4105

Bergvesenet

Postboks 3021, N-7441 Trondheim

Rapportarkivet

Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
BV 4105	Kasse 60		Trondheim	

Kommer fra ..arkiv	Ekstern rapport nr	Oversendt fra	Fortrolig pga	Fortrolig fra dato:
		Tverrfjellet		

Tittel

Comparison of HEM-results and data presentation.

Forfatter	Dato	Bedrift
	1983	Dighem Limited Folldal Verk A/S

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
	Hedmark	Østlandske		

Fagområde	Dokument type	Forekomster
Geofysikk	Rapport	

Råstofftype	Emneord

Sammendrag

Sammenligning Dighem + HLEM-data
Bildjørnegg-området Kaalskaro

Comparison of HEM Results and Data Presentation

System X Survey - Presentation and Processing not by Dighem Ltd.

Fig.	1	EM - Inphase Component
	2	EM - Out-of-Phase Component
	3	Magnetics - Total Field
	4	Magnetics - Total Field Profiles

System X Survey - Presentation and Processing by Dighem Ltd.

Fig.	5	Electromagnetics
	6	Resistivity
	7	Magnetics
	8	Enhanced Magnetics

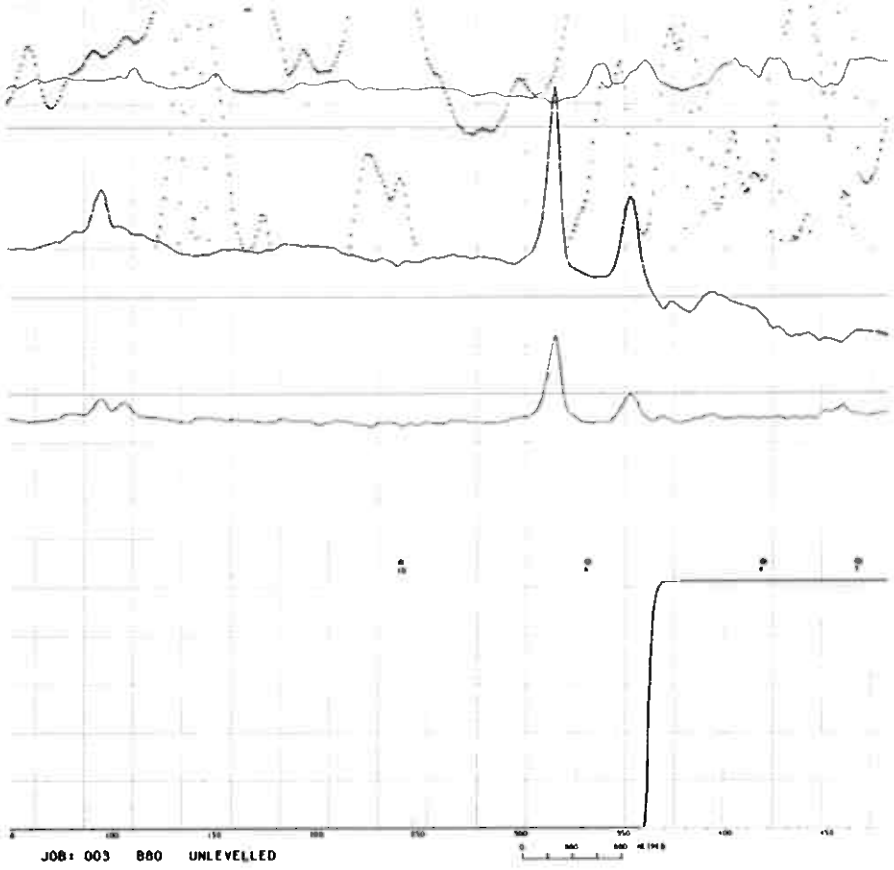
DIGHEM^{II} Survey - Presentation and Processing by Dighem Ltd.

Fig.	9	Electromagnetics
	10	Resistivity
	11	Filtered Total VLF-EM Field
	12	Magnetics
	13	Enhanced Magnetics

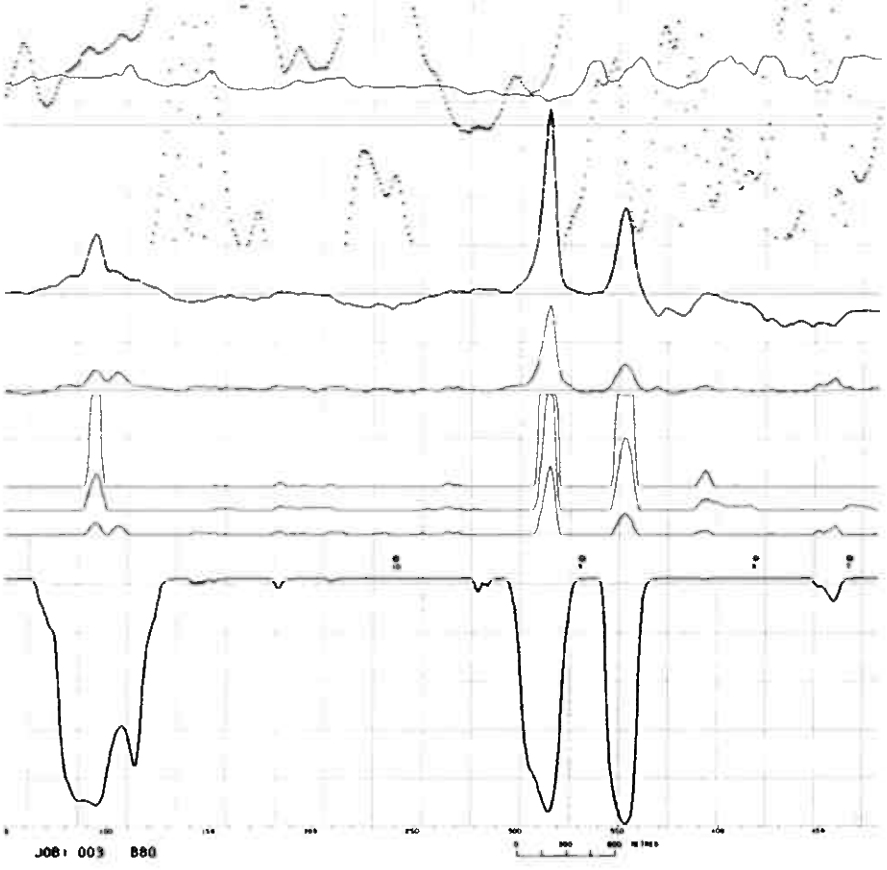
Profiles

Fig.	14	System X; Original Traces
	15	System X; Dighem Processed, unlevelled
	16	System X; Dighem Processed, levelled
	17	DIGHEM^{II}; Dighem Processed

