



Bergvesenet

Postboks 3021, 7002 Trondheim

Rapportarkivet

Bergvesenet rapport nr BV 584	Intern Journal nr 2828/79 ØB	Internt arkiv nr	Rapport lokalisering Trondheim	Gradering Åpen
Kommer fra ..arkiv Østlandske	Ekstern rapport nr Sul 339-74-20	Oversendt fra Sulfidmalm a.s.	Fortrolig pga	Fortrolig fra dato:
Tittel Geological, geophysical and diamond drilling investigations in the Kvikne area 1974				
Forfatter R Sivertsen F Nixon		Dato 21.01 1975	Bedrift Sulfidmalm A/S	
Kommune Tynset	Fylke Hedmark	Bergdistrikt Østlandske	1: 50 000 kartblad 16203	1: 250 000 kartblad Røros
Fagområde Geologi Geofysikk Boring	Dokument type Leieavtalerapport	Forekomster Vakkerlien Hakadal Kaltberget Russua Myssmørdalen Nybergåsen Sæterfjell Kvikne		
Råstofftype Malm/metall	Emneord Ni Cu			
Sammendrag Omfattende rapport med bilag.				

Inv. 2828/79.06.

A/s SULFIDMALM

TELEGRAMADR.: FALCONBRIDGE
TELEX: 11959 FNA N
TELEFON: (042) 25500

4601 KRISTIANSAND S.
NORWAY
POSTBOKS 457

Bergmesteren i Østlandske Distrikt
Munkedamsveien 62
Postboks 7581
SKILLEBEKK, Oslo 2

DERES REF./YOUR REF.

DERES BREV/YOUR LETTER

VÅR REF./OUR REF.

DATO/DATE

19. desember 79

Statens rettigheter i Kvikne området

I brev av 30. mai 1979 har vi meddelt Industridepartementet at vi ikke ønsker å forny håndgivelsesavtalen av 15.08.73 for statens rettigheter i Kvikne området.

Da vårt arbeid har vært og i noen tid fremover vil være konsentrert om Vakkerlien, har vi i brev av 5.12.79 bedt om å få leie rettighetene staten har der.

I overensstemmelse med håndgivelsesavtalens §4 oversender vi herved sluttrapporter for de arbeider som er utført ved Kvikne gruver.

Prøvematerialet oppbevares i Kristiansand og kan avgis eller på annen måte stilles til disposisjon for videre bearbeide på ethvert tidspunkt.

Med hilsen



Frank Nixon

Kopi: Undersøkelse av statens bergrettigheter.
Inklusive ett sett rapporter.

A/S SULFIDMALM

GEOLOGICAL, GEOPHYSICAL AND DIAMOND
DRILLING INVESTIGATIONS IN THE
KVIKNE AREA 1974.

PROJECT 905.20

R. SIVERTSEN

F. NIXON

LIST OF ENCLOSURES

1. Location map
2. General geology of the Trondheim Field.
3. Location map of Kvikne-Budal Region showing.
Greenstone belts and sulphide showings, helicopter survey
area and stream sediment coverage.
4. Geology of the Kvikne Mine Grid.
5. Tip sample locations Kvikne Mine.
6. V.L.F. Dip angle data. Kvikne Mine Grid.
7. V.L.F. Contoured REAL. Fraser values. Kvikne Mine Grid.
8. V.L.F. Contoured IMAG. Fraser values. Kvikne Mine Grid.
9. Magnetic Anomaly map " " "
10. Diamond drill hole 1
11. " " " 2
12. " " " 3
13. " " " 4
14. " " " 5
15. " " " 6
16. " " " 7
17. " " " 8

LIST OF FIGURES

- Fig. 1. Location of mines and showings in the Kvikne Mine area.
- Fig. 2. Diagram of chip sample location at entrance adit, Gaben Gottes Mine.
- Fig. 3. Shape of ore bodies due to boundinage.
- Fig. 4. Sketch of Vakkerlien showing.

CONTENTS

	<u>Page</u>
1. INTRODUCTION	5
1.1 Background information	5
1.2 Work carried out	5
2. REGIONAL GEOLOGY AND MINERALIZATION	6
3. LOCAL GEOLOGY OF THE KVIKNE MINE AREA	6
3.1 Petrography of the main rock units	6
3.1.1 Mica schist	6
3.1.2 Quartz sericite schist	6
3.1.3 Amphibolite	7
3.1.4 Gabbro	7
3.1.5 Trondhjemite	7
3.2 Structures	7
3.3 The Kvikne ore deposits	8
3.3.1 General & historical	8
3.3.2 Individual deposits	8
3.3.3 Assays and sampling	11
3.3.4 Wall rocks	12
3.3.5 Shape of ore bodies	13
4. OTHER SHOWINGS IN THE KVIKNE REGION	14
4.1 Kaltberget	14
4.2 Vakkerlien	14
4.3 Myssmørdalen	15
4.4 Nybergåsen	15
4.5 Hakadal	16
4.6 Russua	16
4.7 Sæterfjell	16
5. GEOPHYSICAL INVESTIGATIONS IN THE KVIKNE MINE GRID	16
5.1 Introduction	16
5.2 Results	16
6. DIAMOND DRILLING	17
6.1 Introduction	17
6.2 Work carried out	17
6.3 Results	18
6.4 Assay results	20
7. GENERAL CONCLUSION	21
APPENDIX	
DRILL LOGS	

INTRODUCTION

1.1 BACKGROUND INFORMATION

During 1973 A/S Sulfidmalm optioned from the Norwegian State 42 mining claims in the Kvikne region of the Central Norwegian Caledonides.

Most of the claims covered polymetallic massive sulphide showings in the main Kvikne Mines area, an area which comprises a great number of old mines and showings. Several claims covered showings in the same geological environment but some distance away from the Kvikne Mines.

This report will describe some of the work that has been carried out in the Kvikne region.

The Kvikne region is an area of approximately 700 km² extending from Røstvangen Mines in the south to Budalen in the north. (Encl. 3).

Most of the area lies over 600 m.a.s.l. and some of the mountain peaks extend up to 1200 m. Overburden is extensive.

1.2. WORK CARRIED OUT

A. Regional investigations

1. Helicopter E.M. and mag survey, 1500 line kilometers. (Encl. 3)
2. Regional stream sediment survey, 2575 samples. (Encl. 2)
3. Mapping and sampling of old showings in the region.
1 and 2 above will be reported upon at a later date.

B. Local investigations in the Kvikne Mine Grid

1. Geological mapping in the Kvikne Mine Grid.
2. V.L.F. slingram and magnetometer surveys.
3. Sampling of old showings; - openings and dumps.
4. Drilling program based on results of 1 and 3 above.

2. REGIONAL GEOLOGY AND MINERALIZATION. (Encl. 2 and 3)

The Kvikne area lies within strongly folded metasediments and metavolcanics in the central Norwegian Caledonides. Stratigraphically these rocks belong to the Gula Group which is presumed to be the oldest part of the Cambro-Silurian sequence of the Trondheim region.

The Gula schist group in the southern part of the Trondheim Region comprises a variety of rock types, dominantly metasandstones and calc-silicate bearing mica-schists and phyllites of various metamorphic grades.

Within the metasediments there occur some horizons of metavolcanics (Gula greenstone), limestones, conglomerates and black schists.

A great number of sulphide deposits, confined to the narrow horizons of the Gula greenstone run in a SSW-NNE direction from Røstvangen through the Kvikne district to Gauldalen.

The two main ore deposits in the region are Røstvangen and Kvikne.

Røstvangen which is optioned from the State to Folldal Verk was worked from 1908 - 1921. The deposit is small and only about 400,000 tons were worked out. Average grade is given as 2.65% Cu, 1% Zn, 43% S.

3. LOCAL GEOLOGY OF THE KVIKNE MINE AREA

The geology is presented on map No. , enclosure No. 4.

3.1 PETROGRAPHY OF THE MAIN ROCK UNITS

3.1.1 MICA SCHIST (Quartz Biotite Schist)

The mica schist unit occurs mainly in the eastern part of the area. It shows a colour change from brown to grey with varying content of the main minerals: biotite, quartz, muscovite with some amphibole and garnets. Graphite is occasionally present.

The schist is fine grained and well foliated. Banding is common, the garnet and feldspar rich bands often have a cataclastic texture.

3.1.2 QUARTZ SERICITE SCHIST

This rock type covers a large area around the old mines and consists mainly of quartz and sericite.

3.1.3. AMPHIBOLITE

Two different types of amphibolite occur in the area. The first type consists of strongly foliated fine grained amphibolitic horizons that are always conformable to the enclosing schist. The thickness is variable seldom more than 20 m. The amphibolite horizons wedge out in strike direction and have a lens shape.

The second type of amphibolite probably represent strongly deformed gabbros, often exhibiting relict igneous texture.

Common to both types are banding and a strong cataclastic appearance.

3.1.4. GABBRO

Gabbro occurs in an area to the south and east of Bergstjern in the southern part of the mapped area.

Hornblende and plagioclase are the major constituents, and in part the gabbro exhibits a porphyritic texture. Near the contacts the gabbro is fine grained and strongly sheared.

3.1.5. TRONDHJEMITE

Probably two generations of trondhjemite are present in the area. The oldest contains xenoliths of mica schist and gabbro. This generation has a good foliation (S2) which is conformable with the foliation in the mica schist. These older types have a typical lens shape and are conformable with the enclosing rocks.

The second generation of trondhjemite crosscuts the main foliation S2 and is only deformed by late bondinage.

3.2 STRUCTURES

The rocks of the Gula schist group in the Kvikne mine area folded into tight isoclinal folds with nearly horizontal fold axes having a NNE-SSW trend. This folding pattern gives a uniform schistosity - a NNE-SSW strike and a gentle 20 - 40° east.

A younger lineation is defined by parallel elongated aggregates of individual minerals. This direction is well developed and has a NW-SE trend and a SE plunge.

Strong jointing WNW-ESE is dominant in the area.

3.3 THE KVIKNE ORE DEPOSITS

3.3.1 GENERAL AND HISTORICAL

The Kvikne Mines comprise a great number of mines and prospects. The deposits can be divided into two principal classes.

Pyritic/Chalcopyritic ⁺ sphalerite Pyrrhotitic.

The deposits of the first class comprise from an economical point of view the most important sulphide mineralizations in the area on which the most extensive exploitation has taken place. The second class of deposits often accompanies the ores of the first class.

Fig. 1 shows the location of the various mines and showings.

The first mine in operation was Prestens gruve which now constitutes the upper parts of Segen Gottes gruve (9.10.17). In 1631 a richer ore was found some hundred metres to the south where Gabe Gottes mine was developed. (12, 13, 14, 27). At Gabe Gottes ore was mined about 120 m along strike and 200 m along dip.

In 1642 a vertical shaft (27) was sunk in order to facilitate transport but in 1677 when the roof collapsed Gabe Gottes was abandoned. Work, however, continued at Prestens gruve in 1666 a vertical shaft (Gammelsjakten) (9) was sunk and ore worked 150 m along the dip. From 1670 - 1680 the mines lay idle, after the turn of the century the mine was reopened and between 1732 and 1739 a vertical shaft (Nysjakten) (17) was sunk at Segen Gottes.

In 1789 the mines were flooded by spring melt water and Segen Gottes was abandoned for good. Exploitation continued at Banken and Vangsgruve.

The Kvikne mines were finally closed down in 1812 after having produced 7,343 tons of copper.

3.3.2. INDIVIDUAL DEPOSITS

A short description of some of the deposits follows.

GABE GOTTES

The ore can be seen outcropping in the adit by the stream. This adit leads to the collapsed and flooded parts of the mine. The ore zone was reported to be between 0.5 and 6 m thick with an average of 3 m.

A chip sample was taken across the outcrop of the ore in the entrance adit and gave the following results.

Fig. 2 shows a diagram of the sample location.

Sample No.	Distance	Type	Cu	Zn	S
27.20.74	0.3 m	min. amph.	1.3	0.26	3.68
26.20.74	0.3 m	min. quartzite	1.8	0.30	10.0
28.20.74	0.6 m	min. quart.-amp.	4.7	0.88	7.2
29.20.74	0.4 m	quartz epidote rock	0.38	/ 0.1	2.68
30.20.74	0.4 m	min. quartzite	0.90	/ 0.1	13.9
31.20.74	1.2 m	min. quartzite	0.15	/ 0.1	0.88
32.20.74	0.4 m	massive ore	3.9	0.43	34.4

Two further chip samples over the Gabe Gottes zone gave the following results:

33.20.74	0.30 m		1.2	1.3	7.85
34.20.74	1 m	ore in quartzite	0.61	1.6	21.2

Two grab samples returned:

35.20.74	grab	ore	4.3	2.6	15.1
36.20.74	grab	ore	0.39	3.2	36.0

SEGEN GOTTES

This mine is completely flooded. The mine produced a total of 5000 tons of copper from 1730 - 1789. The ore zone is supposedly 2 - 3 m thick.

VANGSGRUBE (Upper and Lower).

These are situated south of Storbekken. The ores occur as sulphide impregnated veins of quartzite at the border between amphibolite and sericite garnet schists.

The ore consists of mainly impregnations of pyrrhotite and chalcopyrite. Often sphalerite and pyrite are seen in dump specimens.

The following samples were collected:

Sample No.	Location	Cu	Zn	S
77.20.74	grab	1.2	2.6	29.0
78.20.74	grab	3.0	2.2	12.3
83.20.74	chip	1.2	20.0	44.5
84.20.74	chip	0.5	1.3	18.8
4.20.74	grab	3.1	1.6	21.2

BANKEN

Again all the workings are flooded. Dumps suggest a pyritic, quartz rich ore.

MINE 1707

Opened in 1707 hence the name.

An inclined shaft is sunk parallel to an amphibolite. Sulphide impregnation occurs in thin bands of quartzitic rock.

A sample taken over the available ore horizon 0.5 m gave the following results.

Assays 1707

	Cu	Zn	S
60.74	0.32	∠ 0.1	6.07

DALSGRUVEN

Situated at the junction between Gruvebekken and Storbekken. Small flooded workings. The ore varies in thickness from 0.3 - 1 m. Dump samples show pyrrhotite and chalcopyrite as the main ore constituents, but sphalerite is also present.

Sample No.	Distance	Type	Cu	Zn	S
20.20.74	Grab	Ore	3.3	1.7	31.6

3.3.3. ASSAYS AND SAMPLING

Most of the old mine workings where accessible were sampled. Also a representative collection of dump samples were collected and assayed. Because of weathering and leaching it was often difficult to obtain fresh samples.

SHOWINGS

GABE GOTTES. Sampling and assay results are reported above on page 9.

VANGSGRUBE. Reported on page 10.

MINE 1707. Reported on page 10.

Dalsgruven. Reported on page 10.

BERSTJERN SHOWING. Two ore horizons in amphibolite, dominantly pyrrhotite.

Sample No.	Type	Cu	Ni	Zn	S
75.20.74	0.75 m chip	0.024	0.012	∠ 0.1	6.24
76.20.74	0.75 m chip	0.048	0.014	∠ 0.1	11.3

STORBEEKEN PROSPECT. Pyrrhotite rich showings in Storbekken.

Sample No.	Type	Cu	Ni	Zn	S
55.20.74	chip 1 m	0.10	0.007	∠ 0.1	8.00
56.20.74	chip 1 m	0.12	0.012	∠ 0.1	10.7
57.20.74	chip 1 m	0.13	0.013	∠ 0.1	10.2
58.20.74	chip 1.5 m	0.064	0.0065	∠ 0.1	12.3
59.20.74	chip 1.5 m	0.041	0.01	∠ 0.1	14.6
61.20.74	chip 0.5 m	0.08	∠ 0.01	∠ 0.1	11.5
69.20.74	grab	0.07	∠ 0.01	∠ 0.1	9.64
70.20.74	grab	0.05	∠ 0.01	∠ 0.1	10.4
71.20.74	grab	0.086	0.013	∠ 0.1	14.3

TIPS

Various sections of the tips were also sampled usually in profiles with samples being taken over 10 m. Enclosure 5 shows the locations of these samples.

Sample No.	Type	Location	Cu	Zn	S
38.20.74	chip	near 1707	0.068	∠ 0.1	1.18
39.20.74	chip	" "	0.26	1.5	8.50
40.20.74	chip	" "	0.28	∠ 0.1	2.82
41.20.74	chip	" "	0.31	∠ 0.1	1.48
42.20.74	chip	" "	0.035	∠ 0.1	3.18
43.20.74	chip	" "	0.017	∠ 0.1	0.80
44.20.74	chip	" "	0.034	0.6	1.88
45.20.74	chip	" "	0.017	∠ 0.1	0.38
46.20.74	chip	near Gaben	0.78	3.5	17.9
47.20.74	"	" "	4.8	5.9	34.8
48.20.74	"	Segen old shaft	0.17	∠ 0.1	0.96
49.20.74	"	" " "	0.04	∠ 0.1	0.56
50.20.74	"	" " "	0.19	∠ 0.1	1.34
63.20.74	"	Segen new shaft	0.32	∠ 0.1	2.38
64.20.74	"	" " "	0.43	0.43	3.06
65.20.74	"	" " "	0.17	∠ 0.1	1.28
66.20.74	"	" " "	0.23	∠ 0.1	1.30
67.20.74	"	" " "	0.21	∠ 0.1	1.84
68.20.74	"	" " "	0.25	∠ 0.1	1.68

3.3.4: WALL ROCKS

1. Quartz muscovite biotite (sericite) schist.

This is probably the most common rock type occurring next to the ore horizons. The rock is silver grey in colour and lens shaped biotites together with garnets are often seen. These biotites mark a good lineation. The rock is well foliated. Some of the garnets show textures which indicate both pre and post tectonic development. Quartz rich bands or lenses occurring in this rock contain kyanite with a partly random orientation. The kyanites are developed prior to the main foliation. The contact between this rock type and the ore horizons is always fairly sharp.

QUARTZITE

This rock type nearly always contains ore in different quantities together with amphibole and garnets. Some of these horizons are amphibole and garnet rich with quartz as a matrix mineral, others contain mostly quartz with amphibole and garnets as a matrix. Some of the massive pyrrhotite horizons often have a marginal zone rich in quartz garnet and amphibole.

AMPHIBOLITE

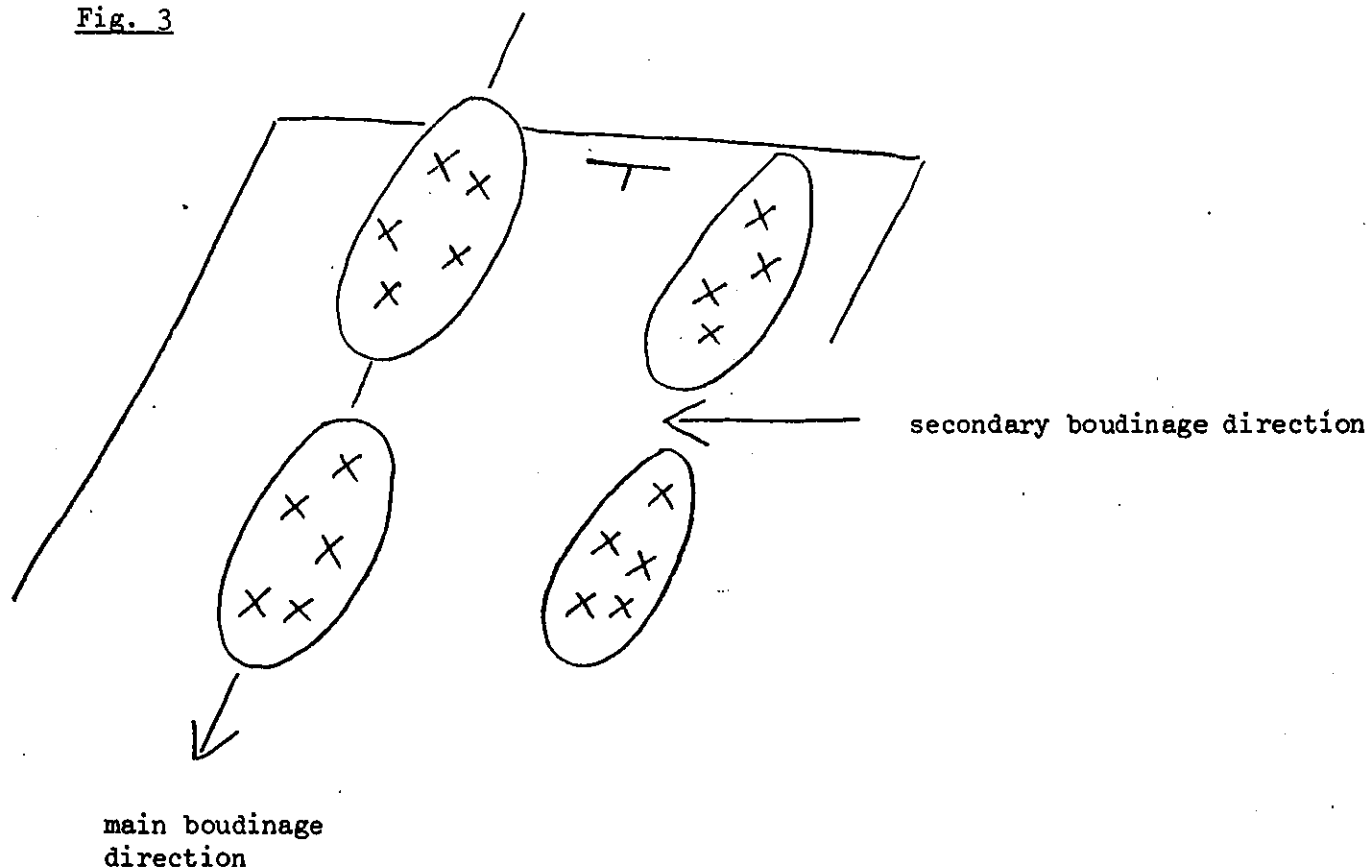
Consists of cummingtonite with quartz and garnets in varying amounts.

