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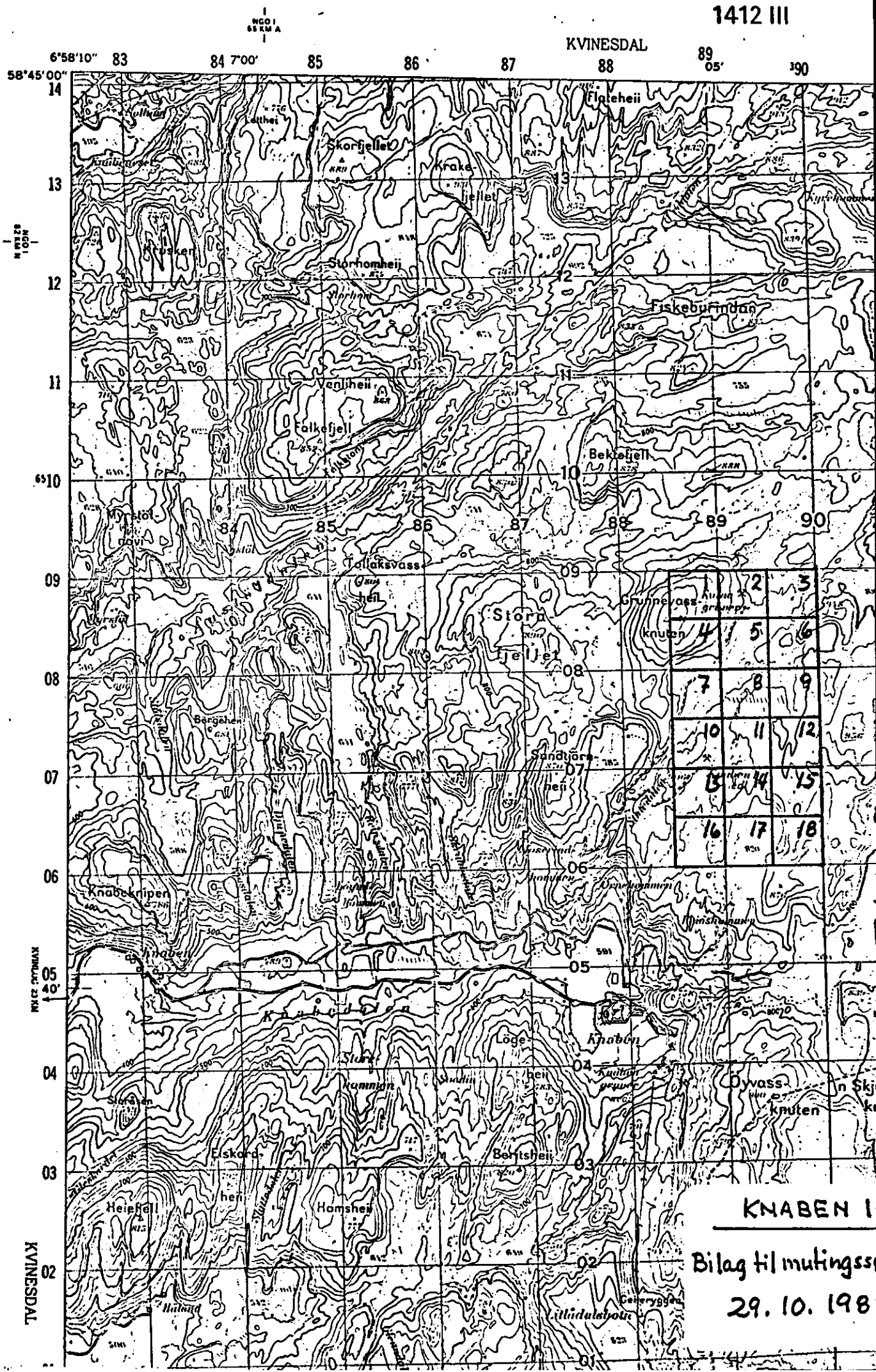
Joint Venture Folldal Verk A/S - Norske Fina A/S

Knaben area

Exploration 1983

Jan Inge Tollefsrud





KNABEN I

Bilag til mutingsss

29. 10. 198

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1.

The hatted camp in southern end of Smalvann.

2.





3. DH 5



4. DH 5B

Abstract

During the field season of 1983, diamond drilling and detailed geological mapping were performed in the area south of the old Kvina molybdenum mine. The aim of the work was to locate a possible continuation of the Kvina orebody towards south, and by means of geological mapping to find structures that could explain the ore grade mineralization in the area.

Six holes, of length from 205 to 486 m, in total of 1727 m, were drilled. The area was mapped on scale 1:2000.

