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Joint Venture Folldal Verk A/S - Norske Fina A/S. Knaben area. Exploration 1984

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JOINT VENTURE FOLLDAL VERK A/S - NORSKE FINA A/S

KNABEN AREA

Exploration 1984

Jan Inge Tollefsrud

C O N T E N T S

ABSTRACT

During the field season of 1983, diamond drilling and detailed geological mapping were performed in the area west and south of lake Smalvann.
The aim of the work was to find out if the mineralized zone in DH 7-83 was part of a large mineralized zone cropping out in the Sandtjern-Grunnevannsknuten area, and to see if these mineralized zones were hiding ore grade mineralizations at depth.

Eleven holes of length from 53 to 360 m, in total of 1376 m, were drilled.
The area was mapped on scale 1:2000.

The Sandtjern- Grunnevannsknuten zone consists of several parallel mineralized zones. One of these were found to hide at least 1000000 tons of 0.25% Mos2 found at a depth of 25-50 m in the area SW of lake Smalvann.

A up to 17 m thick section of quartz may be part of a 280000 tons, large lens of quartz that is connected to the mineralizations and may have commercial interest.

The zone is not connected to the mineralized zone in DH 7-83.

It is recommended to continue the investigations of the zone towards north to Grunnevannsknuten and towards south to Ørnehommen by means of diamond drilling.

Drillholes of 80-200 m length should be set out parallel to, and east of the outcropping mineralizations of the zone.

INTRODUCTION

During the field season of 1984, the Joint Venture - Folldal Verk A/S - Norske Fina A/S, continued with diamond drilling and detailed geological mapping in the area to the west of Smalvann and SW of the old Kvina Molybdenum mine in the Knaben district. (John Pedersen, report 1982, J.I. Tollefsrud, report 1983).

The aim of this seasons work was to try to find gangfjell mineralizations of the Knaben II type in the continuation towards depth of the Sandtjern-Grunnvannsknuten mineralized zone. It was supposed that the mineralized zone of bleached granite in DH 7-83, found at a depth of 270 m was connected to the Sandtjern zone.
Detailed, geological mapping on scale 1:2000 was continued in the western direction of the area,mapped last year. That is to say Grunnvannsknuten-Sandtjern-Lilleknaben-Ørnehømmen. This was meant to give a better picture of the lower boundary of the main gneis horizon, and of the mineralized zones that paralells this boundary. The work started 20.6 and continued until 22.10.

Until the end of august, diamond drilling was carried out with a Toram drilling machine, built at Hagby Bruk A/S in Sweden and hired from Folldal Verk A/S.
Because of continuos problems with this machine, it was abandoned and a Craelius Diamec 250 of the same type which was used last year, was hired from Backe Maskin A/S/Craelius.

The drilling machines were operated by 2 local residents, Tom Toralf Røynestad and Karl Røyseland, who also operated the drilling machine last year. Arne Knaben was a stand-in for Karl Røyseland during spring farming.

The equipment was transported with a Ford County 754 tractor equipped with a doubble winch, used for winching equipment across the Stutedalen valley.
The diesel aggregate was mounted on a sledge,constructed by Holstad/Røynestad last summer, and the Toram drilling machine was mounted on a sledge constructed at Folldal Verk A/S.

Røynestad and the writer stayed in a hired house in Knaben (owned by O.K. Rejersen, Kvinesdal), which also served as a storage for the drill cores as last summer. Røyseland drove home to Eikeland every evening.

As transport from Knaben to Smalvann was used a Subaru 4WD pick up.

The hired cottage in Knaben.The old Knaben II mine in the background.

Winter in the field.Røyseland (left),Røynestad.DH 7-84.

Rigging the Toram.DH 2-84.

The Diamec rig .DH 4-84.

Winching the hydraulic aggregate (Diamec) across the Stutedalen valley to DH 4-84.

Digging road to DH 5-84.

GEOLOGICAL SETTING

The Knaben area is situated within the precambrium of South Norway. The predominant rocktype is a pink to grey orthogneis called red granite (see description of rocktypes). Within this complex, there exists a up to 1,5 km wide zone where red granite is mixed with lenses and bands of various grey gneisses and amphibolites. The strike of this horizon (called the gneiss horizon, this report) is SSW-NNE and the dip is 15-40°E. The gneiss-horizon often has a rusty appearance due to weathered iron-sulfides, and because of this, the term "fahlband" has been used. (Bugge, 1963).

The Knaben II, Ørnehommen-Sandtjern-Grunnvannsknuten mineralizations are situated below the main gneiss horizon, while the old Knaben I - and Kvina mines are situated within the horizon.

ACTIVITIES

The gneiss horizon was mapped on the scale of 1:2000 in the area from Grunnvannsknuten to Sandtjern, Stutedal, Lilleknaben, Ørnehommen and upper part of Geiteryggen. (App.E)
Eleven vertical diamond drillholes of length 53,5-360 m, in total 1376 m, were drilled. (Mapp.17 App. A and B)

DESCRIPTION OF ROCKTYPES

Red granite (RGR)

The predominant rocktype in the Knaben area is a pink to grey orthogneiss with 1-2 cm blastophyres of alkali-feldspar. The texture varies from near granitic to typical gneiss-granitic. The size of the blastophyres and grains vary from medium to coarse grained over short distances (dm) across the strike. RGR has often a bleached appearance within the gneiss-horizon.

The red granite contains some magnetite and pyrite, but seldom molybdenite and ironsulfides other than pyrite.

Banded gneiss (BGN)

The main gneiss-type is a rather light, grey hornblende biotite gneiss, often with a rusty appearance because of weathered disseminated ironsulfides. It sometimes also contains molybdenite disseminated in the rock, and at the contact towards concordant and discordant quartzveins. The foliation is made up of biotite-hornblende as dark, mm thick bands between light bands of feldspar and platy quartz. The gneiss sometimes shows feldspar blastosis, and this gives the rock a lense - or augen-gneiss-like appearance.

Finegrained gneiss (FGGN)

The grey, finegrained gneiss has a grain-size less than 1 mm. Alternating mm to cm thick, grey-white and dark grey bands are due to varied concentration of dark minerals. The rock is criss crossed by aplitic to granitic vens.
The finegrained gneisses are found as small slices and as concordant bands of 100-200 m length. They are often impregnated with ironsulfides, and traces of molybdenite as diffuse, concordant bands.
FGGN often appears together with amphibolite, and in a few places they both contain garnet.

Aplite (Apl.)

The aplites appears as "old" concordant and discordant veins of dm to m width, and as late, cross-cutting dikes. They are red to grey in colour, and some may show feldspar blastesis, with a gradual change to red granite. The grey varieties may contain disseminated molybdenite and ironsulfides.

Amphibolite (Amph.)

Amphibolites occur as dark lenses, both old, concordant, and younger discordant. They often shows ptygmatic folded quartz-veins and lenses, and is often altered to glimmerite in banded zones, due to hydrothermal alteration.

"Gangfjell"/Bleached red granite (BRGR)

Gangfjell is supposed to be a hydrothermally altered variety of the red granite. The texture is the same as in red granite, except in heavy altered parts, where the textures are diffuse.
It has raised silica-content, mainly due to abundant secondary, subparallel molybdenite-mineralized quartz-veinlets. The colour is grey to weak greenish-grey, presumably caused by sericittisation of feldspar. Besides molybdenite, gangfjell contains some chalcopyrite, pyrite and pyrrhotite, while red granite show some magnetite and pyrite, and only seldom molybdenite. The magnetite is assumed to be the Fe-source for ironsulfides in gangfjell (Gvein, 1981).

In this report bleached varieties of red granite are called bleached red granite (BRGR), and not gangfjell, because the quartz enrichment is not very obvious.

Diorite

Apart from the aplites, banded gneisses, amphibolites and granites described in last years report. (Tollefsrud, 1983), a new rocktype, called diorite was found where the road to Knaben I leave the Kvina road.

It looks like a discordant intrusive body with apparently close to vertical contacts to the surrounding granite.
It has a dike-like arm running west for about 100 m. The rock has a weak foliation and is medium grained. It is very dark, due to a high content of biotite, and have white eyes of what looks like plagioclase.

STRUCTURE

Last years 1:2000 scale geological mapping of the main gneiss horizon in the area from Knaben I - to Kvina old mines, was continued this year by mapping of the western, lower border zone of the horizon in the area from Grunnevannsknuten in the north to Ørnehommen in the south.

The western border of the gneiss horizon is not clear cut. There is a gradual change towards west, with less mixing of banded gneiss and amphibolites into the various red granites.

On the north west flank of Grunnevannsknuten there is a steep slope with a strike of N 70-80°E. This slope represents a narrow zone of dextral drag in the rocks. The westernmost gneiss-amphibolite band has a strike and dip of N80°E/28°E where it ends in this zone.

The zone is considered to be a result of the same deformation as the local drag in some gneiss bands (Tollefsrud, report 1983). One of the mineralized quartz-veins on the south-eastern slope of Grunnevannsknuten (in the area of the little stream, map 4) show this same type of deformation along a plane with the same orientation.

It is possible that this deformation is the same as the youngest of Hermanns et al.'s (1975) four fold-phases distinguished for the region west of Sirdalsvann.

The Stutedalen (dalen = valley) - Smalvann fracture zone is a structure that represented a problem when we tried to find a continuation of the mineralized zone in DH 2-84 and 3-84 on the east side of Stutedalen.

About 350 m south of the dam a discordant aplitic "dike" with weak vertical foliation seems to be displaced about 100 m in a dextral manner in the Stutedalen zone. Still further south a dioritic, discordant lens with apparently vertical contacts to the red granite was found. It is situated mainly on the west side of Stutedalen, but a part of it was found on the east side, and opposite the southern part of the main body on the west side. The possible displacement towards south of the east part of the lens could be due to the same displacement as the one on the aplite further north.

Along the shores of Smalvann there are no signs of displacement along a narrow zone, but deformation is more like a flexure (Tollefsrud, report 1983), giving the gneiss a strike parallel to the shores of the lake. DH 6-84 that was set out on the west side of Stutedalen shows a gradual change over half a meter, from a dragged, plastic deformed granite to an ordinary bleached granite, which indicate an episode of ductile deformation in the Stutedalen zone.

On the north-west shore of the largest lake in the Lilleknaben area it was found a narrow zone (2m) with a strike of 32°E and dextral drag of a few meters. This could represent a miniature of the deformation in the Stutedal zone.

Just west of DH 1, 2, and 7-84 there is a zone of apparant weakness, making it visible in the terrain as a notch or ditch. No signs of a relative displacement that could have given a wrong estimate of the dip of the mineralized zone between hole 7- and 9-84 was found however.

Isophypses drawn through the mid point of the mineralized zone in each hole, show a plane structure with a strike N 10°E and a dip 20° E. Outcropping rocks in the drillhole area give a compareable strike, but varied dip.

Further west, on the slope down to Sandtjern the dip varies from 20-40° E, and strike seems to be N-S and weak westerly. On the north side of hilltop north east of Sandtjern the strike is easterly and this gives the possibility of a synform with a fold axis dipping towards ESE. Whether such a structure can have been of importance to the formation of the mineralization is however uncertain.

Summary - structure.

Narrow vertical zones of ductile deformation running NNE-SSW and ENE-WSW were found several places in the area.

Relative displacements along the zones were always found to be dextral, and this indicates that the two orientations not represents conjugated shears, but are the result of two deformation episodes.

The Stutedalen valley is a representative of the NNE-SSW running zones. Relative horizontal displacement is supposed to be about 100 m. Mos2-mineralizations seems to be cut by this zone, and the deformation is therefore younger than the mineralization.
Concordant, small, Mos2-mineralized quartz-veins are also seen to be displaced by ENE-WSW running zones.

The large mineralized zone that was found at depth west of Smalvann is concordant and seems to have an average strike of about N10°E and dip of 20°E.
No unambiguous structures that may have controlled the mineralization was found.

MINERALIZATION

The mineralization on the western border of the gneiss horizon seems to be connected to several parallel concordant zones that are persevering along strike, but have irregular mineralization.
Some of the zones partly consists of slices of gneiss and amphibolite.

The mineralizations are mainly of quartz-vein type, with weak disseminations in granite and aplite. Mos2-mineralized quartz-veins of the westermost Sandtjern zone show signs of ductile deformation , just like the Mos2-mineralized quartz-vein on the south-east slope of Grunnevannsknuten, that show dextral drag along a ENE trending plane.

The mineralized zone that was found in drillholes 1-, 2-, 3-, 7-, 8-, 9-, and 10-84 consists of:

1. Quartz. Both as cm wide veins and sections of several meters. The small quartz-veins shwo mineralization both in the form of impregnation of mm large grains and larger clots of Mos2, while the thick sections of quartz is almost pure SIO2 with only spread cm masses of mainly pyrite and chalcopyrite. In DH 2-84 there are mirrors of pyrite on young, close to vertical fractures.

2. Aplite. This is a "sugar"-grained greenish coloured quartz-feldspar rich type with foliation. It is mineralized with both chalcopyrite and pyrite, but mainly by Mos2. Mos2 is disseminated in the rock as concordant, less than cm long, flat lenses with a discuss like shape. The texture of the mineralization indicates that it is "old" and has survived at least the deformation that gave the rock its foliation.

3. Bleached red granite. This is a weak greenish coloured bleached variety of the red granite and it show impregnation of Mos2, pyrite and chalcopyrite.

The relative amounts of the various rocktypes varies, but the zone as a hole is so characteristic that there should be no doubt that it is the same zone that is intersected by all holes.
A stone with the same textures was found close to the open pit of Knaben II mine, and that indicates that this rocktype has been a part of the Knaben II orebody.

In drillholes 1-, 7-, 9- and 10-84 part of the zone consisted of thick sections of quartz, with only minor impregnation of sulfides. The quartz is as thick as 17 m in DH 10-84, 5 m in DH 9-84, 4 m in DH 2- and 3 m in DH 7-84. This opens the possibility of a large quartz-lens like the one in the old Kvina mine. (Tollefsrud, 1983).

It seems that we have to do with a mineralized zone with characteristics that are known from both the Knaben II and Kvina ore deposits. This means that there need not necessarity be any genetic diffences between the two deposits.

At the upper excavation in the Sandtjern zone, lying at about 840 m.a.s. there is a 5 m long and m wide quartz-vein with spread mineralizations of Mos2 and a dip of 20°E. The vein is thinning out to less than 0.5 m towards south and can be followed for about 100m. It shows mineralization at only 2 places and seem to be situated at a too low level to be directly connected to the mineralized zone in the drillholes.

On top of the steep slope ENE of Sandtjern there are some lenses of banded gneiss and aplite. There are also lots of cm to dm. wide quartz-veins without Mos2. A medium grained, rusty gneiss has weak impregnation of Mos2.
Just north of high 885 there are lots of cm to dm wide quartz-veins with Mos2 covering an area of about 20x 6 m. Quartz-veins show varied dip, and the dip of the zone was not possible to messure. This zone is expected to lie above the mineralized zone in the drill-holes, but has no continuation towards depth.

275 north of DH 1-84 there is a zone of Mos2-mineralized quartz-veinlets in bleached granite. The zone has been excavated, and 175 m towards east a diamond drillhole (3, p.17) intersected the zone at a depth of about 80 m, where it was 3 m thick and had an average content of 0.085% Mos2.
When considering strike and dip of this zone, it can be connected to the mineralized zone found in last summers drill-holes.
The zone seems to continue up on the west side of Grunnvannsknuten (map p.15) as spread and weak quartz-vein mineralizations all the way up to 75 m west of the house on top of Grunnvannsknuten. Here the zone widen out before it continues with more spread mineralizations on the north side of the mountain.
Below the uppermost zone on Grunnvannsknuten there can be recognized 2 or 3 more zones.
The lowest and westernmost is connected to impregnation in aplite, the one above this is connected to apparently concordant quartz-veins with mirrors of Mos2 on the contacts to red and bleached red granite.
The zone above this seem to follow the gneiss-amphibolite zone and consists of quartz-vein mineralization.

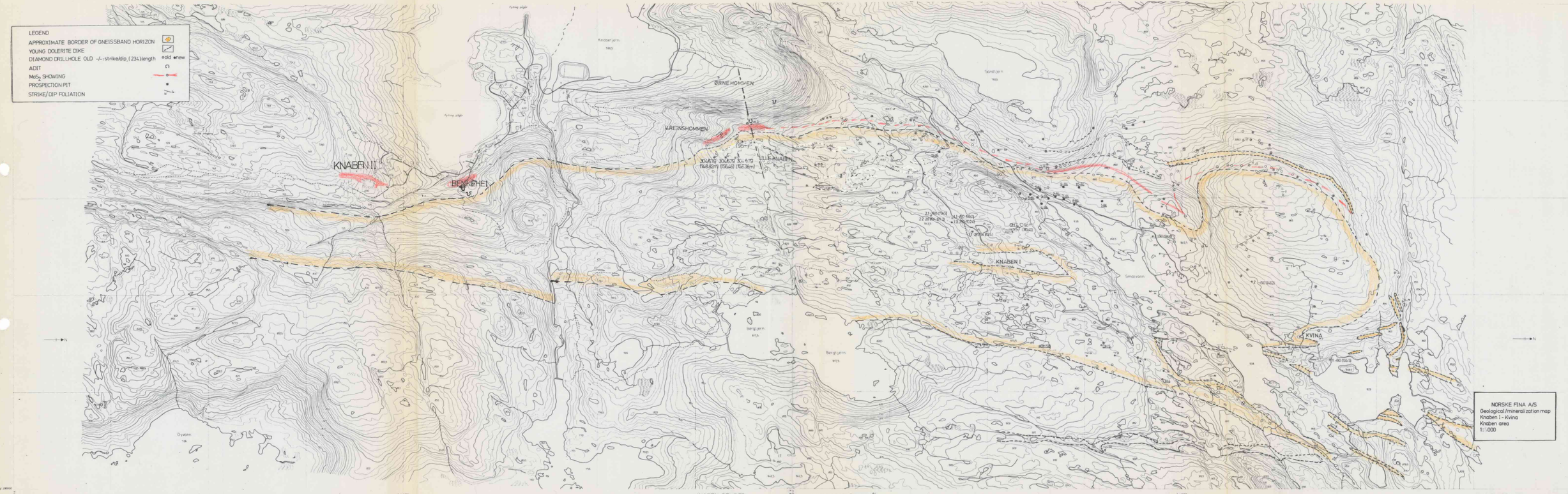
South west of DH 3-84, the mineralized zone should crop out and cross the Kvina road in the area west of the scree in Stutedalen. No mineralizations was found however.
Still further SW on the road to Knaben I, where this makes a 100° bend, there are Mos2 mineralizations of the qz.vein type and also impregnation in aplite. These zones continues towards Ørnehommen, mainly as up to 5-6m wide zones of trains of 3-20 cm thick quartz-veins with Mos2. The zones are considered to be the continuation of the Sandtjern-Grunnvannsknuten zone. They have been mined at "Abels mine", which is situated just west of, and above the discordant dioritic lense in Stutedalen. Here a meter thick quartz-vein, fairly rich in Mos2 have been mined, but several smaller mineralized qz.veins are found just south of it.

On the NE edge of the steep slope in Ørnehommen there are three small pits mined on Mos2-mineralized quartz-veins in granite.

From Reinshommen to Jelå in Ørnehommen there is a zone of mineralization both as impregnation in aplit (Vestre Reinshommen 760 m.a.s.), and as quartz-vein mineralization and impregnation in bleached granite. (Jelå and Rubens mine, Upper Ørnehommen 770 m.a.s.)
The zone is up to about 8 m (Rubens mine) thick and is found on the same level as the the prospection pits on top of the Ørnehommen slope described above. The zone has been mined in Vestre Reinshommen and upper Jelå.
At a lower level, about 710 m.a.s. in Ørnehommen, there have been some mining on a Mos2-mineralized, 150 m long and about 2 m wide zone of quartz-veins.

Summary - mineralization

The mineralizations in the Grunnvannsknuten-Sandtjern-Ørnehommen-Reinshommen area consists of several paralell zones with quartz-vein-, aplite and granite impregnations. The zones are persevering along strike and mineralization irregular, but larger zones of mineralization have been found, both in the Sandtjern area and in Reinshommen.
The mineralizations seems to have survived at least one-, possibly more deformation episodes.
The last one beeing ductile drag along vertical planes.
Concordant mineralization in aplite indicate that it even has survived the major deformation that gave the rocks their present foliation. Even if this is correct, the mineralization found in the drillholes have characteristics in common with both the Knaben II-, which have been considered to be the result of a late mineralization episode and Kvina orebodies.
The impregnation of Mos2 in granite, aplite and small quartz-veins beeing typical for Knaben II and the large quartz lens beeing typical for the Kvina mine.


LEGEND
APPROXIMATE BORDER OF GNEISSBAND HORIZON
YOUNG DOLERITE DIKE
DIAMOND DRILLHOLE OLD +/- strike/dip, (234) length old new
ADIT
MoS2 SHOWING
PROSPECTION PIT
STRIKE/DIP FOLIATION
KNABEN II
BENKEHEI
ØRNEHOMMEN
KREINSHOMMEN
LILLE KNABEN
KNABEN I
KVINA
NORSKE FINA A/S
Geological / mineralization map
Knaben I - Kvina
Knaben area
1:1000
KNABEN GRUBER
2 00.151
KNABEN GRUBER
Bl. 1
K.M. 00.150

THE DIAMOND DRILLING PROGRAM 1984

Activities.

11 holes were drilled (Tabel 1, map. p.17)

Tabel 1. Drillholes 1983.

Hole No.	Strike/Dip.	Length of hole
DH 1-84	-/90	360,00 m
DH 2-84	-/90	180,00 m
DH 3-84	-/90	110,00 m
DH 4-84	-/90	192,70 m
DH 5-84	-/90	92,50 m
DH 6-84	N85W/85	84,20 m
DH 7-84	-/90	61,20 m
DH 8-84	-/90	62,50 m
DH 9-84	-/90	53,50 m
DH10-84	-/90	55,50 m
DH11-84	-/90	123,80 m
Sum		1376,00 m

1-84 was drilled to locate possible plane(s) of mineralization that could be connected with the Sandtjern-Grunnvannsknuten zone.

2-84 was set out to get a better control of structures and try to find a direct connection between the Sandtjern zone and mineralized zone in DH 7-83.

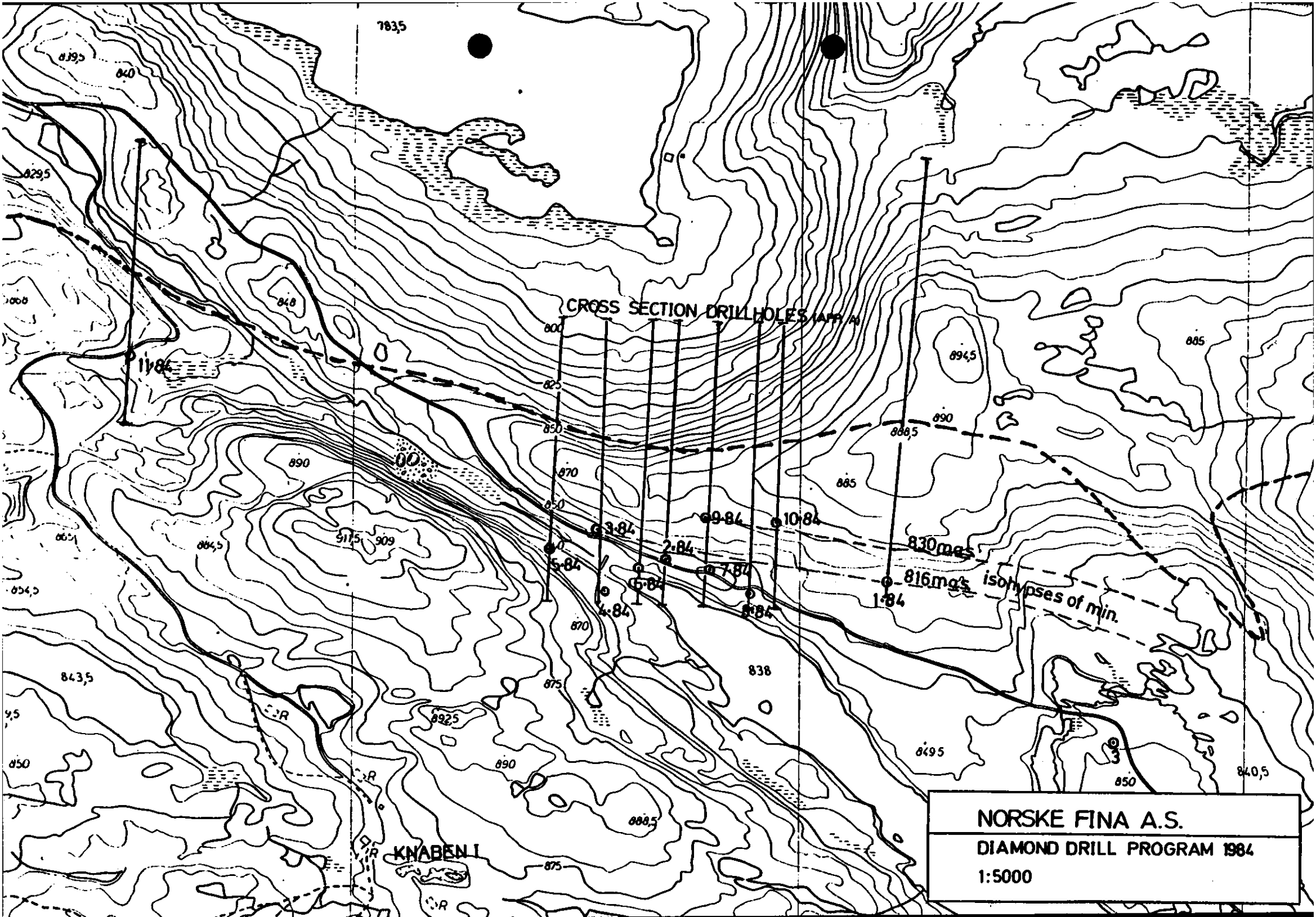
3-84 was drilled to find a continuation of the mineralized zone at shallow level in 2-84.

4-84 was set out to try to find the continuation of the mineralized zone in 2-84 and 3-84 on the east side of Stutedalen valley, which could represent a fault-zone with relative displacement.

5-84 was set out as far south as possible on the same side of Stutedalen valley as 4-84. This was to get closer to the strike-line of mineralization cutting 1-84 and 3-84 on level 815 m.a.s., to make sure that the negative result of 4-84 was not due to bad luck or that it interected the level of mineralization below, along dip, a possible orebody.

6-84 was set out to find out what happened to the mineralization in the Stutedalen valley. The hole was set as close as possible to the western side of the valley. Drillhole was tilted 5^{0} towards west to intersect the boundary between "valleyrock" and fresh rock on the west side.

7-84: It was decided to try to find the continuation of mineralization along the Smalvann towards north.


CROSS SECTION DRILLHOLES (APP A)
1-84
2-84
3-84
4-84
5-84
6-84
7-84
8-84
9-84
10-84
830mas
816mas
isohypses of min.
KNABEN I
NORSKE FINA A.S.
DIAMOND DRILL PROGRAM 1984
1:5000

8-84 was set out as a consequence of the decision described above.

9-84. Because of negative result of 8-84, it was decided to move west to get an impression of the geometry and structure of the mineralized zone.

10-84. Was set out because of good result of 9-84.

11-84. Because of heavy snow-fall, and because a removal towards north had to involve a complicated and timeconsuming transport of diesel aggregate. It was decided to examine the zones of comparable mineralizations running south from Stutedalen to Ørnehommen, and which seems to be a continuation of the Sandtjern-Grunnevannsknuten zone. The drillsite was at a lower level and on the road to Knaben I, so that the risk of getting stucked because of snow was'nt too big.