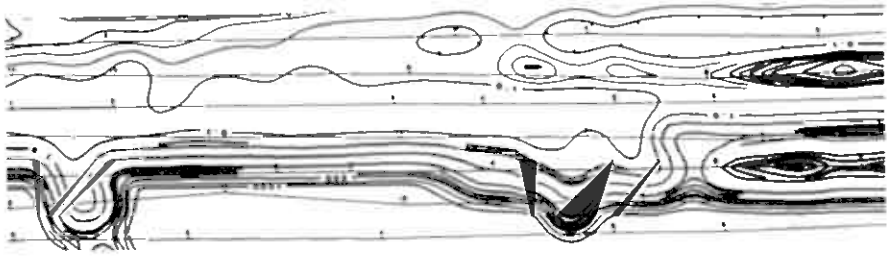
Raw digital profile



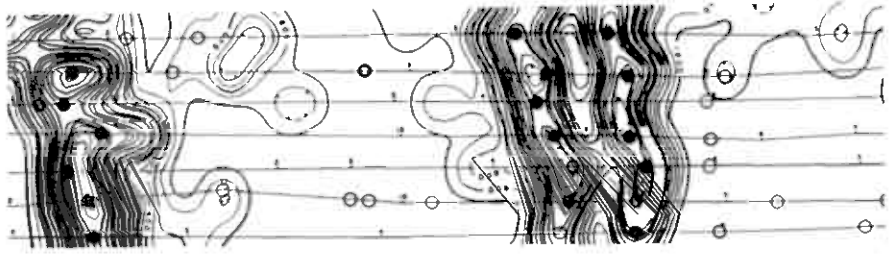
Final digital profile

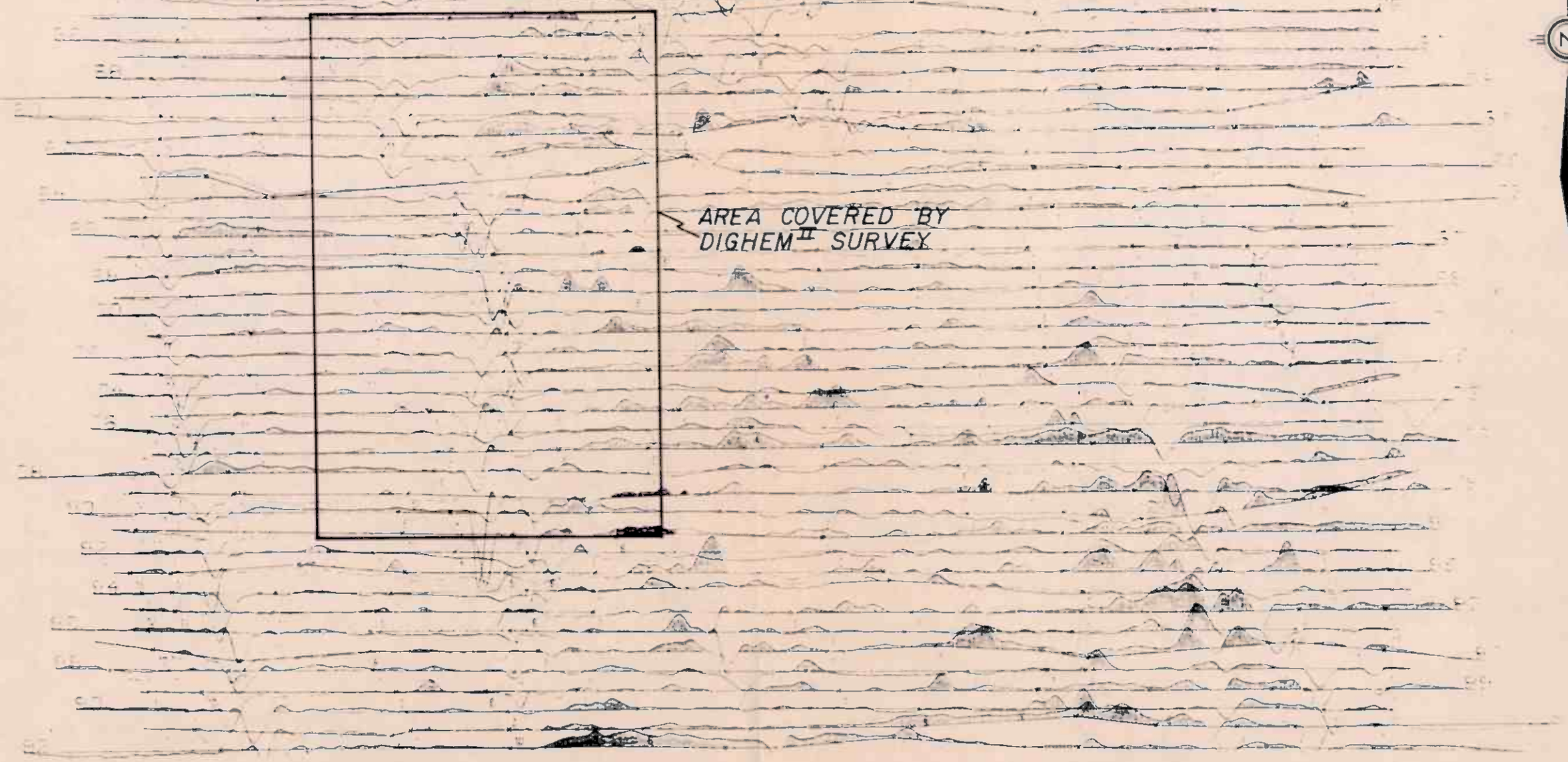


Unlevelled Resistivity



Final Resistivity





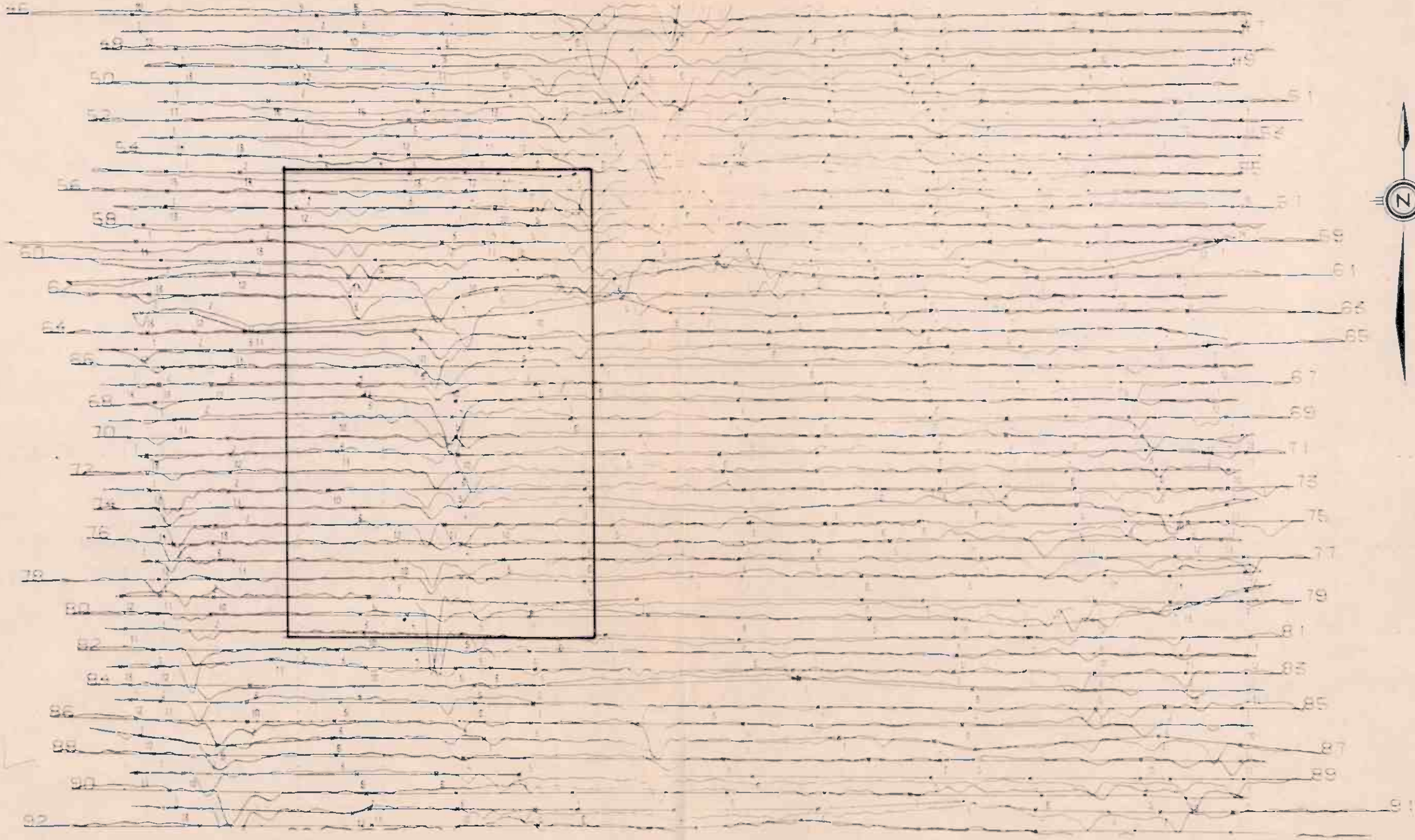
SYSTEM - X SURVEY

PRESENTATION AND PROCESSING NOT BY DIGHEM LTD.

VERTICAL SCALE 1cm = 60 ppm
HORIZONTAL SCALE 1:50000

EM - In Phase Component

Fig. 1



SYSTEM - X SURVEY

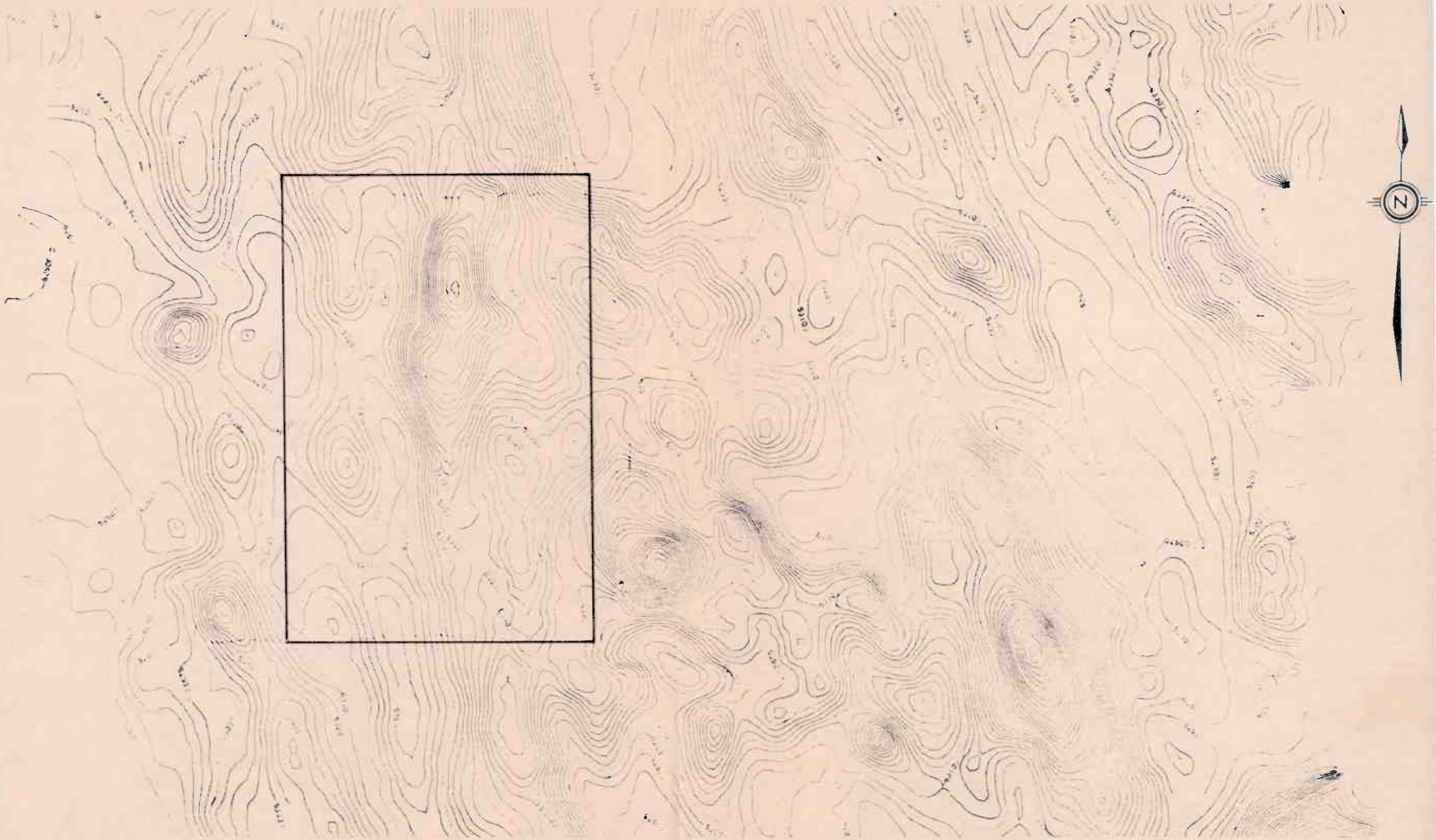
PRESENTATION AND PROCESSING NOT BY DIGHEM LTD.

