



Bergvesenet

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Rapportarkivet

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Tittel Evje Iveland Project. Report on an induced polarization and magnetic survey at Klepptjern and Klepptjern East grids.				
Forfatter F Nixon		Dato vinter 1971	Bedrift Sulfidmalm A/S	
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Fagområde Geofysikk	Dokument type Rapport	Forekomster Klepptjern		
Råstofftype Malm/metall	Emneord Cu Ni			
Sammendrag Denne har vi to av !				

A / S S U L F I D M A L M

EVJE-IVELAND PROJECT

REPORT ON AN INDUCED POLARIZATION
AND MAGNETIC SURVEY AT KLEPPTJERN
AND KLEPPTJERN EAST GRIDS.

WINTER 1971.

F. Nixon

1) SUMMARY OF PREVIOUS WORK

- a) An old nickel showing near the western shore of Klepptjern has been investigated by the Evje Nikkelverk. Some trenching was carried out and 3 diamond drill holes put down. The logs of these holes have never been traced.
- b) A/S Sulfidmalm carried out geological mapping in scale 1:15000 and 1:5000 in the area during the years 1967-68. This mapping showed a zone of meta-ultrabasic rocks that run in a NW/SE direction from the shore of Klepptjern for a distance of about 600 m north-westwards. In outcrop the zone at its widest point, just north of Klepptjern, is approximately 150 m wide narrowing rapidly northwards. The nickel showing is located in this body. (see plan map).
- c) E.M. work (see enclosure) was carried out by A/S Sulfidmalm in the summer of 67 and winter 67/68. Interesting anomalies were obtained over the old showing and to the north. Weak E.M. indications were also obtained in the survey on the lake.

2) WORK CARRIED OUT

The I.P. survey was carried out using a McPhar Variable Frequency Unit (Model P 660) with operating frequencies of 0.3 and 5 cps. McPhar supplied the operator, (A.W. Wood), Sulfidmalm being responsible for supplying the rest of the four man crew. The grid lines were chained by local help hired by Sulfidmalm. The project was co-ordinated and supervised by the writer.

Interpretation of the I.P. plots has been undertaken by D.B. Sutherland, Chief Geophysicist, Falconbridge Nickel Mines Ltd.

The following profiles were run:

a) KLEPP TJERN GRID

<u>Line</u>	<u>Dipoles</u>	<u>N/S extension</u>	<u>Total length</u>
500W	50 m	300N - 350 S	650 m
400W	50m	300N - 300 S	600 m
300W	50 m	300N - 300 S	600 m
200W	50 m	350N - 300 S	650 m
200W	25 m	75N - 250 N	175 m
100W	50 m	350N - 300 S	650 m
50W	25 m	250N - 75 S	325 m
0/0	50 m	350N - 300 S	650 m
0/0	25 m	125N - 125 S	250 m
50 E	25 m	100N - 125 S	225 m
100E	50 m	380N - 300 S	650 m
200E	50 m	300N - 300 S	600 m

<u>Line</u>	<u>Dipole</u>	<u>N/S extension</u>	<u>Total length</u>
200 E	25 m	75N - 100 S	175 m
300 E	50 m	300 N - 300 S	600 m
400 E	50 m	300 N - 300 S	600 m

b) KLEPPTJERN EAST

0	50 m	300 N - 300 S	600 m
100 E	50 m	300 N - 300 S	600 m
200 E	50 m	300 N - 300 S	600 m
300 E	50 m	1100N - 300 S	1400m
400 E	50 m	300 N - 300 S	600 m
500 E	50 m	300 N - 300 S	600 m
600 E	50 m	300 N - 300 S	600 m

Total line distance 12,400m

The magnetometer survey was carried out by L. Nesvoll of Sulfidmalm, using a McPhar M700 Fluxgate magnetometer. On the Klepptjern grid the mag. was run on the same lines as the I.P. with fill in lines so that maximum distance between profiles was 50 m. The same lines as the I.P. survey were run on Klepptjern East. A total of 11,75 profile-kms were measured with approximately 840 readings.

3) RESULTS

The I.P. anomalies discovered have been divided into 3 classes. Class 1 anomalies being the strongest and most interesting, class 3 being the weakest.

In the following table the anomalies are numbered and their location and class given.

a) LIST OF I.P. ANOMALIES KLEPPTJERN GRID

<u>No.</u>	<u>Line</u>	<u>Dipoles</u>	<u>N/S co-ordinates</u>	<u>Class</u>
1	500 W	50 m	110N - 140 N	3
2	500 W	50 m	150S - 100 S 180E - 10 N	1 3
3	400 W	50 m	125S - 75 S 75S - 50 N	2
4	300 W	50 m	100S - 60 S 60S - 10 N	2 3

No.	Line	Dipoles	N/S co-ordinates	Class
4.	300 W	50 m	100 S - 50 S 50 S - 10 N	2 3
6.	200 W	50 m	0 - 50 S 50 S - 80 S	2 3
5.	200 W	50 m	125 N - 175 N	1
7.	200 W	25 m	130 N - 155 N 155 N - 175 N	1 2
8.	100 W	50 m	100 S - 50 S	2
9.	100 W	50 m	50 N - 100 N 100 N - 160 N	1 3
10.	100 W	50 m	160 N - 200 N	2
11.	50 W	25 m	35 N - 62 N	1
12.	50 W	25 m	100 N - 125 N 125 N - 150 N	2 1
13.	0/0	50 m	150 S - 100 S 100 S - 50 S 50 S - 0 0 - 80 N	2 3 1 3
14.	0/0	25 m	35 S - 12 N	1
15.	0/0	25 m	35 N - 55 N	1
16.	50 E	25 m	50 S - 12 N 12 N - 65 N	1 3
17.	100 E	50 m	80 S - 50 S 50 S - 100 N 100 N - 180 N	3 2 3
18.	200 E	50 m	25 S - 25 N	1
19.	200 E	50 m	75 N - 125 N	3

No.	Line	Dipoles	N/S Co-ordinates	Class
20.	200 E	25 m	10 S - 25 N	2
21.	300 E	50 m	10 N - 100 N 100 N - 150 N 150 N - 190 N	3 2 3
22.	400 E	50 m	25 S - 75 N	3

b) LIST OF I.P. ANOMALIES KLEPPTJERN EAST GRID

23.	0/0	50 m	150 S - 140 S	3 ?
24.	0/0	50 m	40 S - 10 S	3 ?
25.	100 E	50 m	100 S - 115 S	3 ?
26.	100 E	50 m	10 S - 40 S	3 ?
27.	200 E	50 m	0 - 40 S	3
28.	300 E	50 m	50 S - 100 S	3
29.	400 E	50 m	0 - 50 S	3
30.	500 E	50 m	125 S - 160 S	3 ?

The magnetic data is presented as an isonomaly map in scale 1:1000.

4) INTERPRETATION

D. B. Sutherland's verbal and written comments to the writer are incorporated in this section.

The background frequency effects on these grids are somewhat high and rather widespread. The ultrabasic rocks seem to be characterized by fairly low resistivities and the contoured nsl resistivities correlate quite well with the mapped surface expression of the ultrabasic body.

..../ 5

The strongest anomalies on the Klepptjern grid seem to outline an irregular mass lying in the vicinity of the base line between 0 and line 300 E and underlying the western part of the lake. There is some suggestion of a linear extension of this source from the base line on line 0 to 150 N on line 200 W. From the initial 50 m dipoles coverage it appeared that most of the responses came from broad sources which could be caused by a very weak dissemination of sulphides within the ultrabasic or even by the ultrabasic body itself. The detailing on 25 m dipoles suggest, however, that there exist some definite defined sources with moderate to high metallic content. The fact that E.M. picked up some response here also points to the fact that some of the sources may have a quite high metallic content.

Brief comments will now be given on the anomalies:

Anomaly 1 Indicates a possible narrow weak source with steep dip. Resistivities are fairly high (over 1000) and surface geology indicates that we are in foliated amphibolites and dioritic gneisses. This anomaly is associated with a magnetic high 1250 - 1500 gamma.

Anomaly 2 Indicates a fairly broad source with stronger indications on the southern edge. The anomaly area has no outcrop, but is very near the contact of the ultrabasic with dioritic gneisses. Two hundred metres to the north in approximate strike direction are outcrops of dioritic gneiss that contain fairly good impregnation of pyrite and pyrrhotite. The best portion of the anomaly, however, correlates with a magnetic low and this might suggest some basic rock, as the basic rocks in this area seem to be characterized by low magnetic values. On the basis of this and the fact that it is not closed to the north, this anomaly should be considered as fairly important. The weaker part of the anomaly correlates mainly with fairly high magnetic values.

Anomaly 3 This is similar to anomaly no. 2, but weaker. Resistivities are under 1000 in the best part.

Anomaly 4 Again like anomaly no. 3, but much weaker.

Anomaly 5 Similar to 2, 3 and 4 with a slightly better concentration in a broader zone. Associated with low magnetic values and near the contact of the ultrabasic.

Anomalies 2, 3, 4 and 5 are classified as the southwest anomaly. From line 200 W to 500 W inclusive, there are weak indications of a linear source extending southwesterly across the grid.

...../ 6.

The metal factors are quite small and only slightly above the rather broad background response that extends south from the base line and has a width of 100 m or more. These anomalies occur on an area of the grid where there is considerable culture, such as power lines and telephone cables and the strongest anomaly occurs near an abandoned farm house. Nevertheless, the best anomaly on line 500 W is only slightly less definite than the response obtained on 200 N on the Kjettevann grid, and this weak zone may warrant further investigation. This anomaly zone also seems to correlate with the contact zone of the ultrabasic.

Anomaly No. 6 This is a definite anomaly obtained by 50 m dipoles indicative of a shallow narrow source with I.P. effects quite similar to those obtained over Kjettevann.

Anomaly no. 7

Obtained by 25 m detailing. It shows some increase in frequency effect and a definite shallow metal factor anomaly centred near 150 N. The contouring shows that the source is probably no wider than the 25 m dipole interval used in surveying. As this is a shallow, definite anomaly, it may be possible to establish its cause by surface examination. The anomaly is centered on a definite magnetic low. Surface geology indicates that the anomaly is to the north of the main ultrabasic body.

Anomaly no. 8 Indicates a shallow narrow source. Could possibly have a high metallic content. The source is located in the ultrabasic near the contact. Might form part of the southwest anomaly zone mentioned above.

Anomalies No. 9 & 10 These indicate a complex source and there are probably two sources at depth. The source is again near the contact of the ultrabasic and the class 1 part from 50 N - 100 N is associated with a magnetic low. This anomaly is important.

Anomaly 11 Indicates a moderate source at depth possibly 100 m to the strongest portion.

Anomaly 12 Indicates a narrow steeply dipping source with a moderate metal content and closer to surface than No. 11. Anomaly 12 is co-incident with a weak E.M. anomaly. Weak E.M. indications are also present to the west of anomaly 11. Anomaly No. 11 is centrally placed within the ultrabasic, whereas no. 12 is near the northern contact. Both are associated with magnetic lows.

Anomalies 13, 14, 15 The 50 m dipoles (anomaly 13) showed a broad source with much stronger values at depth just south of the base line. Detailing with 25 m dipoles shows a definite increase in frequency effect and much stronger metal factor values. One interpretation of the detailed data would be a strong shallow source near 25 S (no. 14) and a second and deeper one near 50 N (no. 15). However, model studies have shown that similar patterns can be obtained from a single broad, shallow source; in this case one that could extend from about 25 S to approx. 50 N. Nevertheless, the metal factor values are sufficiently strong to indicate a moderate metallic concentration over a source as much as 75 m in width, or higher concentrations over smaller widths, if the first interpretation is correct.

There is also the possibility that the sources are much more complex than shown on the reconnaissance data. For example, there could be two separate sources with the more northerly being part of a northwest trending system which was detailed on line 200 W. Detailed work on line 50 W seems to indicate that the first interpretation, i.e. 2 separate sources, is the more correct.

Anomaly no. 16 Indicates a shallow broad source with a moderate metallic content.

Anomaly no. 17 Appears to be broad, shallow and weak, but could be important. Lies under lake in mag. low area. There are also weak E.M. indications slightly to the east of this anomaly.

Anomaly no. 18 This is a strong anomaly typical of narrow source of high metallic content. It did not, however, improve on the 25 m dipoles. E.M. indications are again present in this area being strongest about 30 m to the west. (For comments on 25 m dipoles, see anomaly 20).

Anomaly 19 Weak effects on the fringe of anomaly 18.

Anomaly 20 The 50 m data suggest a shallow source of moderate metallic content 50 metres or so in width. The shorter dipoles indicate that there is a depth of more than 10 metres to the top of its strongest portion. However, there is no definite increase in magnitude of the frequency effect or the metal factor values with the shorter dipoles and the source material now appears to be a rather broad zone of low and quite uniform metallic content. The anomaly is associated with a magnetic low.

Anomaly 21 Reflects a broad shallow source with its best portion being from 100 N - 150 N. This portion co-incides with a high/low mag. gradient and may reflect some mineralization associated with the ultrabasic contact.

Anomaly 22 Very weak effects, but associated with mag. low.

Anomalies 23 - 30 are located on the Klepjtjern East grid. In general there is a weak indication of a narrow, near vertical source that trends parallel to the base line from line 0 to line 400 E. Nearly all of the metal factor responses are due to decreased resistivity, and there is little indication of any positive frequency effect. With the present information this is regarded as a possible anomaly zone of low priority. There is little outcrop in this grid and those rocks encountered are mainly amphibolites and dioritic gneisses. However, some small patches of ultrabasic, low magnetic anomalies and low resistivities suggest that the Klepjtjern ultrabasic body may run through the grid.

Anomalies 23, 24, 25, 26 Very weak effects.

Anomaly 27 Could possibly indicate a narrow source that might improve with depth. The resistivities are, however, very high.

Anomaly 28 This shows a good pattern, but is a most difficult anomaly to interpret. It is almost an F.E. low, the anomaly being mainly due to very low resistivities.

Anomaly no. 29 Indicates a weak, narrow, shallow source.

Anomaly 30 This is very weak and at some depth.

In general 3 main anomaly zones seem to present themselves:

- A) The southwest anomaly zone which includes 2, 3, 4, 5 and possibly 8 and part of 13.
- B) The northwest anomaly zone which runs from 150 N on line 200 W to near the base line on line 0/0 and merging with anomaly zone.
- C) The lake zone which runs roughly E/W across the lake.

The anomalies in zone A and B are fairly near the ultrabasic contacts.

It is possible that both zone A and B merge into zone C and the anomaly pattern around line 0/0 is complex.

The Klepptjern East zone is already mentioned.

The correlation of mag. data with geology seems to indicate the ultrabasic to be associated with magnetic negative and low positive values, and the suboutcrop of the ultrabasic can be traced fairly well using the magnetic data. The contoured $n=1$ resistivities show a similar pattern to that of the magnetic data, and again the low resistivities seem to outline the ultrabasic rocks.

RECOMMENDATIONS

All 4 anomaly zones (the 3 on Klepptjern grid and the Klepptjern East zone) seem to be associated with ultrabasic rocks. Nickeliferous sulphides are known to be associated with the ultrabasics. E.M. anomalies are also in part associated with the I.P. anomalies. Bearing this in mind it is recommended that a drilling program be set up such as to drill all these anomaly zones, concentrating on the strongest anomalies in the zones.

We hope to carry out this drilling during calendar 1972, or, budget permitting, in late 1971.

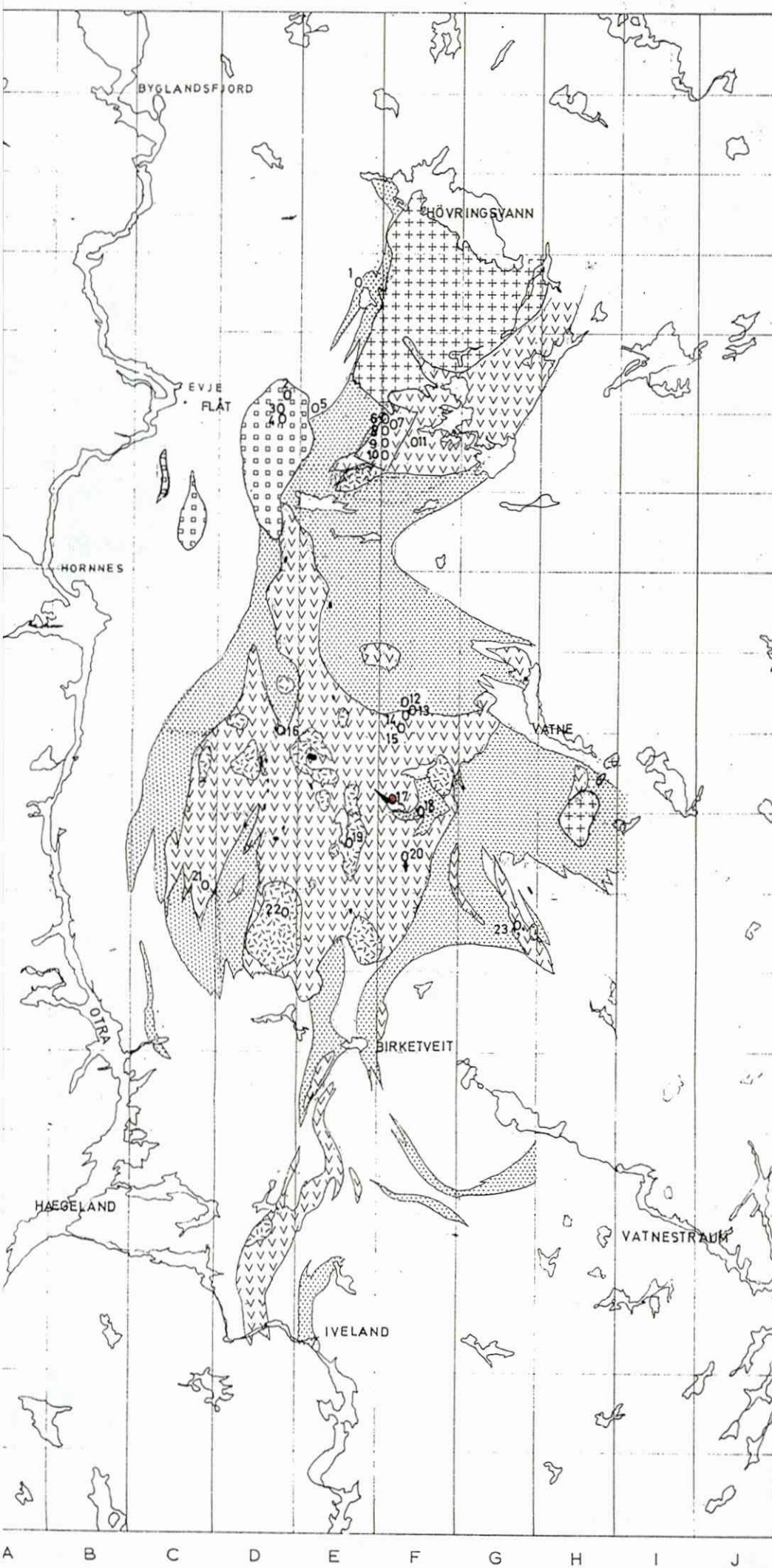
Frank Huxon

LIST OF ENCLOSURES

- ✓ 1. Plan map showing grid, geology and plotted I.P. anomalies, 1:5,000
2. Transparent overlay of magnetic anomalies Klepptjern Grid, 1:5,000
3. Transparent overlay of contoured $n = 1$ metal factor values on 50 m spread Klepptjern Grid, 1:5,000
- Korin ✓ 4. (Transparent overlay) of contoured apparent resistivity for $n = 1$ on 50 m spread, Klepptjern Grid, 1:5,000
- Korin ✓ 5. Transparent overlay of magnetic anomalies, Klepptjern East grid, 1:5,000
- ✓ 6. Transparent overlay of contoured $n = 1$ metal factor values on 50 m spread Klepptjern East grid, 1:5,000
- ✓ 7. Transparent overlay of contoured apparent resistivity for $n = 1$ on 50 m spread, Klepptjern East grid.
- ✓ 8. Magnetic anomaly map Klepptjern grid, 1:1,000 + microfotograf A.4.
- ✓ 9. Magnetic anomaly map Klepptjern East grid, 1:1,000
- ✓ 10. Electromagnetic map from Klepptjern, 1:1,000
- ✓ 11-33. Individual I.P. plots with anomalies plotted and numbered.

15/6-71
FH/jr

EVJE-IVELAND AREA



- GRANITIC AND DIORITIC GNEISS
- AMPHIBOLITE FOLIATED AND MASSIVE
- HORNBLENDE GNEISS
- GABBRO
- HORNBLENDE DIORITE
- ULTRABASIC
- GRANITE

- 1 st. AAFLOU PROSPECT
- 2 FLATERYGD "
- 3 FLÅT MINE "
- 4 MYKLEÅSEN PROSPECT
- 5 STABBESTEN "
- 6 HESTÅSEN "
- 7 LANGTJERN "
- 8 LOMTJERN "
- 9 GULREGN "
- 10 BYTTINGSMYR "
- 11 VIKSTØL "
- 12 N. PAASCHE "
- 13 S. PAASCHE "
- 14 BEKKEN "
- 15 ORREKNAPPEN "
- 16 LITJERN "
- 17 KLEPPTJERN "
- 18 EPTEVASSMYR "
- 19 MÖLLAND (Kjellerhuset)
- 20 HAALAND "
- 21 LANDAAS "
- 22 SKRIPELAND "
- 23 ELSHAUGEN