SHORT DESCRIPTION OF DRILLHOLES 1984

(Corelogs app. A and B).

DH 1-84 863 m.a.s. 360 m.
DH I cuts various types of red granite. From 43 to 49 m depth a zone of bleached to greenish coloured granite, qz-veins and aplitic-, qz-feldspar rich rocks was found. Mos2 mineralization dominantly as concordant,cm long, flat lenses in aplit, but also as spots in qz-veins.

From 90 - 135 m depth, there was a zone consisting of a mixture of red to bleached red granite, aplites, banded gneisses and amphibolites. Weak and spread impregnation of py, chp and pht, also some traces of Mos2. This zone was believed to be the same as the western gneiss/amphibolite band on Grunnvannsknuten
From 135-163 m depth there was an ordinary red granite,and from 163-275 m there was various types of red granite with varied grainsize. and content of dark minerals.
This last zone was considered to be the same as the one cropping out in the area between the two westernmost mineralization zones.

From 275 to 355 m depth there was a zone dominated by bleached red granite and grey aplites with weak mineralization of py, chp,pht and Mos2, both as impregnation and connected to concordant and discordant qz. veinlets.
This zone was considered to be connected to the westermost mineralized zones in the Sandtjern area.

Samples analysed: 44-49 m: 966 ppm Mo, 524 ppm Cu.
" " 275-354*: 76 ppm Mo, 124 ppm Cu.

*Samples taken each third meter.

DH 2-84 848 m.a.s. 180 m.
The first 30 meters is a mixed zone typical of the gneiss-horizon, with bleached and red granites, banded gneiss, aplite and amphibolite.

From 30-43 m the same zone as was found on level 43-49 m in hole I was found.
The uppermost 4 meters of the zone is quartz.
43-98 m depth is dominated by weakly bleached granite with spread and weak mineralization of chp, py and some Mos2, both as impregnation and in qz-veins.
98-117 m is a zone of bleached red granite, banded gneiss and some aplite and amphibolite, mineralized in the same way as the zone above.
117-128 m is a zone of bleached granite with weak impregnation of py, pht and chp.
128-150 m depth is a new mixed zone, with weak impregnation of py, pht and chp. Some concordant Mos2 (+chp, py, pht) in grey apl.

Samples analysed: 34-42 m: 1561 ppm Mo, 649 ppm Cu.

DH 3-84 845 m.a.s. 110 m.
The upper 26 m is dominated by red granite.
From 25-33 m the mineralized zone was found. In this hole without a thick qz-section.
33-90 m is dominated by weakly bleached granite and grey aplite with weak and spread mineralization of py, chp and some Mos2, both as dissemmination and in qz-veins.
90-110 m is dominated by banded gneiss with weak mineralization of py, chp and pht.

Samples analysed: 25-32 m: 1373 ppm Mo, 1361 ppm Cu.

DH 4 847 m.a.s. 192,7 m.
The first 80 m is dominated by weakly bleached granite.
From 80-90 m the granite show traces of Mos2 and chp.
120-156 m is dominated by banded gneiss. The gneiss is weakly impregnated by py, chp, pht and traces of Mos2, as usual for banded gneisses.
156-192 m is dominated by red and bleached red granite. Spread grains of sulfides.

DH 5 850 m.a.s. 92,5 m.
Is very much like DH 4-84.
The mineralized zone at depth 80-90 m in hole 4-84 was found at the same depth in 5-84 .

DH 6 840 m.a.s. 84,2 m.
The hole was tilted 5° W.
The first 45 m seems to be some sort of a mylonite with textures of plastical deformation.
From 45 m depth the rock is a red granite, and from 45-76 m there are traces of py, chp and Mos2.

DH 7 850 m.a.s. 61,25 m.
The upper 44 m is dominated by red- and bleached red granite, but with some bands of banded gneiss, aplite and amphibolite. Banded gneiss mineralized was as usual.
From 36 to 44 m depth the mineralized zone of hole 2 (34-42m depth) was found. The upper 3,5 m is quartz, which is also mineralized with chp, py and Mos2.
From 44 m and downwards the rocktype is red granite.

Samples analyzed: 36-44m: 1904 ppm Mo, 714 ppm Cu.

DH 8 842 m.a.s. 62,4 m
The first 45 m is a mixed zone dominated by red granite and with subordinate banded gneiss.
From 40 to 42 m a possible combination of the mineralized zone of hole 7-84 (36-44 m depth) was found. It consists of bleached red granite, grey aplite and qz.veins. Mos2 occurs both in qz. and as impregnation in the other rock types.
From 45 m depth the rocktype is a weakly bleached red granite.

Samples analysed: 40-42 m: 2440 ppm Mo, 1350 ppm Cu.

DH 9 865 m.a.s. 53,5 m.
The hole is dominated by RGR.
The mineralized zone was intersected at a depth of 30 to 42 m. It consists of one upper 2 m thick qz.zone and a lower qz.zone of about 5 m. The quartz is partly mineralized with Mos2, py and chp. The rest of the zone is Mos2-impregnated aplite and bleached red granite criss-crossed by qz.-veins containing Mos2.

Samples analysed: 30-38 m: 1309 ppm Mo, 564 ppm Cu.
40-42 m: 2895 ppm Mo. 255 ppm Cu.

DH 10-84 865 m.a.s. 55,5 m.
The hole is dominated by red granite.
The mineralized zone was intersected from 26-50 m depth.
From 26 to 28 m depth the rock-type is a bleached red granite cut by qz. veinlets and with Mos2 in both.
28-45 m is almost pure quartz.
45-50 m is mixed bleached red granite and grey aplite.
Most of the Mos2 as concordant impregnation in aplite as described for 1-84.

Samples analysed: 26-28m: 640 ppm Mo, 200 ppm Cu.
45-50m: 1318 ppm Mo, 610 ppm Cu.

DH 11-84 847 m.a.s. 123,8 m.
Hole dominated by RGR. Only traces of Mos2.

PREVIOUS DRILLING

Apart from the earlier mentioned drillhole 3, 1200 m SW of the Kvina mine, that intersects a 3 m mineralized zone with 0.085% Mos2 at depth of about 80 m, two more drillholes have been drilled in this area (Table 2). Hole 2 was set out 500m south/east of Kvina to test the quartz-vein mineralizations on the south east slope of Grunnvannsknuten.

Table 2 Old drillholes, Kvina area.

Hole no.	Strike/dip	Length of hole
1	-/90	155,5 m
2	-/90	146,2 m
3	-/90	98,8 m

The hole is just about to reach the level of the uppermost mineralization zone on Grunnevannsknuten. No mineralization was found, but the hole lies very far from the outcropping mineralization and it is not certain that the level was reached (estimated dip from outcropping mineralization to bottom of hole: 20°).
Hole 1 was set out 150 m east of Kvina mine to look for a continuation of the Kvina ore. No mineralization was found.

Further south, in the Lille Knaben area, 7 holes have been drilled. (Table 3). They were set out on a line 40-50 east of and paralell to the outcropping mineralized quartz-veins that have been mined in the area. The veins lies east of the main mineralization zone Sandtjern-Ørnehommen. They were intersected at a depth of 25-45 m, but only sections of 0,5-1,5 m of Mos2 mineralizations were found. (Bugge, 1967).

Still further south, in the Ørnehommen-Reinshommen area, several holes have been drilled. (Table 4).
Mineralizations of five of these are known, and shows that hole 3 had a 23,45 m zone of 0.1% Mos2 on the level of the outcropping aplite/quartz-vein mineralizations in Reinshommen. (Sydvaranger, report, 1980).
Drillhole 2, situated between the outcropping aplite and hole 3, did not show mineralization at the same level however. This shows that the mineralizations towards depth show the same lens-shape or pitch and swell structure as is seen at the surface. It also shows that there exists wide zones of fairly rich Mos2-mineralizations hidden along the zone.

Table 3 Old drillholes Lilleknaben.

Hole no.	strike/dip	Length of hole
1	300g/66.7	86,87 m
2	"	39,90 m
3	"	40,12 m
4	"	63,50 m
5	"	60,00 m
6	"	66,30 m
7	"	65,05 m

Table 4 Old drillholes Reinshommen

Hole no.	Strike/dip	Length of hole
2	304g/66.7	96,00 m
3	"	158,98 m
4	"	156,46 m
5	"	148,42 m

DISCUSSION/CONCLUSION

The diamond drilling in 1984 confirmed that the Sandtjern-Grunnevannsknuten zone have mineralizations of the type that could be connected to ore grade mineralizations at depth.

The zone cannot however be considered as one big, continuous zone, but rather as several parallel zones with discontinuous mineralization.

One of these zones was found to have ore grade mineralizations at depth. It has a strike of about N10°E and dip 20°E.
Fig. (5)

Fig. (5)

Hole no.	width of zone incl. quartz	meter mineralized	% Mos2	meter quartz
1-84	44-49	5 m	0,16	-
2-84	34-42	8 m	0,26	4 m
3-84	25-32	7 m	0,23	-
7-84	36-44	8 m	0,30	3 m
8-84	41-42	2 m	0.406	-
9-84	30-38, 40-42	10 m	0.34	5 m
10-84	26-28, 45-50	7 m	0.183	17 m

The zone was not refound on the east side of Stutedalen, and could not be connected to the mineralized zone in DH 7-83.

The zone seems to thin out towards east, on the west side of Stutedalen.
Towards south the zone should crop out, and cross the Kvina road with an approximate strike N-S, 200 m SW of DH 3-84.

The mineralizations is not found here, and the zone must be limited to the north of this area.
Towards north, no unambigous limitation of the zone can be given at this stage of investigation.
It may be that the thin section found in DH 8-84 (2 m) was just bad luck, and that the zone is thicker further north.
The same thing could be case with the weak mineralization found in the old drillhole 3 NE of DH 1-84. (3 m with 0.085% Mos2).

The main thing to note is that there exist a large mineralized zone that is very persevering along strike and can be followed more or less continuously from the area investigated last summer and all the way up to the north side of Grunnevannsknuten, a distance of about 1500 m.
A part of this zone has shown to contain ore grade mineralizations, that have characteristics in common with both the Knaben II and the Kvina orebodies.

Using a length of 550 m from south of DH 3-84 to north of 1-84, 100 m in east-west directions and an average thickness of about 7 m, this gives an orebody of about 1000000 tons with an average of 0.25% Mos2. Such rich mineralizations has never been found at depth outside the Knaben II ore before.'

Apart from the Mos2, a quartz lens is connected to the mineralized zone. It is up to 17 m thick, and may have commercial interest. Suppose that the quartz in DH 2-, 7-, 9- and 10-84 are sections of the same quartz body - there may exist a quartz lens with a longest axis oriented N10°W and plunging about 7°S. This fits well with orientation and shape of the quartz in the old Kvina mine. (Tollefsrud, report, 1983). Using an average thickness of 7 m, 250 m length adn a width of 60 m - this gives about 280 000 tons of quartz.

Even if the mineralized zone is found not to be continuous towards north to Grunnevannsknuten, the whole zone is still an interesting target for investigations. The outcropping mineralizations are irregular, and of show lens-like geometry.

Diamong drilling in the Reinshommen area (see "Previous drilling") indicate that this is the case also towards depth: Diamond drilling showed a zone of 23 m with 0.1% Mos2 east of, and on the same structural level as the mined outcropping mineralizations in Reinshommen. In a hole further west, between the outcropping mineralizations and the drillhole zone, no mineralizations were found however. It seems that mineralizations show pitch and swell structures both along strike and dip.

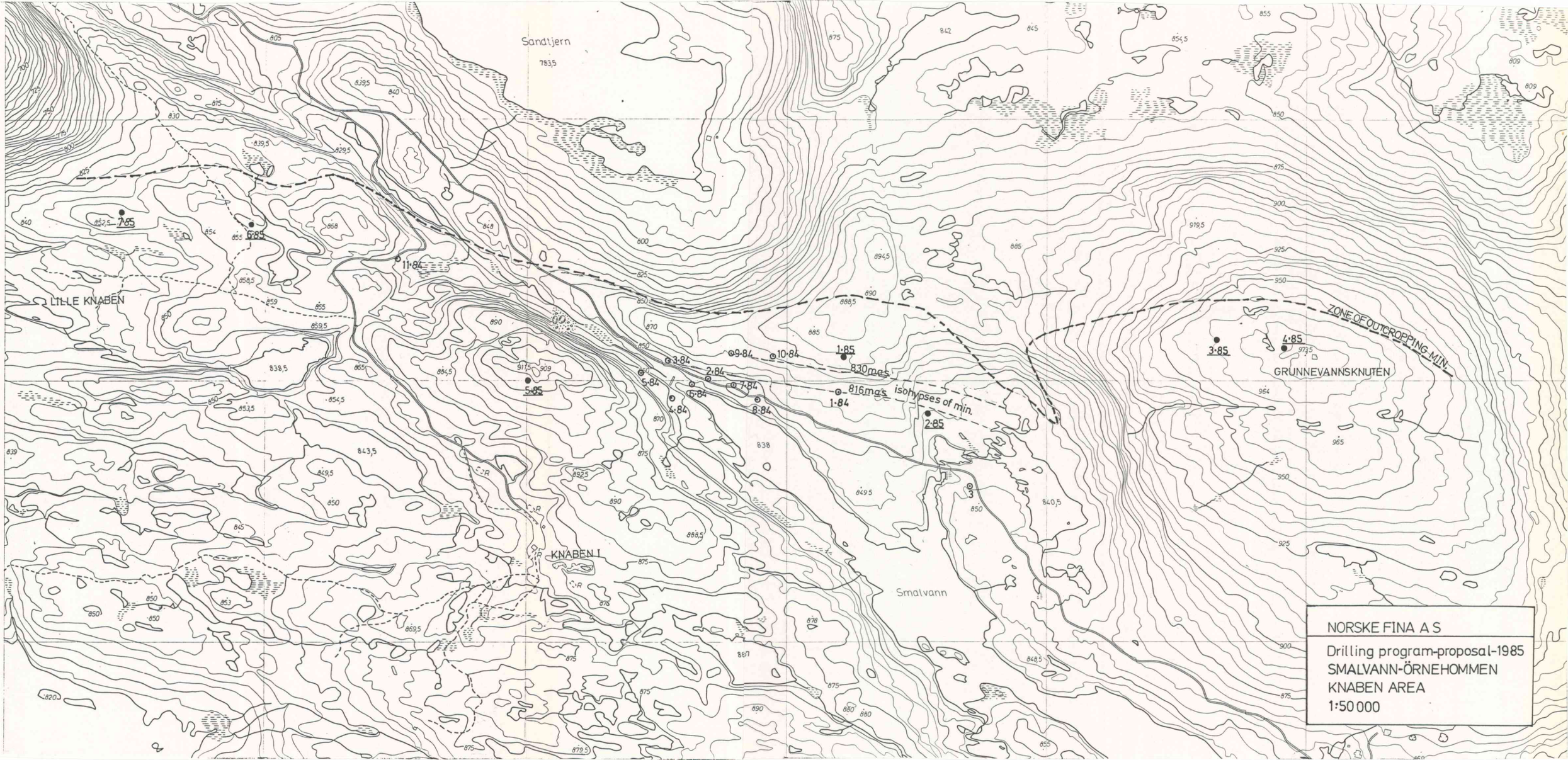
It is concluded that the mineralized zone running from Reinshommen/Ørnehommen in the south to Grunnevannsknuten in the north has a potential for hiding large, ore grade mineralizations.
On this structural level rich mineralizations have been found both in Knaben II, in Reinshommen/Ørnehommen and in the Smalvann area.
Diamond drilling should be continued both north of DH 1-84 and south of DH 11-84 - towards Reinshommen.

RECOMMENDATION

It is recommended to continue diamond drilling in the area west of Smalvann, to follow up the mineralized zone found last summer. If it is lost, further drilling should be consentrated on finding shallow level mineralizations along the same structural level. If DH 3-85 on Grunnevannsknuten gives a negative result at shallow level, it should be continued to 200 m to intersect a possible continuation of the lower mineralizations cropping out on Grunnevannsknuten.

Position of drillholes has to be consecutive evaluated, so the proposal should be considered as a frame for further investigations.

Locality	Hole no.	Strike/dip	Length of hole	expected depth of mineralization
Smalvann W	1-85	-/90	60 m	30 m
" W	2-85	-/90	60 m	30 m
Grunnevannsknuten	3-85	-/90	200 m	45 ±10 m
"	4-85	-/90	80 m	50 ±10 m
Stutedalen E	5-85	-/90	200m	150 m
Lilleknaben W	6-85	-/90	100m	55 ±10
"	7-85	-/90	100m	50 ±10
Totalt			800 m	


Sandtjern
783,5
LITLE KNABEN
KNABEN I
Smalvann
GRUNNEVANNSKNUTEN
ZONE OF OUTCROPPING MIN.
830mas
816mas isohypses of min.
7-85
6-85
11-84
5-85
3-84
2-84
5-84
6-84
4-84
7-84
8-84
9-84
10-84
1-85
1-84
2-85
3-85
4-85
NORSKE FINA A S
Drilling program-proposal-1985
SMALVANN-ÖRNEHOMMEN
KNABEN AREA
1:50 000

Bl.2

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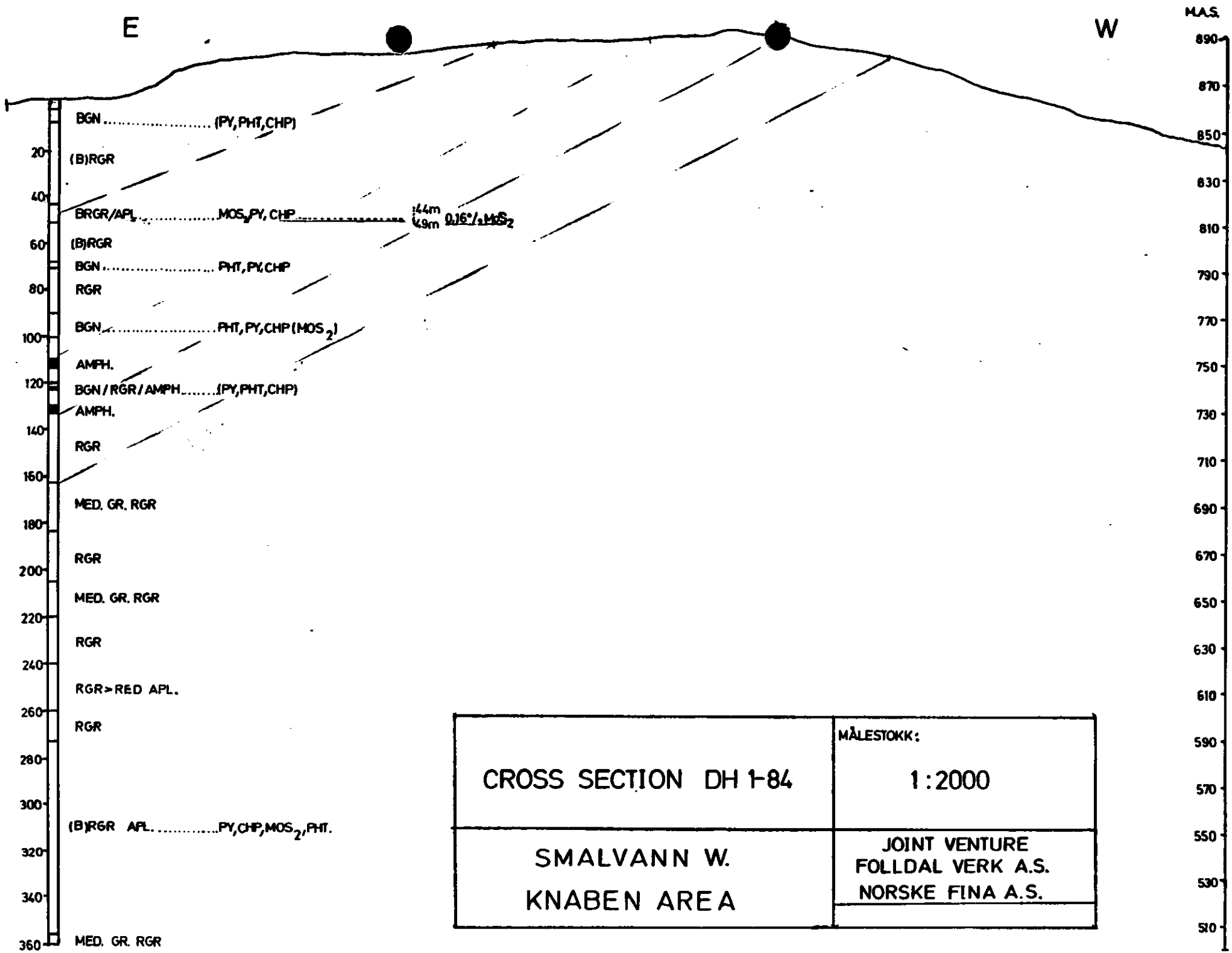

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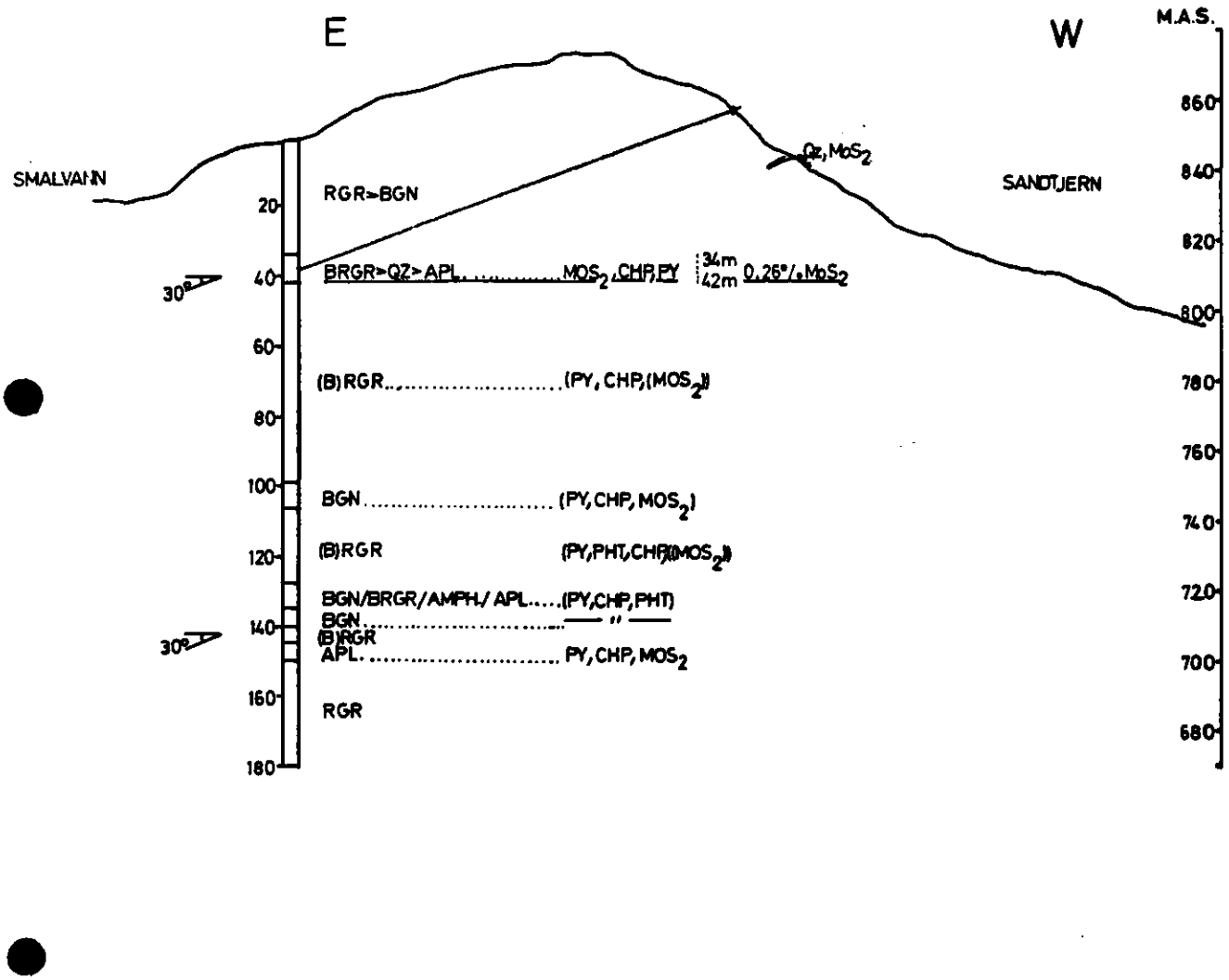