VERTICAL SCALE 1cm = 30 ppm

HORIZ. SCALE 1:50000

EM - Out of Phase Component

Fig. 2



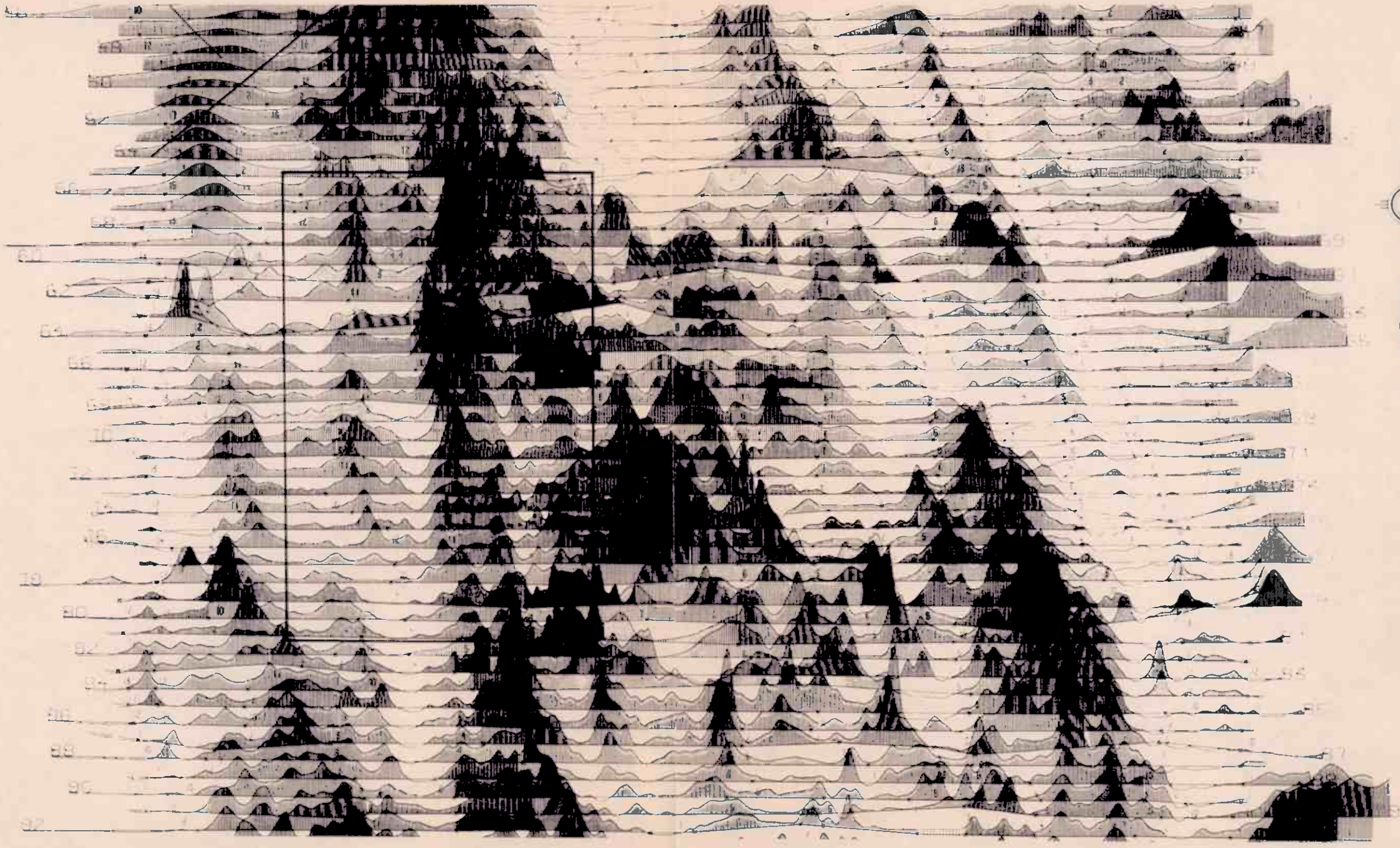
SYSTEM - X SURVEY

PRESENTATION AND PROCESSING NOT BY DIGHEM LTD.

CONTOUR INTERVAL = 100 gammas
SCALE 1:50 000

MAGNETICS (TOTAL FIELD)

Fig. 3



SYSTEM - X SURVEY

PRESENTATION AND PROCESSING NOT BY DIGHEM LTD.

VERTICAL SCALE 1 cm = 2000 gammas
HORIZONTAL SCALE 1:50000

MAGNETICS (TOTAL FIELD PROFILES)

Fig. 4

AREA COVERED BY DIGHEM II SURVEY

SYSTEM-X SURVEY
PRESENTATION AND PROCESSING BY DIGHEM LTD.

ELECTROMAGNETICS

Flight Line
5 ← Fiducial
4 ← Fiducial
44 Line Number

SCALE 1:20,000
0 1 2 Kilometres

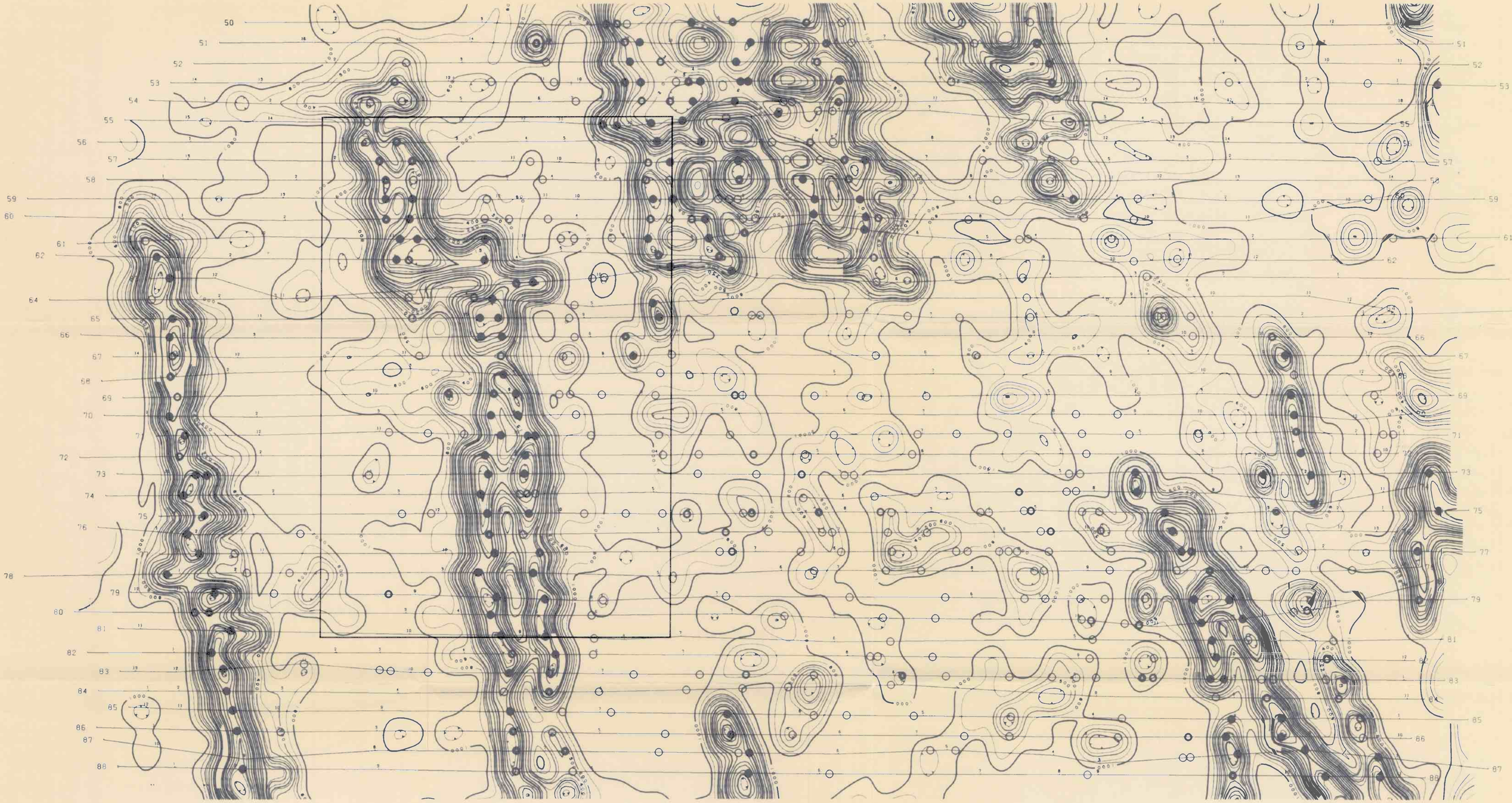
LEGEND

EM anomalies are graded as to the probability that they reflect bedrock conductors. There are four grades as follows:

Symbol	Probability Grade	Probability Rating
	4	> 90%
	3	75–90%
	2	60–75%
	1	40–60%

Vertical coaxial coils	
Coil seperation	6.7m
Frequency	1000 Hz

Fig. 5



SYSTEM-X SURVEY
PRESENTATION AND PROCESSING BY DIGHEM LTD.

RESISTIVITY

Flight Line
5 ← Fiducial
4 ← Fiducial
44 Line Number

SCALE 1:20,000
1 0 1 2 Kilometres

LEGEND

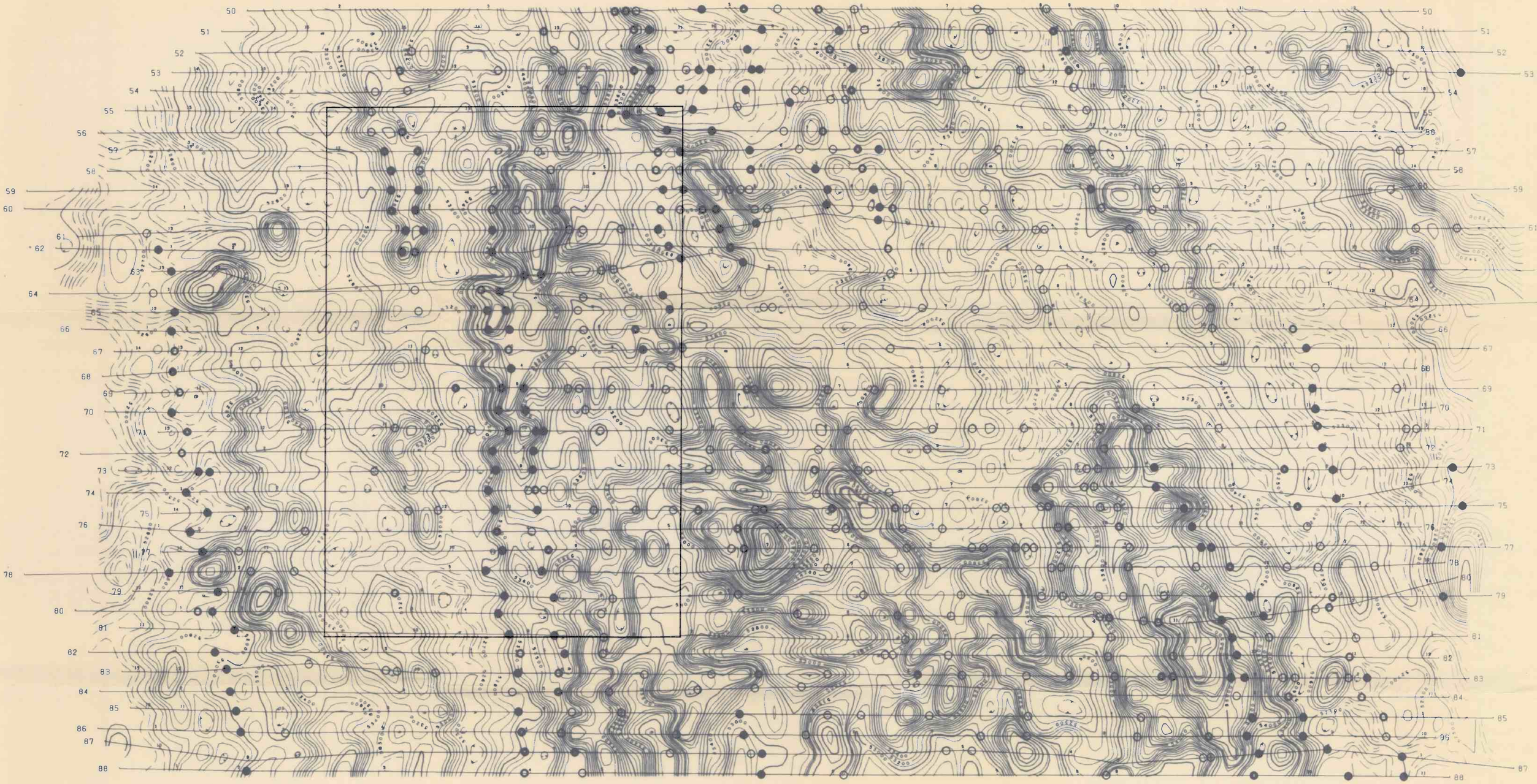
Contours in ohm-m
at ten intervals per decade

1000
800
600
500
400
300
250
200
150
125
100

Note
The numbers face in the direction of increasing value

Vertical coaxial coils
Coil seperation 6.7m
Frequency 1000 Hz

Fig. 6



SYSTEM - X SURVEY
PRESENTATION AND PROCESSING BY DIGHEM LTD.