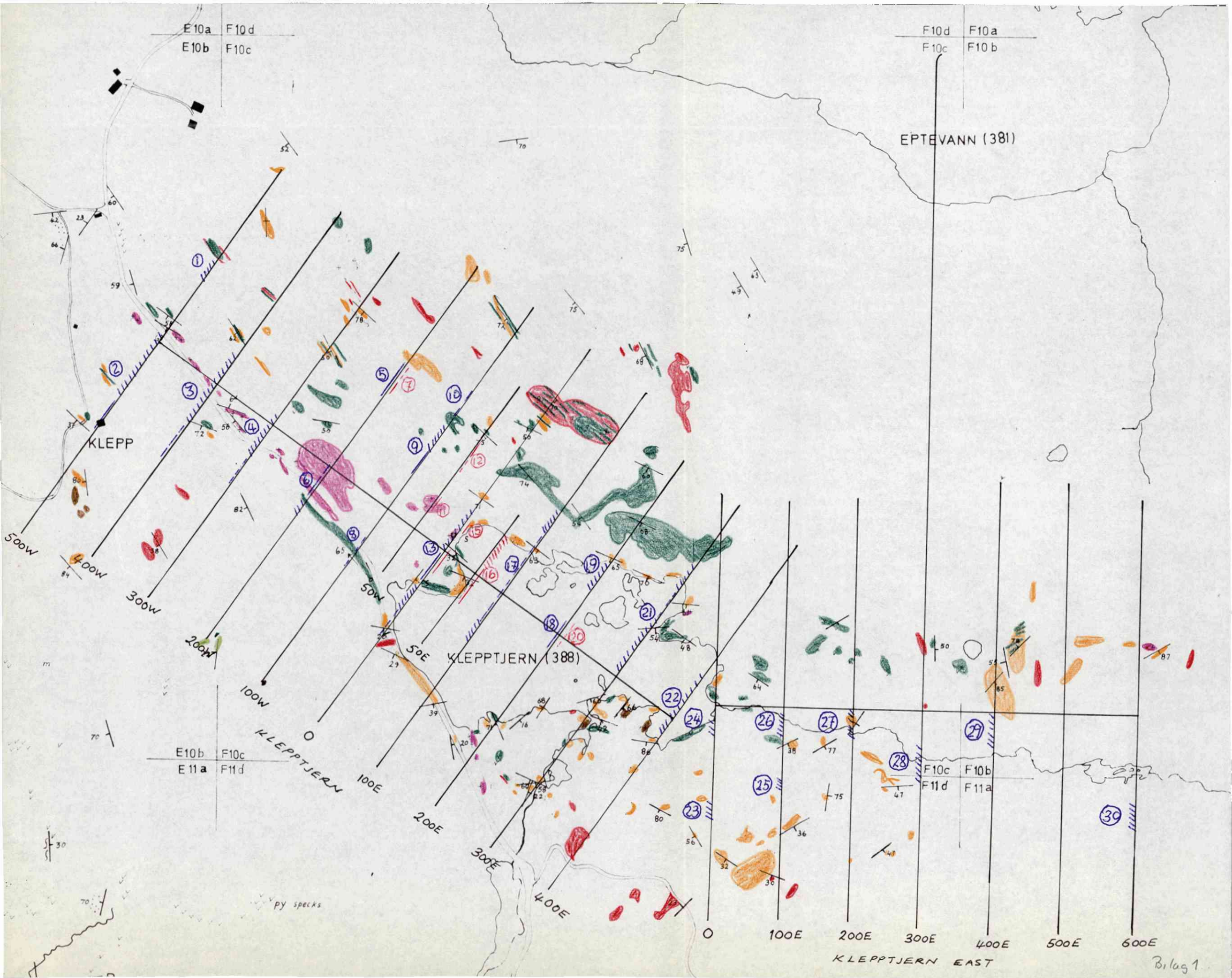
AAVITSLANDSHEIA GRID AREA

0 1 2 3 4 5 KM

LEGEND

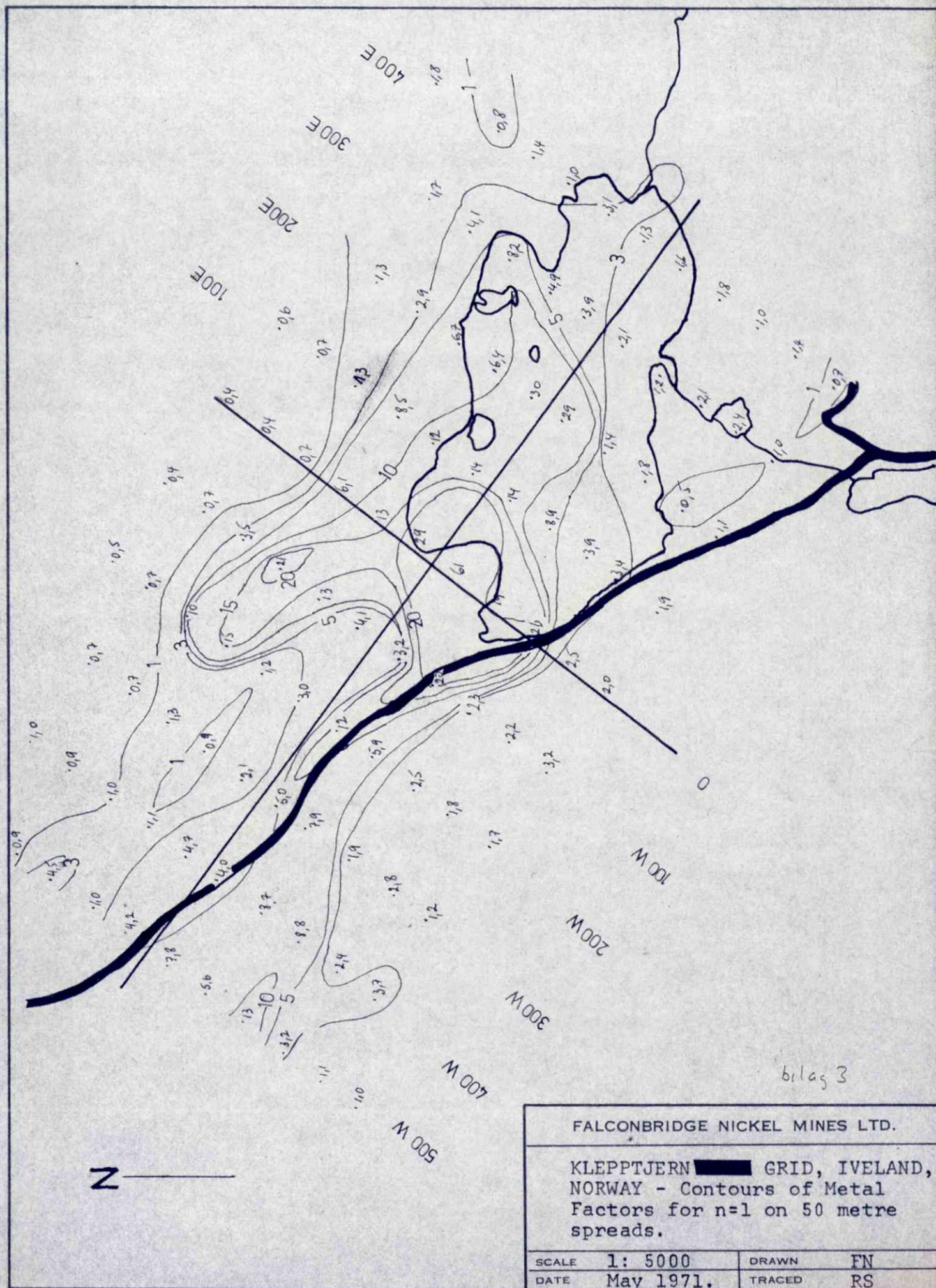
-  Ultrabasic
-  Amphibolite
-  Gabbro
-  Hornblend gneiss
-  Dioritic gneiss
-  Pegmatite
-  Foliation
-  Lineation

-  I.P. anomalies 50 m spreads
-  " " 25 m spreads
-  Class 1
-  Class 2
-  Class 3



LEGEND

-  Ultrabasic
-  Amphibolite
-  Gabbro
-  Hornblend gneiss
-  Dioritic gneiss
-  Pegmatite
-  Foliation
-  Lineation
-  I.P. anomalies 50 m spreads
-  " " 25 m spreads
-  Class 1
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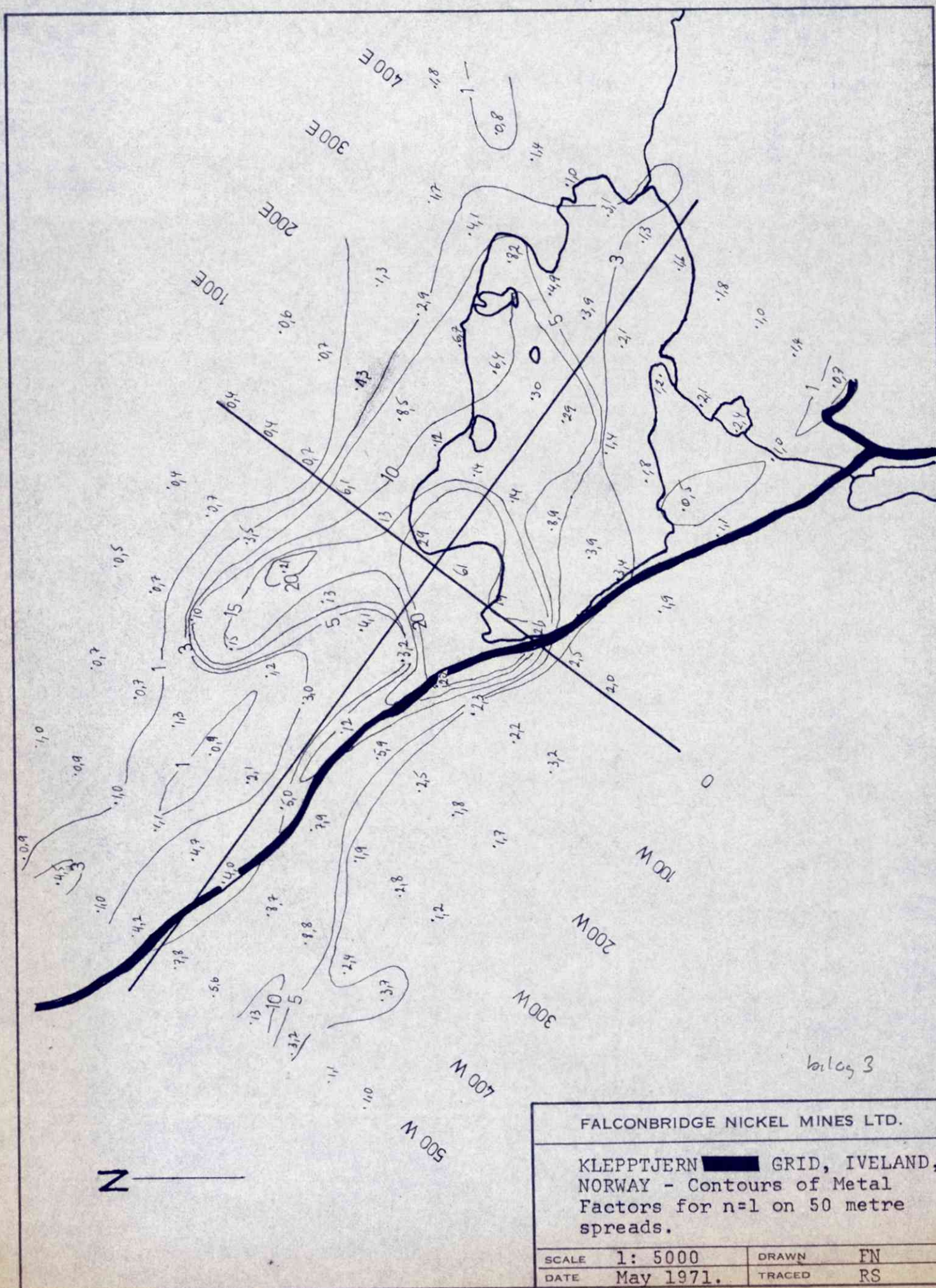


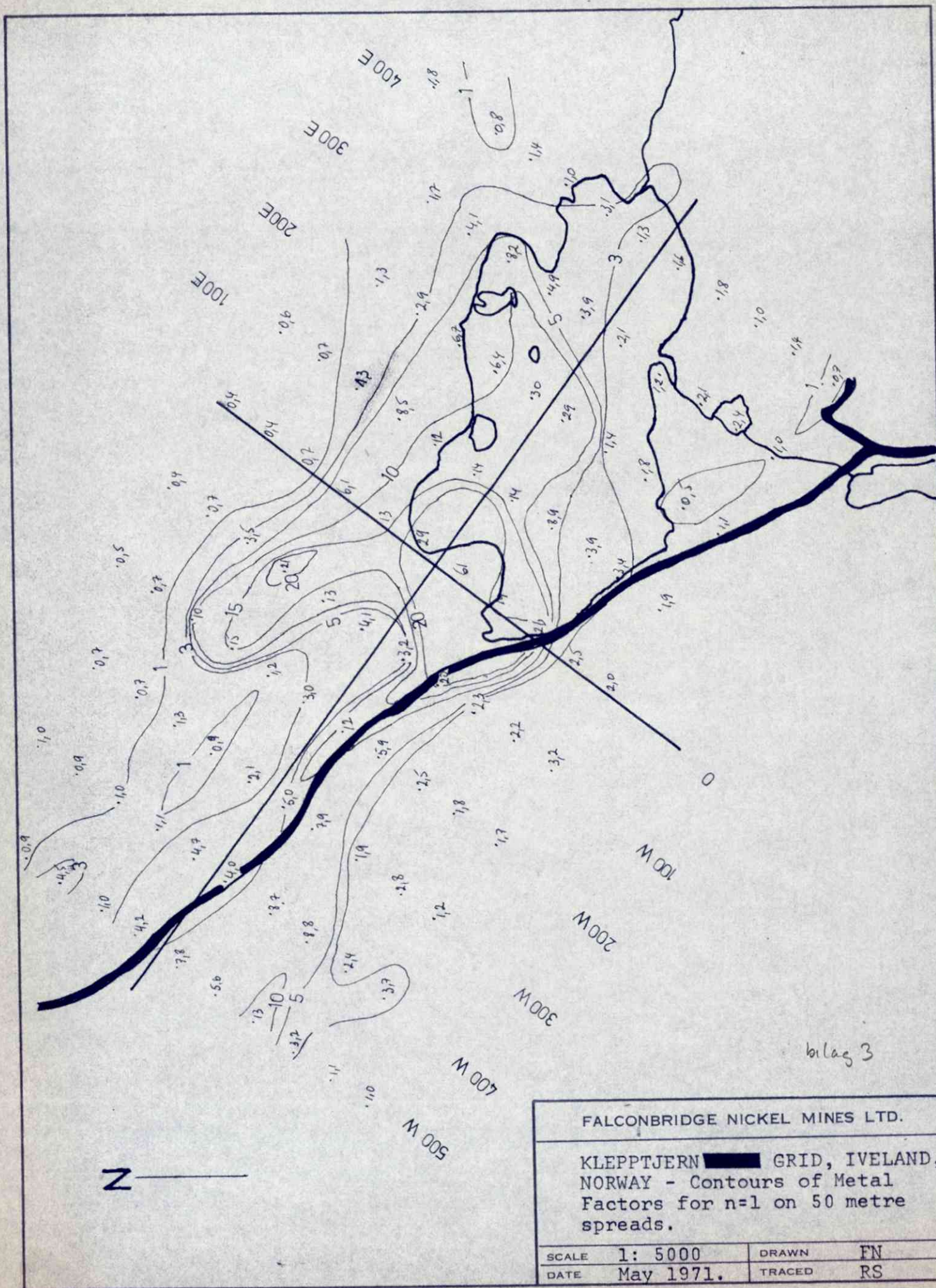
bilag 3

FALCONBRIDGE NICKEL MINES LTD.

KLEPPTJERN GRID, IVELAND,
NORWAY - Contours of Metal
Factors for $n=1$ on 50 metre
spreads.

SCALE	1: 5000	DRAWN	FN
DATE	May 1971.	TRACED	RS



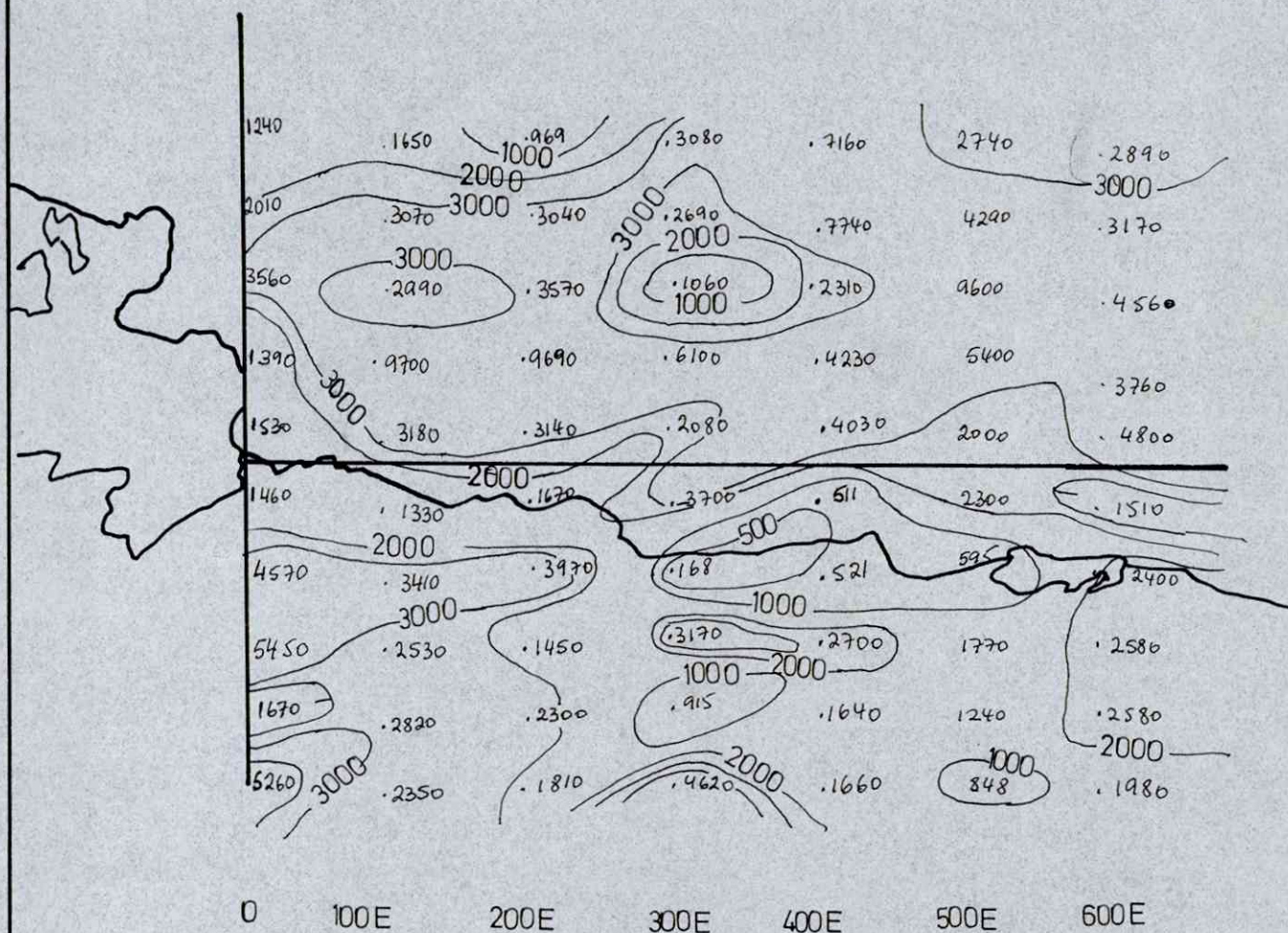


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FALCONBRIDGE NICKEL MINES LTD.

KLEPPTJERN [REDACTED] GRID, IVELAND,
NORWAY - Contours of Metal
Factors for n=1 on 50 metre
spreads.

SCALE	1: 5000	DRAWN	FN
DATE	May 1971.	TRACED	RS



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FALCONBRIDGE NICKEL MINES LTD.

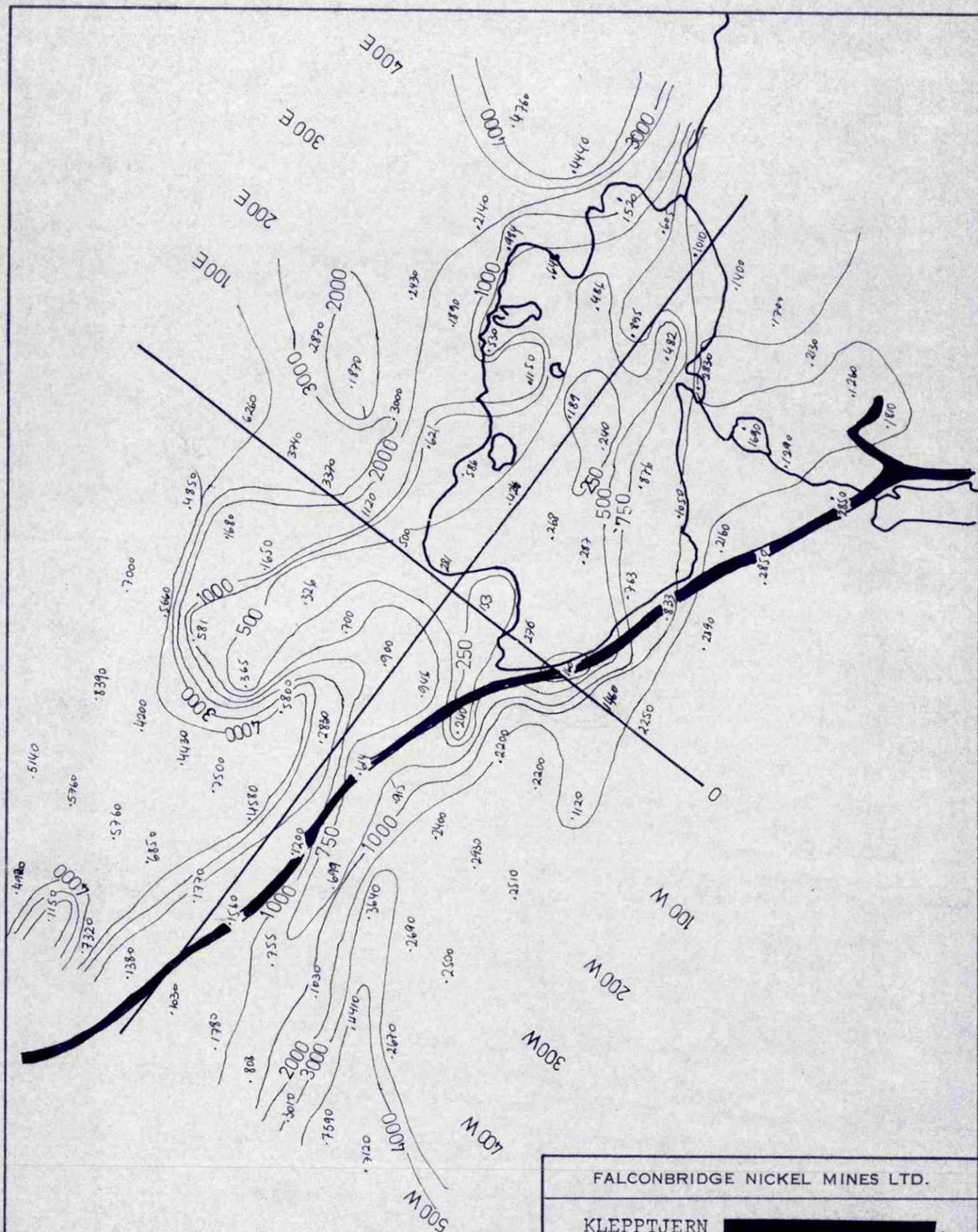
KLEPPTJERN EAST GRID, IVELAND,
NORWAY - Contours of apparent
resistivity ($\rho/2\pi$) for
 $n=1$ on 50 metre spreads.

SCALE 1: 5,000

DRAWN FN

DATE MAY 1971

TRACED RS



FALCONBRIDGE NICKEL MINES LTD.	
KLEPPTJERN XXXXXXXXXX , IVELAND, NORWAY. Contours of apparent resistivity ($\rho_a/2\pi$) for $n=1$ on 50 metre spread.	
SCALE	1: 5000
DATE	May 1971
DRAWN	FN
TRACED	RS