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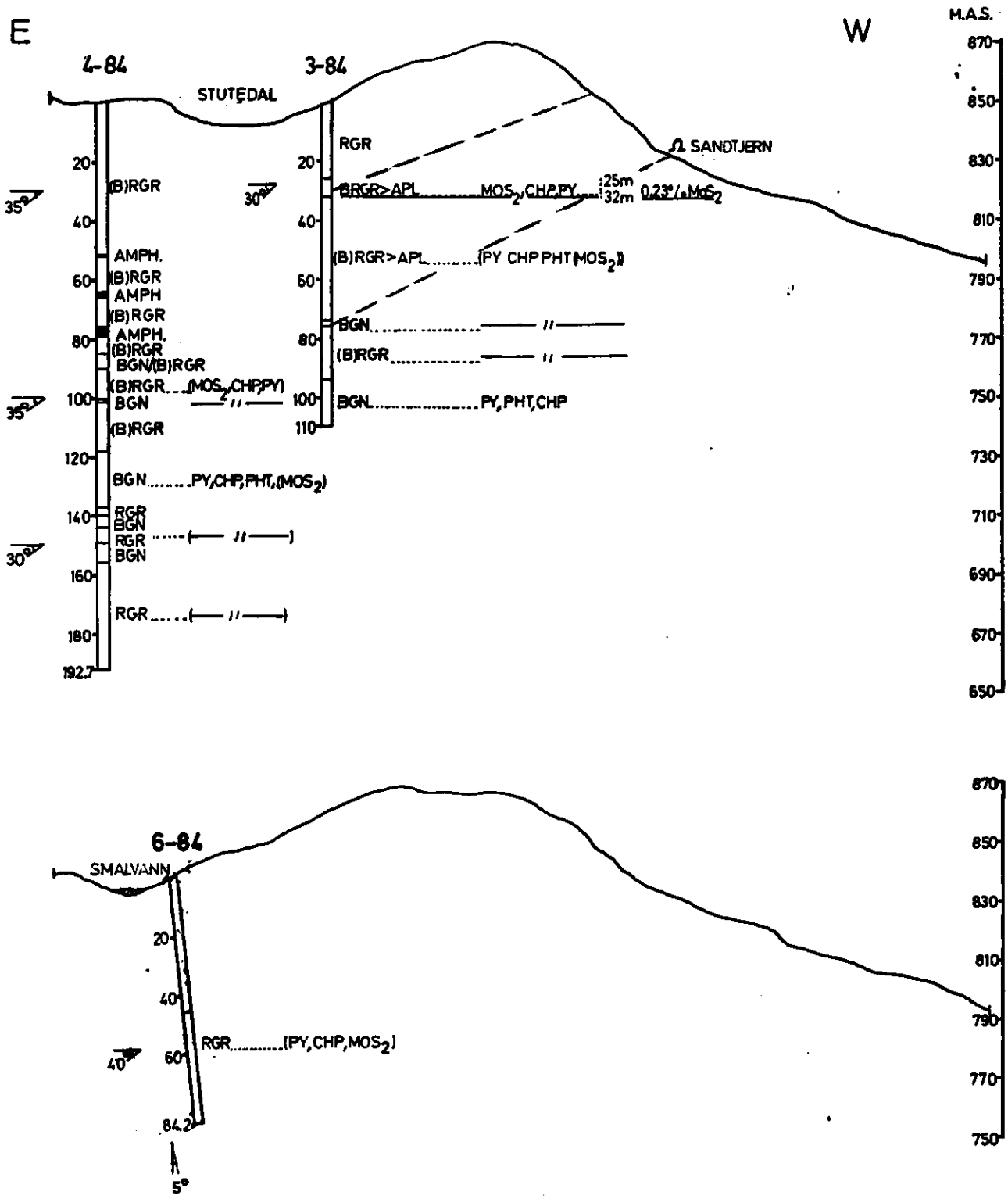
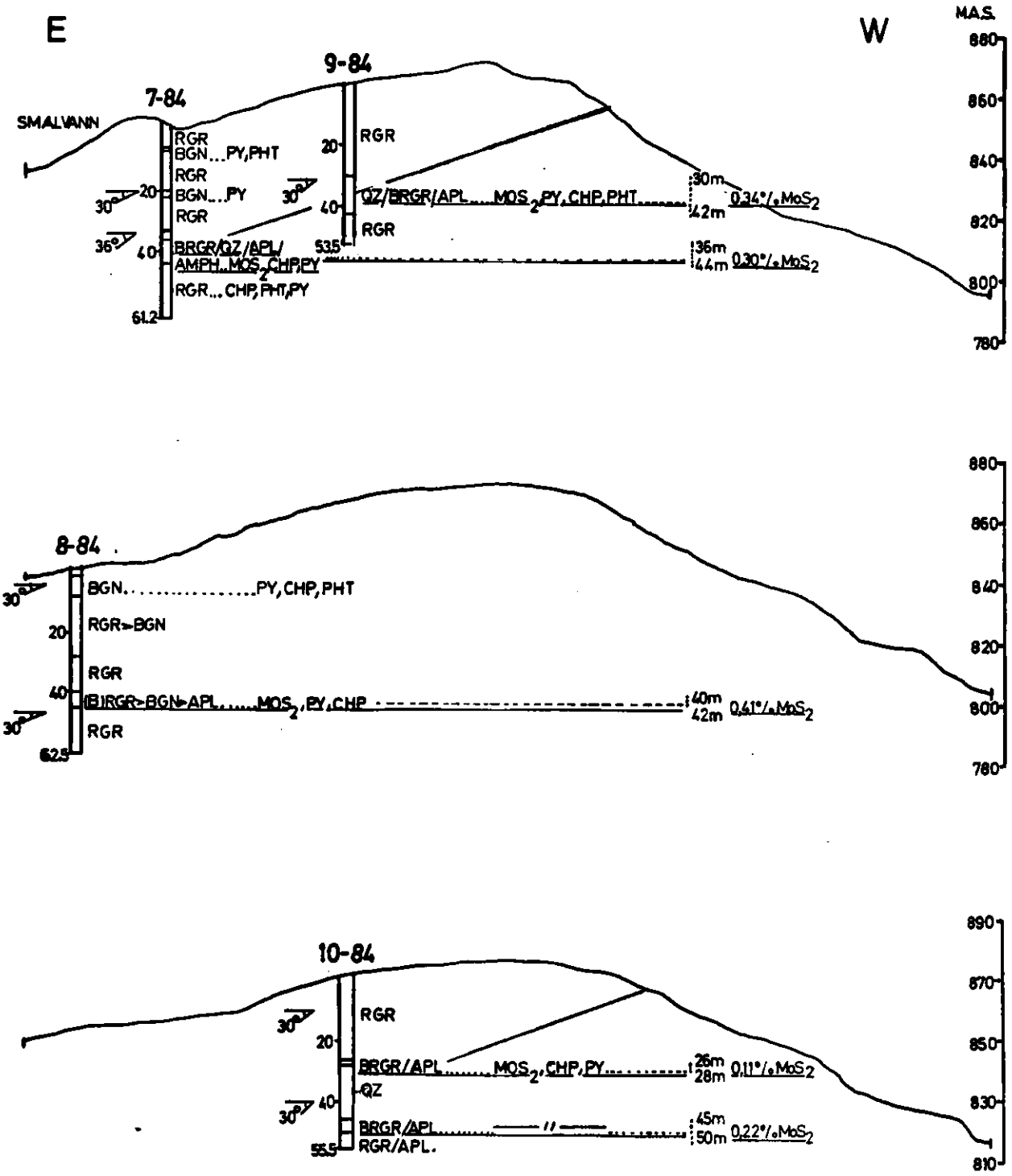
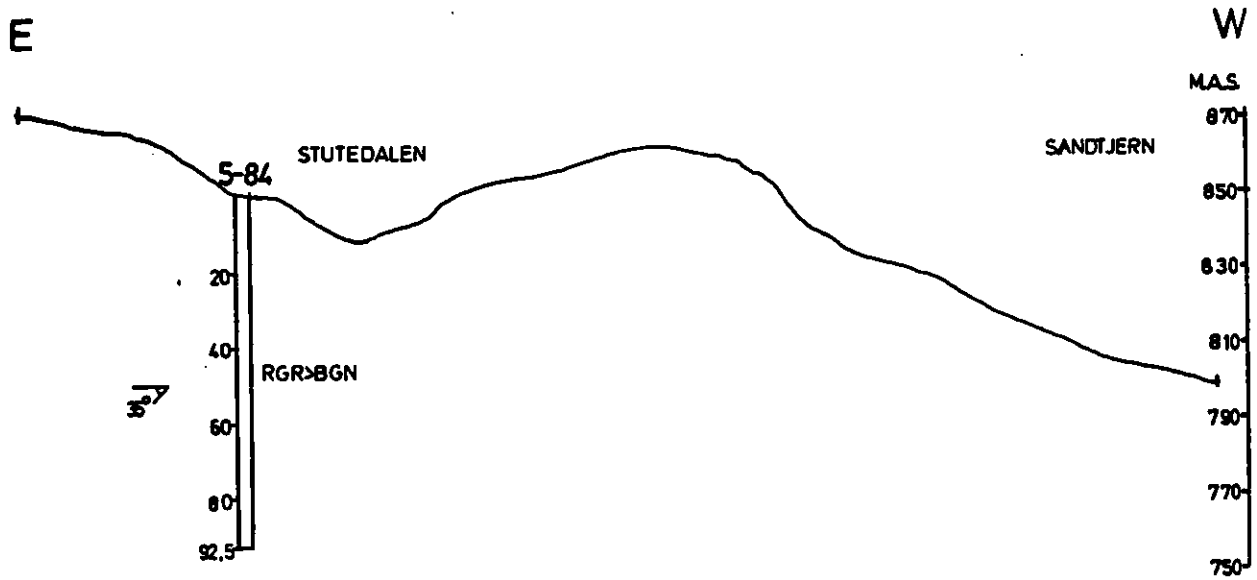


CROSS SECTION DH 3-,4-,6-84	.MÅLESTOKK: 1:2000
SMALVANN W. KNABEN AREA	JOINT VENTURE FOLLDAL VERK A.S. NORSKE FINA A.S.



CROSS SECTION DH 7-,8-,9-,10-84	MÅLESTOKK: 1:2000
SMALVANN W. KNABEN AREA	JOINT VENTURE FOLLDAL VERK A.S. NORSKE FINA A.S.

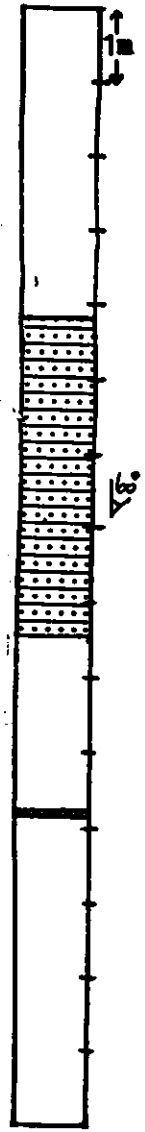


CROSS SECTION DH 5-,11-84	MÅLESTOKK: 1 : 2000
SMALVANN W. KNABEN AREA	JOINT VENTURE FOLLDAL VERK A.S. NORSKE FINA A.S.

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	Rusty fractured			
(B)RGR	"			
	"			
BGN		Traces of py,pht,chp in BGN		1/1
(B)RGR				
10cm apl.	rusty vertical frac.			
(B)RGR				2/1

DATO: 10.7.84

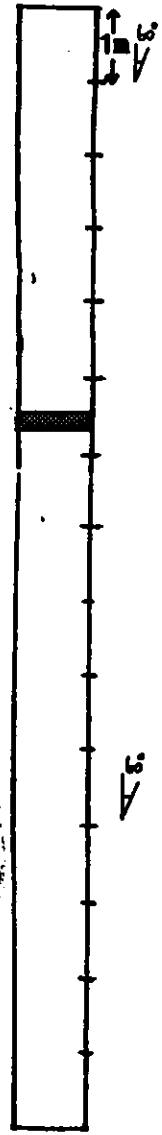
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR	rusty fractures			2/1
Grey apl (B)RGR		10cm zone w.0,5cm bands w. py, chp, Mos2		3/1

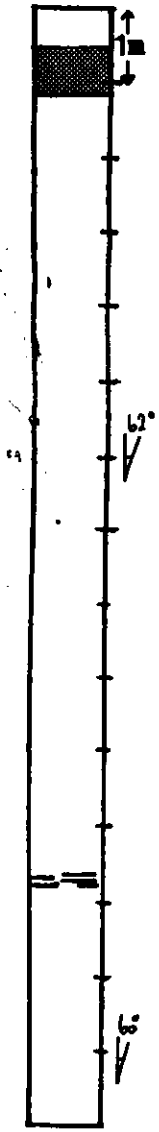
DATO: 10.7.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR grey apl.				
(B)RGR 10 cm BGN		py, chp in BGN		4/1
Slices of amph.		chp, py impreg.		5/1
	weak greenish colour	traces of Mos2, py, chp		
2 cm conc. gz.vein		in rock as spots. Mos2 in gz.vein	ppm Mo 1350 ppm Cu 610	

DATO: 10.7.84

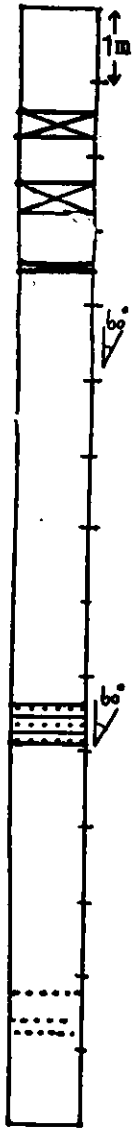
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	Mo TIL ANALYSE ppm Mo	Mo TIL ANALYSE ppm Cu.	KASSE
BRGR			1150	820	
45cm gz.fsp. rich apl.veins	weak greenish colour	conc. spots of Mos2 and chp in qz.fsp veins	950	540	
45cm " " " " "		" "	800	380	5/1
10cm " " " " "		" "	580	270	
			x: 996	524	
BRGR w.zone 5-10cm bands of apl. 2 first					
BGN		chp, py in BGN			6/1
		cm bands w.conc.Mos2,chp,py			

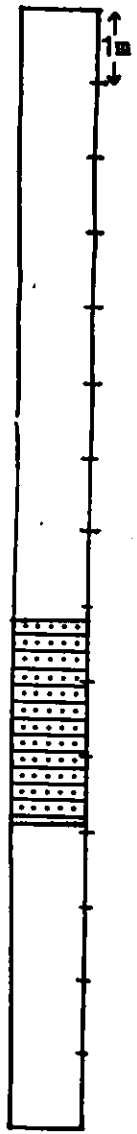
DATO: 10.7.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 7,8 FRA 60 m TIL 75 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				7/1
BGN	greenish colour	pht, py (chp) spot w. Mos2 concord.		
RGR		conc. spot Mos2		8/1

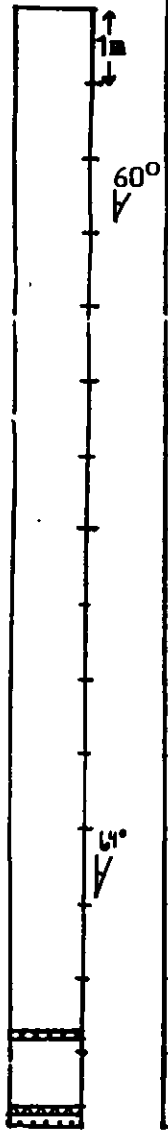
DATO: 10.7.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 8,9 FRA 75 m TIL 90 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				8/1
RGR				
				9/1
Pegm.	greenish colour. ep alt.			
Pegm.				
BGN				

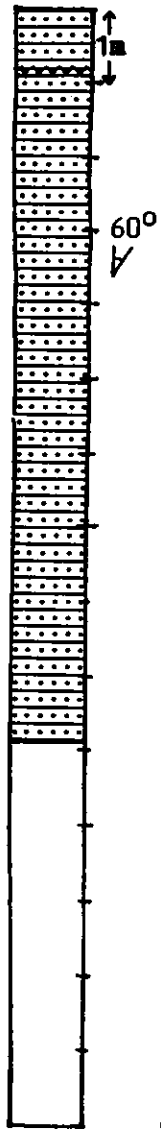
DATO: 10.7.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 6,11 FRA 90 m TIL 105 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
Pegmatite	greenish colour	pht, py, Mos2 (traces) chp conc. in BGN		10/1
	close to vertical frac.	weak imp.of py, pht, chp		11/1

DATO:10.7.84

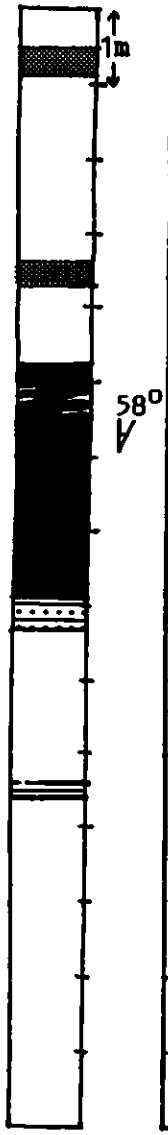
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 11,12 FRA 105 m TIL 120 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BRGR grey apl.				
BRGR				11/1
apl medium grained BRGR		weak imp. of py, chp, pht.		
		3qz. veins w. chp, Mos2(conc)		
amph.	partly altered to glimmerite			
BGN		conc. spot w. pht. chp, py		12/1
Bleached medium grained granite.				
BGN		weak imp.of py, chp, pht		
BRGR				

DATO: 10.7.84

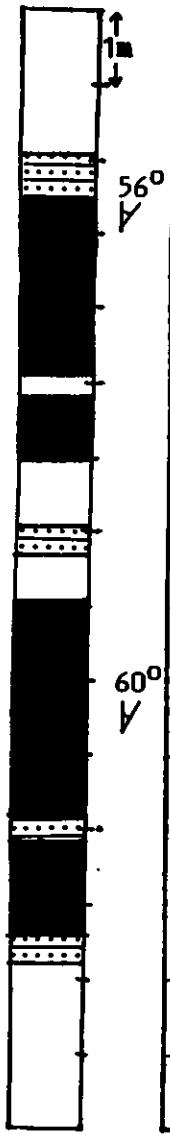
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 13,14 FRA 120 m TIL 135 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
Bleached med.gr, granite		weak imp. of py, pht, chp		
BGN				
Amph	partly altered to glimmerite			13/1
fractured granite ?				
amph	—"—			
BRGR				
BGN	greenish colour	conc.imp. Mos2 chp, py in BGN		
BRGR				
amph	partly alt. to glimmerie			
BGN				
Amph.	-"—			
BGN	greenish colour	py, pht, chp conc.imp.in BGN		14/1
RGR				

DATO: 11.7.84

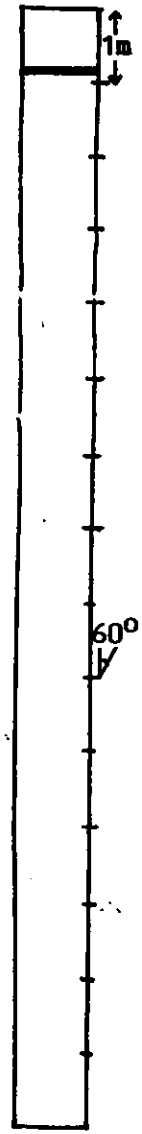
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 14,15 FRA 135 m TIL 150 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
10 cm apl (qz.tsp rich)		Mos2, chp in apl. (qz-fsp-rich)		14/1
RCR				15/1

DATO: 11.10.84

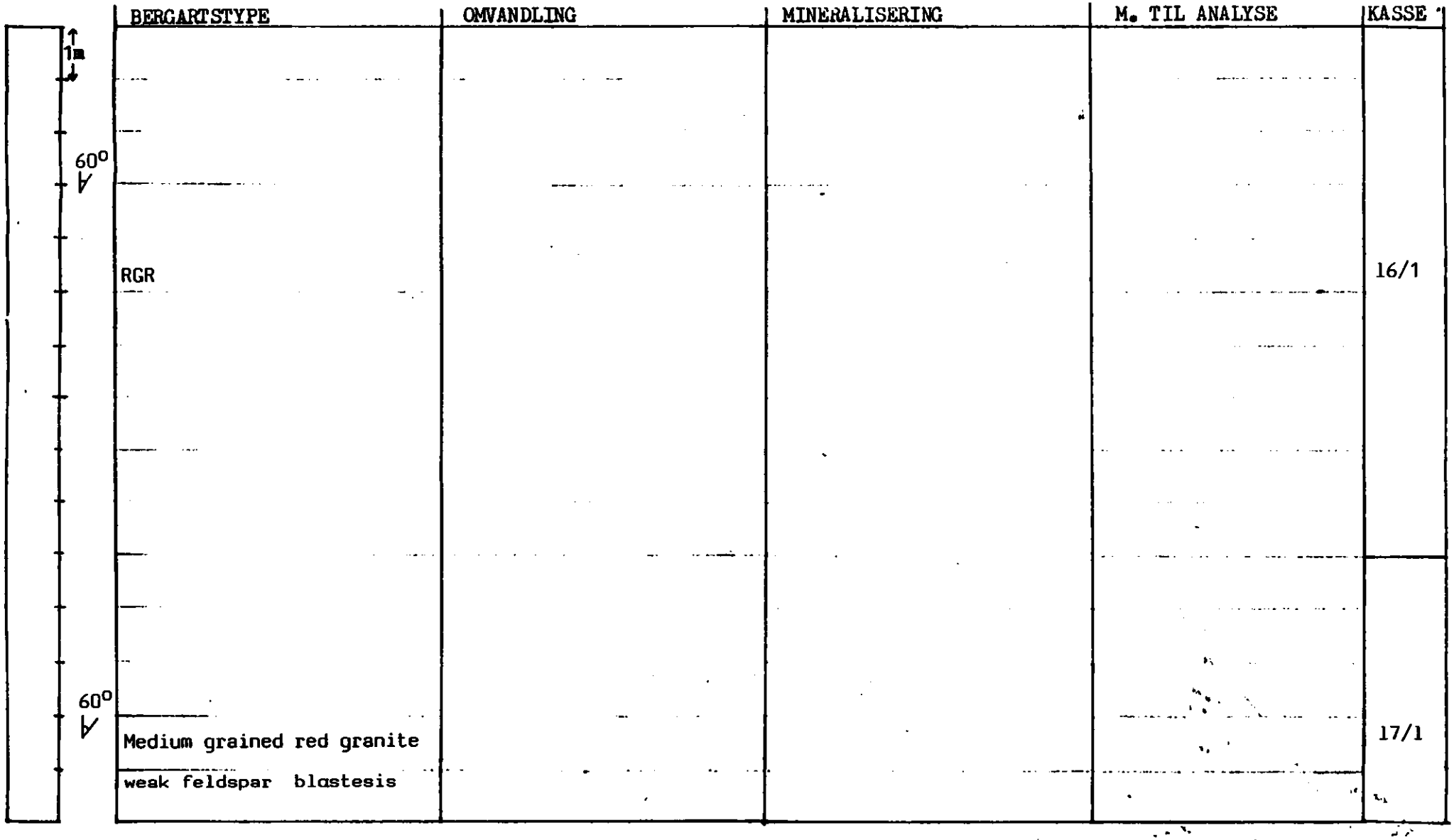
JIT-83

S: 2

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 16.17 FRA 150 m TIL 165 m



DATO: 11/10.84

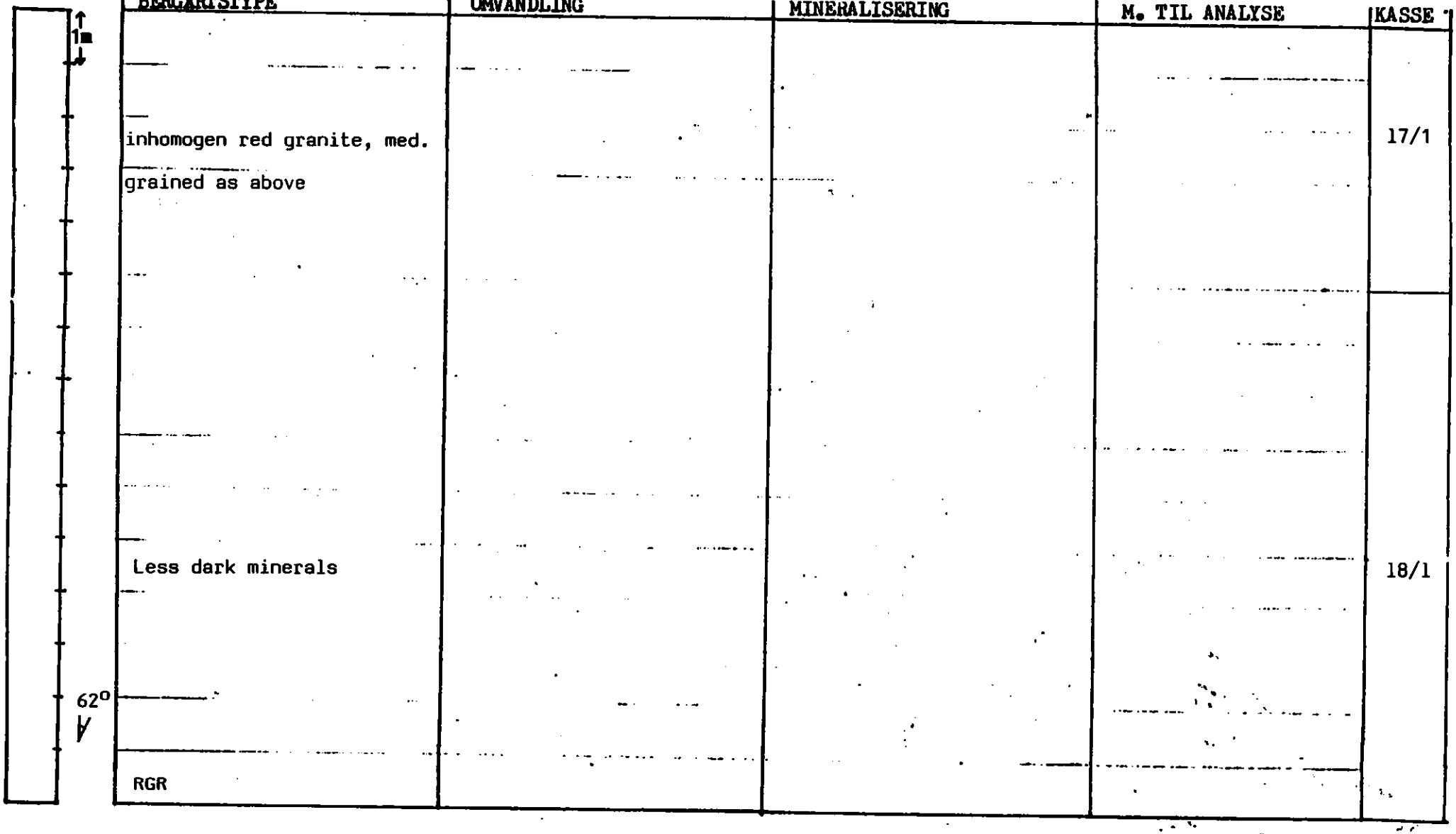
JIT-83

S: 2

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 17, 18 FRA 165 m TIL 180 m



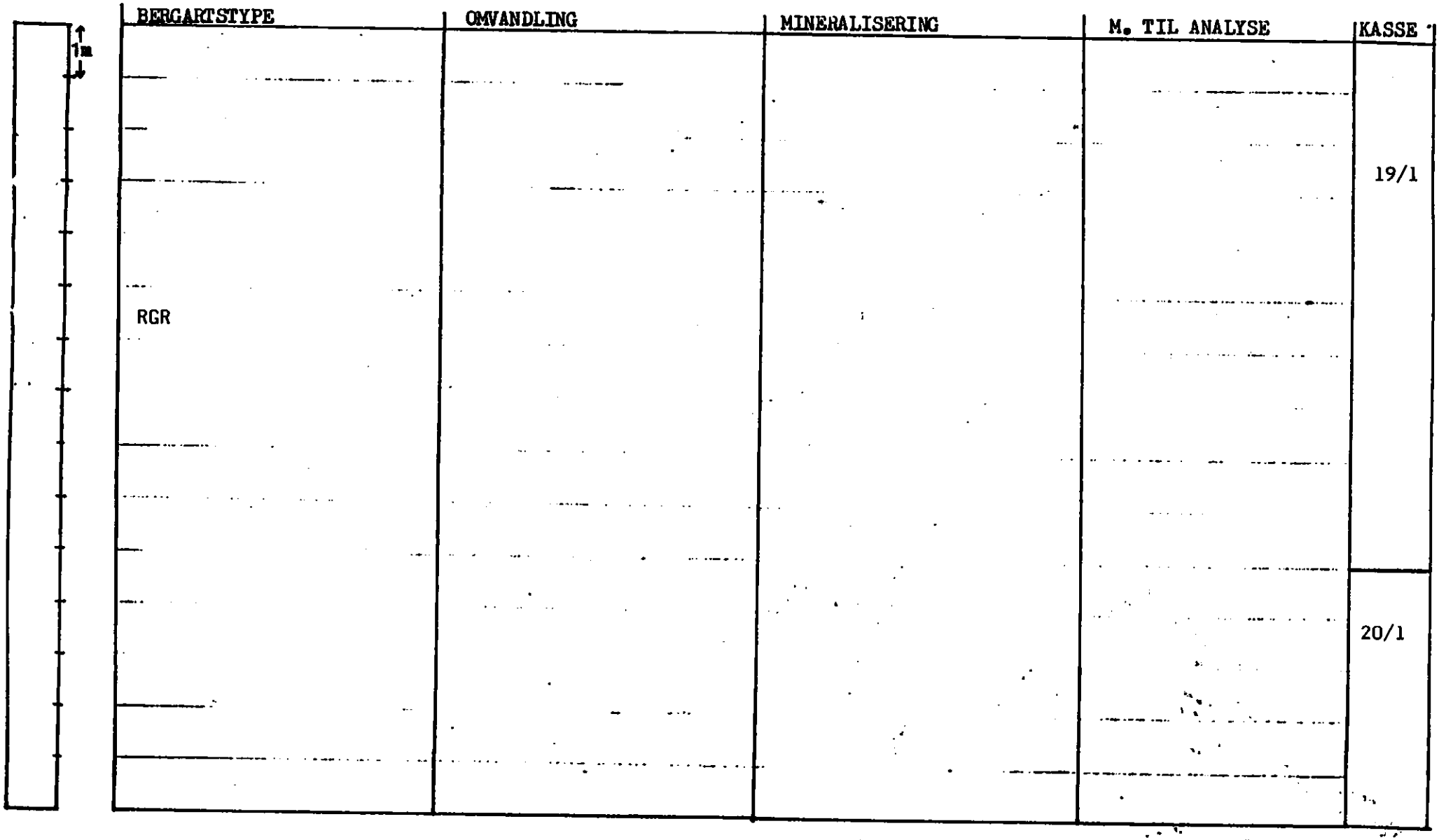
DATO: 11.10.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 19,20 FRA 180 m TIL 195 m



