Bergvesenet

Postboks 3021, 7002 Trondheim

Rapportarkivet

Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
BV 466			Trondheim	**Åpen**
Kommer fra ..arkiv	**Ekstern rapport nr**	**Oversendt fra**	**Fortrolig pga**	**Fortrolig fra dato:**
Falconbridge	Sul 205-72-5	Sulfidmalm A/S		

Tittel

Investigation of the Homse Mine area and the Bjørndalsnipa HEM anomaly, Hå

Forfatter	Dato	Bedrift
R Hovland	1972	Sulfidmalm A/S

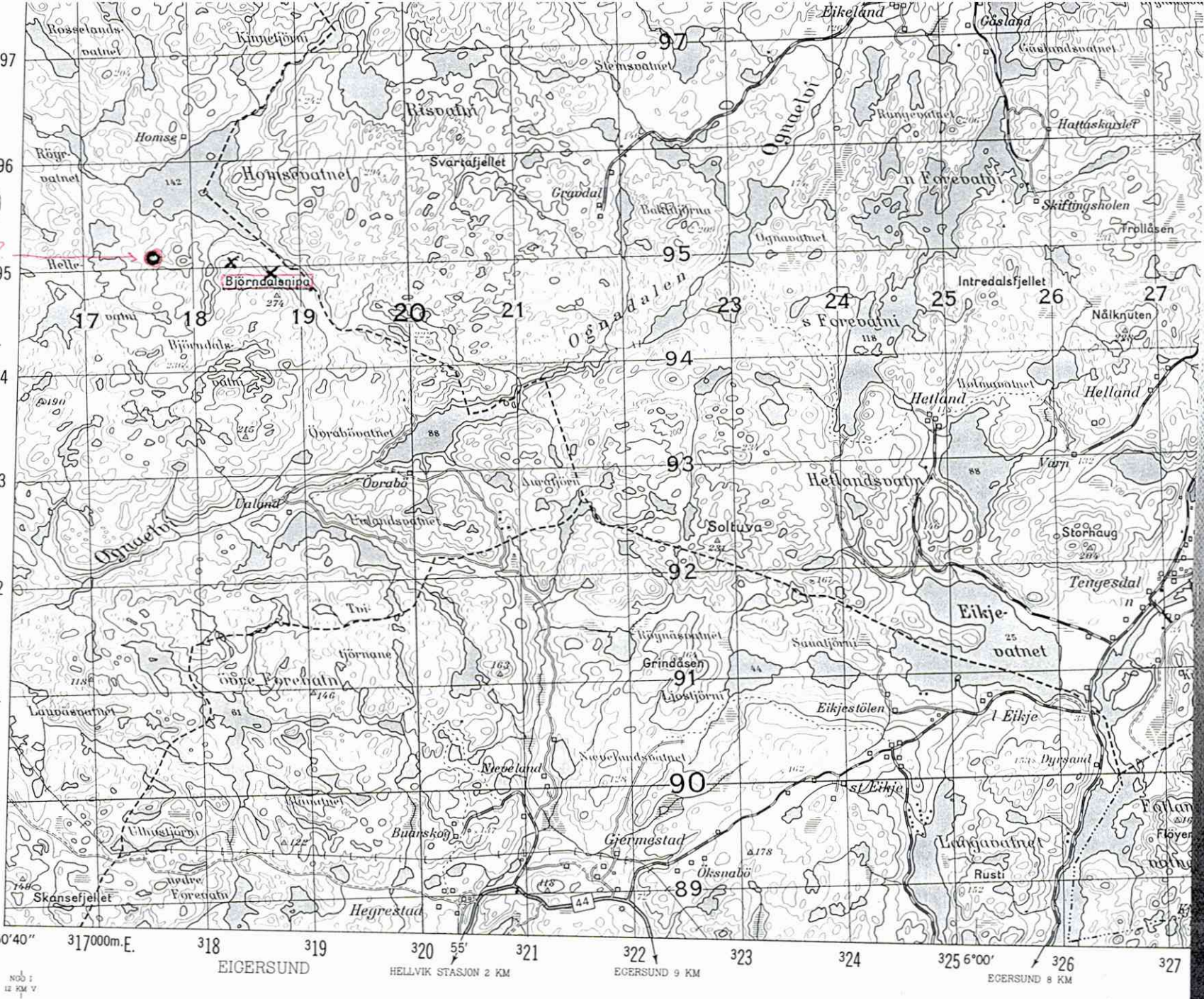
Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Hå	Rogaland	Vestlandske	12122	Stavanger

Fagområde	Dokument type	Forekomster
Geologi geofysikk geokjemi	Rapport	Homse Bjørndalsnipa
Råstofftype	**Emneord**	
Malm/metall	Ni Cu Co	

Sammendrag

Undersøkelser nær Homse gruve som viser snittverdi på berghallprøver på 0,89% Ni og 0,35% Cu. Skjerp 1 viser 0,41% Ni og 6,0% Cu.

En 160m lang geokjemisk og geofysisk annomali med en forventet mineralisering med 1-3% Cu og noe Ni. Nikkelmineralene pentlanditt og Bravoitt opptrer som fri korn i sprekker i magnetkis..



Homse gruve ?

Kartblad Bjerkreim
1212-2

Vedlegg febr. 1991.

Flyfotografert 1955. Synfart 1957. Utgitt av Norges geografiske oppmåling 1967. Ajourført 1972.
Compiled by AMS from air photography dated 1955. Field checked by NGO 1957.
Horizontal and vertical control and names data furnished by NGO.
Reproduced by AMS. Published 1967. Up-dated 1972.

M711
Edition 4-NOR

Målestokk, Scal

1 ½ 0 1 2
1000 500 0 1000 2000
1 ½ 0 1

A/S SULFIDMALM

INTER-OFFICE MEMORANDUM

Mottatt 26 JAN 1973

Date: 24th January, 1973

To: Falconbridge Nikkelverk A/S

cc: A. M. Clarke, D. R. Loohhead, R. Hovland

From: J. B. Gammon

Subject:

205-5, Bjørndalsnipa anomaly, Homse Area. (Report No. 205-72-5).

Please find attached Hovland's report on geology, geophysics and geochemistry over the Bjørndalsnipa HEM anomaly near Homse. We are approaching completion of our agreement with the Sydvaranger Company to jointly test this target with a limited drill programme early in 1973.

J. B. Gammon

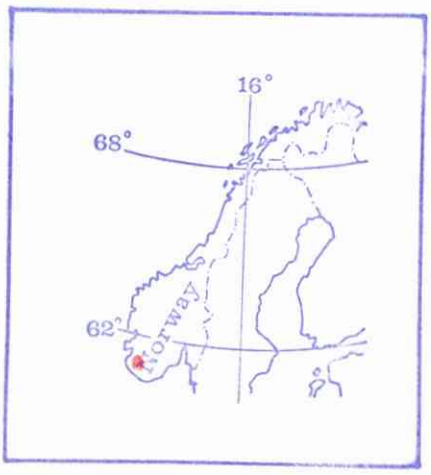
FOR FALCONBRIDGE NIKKELVERK A/S

A/S SULFIDMALM

PROJECT 905-05

INVESTIGATION OF THE HOMSE MINE AREA AND THE BJØRNDALSNIPA HEM ANOMALY, HÅ, NORWAY, 1972.