LEGEND

~~~~~ Intervals of 1000 γ

~~~~~ Intervals of 500 γ

~~~~~ Intervals of 200 γ

Scale

Meters

INSTRUMENT: M. PRAR, M 100 FLUXGATE MAGNETOMETER

MAGNETIC ANOMALIES  
KLEPPTJERN IVELAND, NORWAY

SCALE  
1:1000

|      |       |      |
|------|-------|------|
| OBS  | LN    | 3.71 |
| DRAW | FN RS | 3.71 |
| TRAC | RS    | 4.71 |
| CHK  | JO    | 4.71 |

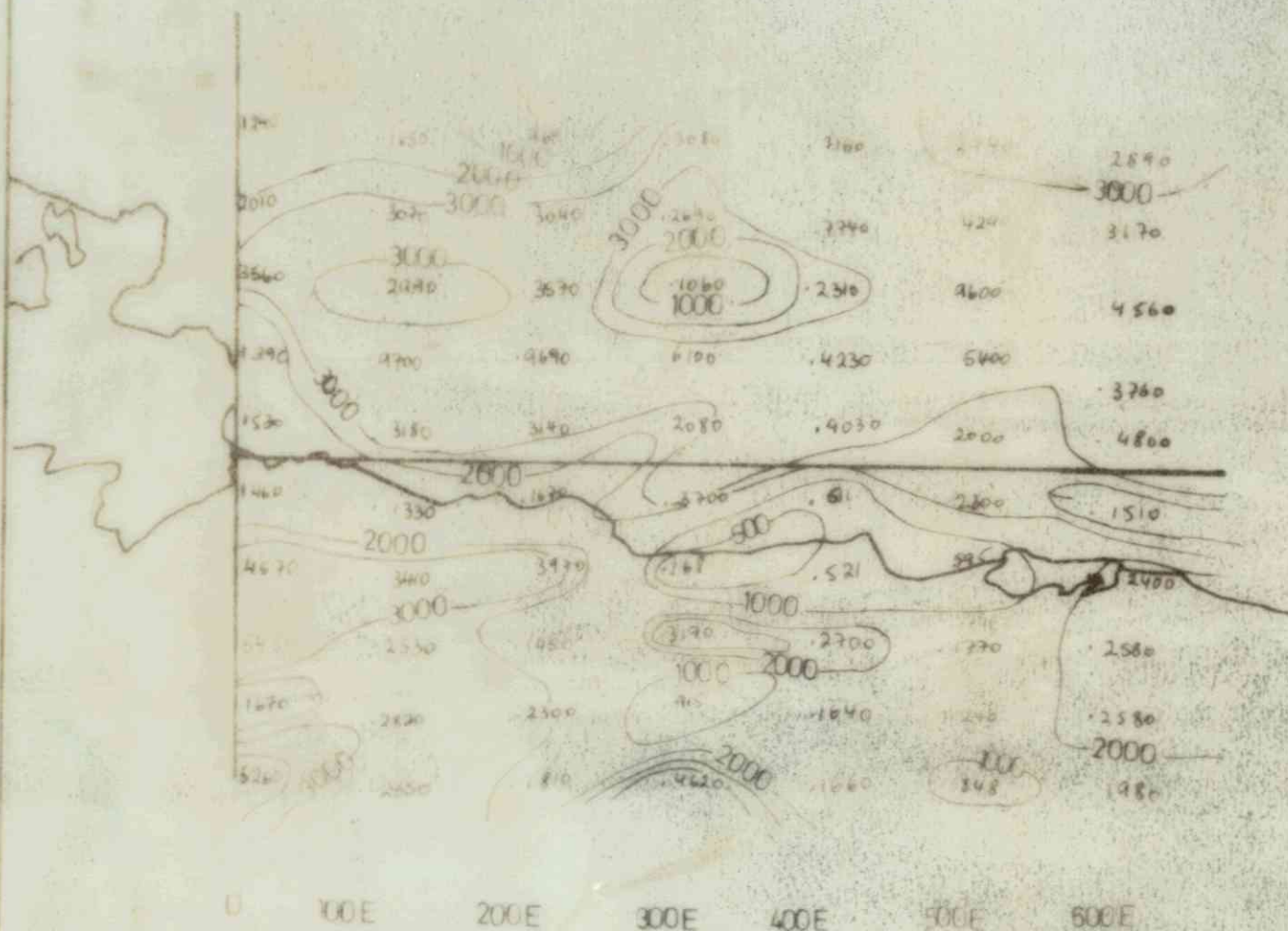
MAP NO

MAP SHEET 1512 III

A/S SULFIDMALM

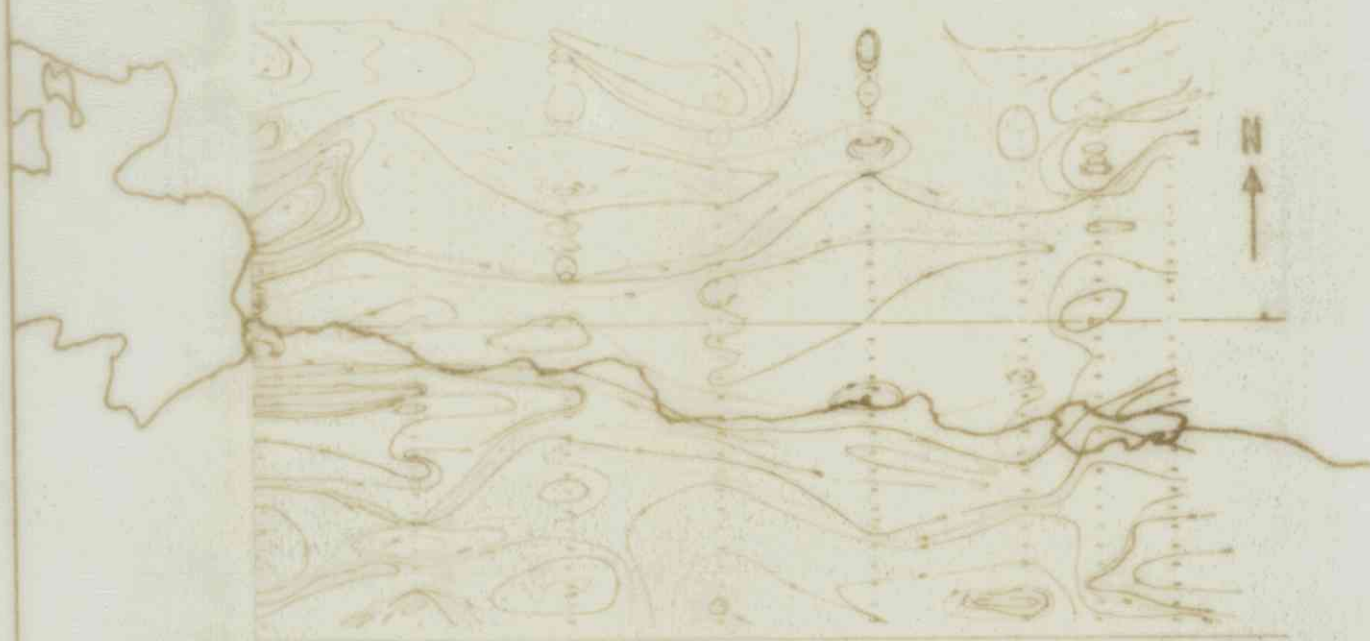






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|-----------------------------------------------------------------------------------------------------------------------------|----------|--------|----|
| FALCONBRIDGE NICKEL MINES LTD.                                                                                              |          |        |    |
| KLEPPTJERN EAST GRID, IVELAND, NORWAY - Contours of apparent resistivity ( $\sqrt{2/2\pi}$ ) for $n=1$ on 50 metre spreads. |          |        |    |
| SCALE                                                                                                                       | 1: 5,000 | DRAWN  | FN |
| DATE                                                                                                                        | MAY 1971 | TRACED | RS |





0 1 2 3 4 5 6 7 8 9 10

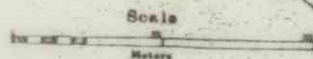
FALCONBRIDGE NICKEL MINES LTD.

KLEPFTJERN EAST GRID, IVELAND,  
NORWAY. - Magnetic Anomalies.

|       |          |        |    |
|-------|----------|--------|----|
| SCALE | 1: 5,000 | DRAWN  | RS |
| DATE  | May 1971 | TRACED | FH |



LEGEND



INSTRUMENT: GEOMAGNETIC FIELD MEASURING MACHINE

MAGNETIC ANOMALIES  
KLEPPTJERN IVELAND, NORWAY

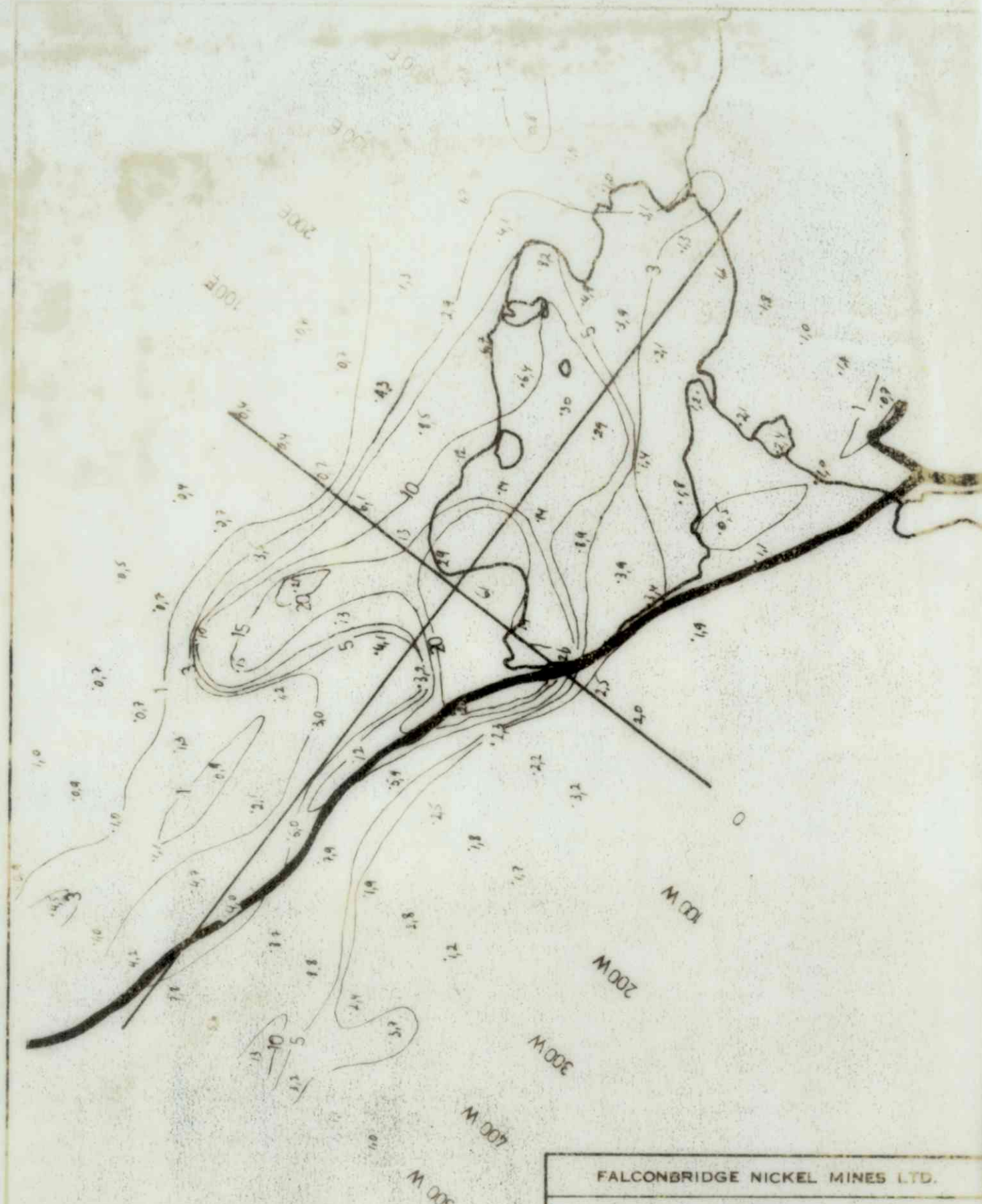
SCALE  
1:1000

|      |      |      |
|------|------|------|
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| RAW  | FWRS | 5.71 |
| TRAC | RS   | 4.71 |
| CHK  | JD   | 4.71 |

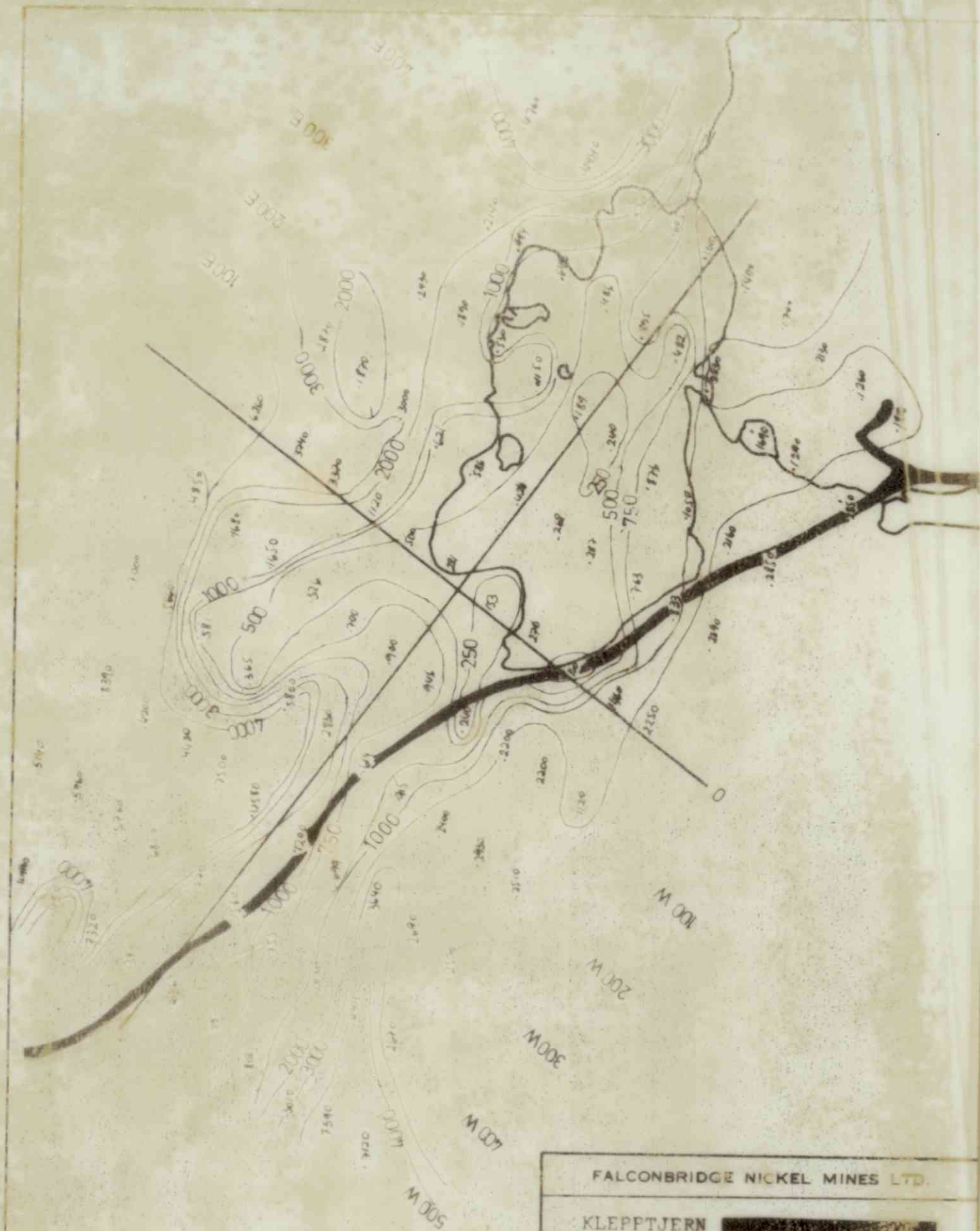
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A/S SULFIDMALM

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|                                                                                                                                                                       |          |        |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|----|
| FALCONBRIDGE NICKEL MINES LTD.                                                                                                                                        |          |        |    |
| KLEPPTJERN <span style="background-color: black; color: black;">XXXX</span> GRID, IVELAND,<br>NORWAY - Contours of Metal<br>Factors for $n=1$ on 50 metre<br>spreads. |          |        |    |
| SCALE                                                                                                                                                                 | 1: 5000  | DRAWN  | FV |
| DATE                                                                                                                                                                  | May 1971 | TRACED | RS |



FALCONBRIDGE NICKEL MINES LTD.

KLEPPTJERN XXXXXXXXXX  
 IVELAND, NORWAY. Contours of  
 apparent resistivity ( $\rho_a/2\pi$ )  
 for  $n=1$  on 50 metre spread.

SCALE 1: 5000

DRAWN FN

DATE May 1971

TRACED RS



**LEGEND**

~~~~~ Intervals of 1000 γ

~~~~~ Intervals of 500 γ

~~~~~ Intervals of 250 γ

INSTRUMENT: Mc PHAR, M 700 FLUXGATE MAGNETOMETER

Scale

0 50 100 200

Meters

MAGNETIC ANOMALIES KLEPPTJERN IVELAND, NORWAY

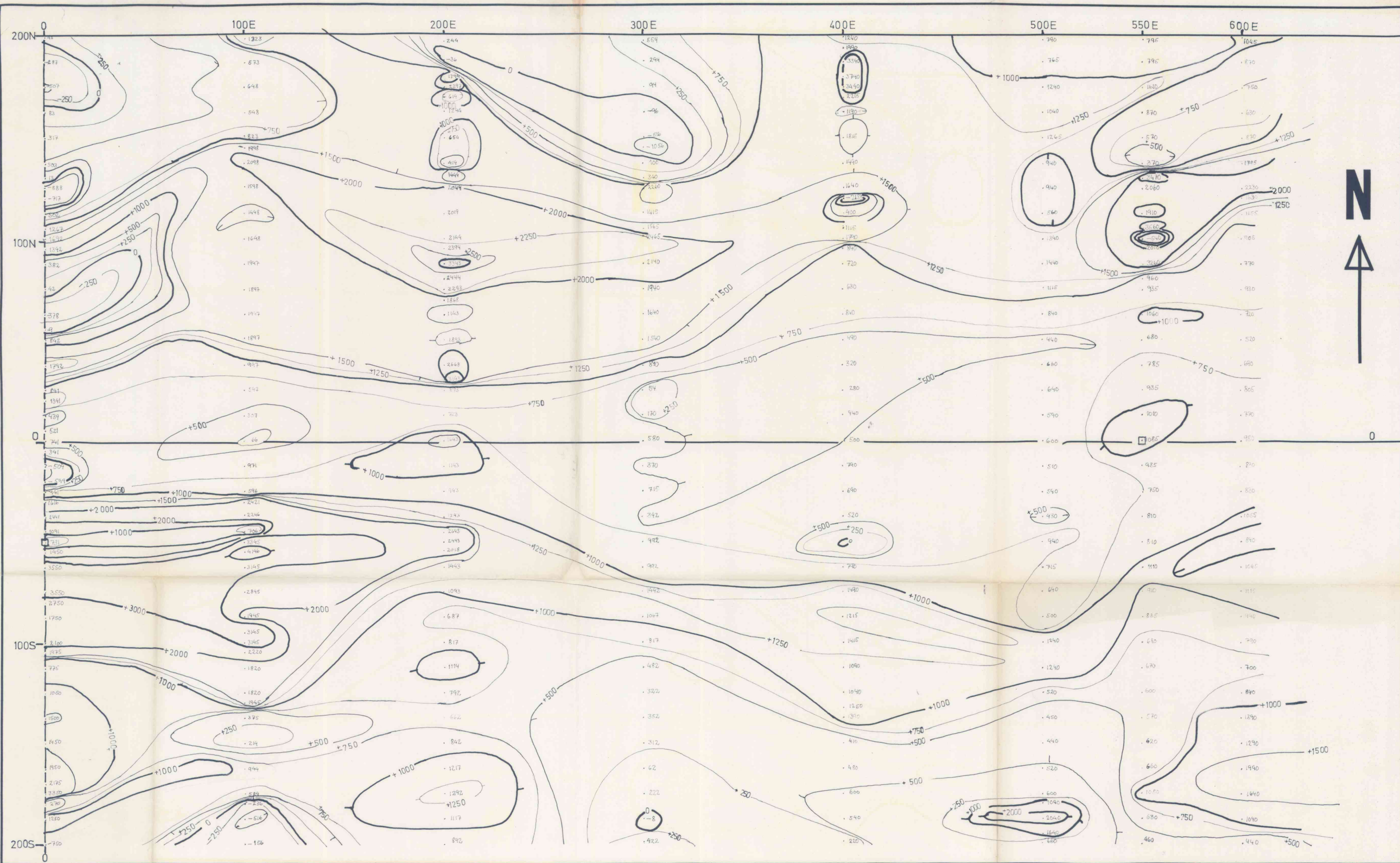
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A/S SULFIDMALM

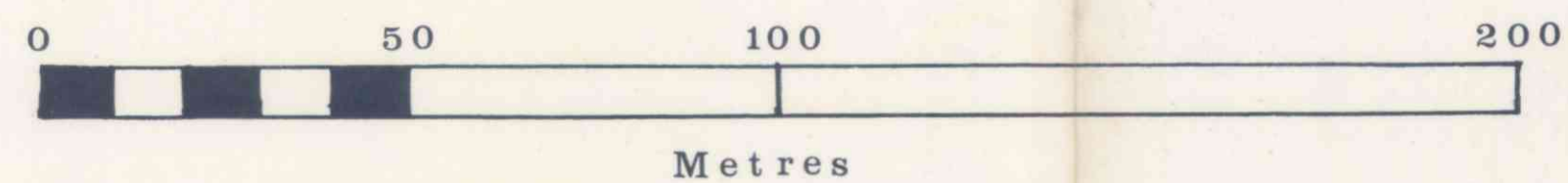
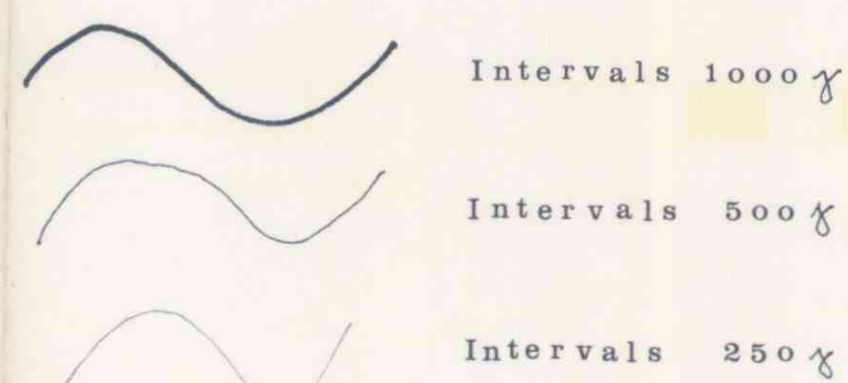
| | | | |
|-----------------|------|-------|------|
| SCALE
1:1000 | OBS | LN | 3.71 |
| | DRAW | FN.RS | 3.71 |
| | TRAC | RS | 4.71 |
| | CHK | JG | 4.71 |

MAP NO

MAP SHEET 1512 III



LEGEND



MAGNETIC ANOMALIES
KLEPPTJERN EAST GRID
IVELAND, NORWAY

SCALE
1:1000

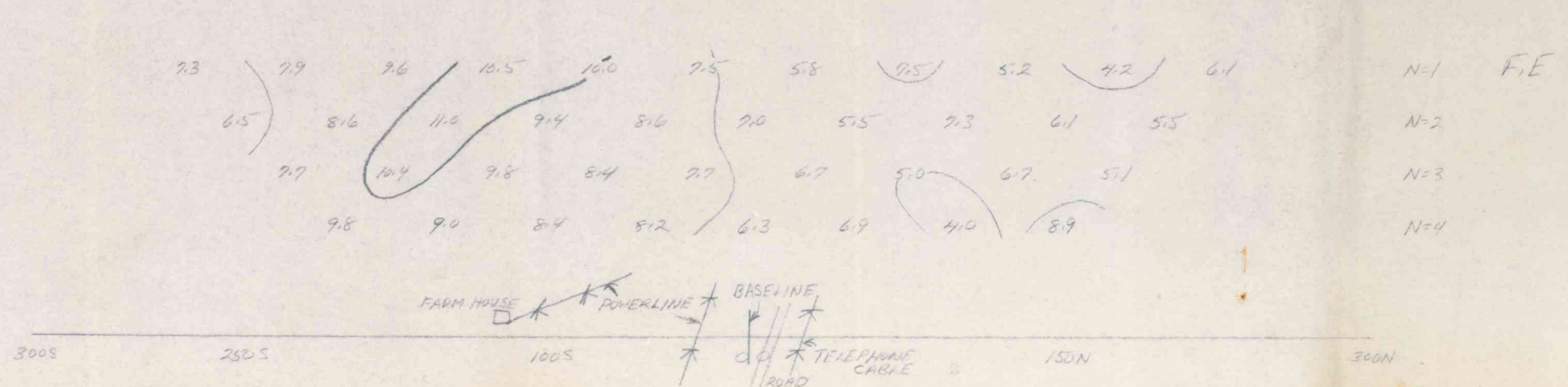
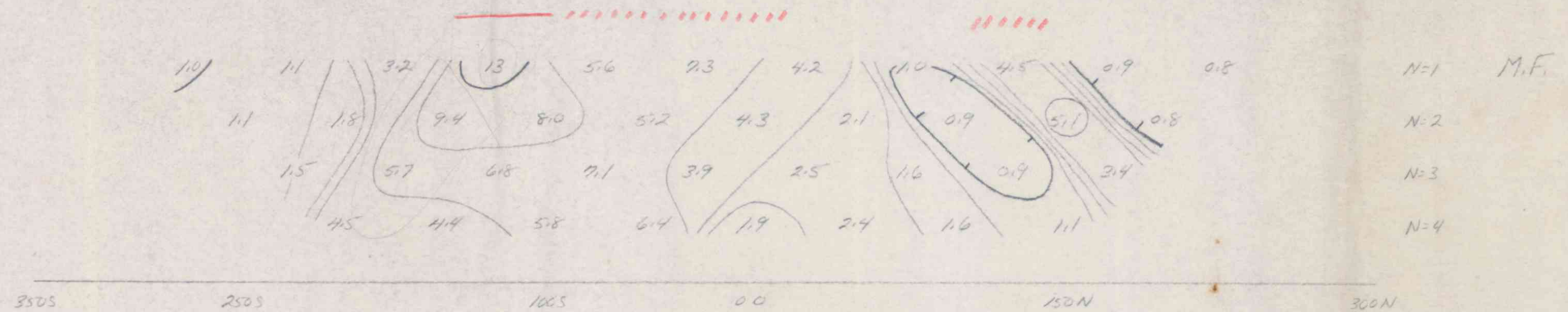
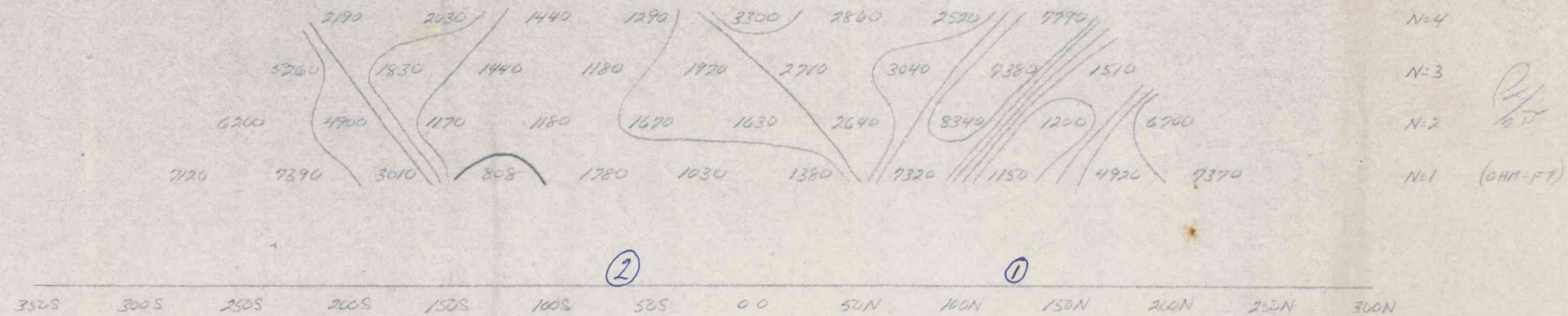
| | | |
|------|--------|------|
| OBS | LN | 3.71 |
| DRAW | LN, RS | 4.71 |
| TRAC | FH | 4.71 |
| CHK | JG | 4.71 |