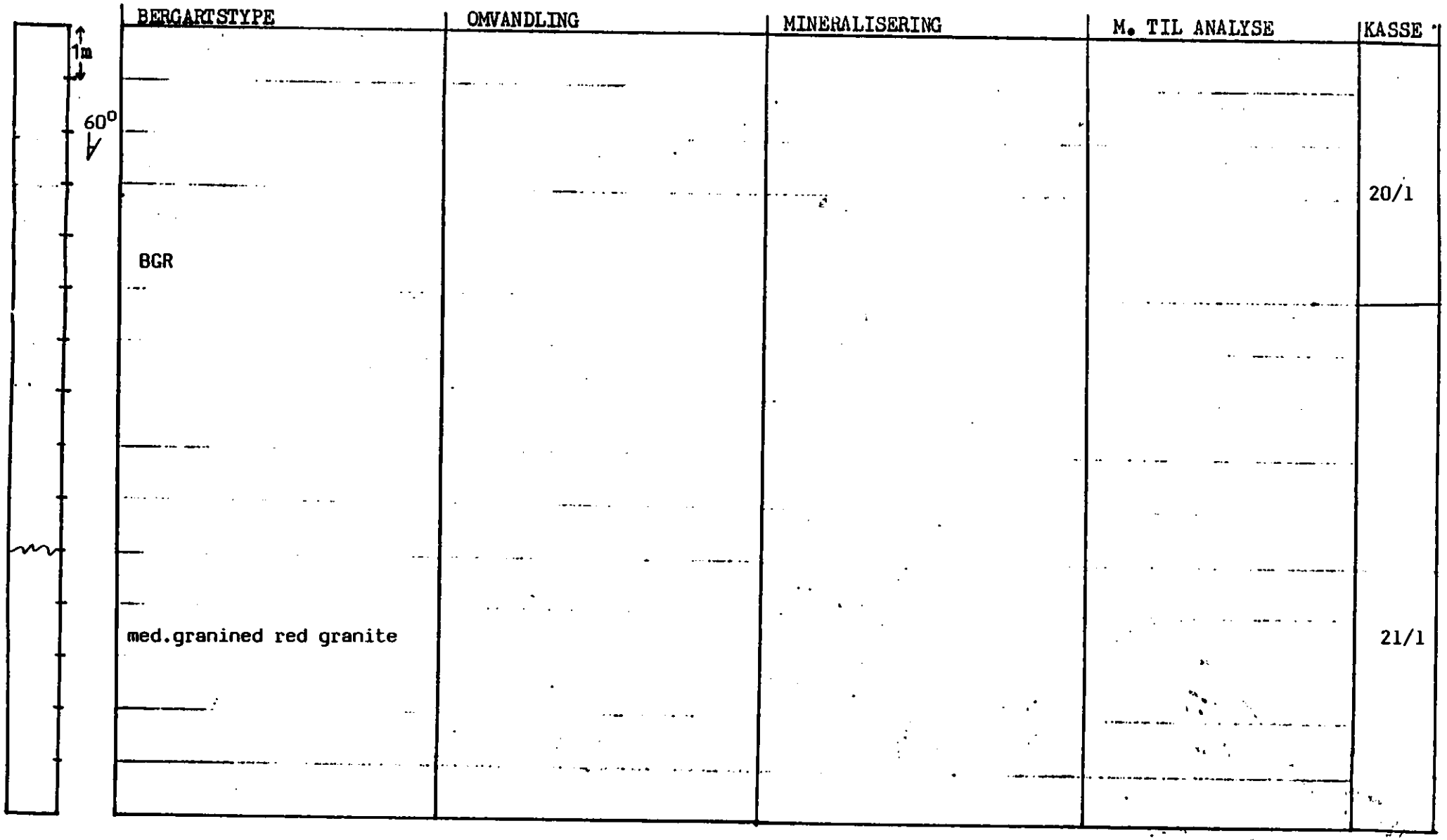
DATO: 11.10.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 20,21 FRA 195 m TIL 210 m



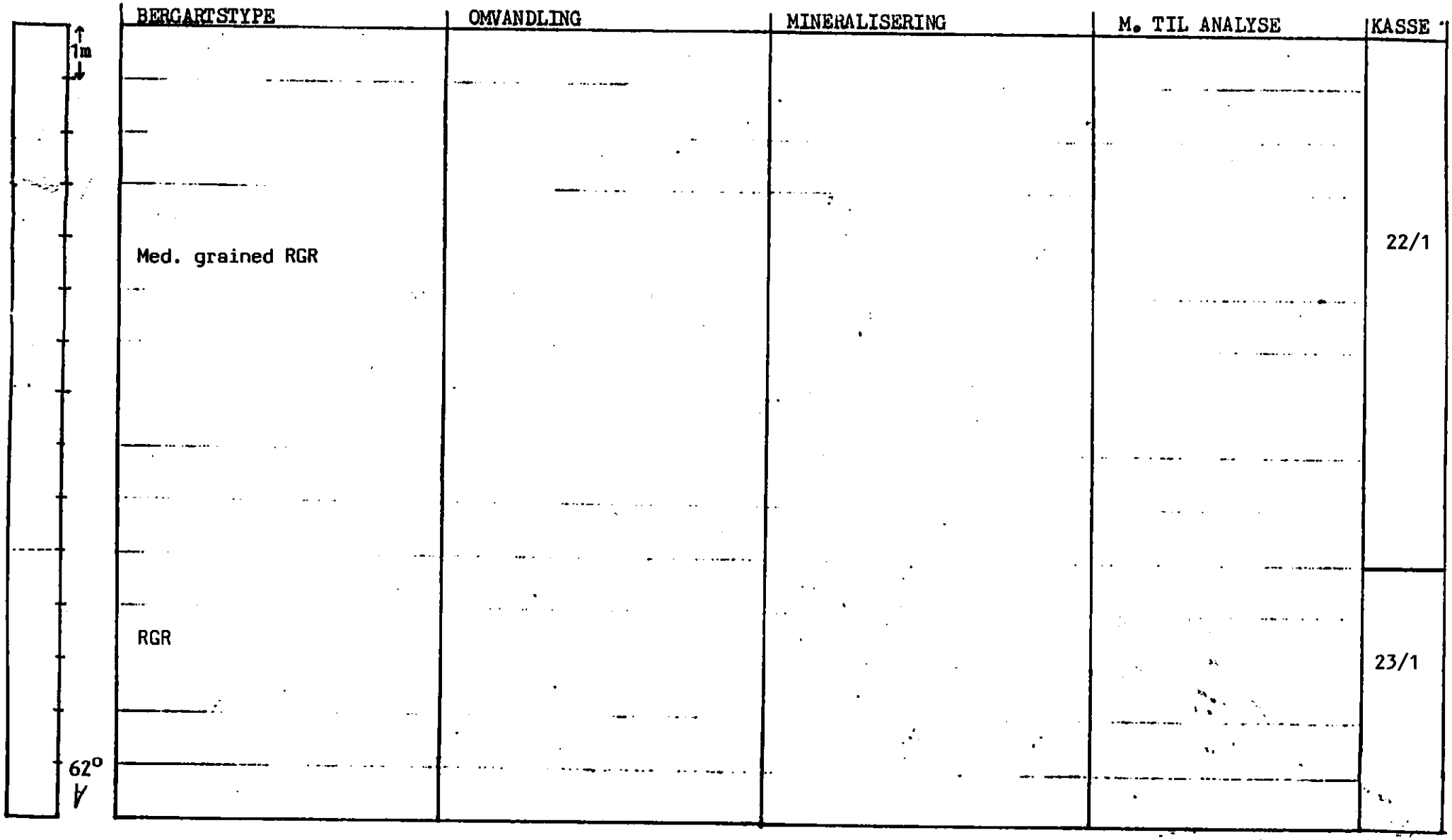
DATO: 19.7.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 22,23 FRA 210 m TIL 225 m



DATO: 23.7.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 23-24 FRA 225 m TIL 240 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				23/1
RGR				
				24/1
30 cm red aplite				
5 cm red aplite				

DATO: 25.7.84

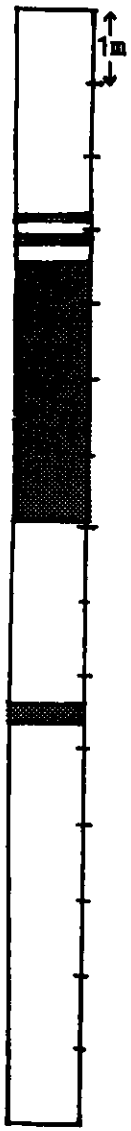
si

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 25,26 FRA 240 m TIL 255 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR 5 cm red apl. 10 cm red apl. Red apl.	red apl. greenish coloured in 5-10cm thick zones			25/1
RGR 25 cm red apl. RGR				26/1

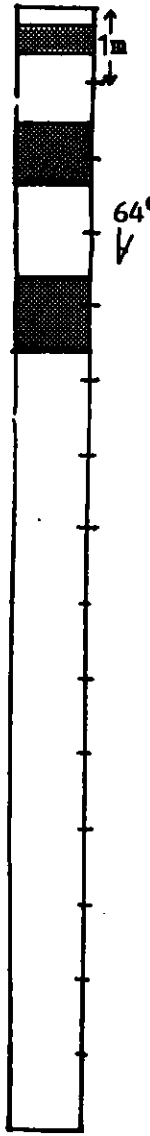
DATO: 31.8.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 26,27 FRA 255 m TIL 270 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
40 cm red aplite				
RGR				
60 cm red apl.				
RGR				26/1
1 m red aplite				
RGR				27/1

DATO: 31/7-84

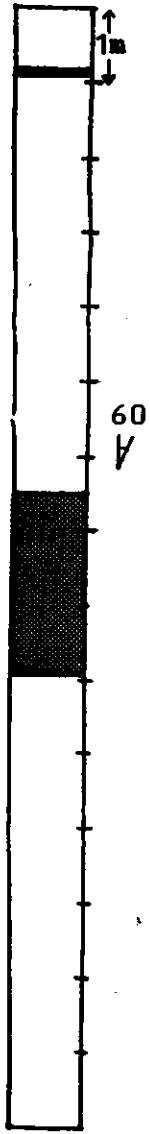
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 28,29 FRA 270 m TIL 285m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR 20 cm apl.				
RGR		py, chp	ppm Mo ppm Cu	
(B)RGR	cm. zoneof green colour w. mineralization	conc.diss.of Mos2,chp, py also conc.cm zone w.sulfides	380 430	28/1
grey apl.		conc.imp.of traces of Mos2, py, chp	15 140	
BRGR		weak, conc, imp. of py, chp.		
		conc.diss.of chp, py,traces of Mos2 both in rock and on border to qz.vein.	25 35	29/1
			6 90	

DATO: 31.7.84

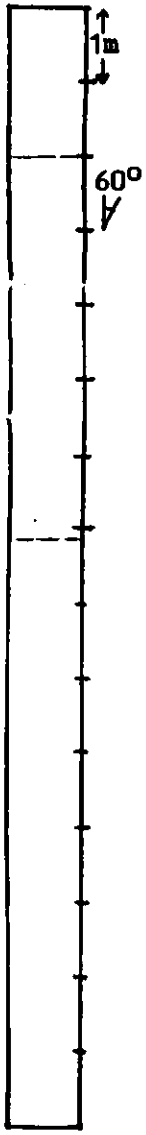
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.i-84 KASSER NR.: 24,30 FRA 285 m TIL 300 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE ppm Mo	ppm Cu	KASSE
(B)RGR			2	15	29/1
RGR		traces of chp,py last 5cm			
		weak imp.of chp, py	20	90	
BRGR	alternating 15-20cm zones of RGR/BRGR	conc.imp.of chp,py,some grains of Mos2	8	180	30/1
		weak imp.of chp, py	20	210	
		some grains of Mos2			
			25	280	

DATO:1.8.84

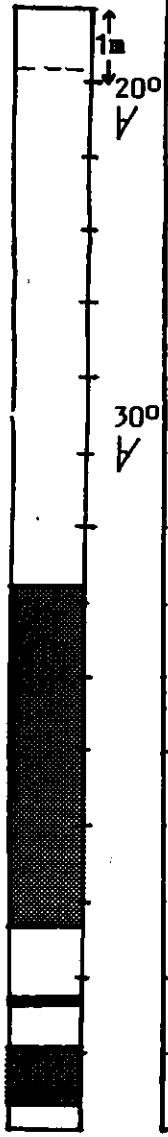
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 31.32 FRA 300 m TIL 315 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE ppm Mo	ppm Cu	KASSE
		disc.zone w. Mos2, py,chp			
BRGR	zones 15-60cm transitional to RGR	conc.traces of chp,py(Mos2) pht in cm bands and diss.	25	200	31/1
			140	230	
			13	95	
grey aplite					
		cm qz-vein (conc) chp,pht, Mos2	47	500	32/1
BRGR					
grey apl.					
BRGR					
grey apl.			20	55	

DATO: 6.8.84

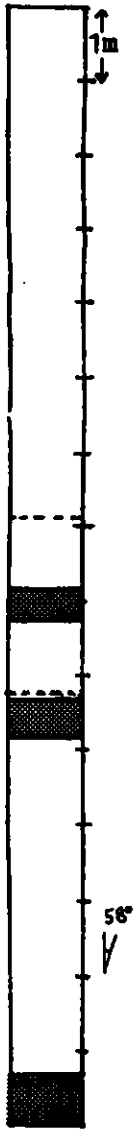
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 32-33 FRA 315 m TIL 330 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE ppm Mo	ppm Cu	KASSE
(B)RGR			3	25	32/1
		cm qz-veins Mos2, chp,(py)			
RGR		2cm qz-veins w.Mos2 some chp also Mos2 conc. in rock " "	580	35	
med.grained RGR,few dark min. grey apl. med. grained RGR grey apl.			15	10	33/1
RGR (B)		weak traces of chp.			
		cm.conc. bands w.chp,pht,py Mos2	5	160	
		"			
		"			
grey apl.		diss. chp, pht, py	4	150	

DATO: 6.8.84

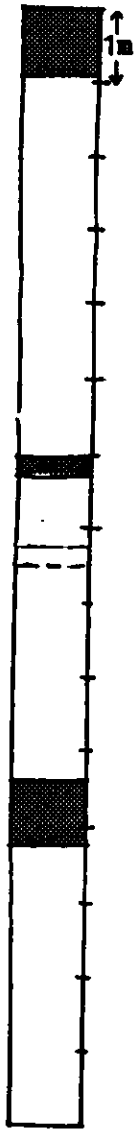
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 34,35 FRA 330 m TIL 345 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE ppm Mo	ppm Cu	KASSE
Grey apl.					
			4	55	
RGR					
Grey apl.			3	20	
BRGR		Conc.bands and qz.veins w. chp, Mos2, py(pht)			34/1
RGR		dic. qz.vein w. Mos2 ∥10°			
			3	15	
Grey apl.		weak diss.of chp, py (Mos2)			
			3	25	35/1
RGR					
		5 cm qz.veins w.chp, Mos2 in central parts			
		dark 0,5 cm band conc. w. Mos2, chp, py	6	20	

DATO: 6.8.84

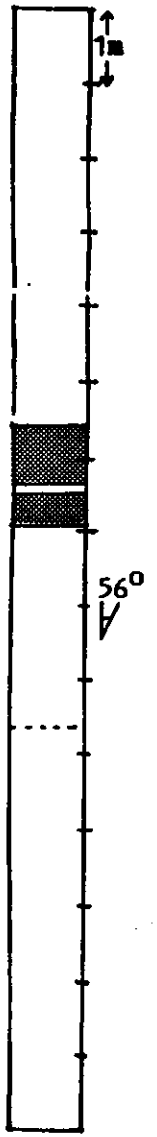
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 1-84 KASSER NR.: 35,36 FRA 345 m TIL 360 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE ppm Mo	ppm Cu	KASSE
RGR Medium grained		Weak imp. od chp, py	10	25	35/1
Pink apl RGR Pink apl. RGR BRGR RGR	5 cm greenish color.zones	weak, conc.diss.of py, chp, Mos2 Conc.diss.of Mos2, chp,py 2 cm rich in Mos2 at lower end of altered zone	15 660	70 180	36/1
			$\bar{x}$ 76	124	
Medium gr. red granite					

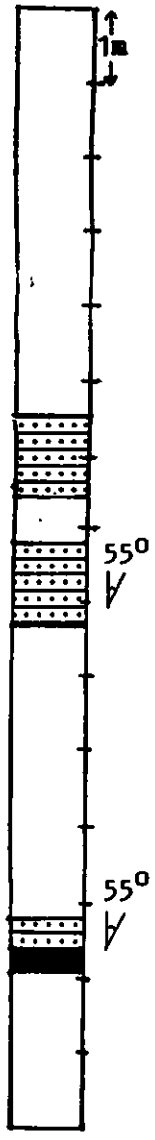
DATO: 11.8.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR				
BGN BRGR		conc.diss.of py,chp,pht in BGN		1/2
BGN	close to vertic.fractures altered rock	"		
(B)RGR				
BGN amph.	amph.partly alt.to glimmerit.	some py in BGN		2/2
RGR	fractured, close to vert. fract.			

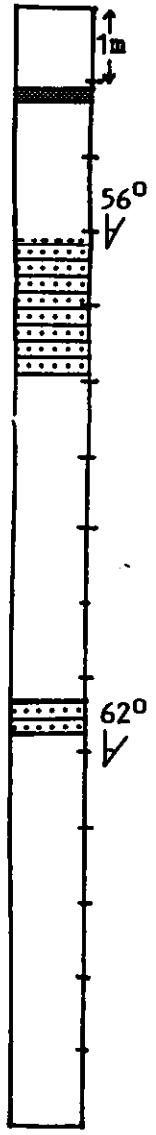
DATO: 14.8.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR Grey apl. RGR	rusty, vertical fract.			
BGN (inhomog.)	close to vertc.fract. 84°	some grains of Mos2 in BGN, else py, (chp) conc.imp.		2/2
BRGR				
BGN				
BRGR				3/2

DATO: 14.8.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BRGR		some py		
qz		close to vertic.frac.w. mirrors of fresh py		
		traces of chp and Mos2 diss. in qz.	ppm Mo ppm Cu	
BRGR			1000 2400	
Qz.			870 300	4/2
mixed qz./BRGR			3900 350	
		conc.Mos2,chp,py dissem.in BRGR and qz.	2300 580	
	weak greenish colour		2100 380	
BRGR			350 290	
			720 400	
			1250 490	
grey apl.		conc.dissem.of Mos2, py,chp and py	x: 1561 649	5/2
(B)RGR				

DATO: 14.8.84

sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BRGR		/ = 1-2cm zones mineral. dominantly by chp,som Mos2 zones seems to be concord.		5/2
(B)RGR		very weak conc.diss.of chp, py, some grains of Mos2		6/2

DATO: 14.8.84

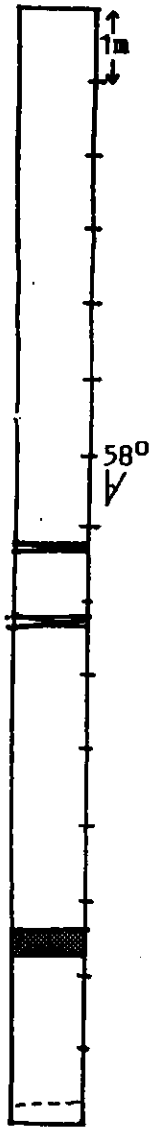
JIT-83

S:

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 7,8 FRA 60 m TIL 75 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR		very weak,often in 0,5cm conc. zones,dissem.of chp,py(Mos2)		7/2
2 cm qz.vein				
5 cm qz.vein				
RGR				
20 cm pink aplitt (conc?)				8/2
(B)RGR		Traces of chp, py, Mos2		

DATO: 14.8.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 8.9 FRA 75 m TIL 90 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
		traces of chp, py, Mos2		
(B)RGR				
3 cm qz.vein w. Mos2		Mos2 in qz.vein		8/2
(B)RGR				9/2
		weak conc. miner. of py,chp.		

DATO: 14.8.84

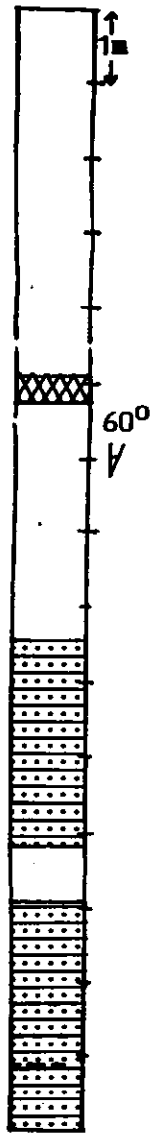
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 10,11 FRA 90 m TIL 105 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR				
pegm.				10½
(B)RGR				
BGN				
(B)RGR				
BGN				
10 cm zone ∕ 58°	greenish colour. Disc. young silicu. filled fract. ∕ 15°	chp min. conc. min.py(chp, Mos2)		11/2
5 cm zone ∕ 50°		" " " "		

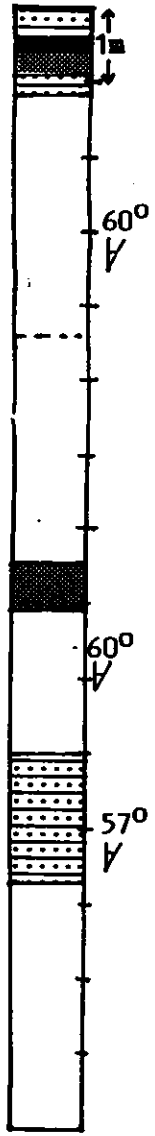
DATO: 15.8.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 11,12 FRA 105 m TIL 120 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN amph. apl. BGN	amph. partly alt.to glimmer	lcm conc.vein w. py and pht in amph. ∀36°		
BRGR		BRGR imp.by py,pht,chp veins Few grains of Mos2. Mos2 often alone		11/2
(B)RGR	∀ 7° frac.filled w.fluorite, qz. hostrock alt.w.light glimmer			
BRGR				
grey apl.				
BRGR				
finegrain.glimmer.rich grey gneiss				12/2
BRGR		weak diss.of py,chp,pht, very few grains of Mos2.		

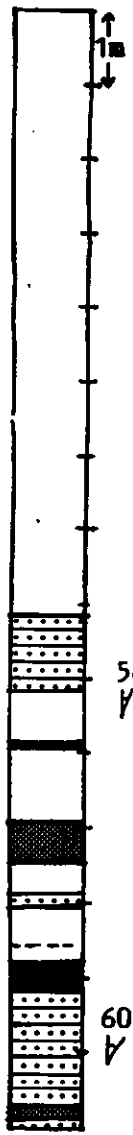
DATO: 15.8.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 13,14 FRA 120 m TIL 135 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
		conc.imp.of py,chp,pht		
BRGR				13/2
BGN BRGR Amph.				
BRGR Grey apl. BRGR BGN BRGR ∀17° frac.w.pht,chp,py Amph.				14/2
Grey apl. BGN				

DATO: 15.8.84

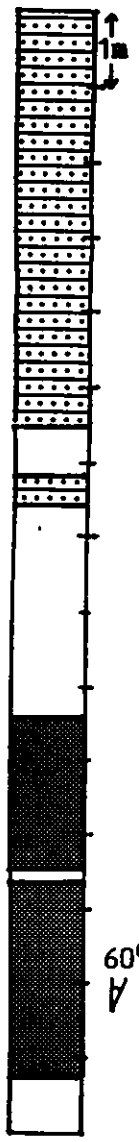
JIT-83

side

KVINA GRUVER.