3.3.5. SHAPE OF THE ORE BODIES

Little data is available concerning the shape of the ore deposits, but field evidence together with a study of old maps points to a lens shape. The longest axis of the bodies corresponding to the direction of the main lineation in the region. The bodies wedge out along strike and probably also down dip.

The shape of the ore bodies seems to be a result of boundinage development in two directions.

Fig. 3



As can be seen from fig. 3 the two boudinage directions are NW-SE and NNE-SSW.

Quartzites, ore horizons and amphibolites show boudinage development both as major and minor structures.

4. OTHER SHOWINGS IN THE KVIKNE REGION (Encl. 2 & 3)

4.1 KALTBERGET SHOWING

Three small lenticular bodies of ultrabasic rock occur 100 m below the top of Kaltberget on the western slope of the mountain. They are links in a chain of small bodies of ultrabasics which can be traced from the Røstvangen area to Kvikne.

The ultrabasics are coarse to medium-grained massive rocks rich in amphibole and phlogopite. The border zone of the ultrabasics are felspathic and in this zone pyrrhotite and some chalcopryrite occur. The Kaltberget showing has worked such a zone. The zone is extremely sheared and is of small extent. Samples give good assays but the showing and ultrabasic are too small to have any economic interest.

Sample No.	Type	Ni %	Cu	Zn	S
85.20.74	grab	0.54	0.11	/ 0.1	2.38
86.20.74	grab	3.8	0.36	/ 0.1	14.6
87.20.74	grab	0.66	0.19	/ 0.1	3.58

4.2 VAKKERLIEN

This is an old showing situated 6 km west of Kvikne in a very swampy area. A large swamp covers approx. 10 km² and the showing occurs on the eastern edge of this.

The mineralization is associated with an amphibolitic/gabbroic rock which lies in mica-schists. Shearing and cataclastic deformation are evident.

The ore bearing amphibolite is sporadically exposed over ca. 40 m and seems to have a width of 1 - 2 m. The mineralization is an impregnation of pyrrhotite, chalcopryrite with minor pyrite. Strike is NW-SE with a gentle north dip.

This deposit was visited only very late in the field season which is a pity seeing now the high nickel assays turned up.

Fig. 4 shows a brief sketch of the showing and location of samples.

Samples Vakkerlien

Sample No.	Type	Cu	Ni	S
100.20.74	chip 1.25	1.7	0.82	5.72
101.20.74	chip 2.0	0.54	1.8	7.00
103.20.74	chip 0.5	1.9	0.54	5.02
102.20.74	grab tip	1.26	1.32	4.83
104.20.74	grab	0.91	1.85	4.35
105.20.74	random grab tip	4.09	2.21	7.60
106.20.74	" "	3.67	0.68	7.42
107.20.74	" "	1.44	2.64	7.94
108.20.74	" "	1.71	0.87	2.87
109.20.74	" "	4.95	1.91	7.23
110.20.74	grab	1.18	1.98	7.64
111.20.74	random grab tip	1.30	1.88	6.62
112.20.74	" "	0.87	1.15	3.34
130.20.74	grab tip	2.70	2.35	8.14
131.20.74	" "	1.44	2.26	9.80
132.20.74	" "	1.22	3.02	11.3

4.3 MYSSMØRDALEN

In this area we have eight claims. It is a large area with some very broad and extensive rust horizons which extend south to Rustvangen and north to Kvikne. Strong weathering makes it difficult to get good samples.

4.4 NYBERGÅSEN

This is an old showing some kilometres south of the Myssmørdalen area and can probably be located in the same general zone. One chip sample taken from a 1 m broad sulphide impregnated horizon gave: -

4.5 HAKADALS SHOWING

An old showing in the northern part of the survey area.

4.6 RUSSUA

A small pit with bondinaged massive pyrrhotite horizons.

4.7 SÆTERFJELL

Possibly an extension of the main Kvikne zone.

Assays from these showings are pending and will be incorporated in the report on stream sediment geochemistry to follow.

5. GEOPHYSICAL INVESTIGATIONS IN THE KVIKNE MINE GRID

5.1 INTRODUCTION

In a grid layed out in the Kvikne Mine area the following surveys were carried out:

1. V.L.F. EM measurements (Geonics unit)
2. Magnetic measurements (McPhar unit)
3. Supplementary EM slingram measurements

The results are presented on the following enclosures.

- | | |
|-------------|---|
| 6. Map. No. | V.L.F. Dip angle map. 1:4'000 |
| 7. " " | V.L.F. Contoured REAL Fraser values, 1:4'000 |
| 8. " " | V.L.F. contoured IMAG. Fraser values, 1:4'000 |
| 9. " " | Magnetic anomaly map |

5.2 RESULTS

The V.L.F. survey gave a series of long linear anomalies of varying intensity with a general N-S strike. The outcrop of the Gaben-Segen Gottes zone lies on the flank of such an anomaly.

Three main V.L.F. zones are apparent.

- A) A central zone that contains the Gaben-Segen Gottes, to the south this zone continues to 900 S.

A possible faulted extension runs from 1200 - 1800 S, slightly offset to the east

The zone continues to 900 N.

- B) To the west of this central zone are a series of fairly strong anomalies that have a NNE/SSW trend. Some small (dominantly pyrrhotite rich) showings are associated with this series.
- C) To the east of the central zone are two strong anomalies (200 S/800 E, 1400 S/900 E).

The magnetic picture is dominated by a central positive zone that is co-incident in part with the central V.L.F. zone.

Isolated anomalies are co-incident with the east and west V.L.F. zones.

Slingram profiles were carried out to check certain of the V.L.F. anomalies. All the profiles run verified the V.L.F. measurements and gave interesting anomalies.

6. DIAMOND DRILLING

6.1 INTRODUCTION

On the basis of the geophysical surveys a short diamond drilling program was carried out to test some of the more promising anomalies and to check on the extensions of the Gaben-Segen Gottes deposit.

6.2 WORK CARRIED OUT

The drilling was carried out by the Norwegian Geological Survey. Eight holes were drilled with a total length of 877 m.

Hole No.	Co-ordinates	Dip	Length
1	400 S/0	90°	58.3
2	50 N/675 E	90°	138.8
3.	400 S/950 E	45° W	87.7
4	300 S/700 E	45° W	122.4
5	500 S/450 E	45° W	180.40
6	1100 S/350 E	60° W	58.7
7	1300 S/1150 E	45° W	136.0
8	75 S/200 E	90°	95.3

All assays have been carried out at the Institute of Atomic Energy.

6.3 RESULTS

Drill log data for the holes together with drill sections are enclosed.

Hole 1. 400 S/O, vertical 58.3 m. This hole was put down to test a strong V.L.F. anomaly.

The hole was drilled entirely in quartz biotite schist with varying amounts of quartz. Bands rich in graphite are common around 49 m. These graphite bands were considered to be the anomaly cause.

Hole 2. 50 N/675 E vertical 138.8 m. This hole was set out to test the northern extension of the old mine and two V.L.F. anomalies with partly co-incident magnetic anomalies.

The hole was drilled partly in amphibolitic rocks and partly in mica rich schist. Mineralization occurs as narrow bands with dominantly pyrrhotite but with some minor pyrite and chalcopyrite. These sulphide bands occur both within the amphibolite and the mica schist. No extension of the main Kvikne ore was found.

Sulphide rich bands from 55 - 72 m and around 120 m have probably caused the V.L.F. anomalies.

Hole 3. 400 S/950 E, 45° W, 87.7 m.

This hole was put down to test the southern end of a strong and extensive V.L.F. anomaly with partly co-incident magnetic anomalies.

The drill profile was checked with slingram which indicated 4 conductors.

The hole was drilled partly in amphibolitic rocks and partly quartz biotite schist. Pyrrhotite rich bands occur both in the amphibolite and the schist.

Pyrrhotite impregnated bands at 15 m, 30 m, 45 m and a graphite rich horizon around 70 m were considered to have caused the anomalies.

Hole 4. 300 S/700 E, 45° W, 122.4 m.

This hole was put down to test a broad but not very high V.L.F. anomaly with a co-incident mag. The hole should also pick up any southerly continuation of the main Kvikne ore. Slingram measurements indicated probably more than one conductor.

The hole was mainly drilled in different types of mica schists with some amphibolitic horizons. Pyrrhotite impregnation at 65 m and some pyrrhotite and graphite around 105 m are anomaly causes.

Hole 5. 500 S/450 E. 45° W. 180.40.

Put down to test a V.L.F. zone with coincident mag. and slingram.

The first 30 m was drilled in mica schist, the rest down to 180.4 m in amphibolite.

A large number of sulphide impregnated bands occur in the amphibolitic section. They mainly contain pyrrhotite.

The main sulphide impregnated areas are at 63 m, 85m and 120 m.

Hole 6. 1100 S/350 E. 60° W. 58.7 m.

Put down to test a moderate V.L.F. anomaly with coincident mag, and slingram.

The hole was drilled mainly in quartz biotite schist with an amphibolitic horizon around 40 m. Narrow bands with pyrrhotite mineralization in the amphibolite were considered to have caused the anomaly.

Hole 7. 1300 S/1150 E. 45° W. 136 m.

Put down to test a strong V.L.F. with co-incident mag. Slingram indicated two good conductors. The hole was drilled entirely in mica rich schist partly with garnets.

Pyrrhotite impregnation at 50 m and graphite from 107 m have caused the anomalies.

Hole 8. 75 S/200 E vertical 95.3.

This hole was put down to test two V.L.F. anomalies.

The hole was drilled mainly in different types of mica rich schist with some amphibolite at the top.

Sulphide impregnation around 50 m and graphite rich schist around 80 m were considered to have caused the anomalies.

6.4 ASSAY RESULTS

Hole	Meterage	Cu %	Ni %	Zn %	S %
2	68 - 69	0.014	0.017	0.010	1.13
2	69 - 70	0.017	0.026	0.008	3.62
2	80 - 81	0.037	0.009	0.011	0.36
2	81 - 82	0.013	0.029	0.009	1.95
2	82 - 83	0.012	0.022	0.007	1.38
2	125 - 126	0.011	0.014	0.009	3.31
2	126 - 127	0.011	0.015	0.008	0.09
2	127 - 128	0.014	0.018	0.008	1.40
2	128 - 129	0.012	0.018	0.010	1.90
3	26 - 27	0.011	0.025	0.008	1.33
3	27 - 28	0.012	0.021	0.007	2.51
3	28 - 29	0.012	0.032	0.006	0.06
3	29 - 30	0.017	0.022	0.005	2.71
3	30 - 31	0.011	0.009	0.009	0.28
4	63 - 64	0.012	0.029	0.006	0.17
4	64 - 65	0.011	0.023	0.006	1.16
4	62 - 63	0.010	0.029	0.006	0.25
4	108 - 109	0.013	0.009	0.011	2.78
4	109 - 110	0.013	0.014	0.010	2.95
5	60 - 61	0.056	0.030	∠ 0.1	3.75
5	61 - 62	0.007	0.021	∠ 0.1	1.65
5	62 - 63	0.023	0.024	∠ 0.1	1.64
5	63 - 64	0.010	0.03	∠ 0.1	1.05
5	64 - 65	0.007	0.026	∠ 0.1	0.62
5	65 - 66	0.027	0.024	∠ 0.1	4.21
5	66 - 67	0.020	0.029	∠ 0.1	1.86
5	84 - 85	0.018	0.014	∠ 0.1	2.23
5	85 - 86	0.016	0.012	∠ 0.1	4.69
5	86 - 87	0.028	0.007	∠ 0.1	2.20
5	120 - 121	0.045	0.006	∠ 0.1	1.41
6	32 - 33	0.021	0.006	∠ 0.1	1.22
6	33 - 34	0.031	0.018	∠ 0.1	1.62
6	34 - 35	0.040	0.016	∠ 0.1	2.25
6	35 - 36	0.023	0.026	∠ 0.1	2.25

Hole	Meterage	Cu %	Ni %	Zn %	S %
7	50 - 51	0.013	0.005	/ 0.1	0.30
7	51 - 52	0.013	0.006	/ 0.1	3.19
7	52 - 53	0.015	/ 0.001	/ 0.1	2.51
7	53 - 54	0.001	0.003	/ 0.1	0.24
7	54 - 55	0.003	0.005	/ 0.1	0.98
7	55 - 56	0.052	/ 0.001	/ 0.1	5.31
7	56 - 57	0.003	0.011	/ 0.1	0.78
7	57 - 58	0.009	0.007	/ 0.1	0.33
7	58 - 59	0.007	0.004	/ 0.1	0.05
7	59 - 60	0.019	0.006	/ 0.1	0.14
7	118 - 119	0.006	0.007	/ 0.1	0.13
7	119 - 120	0.023	0.009	/ 0.1	1.35
8	47 - 48	0.018	0.037	0.014	4.71
8	48 - 49	0.016	0.006	0.014	9.28
8	49 - 50	0.013	0.006	0.022	4.96
8	50 - 51	0.017	0.008	0.010	3.47
8	51 - 52	0.030	0.009	0.008	21.2
8	52 - 53	0.014	0.008	0.014	3.91

7. GENERAL CONCLUSIONS

This year's work has shown that the possibilities of finding a new ore body in the main Kvikne Mine grid are extremely small. The known ore bodies seem to be completely de-limited by the old workings, the only chance for continuation being down dip: - this is not considered to be an economic venture.

Vakkerlien has given extremely good assay results and is the prime target for follow up work in 75.

January 21, 1975

FN/hg

GEOLOGICAL MAP OF THE TRONDHEIM REGION

GEOLOGISK KART OVER TRONDHEIMSFELTET

1:

COMPILED BY FR. CHR. WOLFF AFTER:
SAMMENTEGNET AV FR. CHR. WOLFF ETTER:

T. BIRKELAND, C. W. CARSTENS, H. CARSTENS, J. CHALOUPSKY, G. GRAMMELTVEDT, F. FEDIUK,
M. FISER, S. FOSLIE, J. FÆRDEN, A. HAUGEN, H. HEIM, P. HOLMSEN, H. J. KISCH, G. H. OFTEDAHL,
J. PEACEY, Z. PELC, D. ROBERTS, I. J. RUI, G. SCHAAR, A. SIEDLECKA, S. SIEDLECKI,
T. STRAND, TH. VOGT, FR. CHR. WOLFF.

LEGEND TEGNFORKLARING

RÖRAGEN BEDS (DEVONIAN) RÖRAGENFELTET (DEVON)

CONGLOMERATE AND SHALE
KONGLOMERAT OG SKIFER

SLÅGAN GROUP - HÖRS GROUP (SILURIAN) SLÅGANGRUPPEN - HÖRSGRUPPEN (SILURI)

DARK SHALE AND SANDSTONE
MØRK SKIFER OG SANDSTEIN

KJØLHAUGEN GROUP - RÖROS GROUP - UPPER HÖVIN GROUP (UPPER ORDOVICIAN) KJØLHAUGENGRUPPEN - RÖROSGRUPPEN - ØVRE HÖVINGRUPPEN (ØVRE ORDOVICIUM)

PHYLLITE, METAGRAYWACKES, WITH INCREASING AMOUNTS OF BIOTITE,
HORNBLEND AND GARNET TOWARDS THE SOUTHEAST. PARTLY CONGLOMERATIC
FYLLITT, METAGRÅVAKKER MED ØKENDE MENGDER AV BIOTITT,
HORNBLENDE OG GRANAT MOT SYDØST, DELVIS KONGLOMERATISK

POLYGENOUS CONGLOMERATE
POLYMIKT KONGLOMERAT

SULAMO GROUP - LOWER HÖVIN GROUP (MIDDLE ORDOVICIAN) SULAMOGRUPPEN - ØNDRØYINGRUPPEN (MIDTRE ORDOVICIUM)

DARK SHALE AND RHYOLITE TUFF IN WEST, GREENSTONE IN EAST
MØRK SKIFER OG RHYOLITT TUFF I VEST, GRØNNSTEN I ØST

GREY CALCAREOUS SANDSTONE AND GREY TO DARK PHYLLITE
GRÅ KALKHOLDIG SANDSTEIN OG GRÅ TIL MØRK FYLLITT

HÖLÖNDA, TRØMSDALEN, BRENNÅ AND SIMILAR LIMESTONES
HÖLÖNDA, TRØMSDALEN, BRENNÅ OG LIGNENDE KALKSTEINER

VENNA, STOKKVOLA, LILLE FUNDSJØ AND SIMILAR CONGLOMERATES
VENNA, STOKKVOLA, LILLE FUNDSJØ OG LIGNENDE KONGLOMERATER

FUNDSJØ GROUP - STÖREN GROUP (LOWER ORDOVICIAN) FUNDSJØGRUPPEN - STÖRENGRUPPEN (ØNDRØYINGRUPPEN)

GREENSTONES AND QUARTZKERATOPHYRES
GRØNNSTENER OG KVARTSKERATOPHYRER

GRANODIORITIC GNEISS
GRANODIORITISK GNEISS

SONYATN GROUP - GULA SCHIST GROUP (CAMBRIAN) SONYATNGRUPPEN - GULASKIFERGRUPPEN (KAMBRIMUM)

MICA SCHISTS, OFTEN WITH GARNET
GLIMMERSKIFER, OFTE MED GRANAT

CONGLOMERATES OF THE GUDÅ CONGLOMERATE ZONE
KONGLOMERATER TILHØRENDE GUDÅKONGLOMERATSONEN

LIMESTONE
KALKSTEIN

CALEDONIAN INTRUSIVES KALEDONISKE INTRUSIVER

LARGER BODIES OF TRONDHEIMITE
STØRRE LEGEMER AV TRONDHEIMITT

LARGER BODIES OF GABBRO
STØRRE LEGEMER AV GABBRO

NORITE
NORITT (DYRHAUGEN)

SERPENTINITES
SERPENTINER

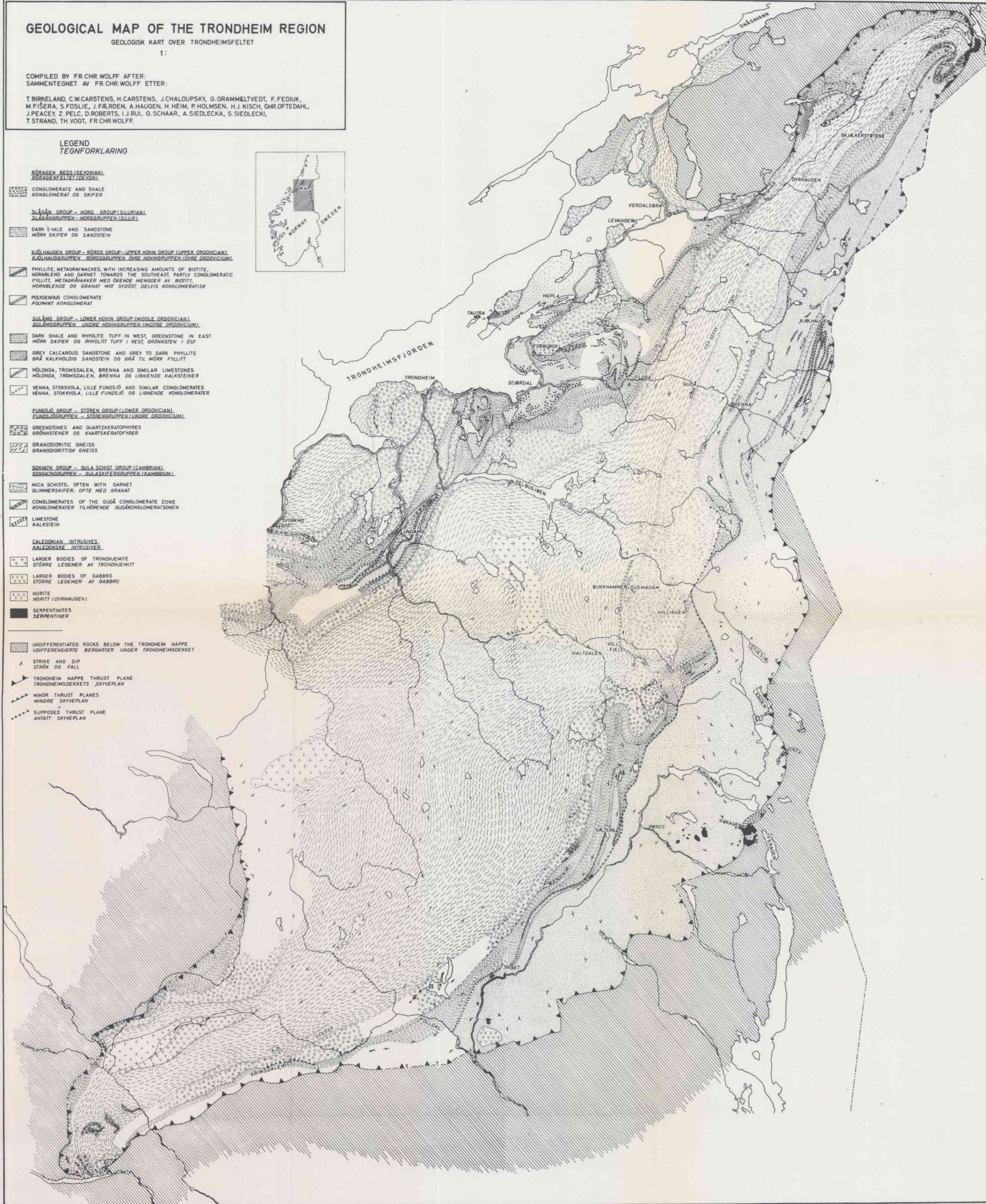
UNDIFFERENTIATED ROCKS BELOW THE TRONDHEIM NAPPE
UDIFFERENSJERTE BERGARTER UNDER TRONDHEIMSNAPPE

STRIKE AND DIP
STRØK OG FALL

TRONDHEIM NAPPE THRUST PLANE
TRONDHEIMSNAPPE SKYVEPLAN

MINOR THRUST PLANES
MINDRE SKYVEPLAN

SUPPOSED THRUST PLANE
ANTATT SKYVEPLAN



Sulphide occurrences

in the

Kvikne - Innset

Støren - Budal area

— Survey with VLF, winter 1976.

□ Claimed this month.

