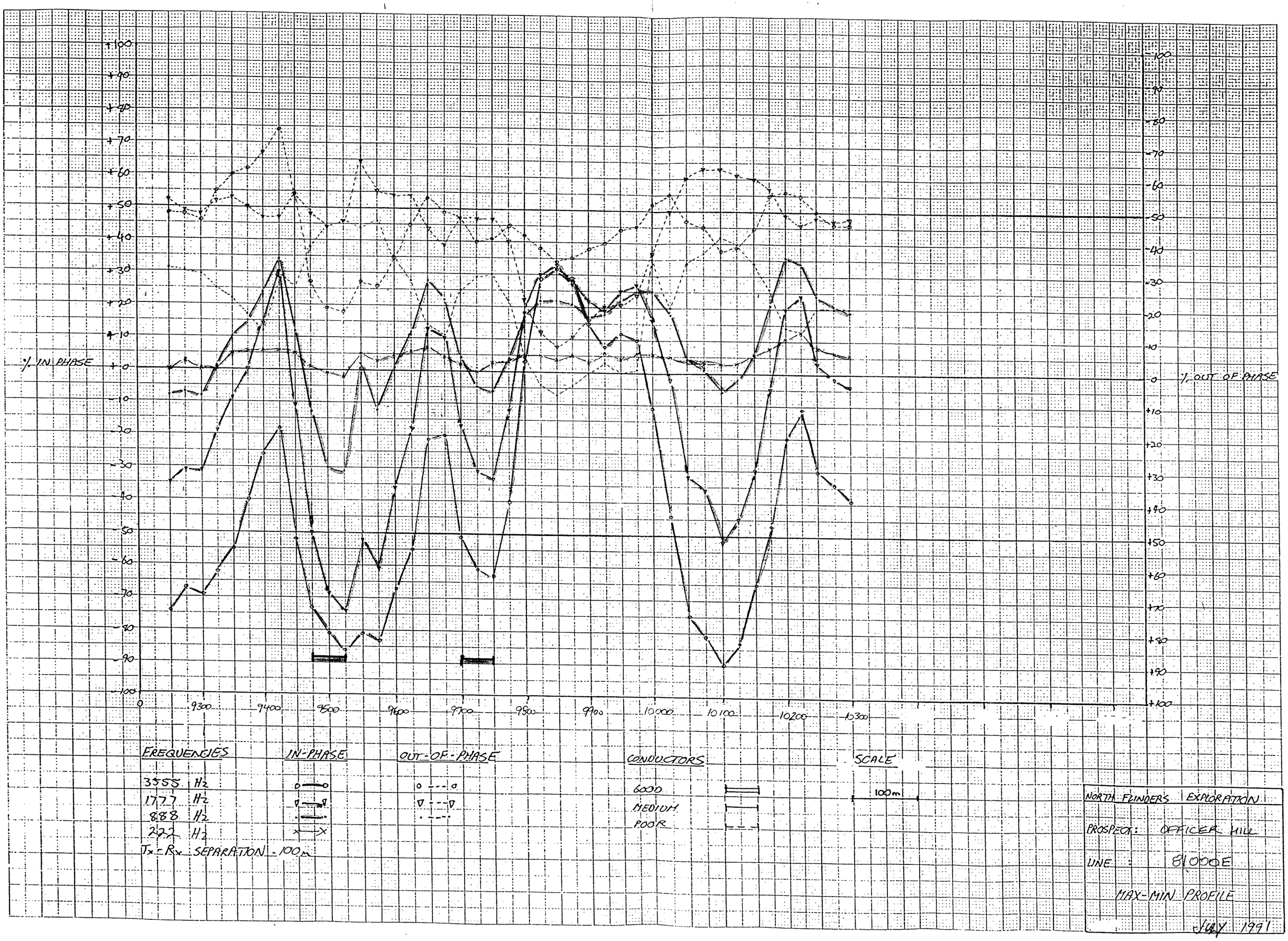
Regards,

Yours sincerely,

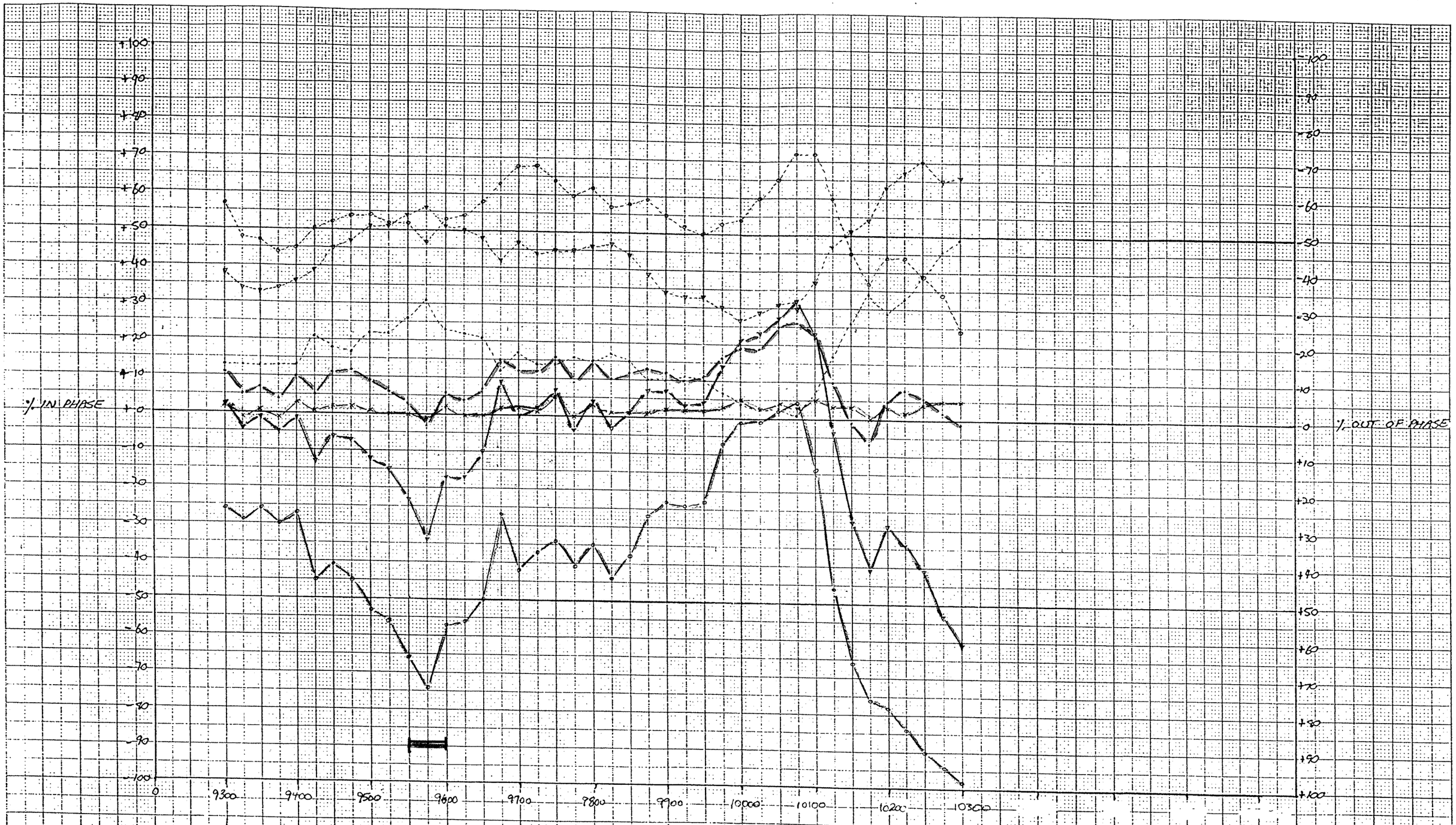
Hugh Rutter

HUGH RUTTER
CONSULTANT GEOPHYSICIST





MICADOR A3 -- 297 x 420 mm



MICADOR A3 - 297 x 420 mm