Flight Line
5 ← Fiducial
4 ← Fiducial
44 Line Number

MAGNETICS

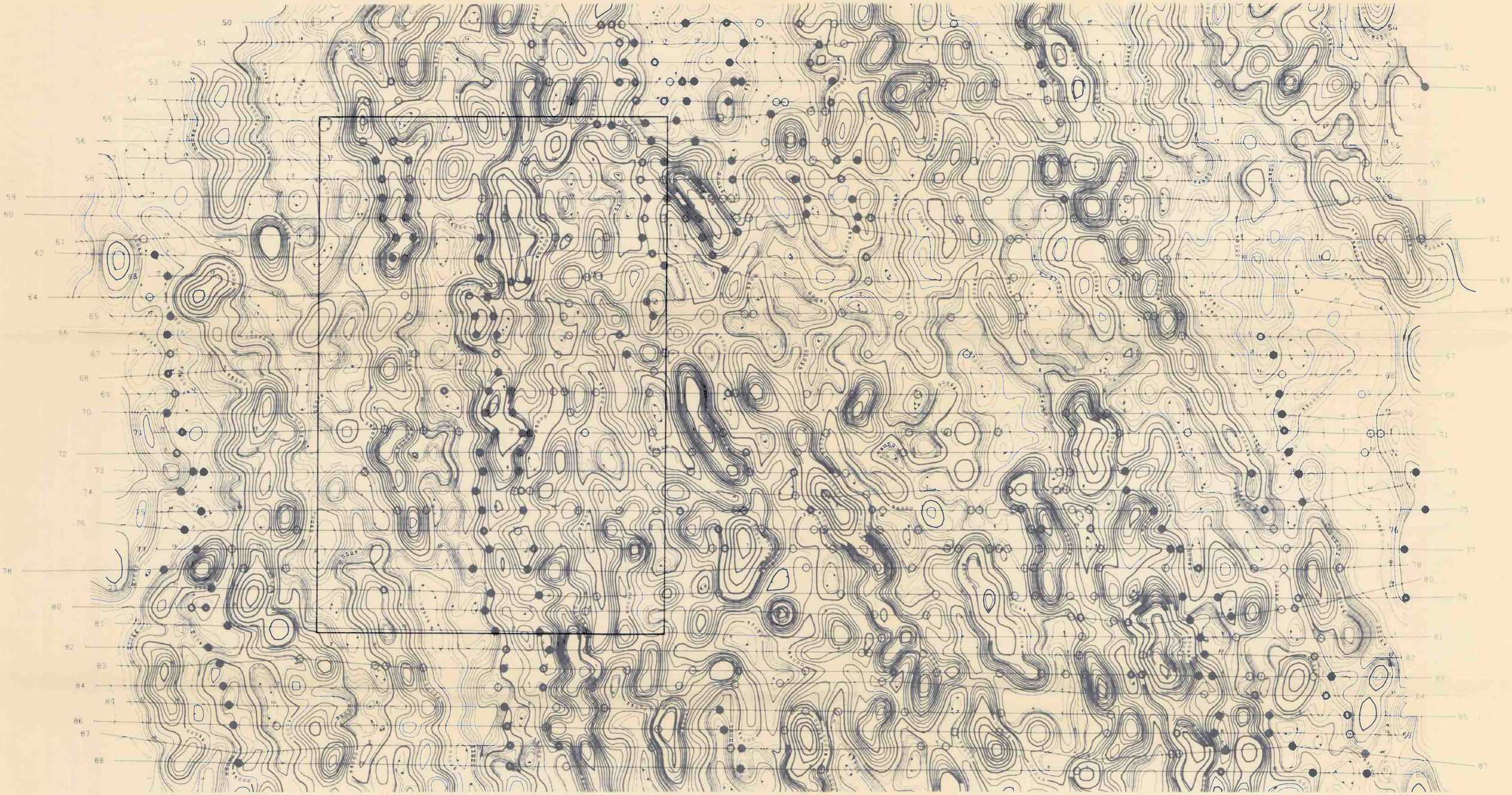
ISOMAGNETIC LINES
(total field)

1,000 nT
200 nT
50 nT
25 nT
magnetic depression

Magnetic inclination within the survey area.

SCALE 1 : 20,000
1 0 1 2 Kilometres

Fig. 7



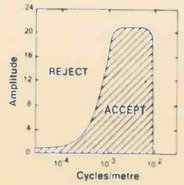
SYSTEM-X SURVEY
PRESENTATION AND PROCESSING BY DIGHEM LTD.

Flight Line
5 ← Fiducial
4 ← Fiducial
44 Line Number

ENHANCED MAGNETICS

ISOMAGNETIC LINES
(enhanced field)

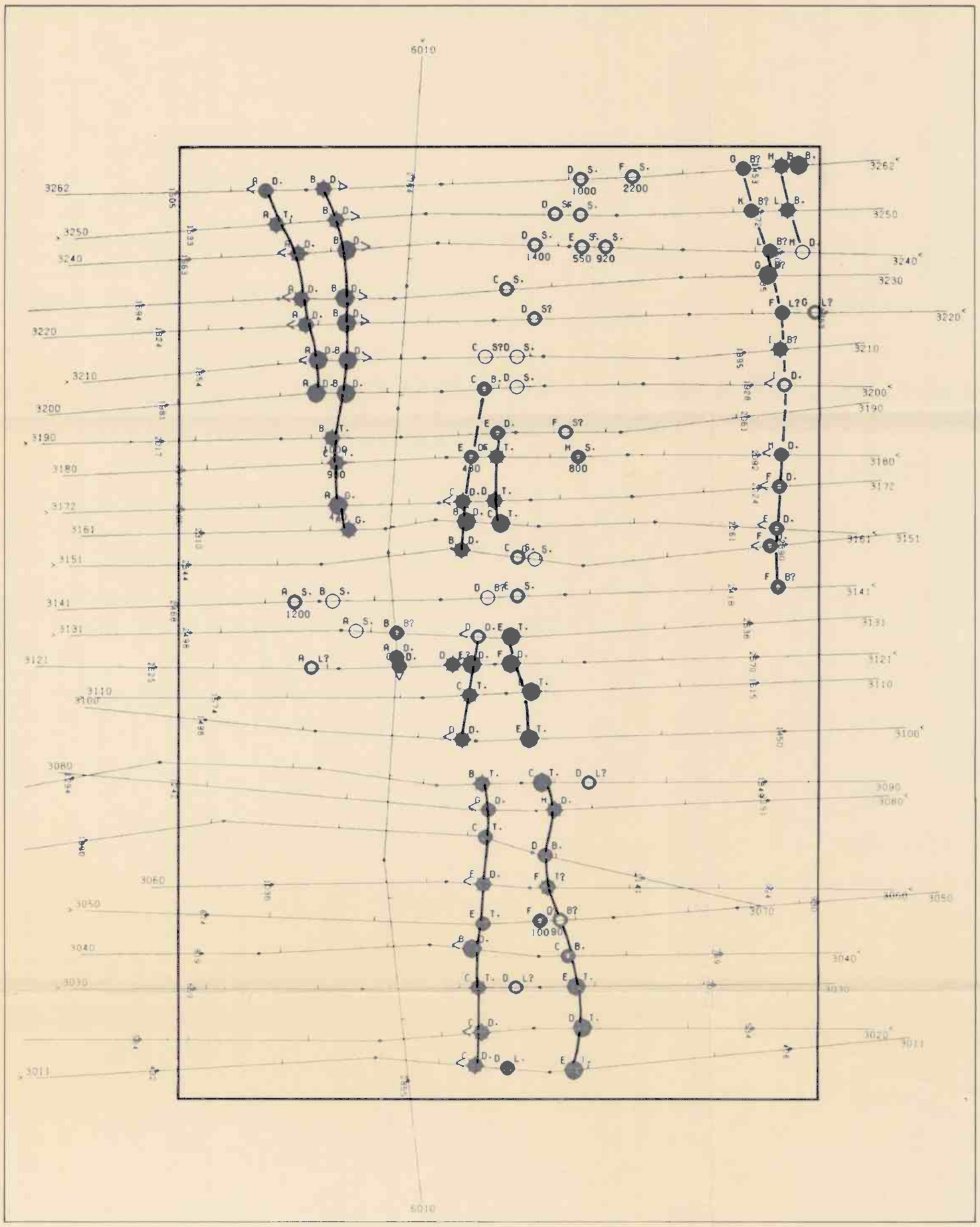
5 000 nT
1 000 nT
200 nT
100 nT
magnetic depression



Frequency response of magnetic operator

SCALE 1:20,000
1 0 1 2 Kilometres

Fig. 8



Flight Line

Fiducial 2120 (Not recovered from film)

2118 Fiducial 2118 (Recovered from film)

Fiducial 2110 (Not recovered from film)

2104 Fiducial 2104 (Recovered from film)

301 A Line number and Flight direction

ANOMALY GRADE	EM GRADE SYMBOL	CONDUCTANCE RANGE (MHOS)
6	●	> 99
5	●	50 — 99
4	●	20 — 49
3	◎	10 — 19
2	○	5 — 9
1	○	< 5
—	×	indeterminate

DIGHEM anomalies are divided into six grades of conductivity—thickness product. This product in mhos is the reciprocal of resistance in ohms. The mho is a measure of conductance, and is a geologic parameter.

identifier name — size — interpretive symbol

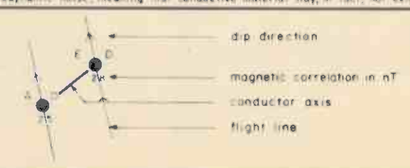
Depth is greater than: 15 m, 30 m, 45 m, 60 m

Inphase and Quadrature of Coaxial Coil is greater than: A coil 20 ppm, 15 ppm, 20 ppm

Refer to list of anomalies or curves record for the actual peak values for all coils and for the conductance and depth of conductors

The interpretation is shown by the interpretive symbol (see legend below). The left letter is the anomaly identifier. The horizontal rows of dots indicate anomaly amplitude on the flight record, and the vertical column gives the estimated depth. This depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or conductive overburden effects.