● Kvikne type "Chalcopyrite"

○ Budal "Pyrite"

⊙ Nickel showing

⊕ Lead showing

□ Helicopter survey area

--- Geochemistry sampled area 75

Nickel stream sediment anomaly area

Greenstone - } STØREN GROUP
Siltstone

Greenstone } GULA GROUP
Graphite schist

Schist

Ultrabasic
Gabbro

Acid intrusives TRONDHJEMITE - OPDALITE

□ CLAIM BLOCKS

0 5 10 km

KVIKNE AREA LOCATION AND SUMMARY MAP

SCALE 1:100 000
D.B.S. O. Nilsen
DRAW LN/BB
TRAC.
CHK.

MAP NO.

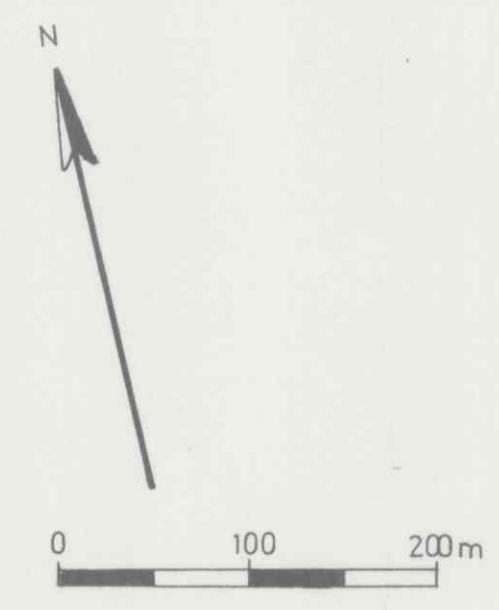
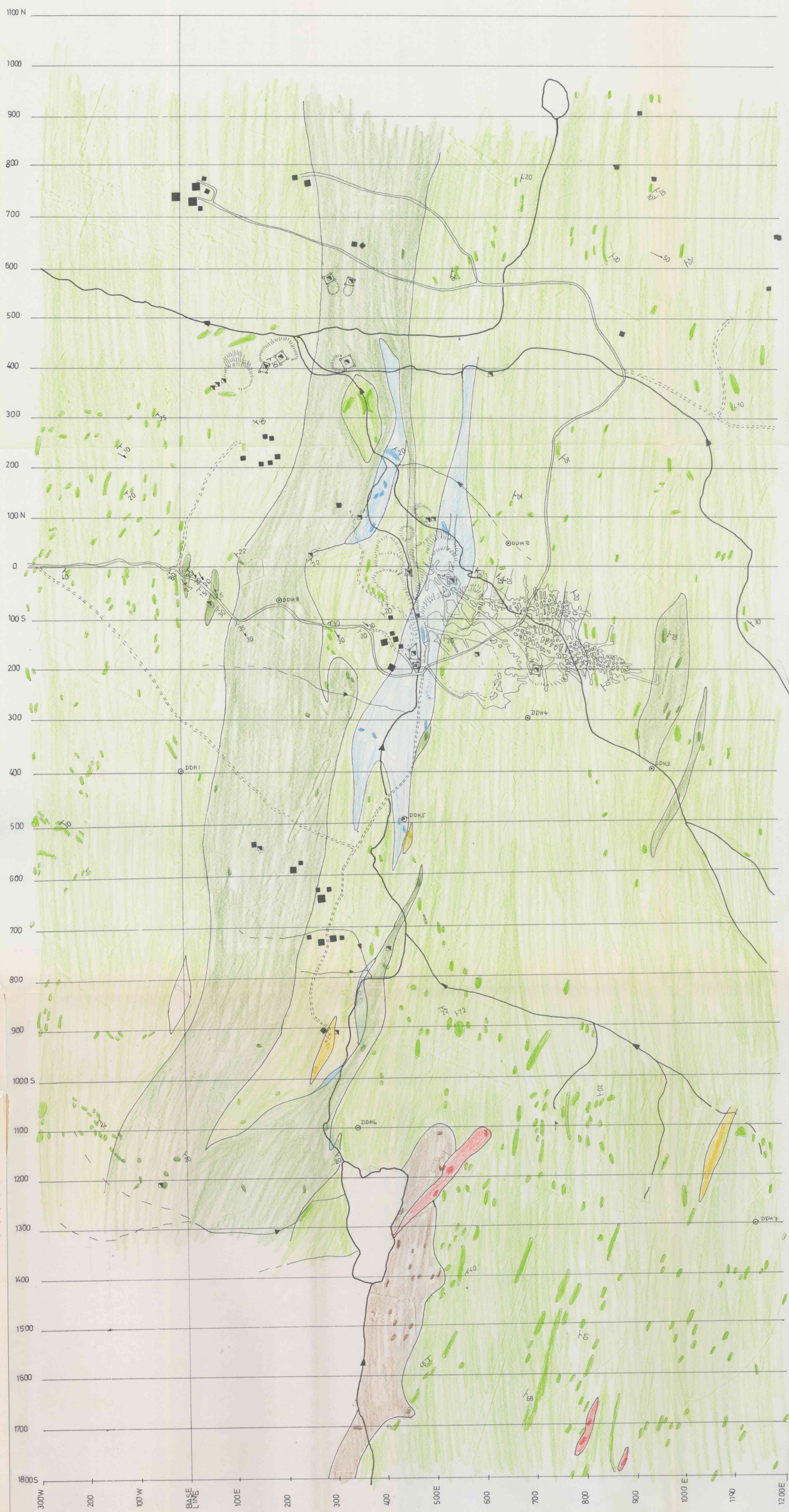
20-74-A1

MAP SHEET

1/2 SULFIDMALM

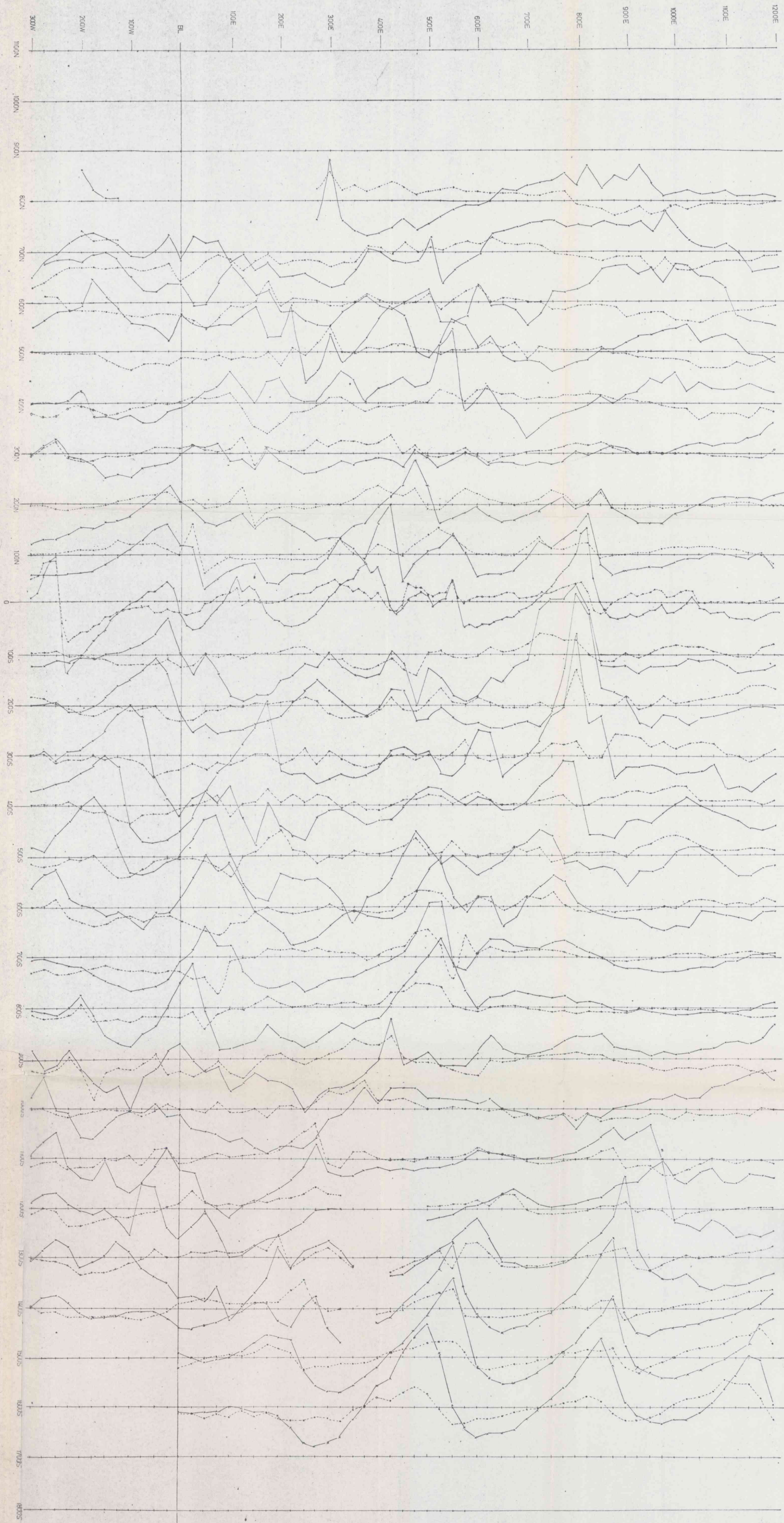


A-770000 3000 A-1 634 10271 Saurum Trakken



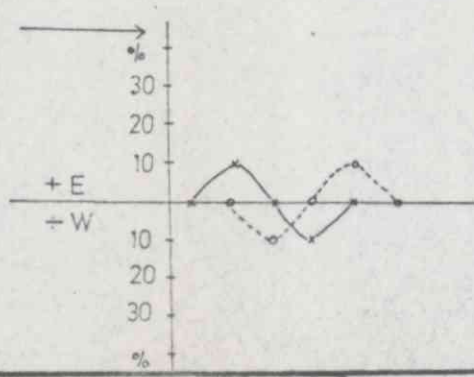
- BIOTITE QUARTZ SCHIST
- AMPHIBOLIT
- PHYLLITE SCHIST
- QUARTZITE
- TRONDHEJEMITE
- DIORITE
- SULPHIDE HORIZON
- OUT-GROP
- MINE, SHAFT, ADIT
- DUMP
- PLAN OF MINE WORKINGS FROM 1677 MAP
- DRILL HOLE
- BULDINGS
- ROAD
- STREAMS, RIVERS

GEOLOGY OF KVIKNE HOVEDGRUVE	SCALE	OBS. ARS BW 74
	1:4000	DRAW. LN 12
		CHK.
	MAP NO.	20-74-A2
SULFIDMALM		MAP SHEET



INNSTR. GEONICS EM16

— Real comp.
- - - Imag "

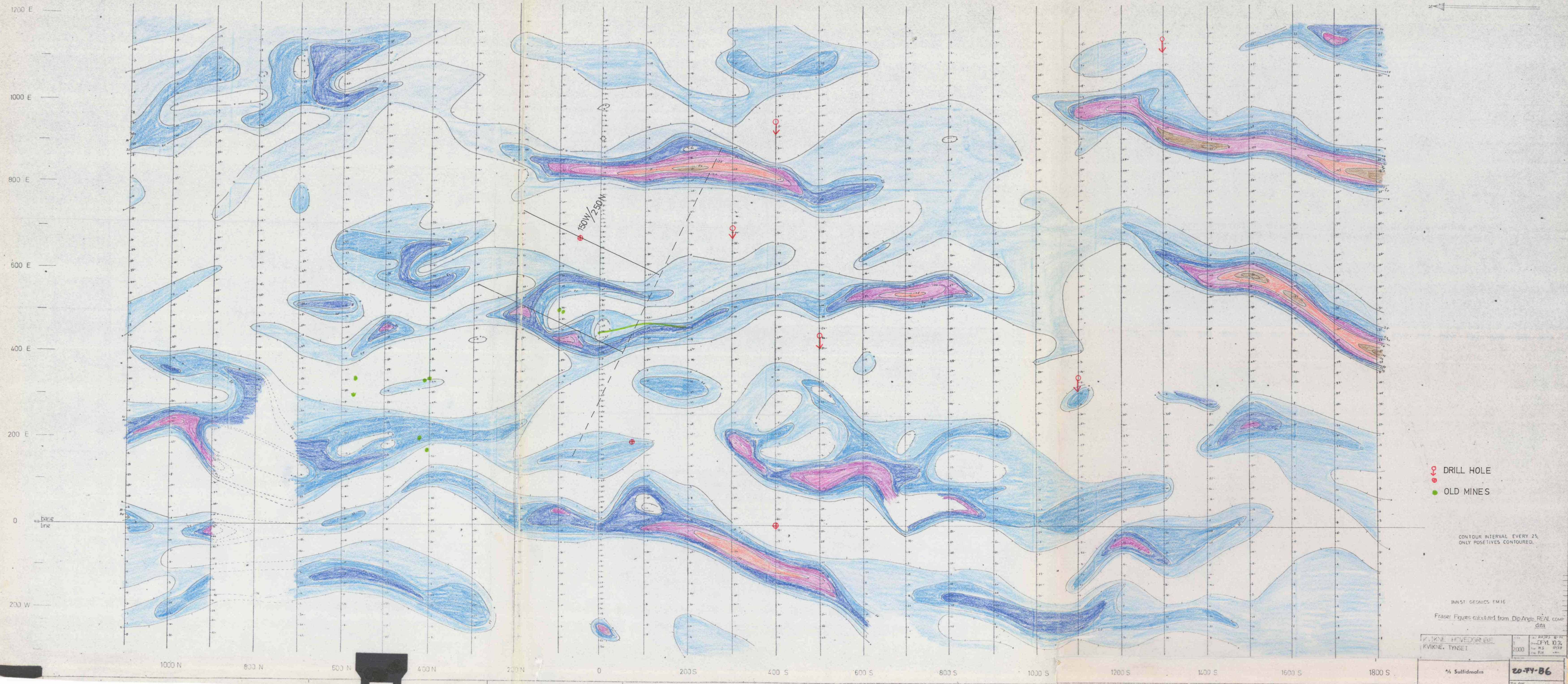


KVIKNE HOVEDGRUBE
KVIKNE, TYNSET
VLF-DIP ANGLE MAP

% SULFIDMALM

SCALE
1:10000
1:20000
1:50000
1:100000

20-74-B8



DRILL HOLE
OLD MINES

CONTOUR INTERVAL EVERY 25,
ONLY POSITIVES CONTOURED.

INST. GEONICS EM16
Fraser Figures calculated from Dip Angle REAL comp data
KVIKNE HOVEDGRUBE
KVIKNE, TYNSET
1:2000
20-74-86
% Sulfidmalm

1200 E

1000 E

800 E

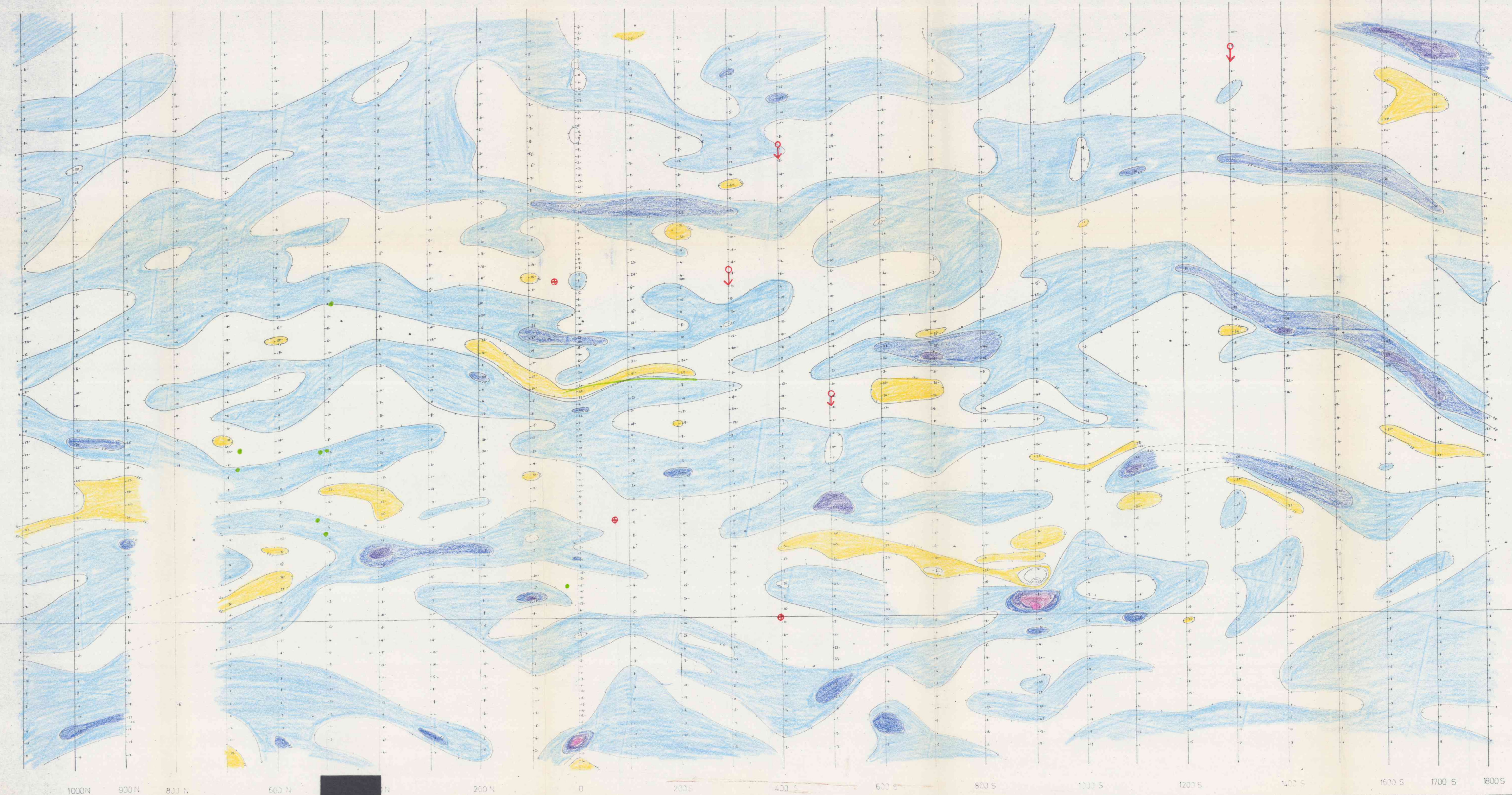
600 E

400 E

200 E

0

200 W

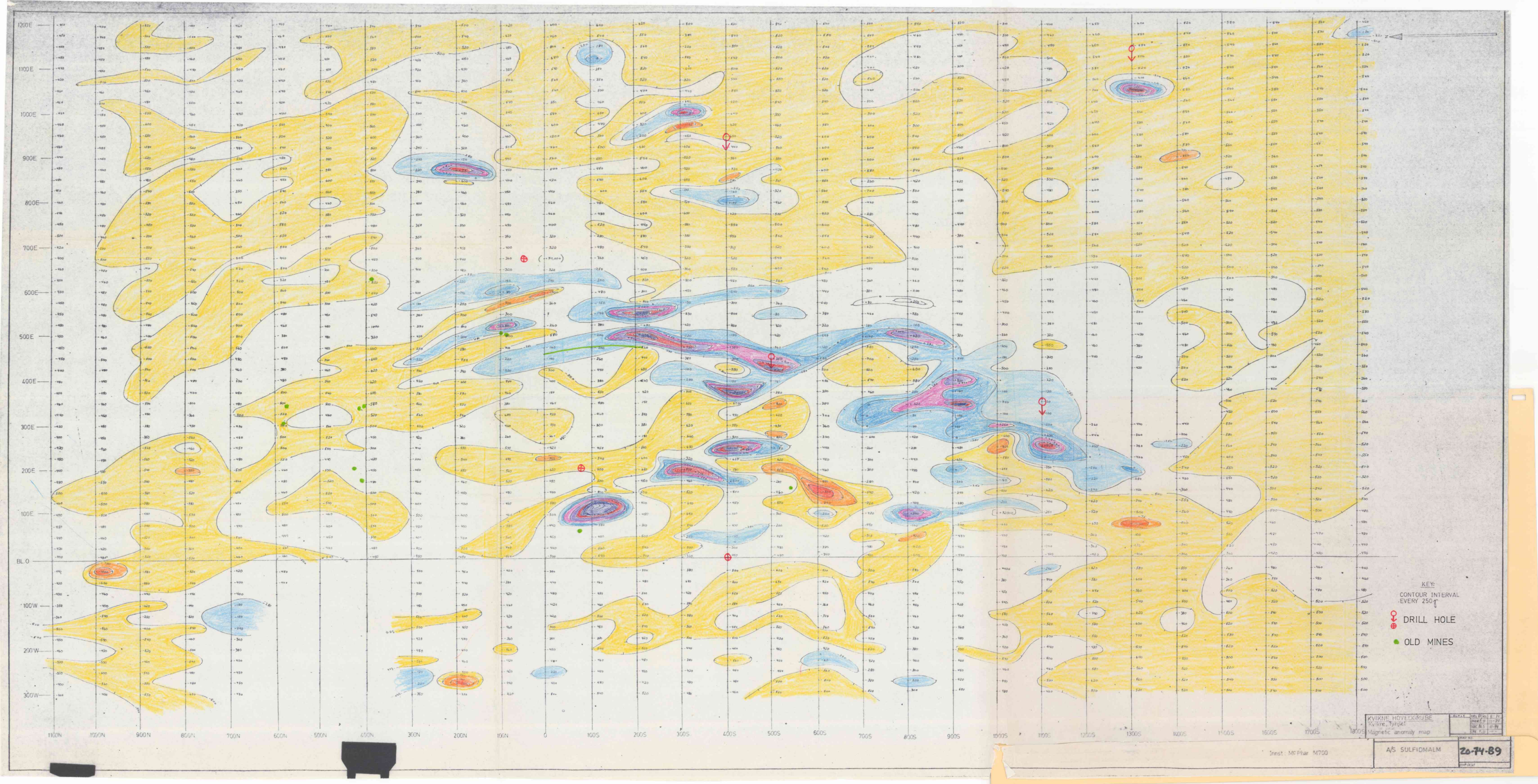


DRILL HOLE
OLD MINES

CONTOUR INTERVAL EVERY 25.