R. HOVLAND



INTRUDUCTION.

This report presents the results of the geological, geochemical and geophysical work done in the area around Homse mine and in the Bjørndalsnipa grid, 600 m E of the mine. The following maps are attached:

205-72-5-01		Geological sketch map, Homse mine.
"	02	Geological sketch map, Bjørndalsnipa grid.
"	03	Soil geochemistry (Ni) Bjørndalsnipa grid.
"	04	Soil geochemistry (Cu) Bjørndalsnipa grid.
"	05	Magnetic anomalies, soil geochemistry Homse mine.
"	06	Magnetic anomalies, soil geochemistry Bjørndalsnipa grid.
"	07	EM anomalies V.L.F. real comp.
"	08	EM anomalies V.L.F. imaginary comp.
"	09	EM anomalies V.L.F. (Frazer contoured, real comp.)
"	10	EM anomalies V.L.F. (Frazer contoured, imaginary comp.)
"	11	EM anomalies (Slingram, real comp.)
"	12	EM anomalies (Slingram, imaginary comp.)
"	13	Profiles of the observed geophysical values.

LOCATION.

Homse mine and Bjørndalsnipa grid are located on the Bjerkreim 1:50.000 topographic mapsheet 1212 II, between the Helle lake and the Homse lake in the district of Hå. The distanse to Brusand station, on the railroad from Egersund to Stavanger, is 7 km. The distanse to the nearest harbour at Sirevåg is also 7 km (air line).

Accessibility is good. A well maintained track stops approximately 1 km from the mine, and a track leads directly to the mine and to the Bjørndalsnipa grid.

TOPOGRAPHY.

The area is one of low outcrop hills and generally swampy valleys. Maximum relief is 275 m. The area is treeless, being covered only by low bushes and grass.

PREVIOUS WORK.

The Homse mine was opened around 1870. The production period lasted only a couple of years, and the total production was about 1000 t. Since then there has been little activity in this region until 1970 when A/S Vigsnes Kobberverk did an airborne geophysical survey (helicopter) over a small area around the mine (5 km^2). By this survey, a new and interesting E.M. and mag. anomaly was found near Bjørndalsnipa. This anomaly has been the main target for the ground work this year.

GEOLOGY.

The area lays within a Precambrian anorthosite/norite province, of about 1000 square kilometers size. The rocks present in our area are solely anorthosite and related phases. The grain size varies from fine to very coarse grained, and the texture from massive to layered. In the area around the showings, one often finds a more coarsely crystalline phase of the anorthosite where large knots or segregations of hypersthene, ilmenite and plagioclase are present. The map 205-72-5-01 shows the geology in the Homse mine area. The showings no. 1 and no. 2 have disseminated and vein filling pyrrhotite and chalcopyrite. Showing no. 1 appears to be particularly rich in copper. (Assay shows 0.41% Ni - 6.0% Cu). Homse mine has sulphides, mainly pyrrhotite, in what appears to be a breccia. Material from the dump shows massive pyrrhotite with chalcopyrite.

Assays from the dump material gave the following results (A/S Vigsnes Kobberverk):

Sample 1 : 0.95% Ni, 0.10% Cu
" 2 : 0.90% Ni, 0.34% Cu
" 3 : 0.82% Ni, 1.14% Cu
Average : 0.89% Ni, 0.53% Cu

(A/S Sulfidmalm 1964):

Sample 1 : 0.95% Ni, 1.30% Cu, 0.12% Co, 57.3% Fe, 37.2% S.

Polished sections from the Homse deposit show the following ore minerals:

Bravoite
Marcasite
Pentlandite
Chalcopyrite
Pyrite
Pyrrhotite
Limonite
Ilmenite
Magnetite.

Pentlandite occurs sometimes as small inclusions of parallel lenses within the pyrrhotite. The most commen occurance is as larger grains in aggregates partly altered to bravoite along or near joints and fractures in the pyrrhotite. The joints and fractures are often filled with chalcopyrite.

Map no. 205-72-5-02 shows the general geology in Bjørndalsnipa grid. The geology is similar to that in the Homse mine area. There are three small areas of rusty outcrop, all of which contain sulphides. The sulphides are pyrite, pyrrhotite and chalcopyrite.

Homse mine and all the showings occur in close connection to fault-zones.

WORK CARRIED OUT.

Geological mapping was done in the Homse mine-area and in the anomaly-area near Bjørndalsnipa (Bjørndalsnipa grid).

Three profiles of soil samples were taken in Bjørndalsnipa grid. Profile spacing was 80 m, and the sample spacing along the profile was 25 m. A profile with soil samples was also taken over the Homse mine. The total number of samples was 95.

The Bjørndalsnipa grid was covered by V.L.F.-E.M. and magnetic surveys. Later a part of the grid was covered by ABEM-gun (Slingram) at high frequency 1760 Hz and a coil-seperation of 60 m. Some V.L.F.-E.M. and mag. profiles were run over the Homse mine.

A Geonics V.L.F.-E.M. 16 was used for the V.L.F.-measurements and the transmitter station was Rugby (G.B.R.). For the magnetic survey a Mc Phar M 700 Fluxgate magnetometer was used. Profile spacing was 40 m, and observations were made at every 10 m. R. Hovland, together with A. Little and C. Bow, carried out the work in this area during the month of June 1972.

TREATMENT OF DATA.

The geochemical data from Bjørndalsnipa are presented in two maps, 205-72-5-03 (Ni) and 205-72-5-04 (Cu). Results of the soil-sampling over the Homse mine are shown together with the geophysical data on map 205-72-5-05.

The magnetic data from Bjørndalsnipa grid is presented as an isoanomaly map, 205-72-5-06. The V.L.F. data is presented on four map sheets, two showing the data contoured (real component and imaginary component), the other two showing the data contoured after the Frazer method. (205-72-5-07-10). The data from the Slingram measurements is shown contoured in the maps 205-72-5-11 and 205-72-5-12 (real component and imaginary component).

Some of the geophysical data are also presented in profiles. (205-72-5-13).

DISCUSSION OF RESULTS.

At Homse mine, the ore mineralization gives an obvious magnetic anomaly. One has probably two separate zones of mineralization, both with a NE strike and a dip towards the SE. The anomaly zone has only been followed for 40 m along the strike, but is open at both ends.