The old Knaben I and Kvina mines are situated in open fold-structures within a gneiss-horizon. Knaben I in a synclinal and Kvina in an anticlinal. The structure of the gneisses and the distribution between gneisses and red granite is believed to have controlled the formation of the deposits, by formation of fractures due to different properties of the various rocks during stress. ut

A continuation of the Kvina orebody was not found. A 20 m zone of bleached, MoS_2 mineralized, granite was found at depth in DH 7 (southern end of lake Smalvann). This zone is considered to be a continuation of the Sandtjern-Grunnevannsknoten zone. It is parallel to the gneiss-horizon (as Knaben II), situated on the same structural level relative to the gneiss-horizon as Knaben II, and show the same mineralization-features as the Knaben II ore. The zone is considered to be an interesting target for further investigations.

A second zone of bleached, weakly mineralized, red granite was found SE of Kvina. This zone is considered a possible target for further investigations.

It is recommended to drill three diamond drillholes north of DH7 (west of lake Smalvann) to locate a possible Knaben II-type gangfjell ore. Further it is proposed to drill a single hole east of the zone SE of Kvina. ut

Introduction

During the field season of 1983, the Joint Venture - Folldal Verk A/S - Norske Fina A/S, continued with diamond drilling and detailed geological mapping in the area south of the old Kvina molybdenum mine in the Knaben district (John Pedersen, report, 1982).

The aim of this work was to locate a possible continuation of the Kvina orebody towards south, and by means of geological mapping to find structures, such as open folds, that could explain the distribution of ore grade mineralizations in the area. The work started 25/6, and continued for about 3½ months.

Diamond drilling was carried out with a Diamex 250 drilling machine, hired from Folldal Verk A/S.

It was operated by four local residents who took over the operation after a short period of instruction given by Ola Holstad, A/S Backe Maskin (28/6-5/7), Trond Dal, Folldal Verk A/S (28/6-14/7) and Bjarne Valen, Veglaboratoriet (16/7-30/7). The local operators were: Tom Toralf Røynestad, assisted by Terje Risøen and Karl Røyseland assisted by Tellef Risøen. They all performed an excellent job.

All equipment was transported with a Ford County 754 tractor, and partly by an old Deutz tractor, both hired from T. T. Røynestad. Water pump, hydraulic pump and drilling machine were mounted on a sledge constructed by Holstad/Røynestad and built in Kvinesdal. A field camp was established at the southern end of lake Smalvann (see map p). It consisted of 2 sleeping sheds, a wardrobe shed and a kitchen shed, all hired from Brakke Service A/S, Lillestrøm.

A Pioneer jolly-boat with a Johnson outboard engine was used as transport from campsite to drillsite.

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.

Geological setting

The Knaben area is situated within the precambrian of South Norway. The predominant rocktype is a pink to grey orthogneiss, called red granite (see description of rock types). 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 20-40° 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 mine is situated below this 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 Kvina to Knaben I mines. (App. E). Six vertical diamond drillholes of length 205-485 m, in total 1726 m were drilled. (Map p. 19 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 (see corelogs, app. B).

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. Only the last type was found in the mapped area. They often shows ptgmatic folded quartz-veins and lenses, and is sometimes altered to glimmerite in banded zones, due to hydrothermal alteration



Banded gneiss
(left), and red
granite (right).

5.



6. Bands of gneiss and amphibolite in red granite.
100m W of DH 5B.

"Gangfjell"/Breached 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, sub-parallel molybdenite-mineralized quartz-veinlets. The colour is grey to weak greenish-grey, presumably caused by sericitisation 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 iron sulfides 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.

Structure

The 1:2000 scale geological mapping in the Knaben I - Kvina area showed that the gneiss horizon consists of concordant lenses and bands of amphibolites and various gneisses "floating" in red and bleached red granite. The main strike of the horizon is N-S, with deviations around 10°W and 30°E . The variation of the dip is mainly between 20° - 40°E . Dip up to 60°E has been measured in individual gneiss lenses.

The horizon has a weak wavy appearance due to open folding, and is seen to branch up towards north. In the Smalvann area there is a flexure with dextral drag along a NE-SW trending zone, giving the gneisses a strike parallel to the NE-SW trending shore of Smalvann, and forming an anticlinal running approximately parallel to the eastern slopes of Grunnevannsknoten and with a fold-axis dipping approximately 15°S (c.N170E) (fig.1). A direction being so close to the plunge of the longest axis of the Kvina orebody that it is reasonable to suggest that this structure has taken part in controlling the deposition of this mineralization.

In Knaben I, Kvina, and SE of Kvina (area between DH1, DH2, DH3, DH4, map. p. 19) there are areas of red and bleached red granite enclosed by branches of the gneiss-horizon. These areas may represent cores in isoclinal folds formed by east-west compression of the gneiss-horizon. The closures of the folds then pointing respectively towards north (Knaben I), south (Kvina) and south (area southeast of Kvina) in the three areas.