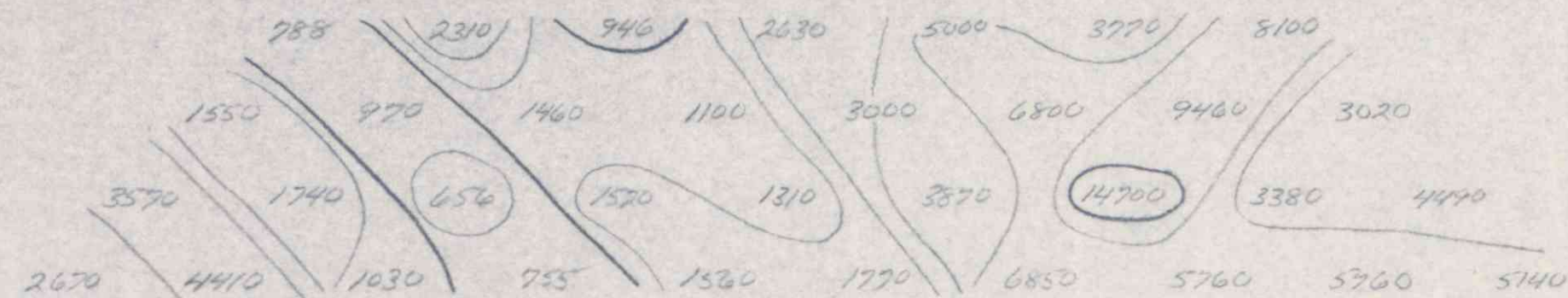
MAP NO 9
MAP SHEET 1512 III

A/S SULFIDMALM

INSTRUMENT: McPHAR, M700 FLUXGATE MAGNETOMETER

A/S SULFIDMAL
 FALCONBRIDGE NIKKELVERK A/S
 KLEPP TJERN GRID
 IVEFLAND TOWNSHIP, NORWAY
 H.R.I.P. D-D
 0.345 CPS
 1" = 50 METRES
 MARCH 8, 1971
 A.K. WOOD-OP





N=4

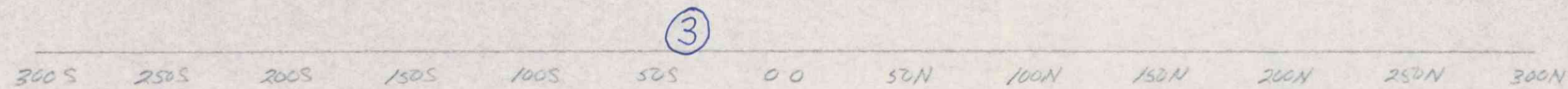
N=3

N=2

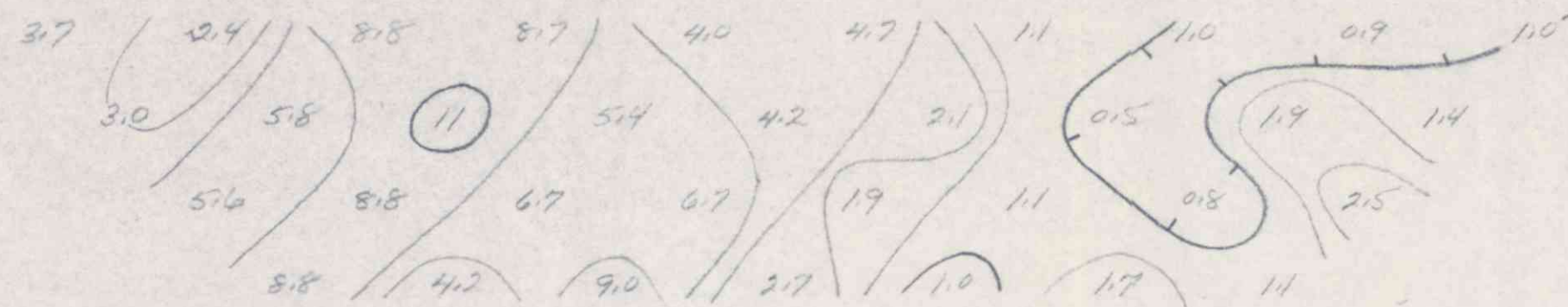
N=1

(OHM-FT)

A/S SULFIDMAL
FALCONBRIDGE NIKKELVERK AIS
KLEPPTJERN GRID
IVELAND TOWNSHIP, NORWAY
H.P.I.P.D-D
0.345 CPS
1" = 50 METRES
MARCH, 2, 1971
A.K. WOOD - DP



LINE 400W



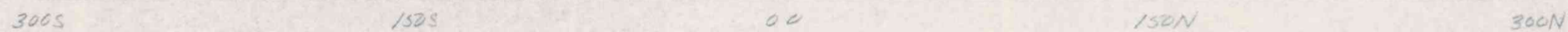
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N=2

N=3

N=4

M.F.



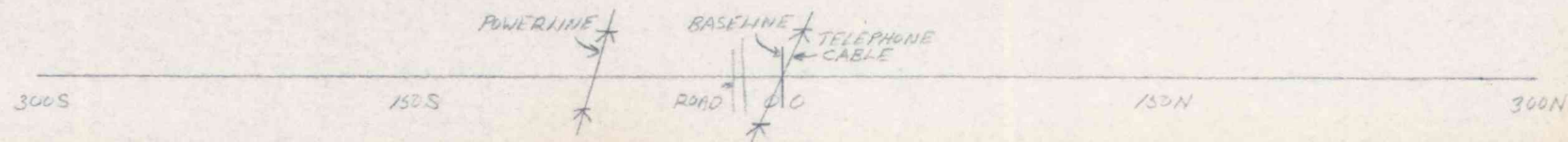
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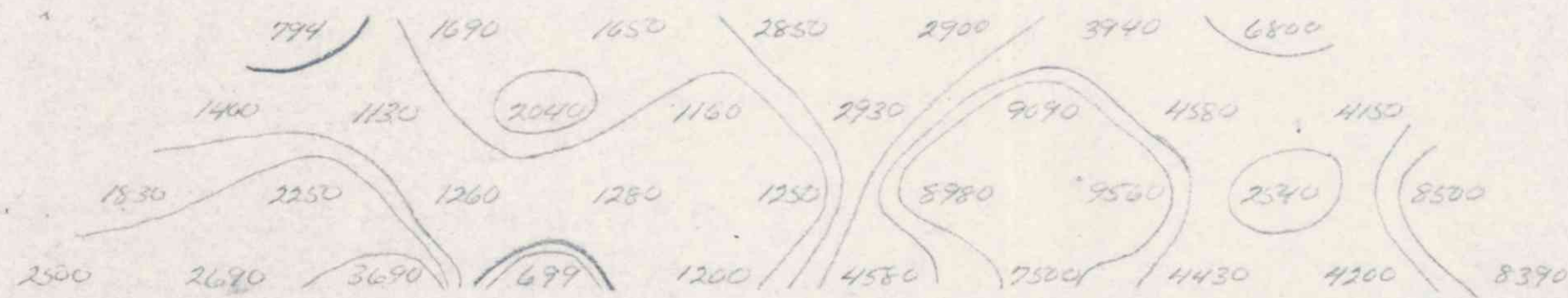
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N=3

N=4

F.E.





N=4

N=3

N=2

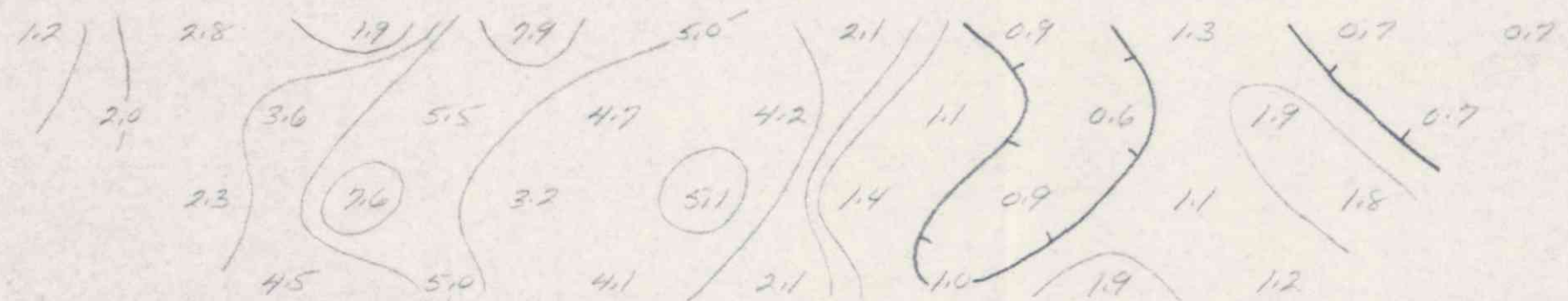
N=1

2.1
10MM-FT)

A/S SULFIDMAL
FALCONBRIDGE NIKKELVERK A/S
KLEPPTJERN GRID
IVELAND TOWNSHIP, NORWAY
H.P.I. P.D.-D
0.345 CPS
1" = 50 METRES
MARCH 2, 1971
A.K. WOOD - CP

④

300S 250S 200S 150S 100S 50S 0 0 50N 100N 150N 200N 250N 300N



N=1

N=2

N=3

N=4

M.F.

300S 150S 0 0 150N 300N



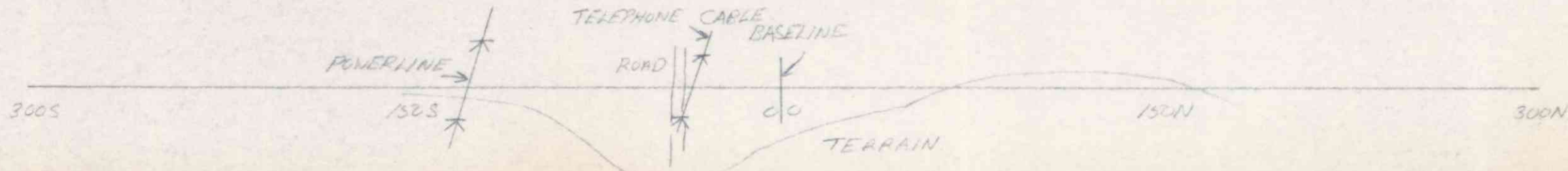
N=1

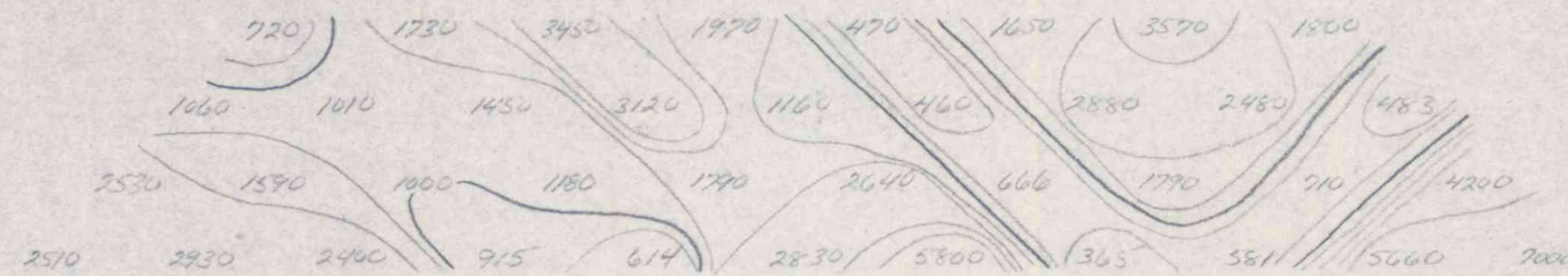
N=2

N=3

N=4

F.E.





N=4

N=3

N=2

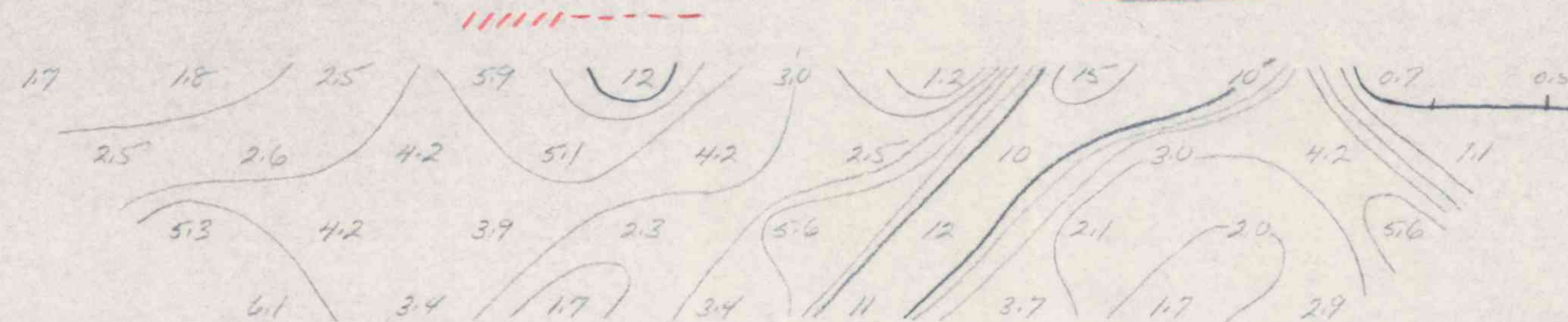
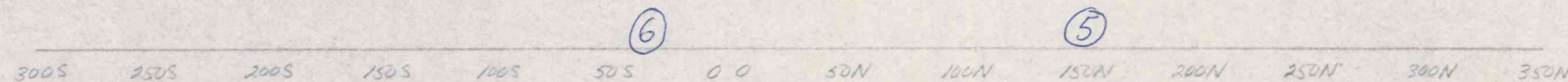
N=1

Handwritten signature

(0111-FT)

A/S SAKFIDMAL
FALCONBRIDGE NIKKEIVERK A/S
KLEPP TERN GRAD
IUELAND TOWNSHIP, NORWAY
H.P.T.P. D-D
0.345 CPS
1" = 50 METRES
MARCH 1, 1971
A.K. WOOD - O.P.

LINE 200 W



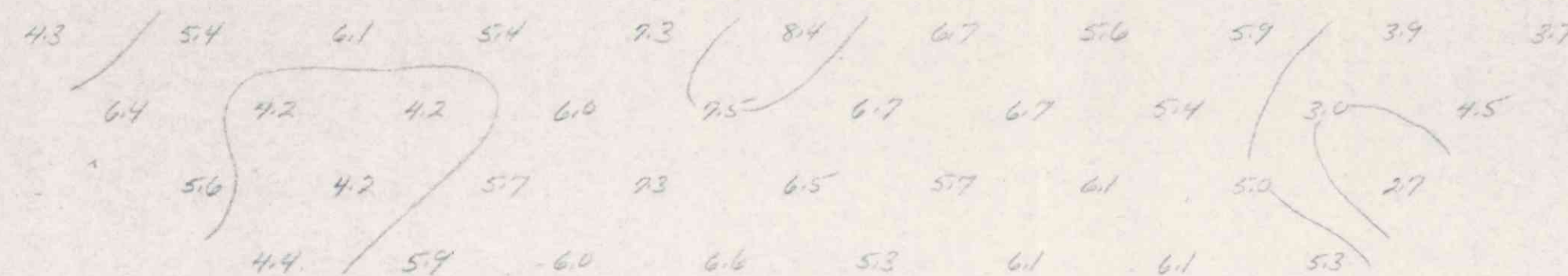
N=1

M.F.

N=2

N=3

N=4



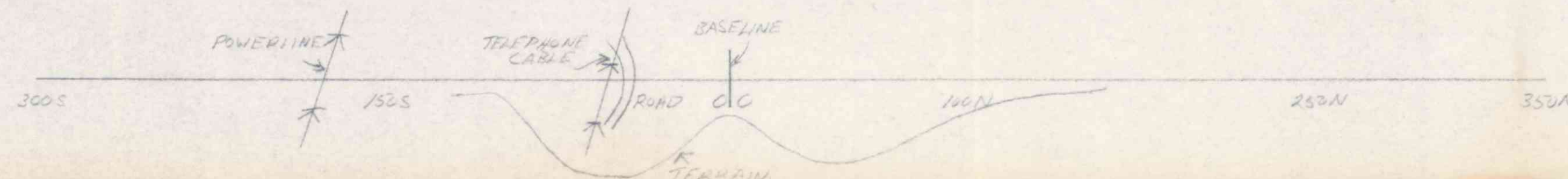
N=1

F.E.

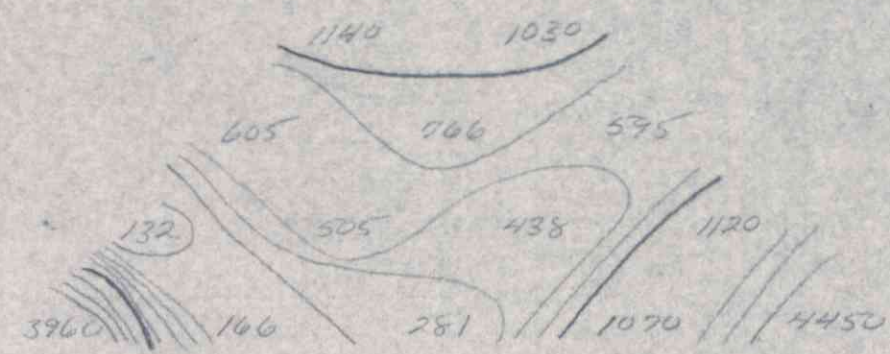
N=2

N=3

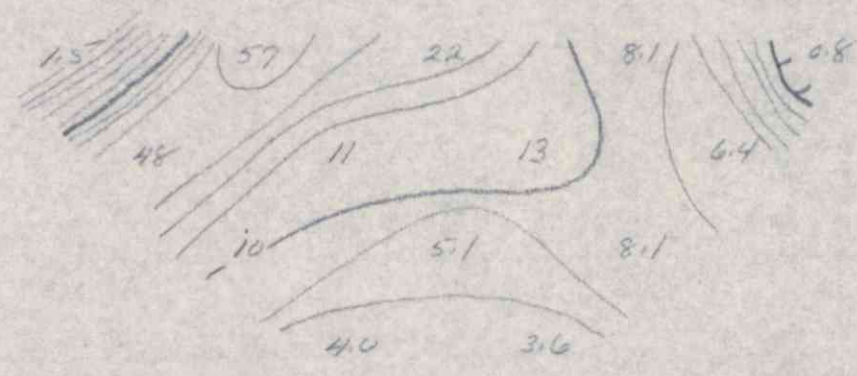
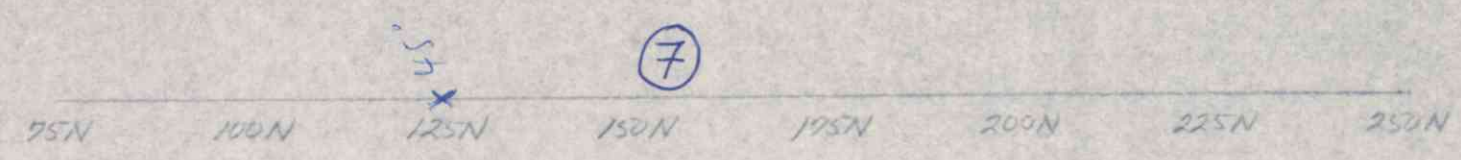
N=4



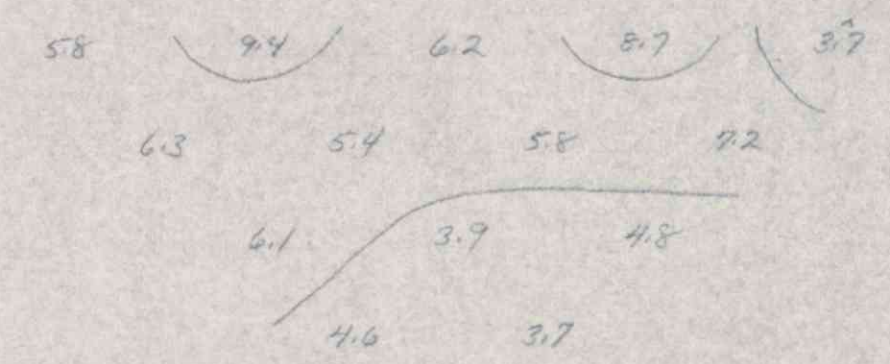
AIS SULFIDAL
 FALCONBRIDGE NIKKELVERK AIS
 KLEPPSTERN GRID
 IVELAND TOWNSHIP, NORWAY
 H.P.I.P.D-D
 0.3 + 5 CPS
 1" = 25 METRES
 MARCH 10, 1971
 A.K. WOOD - OP



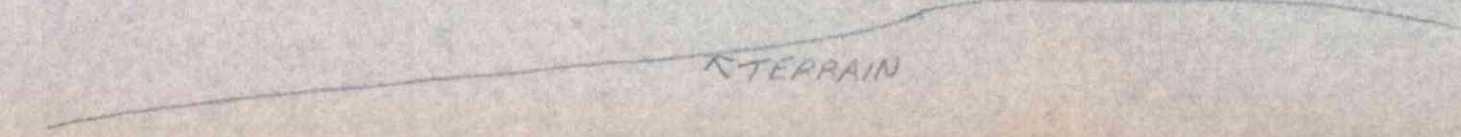
N=4
 N=3
 N=2
 N=1 (OHM-FT)

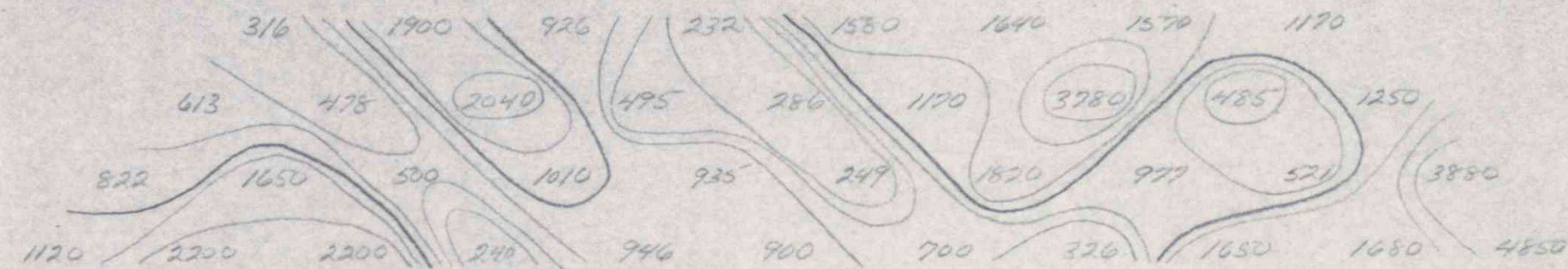


N=1 M.F.
 N=2
 N=3
 N=4



N=1 F.E.
 N=2
 N=3
 N=4





N=4

N=3

N=2

N=1

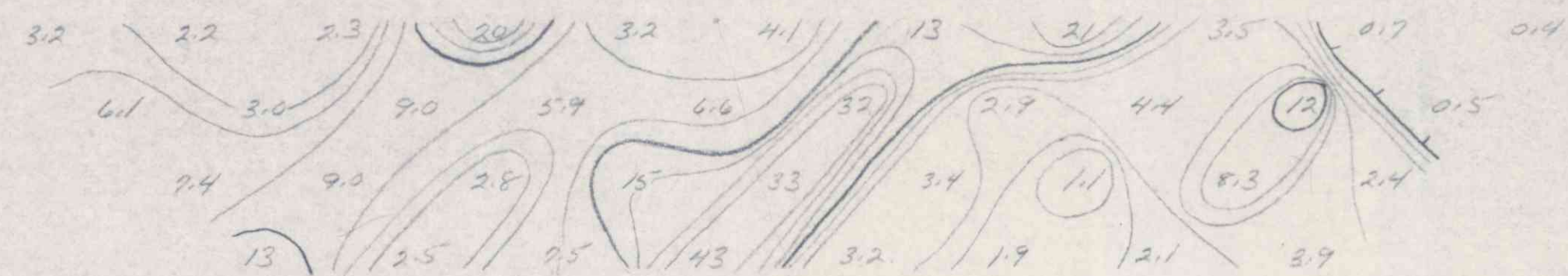
Handwritten notes:
 P
 27

(OHM-FT)

A/S SULFIDMAL
 FALCONBRIDGE NIKKELVERK A/S
 KLEPPTJERN GRID
 IVELAND TOWNSHIP, NORWAY
 H.P.I. P.D.-D
 0.345 CPS
 1" = 50 METRES
 FEB. 27, 1971
 A.K. WOOD - CP



LINE 100W



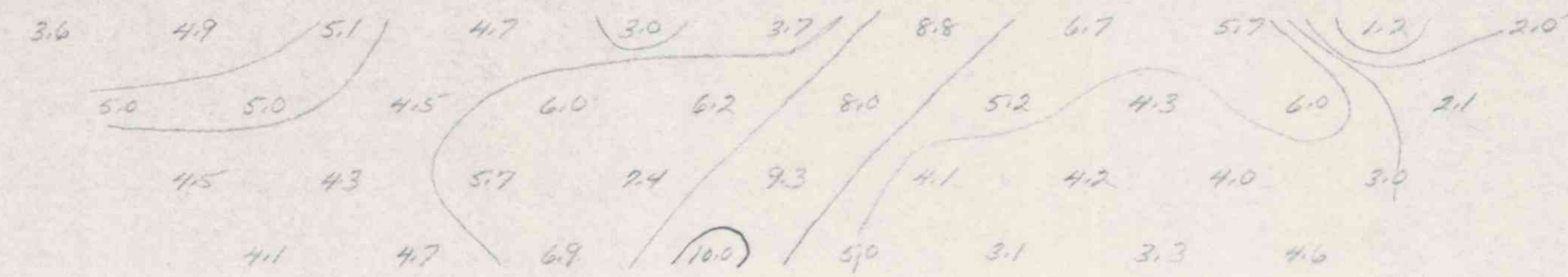
N=1

N=2

N=3

N=4

M.F.