The geochemical profile, which was run over Homse mine shows large Cu-anomalies but small Ni-anomalies. The small Ni-values are surprising, because the profile touched the mine dump where one has about 1% Ni in the material. The pyrrhotite, in this mineralization, must be very resistant against weathering.

In Bjørndalsnipa grid, the geochemical maps show slightly higher values in the central area of the grid, where the airborne anomaly also is located. In the northern part of the grid, one has two small anomaly zones which seem to correspond with observed geophysical ground anomalies.

The magnetic anomaly map shows several anomalies which could be caused by different zones of mineralization. The ore minerals which cause the magnetic anomalies are magnetite and to a lesser degree pyrrhotite and ilmenite.

The magnetic anomalies indicate that the mineralized zones have a NE strike. The dip-directions of the separate zone is difficult to determine because of the influence of the other magnetic zones. The magnetic values are lower in this grid than around Homse mine. A possible explanation is that in Bjørndalsnipa grid, the mineralized bodies are believed to lay 10-15 m under the surface (Terratest helicopter survey report), while at Homse mine, the ore-mineralization can be seen on the surface.

The form of the magnetic intensity profiles also indicates a certain depth to the magnetic source.

Because of the large difference in electrical conductivity between magnetite (ilmenite) and pyrrhotite (chalcopyrite), an E.M. survey can be used to evaluate the different magnetic anomaly zones. A magnetic anomaly with a high electrical conductivity is thought to be significant, containing mainly pyrrhotite (chalcopyrite), while a magnetic anomaly

with little or no electrical conductivity is thought to be worthless, containing only magnetite (ilmenite) mineralization.

In Bjørndalsnipa grid, the magnetic anomalies in the central and northern part were accompanied by E.M. anomalies. In the southern part of the grid, where one has a nearly constant high magnetic level, only one restricted E.M.-anomaly was found. This indicates that the best chance to find pyrrhotite (assosiated with pentlandite and chalcopyrite) is in the central and northern part of the grid. The high magnetic level in the southern part can be caused by a small magnetite/ilmenite impregnation in the bedrocks.

The E.M. survey gives us five main conductors (A, B, C, D, E, on the profiles). By the V.L.F. measurements two of them (A, B,) behave like one, but the Slingram and the mag. measurements indicate that we here have two conductors. On the profiles, the V.L.F. anomaly peak lays between the two peaks of the Slingram and mag. measurements. The conductors (A, B) are the only conductors picked up by the airborne E.M.-survey in this area, and the ground survey shows also the highest anomaly values over these conductors. Therefore, they are regarded as the most significant in the area.

The anomaly caused by these two conductors seems to stop against a fault towards the east but continues out of the surveyed area to the west. The weakening of the anomaly towards the west can be explained by the topography. The terrain is raising in this direction, and the distance to the source of the anomaly will therefore also increase in the same direction. A plunge of the anomaly source towards the west could also be a contributing factor.

On the V.L.F. and mag. anomaly maps it looks like the mentioned conductors (A, B,) can have a continuation on the other side of the fault. The reason that the Slingram has not picked it up, could be that these conductors lay in a deeper level on the eastern side of the fault.

The other conductors are thought to be of secondary interest, even if the ratio between the real and imaginary component indicates that they have an excellent electrical conductivity.

../7

CONCLUSIONS.

In the prospected area, the Bjørndalsnipa grid is the most interesting. Here we have zones that have given geochemical, mag. and E.M. anomalies. The strongest of these zones can be followed more than 160 m in the strike-direction. From our experience in the area, we have reasons to believe that some of these anomaly zones can be caused by a massive pyrrhotite/chalcopyrite mineralization, containing 1-3% Cu + Ni. Since the pentlandite and bravoite minerals occur as individual grains in the cracks in the pyrrhotite, it is believed that it would be possible to produce a satisfactory Ni/Cu concentrate from this type of mineralization even if the recovery of nickel would be a little low.

RECOMMENDATION.

A diamond drill hole should be put through the conductors A-B around the 80 W - line. If this hole shows an economically interesting mineralization, a detailed program should be planned for the further development of the area.

N

5 ppm

10 ppm

10 ppm

10 ppm

100 N

100 S

0

200

120

40

200 W

120 W

40 W

• 5	Sample point – assay result (ppm)		Sulphidemineralization
	Steep hill		0-5 ppm
			5-10 ppm
	Swamp area		10-15 ppm
			15-20 ppm
	Lake		>20 ppm

SOIL GEOCHEMISTRY NICKEL

HOMSE BJØRNDALSNIPA GRID

% SULFIDMALM

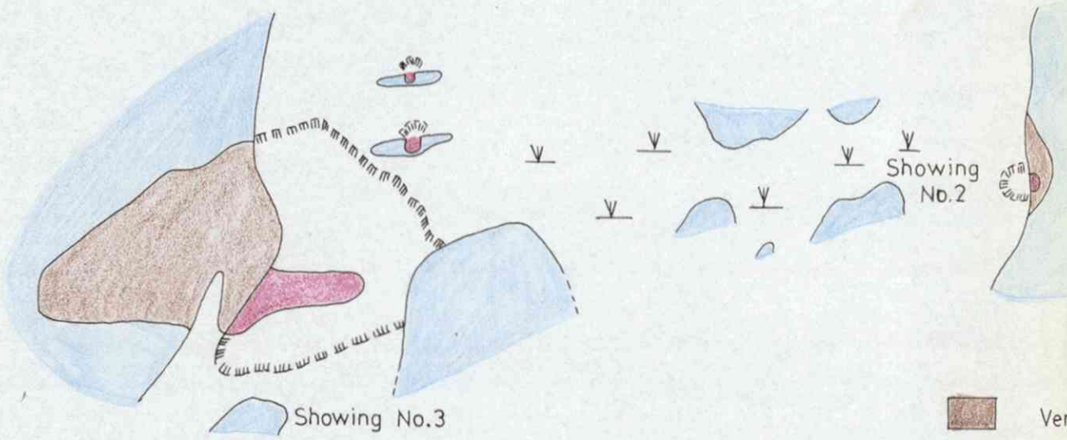
SCALE	OBS.	
1:1000	DRAW. RH	12-72
	TRAC. BL	12-72
	CHK. RH	12-72

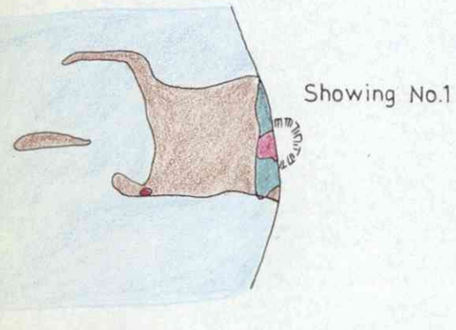
MAP NO.