The dimension of the individual constituents of the gneiss-horizon vary strongly both in width and length. From 1 dm to 50 m in width, and 1 m to 200 m in length. The gneiss-bands some places shows isoclinal folding, and other places also local "drag" along planes with a ENE direction. The drag is in scale 1 dm to 1 m (fig.) and is considered to be the result of the same deformation that formed the flexure described above.

In Knaben I, the gneisses form an open synclinal with the fold-axis dipping $C. 20^{\circ}\text{SSE}$ (see also Pedersen, 1982). The mine is situated on the border between an above lying amphibolite in the gneiss-horizon, and an area of red granite.

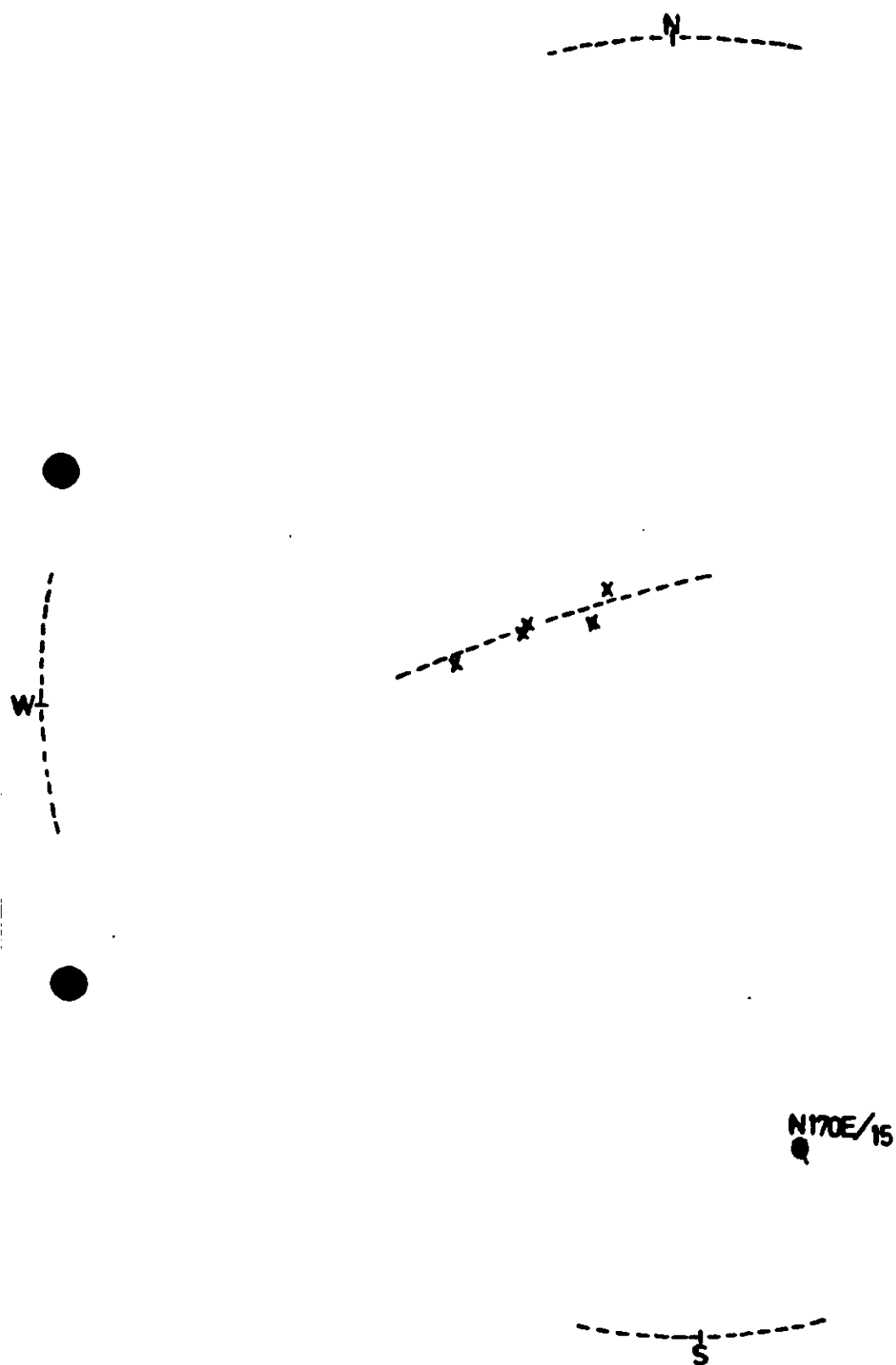


Fig.1 Constructed foldaxis from the area Kvina-Grunnevannsknoten.