JOINT VENTURE. FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 14,15 FRA 135 m TIL 150 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
		Close to vertic.frac.mainly w.py BGN miner.as before		
BGN				14/2
BRG				
BRG				
BGN				
(B)RGR				
Grey apl.		conc.imp.of chp,Mos2,pht and py in grey apl.		
BRGR				15/2
Grey apl.				
RGR				

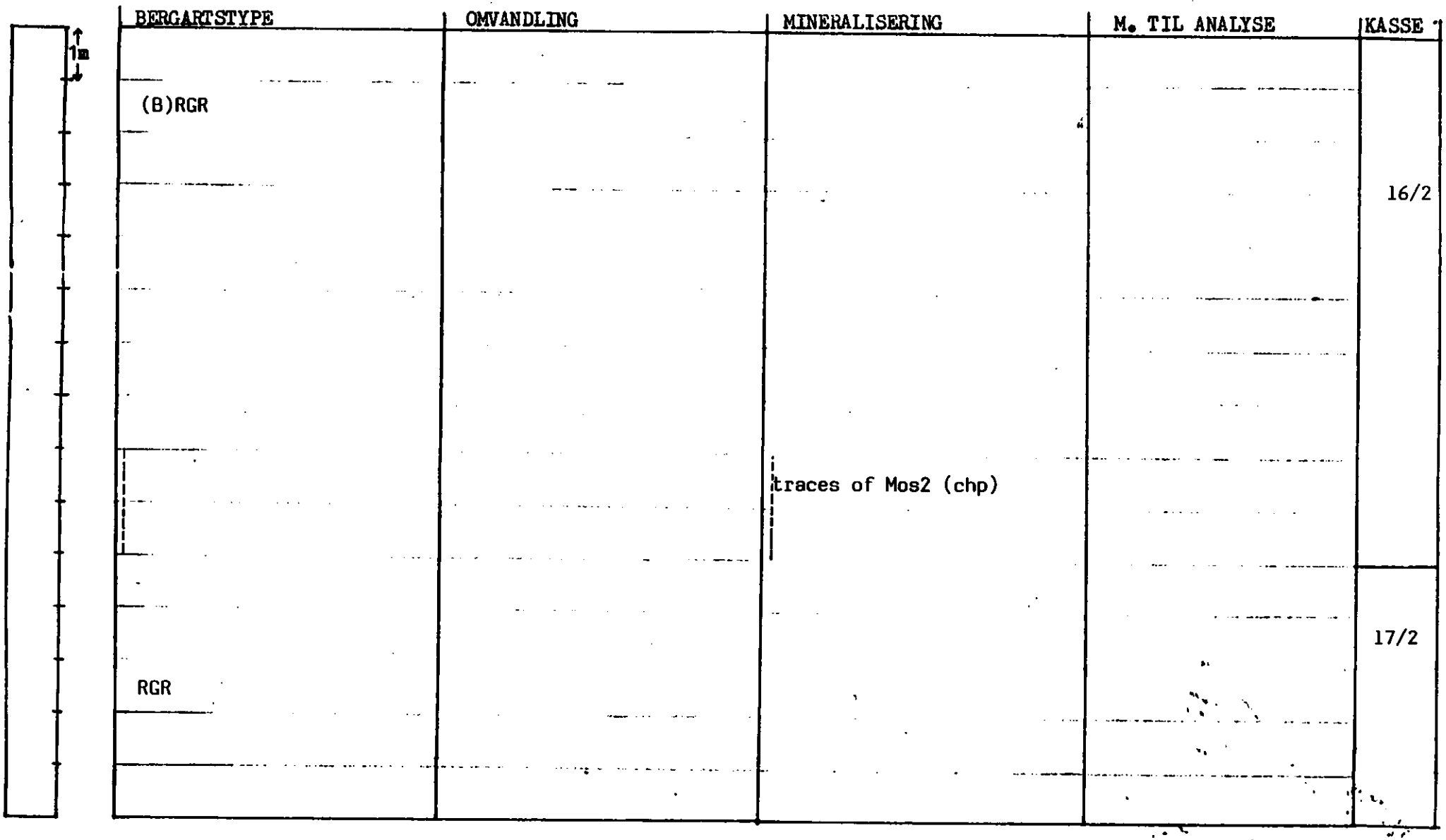
DATO: 16.8.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 16,17 FRA 150 m TIL 165 m



DATO: 16.8.84

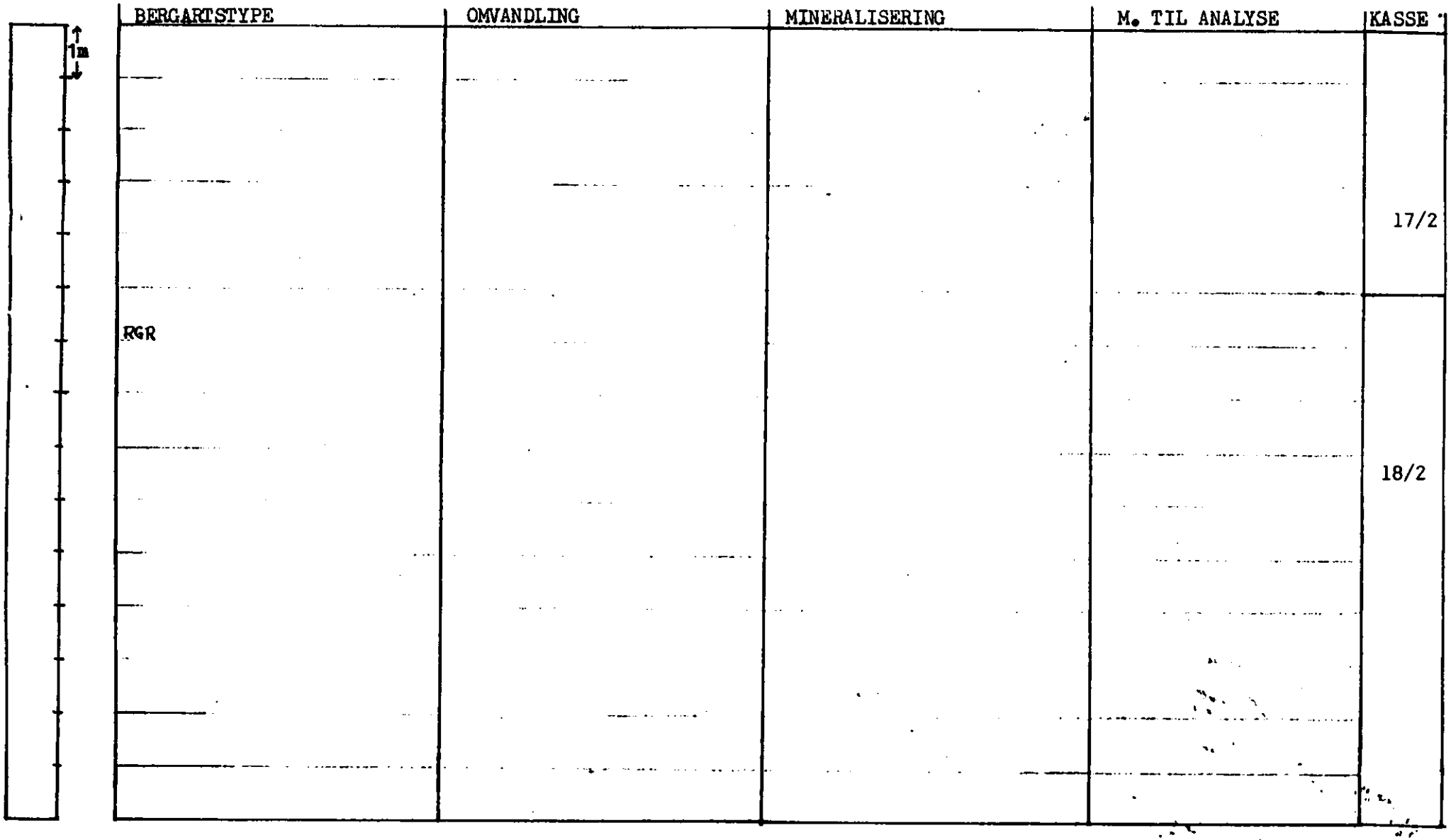
JIT-83

S: 7

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2-84 KASSER NR.: 17,18 FRA 165 m TIL 180 m



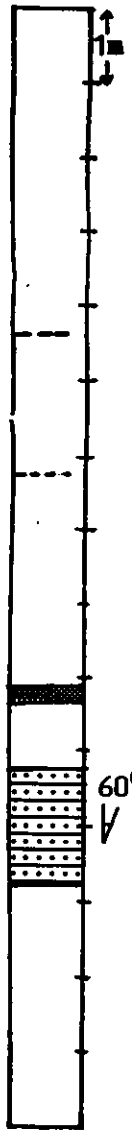
DATO:

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 3-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR	rusty crushed zones	5cm zone w.py,chp,grains of Mos2 Mos2,conc.2cm dissimination		1/3
BRGR Grey apl. BRGR	crushed adn fract.zones (rust)			
BGN				2/3
RGR				

DATO: 21.8.84

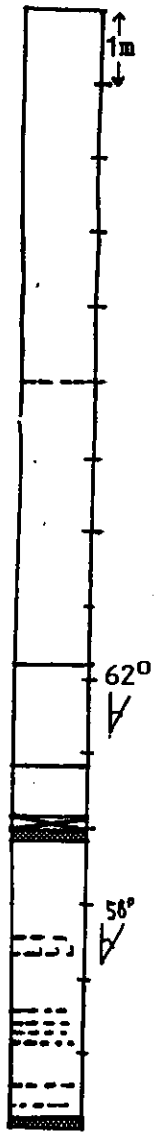
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 3-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BRGR				2/3
RGR				3/3
(B)RGR				
BRGR 20cm qz.vein grey apl. (12cm)	greenish colour	Mos2,chp,py in qz. 2 frac. filled w. chp ∀ 16°	ppm Mo 1550 / ppm Cu 3400	
BRGR		Mos2 imp. in apl.	2200 / 1600	
		Qz.veins dom.by chp,py,Mos2 imp. in BRGR.Veins seems concordant.	1300 / 1900 2400 / 1500	
Grey apl.		conc.imp.of Mos2,chp,py in apl.	690 / 720	

DATO: 21.8.84

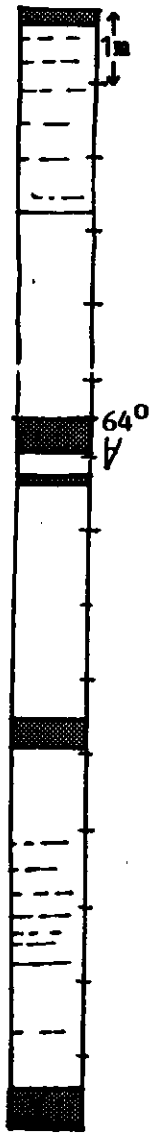
si n

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 3-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
15 cm grey apl.		Mos2 in qz. and BRGR	ppm Mo / ppm Cu 820 / 150	
BRGR w.qz.veins			120 / 130	
			x̄: 1373 / 1361	
(B)RGR				4/3
conc. grey apl. BRGR Conc.grey apl.		conc. 4 mm zones w.chp and py in apl. 68°		
Grey apl.		some grains fo Mos2 in apl.		
BRGR		conc.1-2cm zones w.chp,py few grains of Mos2. Weak imp of chp and py		5/3
Grey apl.				

DATO: 22.8.84

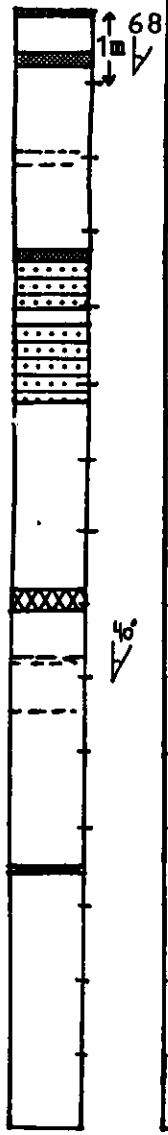
si

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 3-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
APL. BRGR Grey Apl.		5cm conc.qz.w.Mosz,chp,py on border to apl. Grains of Mos2 on border to apl. 20cm conc. imp,of Mos2, chp, py		5/3
Grey apl. BGN BRGR BGN		weak imp.of chp in BGN increased imp.of.chp in BGN.Weak imp.of py,chp.		
(B)RGR				
Pegm.		20cm zone w.conc.imp.of Mos2,chp and py 40° Spot of Mos2 in pegm.vein disc.in tot. 45°(rock), 50°(pegm.)+ diff.strike		6/3
(B)RGR				
		10cm conc.zone w.imp.of Mos2 also on border to conc. qz.veins.		
(B)RGR		Spread grains of Mos2, some chp, py.		
		" "		

DATO: 23.8.84

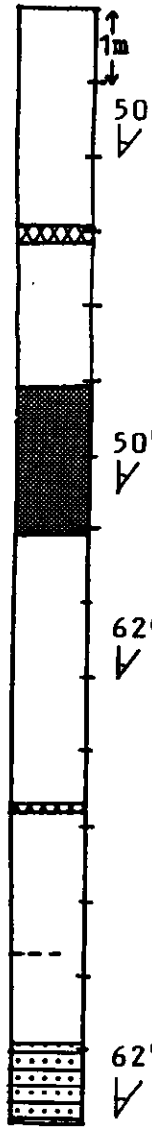
siz

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 3-84 KASSER NR.: 7,8 FRA 60 m TIL 75 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR				
Disc.qz. 90°		Mos2 on border of conc. amd disc.qz. 1-2cm thick imp. of grains + chp,py		
pegm.		cm qz.vein 20cm imp.Mos2 and on contact to 2cm conc.qz.v.		7/3
grey apl.	greenish colour	imp.of Mos2,chp,pht,py. Mos2 in and on border of 4cm qz.veins weaker impregnation		
(B)RGR				
pegm.	close to vert.frac.			
(B)RGR		qz.vein w. Mos2 spot		8/3
BGN		conc.imp.of pht,Mos2,chp and py in BGN.Most pht on top of zone.		

DATO: 28.8.84

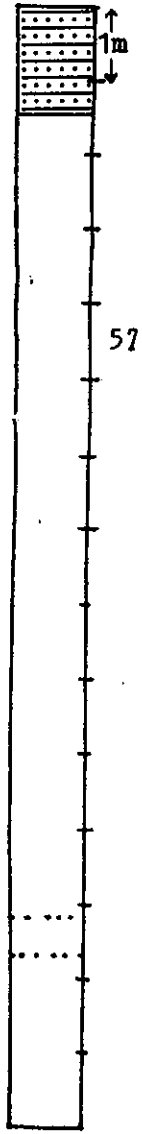
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.:3-84 KASSER NR.: 8,9 FRA 75 m TIL 90 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN	crushed	mineralized as descr.above		
	fractured			8/3
	fract.,close to vert.frac. some py on frac.			
(B)RGR				9/3
	green ep.alt.			
(B)RGR	greenish colour	chp dissem.and in close to vert. frac.∀10°. Some grains of Mos2.		

DATO: 28.8.84

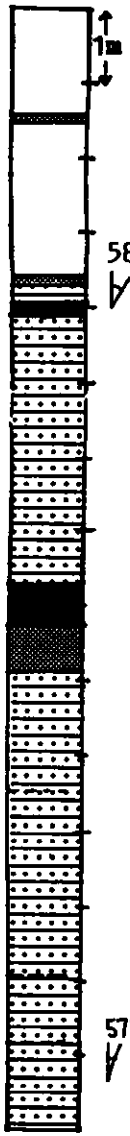
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 3-84 KASSER NR.: 10,11 FRA 90 m TIL 105 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
		V14°disc.frac.along which pht,py,Mos2(pht) is found.		
Red,disc.apl. 65°		Weak imp.of pht.chp,py		
Grey apl. BGN Amph.				10/3
BGN w.1-10cm qz.veins	green ep.alt. fractured	some chp miner.along frac.		
amph grey apl.				
BGN	greenish alt.	pht.,chp,py disseminated		
	" "	" "		11/3
	" "	" "		

DATO:3.9.84

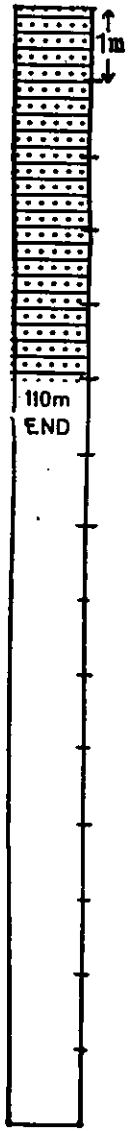
JIT-83

si

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 3-84 KASSER NR.: 11 FRA 105 m TIL 110 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				11/3

DATO: 3.9.84

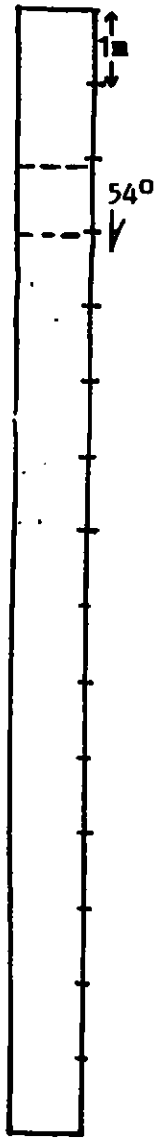
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	shear			
	"			1/4
(B)RGR				
RGR				2/4
	crushed,close to vert.frac.			

DATO: 4.9.84

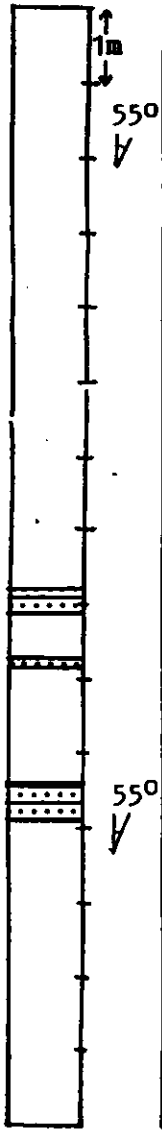
si

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR	close to vertica.frac.			2/4
(B)RGR	crushed			
BGN	" ,close to vert.frac.			
BGN				
(B)RGR	rusty frac.			3/4
BGN				
(B)RGR				

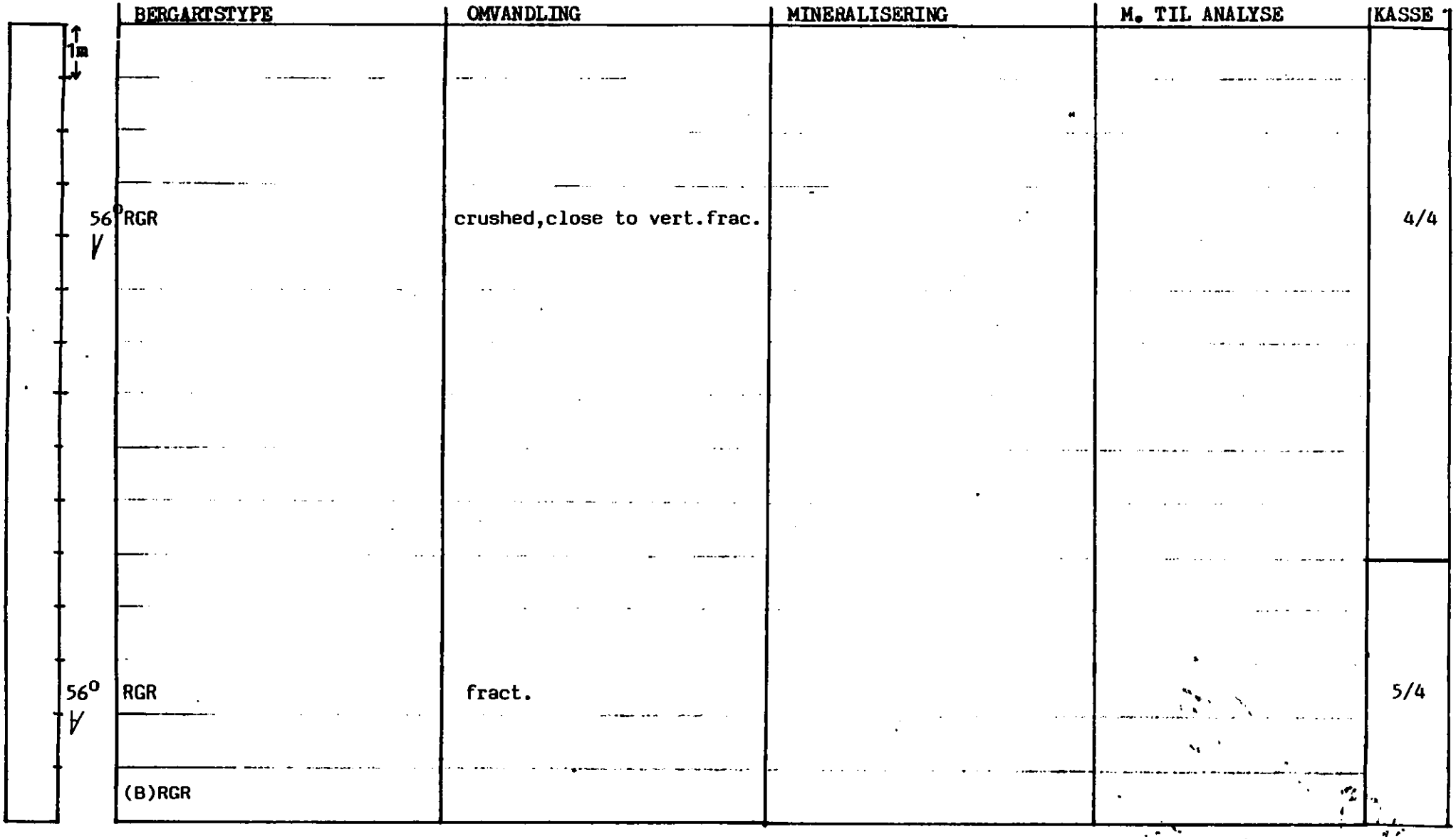
DATO: 4.9.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.:4-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m



DATO: 4.9.84

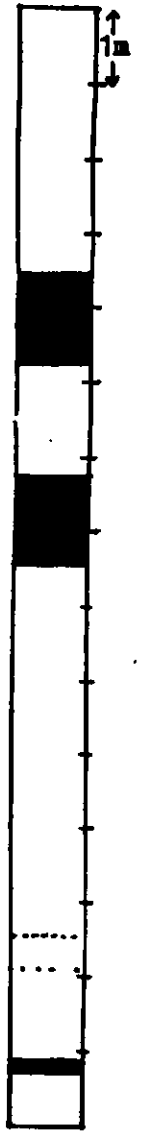
sig

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR	fract.,crushed			5/4
amph.	alt. to clorite			
(B)RGR				
amph.	frac.,crushed			
(B)RGR	orange alt. fsp.			
(B)RGR	" "			6/4
	" "			
	epid .alt.fsp fract.			
amph.				
(B)RGR	frac.crushed			

DATO: 4.9.84

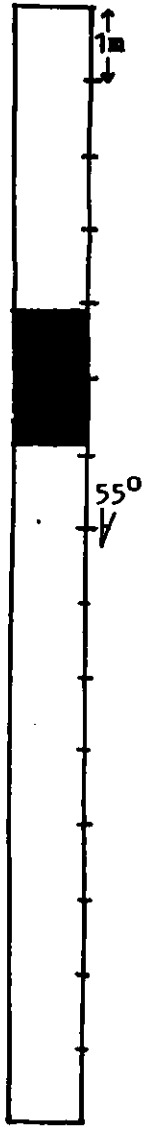
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 7,8 FRA 60 m TIL 75 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR	orange fsp. alter.			
(B)RGR				7/4
amph.				
(B)RGR				
(B)RGR				8/4

DATO: 5.9.84

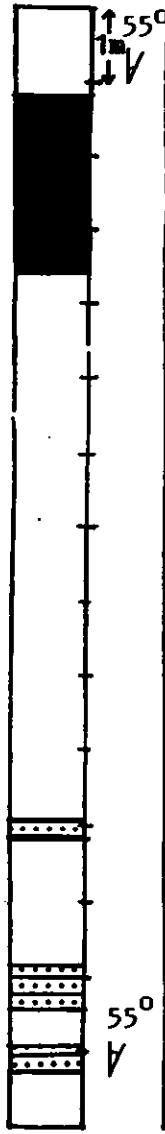
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 8,9 FRA 75 m TIL 90 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR	orange alt- of fsp.			
amph.	epid. chl. alt.			8/4
(B)RGR	orange alt. of fsp.	grain of Mos2.		
		" "		
(B)RGR		" "		
		weak conc. imp.of chp spot of Mos2		
		weak conc. imp. of chp.		9/4
BGN				
(B)RGR	some ep.alt.			
BGN				
(B)RGR				
BGN		grain of Mos2		
(B)RGR				

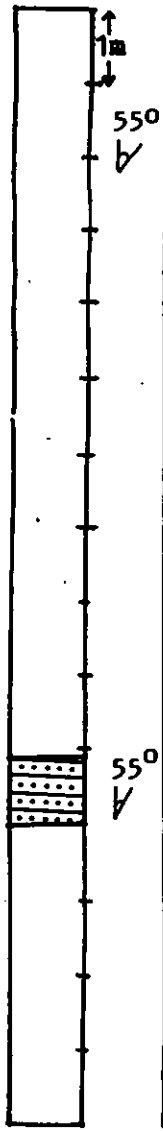
DATO: 5.9.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 10,11 FRA 90 m TIL 105 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	fract.			
(B)RGR		conc. 2cm qz.w. py, chp		10/4
		weak imp. of chp, py		
BGN		imp. of py,chp,pht +grains of Mos2 in BGN		11/4
(B)RGR				

DATO: 11.9.84

sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 11,12 FRA 105 m TIL 120 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR				11/4
(B)RGR				12/4
pink apl.	partly ep.alt.			
BGN	greenish co., part ep.alt.	se next page		

DATO: 11.9.84

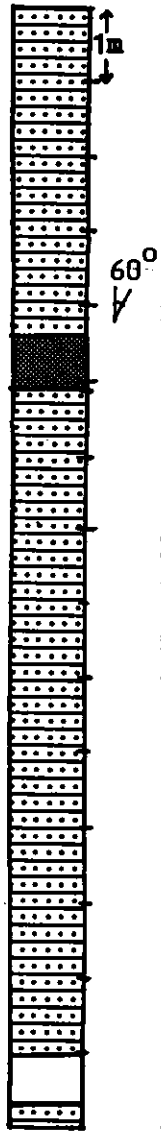
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 13,14 FRA 120 m TIL 135 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
		conc.imp.of py,chp,pht some grains of Mos2 in conc.qz.vein py also in close to vert.frac.		
BGN				
	as described above			13/4
grey apl.				
BGN				
		same as desc.above,but weaker.		
				14/4
(B)RGR BGN		weak imp.of chp,py		

DATO: 11.9.84

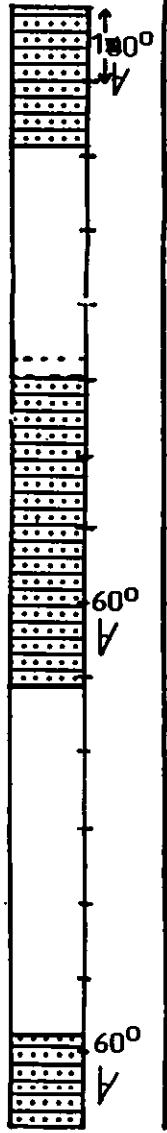
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 14,15 FRA 135 m TIL 150 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN		BGN miner. as descr. above		
RGR				14/4
(B)RGR				
BGN		weak imp.of py,chp,pht.		
RGR				15/4
BGN		imp.of chp,py,pht.		