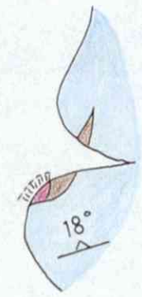
205-72-5-03

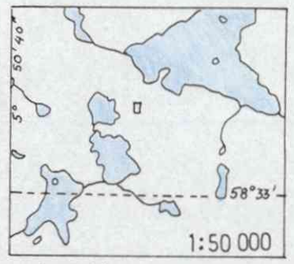
MAP SHEET

M N









Location map

- Very Coarse-Grained Anorthosite with Hornblende and Ilmenite.
- Anorthosite, fine-to medium-grained, usually banded and layered.
- Massive coarse-grained anorthosite.
- Old prospect pits, mines, showings.
- Dump area.
- 18° Attitude of layering.
- Swampy ground.

GEOLOGICAL SKETCH MAP
of
HOMSE MINE AND AREA

SCALE 1: 2000

OBS.		
DRAW. AL	6-72	
TRAC. BL	12-72	
CHK.		

A/S SULFIDMALM

MAP NO. 205-72-5-01

MAP SHEET

A.s Tørrkopi. 1000. A 3. E 9 gl. 10-71. Sentrum Trykkeri.

N

100 N

0

100 S

200 W

120 W

40 W

5 ppm

5 ppm

5 ppm

66

24

•5	Sample point – assay result (ppm)		Sulphidemineralization
	Steep hill		0-5 ppm
	Swamp area		5-10 ppm
	Lake		10-15 ppm
			15-20 ppm
			>20 ppm

SOIL GEOCHEMISTRY COPPER

HOMSE BJØRNDALSNIPA GRID

⅘ **SULFIDMALM**

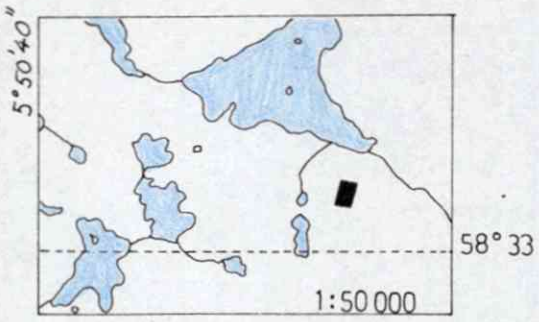
SCALE	OBS.	
1:1000	DRAW. RH	12-72
	TRAC. BL	12-72
	CHK. RH	12-72

MAP NO.

205-72-5-04

MAP SHEET

A.s Terrkopi. 1000. A 3. E 9 gl. 10-71. Sentrum Trykkeri.



Location map

100N

0

100 S

200 W 160 W 120 W 80 W 40 W 0 40 E

15°

Anorthosite, massive, banded, & layered.

Recrystallized Anorthosite

Sulphides &/or Rusty Zones

Swampy Areas

GEOLOGICAL SKETCH MAP OF THE

HOMSE ANOMALI AREA

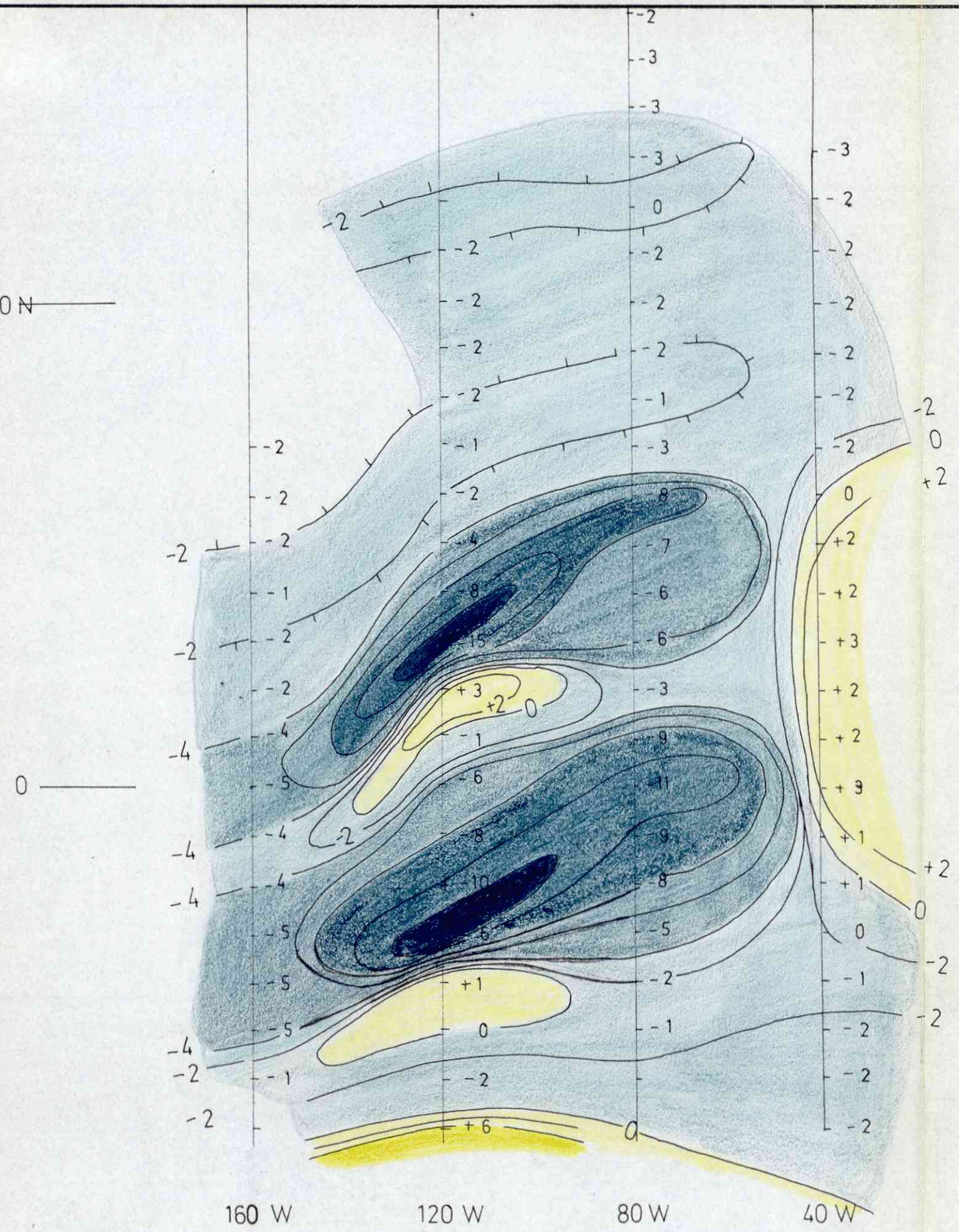
BJØRNDALSNIPA GRID

A/S **SULFIDMALM**

SCALE	OBS.	
1:1000	DRAW. AL	6-72
	TRAC. BL	11-72
	CHK.	