The Kvina mine is situated in an open anticlinal, with the fold-axis dipping 10° - 15° S. In common with Knaben I. The Kvina orebody is situated on the border between areas dominated by gneisses on the one side and red granite on the other side.

The rock distribution and structures described above have been favourable for concentrating MoS_2 in rich, but small mineralizations. It seems unlikely that the open and inhomogeneous gneiss-horizon may have acted as a "roof" or "trap" for hydrothermal solutions (except maybe locally as in the case of the amphibolite in Knaben I). It is considered more likely that the structure of the gneiss-horizon, combined with the distribution of granite and gneiss have caused the rock to fracture due to difference in competence during stress between the red granite and the constituents of the gneiss horizon, caused by variation in texture and foliation.



Mineralization

Types of mineralization

The most frequent oreminerals in the Knaben area are molybdenite, chalcopyrite (chp.), pyrrhotite (pht.) and pyrite (py.). Various types of mineralization can be recognized.

Dissemination in gangfjell

This is the most important type of mineralization, and consists of molybdenite disseminated in gangfjell, often in association with small fractures and quartz-veinlets. In addition to molybdenite, gangfjell also contains minor amounts of chalcopyrite, pyrrhotite and pyrite. The northern part of the Knaben II orebody represents this type of mineralization.

Mineralized quartz-veins

This is considered to be the most widespread type of mineralization, and occur in all the various rock-types. The host-rock may show hydrothermal alternation in the vicinity of the veins (bleaching of red granite, amphibolite altered to glimmerite).

The veins can be grouped into three or four generations due to orientation and type of deformation (see end of next section, description of localities). The veins may contain either molybdenite or chalcopyrite or both in the same area, but molybdenite-mineralized veins are the most predominant.

According to size, the veins have been divided in two groups (Pedersen, 1982). One with veins less than 0,5 m thick, and the other with metre thick veins. Examples of young, concordant representatives of the first group are found in the southern part of Knaben II and in the Sandtjern-Grunne-vannsknuten area.

Representatives of the second group are the Knaben I and Kvina orebodies.

Dissemination in gneiss

The gneisses of the gneiss-horizon often show concordant disseminations of pyrrhotite, chalcopyrite, pyrite and minor amounts of molybdenite.

Mineralizations - Description of localities

The Knaben II mine

The Knaben II orebody is the largest and most important deposit in the area. It consists of a north-south oriented lense of gangfjell which is a hydrothermally altered red granite. For further description see: "Description of rocktypes", this report.

The molybdenite occur both as impregnation, and along, or in subparallel quartz-veinlets and fractures. The lense crops out in the northern end of the mine, and here it has a horizontal width of about 80 m, and a length of about 400 m. It has been mined along dip (30°E) for 250 m where it wedges out. The content of molybdenite is variable, and parts of the lense show very low grade. Average concentration is calculated to 0,25% MoS_2 (a, fig. 3).

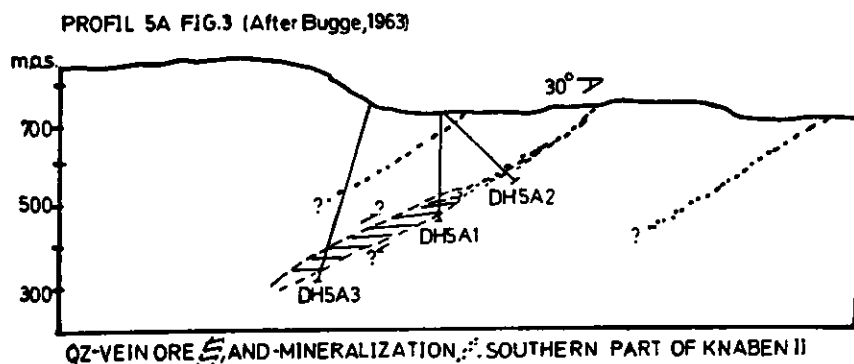
Towards south and towards depth the mineralization continues as a wide zone of close to concordant MoS_2 -mineralized quartz-veins in red granite, which is only partly altered to gangfjell. The average concentration is less than 0,20% molybdenite (b, fig. 3), and the concentration weakens off along dip towards the surface, where it leaves little evidence about the ore at depth. This mineralization continues for about 350 m, where the zone makes a weak bend towards SW. South of this bend, the quartz-veins flattens out to a dip of $10\text{--}20^{\circ}\text{E}$, and crosses the ore-zone which still has a dip of 30°E (fig. 4,5). In the area of the bend, the grade is raised to about 0,20% molybdenite (c, fig. 3), but further south it drops to a level of about 0,14% MoS_2 (d, fig. 3). The ore can still be traced as a weak quartz-vein mineralization at surface.