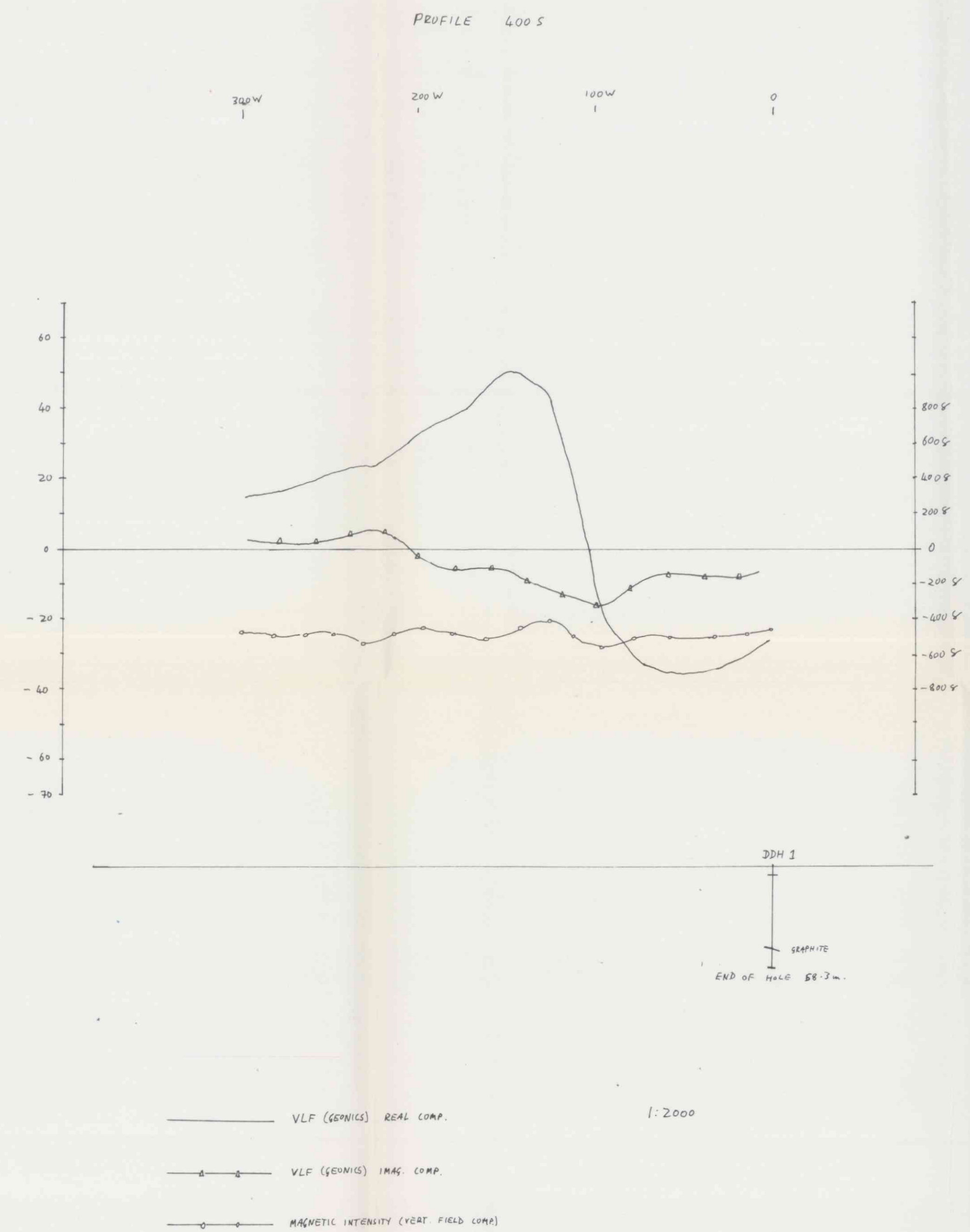
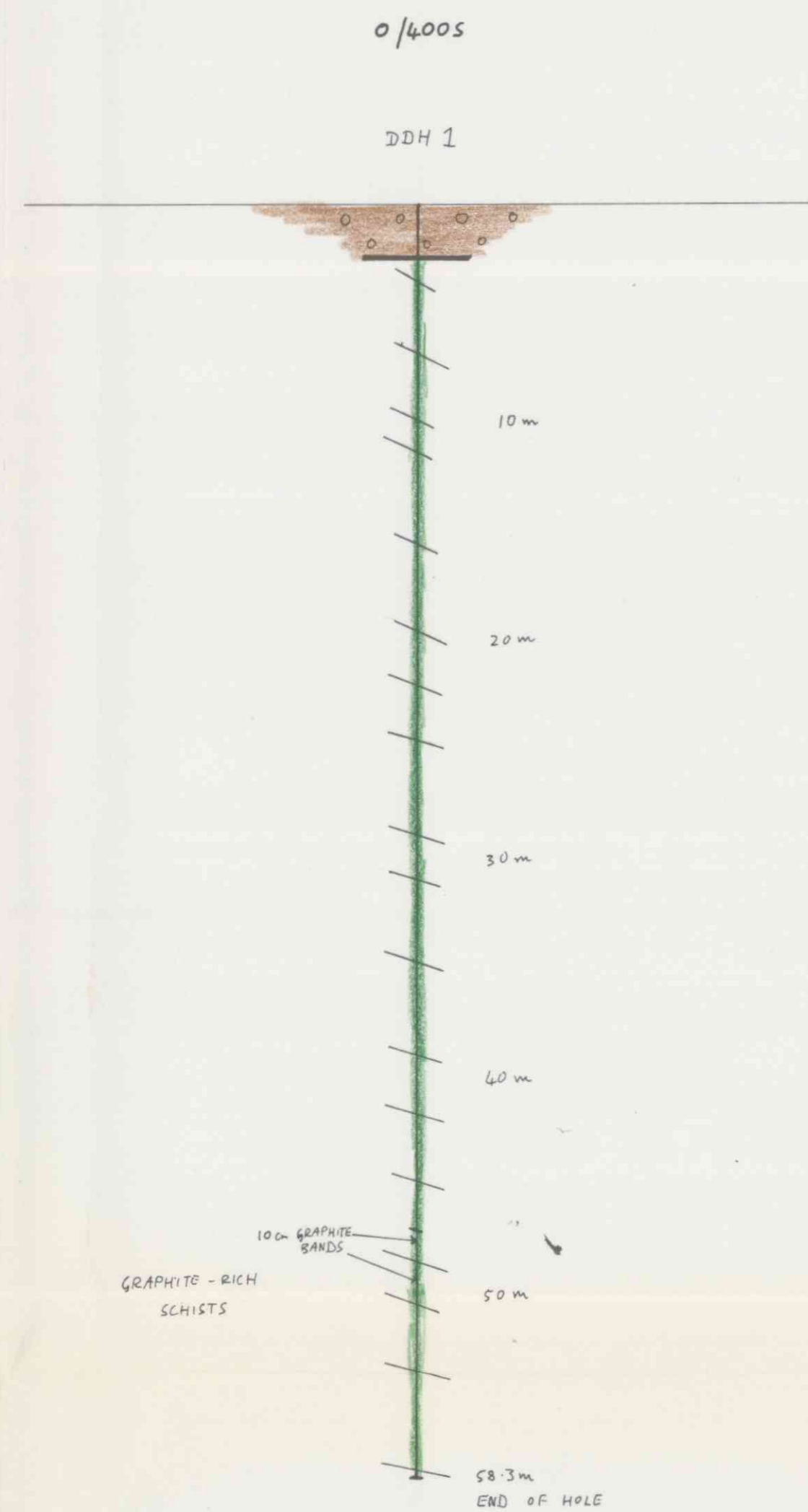
INNST. GEONICS EM16

FRAGER, FIGURES calculated from VLF IMAGINARY COMP DATA	
KVIKNE HOVEDGRUBE	1-10-79
KVIKNE, TYNSET	1-10-79
% Sulfidmalm	20-74-B7

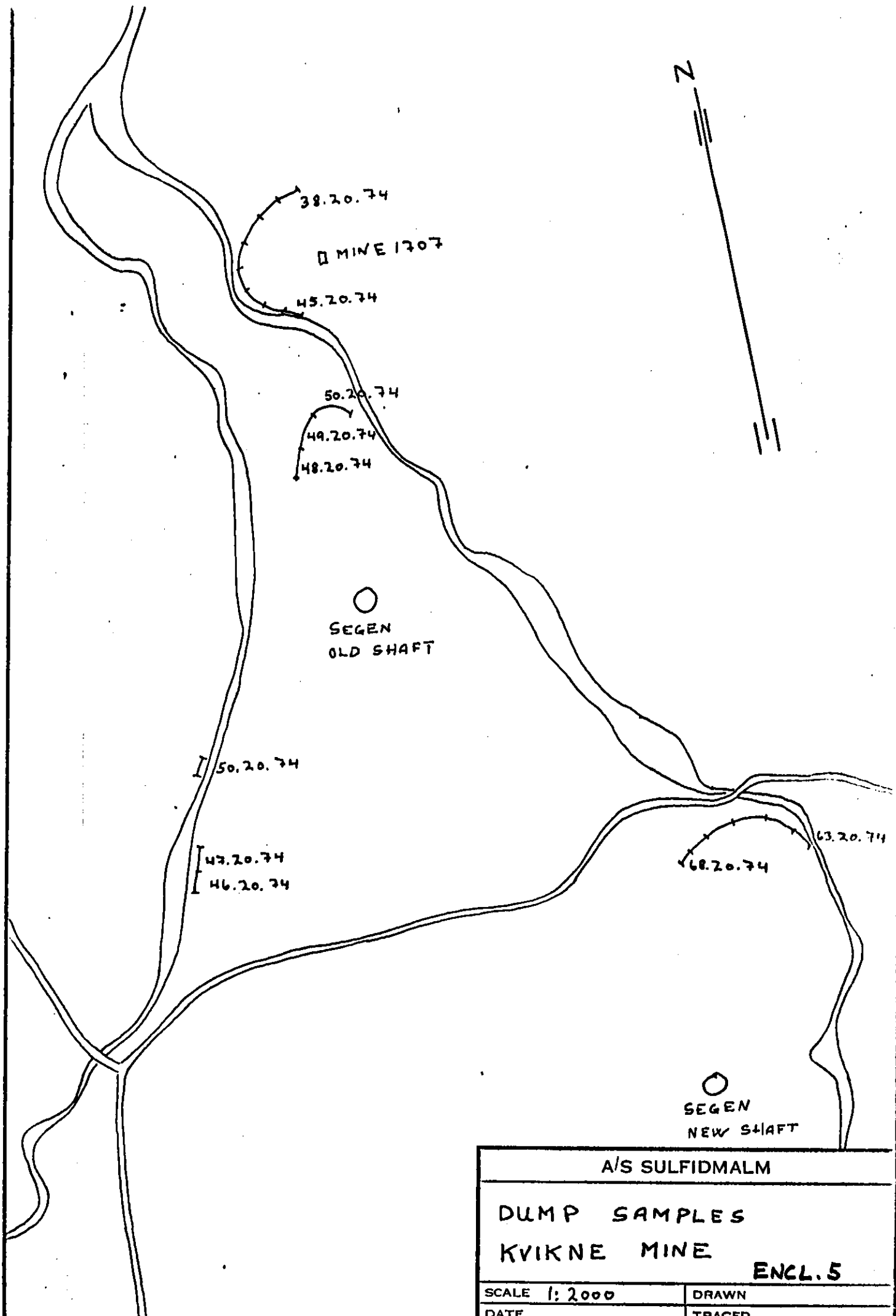


KEY:
CONTOUR INTERVAL
EVERY 250
DRILL HOLE
OLD MINES

KVIKNE HOVEDGRUBE
KVikne, Tynset
Magnetic anomaly map
A/S SULFIDMÅL
20-74-89



DIAMOND DRILL HOLE 1 0-400 S. VERTICAL. KVIKNE.	SCALE	OBS.	RS	10-74
	1:250	DRAW.	RS/DE	10-74, 1-75
		TRAC.	DE	1-75
		CHK.	RS	
1/2 SULFIDMALM	MAP NO.			
	20-75-D2			
	MAP SHEET 1/200			



A/S SULFIDMALM	
DUMP SAMPLES	
KVIKNE MINE	
ENCL. 5	
SCALE 1: 2000	DRAWN
DATE	TRACED

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 50N/675E BEARING: _____ DIP: 90 HOLE NO: 2 SHEET NO: 1
 LOGGED BY: RS STARTED: 14/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 16/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED): _____
 SUMMARY LOG: _____

From	To	Description
0	3.6	Overburden
3.6	28.9	Quartz mica schist, both biotite and muscovite. Some amphibolitic bands occur. Some graphite.
28.9	34.0	Banded amphibolite.
34.0	68.5	Quartz biotite garnet schist with amphibolitic band. Trondhjemites occur around 52 m. Po impregnated bands around 62 m.
68.5	73.4	Weakly banded amphibolite with Po and Py.
73.4	82.7	Mixed rock eg. alternating biotite schist and amphibolite. Sulphides from 80-83.
82.7	91.5	Quartz muscovite schist with amphibolite.
91.5	101.8	Mixed rock eg. alternating mica schist and amphibolitic bands.
101.8	108.9	Amphibolite
108.9	111.1	Quartz biotite schist.
111.1	126.5	Amphibolite. Band with Po.
126.5	138.8	Quartz biotite schist with sulphides around 128.0 m and 135 m.
	138.8	End of hole.
		Anomaly probably caused by sulphides at 70 m and 120 m.

^A/_s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 50N/675E BEARING: _____ DIP: 90 HOLE NO: 2 SHEET NO: 2
 LOGGED BY: RS STARTED: 14/10 PROPERTY: Kvikne
 CASING: 8M FINISHED: 16/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED): _____
 SUMMARY LOG:

From	To	Description
0	3.6	Overburden
3.6	28.9	Quartz biotite schist with pronounced banding. Some millimeter broad graphite-rich bands occur. Quartz veins are common. They always seem to have an irregular pattern, both concordant and discordant to the foliation. Some feldspathic veins with a regular pattern to other structural elements as foliation, lineation. The competent bands and veins are brittle deformed and appear as small boudins, lenses or prophyroclasts. In most cases the boudin lines are parallel to lineation.
28.9	34.0	Banded amphibolite. Mainly amphibole rich bands, feldspar rich bands and mica rich bands. Some of the amphibole rich bands have a nearly random orientation of the amphiboles. The contact to the rock above and the rock beneath is gradual.
34.0	39.8	Quartz biotite muscovite garnet schist. The biotites have a tentacular shape. The longest axes of these biotites marks a good lineation. Often the garnets have the same lens shape. Amphibolitic bands occur. They always have a gradual contact to the quartz.

1/5 SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 50N/675E BEARING: DIP: 90 HOLE NO: 2 SHEET NO: 3
 LOGGED BY: RS STARTED: 14/10 PROPERTY Kvikne
 CASING: 3M FINISHED: 16/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG:

From	To	Description
		biotite schist.
39.8	40.1	Coarse grained amphibolite.
40.1	52.5	Quartz mica schist with some millimeter sized graphite-rich bands. The biotite content increase towards the bottom This gives the rock a darker colour. Amphibolitic zones and bands are common. They always have gradual change to the quartz biotite schist. Between 51 and 52 m two 5 cm broad trondhjemites occure. They are both concordant to the foliation, and they also have a weak internal foliation which is parallel to the external foliation.
52.5	53.5	Trondhjemite with concordant borders to the wallrock.
53.5	58.8	Quartz biotite schist with minor garnets and muscovite. Banding is common and some of the competent (quartz feldspar) bands are deformed, they occure now as streaked out lenses and porphyroclasts. Increasing muscovite and garnet content downwards. At 54.7 a 10 cm broad sulphide impregnated band occure. Total 1-2% mainly po but also py and cpy.

1/5 SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 50N/675E BEARING: - DIP: 90 HOLE NO: 2 SHEET NO: 4
 LOGGED BY: RS STARTED: 14/10 PROPERTY Kvikne
 CASING: 3M FINISHED: 16/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG:

From	To	Description
		The sulphide grains occur as irregular shaped - and as streaked out grains.
58.8	60.2	Quartz muscovite schist with lens-shaped biotite. They mark a good lineation. Competent bands are boundinaged with boundinline parallel to lineation. Grain size decrease downwards-
60.2	60.7	Amphibolitic rock with garnets. Gradual change to the wall rock. Amphibole pophyroclasts are common.
60.7	64.1	Mixed rock. Alternating quartz muscovite schist, quartz biotite schist and amphibolite. Garnets and lens-shaped biotites are common in the quartz muscovite schist. Sulphide impregnation at: 61.7 5 cm broad band with 1% sulphides. Mainly Po, but also some py and cpy. Quartz, garnet, amphibole-rich matrix. 62.1 30 cm broad band with less than 1% Po. 62.8 15 cm broad band with 1-2% po.
64.1	68.5	Quartz muscovite schist with lenticular biotites and some garnets. Gradual change to wallrock.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 50N/675E BEARING: - DIP: 90 HOLE NO: 2 SHEET NO: 5
 LOGGED BY: RS STARTED: 14/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 16/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG:

From	To	Description
68.5	73.4	Amphibolite. Partly banded and foliated partly nearly massive. Sulphide impregnation. Mainly Po but also some py and cpy. Total content 1-2%.
73.4	81.0	Mixed rock. eg. alternative amphibolitic and quartz biotite schist.
81.0	82.7	Banded amphibolite with garnets. Grain size decrease towards bottom and the banding is also more pronounced downwards. Both the upper and the lower contacts are sharp. Sulphides occure, mainly as Po but also Py and Cpy. Total content 2-3%.
82.7	91.8	Quartz muscovite schist with small lens-shaped biotites. The rock is fine grained and have a banded appearance, both because of some biotite - rich bands and some amphibolitic bands.
91.5	101.8	Mixed rock. Alternation between quartz biotite schist, quartz muscovite schist and amphibolite. Gradual change between these different types of bands. Some rich in quartz and garnets occure, they are often boundinaged. Often porphyroclasts are developed on the margins of these boundins.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 50N/675E BEARING: - DIP: 90 HOLE NO: 2 SHEET NO: 6
 LOGGED BY: RS STARTED: 14/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 16/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
		The boundinlines are parallel to the mineral lineation.
		From this schist there is a gradual change to a more amphibolitic rock.
101.8	106.1	Banded amphibolite. Some biotite-rich bands occure.
		Quartz feldspathic veins with an irregular pattern are common.
106.1	106.95	Biotite schist.
106.95	108.9	Banded amphibolite.
108.9	111.1	Quartz biotite schist with minor muscovite. Gradual change to an amphibolitic rock.
111.1	126.5	Banded amphibolite. Alternating amphibole-rich and biotite-rich bands.
		Po impregnated band at 125.2, 40 cm broad with 10-15% Po. The sulphide grains occure as irregular grains and as streaks in an amph. garnet-rich matrix.
126.5	139.9	Quartz biotite schist.
		Banding is common.
		Sulphide impregnated bands occure at 127.8, 40 cm broad band with 10-15% Po.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 50N/675E BEARING: - DIP: 90 HOLE NO: 2 SHEET NO: 7
 LOGGED BY: RS STARTED: 14/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 16/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

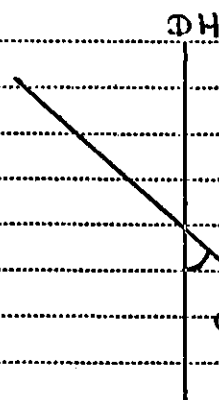
SUMMARY LOG

From	To	Description
		The sulphide grains occur as both irregular and streaked out grains in an amphibole garnet-rich matrix.
128.9	20	cm broad band with 2-3% po. The sulphide occurs as small lens-shaped grains in an amphibolitic matrix.
134.9	10	cm broad band with weak po impregnation.
135,25	20	cm po impregnated band.
		Total 5%.
139.9		End of hole.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 50N/675E BEARING: - DIP: 90 HOLE NO: 2 SHEET NO: 8
 LOGGED BY: RS STARTED: 14/10 PROPERTY Kvikne
 CASING: 3M FINISHED: 16/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 CORE-ANGLES:

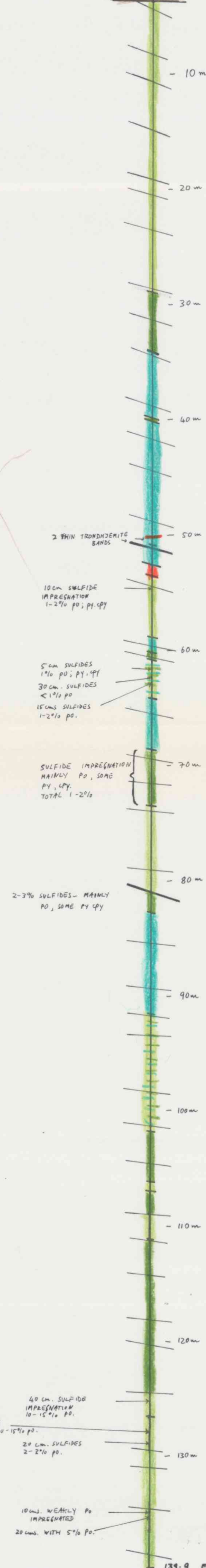
From	To	Description		
		DEPTH	ANGLE	TYPE
		4.5	65	
		8.2	70	
		10.6	70	
		14.8	70	
		19.1	74	
		20.5	74	
		23.5	75	
		28.6	76	
		31.3	73	
		34.4	70	
		38.8	72	
		41.7	73	
		44.4	73	
		48.6	74	
		51.15	75	Contact Trondhjemite
		54.5	74	
		59.7	78	
		60.6	78	
		65.5	78	
		69.5	80	
		71.6	85	
		74.0	85	
		79.1	85	
		81.0	72	Contact
		85.5	80	
		89.4	84	
		91.7	83	
		93.5	88	
		98.4	83	
		101.4	83	
		104.5	83	
		109.0	86	
		111.2	83	
		114.3	84	
		118.1	85	
		120.3	80	