MAP NO. 205-72-5-02

MAP SHEET



100 N

N

0

KEY:

CONTOUR INTERVAL : 2 % deviation from normal component

SUBNORMAL

ABOVENORMAL

ELECTRO MAGNETIC ANOMALIES
SLINGRAM (IMAGINARY COMPONENT)
BJØRNDALSSNIPA GRID – HOMSE

SCALE 1:1000

OBS. RH
DRAW. RH
TRAC. BL
CHK. RH

A/S **SULFIDMALM**

MAP NO. 205-72-5-12

MAP SHEET

A.s Tørrkopi. 1000. A 3. E 9 gl. 10-71. Sentrum Trykkeri.

A.s Terrkopi. 1000. A 3. E 9 gl. 10-71. Sentrum Trykkeri.

200 W

160 W

120 W

80 W

40 W

0

40 E

Major fault
Intervals of 1000 γ
" " 500 γ
" " 250 γ

	0 – ÷250 γ
	÷250 – ÷500 γ
	<500γ –
	0 – 500 γ
	500 – 1000 γ
	1000 – 1500 γ
	1500 – 2000 γ
	>2000γ

MAGNETIC ANOMALIES
HOMSE - BJØRNDALSNIPA GRID

SCALE 1:1000

OBS. CB
DRAW. RH
TRAC. BL
CHK. RH

MAP NO. 205-72-5-06

MAP SHEET

⅛ **SULFIDMALM**

A.s Tørrkopi. 2000. A 2. E 9 gl. 10-71. Sentrum Trykkeri.

PROFILE 40 W

PROFILE 80 W

PROFILE 120 W

PROFILE 160 W

50 % 40 30 20 10 0 ÷10 % ÷20 ÷30 ÷40 ÷50

+2000 γ +1000 γ ÷1000 γ

100 % 90 80 70 60 50 40 30 20 10 -10 % -20 -30 -40 -50

100 N 100 S

A B C D E

KEY:

—o— Magnetic profile
—o— V.LF - EM profile
—x— Slingram - EM profile

PROFILES SHOWING THE OBSERVED GEOPHYSICAL VALUES

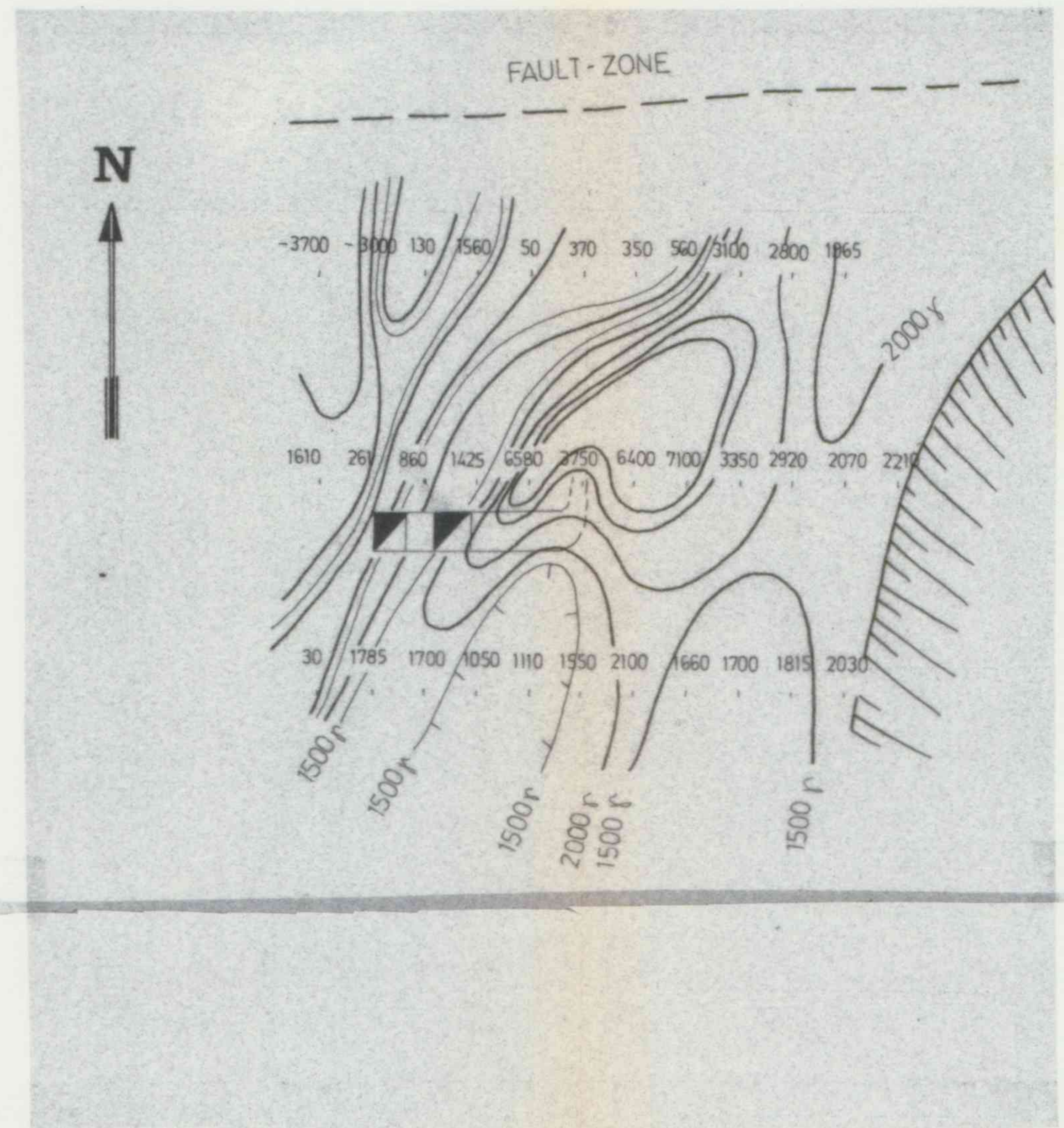
HOMSE - BJØRNDALSSNIPA GRID

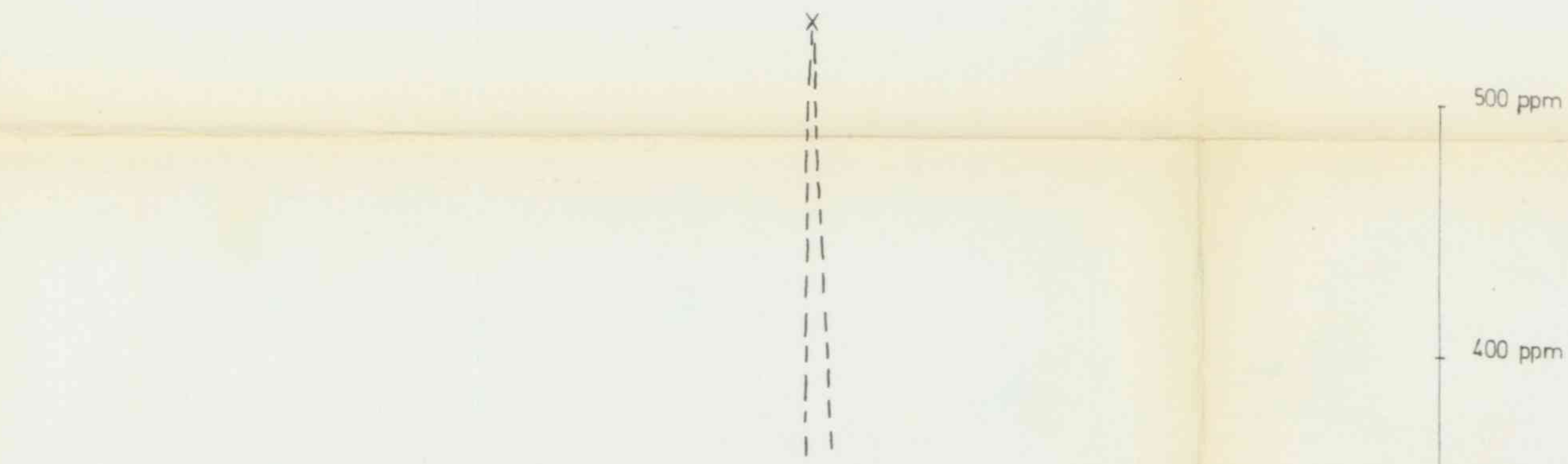
SCALE		
1:1000	OBS. RH	6 - 72
	DRAW. RH	12 - 72
	TRAC. BL	12 - 72
	CHK. RH	12 - 72

A/S **SULFIDMALM**

MAP NO. 205 - 72 - 5 - 13

MAP SHEET





MAGNETIC ANOMALIES SOIL GEOCHEMISTRY (Cu-Ni) HOMSE MINE	SCALE	OBS.	
		DRAW. RH	12-72
		TRAC. BL	12-72
		CHK. RH	12-72
A/S SULFIDMALM	MAP NO. 205-72-5-05		
	MAP SHEET		

A.s Terrkopi. 2000 A 2. E 9 xl. 10-71. Sentrum Trykkeri.

A.s Terrkopi. 1000. A 3. E 9 gl. 10-71. Sentrum Trykkeri.

N

GBR (Rugby)

100 N

100 S

80 W

40 W

40 E

120 W

160 W

200 W

— — Major fault

Contour interval: 5% deviation from normal component (above 20 deviation, the interval is 10%)

0 – ÷20%
÷20 – ÷30%
÷30 – ÷40%
<÷40%
0 – 20%
20 – 30%
30 – 40%
>40%

ELECTRO MAGNETIC ANOMALIES
VLF (GEONICS EM 16)
REAL COMPONENT

HOMSE BJØRNDALSNIPA GRID

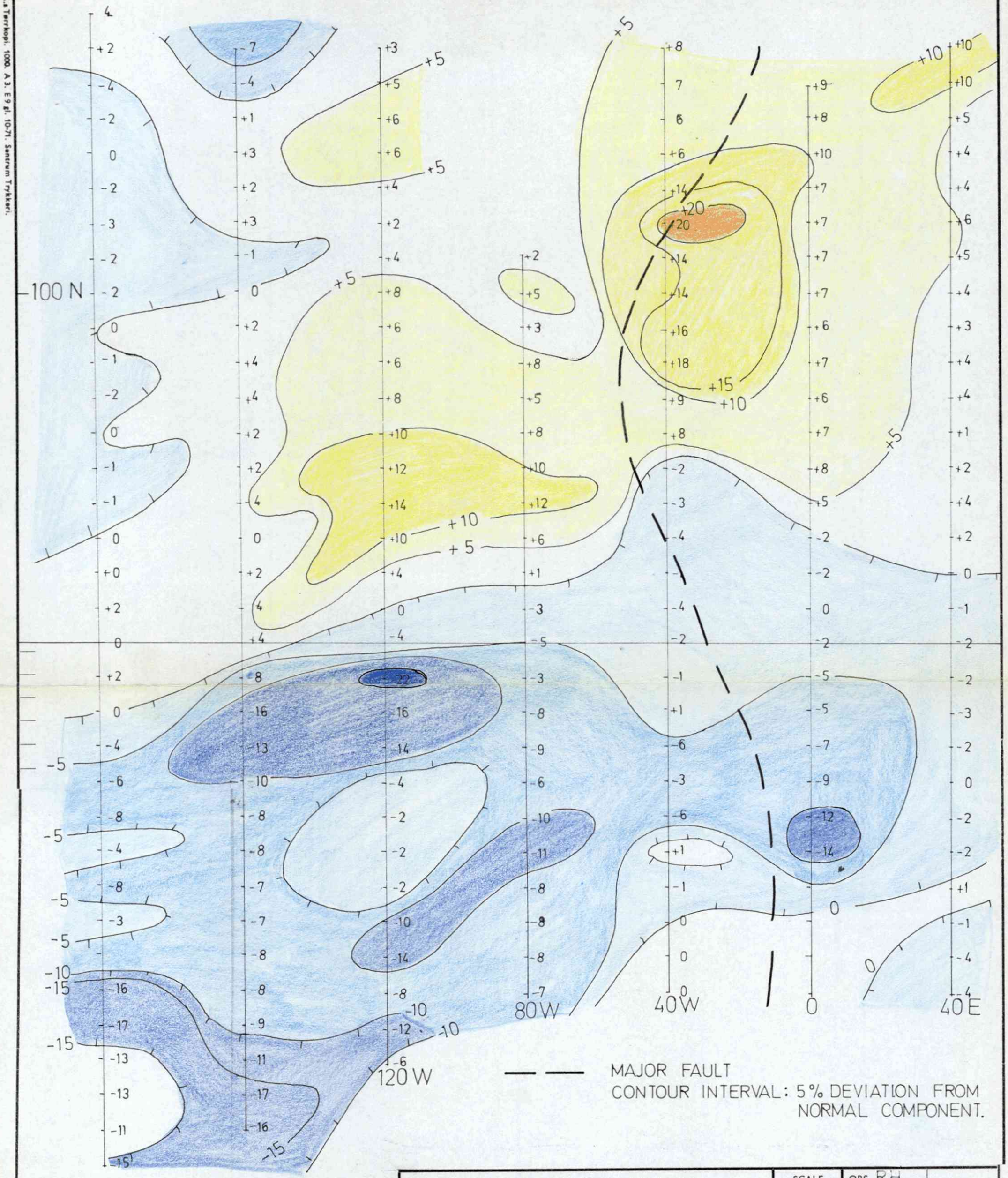
A/S **SULFIDMALM**

SCALE	OBS. RH	
1:1000	DRAW. RH	
	TRAC. BL	
	CHK. RH	

MAP NO.
205-72-5-07

MAP SHEET

A.s Tørrkopi. 1000. A 3. E 9 gl. 10-71. Sentrum Trykkeri.