SYMBOL	GEOPHYSICAL MODEL	BEDROCK CONDUCTOR	or	NON-BEDROCK CONDUCTOR	MOST LIKELY
D.	steeply-dipping thin dike	steeply-dipping planar conductor	or		discrete bedrock conductor
T.	thick dike	thick conductor, with thickness greater than 10 m	or	metal culture which contacts conductive ground	
B.	indeterminate	bedrock conductor	or		
P.	conductor to one side of flight line	flight line passed off the end or side of conductor	or	flight line passed off the end or side of culture	
H.	half space (close to surface)	conductive rock unit	or	deep conductive weathering or thick conductive cover	conductive rock or cover
G.	buried half space	conductive rock unit, buried under non-conductive cover or under a dense forest canopy	or	deep conductive weathering or thick conductive cover, buried under a dense forest canopy	
S.	horizontal sheet	weak bedrock conductor masked by conductive cover	or	thin conductive cover or, occasionally, culture which contacts conductive cover	conductive cover
R.	horizontal ribbon	flatly-dipping narrow conductor (not computer picked)	or	narrow surface conductor, e.g., stream sediments or large fenced area	culture
C.	sphere, horizontal disk	steeply-plunging compact conductor	or	metal roof or fenced yard	
L.	line	bedrock conductor masked by culture	or	fence, pipeline, power line	
a?	"a" is one of the above symbols. "a?" means that the correct identification of the geophysical model is only a reasonable possibility, rather than being a reasonable probability				
?	probable aerodynamic noise, meaning that conductive material may, in fact, not exist				



DIGHEM^{II} SURVEY

PRESENTATION AND PROCESSING BY DIGHEM LTD.

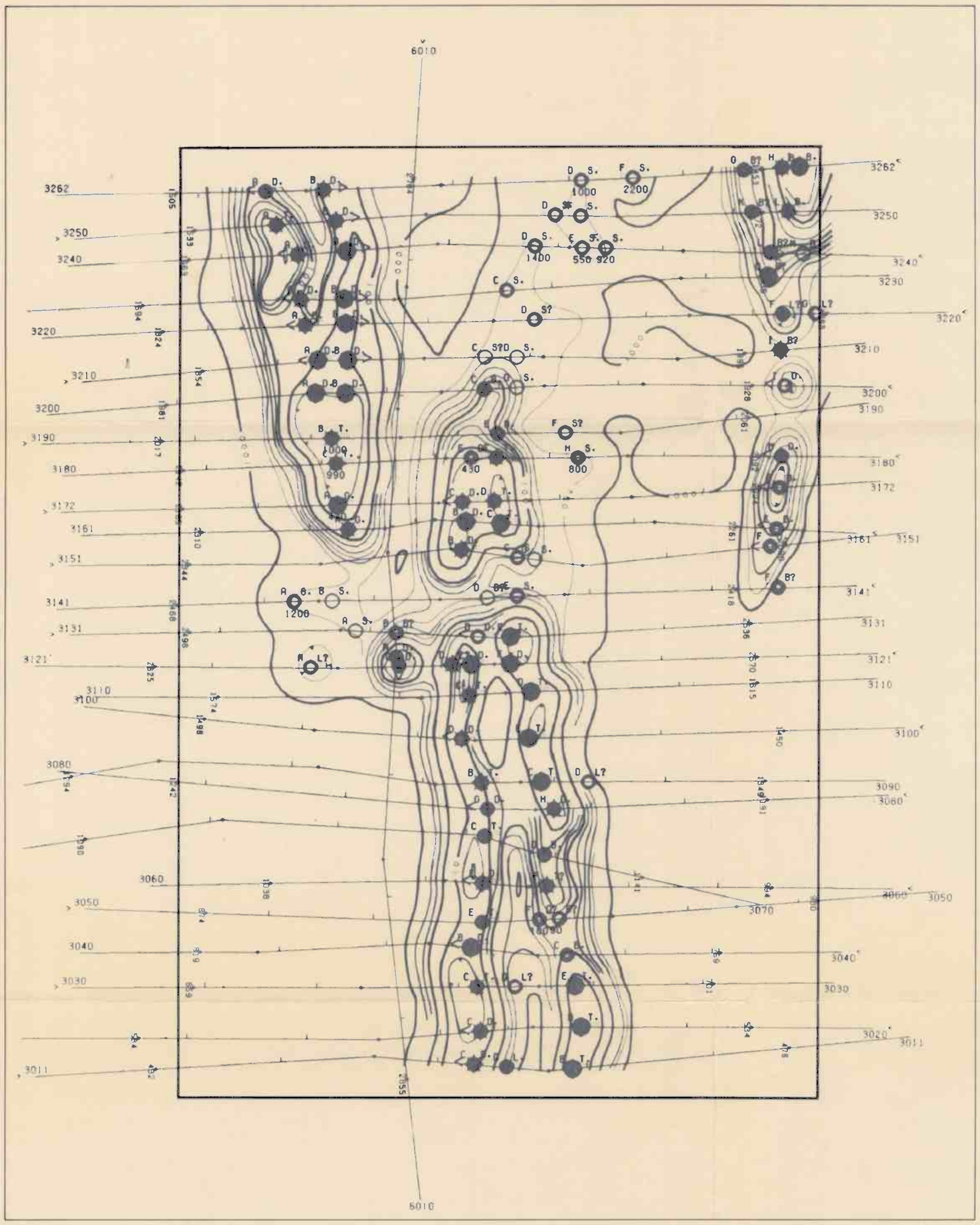
ELECTROMAGNETICS

SCALE 1 : 20,000

1 0 1 2 Kilometres

1/2 0 1/2 1 Miles

Fig. 9



LEGEND

Contours in ohm – m
at ten intervals per decade

1000
800
600
500
400
300
250
200
150
125
100

Note

The numbers face in the direction of increasing value

DIGHEM^{II} SURVEY

PRESENTATION AND PROCESSING BY DIGHEM LTD.

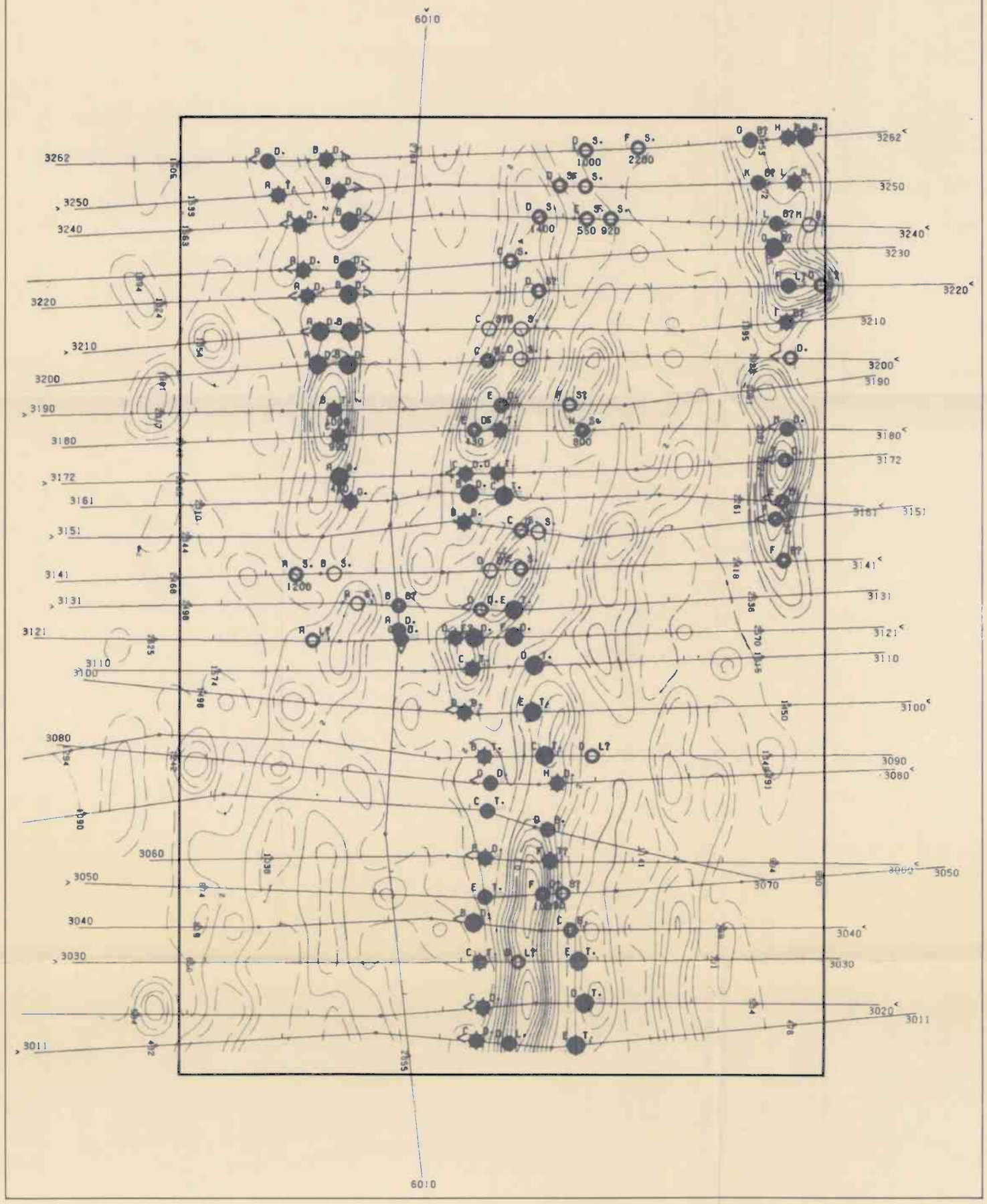
RESISTIVITY

SCALE 1 : 20,000

1 0 1 2 Kilometres

1/2 0 1/2 1 Miles

Fig. 10



LEGEND

Contours in percent

10

4

2

The numbers face in the direction of increasing value

Frequency response of VLF — EM filter

DIGHEM^{II} SURVEY

PRESENTATION AND PROCESSING BY DIGHEM LTD.