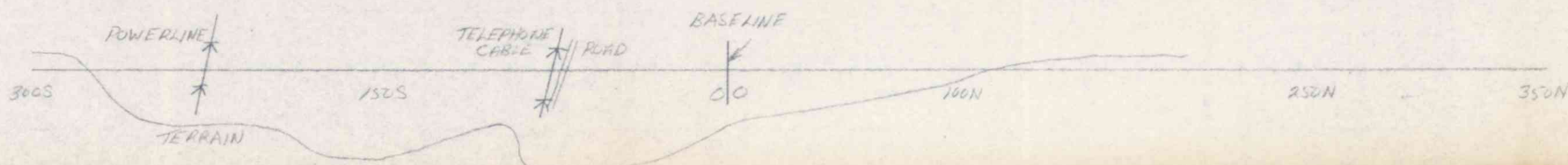
N=1

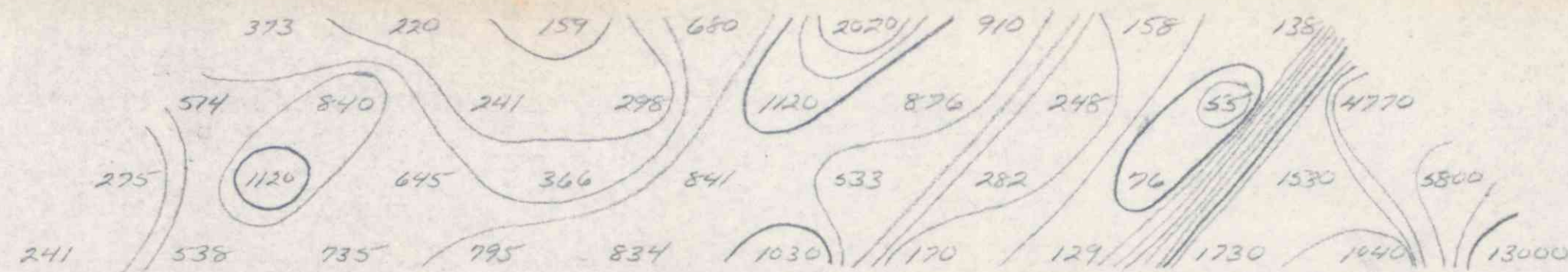
N=2

N=3

N=4

F.E.





N=4

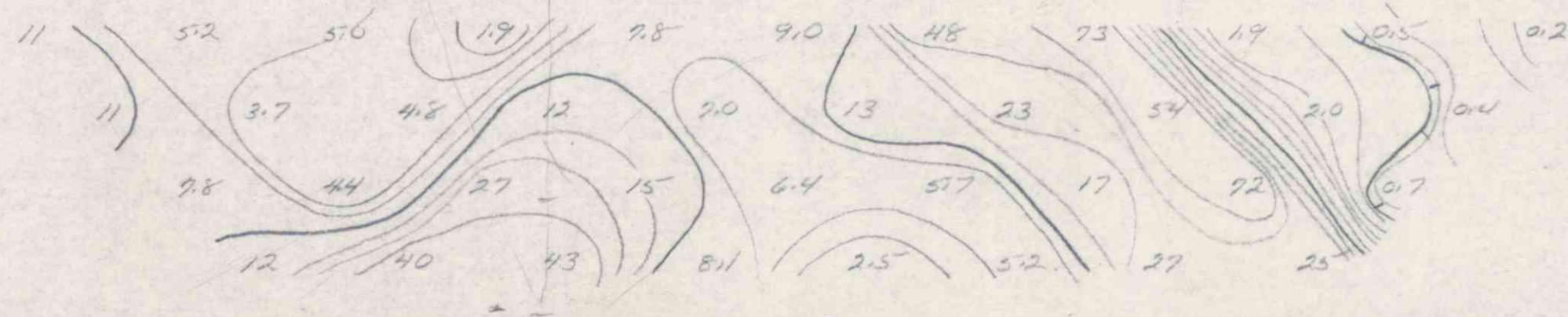
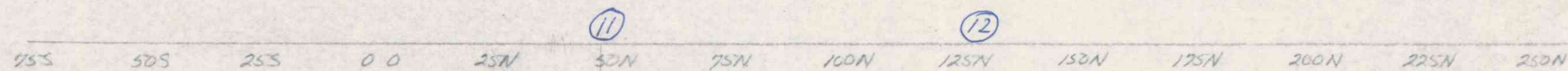
N=3

N=2

N=1

(OHM-FD)

A/S SULFIDMALM
FALCONBRIDGE NIKKELVERK A/S
KLEPP TJERN GRID
IVELAND TOWNSHIP, NORWAY
N.I.P.I.P. D-D
0.345 CRS
1" = 25 METRES
MARCH 25, 1971
A.K. WOOD-OP



N=1

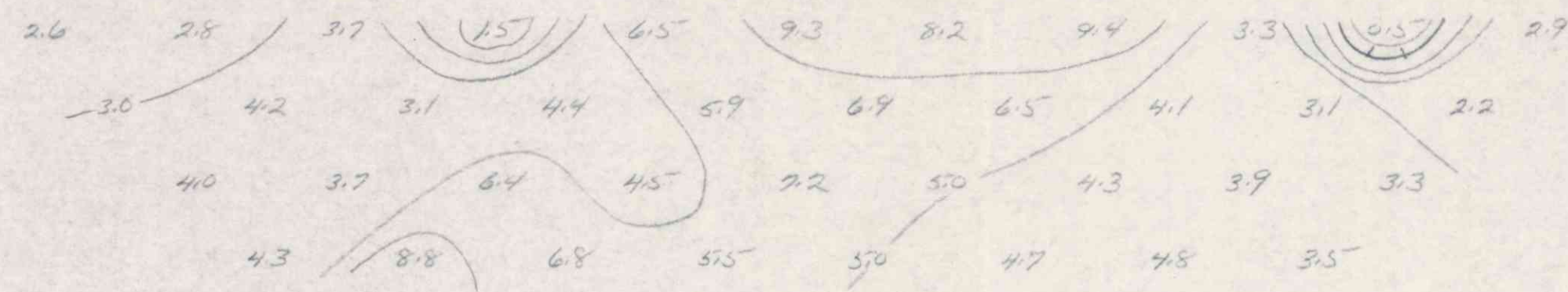
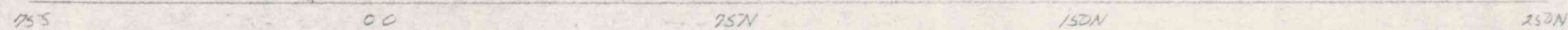
N=2

N=3

N=4

M.F.

LINE 50 W



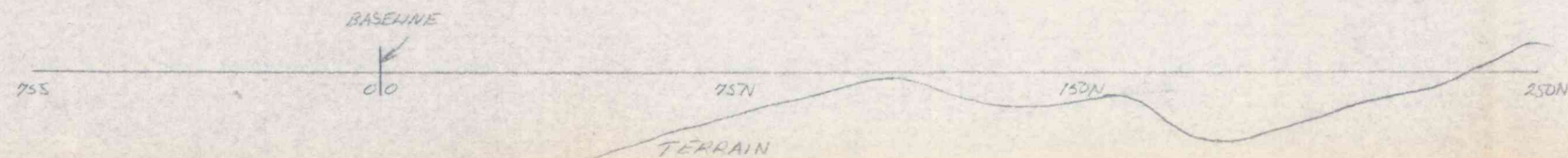
N=1

N=2

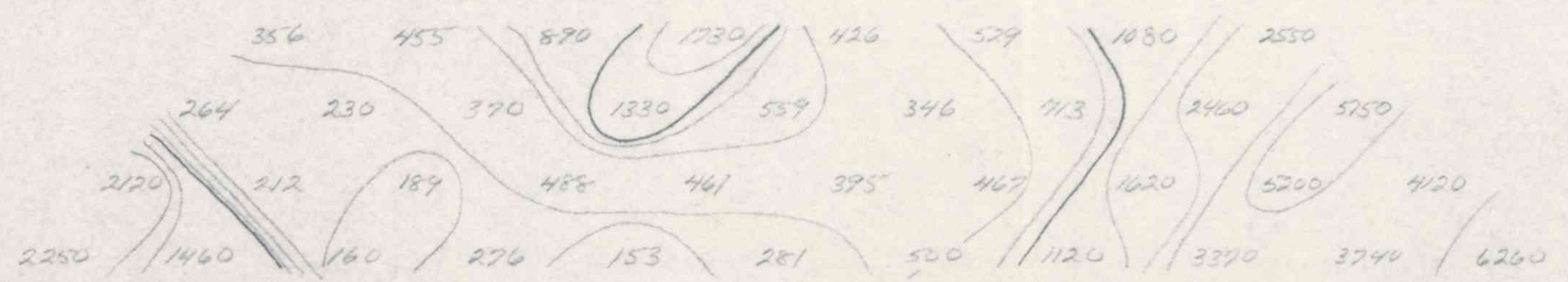
N=3

N=4

F.E.



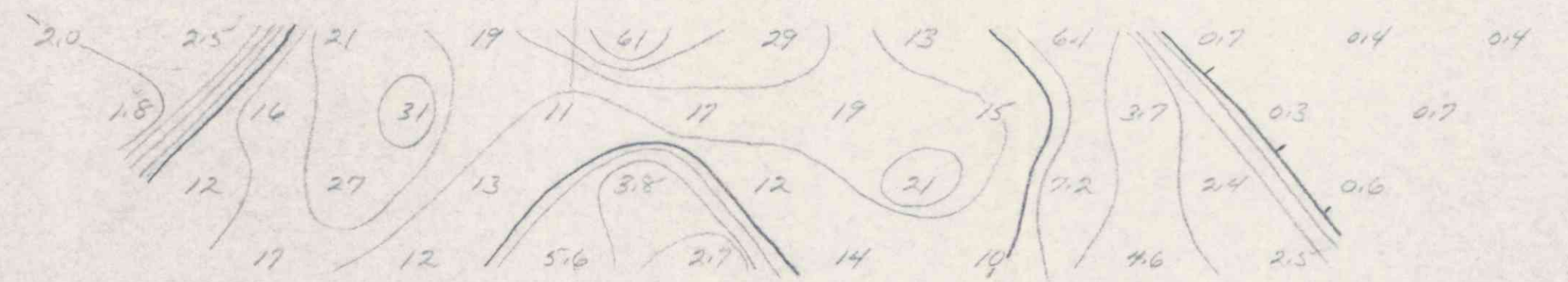
A/S SULFIDMAL
 FALCONBRIDGE NIKKELVERK A/S
 KLEPP TJERN GRID
 IVELAND TOWNSHIP, NORWAY
 H.P.I.P. D-D
 0.345 CPS
 1" = 50 METRES
 FEB. 26, 1970
 A.K. WOOD - O.P.



N=4
 N=3
 N=2
 N=1 (6MM-FT)

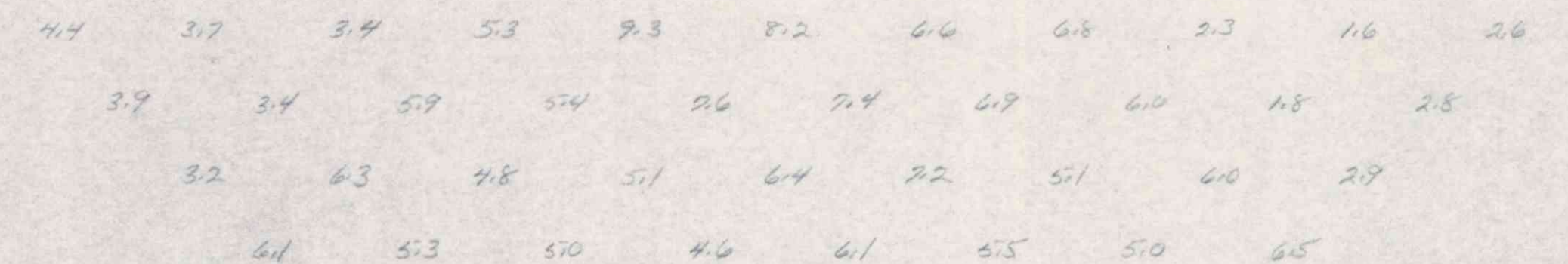
13

300S 250S 200S 152S 100S 50S 0 0 50N 100N 150N 200N 250N 300N 350N



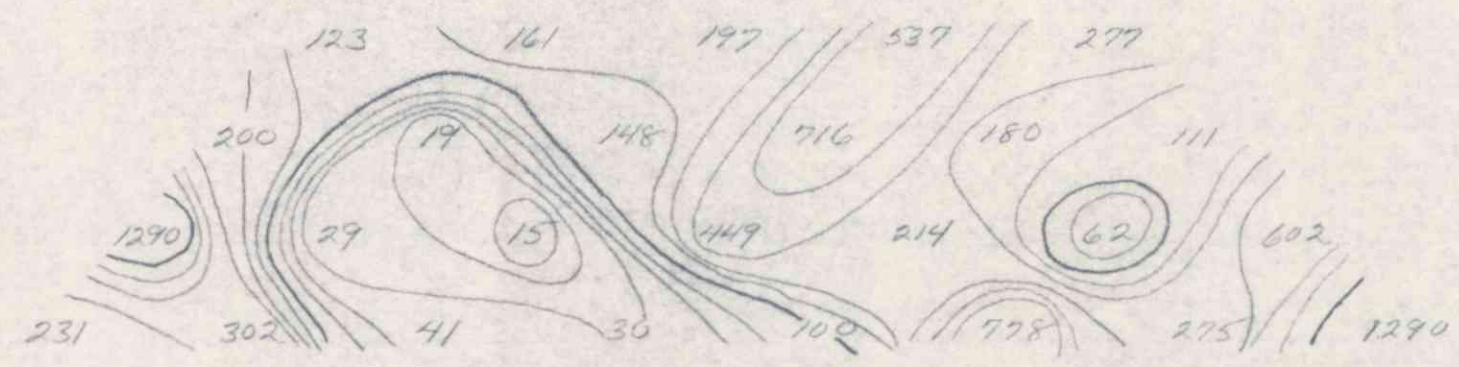
N=1 M.F.
 N=2
 N=3
 N=4

300S 152S 0 0 100N 250N 350N



N=1 F.E.
 N=2
 N=3
 N=4





N-4

N-3

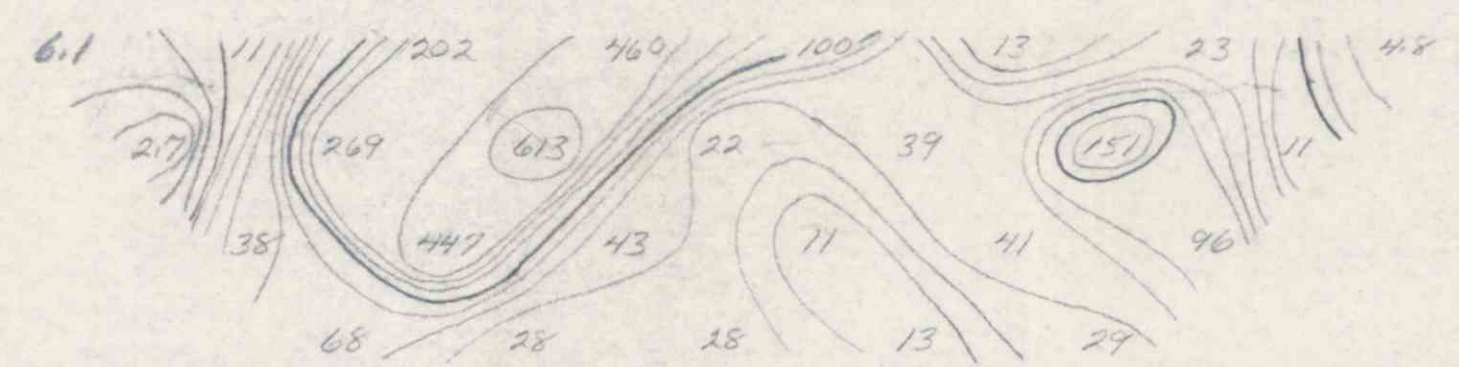
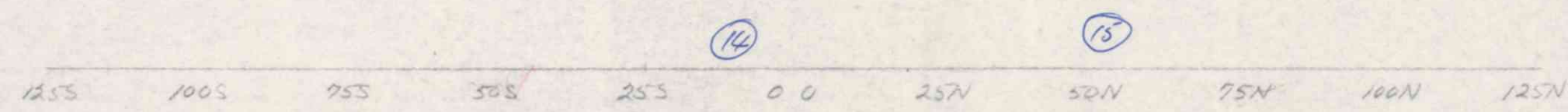
N-2

N-1

(OHM-FT)

A/S SULFIDMALM
 FALCONBRIDGE NIKKELVERK A/S
 KLEPP TJERN GRID
 IVELAND TOWNSHIP, NORWAY
 H.P.T.P D-D
 0.345 CPS
 1" = 25 METRES
 MARCH, 10, 1971
 A.K. WOOD - OP

LINE 0+00



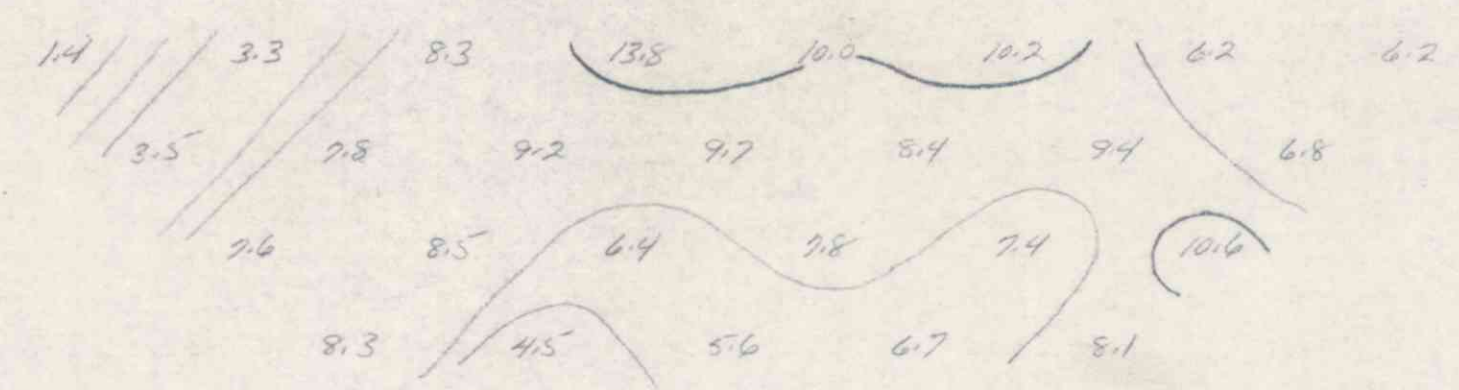
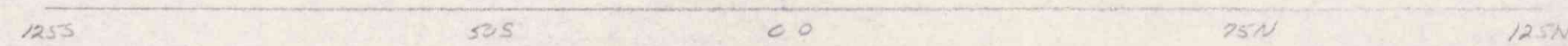
N-1

M.F

N-2

N-3

N-4



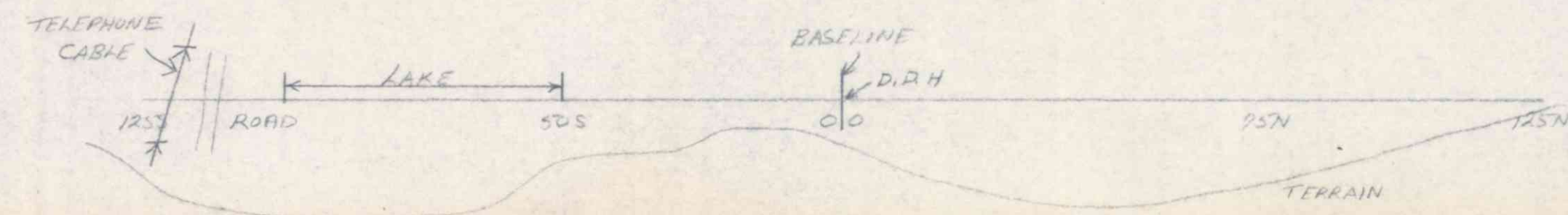
N-1

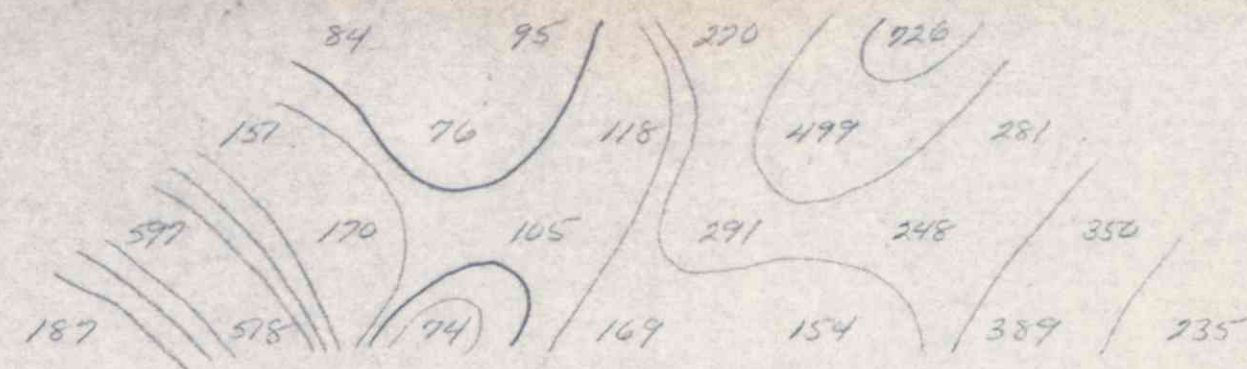
F.E

N-2

N-3

N-4





N=4

N=3

N=2

N=1

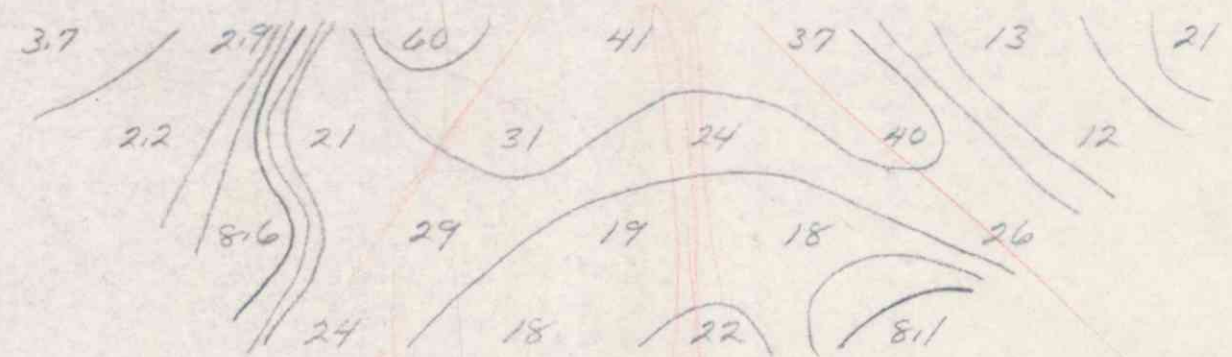
2.7

(OHM-FT)

A/S SULFIDMALM
FALCONBRIDGE NIKKELVERK A/S
KLEPP TJERN GRID
IVELAND TOWNSHIP, NORWAY
H.P.I.P.D-D
0.3 & 5 CPS
1" = 25 METRES
MARCH 25, 1971
A.K. WOOD - U.S.