DIAMOND DRILL RECORD

CORE ANGLES

[illegible]

50N/650E
DDH 2

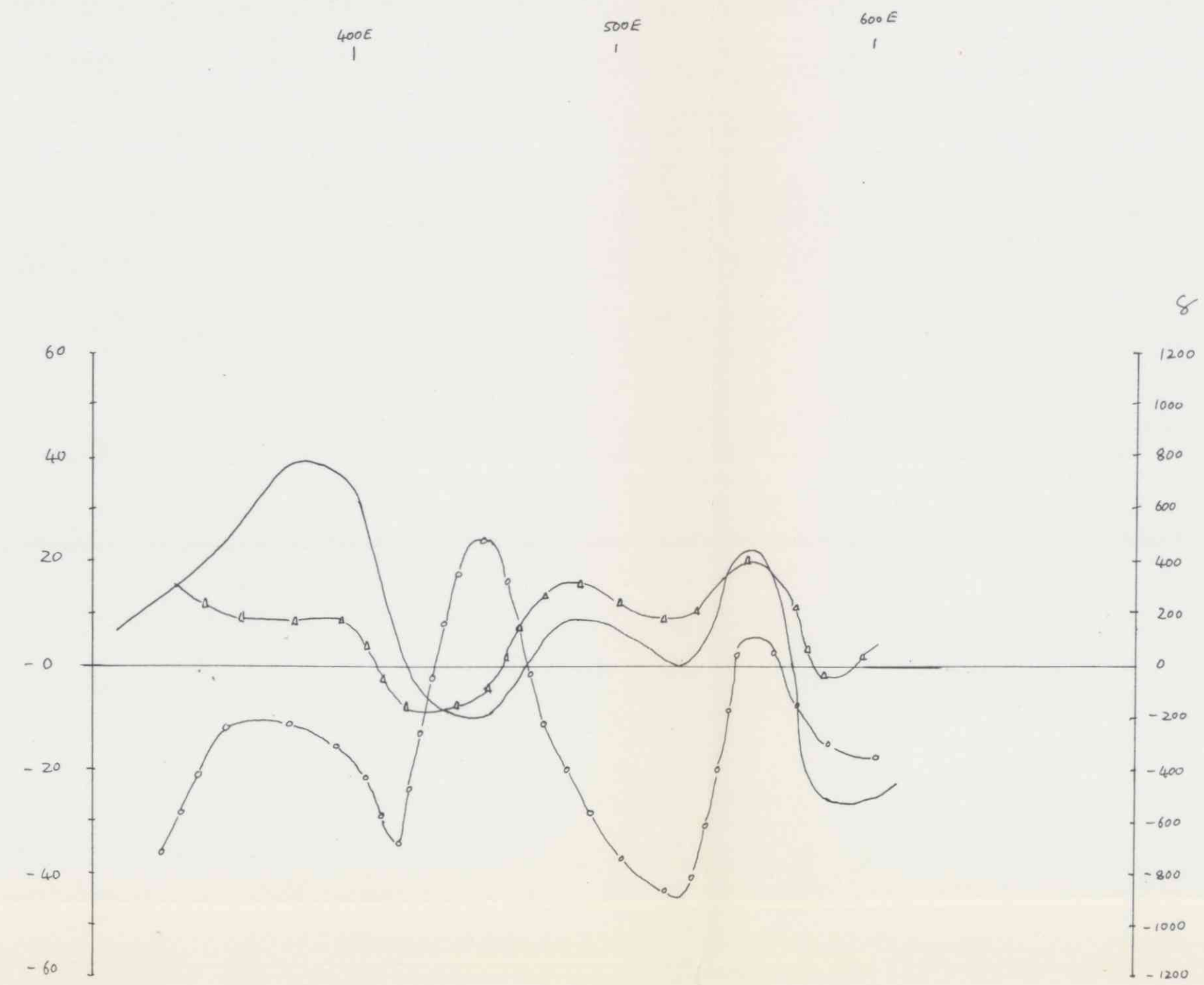


Cu %	Zn %	S %
0.016	0.01	1.13
0.017	0.008	2.42

Cu %	Zn %	S %
0.032	0.011	0.36
0.014	0.009	1.95
0.012	0.007	1.38

Cu %	Zn %	S %
0.011	0.009	2.21
0.011	0.008	0.84
0.014	0.008	1.40
0.013	0.01	1.90

- Overburden
- Quartz biotite schist
- Amphibolite
- Quartz biotite muscovite schist
- Mixed schists and amphibolite
- Contact
- Foliation
- Contact and foliation



DDH2
50N/650E

GRAPHITE BANDS

50m - 1-2% PO, PY, CPY
5-1% PO, PY, CPY
1-2% PO, PY, CPY

100m - 2-3% PO, PY, CPY

10-15% PO
5% PO

END OF HOLE 139.9

— VLF (GEONICS) REAL COMP.

- - - VLF IMAG. COMP.

o - o - MAGNETIC INTENSITY (VERTICAL FIELD)

1:2000

Diamond drill hole 2		SCALE	OBS. RS	10-74
50N - 650 E. Vertical.		1:250	DRAW. RS/DE	10-74/1-75
Kvikne.			TRAC. DE	1-75
			CHK.	
1/2 SULFIDMALM		MAP NO.		
		20-75-D1		
		MAP SHEET 1520 1/4		

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 400S/950E BEARING: W DIP: 45 HOLE NO: 3 SHEET NO: 1
 LOGGED BY: RS STARTED: 9/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 14/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

From	To	Description
0	4.1	Overburden
4.1	8.5	Quartz biotite muscovite schist. Some graphite-rich bands around 7 m, also some Po rich stringers.
8.5	12.8	Amphibolite banded.
12.8	19.8	Quartz biotite schist with amphibolitic bands. Narrow bands with Po impregnation.
19.8	30.1	Amphibolite with mica-rich bands. Sulphide impregnation around 27 and 30 m.
50.1	63.0	Mica schist with both biotite and muscovite. Amphibolitic zones occur. Sulphides around 41, 50. Mainly Po.
63.0	80.0	Quartz biotite with graphite.
80.0	87.6	Quartz biotite muscovite schist.
	87.6	End of hole.
		EM anomaly probably caused by sulphide impregnation at 27 and 30, by sulphide impregnation at 41, by sulphide impregnation at 50 and by a graphite zone between 63 and 80.

^A/_s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 400S/950E BEARING: W DIP: 45 HOLE NO: 3 SHEET NO: 2
 LOGGED BY: RS STARTED: 9/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 14/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

From	To	Description
0	4.1	Overburden.
4.1	5.3	Quartz biotite schist with some muscovite. The rock is banded. Quartz veins are common and they are concordant foliation and banding. Some of these are boudinaged with boudinline parallel to lineation marked by biotite.
5.3	5.7	5-10 cm broad central quartzite with marginal zones of amphiboles and garnets. The garnets increase in size towards the quartzite.
5.7	8.5	Quartz biotite schist with some millimeter broad graphite-rich bands. Sulphide at 7.8. 5 cm broad band with 5% Po. Some of the grains occur as stringers, but others have an irregular shape.
8.5	12.8	Amphibolite with garnets. Banded. Some mica-rich bands, some coarse grained amphibolitic bands and some fine grained amphibolitic bands with good foliation and and reduced size of garnets. Garnets as porphyroclasts in these fine grained bands. Amphiboles in the coarse grained bands have a random orientation. Some quartz feldspathic bands are boudinaged. Boudinline parallel to mineral lineation.

N₁ SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 400S/950E DEARING: W DIP: 45 HOLE NO: 3 SHEET NO: 3
 LOGGED BY: RS STARTED: 9/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 14/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

From	To	Description
12.8	13.7	Quartz biotite schist with muscovite garnets and clorite. Banding and foliation are good. Garnets often occur as porphyroclasts.
13.7	14.7	Amphibolitic rock. In the central parts this rock is coarse grained with a nearly random orientation of the amphiboles. Towards the margins the rock has good foliation and is fine grained. Po impregnated band at 13.7. 6-7 cm broad. The matrix minerals are amphibole and garnets. Total content of Po 30%.
14.7	15.7	Quartz biotite schist with garnets. Amphibolitic bands occur. Gradual change from the amphibolite to this quartz biotite schist.
15.7	16.5	Banded amphibolite with garnets. Gradual change to the wallrock. Sulphide impregnation at 16.0 m as a 15 cm broad band with Po. Total 1-2%.
16.5	19.1	Quartz biotite schist with quartz feldspar-rich bands. Often these bands are boudinaged because of the difference in competence. The boudinlines are parallel to a mineral lineation in the rock. Crinkels occur on the foliation and these make an angle of approx. 250 with the mineral lineation. Sulphide impregnated 10 cm broad band at 19.0 m. Mainly Po in a garnet amphibole-rich matrix. Total 1% Po.

1/5 SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 400S/950E BEARING: W DIP: 45 HOLE NO: 3 SHEET NO: 4
 LOGGED BY: RS STARTED: 9/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 14/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

From	To	Description
19.1	19.8	Quartz muscovite schist with lens-shaped biotites and some garnets. The biotites mark a good lineation.
19.8	30.2	Banded amphibolitic rock. Three different type of bands; amphibole-rich bands, quartz feldspar-rich bands, and mica-rich bands. Garnets are common in this rock. Some of the bands are strongly tectonized and porphyroclasts are often developed. Sulphide impregnation is common. It is mainly Po which occur and the matrix is always coarse grained amphibole, garnets and quartz. Another common thing with these Po - rich bands is quartz muscovite schist on the margins. Sulphide impregnation at: 20.2 as a 15 cm broad with 1-2% Po. On the margins garnets porphyroclasts occur. 24.4 5 cm broad Po - rich band with 50% Po. 27.0 35 cm broad band with Po and Py in a garnet amphibole-rich matrix. Total sulphide content 10-15%. Py 1-2%. 30.0 25 cm broad band with 10-15% Po in an amphibole garnet - rich matrix.

^N/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 400S/950E BEARING: W DIP: 45 HOLE NO: 3 SHEET NO: 5
 LOGGED BY: RS STARTED: 9/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 14/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
30.2	33.5	Quartz muscovite schist with small lenticular biotites. Some amphibolitic bands occur. Some of those contain garnets.
33.5	36.6	Banded amphibolite. The banding is marked as a alternation between amphibole-rich bands, mica-rich bands. Some of the amphibole-rich bands are coarse grained with a slight random orientation of the amphibole. Often a graduated change from the coarse grained type to the more fine grained foliated amphibolite. Also a gradual change from the amphibolite to the biotite - rich schist types. Cross-cut quartz veins are common. They do not seem to have a regular pattern. Porphyroclasts are common.
41.0		Quartz muscovite schist with lens-shaped biotites. Coarse grains. Amphibolitic bands occur. Sulphide impregnation at: 40.4 - 40.9 10%. Mainly Po but also some Py. The sulphides occure as streaky grains in garnet-amphibole matrix. Tectonical garnets on the margins.

1/5 SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 400S/950E BEARING: W DIP: 45 HOLE NO: 3 SHEET NO: 6
 LOGGED BY: RS STARTED: 9/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 14/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
41.0	49.95	Quartz biotite garnet schist with a pronounced banding. Cross - cutting veins occur. When they are nearly parallel to the foliation they are boudinaged with the boudin line parallel to the mineral lineation. Some of the garnets seem to be parallel post foliation.
49.95	50.9	Amphibolite with cross-cutting quartz veins. Sulphide impregnation at: 50.0 as a 25 cm broad with 5% Po in a garnet amphibole-rich matrix.
50.9	59.0	Quartz, biotite muscovite schist with some chlorite.
59.0	60.3	Quartz biotite garnet schist.
60.3	61.0	Quartz biotite muscovite schist.
61.0	61.45	Amphibole garnet-rich some with some Po and Cpy. Total sulphide content 10%. Cpy < 1%.
61.45	63.10	Core loss.
63.10	80.0	Graphite containing quartz biotite garnet schist. The graphite occur in millimeter broad bands.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 400S/950E	BEARING: W	DIP: 45	HOLE NO: 3	SHEET NO: 7
LOGGED BY: RS	STARTED: 9/10	PROPERTY Kvikne		
CASING: 3M	FINISHED: 14/10	Hovedgruver		
CORE SIZE: AX	TESTS (CORRECTED):			

SUMMARY LOG

From	To	Description
80.0	87.6	Quartz biotite muscovite schist with a weak banding.
	87.6	End of hole.

N/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 400S/950E BEARING: W DIP: 45 HOLE NO: 3 SHEET NO: 8
 LOGGED BY: RS STARTED: 9/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 14/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

CORE ANGLES

From	To	Description
DEPTH	ANGLES	TYPE
4.2	70	Foliation
8.5	70	"
10.5	70	
15.4	72	
18.4	68	
21.5	74	
24.6	72	
27.7	68	
31.6	65	
34.4	63	
38.4	68	
40.3	68	
44.4	68	
48.7	67	
51.2	73	
54.5	67	
59.5	72	
60.5	65	
65.4	67	
69.8	63	
70.3	68	
75.5	72	
79.4	74	
80.4	73	
85.3	73	
87.6	73	

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 300S/700E BEARING: W DIP: 45 HOLE NO: 4 SHEET NO: 1
LOGGED BY: RS STARTED: 3/10 PROPERTY: Kvikne
CASING: 3M FINISHED: 8/10 Hovedgruver
CORE SIZE: AX TESTS (CORRECTED):
SUMMARY LOG

From	To	Description
0	5.0	Overburden
5.0	31.0	Quartz biotite schist with some muscovite. Banding is common.
31.0	58.5	Quartz biotite schist with bands of graphite. Garnets occur in the lower parts.
58.5	80.0	Banded amphibolite with some garnets. Po and Py impregnated bands occur at 64 m.
80.0	107.0	Quartz biotite schist with some amphi- bolitic bands. Some Po impregnation at 1.
107.0	108.0	Quartz biotite schist with some graphite.
108.0	114.5	Quartz biotite schist with some bands impregnated with Po.
114.5	122.6	Amphibolite with some mica-schist.
	122.6	End of hole.
		EM anomaly are probably caused by graphite zone at 31.0-58.5, also some Po impregnation in the same zone, and by Po impregnated schist and some graphite between 105.0 and 110.0.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 300S/700E BEARING: W DIP: 45 HOLE NO: 4 SHEET NO: 2
 LOGGED BY: RS STARTED: 3/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 8/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOGC

From	To	Description
0	5.0	Overburden.
5.0	31.0	Quartz biotite schist with some muscovite. Banding is common. Some bands are quartz feldspar-rich and some are mica-rich. Cross cutting quartz veins occur, but they do not have any regular pattern. Biotite marks a good lineation.
31.0	54.2	Quartz biotite schist with bands of graphite. Some Py occur in close connection with the graphite bands.
54.2	54.6	Massive quartzite. On the margins of this quartzite narrow with muscovite-rich schist occur. Lots of garnets occur here. The quartzite is weakly mineralized. Both Po, Py and Cpy. Total less than 1%.
54.6	58.6	Quartz biotite garnet schist. Garnet porphyroclasts are common.
58.6	71.0	Amphibolite with some garnets occurring here and there. The amphibolite is banded with some bands rich in mica, mainly biotite, some in quartz feldspar and some in amphibole. Cross cutting quartz veins are common. They usually have an irregular pattern.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 300S/700E BEARING: W DIP: 45 HOLE NO: 4 SHEET NO: 3
 LOGGED BY: R.S. STARTED: 3/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 8/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

From	To	Description
		Sulphide impregnation at:
		63.6 7 cm broad band with Po and
		Py. Mainly Po. The sulphides
		occur as narrow bands or string-
		ers. 25%.
		63.8 10 cm broad band with some Po
		and some Py.
		Total 2-3 %.
		64.5 8 cm broad band with 5% Po.
71.0	73.2	Quartz biotite schist with some garnets.
		Gradual change from the amphibolite to this
		schist.
73.2	79.0	Coarse grained amphibolite. Sharp and
		irregular contact to the wallrock (schist).
79.0	82.0	Quartz biotite garnet schist with some
		amphibole garnet - rich bands.
82.0	89.8	Quartz biotite schist with some garnet and
		muscovite.
		Garnets occur in bands.
89.8	90.5	Coarse grained amphibolite with relatively
		sharp contact to the wallrock. Partly
		random orientation of the amphiboles.
90.5	106.9	Quartz muscovite schist with lens-shaped
		biotite and garnets. Some amphibole-rich
		bands occur. The biotites mark a good
		lineation. Sulphide impregnation as stringers
		and millimeter broad bands at 90.6, 94.5, 96.8,
		they all contain mainly Po. At 106.4 a 5 cm
		broad band with Po, Py and Cpy in a quartz-
		rich matrix.

DIAMOND DRILL RECORD

SUMMARY LOG

From	To	Description
106.9	108.2	Quartz biotite schist with some graphite. This graphite contains some Py.
108.2	114.5	Quartz biotite muscovite schist. Sulphide impregnation at: 108.7 10 cm broad band with stringers of Po. Total sulphide content 20%. 109.7 10 cm broad with 10% Po impreg- nation.
114.5	119.4	Strongly deformed amphibolitic rock with porphyroclasts of garnets and amphibole. The rock has a banded appearance. Some of the amphibolitic bands are coarse grained with partly random orientated amphiboles.
119.4	122.6	Fine grained quartz muscovite schist with some garnets.
	122.6	End of hole.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 300S/700E BEARING: W DIP: 45 HOLE NO: 4 SHEET NO: 5
LOGGED BY: RS STARTED: 3/10 PROPERTY: Kvikne
CASING: 3M FINISHED: 8/10 Hovedgruver
CORE SIZE: AX TESTS (CORRECTED):
CORE ANGLES

From	To	Description		
		DEPTH	ANGLES	TYPE
		5.6	75	Foliation
		9.1	74	"
		11.2	72	"
		14.5	70	"
		19.1	67	
		21.5	70	
		25.3	70	
		29.4	68	
		31.5	75	
		35.1	70	
		38.4	76	
		41.5	75	
		44.6	75	
		49.2	70	
		51.3	69	
		55.4	71	
		59.5	75	
		61.4	75	
		65.5	74	
		69.1	73	
		72.3	80	
		75.5	55	
		89.5	75	
		80.5	70	
		84.3	72	
		89.5	75	
		91.6	70	
		95.7	77	
		98.2	80	
		100.7	80	
		105.3	78	
		108.6	80	
		110.7	80	
		115.3	74	
		118.4	80	
		121.3	77	

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 300S/700E BEARING: W DIP: 45 HOLE NO: 4 SHEET NO: 1
 LOGGED BY: RS STARTED: 3/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 8/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
0	5.0	Overburden
5.0	31.0	Quartz biotite schist with some muscovite. Banding is common.
31.0	58.5	Quartz biotite schist with bands of graphite. Garnets occur in the lower parts.
58.5	80.0	Banded amphibolite with some garnets. Po and Py impregnated bands occur at 64 m.
80.0	107.0	Quartz biotite schist with some amphi- bolitic bands. Some Po impregnation at 1.
107.0	108.0	Quartz biotite schist with some graphite.
108.0	114.5	Quartz biotite schist with some bands impregnated with Po.
114.5	122.6	Amphibolite with some mica-schist.
	122.6	End of hole.
		EM anomaly are probably caused by graphite zone at 31.0-58.5, also some Po impregnation in the same zone, and by Po impregnated schist and some graphite between 105.0 and 110.0.

1/5 SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 300S/700E BEARING: W DIP: 45 HOLE NO: 4 SHEET NO: 2
 LOGGED BY: RS STARTED: 3/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 8/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOGG

From	To	Description
0	5.0	Overburden.
5.0	31.0	Quartz biotite schist with some muscovite. Banding is common. Some bands are quartz feldspar-rich and some are mica-rich. Cross cutting quartz veins occur, but they do not have any regular pattern. Biotite marks a good lineation.
31.0	54.2	Quartz biotite schist with bands of graphite. Some Py occur in close connection with the graphite bands.
54.2	54.6	Massive quartzite. On the margins of this quartzite narrow with muscovite-rich schist occur. Lots of garnets occur here. The quartzite is weakly mineralized. Both Po, Py and Cpy. Total less than 1%.
54.6	58.6	Quartz biotite garnet schist. Garnet porphyroclasts are common.
58.6	71.0	Amphibolite with some garnets occurring here and there. The amphibolite is banded with some bands rich in mica, mainly biotite, some in quartz feldspar and some in amphibole. Cross cutting quartz veins are common. They usually have an irregular pattern.

1/5 SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 300S/700E BEARING: W DIP: 45 HOLE NO: 4 SHEET NO: 3
 LOGGED BY: R.S. STARTED: 3/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 8/10 Hovedgruver
 CONE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
		Sulphide impregnation at:
		63.6 7 cm broad band with Po and Py. Mainly Po. The sulphides occur as narrow bands or stringers. 25%.
		63.8 10 cm broad band with some Po and some Py. Total 2-3 %.
		64.5 8 cm broad band with 5% Po.
71.0	73.2	Quartz biotite schist with some garnets. Gradual change from the amphibolite to this schist.
73.2	79.0	Coarse grained amphibolite. Sharp and irregular contact to the wallrock (schist).
79.0	82.0	Quartz biotite garnet schist with some amphibole garnet - rich bands.
82.0	89.8	Quartz biotite schist with some garnet and muscovite. Garnets occur in bands.
89.8	90.5	Coarse grained amphibolite with relatively sharp contact to the wallrock. Partly random orientation of the amphiboles.
90.5	106.9	Quartz muscovite schist with lens-shaped biotite and garnets. Some amphibole-rich bands occur. The biotites mark a good lineation. Sulphide impregnation as stringers and millimeter broad bands at 90.6, 94.5, 96.8, they all contain mainly Po. At 106.4 a 5 cm broad band with Po, Py and Cpy in a quartz-rich matrix.