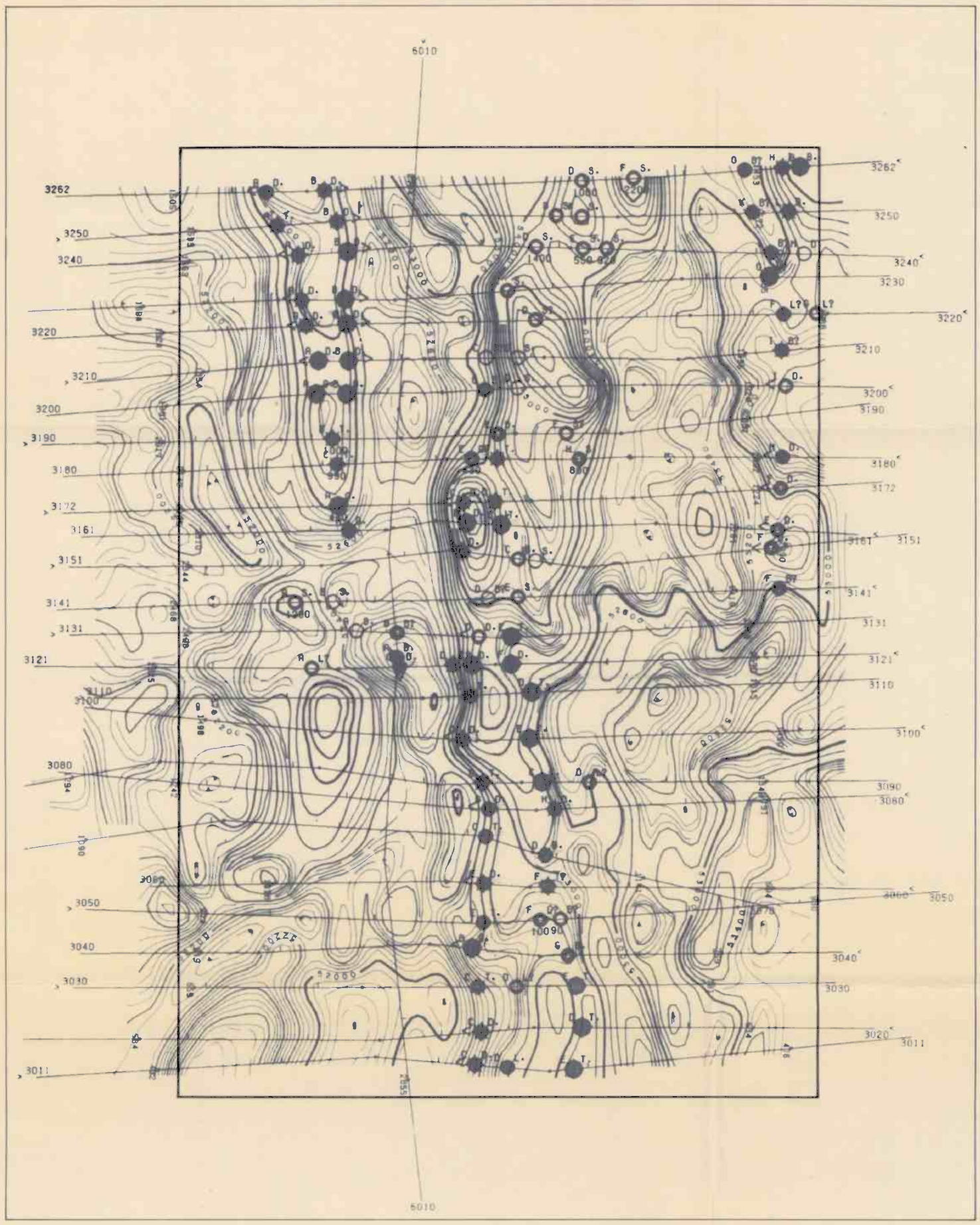
FILTERED TOTAL VLF-EM FIELD

SCALE 1 : 20,000

1 0 1 2 Kilometres

1/2 0 1/2 1 Miles

Fig. 11



DIGHEM^{II} SURVEY

PRESENTATION AND PROCESSING BY DIGHEM LTD.

MAGNETICS (Total Field-IGRF + 52 400) nT

SCALE 1 : 20,000

1 0 1 2 Kilometres

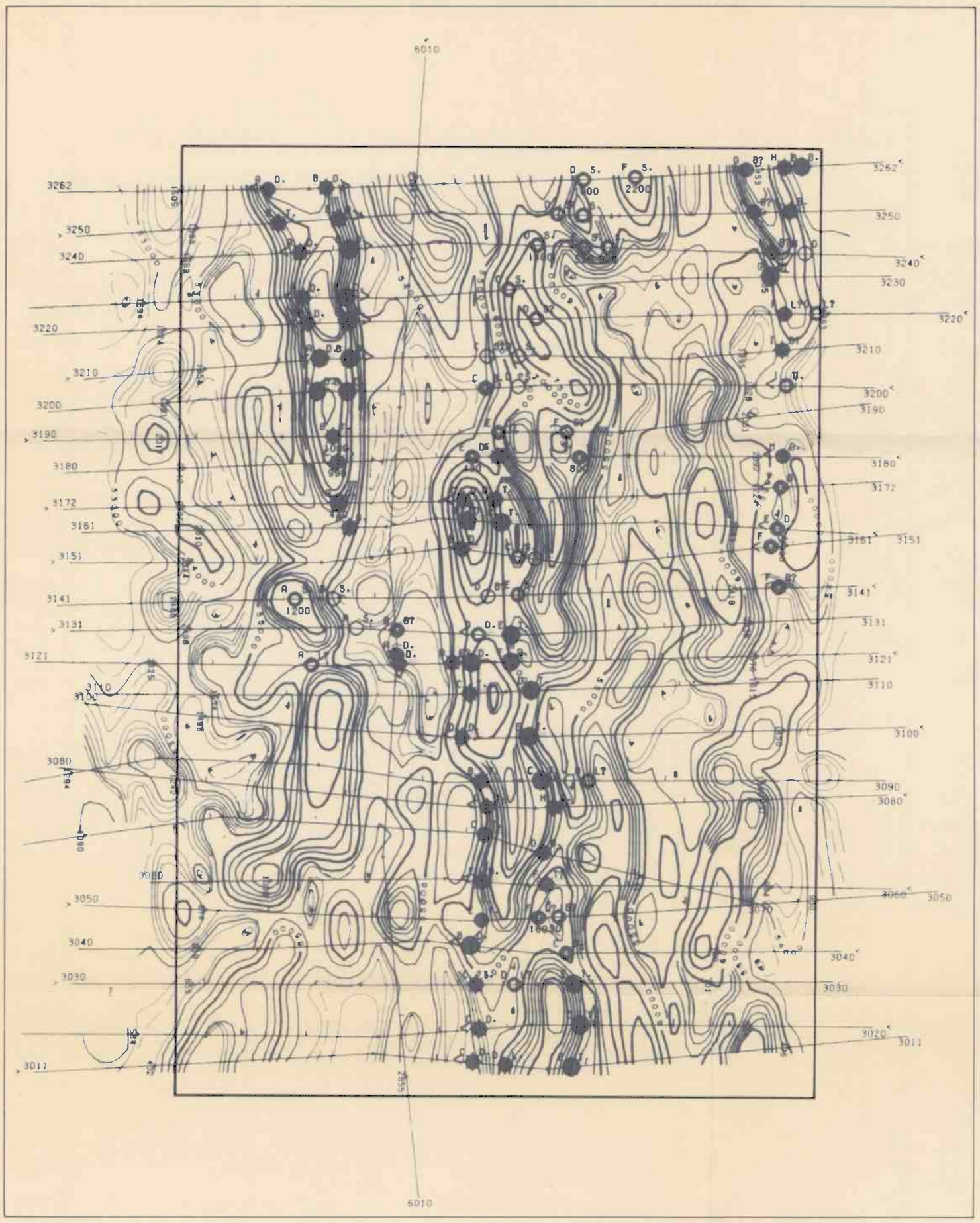
1/2 0 1/2 1 Miles

ISOMAGNETIC LINES
(total field)

1000 nT
200 nT
50 nT
25 nT
magnetic depression

Magnetic Inclination within the survey area: 78°

Fig. 12



ISOMAGNETIC LINES
(enhanced field)

5000 — 5 000 nT

1000 — 1 000 nT

200 — 200 nT

100 nT

magnetic depression

Frequency response of magnetic operator

DIGHEM^{II} SURVEY

PRESENTATION AND PROCESSING BY DIGHEM LTD.