16

125S 100S 75S 50S 25S 00 25N 50N 75N 100N



N=1

M.F.

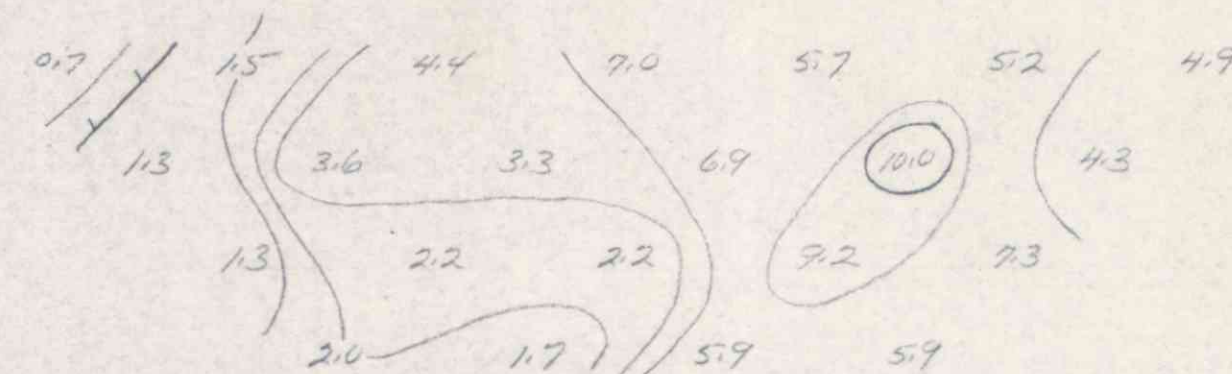
LINE 50E

N=2

N=3

N=4

125S 50S 00 50N 100N



N=1

F.E.

N=2

N=3

N=4

125S 50S 00 50N 100N
LAKE LAKE
BASELINE

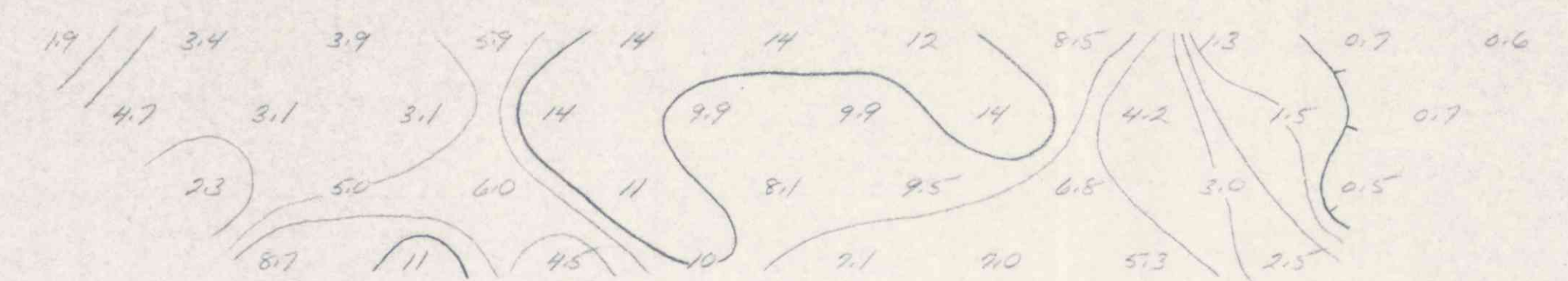
A/S SULFIDMAL
 FALCONBRIDGE NIKKELVERK A/S
 KLEPPTJERN GRID
 IVELAND TOWNSHIP, NORWAY
 H.P.I.P. D-D
 0.345 CPS
 1" = 50 METRES
 FEB 25, 1971
 A.K. WOOD - OP



N=4
 N=3
 N=2
 N=1 (OHM-FT)

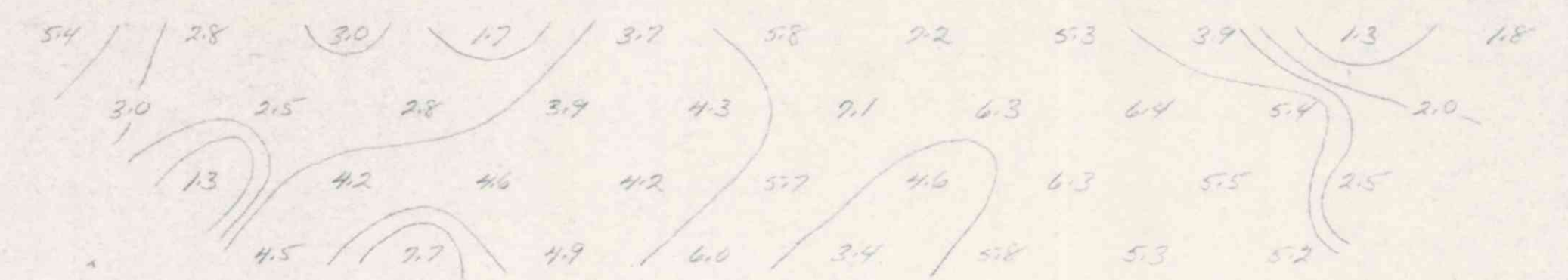
(17)

300S 250S 200S 150S 100S 50S 0 0 50N 100N 150N 200N 250N 300N 350N

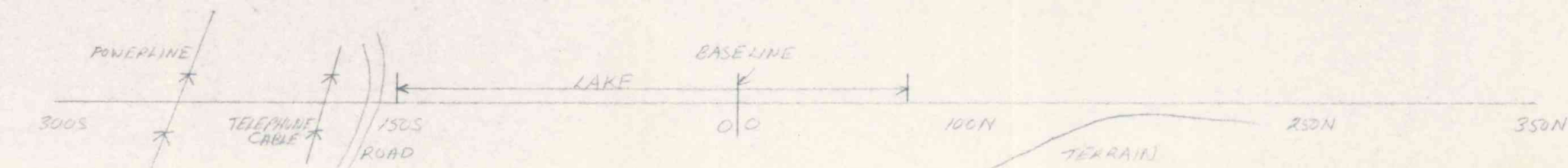


N=1 M.F.
 N=2
 N=3
 N=4

300S 150S 0 0 100N 250N 350N

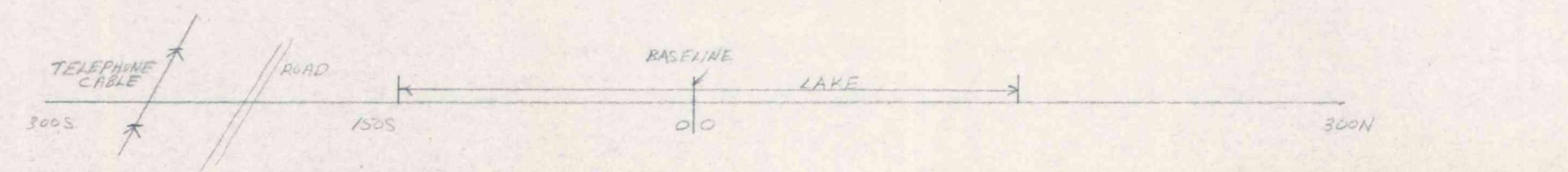
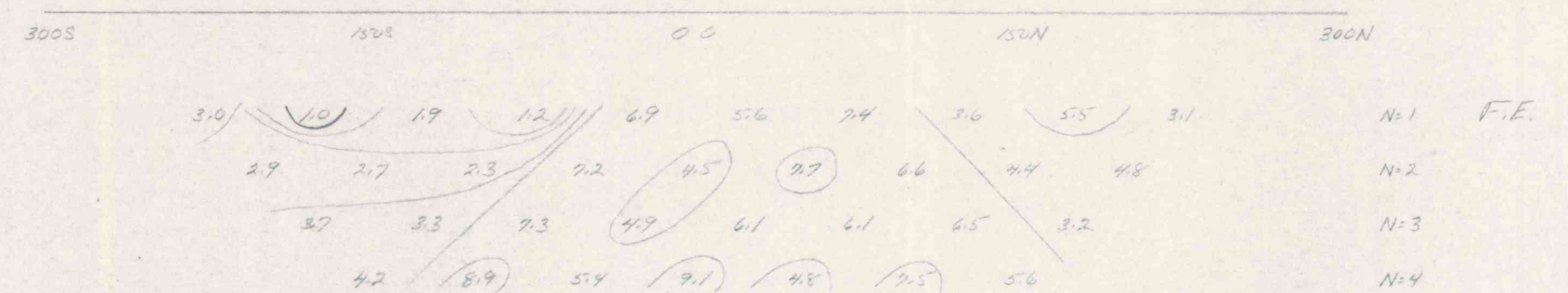
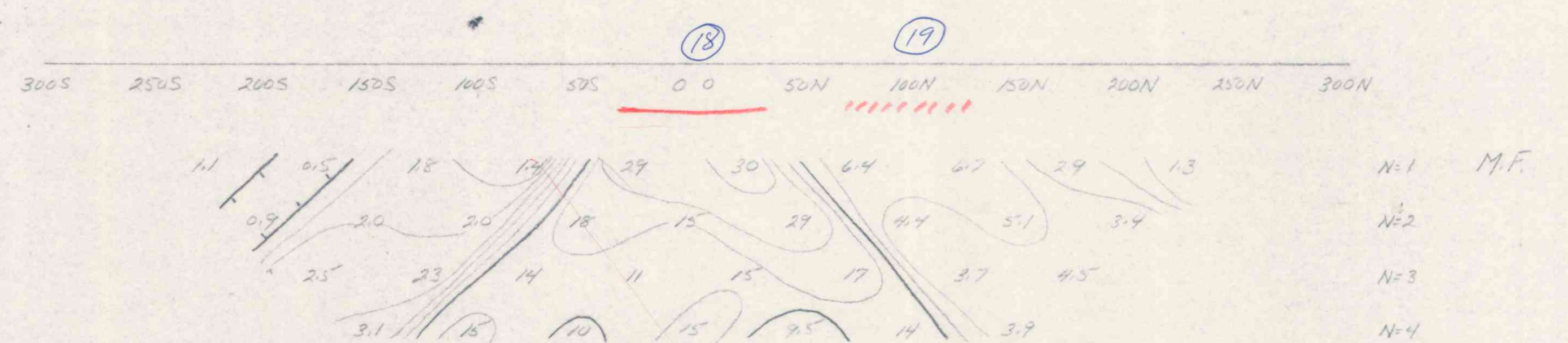
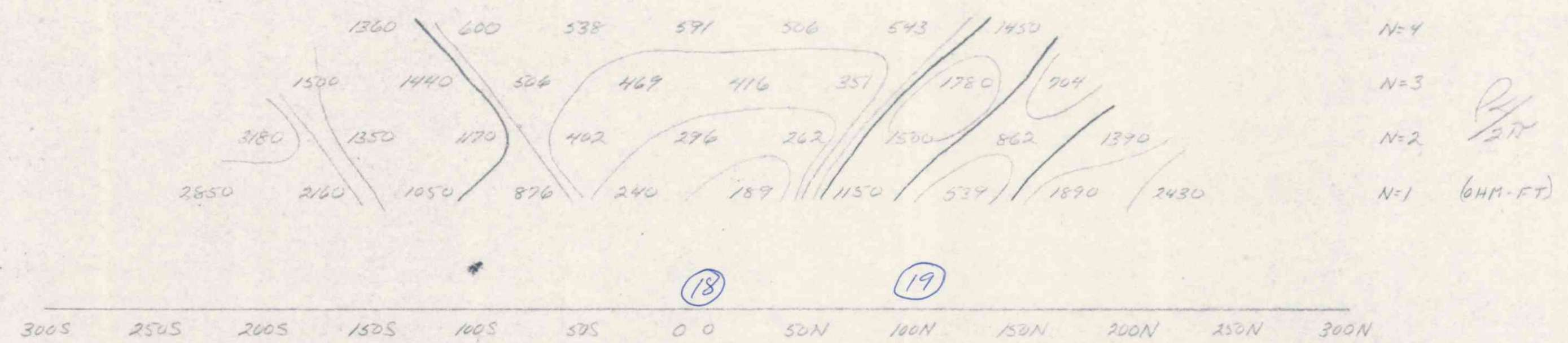


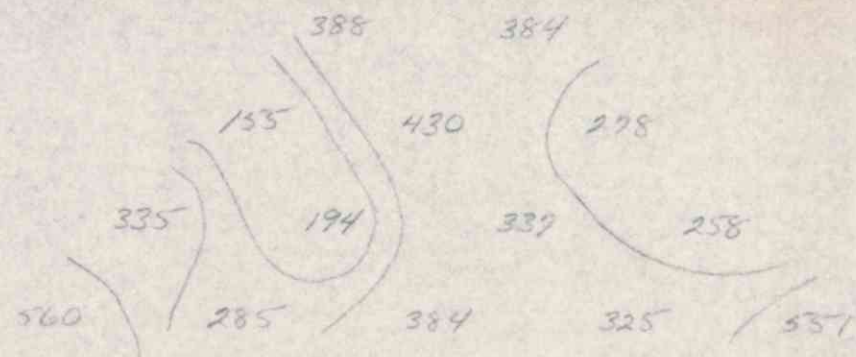
N=1 F.E.
 N=2
 N=3
 N=4



1932

A/S SULFIDMAL
 FALCONBRIDGE NIKKELVERK A/S
 KLEPP TJERN GRID
 IVELAND TOWNSHIP, NORWAY
 H.R.T. P.D.-D
 0.345 CPS
 1" = 50 METRES
 FEB 24, 1971
 A.K. WOOD - O.P.





N=4

N=3

N=2

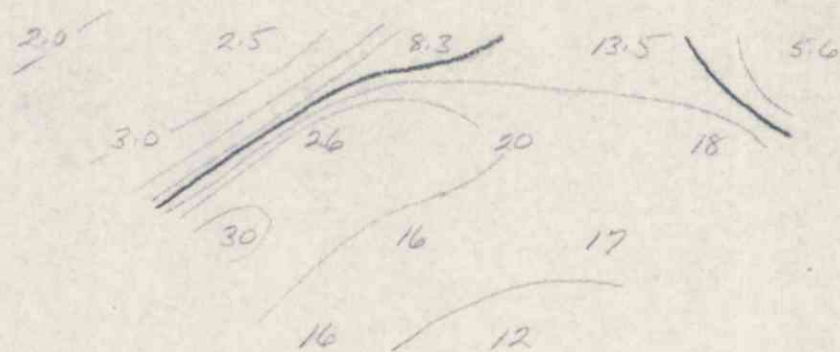
N=1

(6MM-FT)

A/S SULFIDMAL
FALCONBRIDGE NIKKELVERK A/S
KLEPPSTERN GRID
IVELAND TOWNSHIP, NORWAY
H.P.I.P. D-O
0.345 CPS
1" = 25 METRES
MARCH 9, 1971
A.K. WOOD - OP

(20)

100S 75S 50S 25S 00 25N 50N 75N



N=1

M.F.

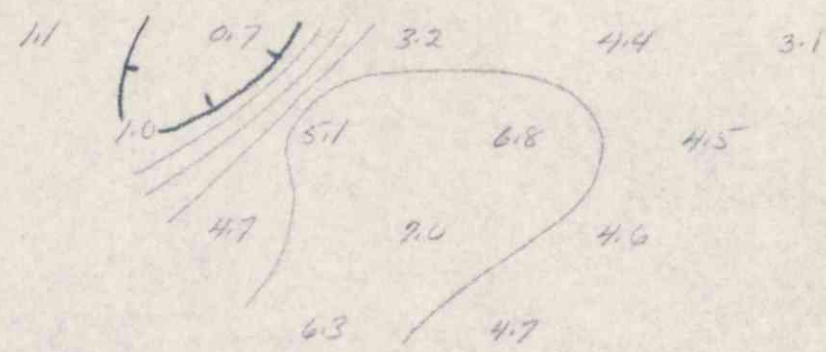
LINE 200 E

N=2

N=3

N=4

100S 50S 00 50N 100E



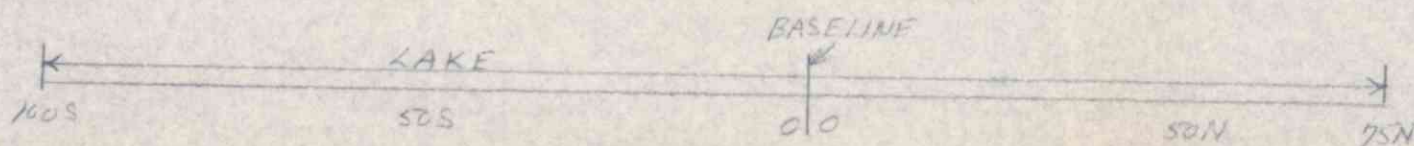
N=1

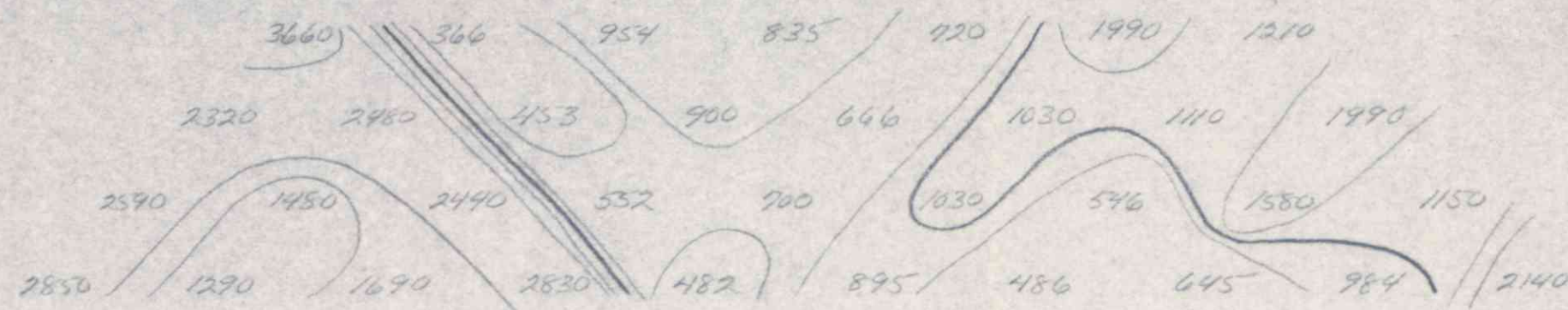
F.E.

N=2

N=3

N=4





N=4

N=3

N=2

N=1

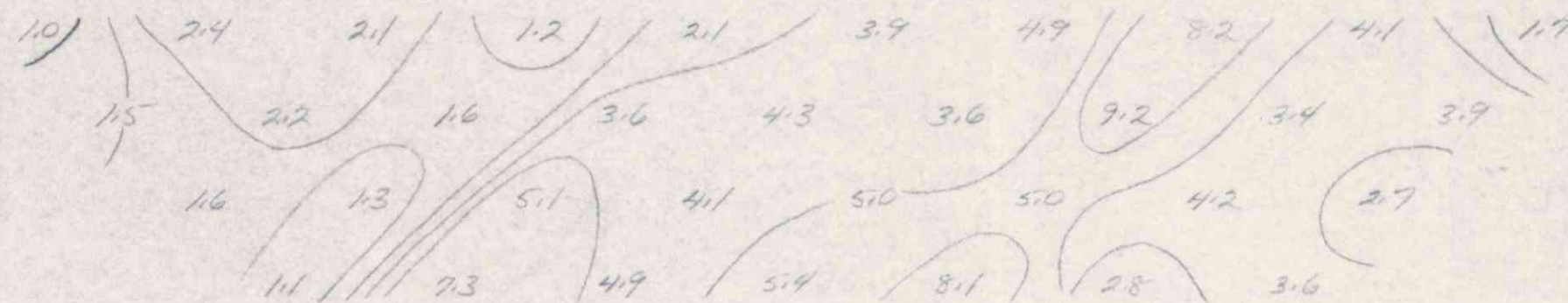
Handwritten signature/initials

(6MM-FT)

A/S SULFIDMAL
FALCONBRIDGE NIKKELVERK A/S
KLEPPTJERN GRID
IVELAND TOWNSHIP, NORWAY
H.I.P. D-D
0.345 CPS
1" = 50 METRES
FEB 24, 1970
A.K. WOOD-OP

(21)

300S 250S 200S 150S 100S 50S 0 0 50N 100N 150N 200N 250N 300N



N=1

N=2

N=3

N=4

M.F.

300S 150S 0 0 150N 300N



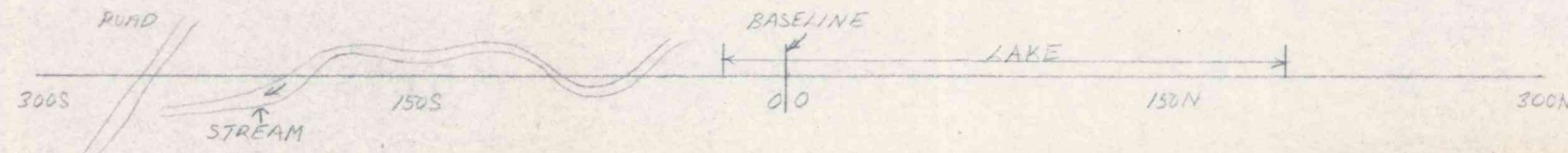
N=1

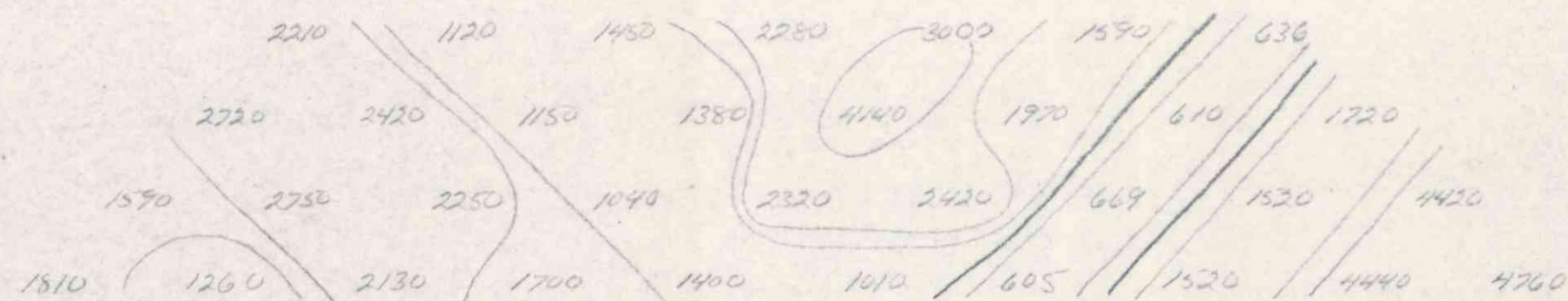
N=2

N=3

N=4

F.E.