After this description of the deeper, now inaccessible parts of the Knaben II mine (Bugge, 1963), it may be proposed that the various mineralized fractures were formed by compressional stress in a ENE-WSW direction, released as feather-joints in the southernmost part of the mine (d. fig. 3 and fig. 4,5), and as shear-fractures, partly controlled by the foliation of the rock, in the north-south oriented part of the orebody. The gangfjell-lense should then be the result of more evenly distributed stress that caused the rock to respond by forming small, evenly distributed fractures, instead of the larger quartz-veins further south. The explanation to this difference in stress-distribution, could be inhomogenities in the rock (granites/aplites as described by Bugge, 1963), and/or the presence of amphibolites which would respond to stress in a different manner than granites.

The mineralizing, siliceous, hot fluids have followed these fractures, and through the relatively wide fractures in the southern parts, they have passed too fast and easy to be able to alter the host rock to any extent. Through the small fractures in the gangfjell-lense, the fluids have been slowed down and had time and access to alter the host rock, and to settle MoS_2 and minor amounts of chalcopyrite. The raised molybdenite-content in the area where the ore bend toward SW, could be due to overlap of the fractures to the north and to the south of the bend.

No matter what the mechanism may be, the Knaben II ore-zone is a very big one. In north-south direction it can be traced for about 1500 m, with a width of 30-80 m (Bugge, 1963). It has a dip of 30°E and a plunge of about $10^{\circ}\text{--}20^{\circ}\text{S}$. Only the northernmost part of it show ore-grade mineralization at surface. Towards south, only irregular quartz-veins in granite, which are very similar to the Sandtjern-Grunnevannsknoten, Bragol and Beritshei-mineralizations, gives a weak sign of the mineralization at depth.

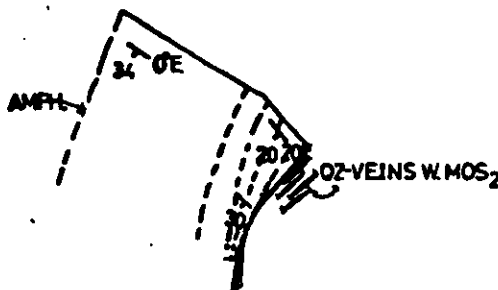
In the southern part of the zone, this weak mineralization can be followed for about 340 m along dip before the grade is raised and can be followed for further 500 m. (Fig. below, after Bugge, 1963).



The Knaben I mine

The ore in Knaben I consists of quartz-veins and -lenses in granite on W border of a concordant amphibolite. In the Knaben I-area, the gneiss-horizon is split up in two cranches with red granite in between. The amphibolite constitute the western border of the eastern gneiss-horizon. The amphibolite form a bend and flattens out towards north ($0^{\circ}/34\text{E}-20\text{E}/20\text{ESE}$). The mineralized quartz-veins are concentrated just north of the bend, and they follow the amphibolite which in places is impregnated with MoS_2 and chalcopyrite, and is totally altered to glimmerite.

The quartz-veins depart from the amphibolite when this approaches the dip of 30°E towards depth. The mineralization disappears at a depth of 25 m.



The concentration of the quartz-veins as described, could be controlled by difference in competence between the folded amphibolite and granite during deformation, or stress as described for the Knaben II-mine (this report).

The Kvina mine

The Kvina ore is connected to a lense-shaped, quartz-dominated pegmatite body with an average strike of 20° , dip 30° E and plunge 10° S. The pegmatite is enveloped by thick, MoS_2 mineralized quartz-veins. The surrounding rock is mainly red granite with some gneiss-bands on the west side of the quarry. Gangfjell has been described in the close vicinity of the orebody. Aplitic dikes cuts the lense. Close inspection of some quartz-veins in the mine, 10-20 cm wide, gives the impression of pinch and swell structures that could be the result of deformation.

Other mineralizations in the mapped area

In adits east of Knaben I, MoS_2 appears in cm to dm thick quartz-veins discordant in banded gneiss and granite.

A 5-15 cm thick quartz-vein inside one adit is weakly discordant in the gneiss, and has a distinct boudinaged, or pinch and swell structure, which imply that the mineralized quartz-vein has been stretched during deformation.

150 m ENE of these adits, on the shore of the lake, another mineralized quartz-vein is visible (photo 7). This vein cuts an isoclinally folded gneiss and is itself pygmatic folded with the hinge pointing towards north. It is not seen to cut the granite on each side of the gneiss-band, but limbs of folded veins follows close to border between gneiss and granite.

In northern end of the lake 867 m.a.s., 500 m north of adits described above, a 1 m long, isoclinally folded slice of quartz and amphibolite is seen to "float" in the red granite. The amphibolite is partly altered to glimmerite, and MoS_2 is found both in quartz and amphibolite (see photo 8).