1/5 SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 300S/700E BEARING: W DIP: 45 HOLE NO: 4 SHEET NO: 1
 LOGGED BY: RS STARTED: 3/10 PROPERTY: Kvikne
 CASING: 3N FINISHED: 8/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

From	To	Description
106.9	108.2	Quartz biotite schist with some graphite. This graphite contains some Py.
108.2	114.5	Quartz biotite muscovite schist. Sulphide impregnation at: 108.7 10 cm broad band with stringers of Po. Total sulphide content 20%. 109.7 10 cm broad with 10% Po impreg- nation.
114.5	119.0	Strongly deformed amphibolitic rock with porphyroclasts of garnets and amphibole. The rock has a banded appearance. Some of the amphibolitic bands are coarse grained with partly random orientated amphiboles.
119.0	122.0	Fine grained quartz muscovite schist with some garnets.
	122.0	End of hole.

^N/₅ SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 300S/700E BEARING: W DIP: 45 HOLE NO: 4 SHEET NO: 5
 LOGGED BY: RS STARTED: 3/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 8/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 CORE ANGLES

From	To	Description
		DEPTH ANGLES TYPE
		5.6 75 Foliation
		9.1 74 "
		11.2 72 "
		14.5 70 "
		19.1 67
		21.5 70
		25.3 70
		29.4 68
		31.5 75
		35.1 70
		38.4 76
		41.5 75
		44.6 75
		49.2 70
		51.3 69
		55.4 71
		59.5 75
		61.4 75
		65.5 74
		69.1 73
		72.3 80
		75.5 55
		89.5 75
		80.5 70
		84.3 72
		89.5 75
		91.6 70
		95.7 77
		98.2 80
		100.7 80
		105.3 78
		108.6 80
		110.7 80
		115.3 74
		118.4 80
		121.3 77

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E DRAWING: W DIP: 45 HOLE NO: 5 SHEET NO: 1
LOGGED BY: R.S. STARTED: 26/9 PROPERTY: Kvikne
CASING: 3M FINISHED: 2/10 Hovedgruver
CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG.

[illegible]

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E DEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 2
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTION):
 SUMMARY LOG:

FROM	TO	DESCRIPTION
0.0	3.0	Overburden
3.0	10.4	Quartz muscovite schist with lenticular biotites which markes a good lineation. Malacite in small quantities parallel to and on the foliation.
10.4	12.2	Amphibolite with garnets. The rock is banded. Some amphibole rich bands, some mica rich and some quartz and feldspar rich. The amphibolite change gradually to a more biotite rich rock towards the margins.
12.2	12.9	Biotite schist with quartz and feldspar. Good lineation and foliation.
12.9	14.2	Amphibolite with garnets. Bands which are more biotite rich are common. Gradual change from the amphibolite to the biotite rock types.
14.2	34.0	Quartz muscovite schist with biotite. The biotite content change downwards, the most common shape of the biotite are as small lenses, often strongly elongated. In the lower parts is this rock more feldspar and quartz rich. The feldspar and quartz often occure in bands which often are strongly elongated.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 3
 LOGGED BY: R.S. STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

FROM	TO	DESCRIPTION
		elongation often result in
		boundinage or necking.
		Boundinlines are parallel
		to lineation. The quartz-
		feldspathic bands are folded
		in isoclinal folds. Feldspar
		porphyroclasts are common.
		Crinkels occure on the foliation.
34.0	35.0	Coarse grained amphibolite. Banded-
		some amphibole rich and some mica
		mainly biotite rich bands. The amphi-
		bolite change to a more biotite rich
		rock towards the margins.
		At 34.1 occure a 5 centimeter band
		with sulphide impregnation. Mainly
		Po with minor Py and probably some
		Cpy. Total sulphide content 1-2%.
35.0	35.3	Quartz biotite schist.
35.3	37.1	Fine grained amphibolite with
		some sulphide streaks or stringers
		parallel to the foliation.
37.1	39.2	Quartz muscovite schist with
		lenticular biotites. The bio-
		tite content increase toward
		the margins. At the margins
		some amphibole rich bands oc-
		cure.
39.2	43.5	Banded amphibolitic rock. Sulphide
		impregnation from 41.95-42.45 and
		from 42.45-42.65., two different
		types. The first is a relatively coarse

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 4
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG:

FROM	TO	DESCRIPTION
		grains in a coarse grained amphibolitic matrix. The amphiboles have a random orientation. Mainly Po, ca. 10%. The second occur as streaks in a banded amphibolite, fine grained. Po ≈ 1%.
43.5	44.8	Quartz biotite schist.
44.8	51.5	Banded amphibolite. Some bands are rich in biotite, and some amphibole rich bands are coarse grained. These coarse grained bands have some Po, less than 1%. The grains (Po) have an irregular shape.
51.5	52.0	Quartz biotite schist.
52.0	60.2	Banded amphibolite with biotite rich bands. Gradual change from the amphibole rich to the biotite rich bands. Feldspar rich bands are also common. Sulphide occurs from 53.0 to 53.1, 53.3 to 53.45, 54.7 to 54.75 and from 59.1 to 59.2. They are all of impregnated type and it is mainly Po. The first and the last of this band contain around 5% Po, the other 1%.
60.2	60.4	Sulphide impregnation in a garnet containing amphibolitic rock. Mainly Po but also some Py. Total 10% sulphides.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E DEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 5
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgraver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

FROM	TO	DESCRIPTION
60.4	60.5	Banded amphibolitic rock.
60.5	60.95	Sulphide impregnated amphibolitic rock. Mainly Po with minor Py and Cpy. Py > Cpy. Total 15% sulphides.
60.95	74.5	Banded amphibolitic rock with garnets. Biotite - rich, feldspar - rich coarse grained amphibole - rich and fine grained amphibolitic band are the most common types. Sulphide - impregnation - often in connection with the coarse grained amphibolitic bands. Sulphide impregnated bands occur at 61.4 5% Po, 3 cm broad, at 61.5 1% Po, 3 cm broad. From 62.0 to 62.15 Po impregnation 5%.
		63.10 - 63.15 Po, 15%
		64.10 Po stringers (streaks)
		64.4 Po stringers "
		64.8 Po stringers "
		64.95 - 66.05 Mainly Po some Py. Total 10-15%.
		The sulphides occur as stringers and bands in a banded amphibolite.
		66.05 - 67.00 Po rich streaks of mm size.
		72.5 - 72.8 Mainly Po. Total 5% Occure as stringers and bands in a garnet amphibole matrix.
		73.7 - 74.05 Mainly Po, minor Py, Cpy.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE No: 5 SHEET No: 6
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG.

FROM	TO	DESCRIPTION
		The sulphides occure as stringers and bands.
		The matrix is garnet rich.
		74.25 - 74.5 Sulphide streaks. Mainly Po, but also some Py. Total 5%.
74.5	80.5	Quartz biotite schist with garnets. Gradual change from the amphibolite, marked by increasing biotite content. Cataclastic structure marked by garnet and quartz porphyroclasts.
80.5	82.3	Amphibolite with garnets. Banded with alternating biotite rich-, and quartz feldspatic bands. In the biotite rich bands are porphyroclasts common.
82.3	84.4	Quartz biotite schist with garnets and muscovite. Some bands with amphibole and garnets. Gradual change from quartz biotite schist to the amphibole garnet rich zones.
84.4	86.2	Amphibolite with garnets. This rock is partly coarse grained and partly fine grained. The fine grained aereas have banding. Sulphide impregnation:
		84.7 - 85.4 Mainly Po, but also some py and cpy.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E DEARING: W DIP: 45 HOLE No: 5 SHEET No: 7
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

FROM	TO	DESCRIPTION
		Py > Cpy. Total sulphide content 5%.
		The sulphides occur both as irregular grains and as small stringers and streaks. The matrix is coarse grained amphibole and garnets.
		85.8 - 86.5 Po impregnated amphibolite 10%.
86.2	90.1	Quartz biotite schist with some muscovite rich bands. Garnet and amphibole rich bands are common. Around 87.1 graphite occurs in millimeter broad bands, garnet porphyroclasts are common in this area. Two millimeter broad sulphide impregnated bands with po and py probably also some cpy. Gradual change from the amphibolite to this quartz biotite schist.
90.1	90.4	Quartz muscovite schist with lens shaped biotite and garnets.
90.4	95.5	Amphibolite with garnets. Both coarse grained and fine grained types. They occur in bands with different width. Amphibole in the coarse grained bands have a nearly random

N/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 8
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

FROM	TO	DESCRIPTION
		orientation, and the garnets are irregular shaped.
		In the fine grained types are garnets often streaked out, flattened, or they have more or less ball shape, porphyroclasts.
		Gradual change from the schist to this amphibolitic rock.
		Sulphide impregnation:
		91.6 - 91.8 Total 5% sulphides.
		Mainly Po, but also Py.
		Cpy present.
		92.95 - 93.2 Total 2-3% sulphides. Po.
		94.05 - 94.15 Total 2-3% sulphides.
		Both py, cpy, po. More py and cpy than po.
95.5	99.0	Quartz biotite schist with more or less garnets which seems to occur in bands.
		The rock is banded with both mica rich, garnet-rich amphibole rich and quartz feldspar rich bands. Garnet and feldspar porphyroclasts are common. The amphibolitic bands contain some po in small quantity.
99.0	100.7	Amphibolitic rock with garnets.
		The rock is banded with some coarse grained bands. The amphibole in the coarse grained bands are nearly random orientated, and the garnet have a irregular shape.
		Garnet porphyroclasts are common in the fine grained types.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 9
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

FROM	TO	DESCRIPTION
		Sulphide impregnation:
		99.8 - 100.0 Mainly Po in a coarse grained amphibole-garnet matrix. Total sulphide content. 1-2%.
		100.5 - 100.8 Po, Py, Cpy in a amphibole garnet matrix. Total 2-3% sulphides. Mainly Po.
100.7	108.2	Quartz biotite schist with some garnets. Amphibolitic bands are common. Streaks of Po occure.
108.2	113.0	Amphibolitic rock with alternation coarse grained amphibole garnet rich bands and fine grained amphibole rich band. Some mica rich (both biotite and muscovite) bands occure. Some of the garnets are elongated and occure as streaks. or flattened porphyroclasts sulphide impregnation:
		108.25 - 108.55 Mainly Po, Cpy present but in small quantities. Total sulphide content 5%.
		111.0 - 111.2 Po. Total 2-3%. The sulphide occure in stringers and bands.
		112.1 - 112.2 5% Po in a amphibolitic matrix. Po occure as stringers.
113.0	123.5	Quartz biotite schist with garnets. The schist is banded. Some amphibole

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 10
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG.

FROM	TO	DESCRIPTION
		and garnet rich bands occure.
		Biotites marks a good lineation.
		Porphyroclasts occure.
		Sulphides occure at:
	115.7	2-3 cm broad band with
		streaky Py, Cpy, Po.
		Total 2-3% Py Cpy > Po.
	118.3	1 cm band with mainly Po,
		Py and Cpy occure total 5%.
	118.4	3 cm broad band with
		sulphides mainly Po 2-3%.
	118.8	5 bands with sulphides.
		Their width are between 1
		and 3 cm. Each of them
		have a total sulphide
		content of 5%. Mainly Po
		but also Py and Cpy.
		Py > Cpy. The sulphides
		occure as 1-2 mm grains
		in a garnet mica matrix.
	119.1	10 cm broad band with
		sulphide impregnation.
		Total 1-2%. Both Py, Po
		and Cpy. Py, Cpy > Po.
	119.5	1 cm broad band with sulphides. Py
		mainly, 1 %.
	119.7	1 cm broad band with
		sulphides. Mainly Po and Py
		Cpy present. Total sulphide
		content 5%.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 11
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

FROM	TO	DESCRIPTION
		120,8 5 cm broad band with sulphides. Mainly Po but also some Py, Cpy present. Total sulphide content 10%.
		122,1 10 cm broad band with Po and py. Total 5 %.
123,5	133,5	Banded amphibolite. Alternation between amphibolitic and biotite rich bands. Garnets occur here and there. Some parts of the amphibolite are nearly massive and here some sulphide grains occur. Sulphide impregnation at:
		124,3 cm broad band with streaky Po. Total 1-2%.
		126,3 cm broad band with streaky Po. some Py. Total 5%.
		126,6 10 cm broad band with Po, 10%.
		130,25 20 cm with Po impregnation Total 5-10%.
133,5	139,0	Quartz biotite schist with garnets. Partly tectonised. The garnets occur as porphyroclasts. The schist has a banding. Some bands are biotite rich, some are muscovite rich and some are more amphibolitic with amphibole and garnets.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 12
 LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

FROM	TO	DESCRIPTION
		biotite rich bands. Good foliation and lineation. Some parts of this amphibolite are coarse grained and in these parts Po occur in cm grains with an irregular shape. In the fine grained amphibolite occur sulphides as stringers, streaks and narrow bands.
		Mainly Po but Cpy occur, total less than 1%.
147,2	153,0	Quartz biotite garnet schist Some amphibole garnet schist. Some amphibole garnet rich bands occur.
		The rock is tectonised and garnets porphyroclasts are common.
153,0	154,2	Banded amphibolite with garnets. Gradual change to the biotite schist on each side.
154,2	155,5	Quartz biotite schist with garnets.
155,5	157,0	Amphibolite with garnets, Sulphide impregnated band at: 156,2. 5 cm broad, mainly Po, total 5%.
157,0	157,5	Tectonised quartz biotite garnet schist. Garnets as porphyroclasts.
157,5	159,5	Amphibolite with garnets alternating with biotite schist. Sulphide impregnation at 158,7.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E DEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 13
 LOGGED BY: R.S. STARTED: 26/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 2/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG:

FROM	TO	DESCRIPTION
		5 centimeter broad zone with mainly Po, also some Py. Total sulphide content 10%.
159.5	160.5	Tectonised quartz biotite schist with garnet porphyroclasts.
160.5	163.4	Amphibolite with some biotite rich bands. Both gradually change and sharp contact between the amphibolite and these mica - rich bands. The amphibolite is partly nearly massive and partly foliated. Sulphide impregnation at: 161.3 5 cm broad band with mainly Po, but also some Py. Total content 25%. 162.6 10 cm broad band, mainly Po. Total content 30%.
163.4	169.0	Quartz biotite garnet schist with some garnet and amphibole rich bands. Garnets occur often as porphyroclasts, some of them are flattened and some are crushed and make "trains". The foliation wraps around these porphyro- clasts. The amphibolite is partly coarse grained with a random orientation of the amphiboles. Sulphides occur as impregnation at: 165.1 1-2 cm broad band with 10-15% Po. 167.3 5 cm broad band with

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 14
LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
CASING: 3M FINISHED: 2/10 Hovedgruver
CORE SIZE: AX TESTS (CORRECTED):
SUMMARY LOG

FROM	TO	DESCRIPTION
		Total sulphide content 10%
		167.7 5 cm broad band with 10% Po.
		168,2 10 cm broad band with
		10-15% Po.
169.0	184.4	Amphibolite with some narrow zones of biotite rich material. The foliation is weak. The biotite rich bands leave a good lineation. Boundinage structures are often seen. The boundenline makes an angel on 90° with the lineation. Dragfolds are common. The fold axes are parallel to lineation. Sulphides at: 176.3 5 cm broad band with Po, 25% 177.0 5 cm broad band with Po, 10% 178,8 10 cm broad band with Po, 10%
	180,4	End of hole.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 500S/450E BEARING: W DIP: 45 HOLE NO: 5 SHEET NO: 15
LOGGED BY: RS STARTED: 26/9 PROPERTY: Kvikne
CASING: 3M FINISHED: 2/10 Hovedgruver
CORE SIZE: AX TESTS (CORRECTED):

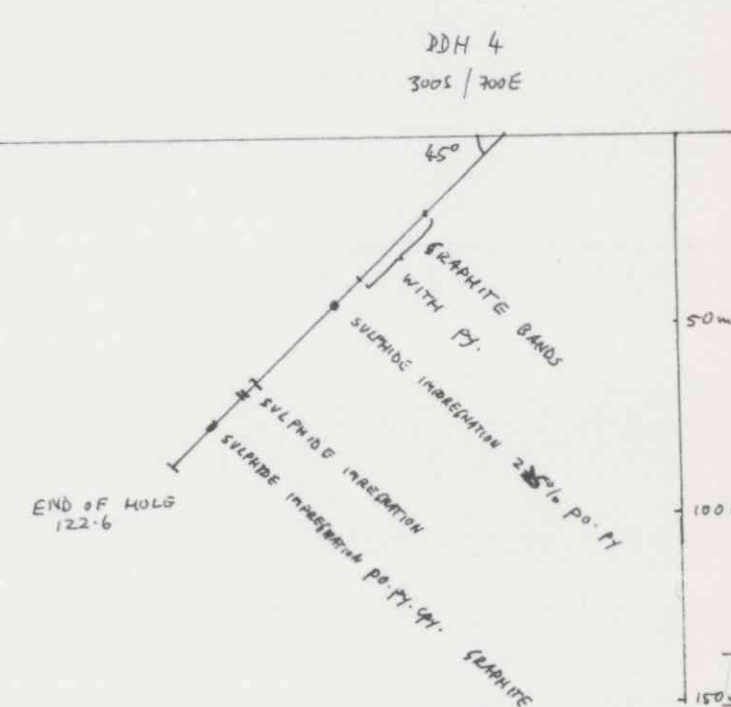
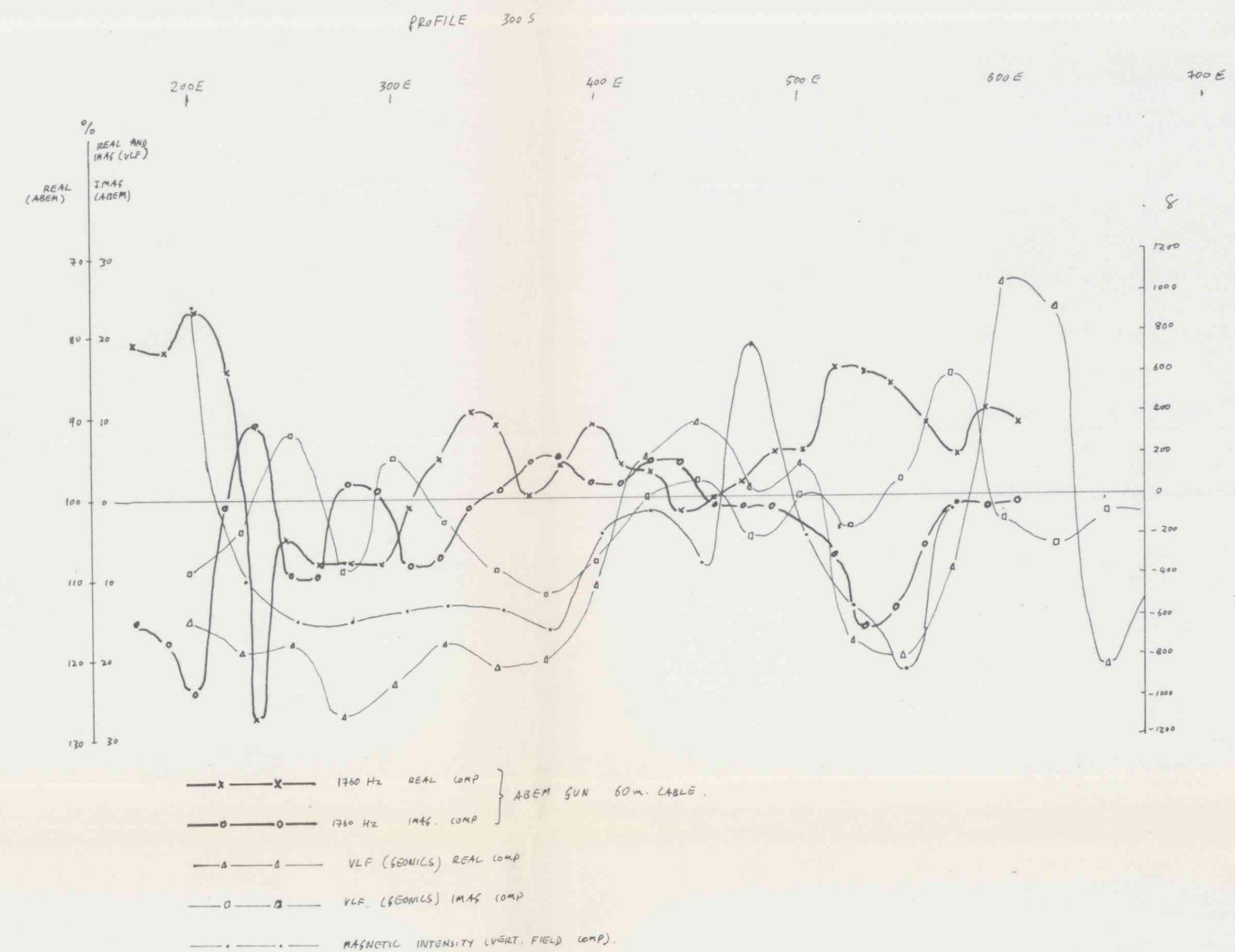
CORE ANGLES

From	To	Description		
		DEPTH	ANGLE	TYPE
		4.2	81	
		9.5	80	
		10.5	79	
		14.6	75	
		19.2	78	
		20.4	71	
		24.5	73	
		29.8	80	
		30.3	82	
		35.4	78	
		39.5	74	
		40.5	72	
		44.5	70	
		49.4	69	
		50.4	72	
		54.4	73	
		59.6	76	
		60.4	73	
		64.5	76	
		69.5	76	
		70.6	80	
		75.4	79	
		79.5	78	
		80.4	77	
		84.6	80	
		89.5	78	
		90.5	78	
		94.5	75	Contact
		99.5	79	
		100.6	64	
		103.3	71	
		109.5	80	
		110.6	75	
		114.5	78	
		119.4	74	
		120.4	76	