N=4

N=3

N=2

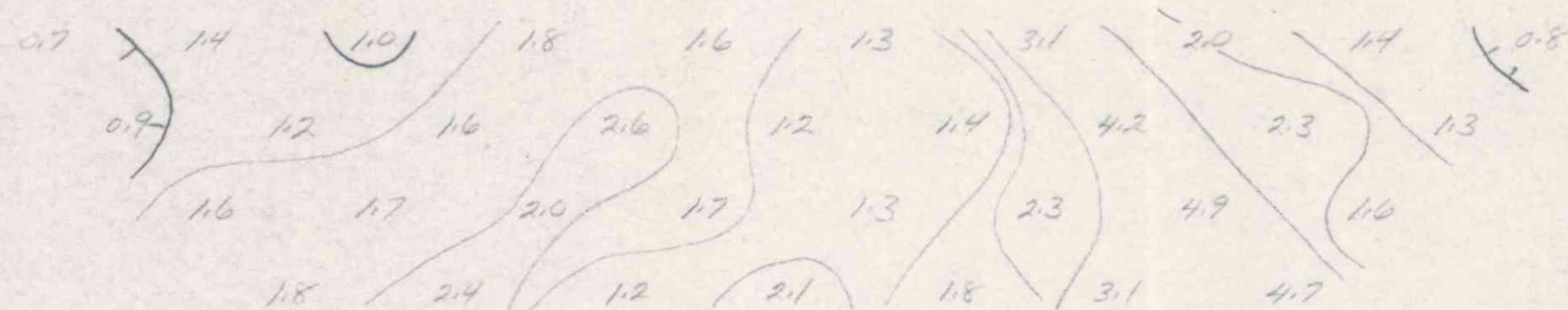
N=1

(OHM-FT)

ALS SULFIDMAL
FALCONBRIDGE NIKKELVERK ALS
KLEPP TJERN GRID
IVELAND TOWNSHIP, NORWAY
H.P.T.P. D-D
0.345 CPS
1"=50 METRES
FEB, 24, 1970
A.K. WOOD-017

22

300S 250S 200S 150S 100S 50S 0 0 50N 100N 150N 200N 250N 300N



N=1

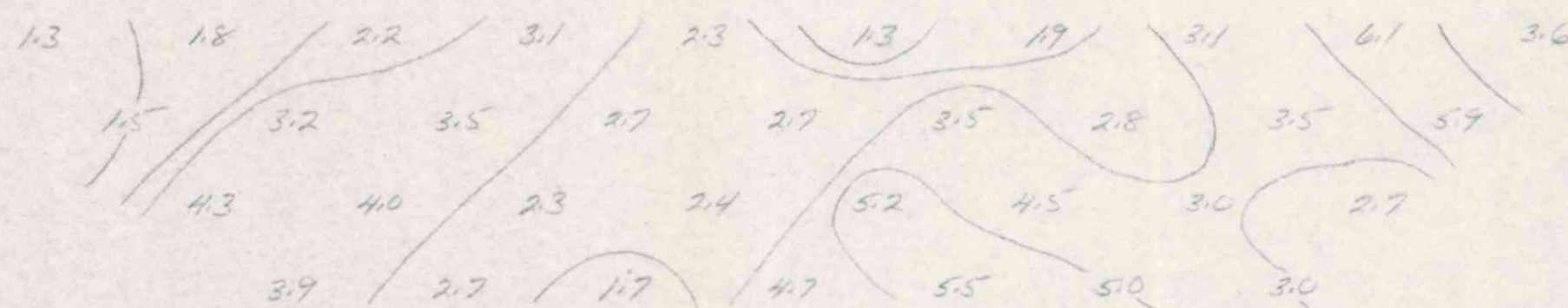
M.F.

N=2

N=3

N=4

300S 150S 0 0 150N 300N



N=1

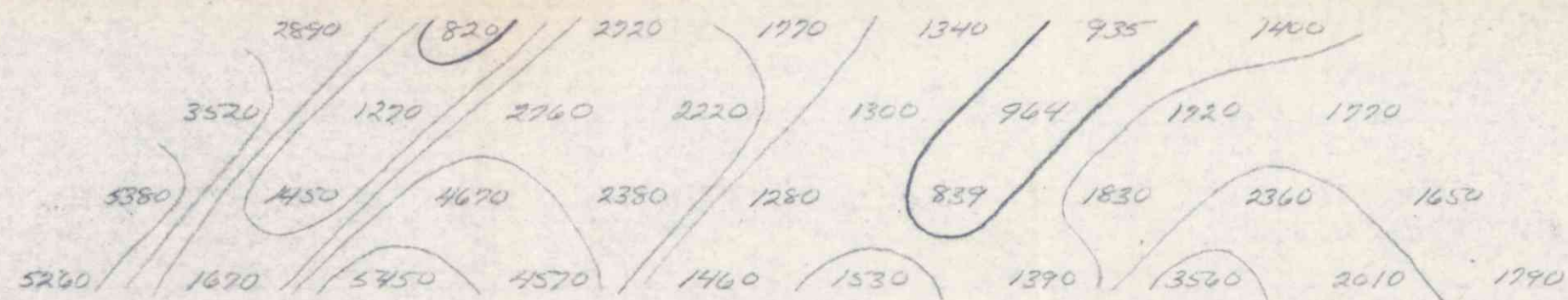
F.E.

N=2

N=3

N=4





N=4

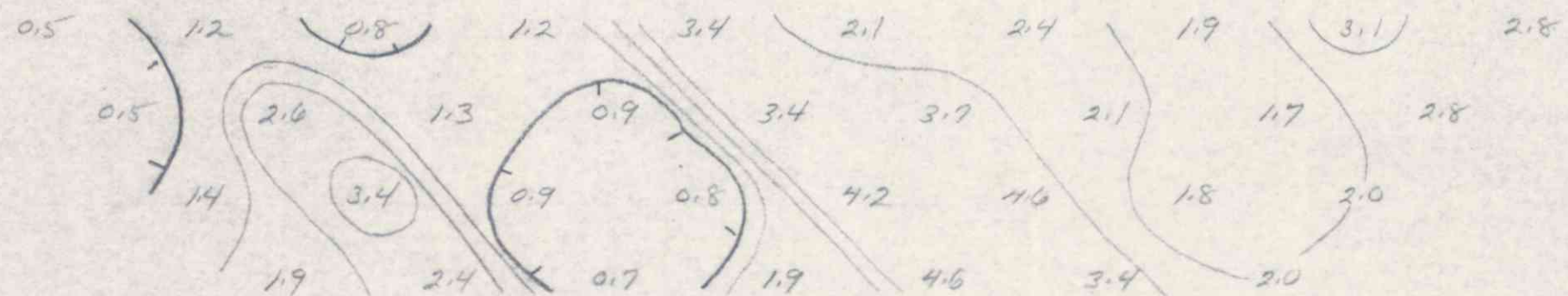
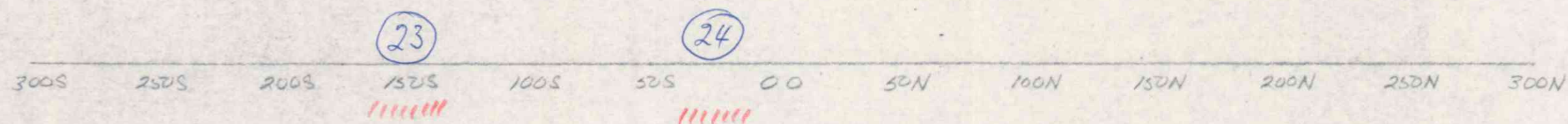
N=3

N=2

N=1

(OHM-FT)

A/S SULFIDMAL
FALCONBRIDGE NIKKELVERK A/S
KLEPPSTERN, EAST GRID
IVELAND TOWNSHIP, NORWAY
H.P.I.P.D-D
0.3 + 5 cps
1" = 50 METRES
MARCH 9, 1971
A.K. WOOD - OP



N=1

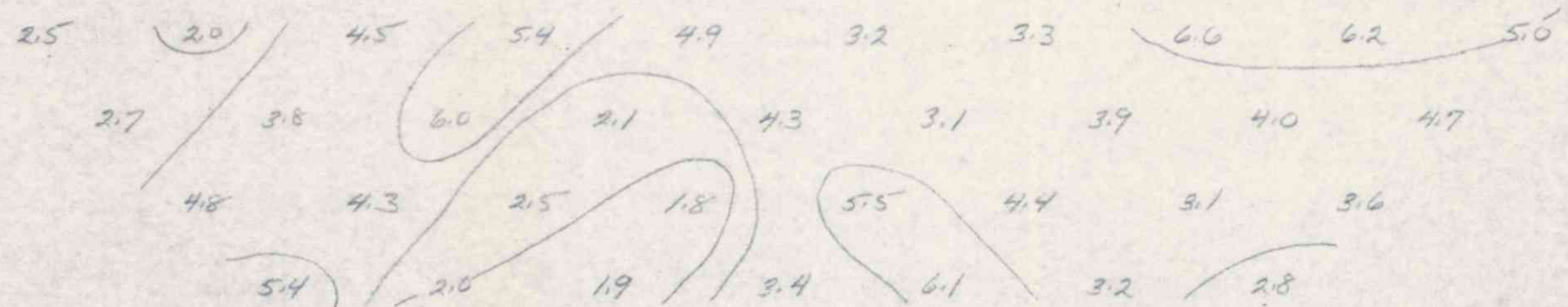
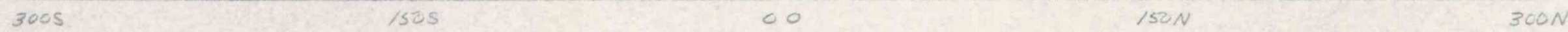
M.F.

LINE 0+00

N=2

N=3

N=4



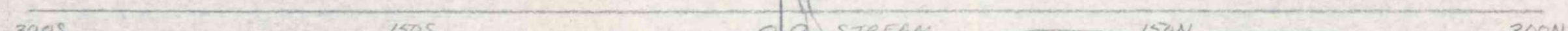
N=1

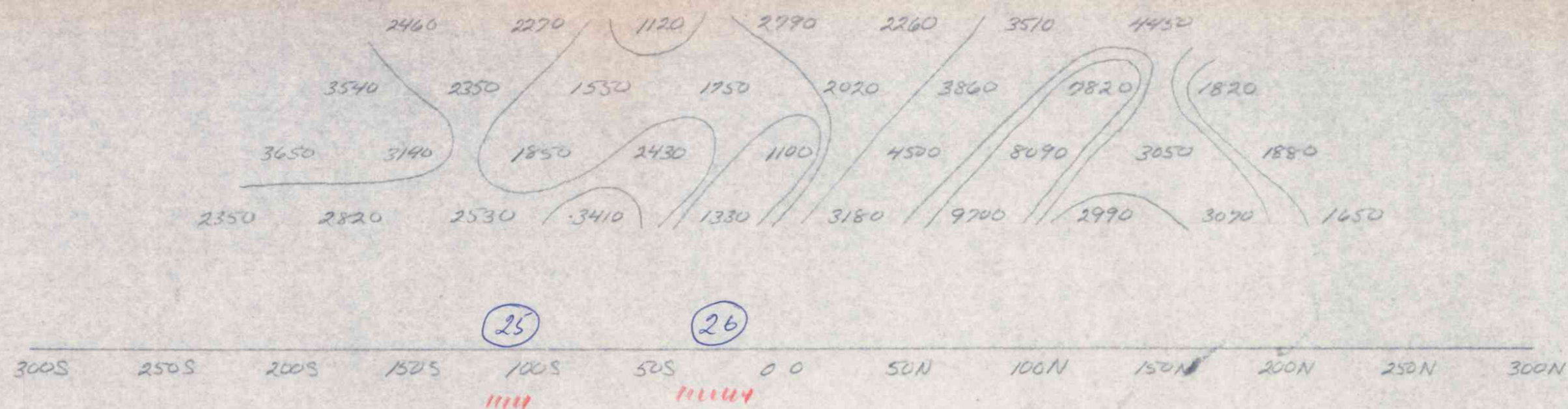
F.E.

N=2

N=3

N=4





N=4

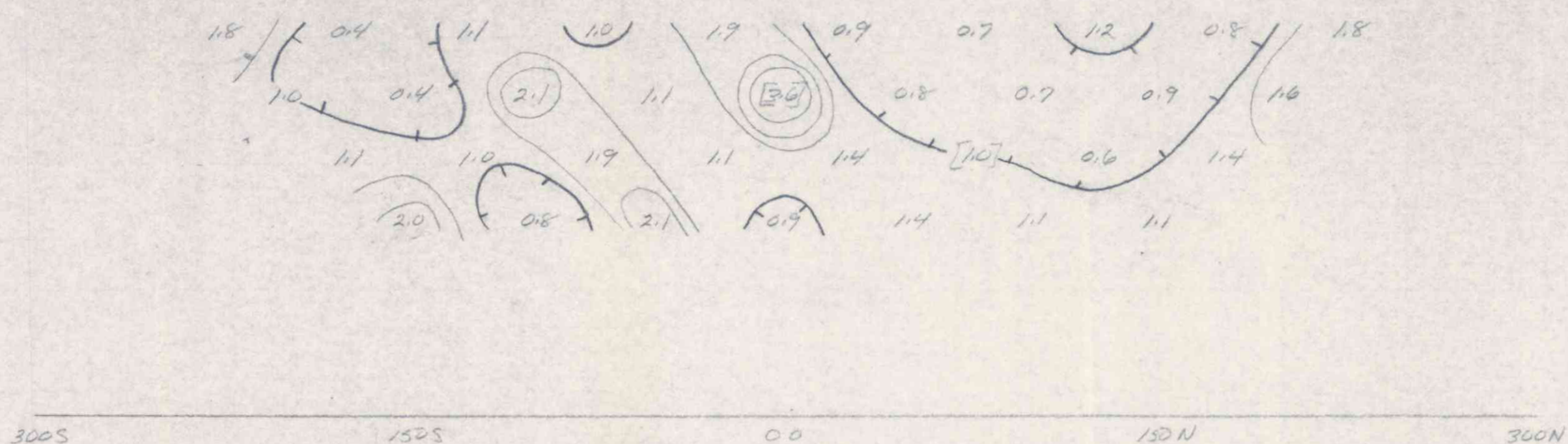
N=3

N=2

N=1

(10MM-FT)

ALS SUAFIDMAK
FALCONBRIDGE NIKKELVERKAS
KLEPP TJERN EAST GRID
IVELAND TOWNSHIP, NORWAY
H.P.I. P.D.-D
0.345 CPS
1" = 50 METRES
MARCH 8, 1971
A.K. WOOD - OP



N=1

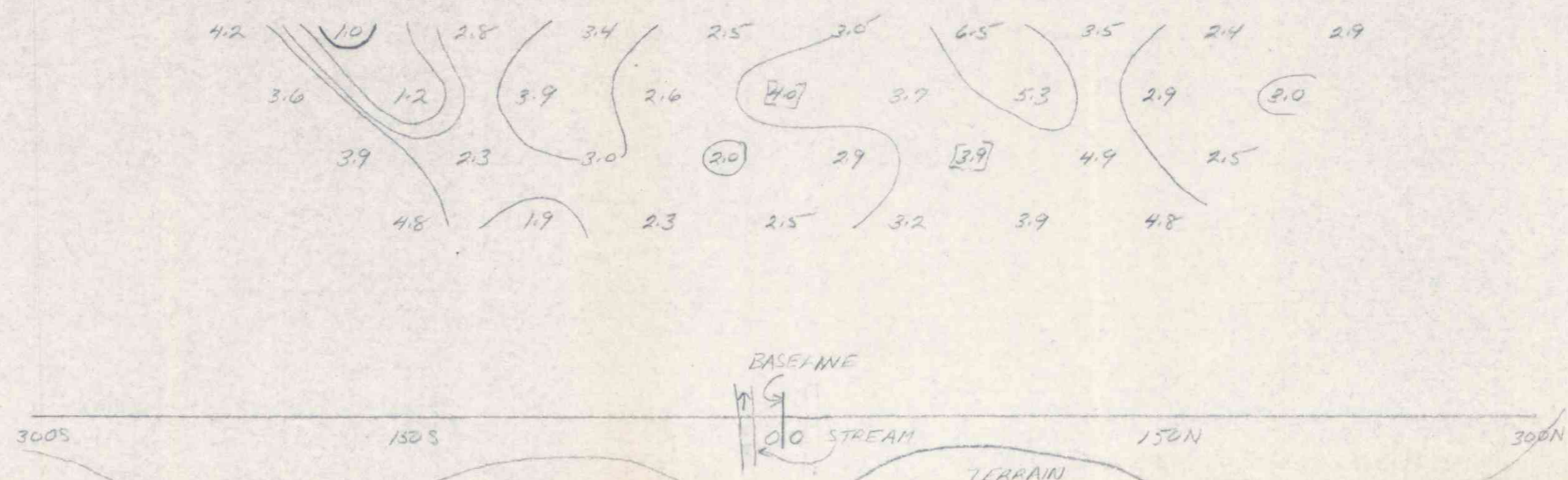
N=2

N=3

N=4

M.F.

LINE 100 E.



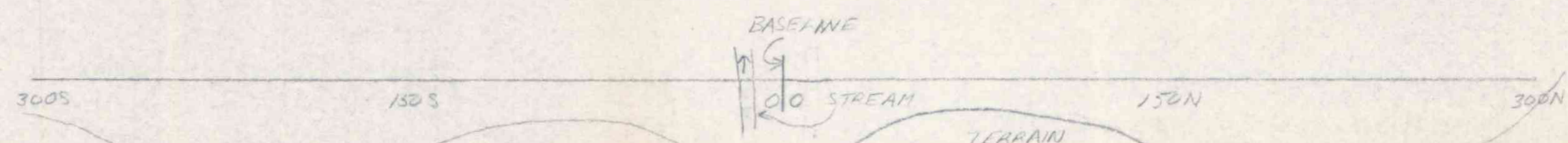
N=1

N=2

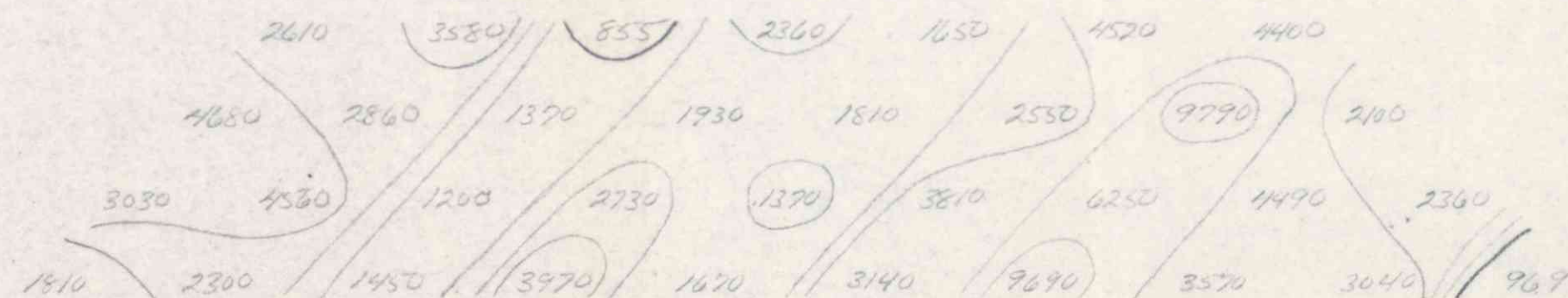
N=3

N=4

F.E.



A/S SULFIDMAL
 FALCONBRIDGE NIKKELVERK A/S
 KLEPPTJERN EAST GRID
 IVELAND TOWNSHIP, NORWAY
 H.P.I.P. D-D
 0.345 CPS
 1" = 50 METRES
 MARCH 6, 1971
 A.K. WOOD - O.P.



N=4

N=3

N=2

N=1

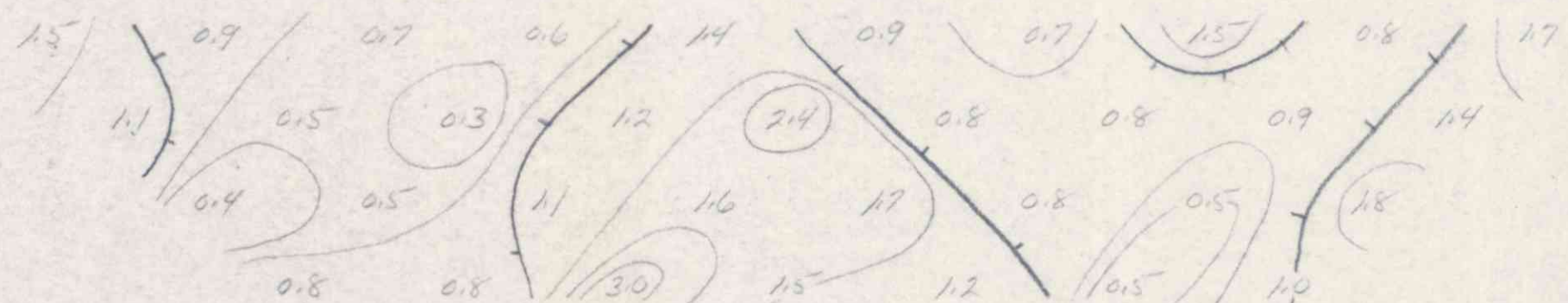
2/4
 1/2

(CHM-FT)

27

300S 250S 200S 150S 100S 50S 0 0 50N 100N 150N 200N 250N 300N

|||||



N=1

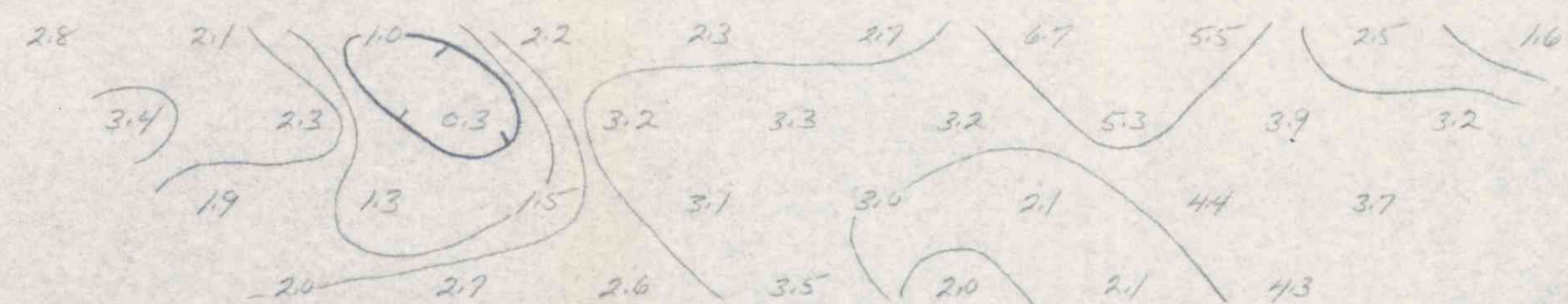
M.F.

N=2

N=3

N=4

300S 150S 0 0 150N 300N



N=1

F.E.