The Sandtjern-mineralization consists of irregular, thin, MoS_2 -mineralized quartz-veins and fractures in red granite. The veins are apparently concordant, and the mineralized zone follows the main strike of the area, approximately N-S, from Ørnehammen-Stutedalen-Sandtjern to west side of the Grunnevannsknoten hilltop. This mineralization was found at 250 m depth in DH 7, in a 20 m thick zone of bleached red granite grading 314 ppm Mo.

The gneisses in the central parts of the gneiss-horizon often show mineralization of pyrrhotite, chalcopyrite, pyrite and molybdenite, mainly as dissemination in concordant bands, but also in quartz-veins, especially chalcopyrite and molybdenite. The mineralization is often followed by green colouring of the rock. Sometimes as a consequence of epidot alteration, but more often as a result of possible sericitisation of feldspar.

Between the location DH 1, DH 2, DH 3, and DH 4 there is an area of bleached granite with a less porphyritic appearance than the ordinary, red granite. The rock is limited in east, west and south by gneiss, and it is mineralized in much the same way as the banded gneiss described above. The rock was drilled through with DH 2 (approximately 70 m thick) and DH 4 (approximately 40 m thick), and samples were picked out. They showed an average grade of 168 ppm and 50 ppm Mo for 2 and 3 m of representative samples. There is, however, a possible zonation in the deposition of ironsulphides, with pyrite in DH 1 and more pyrrhotite instead of pyrite in DH 2 and DH 4. This could indicate a more high temperature mineralization towards east and towards depth, and could be a cause for further investigations of the zone towards east, despite the fact that the relatively



7. Folded and MoS_2 -mineralized qz-vein





8. Folded, mineralized qz-amph. in red granite.



9. Pinch and swell in mineralized qz-vein. Smalvann.



Cross-cutting, undeformed, mineralized qz-vein.

10.



Ironsulfide mineralisation in banded gneiss, cut by two generations of aplites. DH 5B.

11.

large visible and drilled parts of the zone show poor mineralization of MoS_2 .

Some places, on the shore of the lake, 350 m south of DH 5B, there occur 5-10 cm wide, undeformed MoS_2 -mineralized, quartz pegmatite-veins. These veins are crossing both granites and gneisses and strikes 80°E which differs strongly from the dominating N-S strike in this area.

Conclusion

In summary, it is concluded that the area has been MoS_2 mineralized in at least 3, possibly 4 episodes.

The oldest generation is represented by ptygmatic folded quartz-veins in gneiss and granite (see photo 7 and 8).

A possible younger episode, is the lense-shaped and boudinaged quartz-veins and bodies that can have survived a weaker deformation possibly due to a late, open folding.

A third generation is the undeformed quartz-pegmatite veins with strike differing strongly from the main strike of the area.