ELECTRO MAGNETIC ANOMALIES
VLF (GEONICS EM 16)
IMAGINARY COMPONENT

HOMSE-BJØRNDALSNIPA GRID

SCALE	OBS. RH	
1:1000	DRAW. RH	
	TRAC. BL	
	CHK. RH	

A/S **SULFIDMALM**

MAP NO. 205-72-5-08

MAP SHEET

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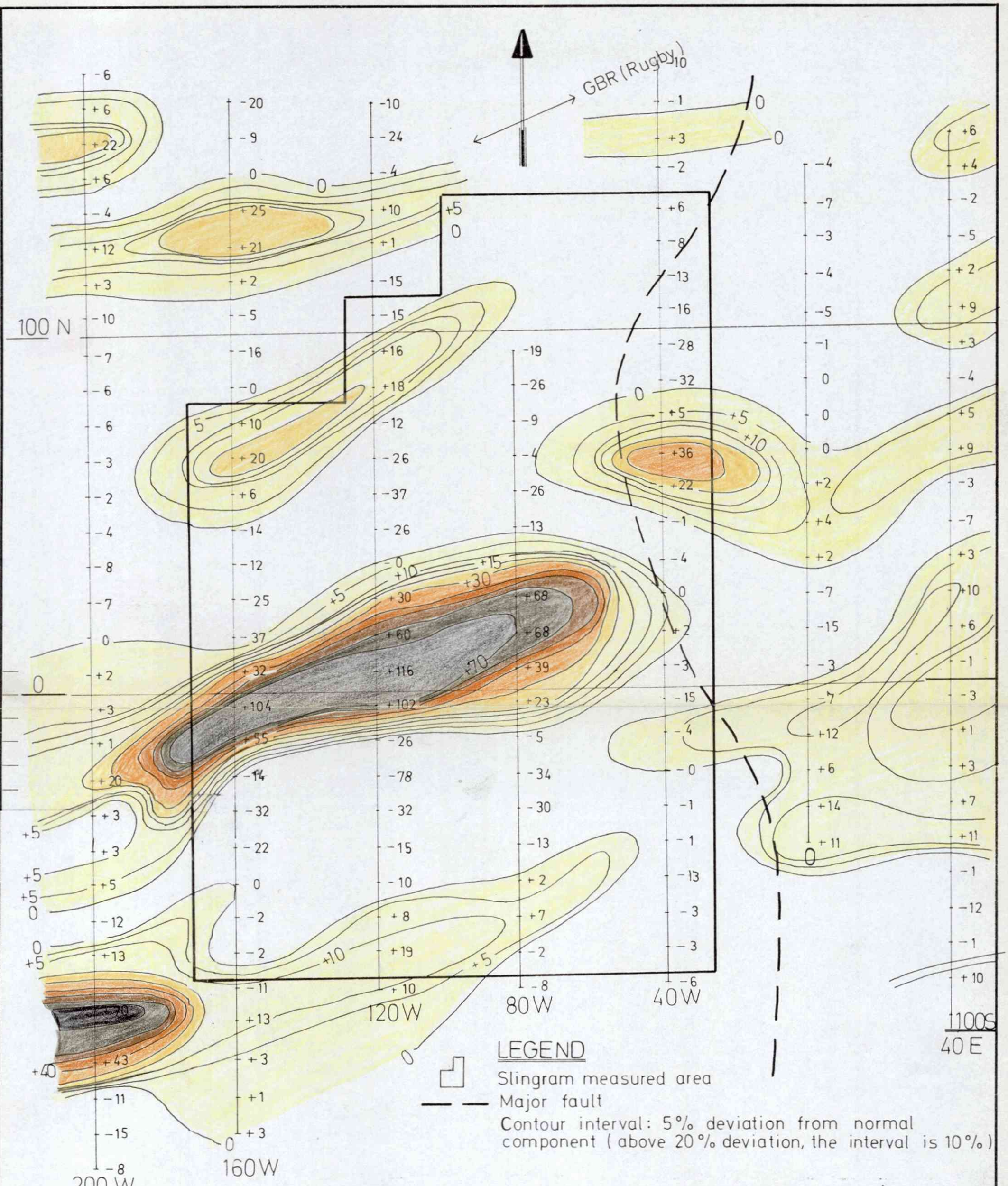