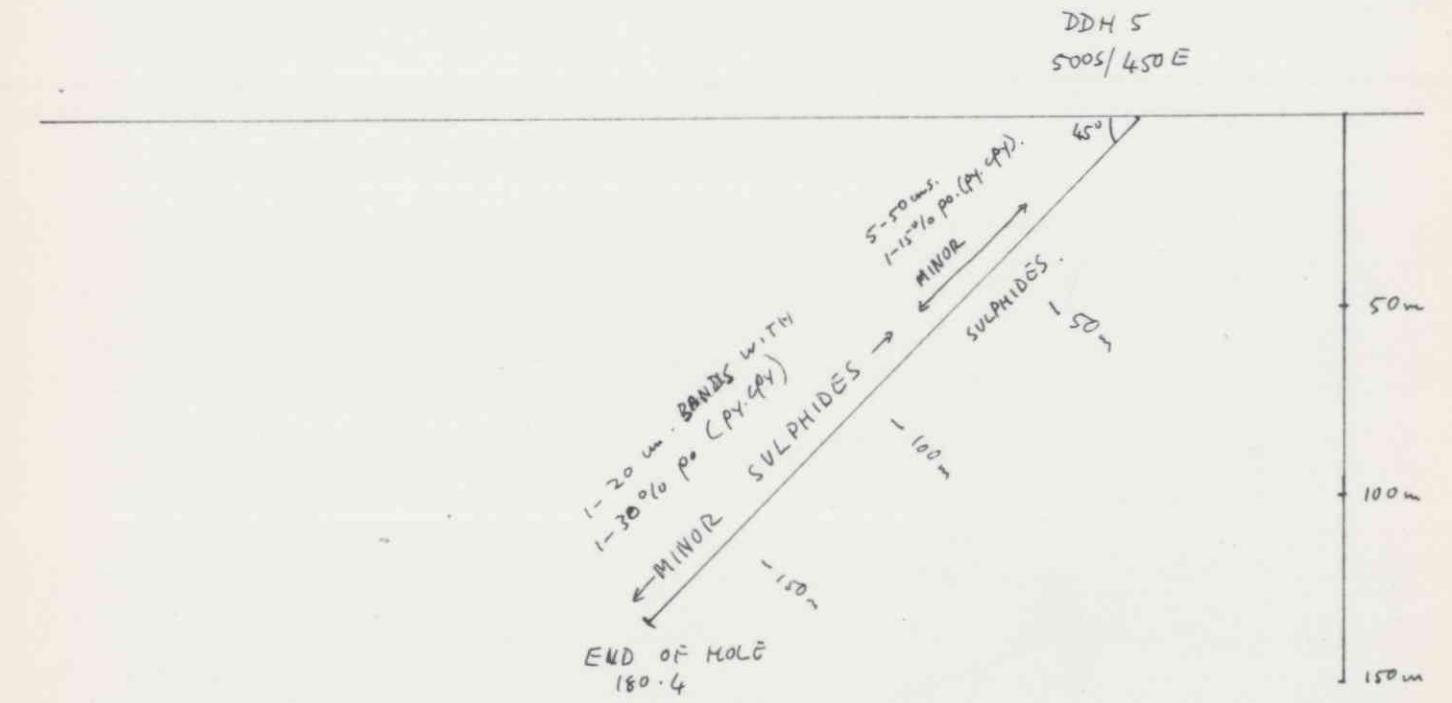
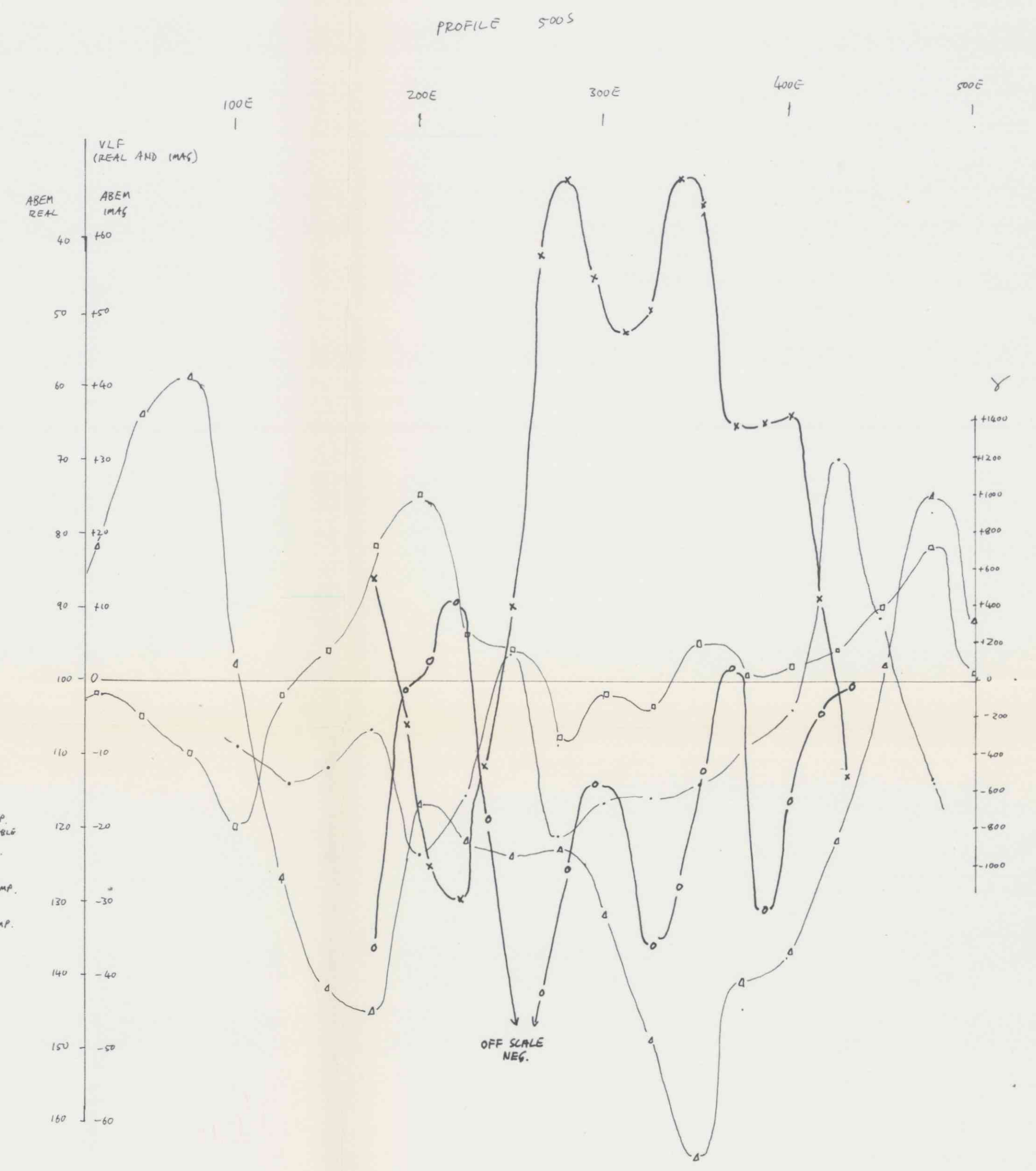
DIAMOND DRILL RECORD

CORE ANGLES

[illegible]



Diamond drill hole 4.		SCALE	OBS. ES. F.H.	9.10-94
300 S - 700 E. Dip 45° W		1:250	DRAW. ES. F.H.	9-94, 9-9
Kvikne.			TRAC. ES.	1-75
			CHK.	ES.
1/2 SULFIDMALM		MAP NO.	20-75-DS	
		MAP SHEET	1620	



Diamond drill hole 5.		SCALE	OBS. RS. FIN	4-10/76
500 S - 450 E. Dip 45° W		1:250	DRAW. DE	10-24/76
Kvikne.			TRAC. DE	1-25
			CHK. DE	
SULFIDMÄLM		MAP NO.	20-75-D4	
		MAP SHEET	1620	

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 1100S/350E BEARING: W DIP: 60 HOLE No: 6 SHEET No: 1
LOGGED BY: RS STARTED: 24/9 PROPERTY: Kvikne
CASING: 3M FINISHED: 25/9 Hovedgruver
CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

FROM	TO	DESCRIPTION
0	5.0	Overburden
5.0	32.4	Quartz biotite schist. Minor muscovite and garnets.
32.4	45.5	Amphibolite with minor sulphides in the upper parts.
45.5	58.7	Quartz biotite muscovite schist
	58.7	End of hole.
		EM anomalies caused by sulphide impregnated amphibolite between 32 and 36.M.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 1100S/350E BEARING: W DIP: 60 HOLE NO: 6 SHEET NO: 2
 LOGGED BY: RS STARTED: 24/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 25/9 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

FROM	TO	DESCRIPTION
0	5.0	Overburden
5.0	17.5	Quartz-biotite schist with minor muscovite and garnets. The schist has banding marked by alternating quartz/feldspar rich and mica-rich bands. Good foliation which is parallel to the banding. Biotite marks a good lineation.
17.5	18.5	Massive quartzite with no observable structural elements. The contact on both sides is parallel with the banding and the foliation in the wallrock.
18.5	30.5	Mica-schist with quartz-biotite and muscovite as the main constituents. The foliation is usually very good and regular, but some narrow "zones" show an irregular structural picture with folding. The fold style is tight to isoclinal with a weak axial foliation. The fold axe seems to be parallel to mineral lineation.
30.5	32.4	Quartz biotite garnets schist. The size of the garnets is often 0.5 cm. Isoclinal folds occure. The rock is strongly "tectonised" with producing of porphyroclasts as a result. Gradual contact both to the mica-schist above and the amphibolitic rock beneath.

A/S SULFIDMALM

DIAMOND DRILL RECORD

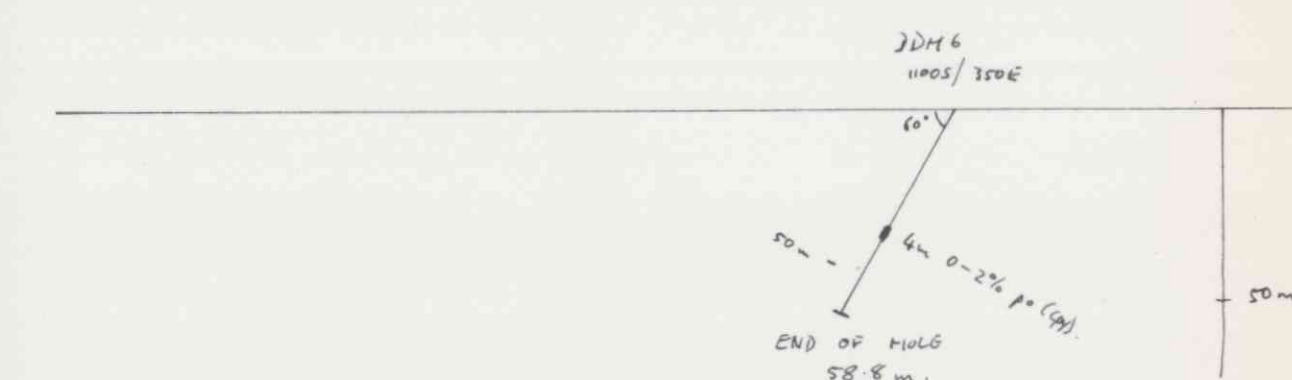
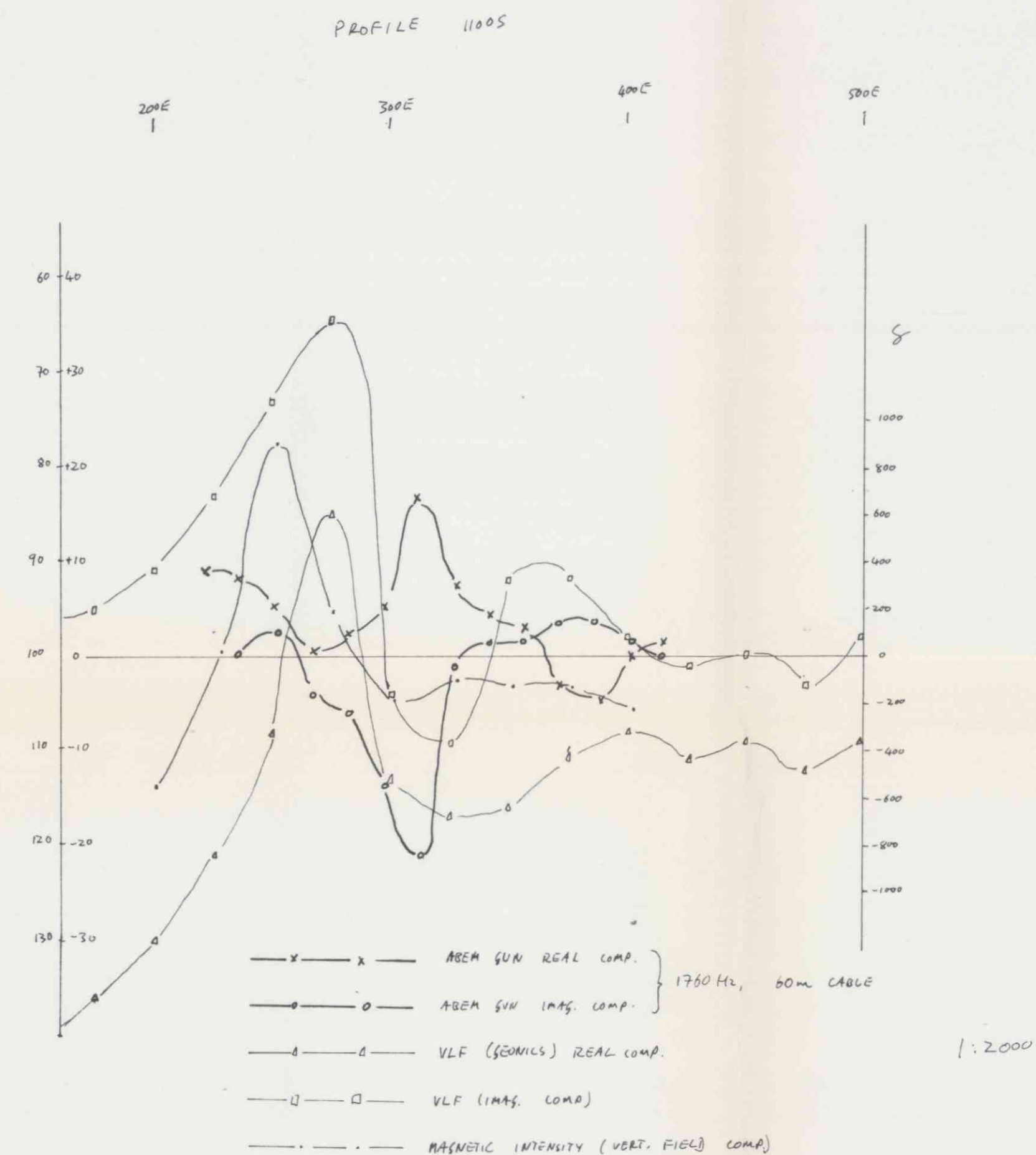
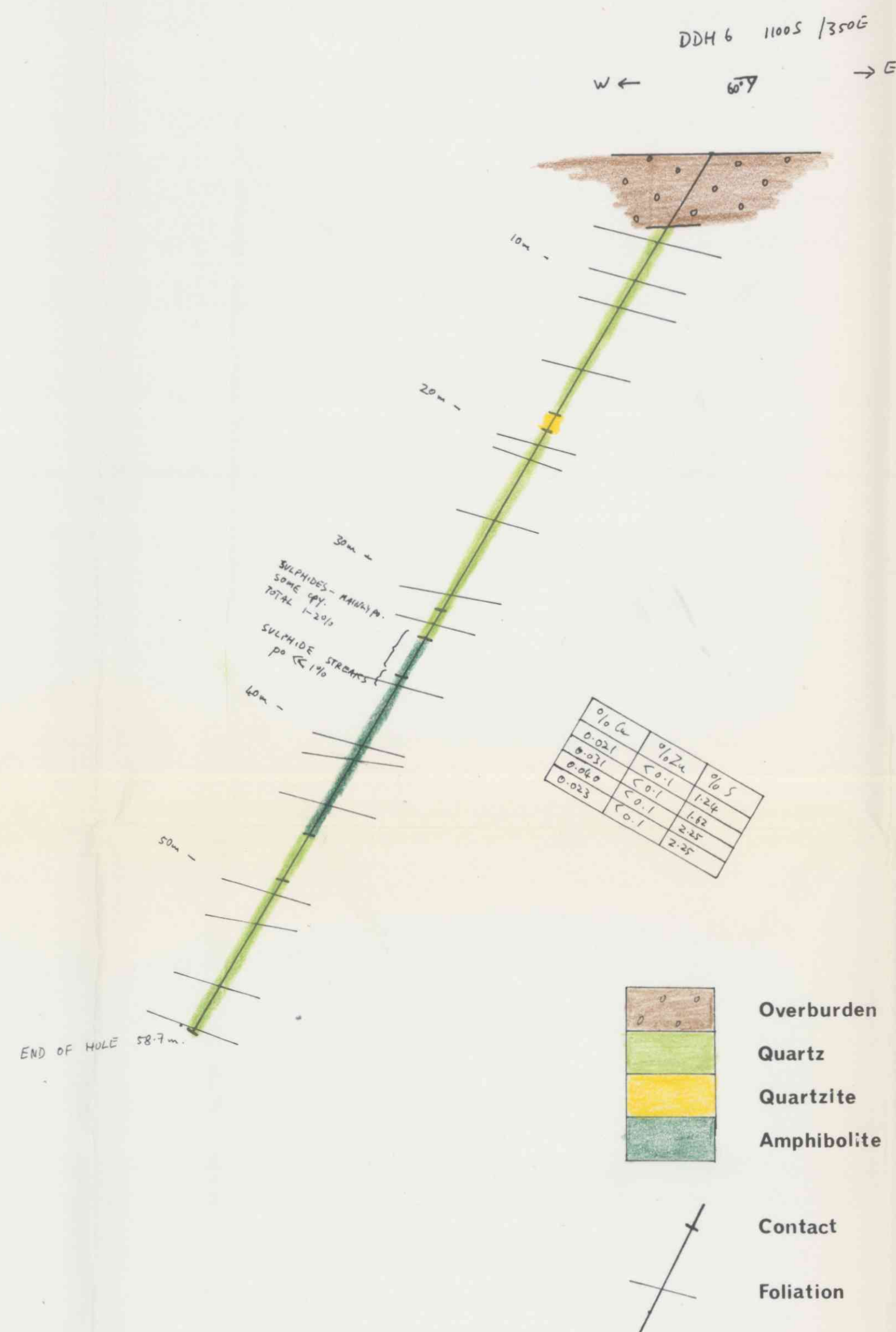
LOCATION: 1100S/35E BEARING: W DIP: 60 HOLE NO: 6 SHEET NO: 3
 LOGGED BY: RS STARTED: 24/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 25/9 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

FROM	TO	DESCRIPTION
32.4	35.0	Coarsed grained amphibolitic rock with a weak banding marked by bands with mainly amphibole and mm broad feldspar-rich bands. Weakly developed planar structures and lineation. The feldspar-rich bands have an irregular pattern probably because of early deformation. Sulphides occur mainly as Po, but also some Cpy. Total sulphide content < 1-2%. Gradual change to the amphibolitic rock beneath.
35.0	45.5	Banded amphibolitic rock with a good foliation and amphibole lineation. Fine grained. The banding is marked by alternating feldspar - and amphibole-rich band millimeter to centimeter broad. Alternation between coarse - and fine grained amphibolitic bands at the contact to the coarse grained amphibolite. Sulphides occur in the upper parts of this rock, streaks. Po < 190.
45.5	48.5	Quartz muscovite schist with lens shaped biotite which marks a lineation.
48.5	58.7	Quartz biotite muscovite schist. Biotite and muscovite in equal quantities. The rock is fine grained, and the banding which often is strong in the schist types is lacking here.
	58.7	End of hole.

DIAMOND DRILL RECORD

[illegible]



Diamond drill hole 6. 1100 S — 350 E. Dip 60° W Kvikne.	SCALE 1:250	OBS. ^{RS} F. H.	9-74
		DRAW. ^{RS} DE	9-74
		TRAC. DE	1-75
		CHK. <i>DE</i>	
1/2 SULFIDMALM	MAP NO.		20-75-D6
	MAP SHEET 1620		24

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 1300S/1150E DEARING: W DIP: 45° HOLE NO: 7 SHEET NO: 1
LOGGED BY: R. S. STARTED: 17/9 PROPERTY: Kvikne
CASING: 3M FINISHED: 24/9 Hovedgruver
CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

FROM	TO	DESCRIPTION
0.0	3.0	Overburden.
3.0	39.0	Quartz, biotite schist, partly with amphibolitic bands.
39.0	51.0	Quartz, biotite garnet schist.
51.0	58.2	Sulphide bearing horizons. Mixed up with quartz biotite schists and quartzites.
58.2	86.0	Quartz biotite garnet schist.
86.0	107.0	Quartz biotite schist
107.0	119.0	Graphitic horizons.
119.0	136.0	Quartz biotite schist with some graphite bearing bands.
	136.0	end of hole
		EM-anomaly caused by sulphide-bearing zones between 51.0 and 58.0 and graphitic horizons between 107.0 - 119.0.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 1300S/1150E BEARING: W DIP: 45 HOLE NO: 7 SHEET NO: 2
 LOGGED BY: RS STARTED: 17/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 24/9 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

From	To	Description
0	3.0	Overburden
3.0	39.0	Quartz biotite schist with some minor light mica. Fsp. and chlorite occure. The rock is banded, this banding is mainly caused by alternating mica-rich-, quartz felspar-rich and some amphibole-rich bands. These bands are seldom more than 5 cm usually millimeters to a couple of centimeters. Amphibolitic bands have garnets. The banding is always parallel with the cleavage or schistosity which is caused by parallel arangement of mica. Some of these bands are folded, these folds are probably dragfolds. At some places the quartz are feldspathic bands broken and occure now as lenses or porphyroclasts.
39.0	40.8	Quartz, muscovite, biotite, garnet schist. Muscovite is the main mica. Biotite occurs as lens-shaped 1-2 mm grains. Garnets as small grains often sounded. Light grey colour.
40.8	51.20	Quartz biotite garnet schist. Banded with a good foliation. Dark bands containing mainly mica and some garnets, light bands - quartz and feldspar.
51.2	51.7	Sulphide impregnated horizon. Mainly Po with some Cpy. Total 25-30% sulphides Cpy <1%. The sulphides occure in a matrix of quartz garnets and probably amphiboles.