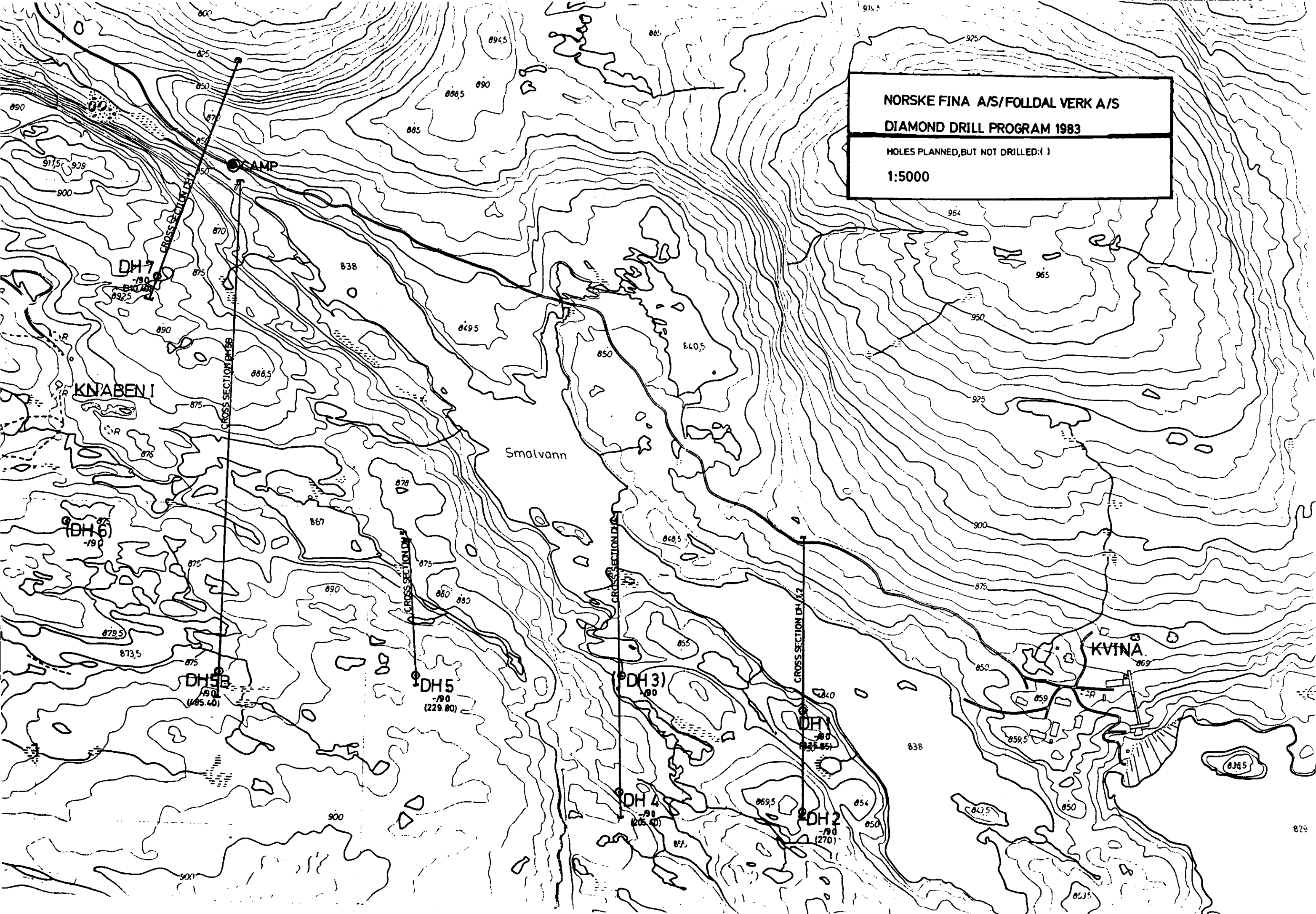
A fourth generation could be the Knaben II and Sandtjern type. The Knaben II mineralization is supposed to be a late episode, with gangfjell-alteration described to cut undeformed pegmatite (Bugge, 1963).

The disseminated mineralizations of the gneisses is suspected to be of old, hydrothermal-, or of primary sedimentary origin. The fact that it is cut by two younger generations of aplites (core DH 5B, photo 11) indicate that this is not a very young episode.

NORSKE FINA A/S/FOLLDAL VERK A/S
DIAMOND DRILL PROGRAM 1983

HOLES PLANNED, BUT NOT DRILLED: ()

1:5000



Short description of drillholes 1983

(Corelogs app. A and B).

DH1

DH1 cuts the mixed zone of red granite, various gneisses and amphibolites of the gneiss-horizon. Weak mineralization of mainly pyrite, but also some chalcopyrite, pyrrhotite and molybdenite in banded gneiss occur at depth of approximately 200 m. No signs of a continuation of the Kvina orebody.

Samples analysed: 206-208 m: 115 ppm Mo and 275 ppm Cu in banded gneiss.

DH2

The drillhole cuts a zone of bleached red granite from 15-85 m. The granite is compact, homogeneous and has relatively small alkali feldspar blastophyres. The rock crops out in the area west of DH1 and DH2. The zone seems to thin out towards depth. It shows a weak mineralization of pyrite, chalcopyrite, pyrrhotite and also traces of MoS_2 as diffuse concordant bands, but also in concordant and discordant quartz-veins.

Analysed samples: 45-48 m - 168 ppm Mo, 373 ppm Cu.

From 85-270 m depth: mixed rocks of the gneiss horizon, partly mineralized by iron sulfides and traces of MoS_2 . No signs of a continuation of the Kvina orebody.

DH4

From 60-100 m: The same zone of bleached red granite as in DH2 (15-85 m depth) was intersected. Type of mineralization is the same as in DH2, but the zone has thinned out to 40 m.

Above and below this zone was found the mixed rocks of the gneiss horizon, with weak mineralization of iron sulfides and traces of MoS_2 , mainly disseminated in banded gneiss and within and on border of discordant and concordant quartz-veins.

DH5

Mixed rocks of the gneiss horizon with weak mineralization of iron sulfides and traces of MoS_2 in gneisses as described above.

DH5B

Mixed rocks of the gneiss horizon with red granite below. The banded gneiss is mineralized with iron sulfides and traces of MoS_2 as described above.

Samples analysed: Banded gneiss - 86-88 m: 100 ppm Mo, 205 ppm Cu.

Banded gneiss - 120-121 m: 90 ppm Mo, 60 ppm Cu.

DH7

The upper 60 m is represented by the mixed rocks of the gneiss horizon. 60-215 m is dominated by the granite below the main gneiss horizon.