DATO:11.9.84

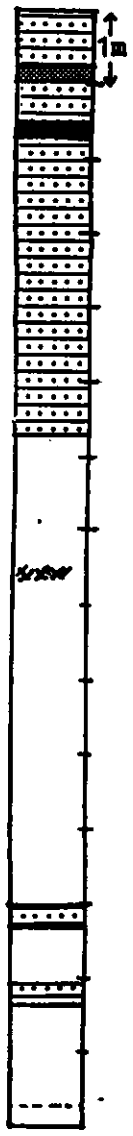
si

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 16.17 FRA 150 m TIL 165 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN grey apl. amph.	amph.partly alt.to glimmerite.			
BGN		weak imp.of py,chp,pht in BGN		16/4
BRGR (med.grained)	10 cm zone w. caly			
BRGR		weak imp.of py,chp,pht in BRGR		
BGN				17/9
BGN				
RGR		2cm qz.vein w. Mos2		

DATO: 11.9.84

sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 17,18 FRA 165 m TIL 180 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR				
		2cm qz.vein w.Mos2. imp. of Mos2 10cm below and above		17/4
RGR				
(B)RGR		weak imp.of py,chp in (B)RGR a few grains of Mos2		18/4
white "apl"		imp. of Mos2,chp,py and pht.		
(B)RGR		weak imp.of py,chp in (B)RGR		

DATO: 11.9.84

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 4-84 KASSER NR.: 16.17 FRA 180 m TIL 195 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR RGR BGN w.2-10cm bands of amph. RGR				19/4 20/4

DATO: 12.9.84

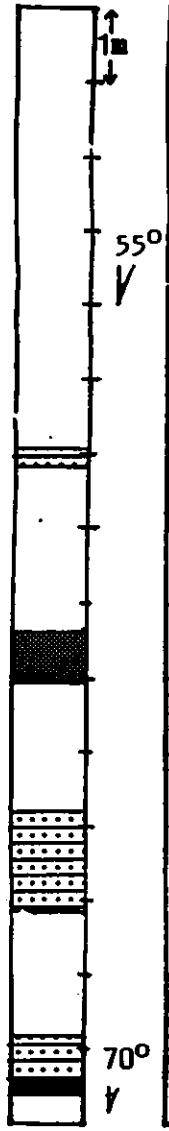
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 5-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR		conc.min.chp,py some grains of Mos2		1/5
BGN				
pink apl.				
RGR				
BGN				2/5
RGR	orange alt. fsp.			
BGN				
amph. RGR				

DATO: 18.9.84

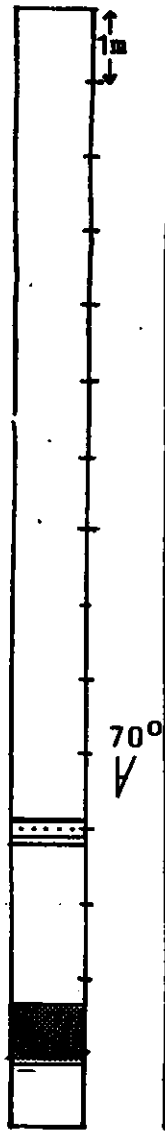
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 5-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				2/3
		conc.imp.of chp few grains of Mos2		3/3
BGN				
RGR				
pink apl.				
RGR				

DATO: 18.9.84

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.:5-84 KASSER NR.: 4.5 FRA 30 m TIL 45 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR	rock totally crushed			4/5
BGN				
RGR	orange alt. fsp			5/5

DATO: 18.9.84

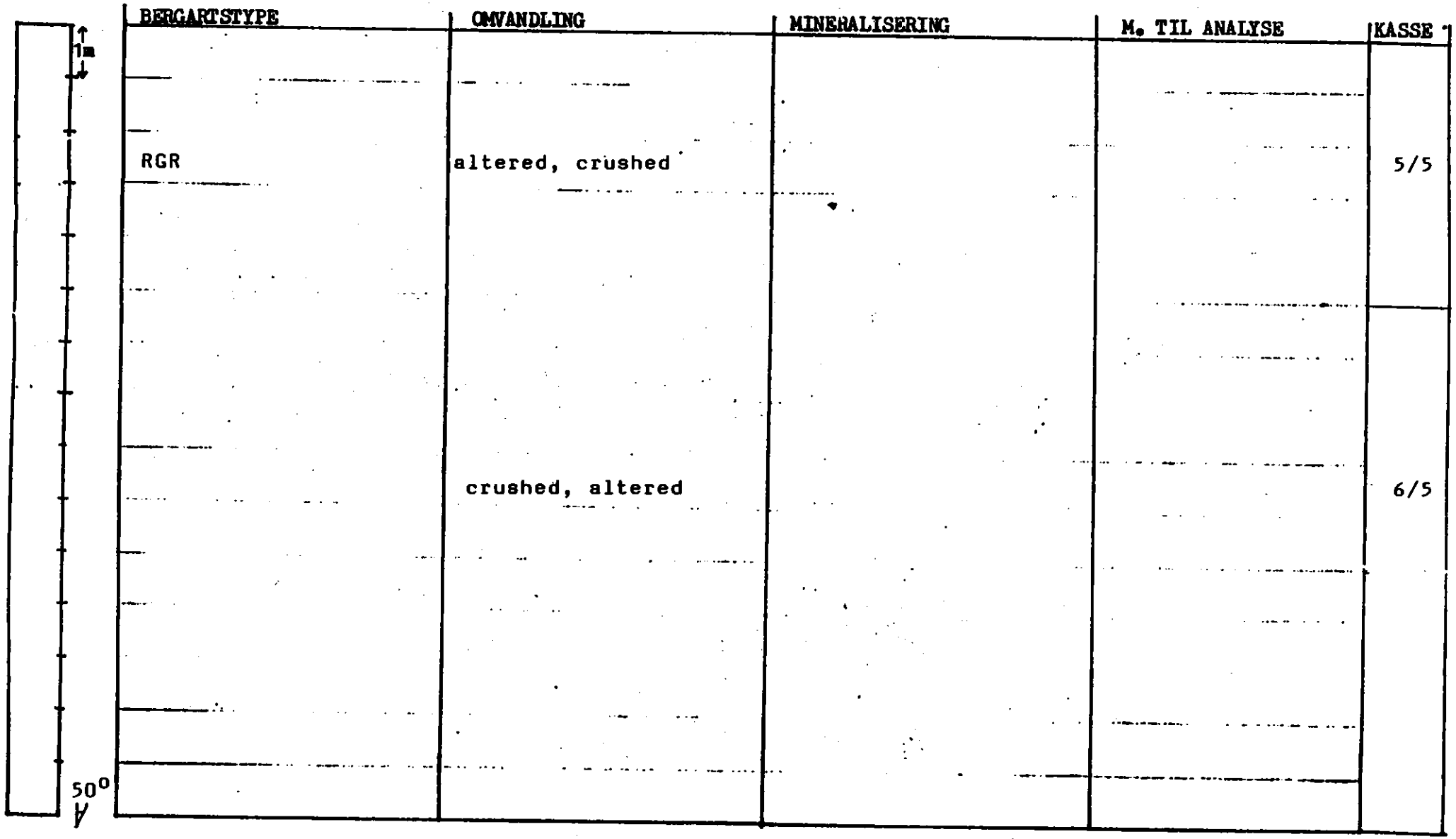
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 5-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m



DATO: 18.9.84

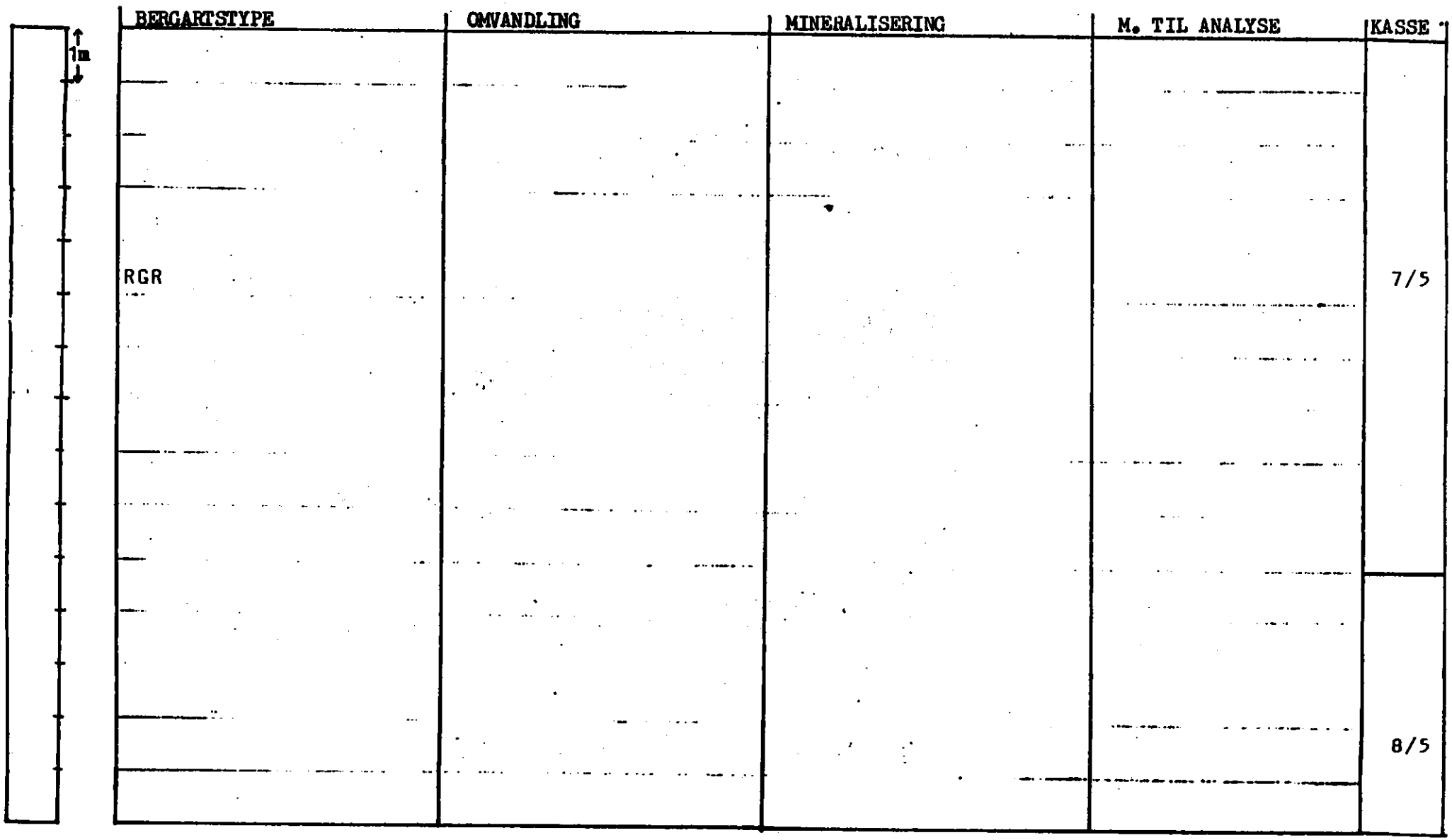
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 5-84 KASSER NR.: 7,8 FRA 60 m TIL 75 m



DATO: 18.9.84

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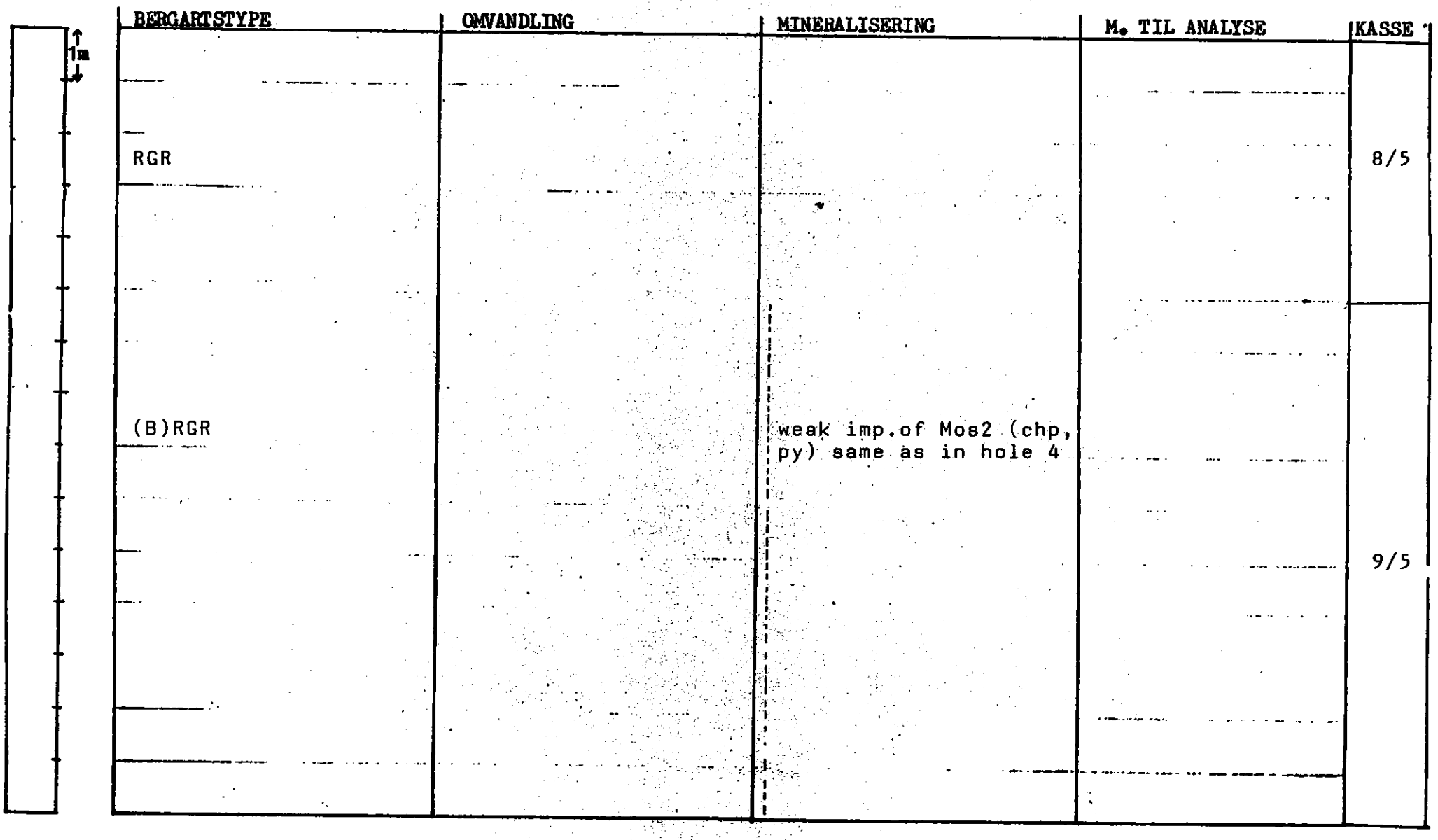
JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 5-84 KASSER NR.: 8,9 FRA 75 m TIL 90 m



DATO: 18.9.84

sign

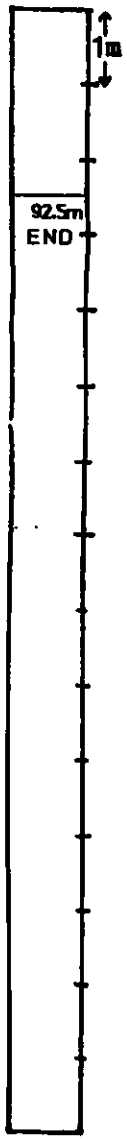
JIT-83

KVINA GRUVER.

5(90-92.5)

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 5-84 KASSER NR.: 10 FRA 90 m TIL 92,5 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				10/5

DATO:

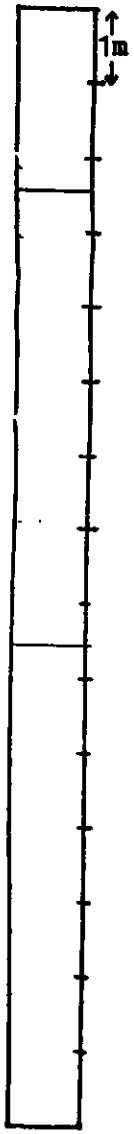
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 6-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m Dip: 5° west.



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
crushed granite (mylonite)				1/6
RGR				
mylonite				2/6
crushed				

DATO: 25.9.84

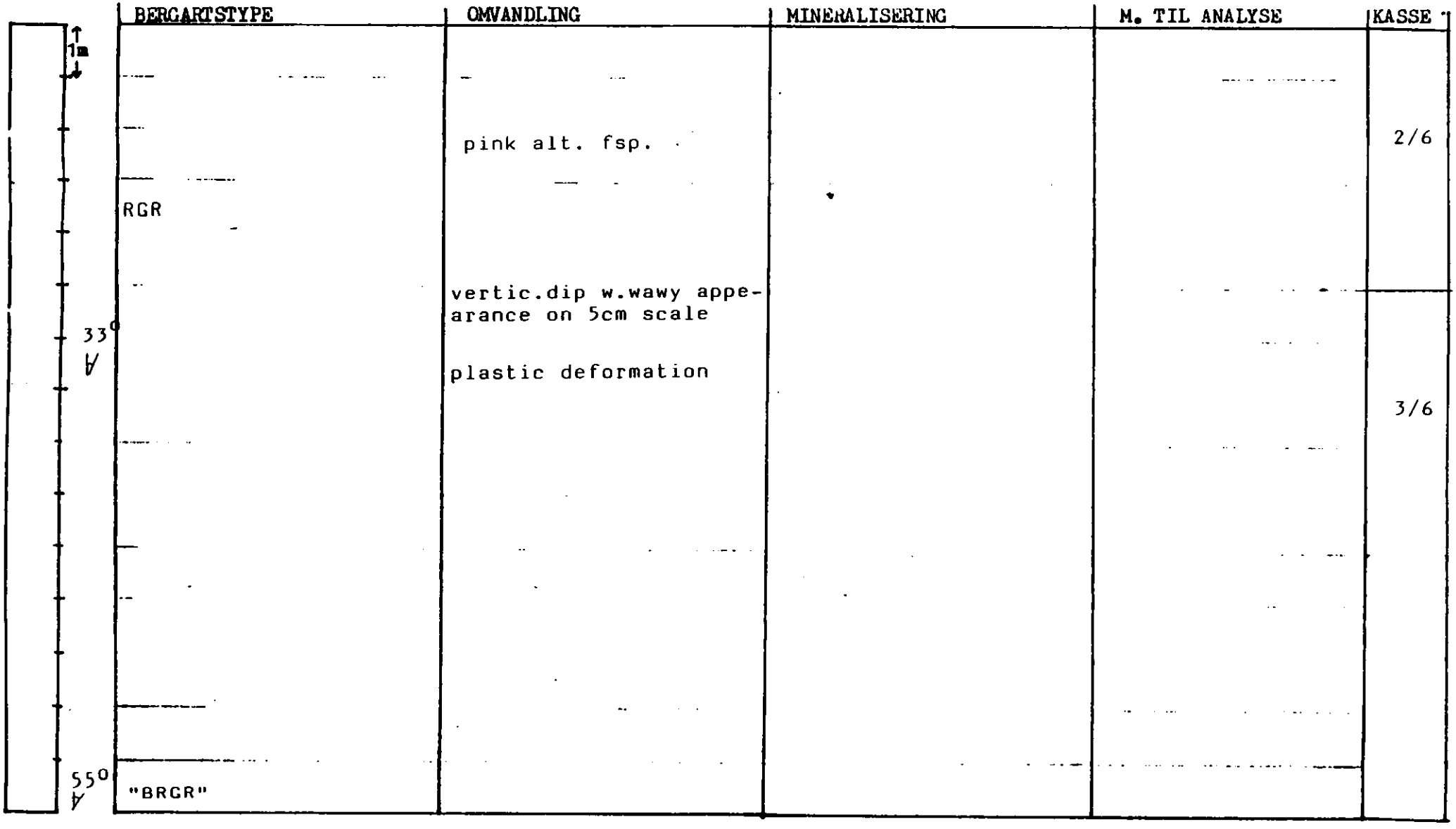
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 6-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



DATO: 25.9.84

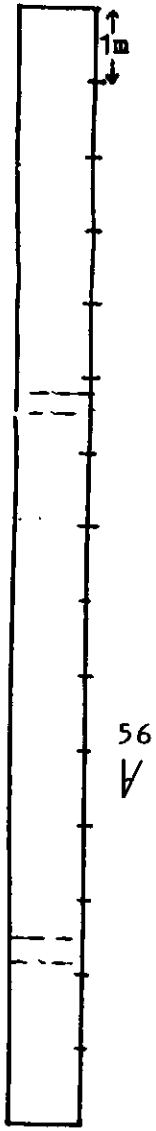
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 6-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
"BRGR"	diffuse texture			
	open frac. w.qz.chrystals			4/6
RGR				
56°	plastic deform.			
qz.brecchia				5/6
mylon				

DATO: 25.9.84

sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 6-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
		gradual change from "fragged" granite to BRGR		
BRGR		2cm glimmer-rich band w.chp, Mos2. cm conc.zone w.Mos2 (chp). some grains of chp, Mos2 dissem.		5/6
		small grains of Mos2.		
grey apl.		Conc. grains of Mos2 in apl.		
RGR		Cm conc. imp. of Mos2.		
		Weak imp. of chp, few grains of Mos2.		
		2 cm zone w.imp. of Mos2,chp.		6/6
		" "		
		5cm conc.imp.of Mos2 (chp)py 2 " " " " " " "		

DATO: 25.9.84

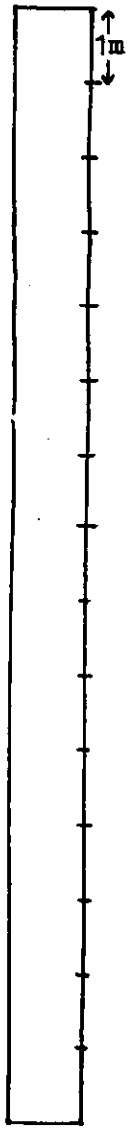
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.:6-84 KASSER NR.: 7,8 FRA 60 m TIL 75 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR		Weak and spread mineraliz. of Mos2, chp, py		7/6 8/6

DATO:

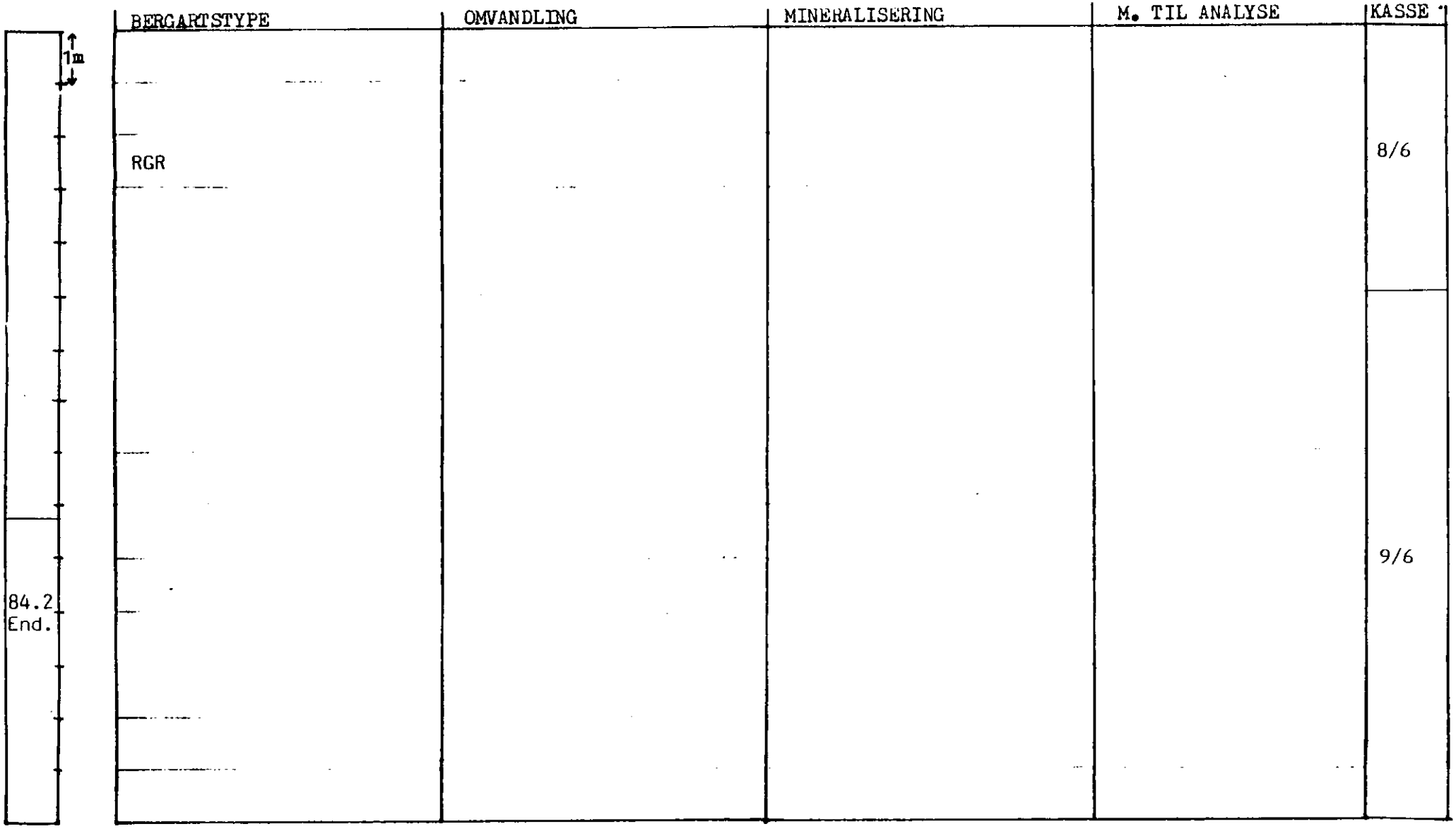
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 6-84 KASSER NR.: 8,9 FRA 75 m TIL 90 m



DATO: 25.9.84

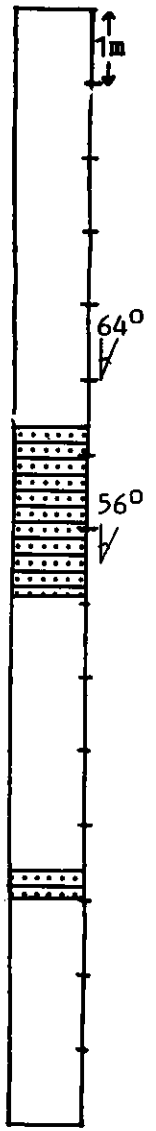
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 7-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR	fractured			
BGN		conc.imp.of py, pht		1/7
RGR				
(B)RGR BGN	fractured			
(B)RGR	Some ep.alt.			2/7

DATO: 4.10.84

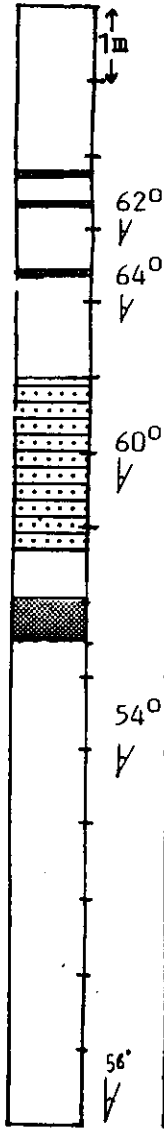
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 7-84 KASSER NR.: 2-3 FRA 15 m TIL 30 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR				
RGR 10cm conc.apl. " " "		grain of Mos2 on upper border of apl.		2/8
4cm conc.grey apl.				
BGN		grains of Mos2,else py in BGN		
(B)RGR Pink to grey apl.				
(B)RGR				3/8

DATO: 4.10.84

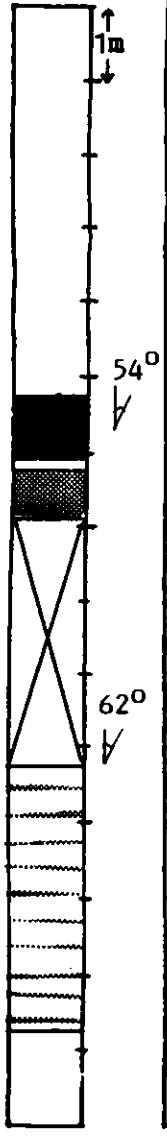
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 7-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE		KASSE
RGR					
					4/7
	crushed				
amph BRGR Apl.(qz.fsp.rich)		imp.of Mos2 in apl.	ppm Mo	ppm Cu	
			4330	1100	
			1330	740	
quartz			310	300	
			2650	680	
			1480	1300	
Mixed apl/BRGR		imp. of Mos2	1430	450	
			2580	750	5/7
			1120	390	
RGR			$\bar{x}$: 1904	714	

DATO: 4.10.84

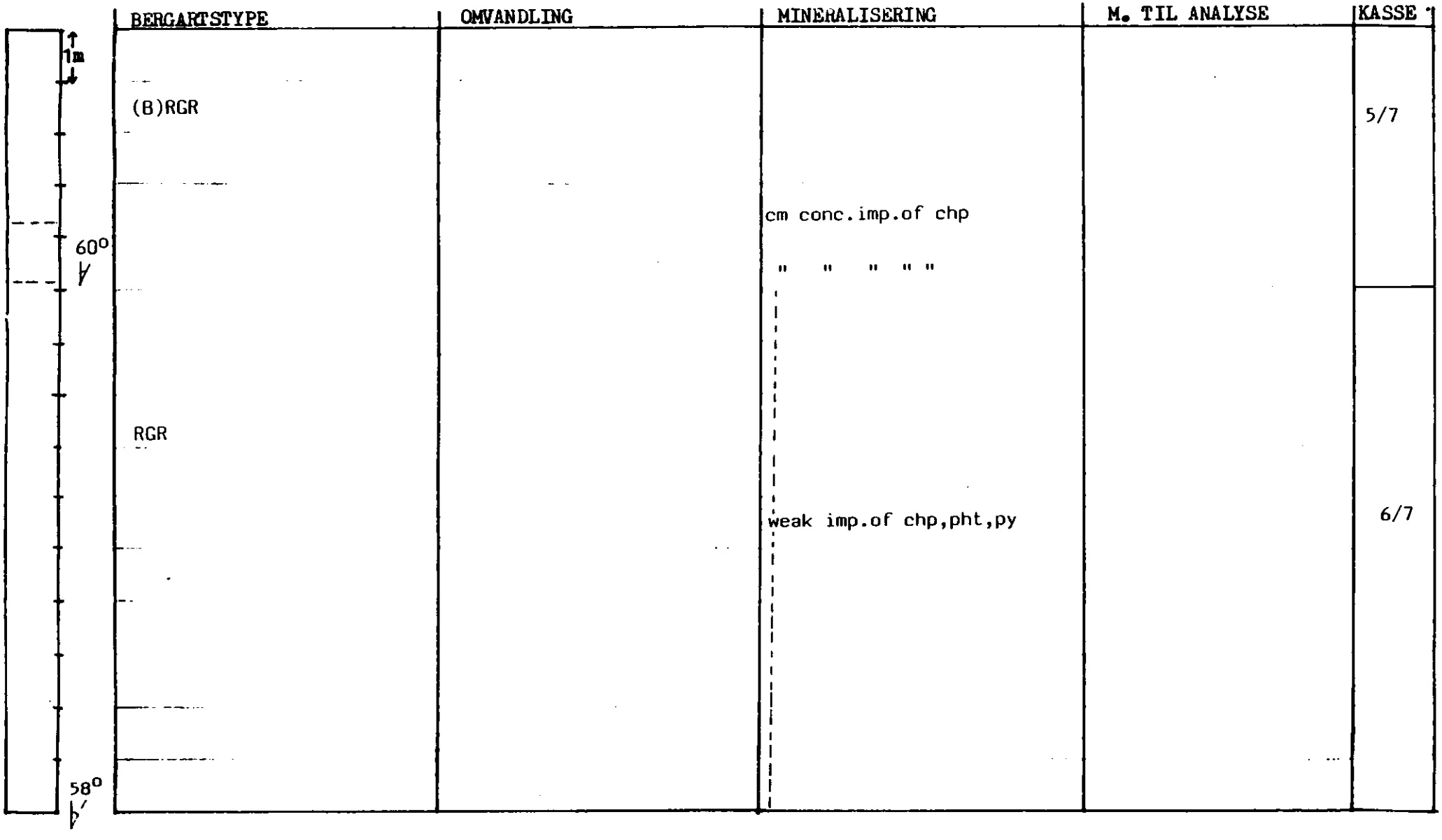
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 7-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m