N=2

N=3

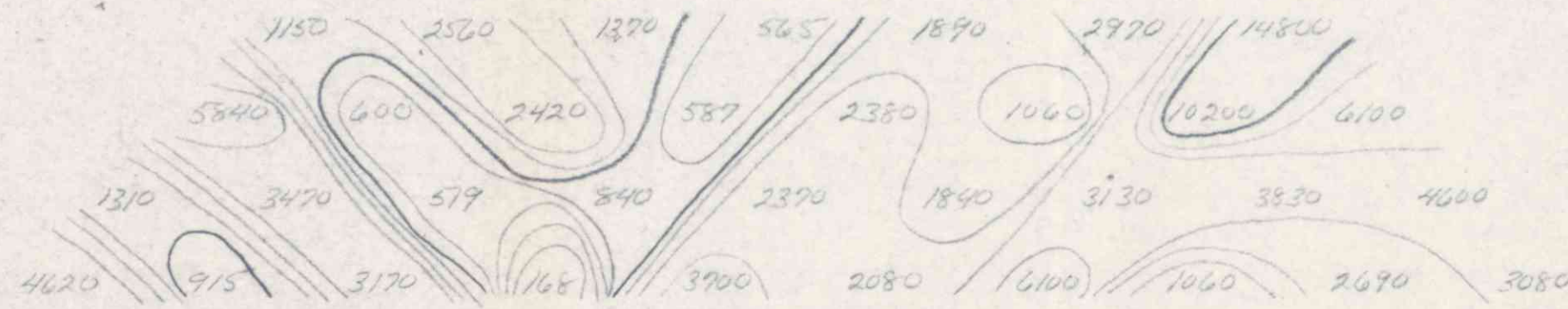
N=4

BASELINE

STREAM

TERRAIN

300S 150S 0 0 150N 300N



N=4
N=3
N=2
N=1

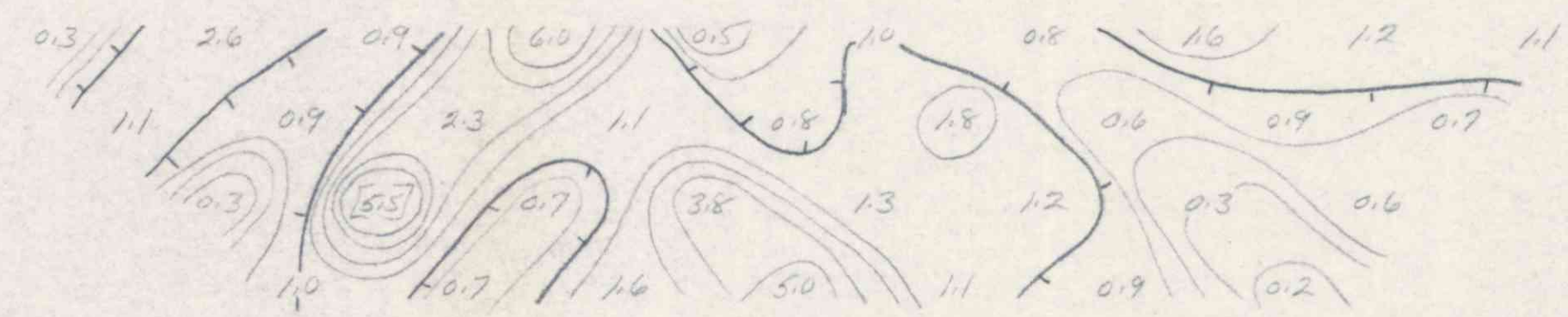
ATI
(OHM-FT)

A/S SULFIDHAL
FALCONERIDGE NIKKELVERK A/S
KLEPPTJERN EAST GRID
JVELAND TOWNSHIP, NORWAY
H.P.I. P.D.-D
0.3 45 CPS
1" = 50 METRES
MARCH 6, 1971
A.K. WOOD-OP

28

300S 250S 200S 150S 100S 50S 0 0 50N 100N 150N 200N 250N 300N

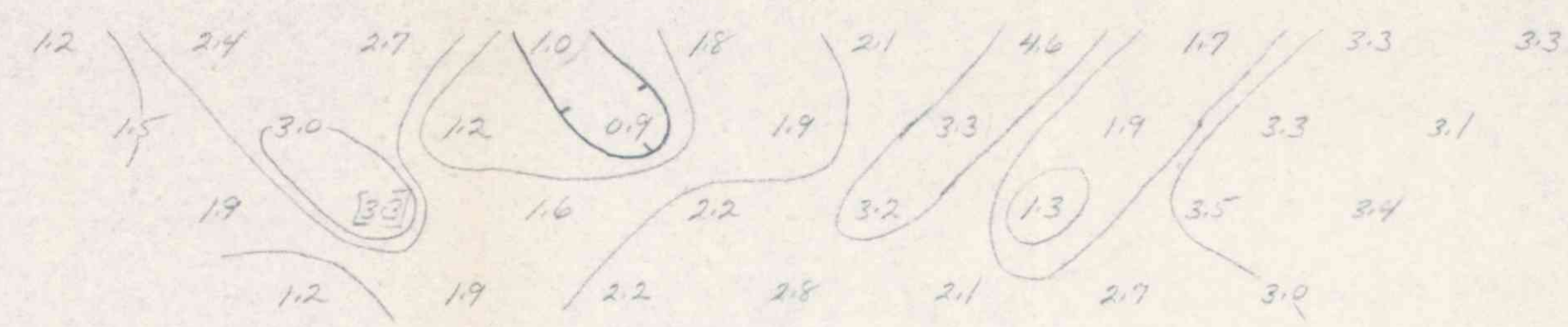
|||||



N=1
N=2
N=3
N=4

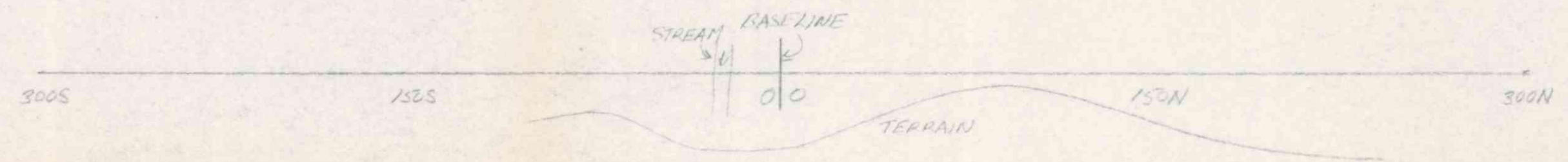
M.F

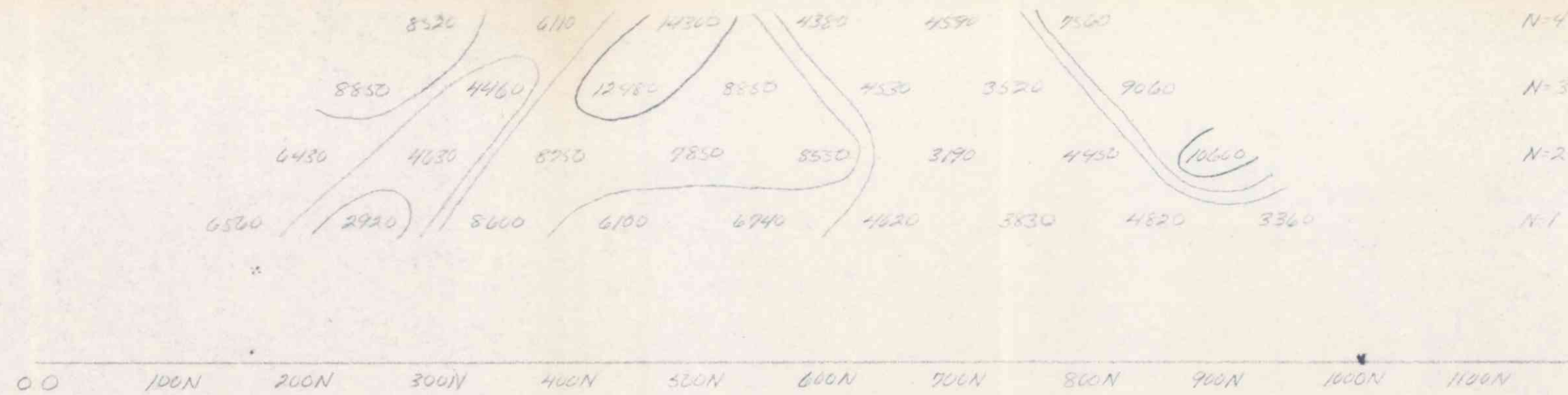
300S 150S 0 0 150N 300N



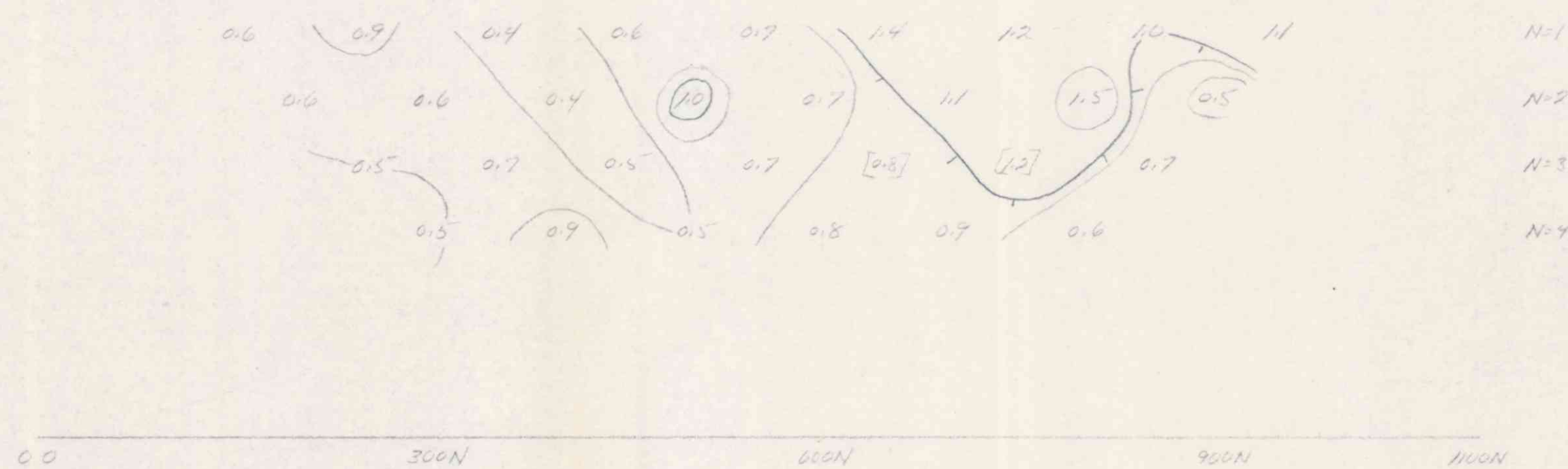
N=1
N=2
N=3
N=4

F.E



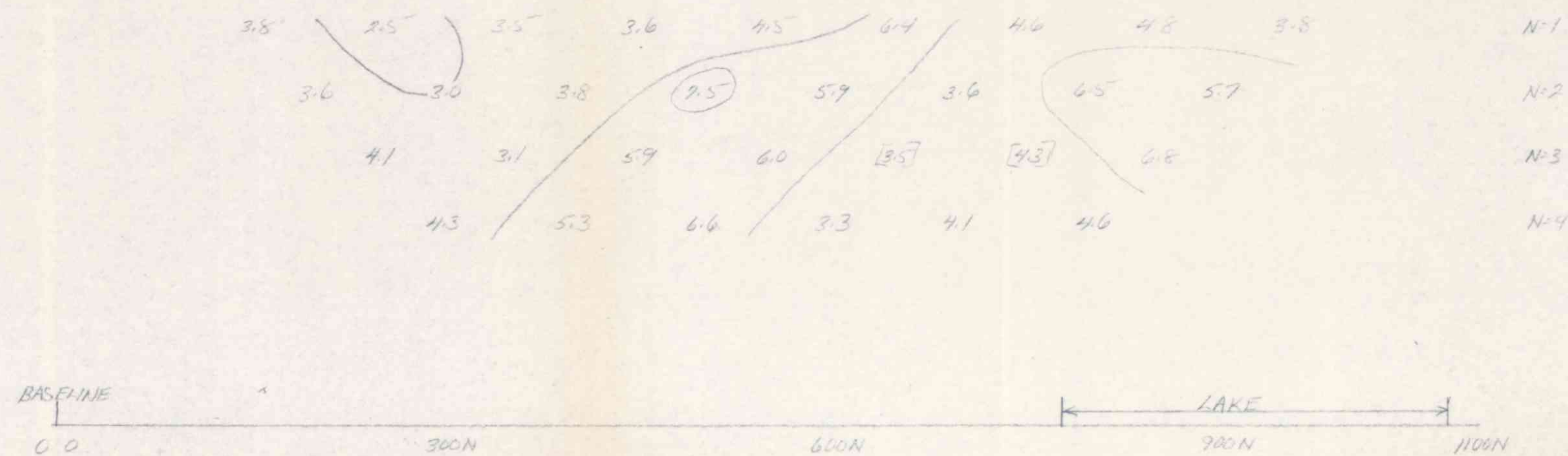


N/S SULFIDMALM
FALCONBRIDGE NIKKELVERK A/S
KLEPPFJERN EAST GRID
JVELAND TOWNSHIP, NORWAY
H.P.J.P.D.-D
0.345CPS
1" = 100 METRES
MARCH 26, 1971.
A.K. WOOD - O.P.



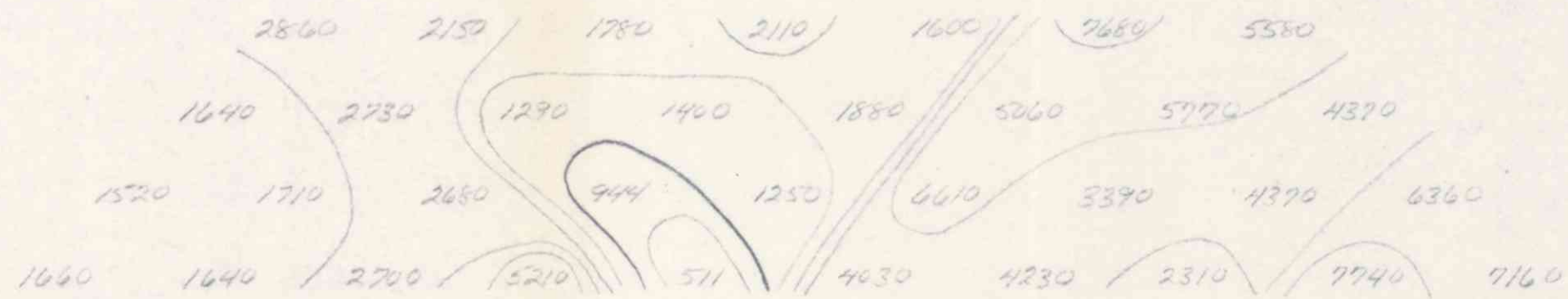
LINE 300E

NOTE
[] - INDICATES NOISY READING



BASELINE
0.0 300N 600N 900N 1100N

LAKE

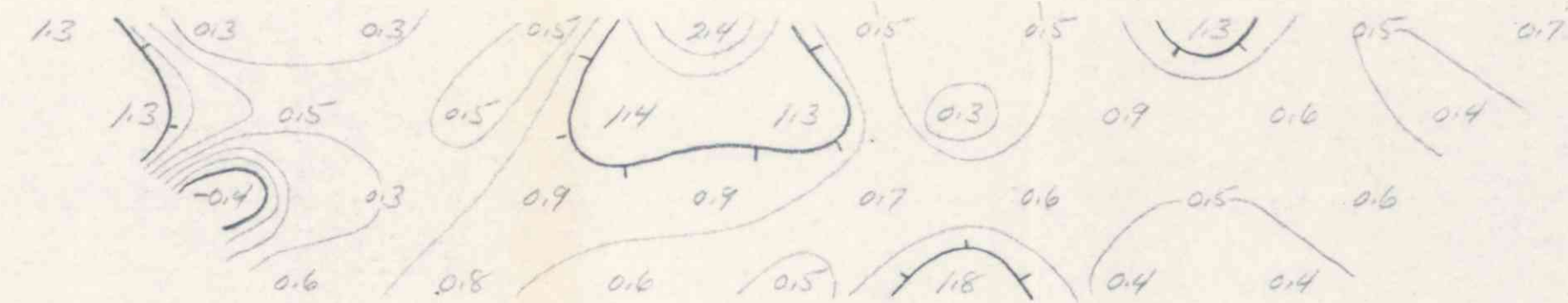


N=4
N=3
N=2
N=1 (OHM-FT)

A/S SULFIDMAL
FALCONBRIDGE NIKKELVERK A/S
KLEPPTJERN EAST GRID
IVELAND TOWNSHIP NORWAY
H.P.I.P.D-D
0.3 45 CPS
1" = 30 METRES
MARCH 5, 1971
A.K. WOOD - O.P.

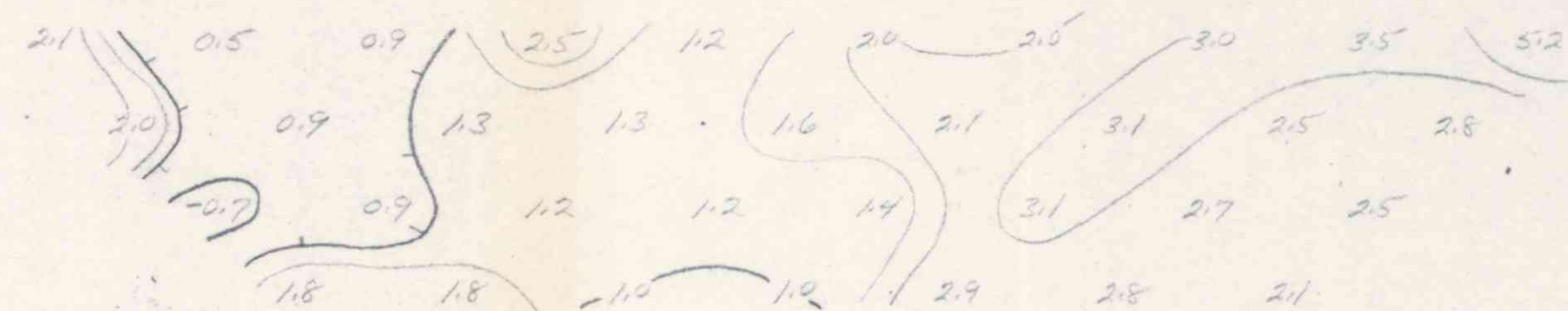
29

300S 250S 200S 150S 100S 50S 0 0 50N 100N 150N 200N 250N 300N

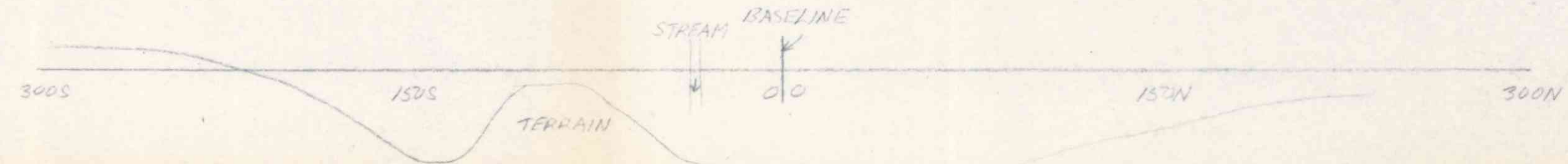


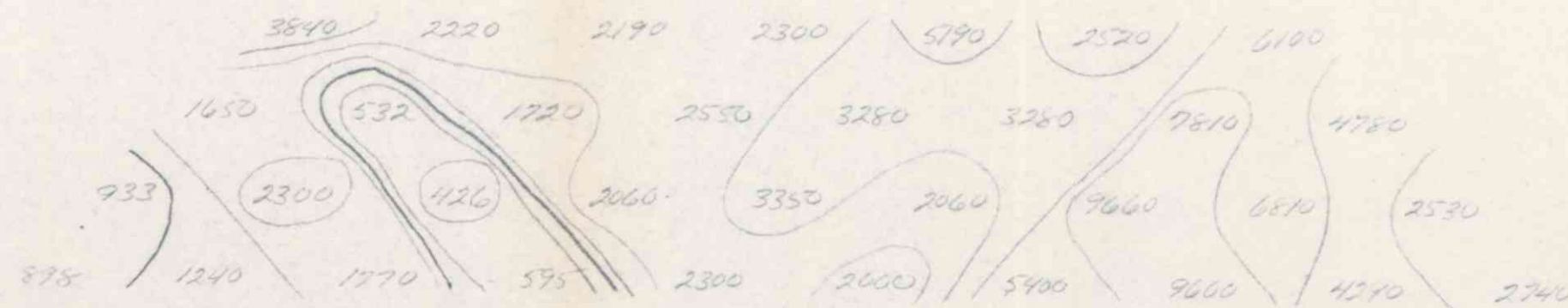
N=1 M.F
N=2
N=3
N=4

300S 150S 0 0 150N 300N



N=1 F.E.
N=2
N=3
N=4





N=4

N=3

N=2

N=1

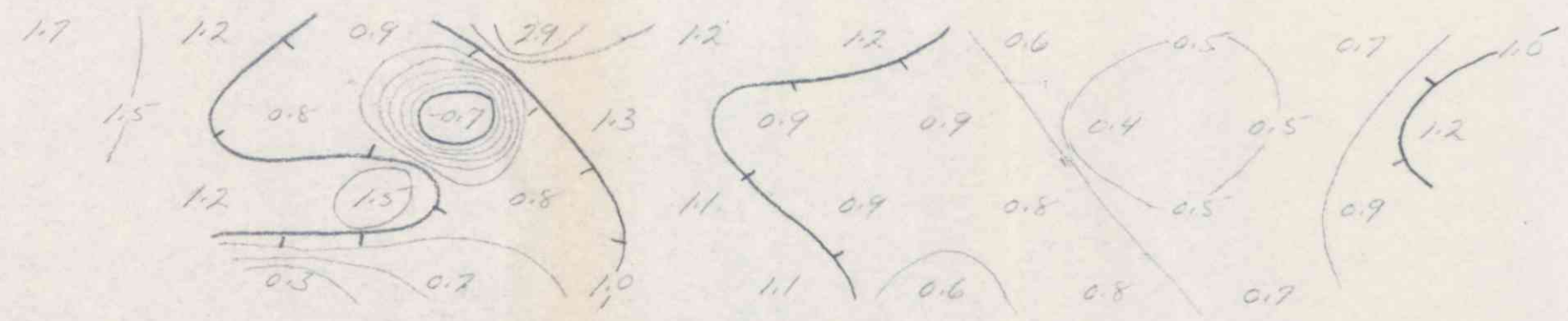
$\frac{P_4}{2T}$

(OHM-FT)

A/S SULFIDMAL
FALCONBRIDGE NIKKELVERK A/S
KLEPP TERN EAST GRID
TVELAND TOWNSHIP, NORWAY
H.P. I.P.D-D
0.13 45 CPS
1" = 50 METRES
MARCH 4, 1971
A.K. WOOD - OP

300S 250S 200S 150S 100S 50S 0 0 50N 100N 150N 200N 250N 300N

LINE 500E



N=1

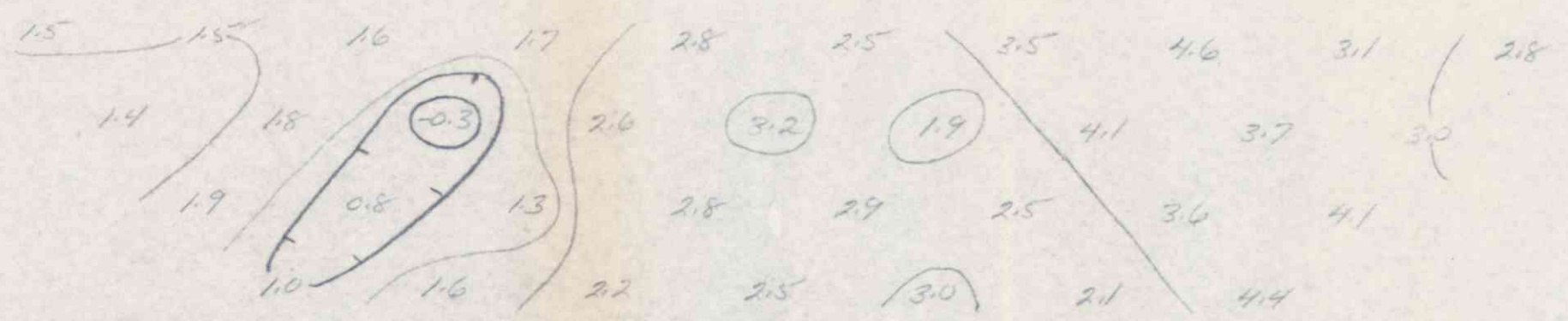
M.F.

N=2

N=3

N=4

300S 150S 0 0 150N 300N



N=1

F.E.

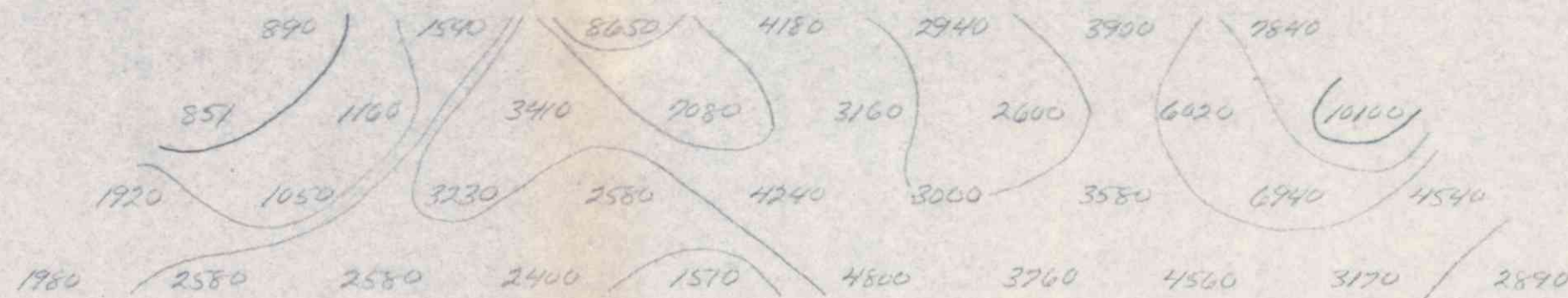
N=2

N=3

N=4

300S 150S 0 0 150N 300N

BASELINE



N=4

N=3

N=2

N=1

1/25

(6MM-FT)

A/S SULFIDMAL
FALCONBRIDGE NIKKELVERK A/S
KLEPPSTERN EAST GRID
IVELAND TOWNSHIP, NORWAY
H.R.T.P.D.-D
0.345 CPS
1"=50 METRES
MARCH 11, 1971
A.K. WOOD-OP

30

300S 250S 200S 150S 100S 50S 0 0 50N 100N 150N 200N 250N 300N