ELECTRO MAGNETIC ANOMALIES
VLF (FRASER CONTOURS)
REAL COMPONENT

BJØRNDALSSNIPA GRID

SCALE 1:1000

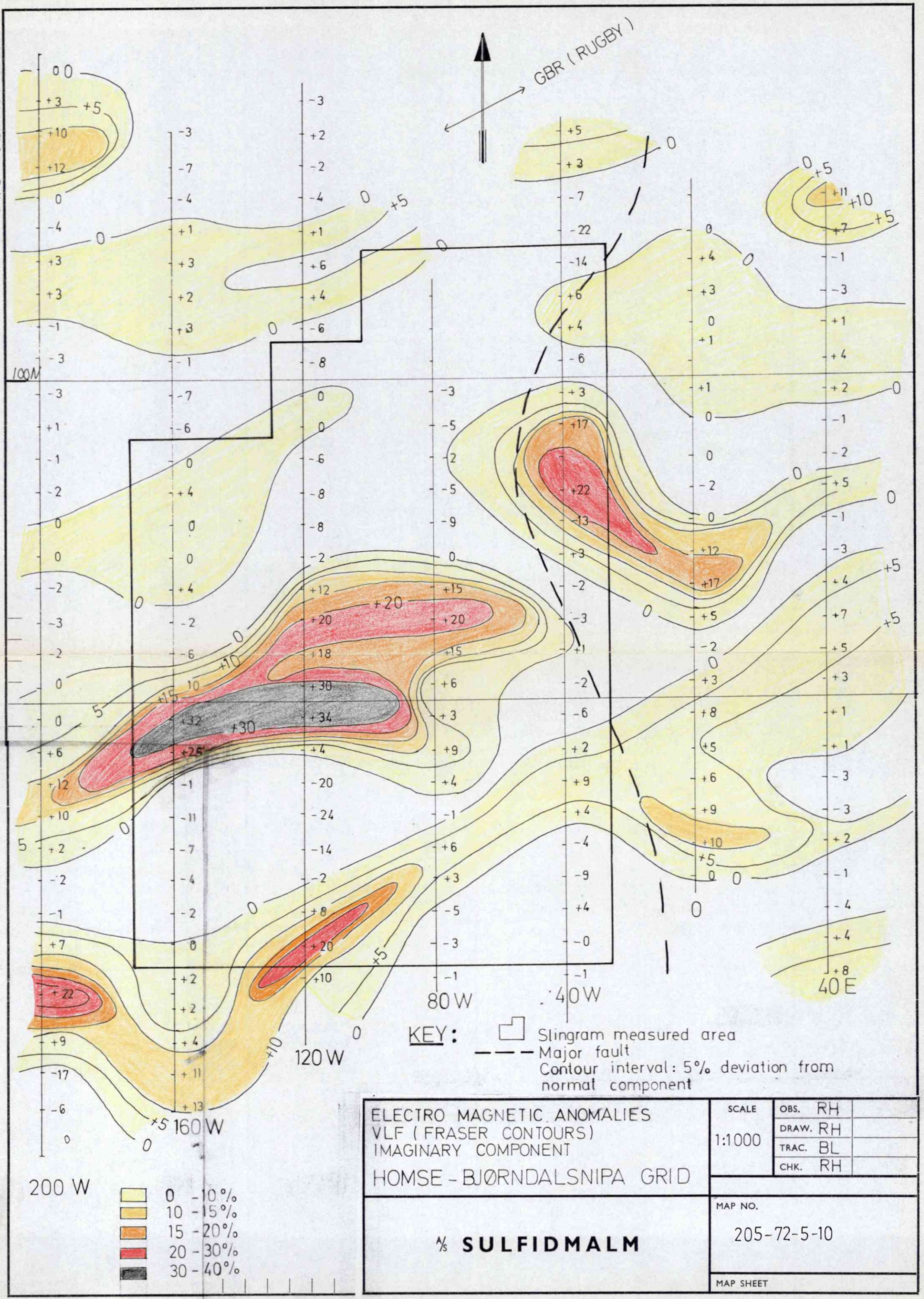
OBS. RH
DRAW. RH
TRAC. BL
CHK. RH

MAP NO. 205-72-5-09

MAP SHEET

A/S **SULFIDMALM**

A.s Tørrkopi. 1000. A 3. E 9 gl. 10-71. Sentrum Trykkeri.



ELECTRO MAGNETIC ANOMALIES
VLF (FRASER CONTOURS)
IMAGINARY COMPONENT

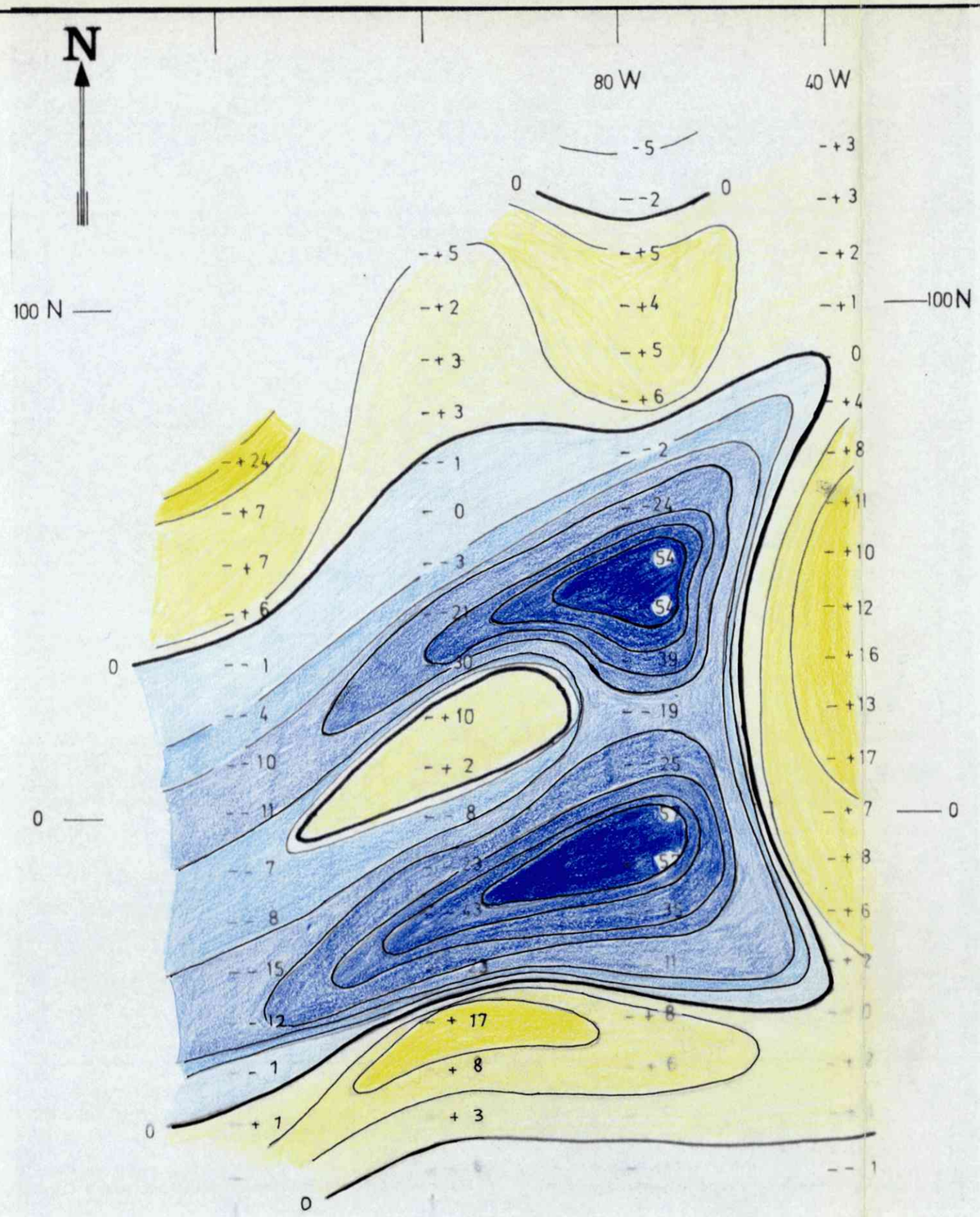
HOMSE - BJØRNDALSNIPA GRID

SCALE	1:1000
OBS.	RH
DRAW.	RH
TRAC.	BL
CHK.	RH

A/S **SULFIDMALM**

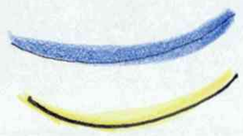
MAP NO. 205-72-5-10

MAP SHEET



KEY:

CONTOUR INTERVAL: 5% deviation from normal component



SUBNORMAL

ABOVENORMAL

ELECTRO MAGNETIC ANOMALIES
SLINGRAM (~~IMAGINARY~~ Real COMPONENT)
BJØRNDALSNIPA GRID – HOMSE

SCALE 1:1000

OBS. RH
DRAW. RH
TRAC. BL
CHK. RH

A/S **SULFIDMALM**

MAP NO. 205-72-5-11

MAP SHEET

A.s Tørrkopi. 1000. A 3. E 9 gl. 10-71. Sentrum Trykkeri.