DATO: 4.10.84

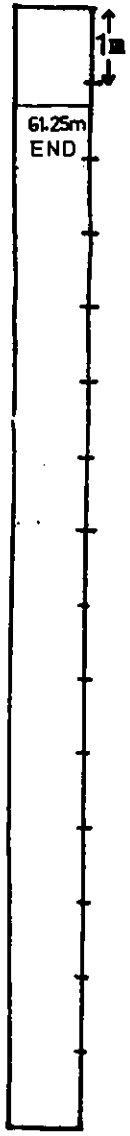
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 7 84 KASSER NR.: 7 FRA 60 m TIL 61,25m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR		weak imp.,as descr.above		7/7

DATO:

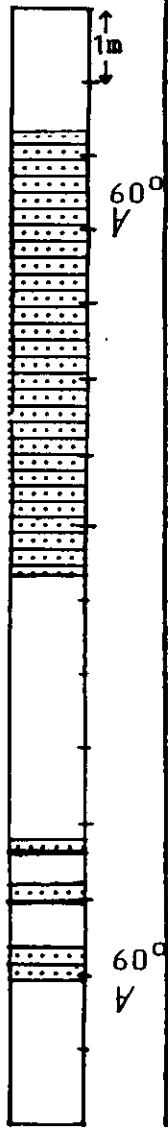
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 8-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				
		weak imp.of py,chp,pht in BGN		1/8
BGN				
RGR				
BGN				
BGN				
RGR				
BGN				2/8
RGR				

DATO: 13.10.84

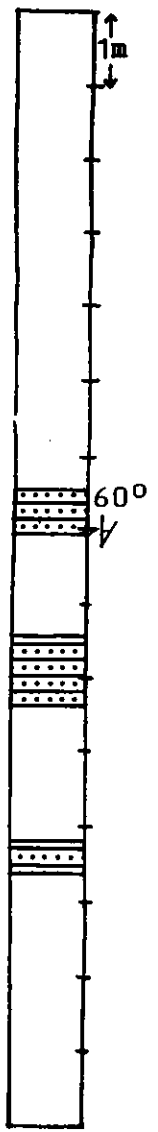
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 8-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				2/8
BGN		weak imp.chp,py,phtin BGN		3/8
RGR				
BGN				
RGR				
BGN				
RGR				

DATO: 13.10.84

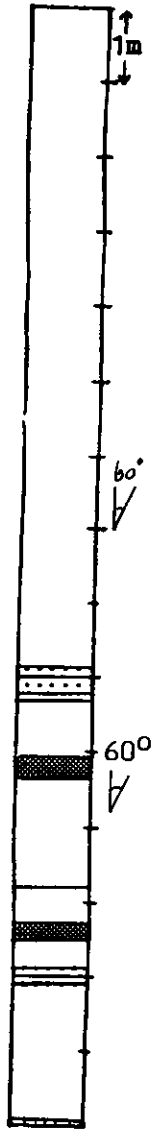
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 8-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				4/8
(B)RGR BGN		Weak imp. of py,chp,pht		
(B)RGR grey apl.				
BRGR/qz.veins		Mos2 in qz.veins and imp.in rock		
(B)RGR Conc., grey apl. (B)RGR BGN				
(B)RGR				
BGN				

ppm Mo	ppm Cu
2280	1100
2000	1600
x̄: 2440	1350

5/8

DATO: 13,10.84

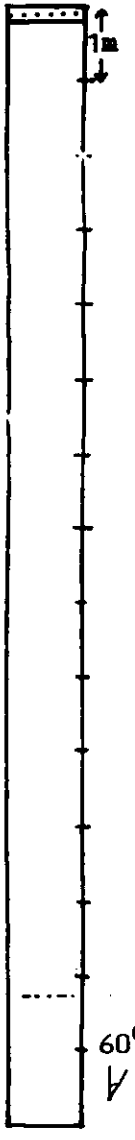
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 8-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN	weak greenish colour			5/8
(B)RGR	" " "			6/8
inh. RGR(B)		grains of Mos2		

DATO: 13.10.84

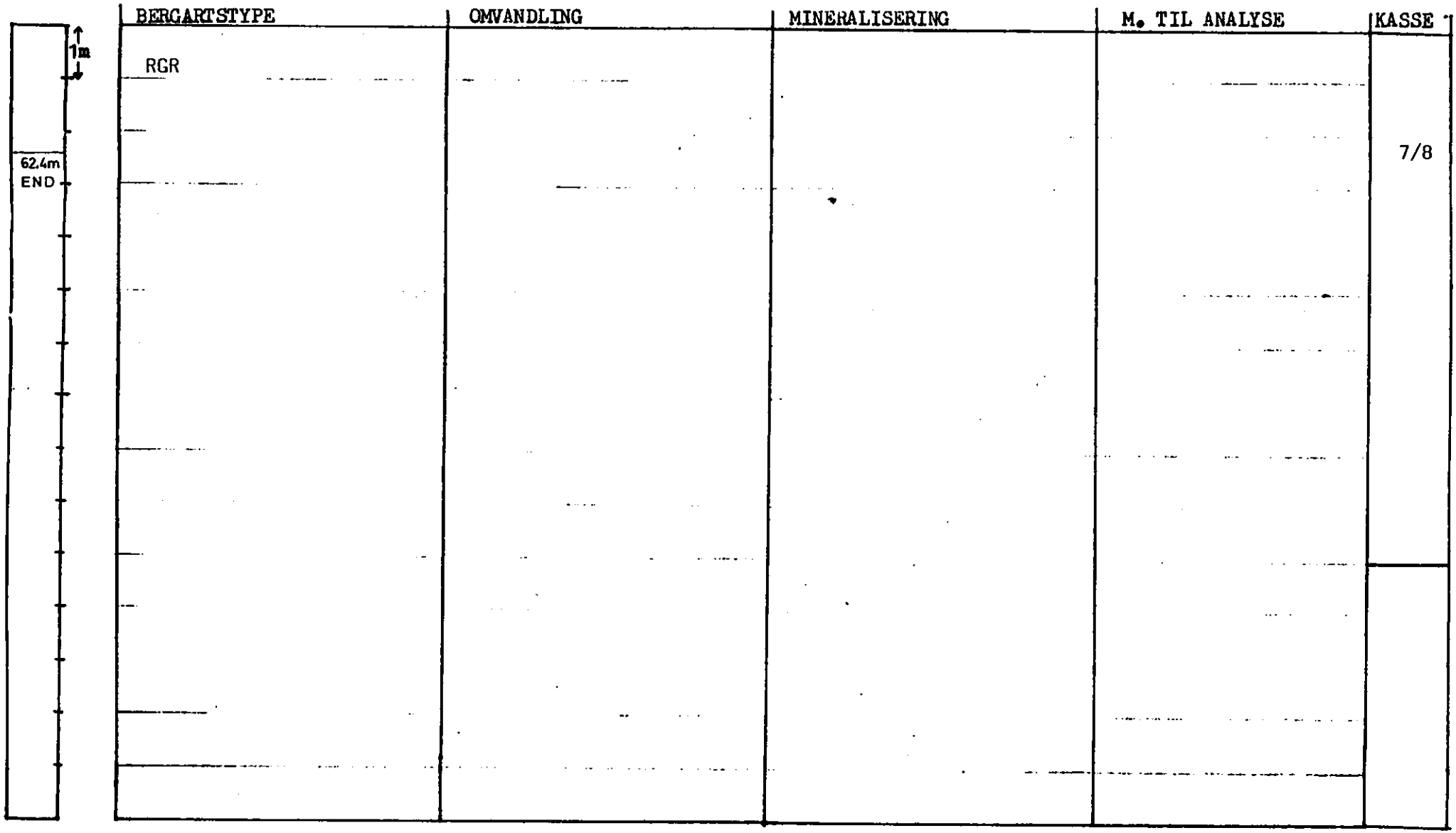
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 8-84 KASSER NR.: 7 FRA 60 m TIL 62.4 m



DATO: 13.10.84

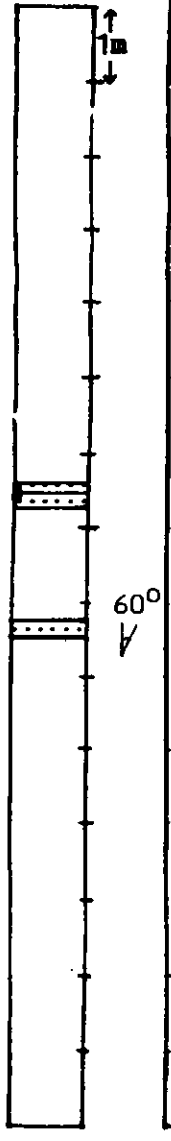
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 9-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				1/9
BGN		imp.of py,chp,pht in BGN		
RGR				
BGN		—"—		
RGR				2/9

DATO: 16.10.84

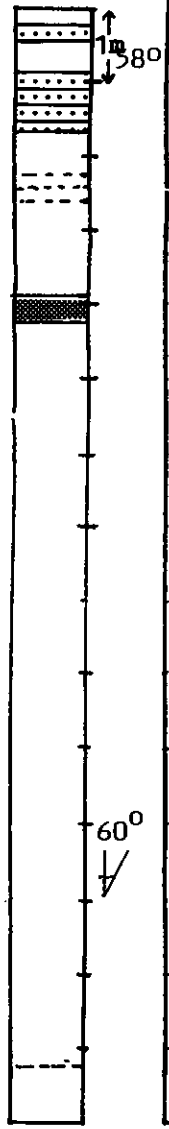
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 9-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN RGR BGN		imp.of Mos2,py,pht,chp in BGN		2/9
grey apl. 3-10cm in RGR				
pink aplitt		weak imp.of Mos2 py,pht,chp		3/9
RGR				
(B)RGR	weak greenish colour	weak imp.of chp,py,pht		

DATO: 10.10.84

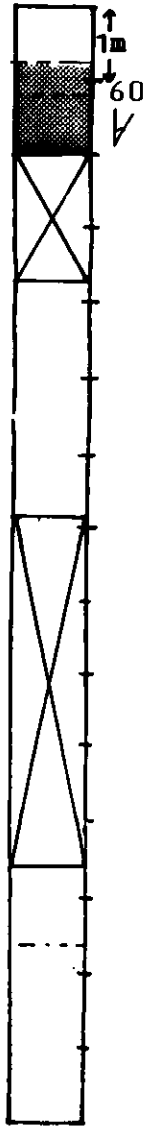
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 9-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE ppm Mo	ppm Cu	KASSE
BRGR			250	1300	
qz.fspt.rich apl.w.qz.veins			460	2000	
quartz			360	300	
			1010	320	
mixed mineral.zone w. qz.veins			2790	400	4/9
			400	162	
		rich min.of chp,py,pht, some Mos2	4120	-	
			1080	230	
			$\bar{x}$:1309	564	
quartz					
			3498	440	
(B)RGR		weak imp.of py.chp,pht	2300	70	
			$\bar{x}$:2895	255	5/9
RGR					

DATO: 10.10.84

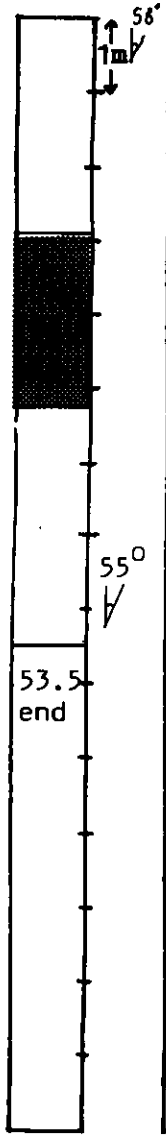
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 9-84 KASSER NR.: 5.6 FRA 45 m TIL 60 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR		weak imp. of py,chp,pht few grains of Mos2		5/9
grey/pink aplite				
RGR				6/9

DATO: 10.10.84

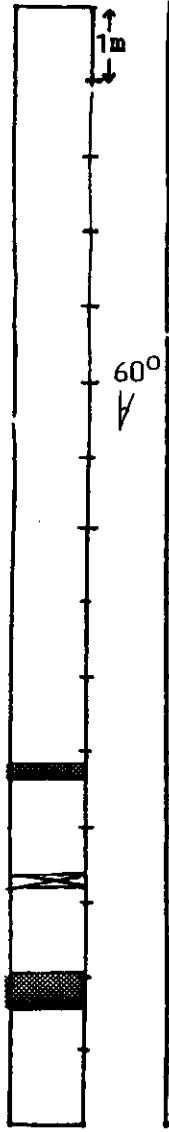
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 10-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				1/10
grey apl.				
10 cm qz.vein				
grey conc. apl.				2/10
RGR				

DATO: 13.10.84

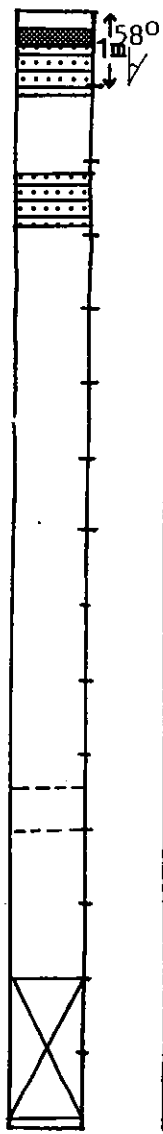
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 10-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE		KASSE
grey apl. BGN					
RGR					
BGN					2/10
RGR					
BRGR			ppm Mo	ppm Cu	3/10
mixed BRGR/qz.	greenish colour	imp. Mos2, chp, py	800	210	
			480	190	
quartz			$\bar{x}$: 640	200	

DATO: 13.10.84

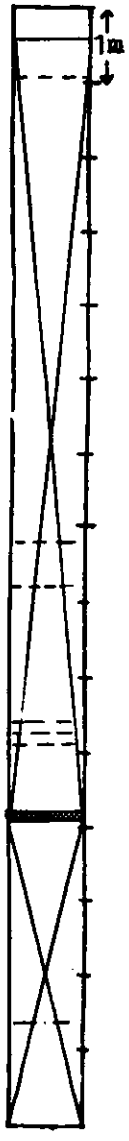
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 10-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BRGR		chp, (py) in qz.		
quartz		spread and very few grains of Mos2 in qz. chp, py		4/10
apl.		chp, py		
		chp, py (Mos2)		5/10

DATO: 13.10.84

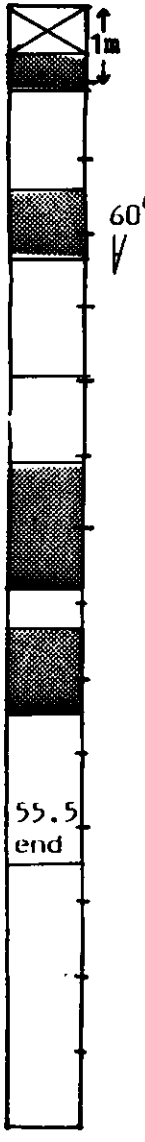
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 10-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE ppm Mo	M. TIL ANALYSE ppm Cu	KASSE
qz. apl. (qz.fsp.rich)			480	590	
BRGR	greenish colour	Mos2, mainly as conc.impregn in apl. weak imp.of chp,py	940	630	
apl. "			1770	1000	5/10
BRGR			1900	600	
			1500	230	
RGR			$\bar{x}$: 1318	610	
grey apl.					
RGR					
grey apl.					
RGR					6/10

DATO: 13.10.84

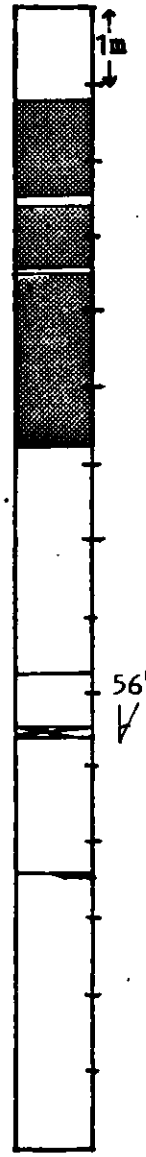
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 11-84 KASSER NR.: 1,2 FRA 0 m TIL 15 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				
Grey apl.				
RGR				
Apl.				
RGR				
Apl.				1/11
RGR				
(B)RGR 10cm qz.vein		imp,of Mos2 in rock and qz. vein (chp,py)		
(B)RGR				
RGR				2/11

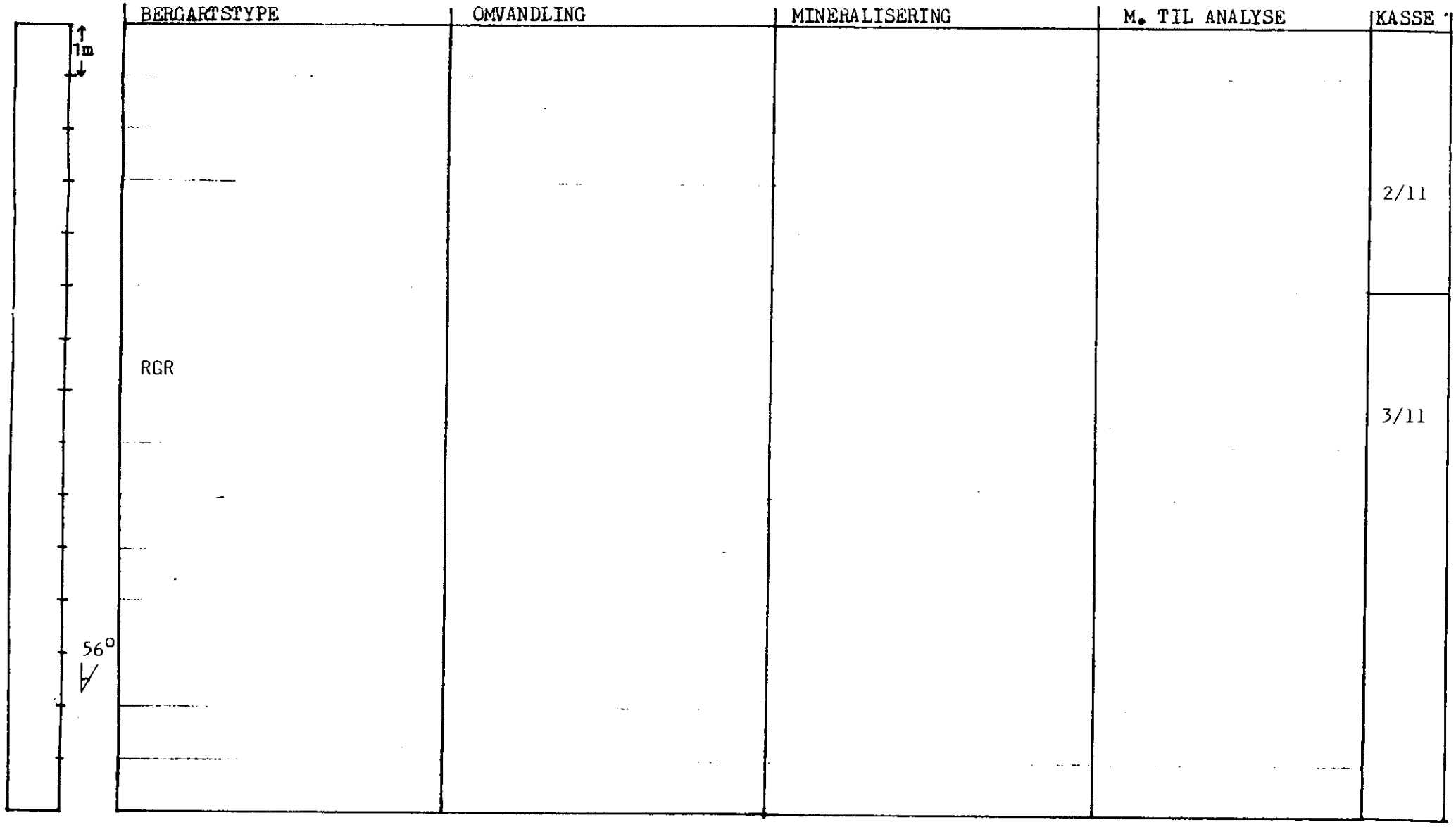
DATO: 19.10.84 sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 11-84 KASSER NR.: 2,3 FRA 15 m TIL 30 m



DATO: 19.10.84

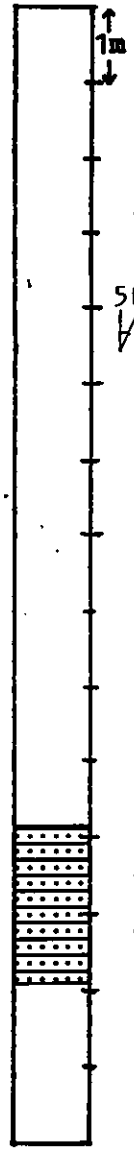
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 11-84 KASSER NR.: 4,5 FRA 30 m TIL 45 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				4/11
	crushed			
	crushed			
BGN	greenish colour	py,chp in BGN		5/11
RGR	crushed			

DATO: 19.10.84

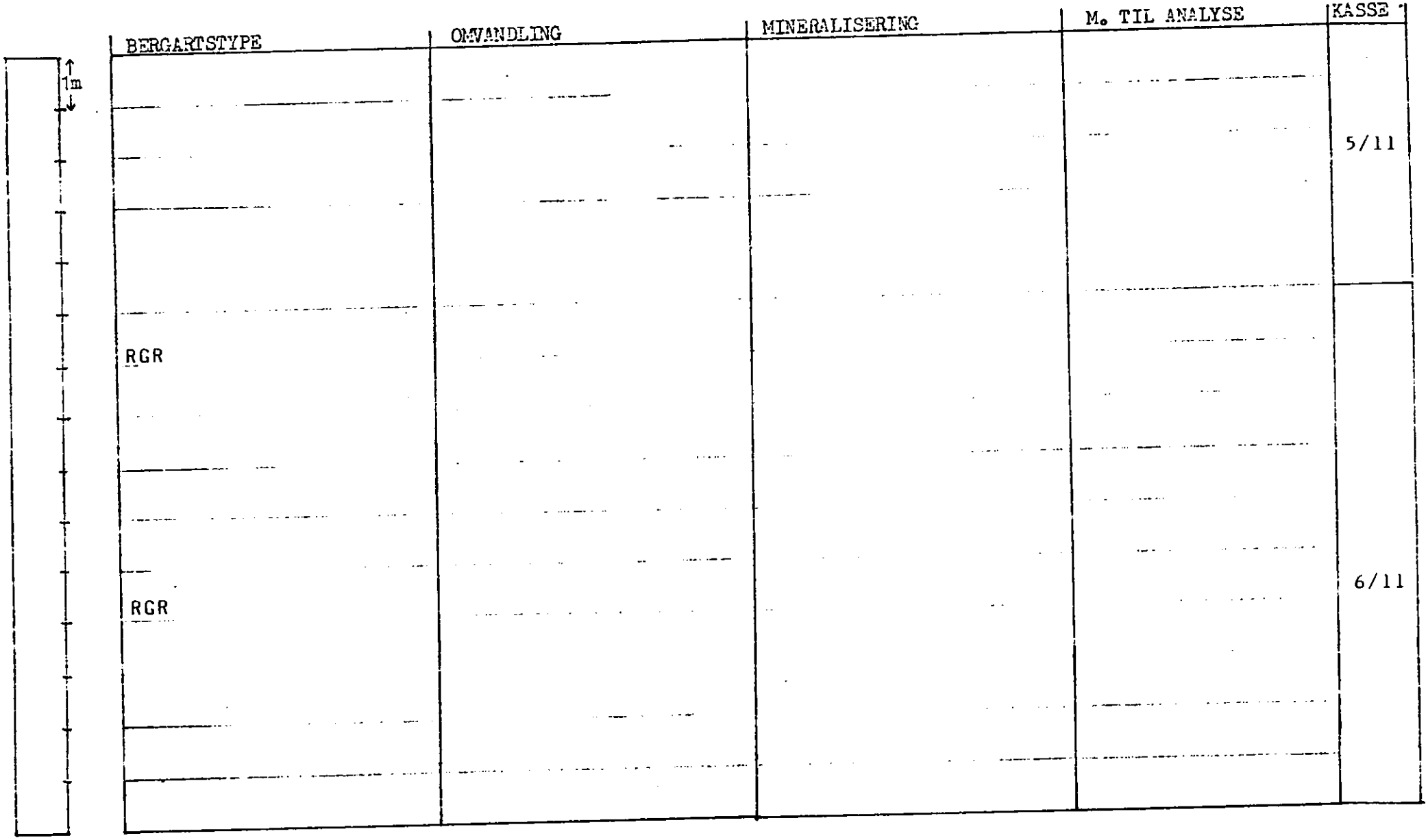
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 11-84 KASSER NR.: 5,6 FRA 45 m TIL 60 m