ENHANCED MAGNETICS

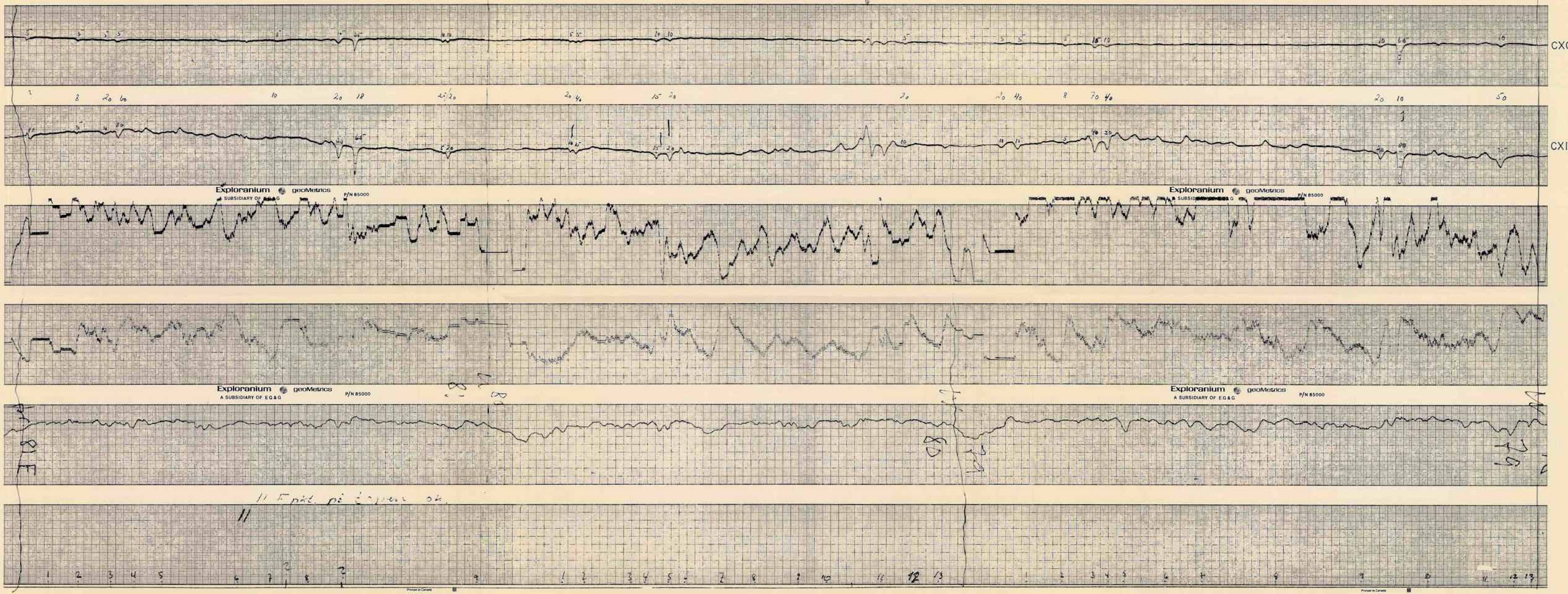
Fig. 13

CXQ

CX1

LINE 70

Fig. 14 a



LINE 81 LINE 80 LINE 79

Fig. 14 b

CXQ

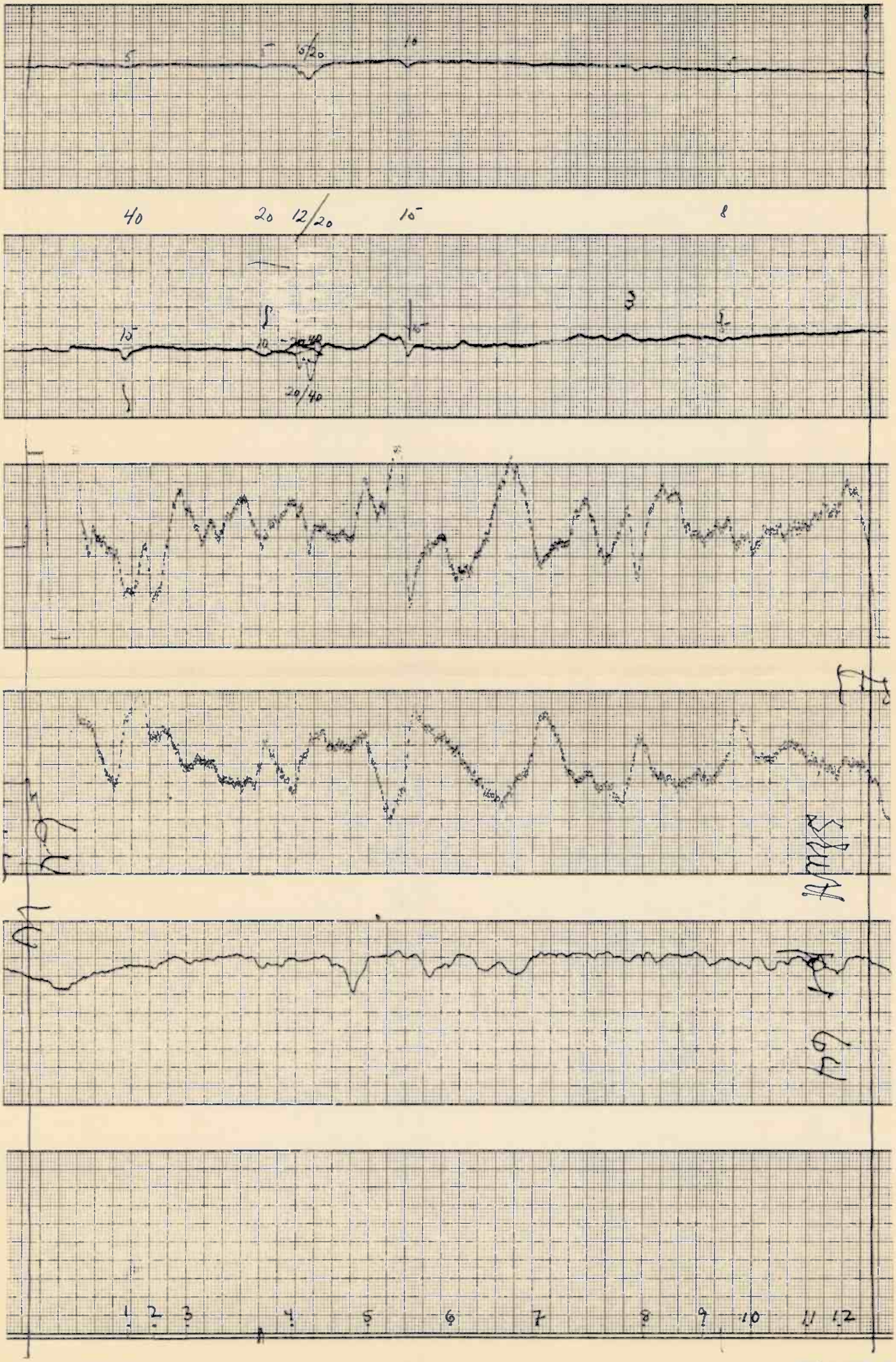
CXI

Exploranium geoMetrics
A SUBSIDIARY OF E G & G
P/N 85000

Exploranium geoMetrics
A SUBSIDIARY OF E G & G
P/N 85000

LINE 63

Fig. 14c



LINE 64

Fig. 14 d

LINE -81 JOB: 003 880 UNLEVELLED 1: 30000 0 880 880 METRES

LINE -81

LINE 80 JOB: 003 880 UNLEVELLED 1: 30000 0 880 880 METRES

LINE 80

LINE 70 JOB: 003 880 UNLEVELLED 1: 30000 0 880 880 METRES

LINE 70

LINE 64 JOB: 003 880 UNLEVELLED 1: 30000 0 880 880 METRES

LINE 64

LINE -63 JOB: 003 880 UNLEVELLED 1: 30000 0 880 880 METRES

LINE -63

Fig. 15

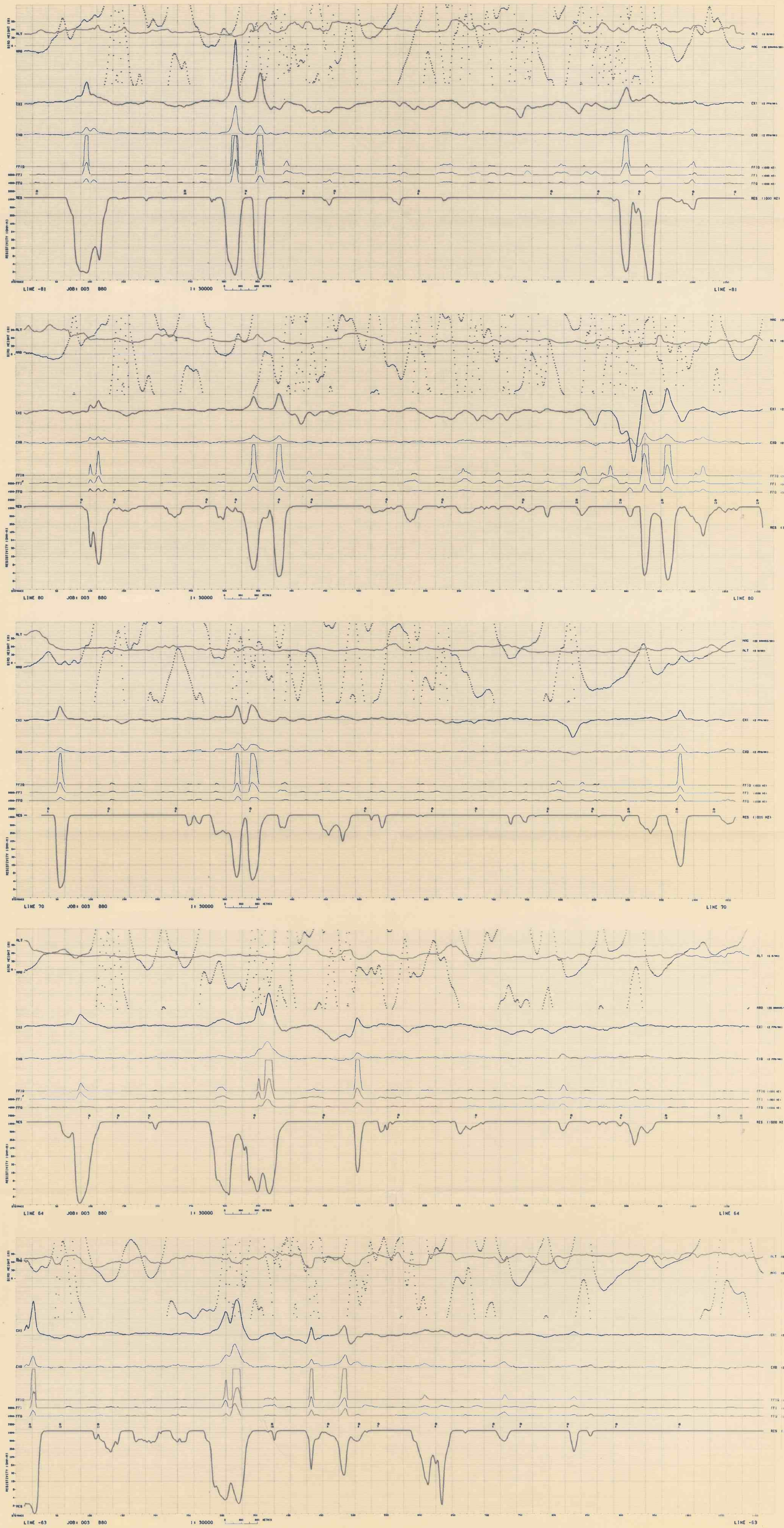

BIRD HEIGHT (M)
ALT
MAG
CXI
CXQ
FF1Q
FF1
FFQ
RES
RESISTIVITY (OHM-M)
DISTANCE
LINE -81
JOB: 003 880
1: 30000
METRES
LINE 80
LINE 70
LINE 64
LINE -63

Fig. 16

CXS

REC1

REC2

FEO%

VLFQ

ALT

MAG
VLFT

CXI

CXQ

CPI

CPQ

CDT

MAP

DIFI

DIFQ

RES

DP

REC4

REC3

CXS (1 PPM/MM)

REC1 (1 PPM/MM)

REC2 (1 PPM/MM)

FEO% (0.25 %/MM)
ALT (3 M/MM)
VLFQ (1 %/MM)

VLFT (1 %/MM)

MAG (10 GAMMAS/MM)

CXI (1 PPM/MM)

CXQ (1 PPM/MM)

CPI (1 PPM/MM)

CPQ (1 PPM/MM)

CDT (1 GRADE/MM)

DIFI (1 PPM/MM)

DIFQ (1 PPM/MM)

RES (900 HZ)

DP (3 M/MM)

REC4 (900 HZ)

REC3 (900 HZ)

EM AMPLITUDE (PPM)

LOG FUNCTION

1000 850 720 610 520 440 370 320 270 230 190 160 140 120 100 90 80 70 60 50 40 30 20 10 0

LINEAR (1 PPM/MM)

BIRD HEIGHT (M)

90 60 30 0

A B C D E F G

VERTICAL HALF PLANE

(GRADE 3 (X-TYPE ANOMALY) RESPONSE)

8000 4000 2000 1000 500 250 125 64 32 16 8 4 2 1

RESISTIVITY (OHM-M)

HALF SPACE

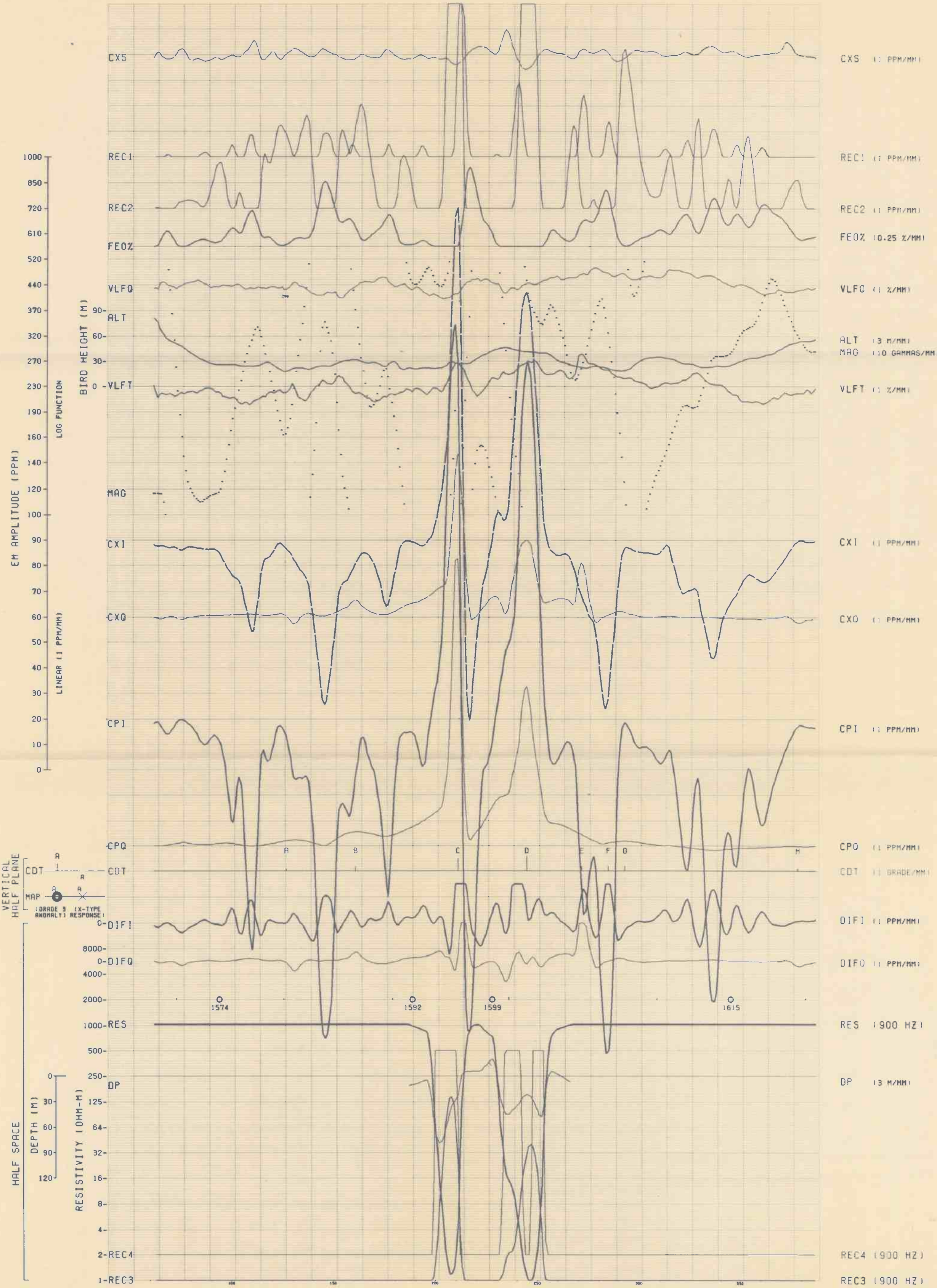
DEPTH (M)