^N/_S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 1300S/1150E BEARING: W DIP: 45 HOLE NO: 7 SHEET NO: 3
 LOGGED BY: RS STARTED: 17/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 24/9 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
51.7	52.0	Massive quartzite. Som small grains Po.
52.0	52.1	Quartz biotite garnet schist. Banded with a good foliation and lineation.
52.1	52.4	Sulphide impregnated horizon. The sulphides occure as irregular grains in a matrix of quartz garnet and amphibole. Total 25-30%. Mainly Po, Cpy present.
52.4	53.10	Quartz - biotite - garnet schist.
53.10	54.5	Quartzite massive. Sulphides occure in the marginal areas as irregular grains. Mainly Po, but Cpy is present.
54.5	55.15	Quartz muscovite schist with lens shaped biotite grains. These biotite grains mark a good lineation. Grinkel on the foliation plains.
55.15	55.7	Sulphide impregnated horizon. Mainly Po with some Cpy. Total 50% sulphides. Cpy < 1%. The matrix is mainly quartz and garnets.

^A/_s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 1300S/1150E BEARING: W DIP: 45 HOLE NO: 7 SHEET NO: 4
 LOGGED BY: RS STARTED: 17/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 24/9 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
55.7	57.85	Massive quartzite with a weak sulphide impregnation in the upper parts. Po < 1%.
57.85	58.4	Quartz muscovite schist with lens-shaped biotite "grains". Biotite marking a good lineation. Weak Py impregnation.
58.4	60.0	Quartz-biotite schist. Good foliation and lineation. Foliation marked by parallel mica both biotite and muscovite. Lineation marked by elongated biotite.
60.0	60.1	Quartz-muscovite schist with garnets and lens-shaped biotite "grains". These biotite grains mark a good lineation in the foliation. Also crinkles on the foliation plan. These small crinkles are normally parallel to the lineation.
60.1	80.2	Quartz biotite schist. Garnets occur. Banding because of alternating quartz fsp rich bands and mica-rich bands. Biotite marks a good lineation. Some millimeter broad graphite-rich bands here and there.
80.2	107.0	Quartz biotite schist. Garnets are lacking. Banding is prominent - both because of alternating quartz - fsp - and mica-rich bands and also because of some millimeter broad graphite-rich bands. In this rock two 0.5 m broad trondhjemitic dykes occur. There is a good discordance. The contact is cross-cutting the foliation in the schist. There is no good foliation in the trondhjemite.

Λ_s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 1300S/1150E BEARING: W DIP: 45 HOLE NO: 7 SHEET NO: 5
LOGGED BY: RS STARTED: 17/9 PROPERTY: Kvikne
CASING: 3M FINISHED: 24/9 Hovedgruver
CONE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

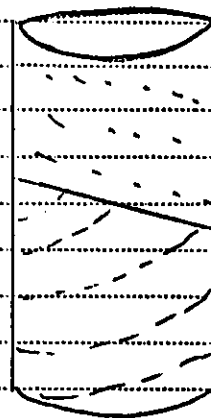
From	To	Description
		A weak foliation seems to be parallel to the contact.
		These two trondhjemitic dykes occur at 86.0 m and 103.0 m.
107.0	119.0	Graphite zone. Some Py in connection with points.
119.0	136.0	Quartz - biotite schist alternating with graphite-rich bands. Banding is pronounced.
136.0		End of hole.

1/5 SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 1300S/1150E BEARING: W DIP: 45 HOLE NO: 7 SHEET NO: 6
 LOGGED BY: RS STARTED: 17/9 PROPERTY: Kvikne
 CASING: 3M FINISHED: 24/9 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 CORE ANGLES

From	To	Description
DEPTH	ANGLES	TYPE
10.5	69	Foliation (Banding)
14.5	74	"
19.4	70	
20.7	68	DDH
24.4	71	
29.6	62	
30.6	64	
33.5	65	
39.5	62	
40.6	70	
44.6	71	
49.5	75	
53.5	76	
59.5	70	
60.4	76	
64.5	76	
69.5	75	
70.4	73	
74.4	76	
79.6	76	
80.6	76	
84.5	77	
89.5	75	103
91.5	77	
94.5	71	
99.6	73	
100.5	80	
104.6	80	
109.4	81	
110.6	80	
114.6	79	
119.5	75	
120.6	76	
124.5	75	
129.5	76	



DIAMOND DRILL RECORD

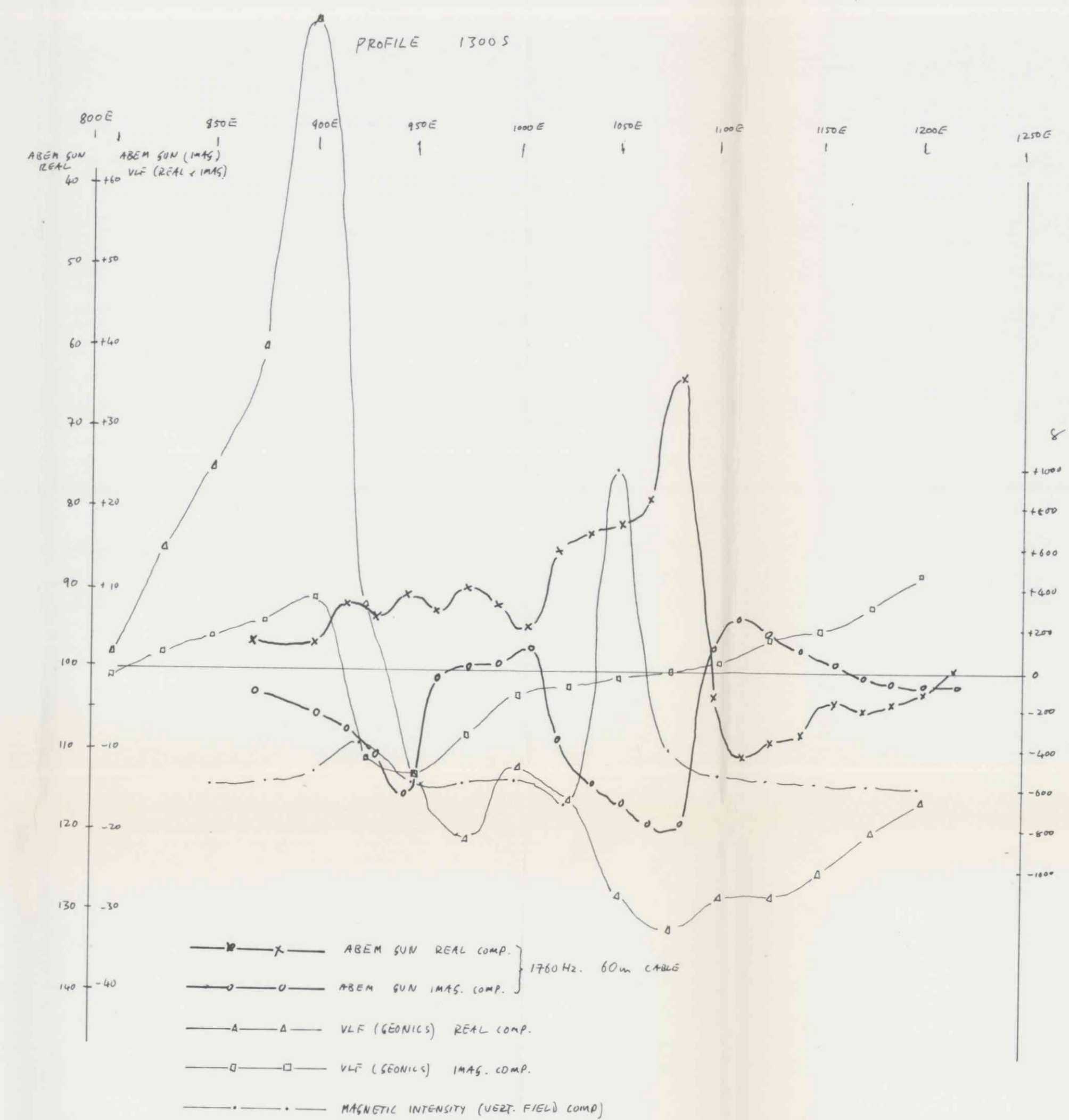
CORE ANGLES

[illegible]

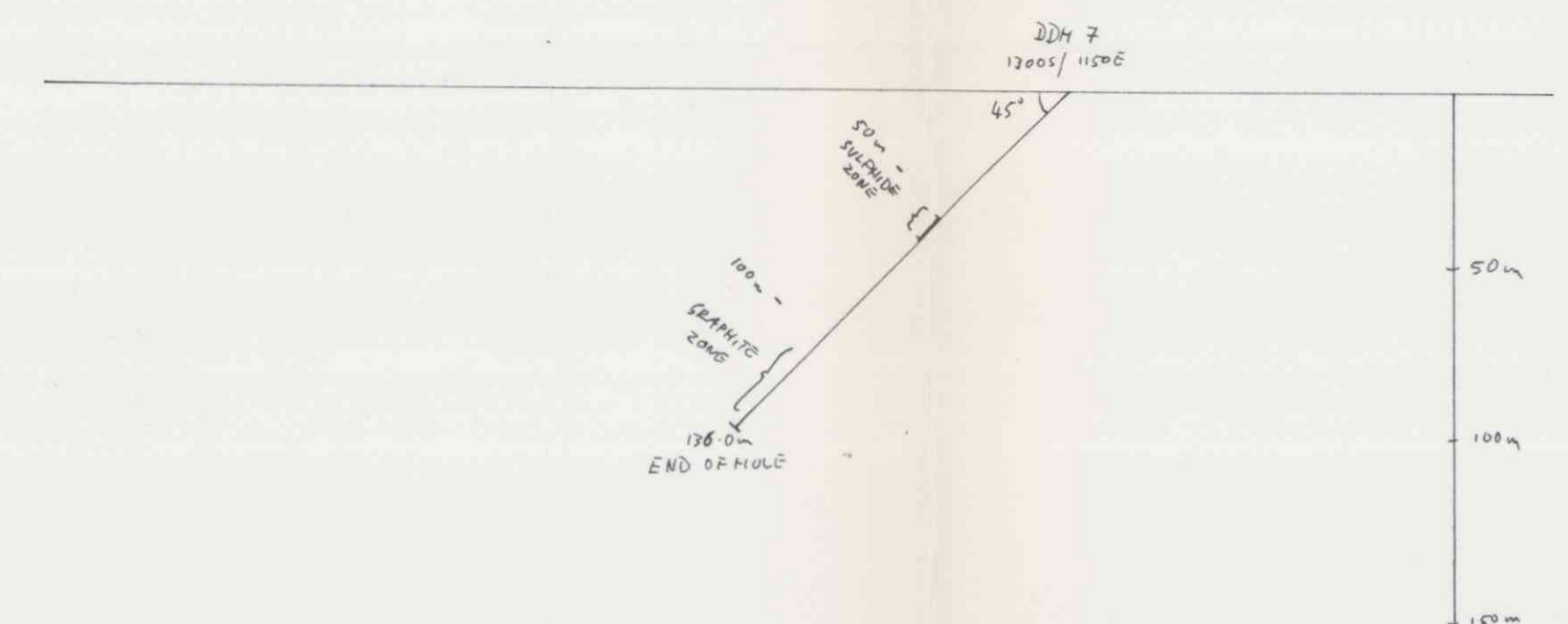


END OF HOLE 136.0m

- Overburden
- Quartz biotite schist (±garnet)
- Quartz muscovite schist (±garnet)
- Quartzite
- Amphibolite
- Contact
- Foliation
- Foliation & contact



1:2000



Diamond drill hole 7.
1300S - 1150 E. Dip 45° W.
Kvikne.

1/2 SULFIDMALM

SCALE OBS. RS. FH 4-74
DRAW. RS. FH 4-74
TRAC. DE 1-75
CHK. *h*

MAP NO. 20-75-D7
MAP SHEET 1820

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 75S/200E BEARING: - DIP: 90 HOLE NO: 8 SHEET NO: 1
 LOGGED BY: RS STARTED: 21/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 30/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
0	2.3	Overburden
2.3	13.7	Banded amphibolite.
13.7	28.7	Quartz biotite muscovite garnet schist with some amphibolitic bands.
28.7	29.5	Quartz biotite schist with some millimeter broad graphite-rich bands.
29.5	43.05	Quartz muscovite schist with lens-shaped biotite grains. Amphibolitic bands occur. Between 37 and 38 two sulphide impregnated 3-4 cm broad zones. Mainly Po.
43.05	45.7	Amphibolite
45.7	72.0	Mainly quartz muscovite schist with some amphibolitic bands and zones. Between 47 and 53 a relatively good sulphide impregnation. Mainly Po, Cpy occur.
72.0	90.0	Quartz biotite schist with some graphite bands.
90.0	95.3	Quartz biotite schist.
	95.3	End of hole
		VLF anomaly caused by sulphide impregnation between 47 and 53, and graphite between 72 and 90.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 75S/200E BEARING: - DIP: 90 HOLE NO: 8 SHEET NO: 2
 LOGGED BY: RS STARTED: 21/10 PROPERTY Kvikne
 CASING: 3M FINISHED: 30/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
0	2.3	Overburden
2.3	13.7	Fine grained amphibolite with a weak banding in the upper parts. Stronger banding downwards. They are as an alternating between amphibole and feldspar. Cross cutting feldspathic veins with a regular pattern are common. The amphibolite is strongly "tectonized" in some zones. Porphyroclasts are commonly developed. Some more biotite-rich bands are probably also a result of the same brittle deformation. The broader feldspathic bands are boudincent. The boudinlines are usually parallel to the mineral lineation, but some are nearly normal to the same lineation.
13.7	28.7	Quartz biotite muscovite garnet schist. There is a gradual change from the amphibolite to this schist. The amphibole content decrease and the biotite content increase. Garnets are not common through the whole schist - seems to occure in certain "zones". The rock has a banding which is marked by alternating quartz-feldspathic/mica-rich/ amphibole-rich bands. The amphibole-rich bands are seldom more than 2-3 centimeter.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 75S/200E BEARING: - DIP: 90 HOLE NO: 8 SHEET NO: 3
LOGGED BY: RS STARTED: 21/10 PROPERTY Kvikne
CASING: 3M FINISHED: 30/10 Hovedgruver
CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
		The rock has a good biotite lineation. Some of the quartz feldspathic bands are boudinaged and boudinlines are parallel to this earlier mentioned biotite lineation.
28.7	29.5	The same schist as above, but in this area millimeter broad graphite-rich bands occure.
29.5	33.2	Quartz muscovite schist with lens-shaped biotite and garnets. Garnets as porphyroclasts. The biotite marks a good lineation.
33.2	33.9	Banded amphibolite with a relatively sharp contact to the quartz muscovite schist. Some biotite rich bands occure in this rock.
33.9	40.2	Quartz biotite schist. Muscovite is common in certain zones. The rock is banded. Partly is this caused by alternation between quartz feldspathic bands and more mica-rich bands, partly by more amphibolitic bands and partly by the relative quantity biotite/muscovite which change from place to place. Some bands of this schist sequence are more like a quartz muscovite schist.

^A/_s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 75S/200E BEARING: - DIP: 90 HOLE NO: 8 SHEET NO: 4
 LOGGED BY: RS STARTED: 21/10 PROPERTY Kvikne
 CASING: 3M FINISHED: 30/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):
 SUMMARY LOG

From	To	Description
		In this band 3-4 millimeter lens-shaped biotites occur.
		Tectonized bands or zones are relatively common, porphyroclasts in these zones.
		Two sulphide impregnated bands in this sequence. One at 37.4 is 5-6 centimeter broad with 10-15% Po. The sulphide grains are elongated parallel to foliation and have a streaky appearance.
		The other occur at 37.9 and is only 2 centimeter broad.
40.2	43.05	Quartz muscovite schist with lens-shaped biotites and garnets. The garnets are often one centimeter in diameter. They are usually lens-shaped and often rotated porphyroclasts.
43.05	45.7	Amphibolite. Good banding, which is marked by change between amphibole-, feldspar- and some biotite-rich bands.
		The rock is fine grained, and the amphiboles mark a good lineation.
		The feldspar-rich bands are often boudinaged. Boudin line is parallel to the lineation.
		There is a sharp contact to the quartz muscovite schist above and a gradual change to the quartz biotite garnet schist beneath.
		Both contacts are parallel to the foliation.

^A/_s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 75S/200E BEARING: - DIP: 90 HOLE NO: 8 SHEET NO: 5
 LOGGED BY: RS STARTED: 21/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 30/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
45.7	47.0	Quartz biotite garnet schist. Gradual change from the amphibolite. Banding.
47.0	47.95	Quartz muscovite schist with garnets and biotite. Garnets often occur as one centimeter big porphyroclasts. The biotites have a lens-shape. Some of the garnets seem to have grown across an earlier mica foliation pre the "production" of garnet porphyroclasts.
47.95	48.2	Sulphide in the quartz muscovite schist. Impregnated type. Mainly Po, 5-10%. The Po grains have a lens or stringer-shape, usually 2-3 millimeter. Sharp contact to the wallrock which is a quartz muscovite schist.
48.2	48.3	Quartz muscovite schist.
48.3	48.5	Po impregnated zone in the quartz muscovite schist. Po = 5-10%. The Po grains have a lens or stringer-shape. Sharp contact to the wall rock.
48.5	48.8	Quartz muscovite schist with garnets and biotites.
48.8	48.85	Po impregnation in the quartz muscovite schist. 5-10% Po.
48.85	49.7	Quartz muscovite schist with two 1-2 centimeter Po impregnated bands. 5-10% Po.

1/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 75S/200E BEARING: - DIP: 90 HOLE NO: 8 SHEET NO: 6
 LOGGED BY: RS STARTED: 21/10 PROPERTY: Kvikne
 CASING: 3M FINISHED: 30/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
49.7	49.8	Po impregnated band in the quartz muscovite schist 10% Po. Some massive quartz occur in this band.
49.8	50.95	Quartz muscovite schist with lenticular shaped biotites and porphyroclasts garnets. The biotites mark a good lineation.
50.95	51.6	Sulphide impregnated schist. Mainly Po, but Cpy is present in small quantities. Total sulphide content 25%. The different grains are elongated or flattened, have a lenticular shape. Orientated parallel to the foliation.
51.6	51.8	Quartz muscovite schist with biotite, lens-formed.
51.8	52.10	Po impregnation in the quartz muscovite schist. 20% Po.
52.10	52.5	Quartz muscovite schist with lens-formed biotite grains. This schist changes gradually to a quartz biotite schist.- increasing biotite content marks this change.
52.5	60.7	Quartz biotite schist with a changeable muscovite content.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 75S/200E BEARING: - DIP: 90 HOLE NO: 8 SHEET NO: 7
 LOGGED BY: RS STARTED: 21/10 PROPERTY Kvikne
 CASING: 3M FINISHED: 30/10 Hovedgruver
 CORE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
		The rock has a good foliation and lineation.
		Small isoclinal folds occur and the rock has cataclastic structure which occur in bands. Porphyroclasts are common in these bands.
		Fold axes are parallel to the lineation.
60.7	61.6	Amphibolitic rock with good foliation on the margins more massive with very weak planar structures in the central parts.
		Gradual change from the quartz biotite schist above to this amphibolitic rock.
		Irregular feldspathic veins occur in the central parts.
61.6	61.8	Some with big (cm) garnets, feldspar quartz and biotite. The zone is tectonized with the garnets as porphyroclasts.
61.8	62.1	Massive quartzite.
62.1	62.35	Some with big garnets, feldspar quartz. The garnets are developed as porphyroclasts.
62.35	72.0	Fine grained banded quartz biotite schist. Foliation and lineation are well developed. Isoclinal folds with axes parallel to the lineation. Strong cataclastic development in some zones.

^A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 75S/200E BEARING: - DIP: 90 HOLE NO: 8 SHEET NO: 8
LOGGED BY: RS STARTED: 21/10 PROPERTY Kvikne
CASING: 3M FINISHED: 30/10 Hovedgruver
CONE SIZE: AX TESTS (CORRECTED):

SUMMARY LOG

From	To	Description
72.0	91.0	The same quartz biotite as above, but some graphite-rich bands here.
91.0	95.3	Quartz biotite schist
	95.3	End of hole.

A/s SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 75S/200E BEARING: - DIP: 90 HOLE NO: 8 SHEET NO: 9
LOGGED BY: RS STARTED: 21/10 PROPERTY: Kvikne
CASING: 3M FINISHED: 30/10 Hovedgruver
CORE SIZE: AX TESTS (CORRECTED): 1
CORE ANGLES

From	To	Description		
		DEPTH	ANGLE	TYPE
		3.10	66	Foliation (banding)
		6.40	64	"
		9.20	65	"
		11.40	66	
		15.50	65	
		18.30	65	
		21.0	66	
		26.5	65	
		28.6	64	
		31.2	65	
		37.5	68	
		39.50	69	
		40.6	72	
		44.3	71	
		48.7	72	
		50.4	72	
		55.3	71	
		58.7	73	
		60.5	74	
		66.0	75	
		68.4	76	
		70.6	78	
		74.5	75	
		78.4	75	
		81.2	76	
		85.4	77	
		88.2	75	
		91.1	74	
		94.4	75	

10m -

20m -

30m - GRAPHITE BANDS

40m - 5-10mm SULPHIDE INTERSPERSED - 10-15mm
2mm SULPHIDE IMP.

50m - 5-10% py IMPREGNATION
OZE MIN. SLUG
5-10% py IMP
5mm 5-10% py
2mm TRAILING py IMP. BANDS
25% SULPHIDES - mostly py SULPHIDE
20% py

60m - LARGE CARBONATES
MASSIVE SPATHS
WITH OY CARBONATES

70m -

80m -

90m -

END OF HOLE 95.3 m.

% Cu
0.018
0.016
0.013
0.017
0.030
0.014