DATO: 19.10.84

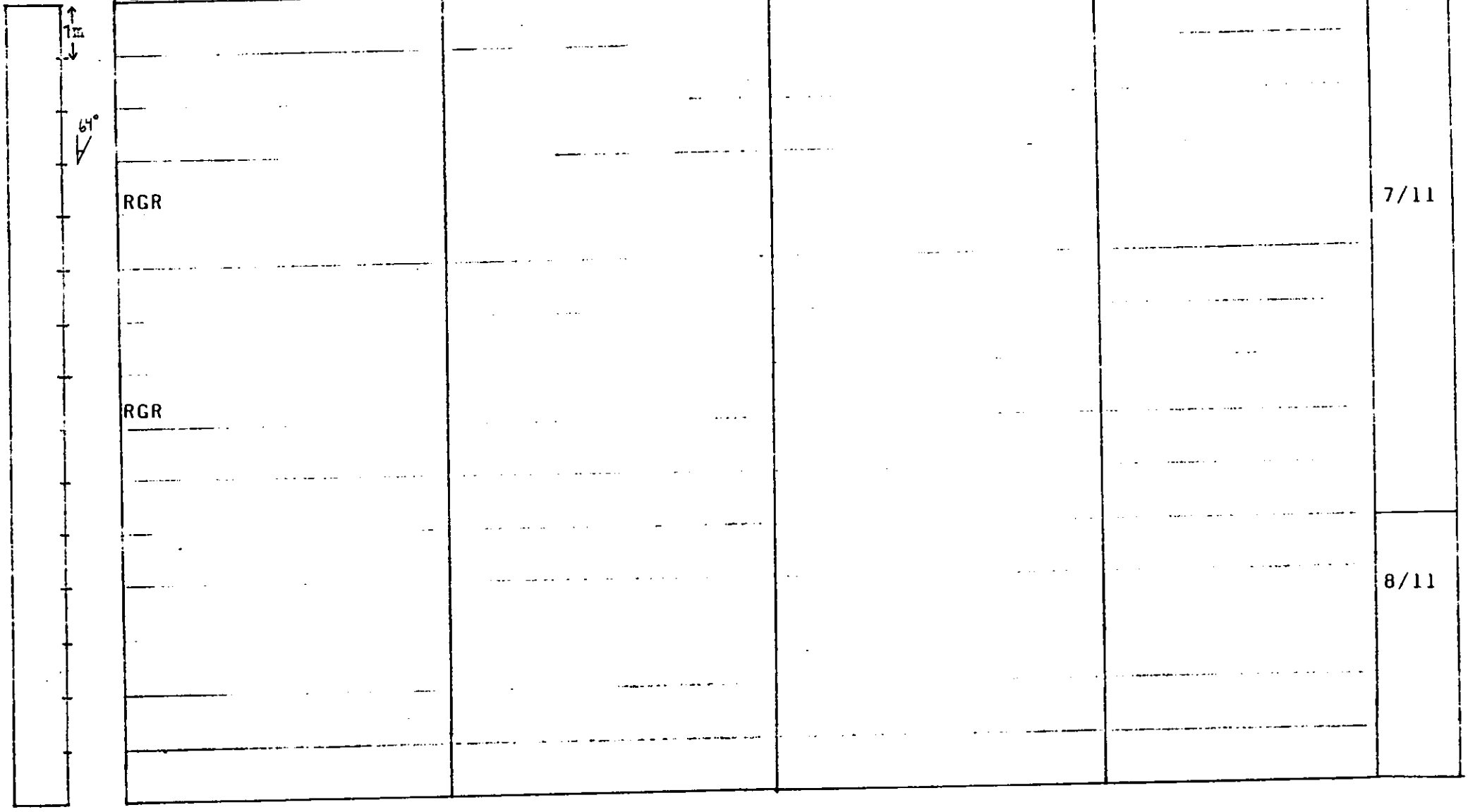
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.:11-84 KASSER NR.: 7,8 FRA 60 m TIL 75 m



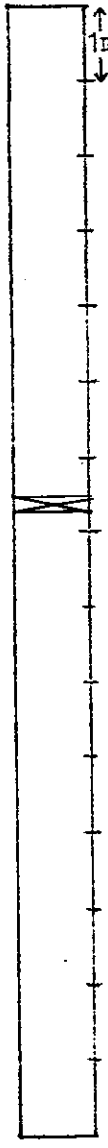
DATO: 19.10.84 _____ sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.:11-84 KASSER NR.: 8,9 FRA 75 m TIL 90 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
60° inhomog.RGR red to grey,med.to coarse grained		som py,chp		8/11
		few grains of Mos2		
qz.	varied dip.			
inhomogen RGR				9/11

DATO: 20.10.84 _____ sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 11-84 KASSER NR.: 10.11. FRA 90 m TIL 105 m

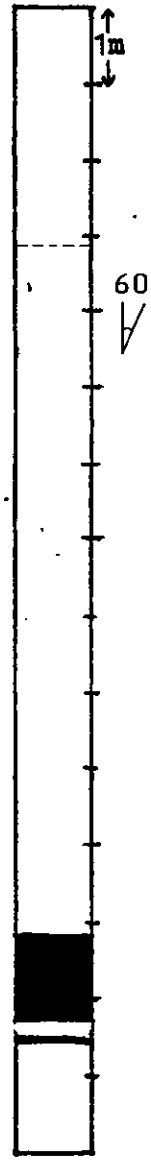
BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
med.grained RGR				
RGR				
(B)RGR				10/11
(B)RGR				11/11

DATO: 20.10.84 _____ sign

JIT-83

KVINA GRUVER.
JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 11-84 KASSER NR.: 11, 12 FRA 105 m TIL 120 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
inh. RGR				11/11
RGR				
				12/11
amph.	partly alt. to glimmer.	some py on frac.		
RGR				

DATO: 20.10.84

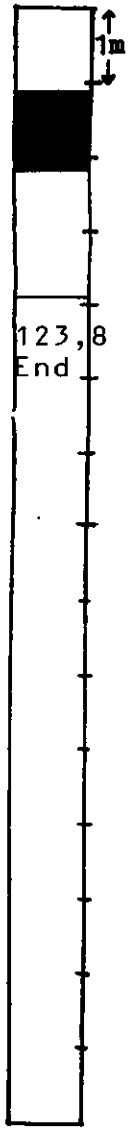
sign

JIT-83

KVINA GRUVER.

JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 11-84 KASSER NR.: 12,13 FRA 120 m TIL 135 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				
Amph.				
RGR				12/11

DATO: 20.10.84

sign

JIT-83

Diary for Jan Inge Tollefsrud.
Fieldwork Knaben and Rjukan/Tuddal.

20.6. Left Oslo together with O. Samskott, employed in E. Kiil A/S, in the morning. Fetched the Subaru 4WD in Kristiansand. Arrived Knaben in the evening.

21.6. Examined the drilling-gear and controlled the position for Dh 1-84. Røynestad, Røyseland, Samskott, a local electrician and myself put together the drilling equipment.

22.6. The machinery was tested. Samskott had forgotten to take with him an important part to the corepipe, and this was ordered. Samskott and I left Knaben 15.00.

26.6. Reco. for geochem. sampling in Telemark.
Spent the first day in the Gausdal area.
Arrived at Rauland in the evening.
Conclusion: It will probably be difficult to get samples because of course gravity and lots of big stones in the streams.

27.6. Spent the day in the Vindsjåen and Bonsvann area (Tuddal). Found some interesting brownish coloured metabasites with gz-veins in this area.
Made an appointment with a farmer to borrow the key to the bar on pad on nothern shore of Bonsvann.
Visited old Bleka goldmine in the afternoon.
Returned to Oslo in the evening.

2.7. Met the streem-sediment samplers and the Folldal Verk's geochemist Krause at Borregaard (Lysaker, Oslo) in the morning. Drove to Rauland, where I had hired a camping cottage for the samplers.
Gave some instructions and information. Krause teached the samplers how to take the samples.

3.7. Continued the institution and sampling in the area west of Groven. It was not easy to get samples. Krause and I returned to Oslo in the evening.

9.7. Left Oslo in the morning. Had a meeting with the sediment-samplers in Rauland at 17,30.
The progress of work is very slow, because of problems with getting enough sample-material from the sediments. Only 37 samples taken. Left Rauland 18.45. Arrived Knaben 23.45.

10.7. Logged 110 m of core, DH-1-84.
Drilled 3.5 m, then the drill-crown got stuck, so it was impossible to take the striny up.

11.7. Mapping N of DH 1-84. Built a stand for the cable on the aggregate-sledge together with the drillers Arne Knaben and T.T. Røynestad.
Holstad called at 23.45 and told us how to save the string. He said that the string could take 30 tons and that it is a point of weakness between the crown and the "sidestone-ring" that shal break at 25 tons.

12.7. Jacked up and broke the string at the top end of the crown. The core-pipe was a bit stretched, but this was repaired during the late evening with the help from a farmer down in Knaben. A new hydraulic rotation-engine to the drilling machine arrived yesterday and was mounted today.

13.7. Travelled from Knaben to Rauland. Made a reco. trip in the area south of Frøystul. Difficult to find sediment-samples. Had a talk with the samplers in the evening. Still very bad progression. 60 samples taken. Arrived Oslo late in the evening. Røynestad had drilled through the damaged crown and 1.5 m in solid rock.

14.7. Day off in Oslo.

15.7. Back to Knaben.

16.7. Mapped in the area D4 1-84. Thundery weather.

17.7. Mapped west of Smalvann. Still problems with the drilling machine. The two rotation engines were exchanged. Took 190 m of cores down to Knaben. Loaded diesel in Knaben to take up to drillsite tomorrow.

18.7. Drilled 6 m, to 205.5 m. Still problems with machine. Mapped NW of Dh 1-84. Holstad arrived in the afternoon.

19.7. Drilled to 219 m. Problems with the hydraulic system when the oil is hot. Holstad checked the rotation-speed and found that it was normal. He left 13.00. Mapped W-NW of DH 1-84. Filled sand on the Smalvann-road to smooth it out.

20.7. Mapped in the same area as yesterday and finished the repairing of the Smalvann road.
Left Knaben in the evening. Oslo at 22.30.

21.7. Day off Oslo.

22.7. Travelled to Tuddal Camping and payed 770 kr. for a camping-cottage for one week. Had a meeting with the samplers when they left Rauland.

23.7. Left Tuddal early in the morning. Arrived Knaben at 13.30. Walked up to the drillsite. Still problems with the hydraulic system on drilling machine. They can only drill 3 m before they must take up the core. Depth of hole 227.5 m. Drilled today 3 x 3 m.

24.7. Mapped the western part of Grunnevannsknuten. Depth of DH 1-84 238,5 m.

25.7. A journalist from the newspaper "Fædrelandsvennen" visited us. Depth of hole 244.5 m. Zones of altered aplitt w. grains of MoSz. Mapped W of DH1-84. Ordered a hydraulic valve from E. Kiil A/S.

26.7. No drilling. The drillers waited for the valve. It arrived at Storekvina 17.30.
Mapped in the Sandtjern area.

27.7. Fetched a new corepipe and valve at Storekvina railway station. Exchanged valves. Left Knaben 17.30. Oslo 23.00.

28.7. Day off Oslo.

29.7. Met the samplers from Telemark in Sandvika at noon. Draw samplemap for the Telemark project.

30.7. Delivered equipment to Folldal Verk and samples and maps to Fina. Arrived at Knaben 16.15. DH 1-84 drilled to 273 m.

31.7. Traces of MOS2 from about 273 m. Drilled 24 m. Mapped in the Sandtjern area.

1.8. Drilled 12 m, lost 6 m of core one time. Mapped on Grunnvannsknuten. Depth of DH 1-84 307.20. Still traces of Mos_2 .

2.8. Drilled 6 m. Studied handbook for the drilling-machine. Tried to adjust hydraulic valves.
Limyr called and said that John Pedersen, Heim and himself will come on monday.

3.8. Drilled 17 m. Depth of hole 309.5 m. Still traces of Mos2 Mapped on Grunnvannsknuten.

4.8. Officework. Made a trip south of Knaben II and in Beritshei to look at the mineralisations.

5.8. Officework.

6.8. Drilled to 360 m depth. John Pedersen and Limyr arrived at 2 p.m. Svinndal arrived at 3 p.m. Decided to finish off DH 1-84. Drove down to Røynestad to look at cores from DH 7-83.

7.8. Drove up to drillsite with T.T. Røynestad and K. Røyseland. Drove back to Knaben to wait for Heim. Waited until 10 a.m. He did not show up. Svinndal, Limyr, J. Pedersen and I drove back to drillsite and decided to place DH 2-84 west of the southern end of Smalvann to get a better control on the structure of mineralized planes.
J. Pedersen and Limyr left Knaben at 2 p.m. Svinndal at 2,45 p.m.
I returned to drillsite, and the removal was started. Sledge with drilling machine placed at the new drill-site at the end of the day.

8.8. All equipment removed to new drillsite.

9.9. Mounting of equipment finished at 4 p.m. Drilled 8 m.

10.8. Drilled 30 m. Some problems with fractured rock. I assisted Røynestad while Røyseland cleaned the old drillsite.
Limyr called and said that Evert Person from Hagby Bruk will come on monday. I will pick him up at Kjevik Airport, Kristiansand at 11 a.m.

11.8. Logged cores. Office work.

12.8. Day off. Inflamation in the right foot.

13.8. E. Person did not reach the planned plane from Oslo, so he arrived at Kjevik at 2.30 p.m.
Arrived at drillsite at 5.30 p.m. Person controlled the hydraulic pressure. It seemed to work normal.

14.8. Drilled 42 m. Depth of DH 2-84 105 m.
Everything worked normal. I mapped south of DH 2-84.

15.8. Person left with the bus at 6.45 a.m. Mapped in the area between Knaben I og DH 2-84. Drilled 30 m. Depth of hole 135 m. Problems at the end of the day. The crown got stuck, probably because of a fault in the hydraulic valves.

16.8. The machine "eat" another crown. Drilled 36 m. Mapped W of DH 1 and 2-84. New rigg will be ordered.

17.8. Drilled 40 m. Depth of hole 180 m. Fire in the fuse box. Still another crown was"eaten". Mapped W of Sandtjern. My parents arrived.

18.8. Sightseeing.

19.8. Reco. in Benkeheia.

20.8. Removed the drilling machinery about 75 m south to follow the continuation of mineralzone in DH 2-84 and DH 1-84. Drilled 2,30 m.

21.8. Drilled 35 m. About 6 m of Mos2 mineralizations from depth 26 m. Mapped in the area between Knaben I and the Kvina road.

22.8. Drilled to 61 m. Still bleached granite w. traces of Mos2. Mapped towards the Knaben I road. The driver, Scott-Karlsen, arrived yesterday evening at 9,30 p.m. with the new Diamec 250 Drilling machine. Unloaded the lorry this morning. Sawed 5 samples from DH 2-84.
Lars Knaben who was laboratory assistent in the Knaben II mine, watched the mineralizations and considered them interesting.

23.8. Transported the new rigg up to Smalvann. Winched the aggregate and the machine over to the east side of the Stutedalen valley.

24.8. Winched over more equipment, raised the tower of the Diamec at drillsite. Left Knaben at 5 p.m.

25.8. Day off Oslo.

26.8. Office work Oslo.

27.8. Office work Oslo.

Private doings. Left Oslo at noon. Arrived Knaben at 6,45 p.m.

28.8. Drilled to 110 m DH 2-84. Mapped south of DH 2-84.
John P. arrived at 9.p.m. Limyr arrived at 11 p.m.

29.8. Left Knaben at noon. Arrived Vikeså about 2 hours later. Examined carbonate-rich metasediments because of geochemical anomalies of Zn. Could not find any Zn-minerals in day-light. Used a UV-lamp during the late evening to look for fluorizing Zn-minerals. Negative.

30.8. Collected some soil samples in the same area. Collected stream sediment samples to try to locate a sourze for sediment W-anomaly.

31.8. Collected stream-sediments from a carbonate-rich horizon W of Oltedal. Looked at some prospects in Oltesvik, Dirdal and Gilja. Looked at some fluonte mineralizations in the Kvinlog area. Back in Knaben at 8 p.m. Limyr returned to Risør immediately.

1.9. John P. left at 10 p.m. Office work.

2.9. Sawed samples from DH 1-84. 275-354 m. Sawed each third meters.

3.9. Rain. Returned from fieldwork at 2 p.m. Office work. Drilled to 52 m. Crushed rocks.

4.9. Drilled to 75 m. No mineralizations. Mapped in the Lilleknaben area.

5.9. Drilled to 104,5 m. No mineralizations. Mapped in the area between Lilleknaben and Knaben I.

6.9. Drilled to 138 m. Found gneiss, possibly the same as the one above minearalization in DH 7-83, at 118m. Mapped in the same area as yesterday.

7.9. Dug a road from DH 7-83 down to DH 4-84. Hired a man (A. Nordaas) and his excavator to help Røynestad with this job. I assisted K. Røyseland on rig. Drilled to 148 m. Left Knaben at 4,30 p.m.

8.9. Day off Oslo.

9.9. Day off Oslo, sick.

10.9. Met Limyr at his office. Took the night-train to Storekvina. Holstad (Backe Maskin A/S) arrived Knaben in the afternoon.

11.9. Rain and sleet. Holstad adjusted the Diamec, and exchanged a rubber-packing on the rotation unit. Drilled to 182 m.

12.9. Drilled to 192,70. Removed hydraulic aggregate and Diamec to DH 5-84.

13.9. Removal finished. The Ford County tractor was used for transport and returned to the Kvina road on the other side of the Stutedal valley via Knaben I. Drilled to 5.40 m. Drilling stopped, because of damage in the dydraulic aggregate.
Damage in the transmission on the shaft between engine and oil-pump. Holstad contacted.

14.9. Rain, fog and wind. Dismounted damaged part. Carried core-cases from DH 4 to the Kvina road. The new part is sent from Craelius. The customs office at Kjevik (Kristiansand) is closed during weekend, so the package is sent via Oslo, where Limyr will send it to Kjevik.

15.9. The package arrived at Oslo at 4 p.m. Will arrive Kjevik on sunday with the 10 o'clock plane from Oslo.

16.9. Drove to Kjevik. Package arrived at 11,50 a.m. Borrowed some tools from Bjørgulf Homme Service station at Kvinlog.

17. Repaired hydraulic aggregate. Finished 10,15 a.m. Took out and turned rubber-packing in rotation unit. New rubber-packing is ordered. Drilled 30 m.

18.9. Drilled to 60 m. Mapped east of Lilleknaben.

19.9. Drilled 92,4 m. Weak mineralization 80-90 m. Very much like a zone in DH 4. Cleared drillsite hole 6-84. Rain and wind.

20.9. Removal. Winched the equipment from DH 5-84 down to the Kvina road. Terrible weather.

21.9. Still very bad weather. The rest of the equipment was winched over to the Kvina road. The right front wheel on the tractor punctured. The wheel was taken off and transported to Kvinlog to be repaired.
I had a reco.-trip in the area DH 4-84 - Lilleknaben-Ørnehammen.

22.9. Office work.

23.9. Office work.

24.9. Removal finished. Drilled 1 m. Carried the last core-cases down from DH 4-84. DH 6-84 tited 5^{o} west.

25.9. Drilled down to 41 m. No mineralizations. Mapped in the Lilleknaben area.

26.9. Drilled to 78,70 m. Some mineralizations from 45-76 m. Cleaned drillsite DH 7-84. Rain.

27.9. Drilled to 84.20. Removal to DH 7-84. Drilled 6 m. Problems with the diesel aggregate.

28.9. Drilled 19 m. The jet in the diesel aggregate is damaged. A new one arrives at Storekvina at 7 p.m. MApped on Grunnvannsknuten. Left Knaben at 6 p.m. Oslo at midnight.

29.9. Oslo, office work.

30.9. Oslo, office work.

1.10. Hada meeting with Limyr in the morning. Left Oslo in the evening.

2.10. Knaben. Rain. Drilled to 62 m (DH 7-84) 36-43 m. Mineralization of the same sort as in DH 2-84. Diesel aggregate removed.

3.10. All equipment removed to DH 8-84. Drilled 11 m. Mapped on Grunnvannsknuten. Good weather.

4.10. Drilled to 47 m. Less than 2 m of mineralization (40-42m).

5.10. Drilled to 62 m. Removal to DH 9-84.

6.10. Rain. Reco., Mos2 mineralizations west of Sandtjern.

7.10. Office work.

8.10. Removal finished at 2,50 p.m. Drilled 29,40 m. No mineralizations.

9.10. Drilled 52,40 m. Mineralization 30-41,5 m. Removal to DH 10-84, 75 m north of DH 9-84. Rain.

10.10. Rain, wind and fog. Removal finished at 1 p.m. Drilled to 29,40 m. Mineralization found at 26 m. Finished report to Limyr.

11.10. Wind, snow and sleet. Drilled to 55,6 m. Decided removal to lower levels. DH 11-84.

12.10. Snow. Removal to DH 11-84. Drilling equipment transported by tractor to road fork Knaben I Kvina road.

13.10. Logged cores. Rain.

14.10. Mapped west of Lilleknaben. Sawed samples from DH 9-84.

15.10. Removal continues. Mapped in the Ørnehammen area. Røynestad tried to put in a new turbo on the diesel aggregate, but it did not fit, so the old one is still in use.

16.10. Removal finished. Drilled 2,5 m.

17.10. Assisted Røyseland on Diamec, while Røynestad organized equipment that is not in use, in case of heavy snowfall. Drilled 49,5 m. Very bad weather.

18.10. Drilled to 83 m. Fractured rocks. Sawed samples and organized core-cases. Rain, sleet, fog and wind.

19.10. Drilled to 107 m. Still very bad weather. Office work. Logged 60 m of core.

20.10. Office work. Packed samples.

21.10. Office work.

22.10. Drilling is finished at 123,7 m. Office work.

23.10. Removal. Diamec + water pump, hydraulic aggregate and various equipment transported down. Mapped in the Ørnehammen area.

24.10. Reco. mineralizations on Grunnvannsknuten. hydr. aggregat and various equipment transported down.

25.10. Took some pictures in the Sandtjern and Lilleknaben area. Packed samples and private equipment and left Knaben in the evening.

LEGEND

APPROXIMATE BORDER OF GNEISSBAND HORIZON

YOUNG DOLERITE DIKE

DIAMOND DRILLHOLE OLD -/-: strike/dip, (234): length ○old ●new

ADIT

MoS_2 SHOWING

PROSPECTION PIT

STRIKE/DIP FOLIATION

KNABEN I

KVINA

Sandtjern

Smalvann

Bergtjern

DH1 DH2 DH3 DH4 DH5 DH5B

1-84 2-84 3-84 4-84 5-84 6-84 7-84 8-84 9-84 10-84

1.1 -90 (99.0)
1.2 -90 (102.0)
2.1 -90 (79.0)
2.2 287/34 (61.0)
3.1 287/34 (82.4)
3 -90 (98.8)
2 -90 (146.2)
1 -90 (155.5)
DH7 ○ 90 (30.40)

N

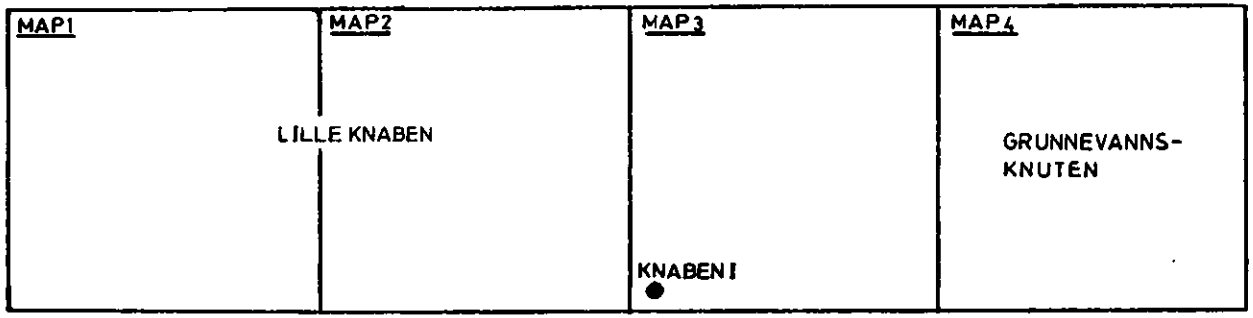
NORSKE FINA A/S
Geological/mineralization map
Knaben I - Kvina
Knaben area
1:5000

Konstuert av Widerøe's Flyveselskap A/S
etter fotogrammer opptatt aug. 1961

1:5000
100 50 0 100 200 300 400 500
Ekv. 5m

KNABEN GRUBER
Bl. 1
K.M. 00, 150

Bl. 2


MAP1
MAP2
MAP3
MAP4
LILLE KNABEN
GRUNNEVANNS-
KNUTEN
KNABEN I


675
700
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775
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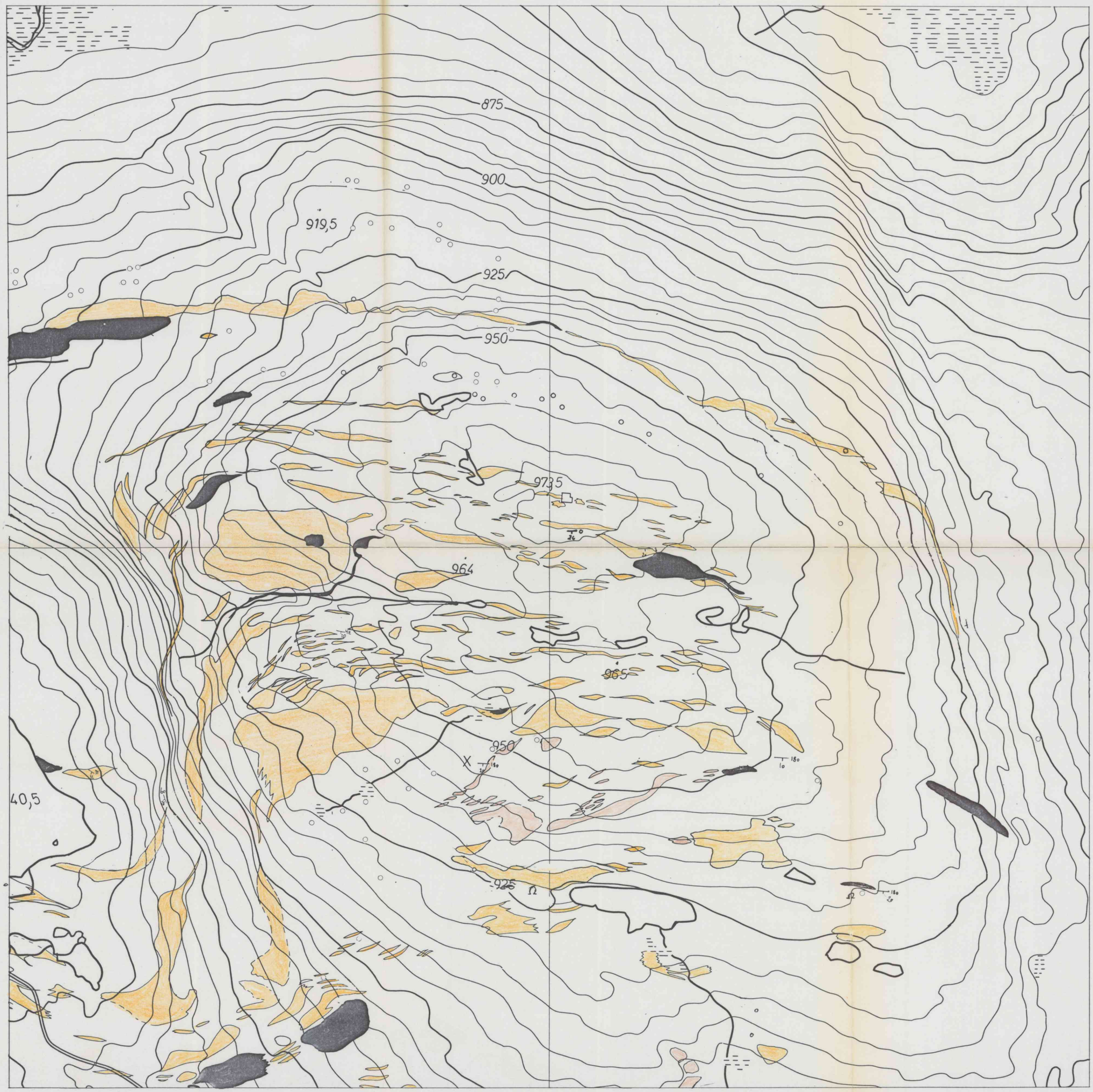
Smalvann



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