0 30 60 90 120

432 446 457 476

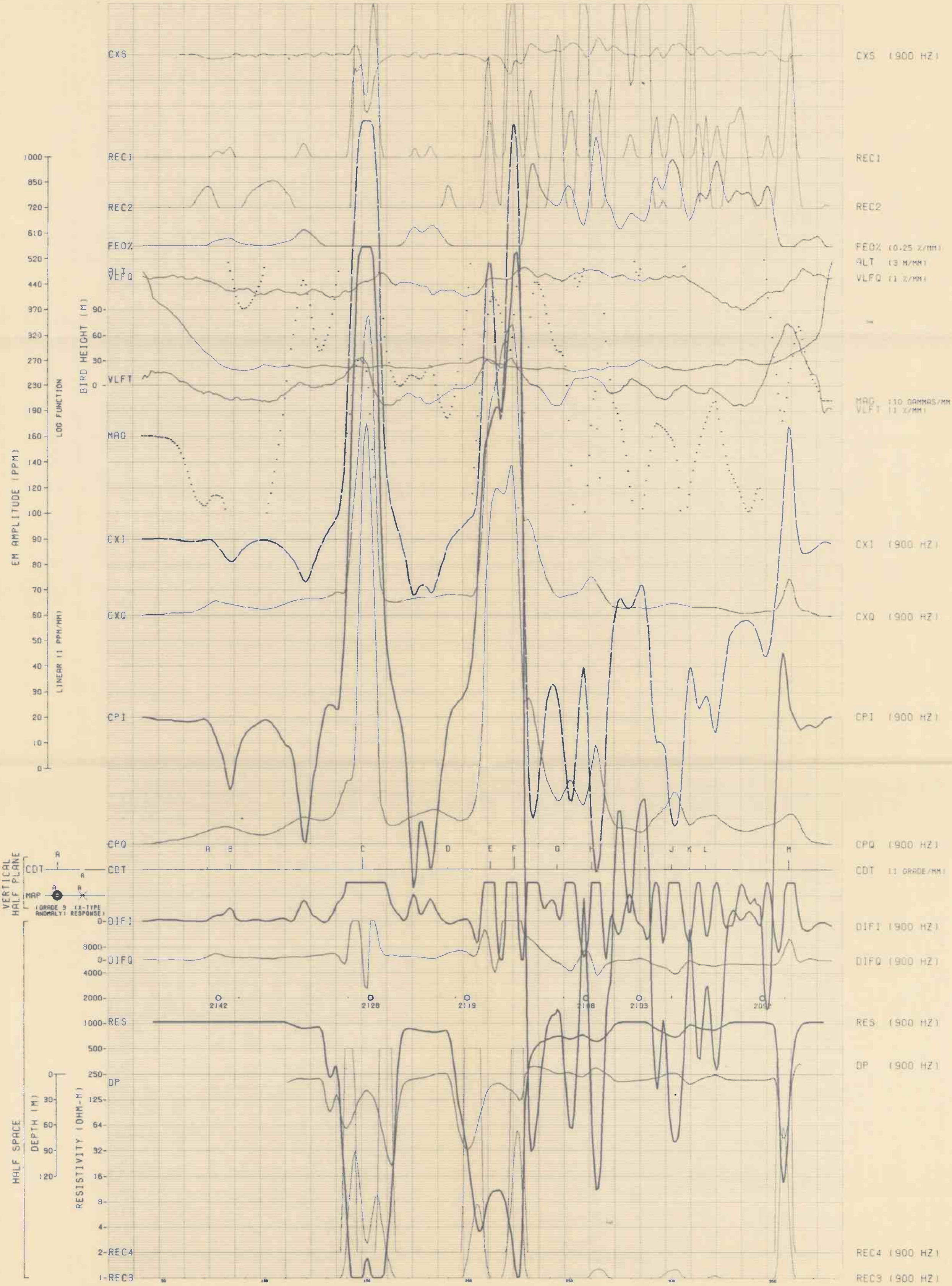
LINE 3011 (FLIGHT 15) JOB: 706 SH3 1: 15000

Fig. 17a



LINE 3110 (FLIGHT 15) JOB: 706 SH3 1 : 15000

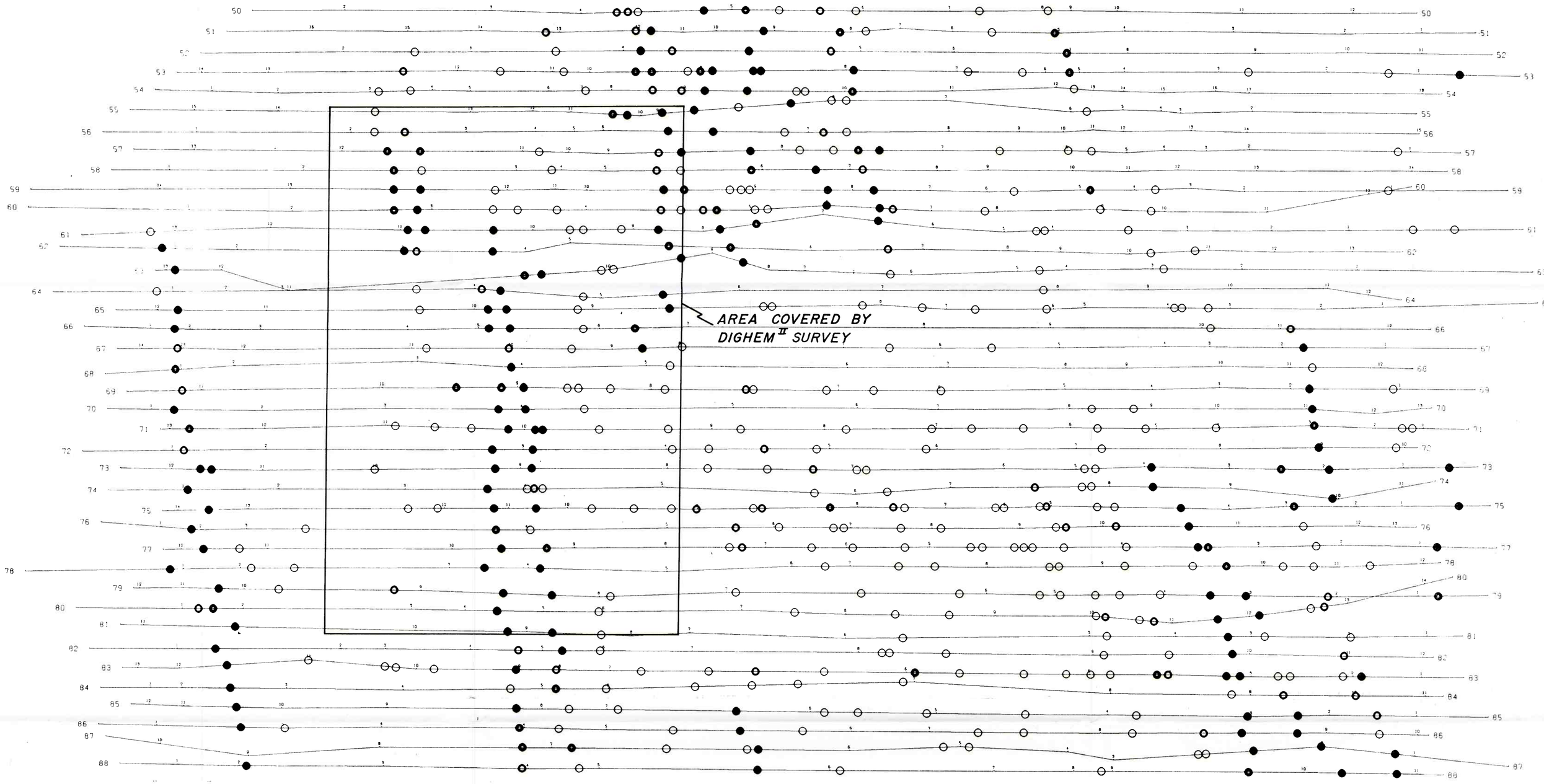
Fig. 17 b



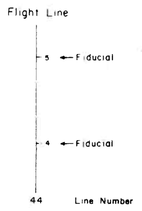
LINE -3180 JOB: 706 SH3 1: 15000

(FLIGHT 27)

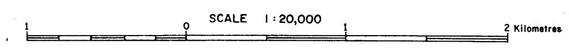
Fig. 17c



SYSTEM-X SURVEY
PRESENTATION AND PROCESSING BY DIGHEM LTD.



ELECTROMAGNETICS



LEGEND

EM anomalies are graded as to the probability that they reflect bedrock conductors. There are four grades as follows:

Symbol	Probability Grade	Probability Rating
●	4	> 90%
◉	3	75–90%
◎	2	60–75%
○	1	40–60%

Vertical coaxial coils	
Coil seperation	6.7m
Frequency	1000 Hz

Fig. 5

SYSTEM - X SURVEY

PRESENTATION AND PROCESSING BY DIGHEM LTD.

RESISTIVITY

Flight Line

5 ← Fiducial

4 ← Fiducial

44 Line Number

SCALE 1 : 20,000

1 0 1 2 Kilometres

LEGEND

Contours in ohm – m
at ten intervals per decade

1000
800
600
500
400
300
250
200
150
125
100

Note

The numbers face in the direction of increasing value

Vertical coaxial coils

Coil seperation 6.7m

Frequency 1000 Hz

Fig. 6