In the section from 215-240 m banded gneiss and aplites, both altered, and containing discordant and concordant mineralizations of iron sulfides and traces of MoS_2 , both disseminated in the rock and in quartz-veins.

From 247 to 267 m there is a 20 m section of altered bleached red granite with concordant and discordant MoS_2 -bearing quartz-veins. Molybdenite is also present as concordant dissemination in the rock. Some pyrite and chalcopyrite. Chalcopyrite and molybdenite are not always concentrated in the same quartz-veins, and may belong to different mineralizing episodes. After these mineralizing episodes the rock has been fractured. This is visible from open fractures, cutting MoS_2 -bearing quartz-veins.

Average of analysed samples 247-267 m, 314 ppm Mo and 316 ppm Cu.

From 270-310 m, the rock type is an ordinary red granite.

Previous drilling

In 1966 Knaben Molybdengruber A/S drilled along the road 225 - 405 SW of the open pit of Knaben I.

Table.2 Drillholes SW of Knaben I.

Hole No.	Strike/dip	Length of hole
2.1	-/90	79,0 m
2.2	287/34	81,0 m
1.1	-/90	90,0 m
1.2	-/90	102,0 m
3.1	287/34	82.4 m

These holes are too short to intersect the Sandtjern zone, and were probably drilled to test the continuation of the Lilleknaben zone further south.

Two other holes has been drilled 500 and 1200 m SW of the Kvina orebody to test some smaller mineralized zones on the south-east side of Grunnevannsknuten:

Table.³ Drillhole south-east of Grunnevannsknuten.

Hole No.	Strike/dip	Length of hole
2	-/90	146,2 m
3	-/90	98,8 m

These holes are also too short to intersect the Sandtjern-zone. The relatively large distance from the outcropping mineralizations in the Sandtjern area was chosen because examination of similar types of mineralizations in the southern end of the Knaben II mine, shows that they are very persevering along dip (fig. 5)

Discussion / conclusion

The diamond drilling in 1983 gave no indication of a continuation of the Kvina orebody towards south, neither in the form of a molybdenite-mineralized quartz-lense nor as a gangfjell-ore of the Knaben II type.

No zones of high grade MoS_2 -mineralizations were found.

A zone of bleached granite, with low grade mineralization was found by mapping the gneiss horizon in the area SE of the Kvina mine. The location of this zone is between DH1, DH2, DH3, DH4 (map p 1a). The same zone is penetrated by DH2 (70 m thick) and DH4 (40 m thick). Representative samples were picked out for analysis: DH2: 45-48 m, 168 ppm Mo, 373 ppm Cu. DH4 88-90 m, 50 ppm Mo, 620 ppm Cu. The zone is limited towards south by a closure in the gneiss horizon with an axis running ESE. Comparing thickness of the outcrop and thickness of intersection in drillholes it seems that the zone is slowly getting thinner towards east.

Despite this fact, that the above mentioned zone both in the outcrop and the depth show poor mineralization of MoS_2 , it is proposed as a possible target for further investigations because of the bleached character of the granite as this indicate gangfjell-alteration.

A second, 20 m thick, zone of mineralized bleached granite was found in DH7 at a depth of 250 m. This zone is dipping 33°E and is assumed to belong to the Sandtjern structural level.

It is concluded that there exists a very persevering molybdenite-mineralized zone cropping out in the area Sandtjern-Grunnevannsknoten, dipping approximately 33°E , and intersecting DH 7 at 250 m depth. It is parallell to, and below, the main gneiss horizon, and on the same structural level relative this horizon as Knaben II.

The outcropping mineralizations in the Sandtjern-Grunnevannsknoten area are of the same type as found south of the gangfjell-lense in Knaben II, where they represents distal parts of the ore-grade mineralizations at depth. In DH7, the zone is represented by concordant and discordant quartz-veins with MoS_2 and concordant disseminated MoS_2 in altered bleached granite. These conditions indicate gangfjell-type mineralization, and the observations leads to the conclusion that it is reasonable to suppose that there exists an ore-deposit of the Knaben II-type at depth in this area.

Assuming that the outcrop of the Sandtjern/Grunnevannsknoten mineralized zone is a structural lower parallell to the Kvina/Grunnevannsknoten anticlinal (dip 15°SSE). This indicate a parallell structure to the Knaben II - open anticlinal in the gneiss-horizon (Pedersen 1982). Expecting a plunge of the orebody $10-15^\circ\text{S}$ a gangfjell orebody should be looked for SSE of Grunnevannsknoten.

Recommendation

- A. It is recommended to drill three drillhole north of DH7 (west of Smalevann) in order to locate a possible orebody of the Knaben II type.
- B. Further it is recommended to drill a single hole SE of the Kvina. The reason for this proposal is to follow the continuation the bleached granite zone observed by mapping and intersected by DH1 and DH2.

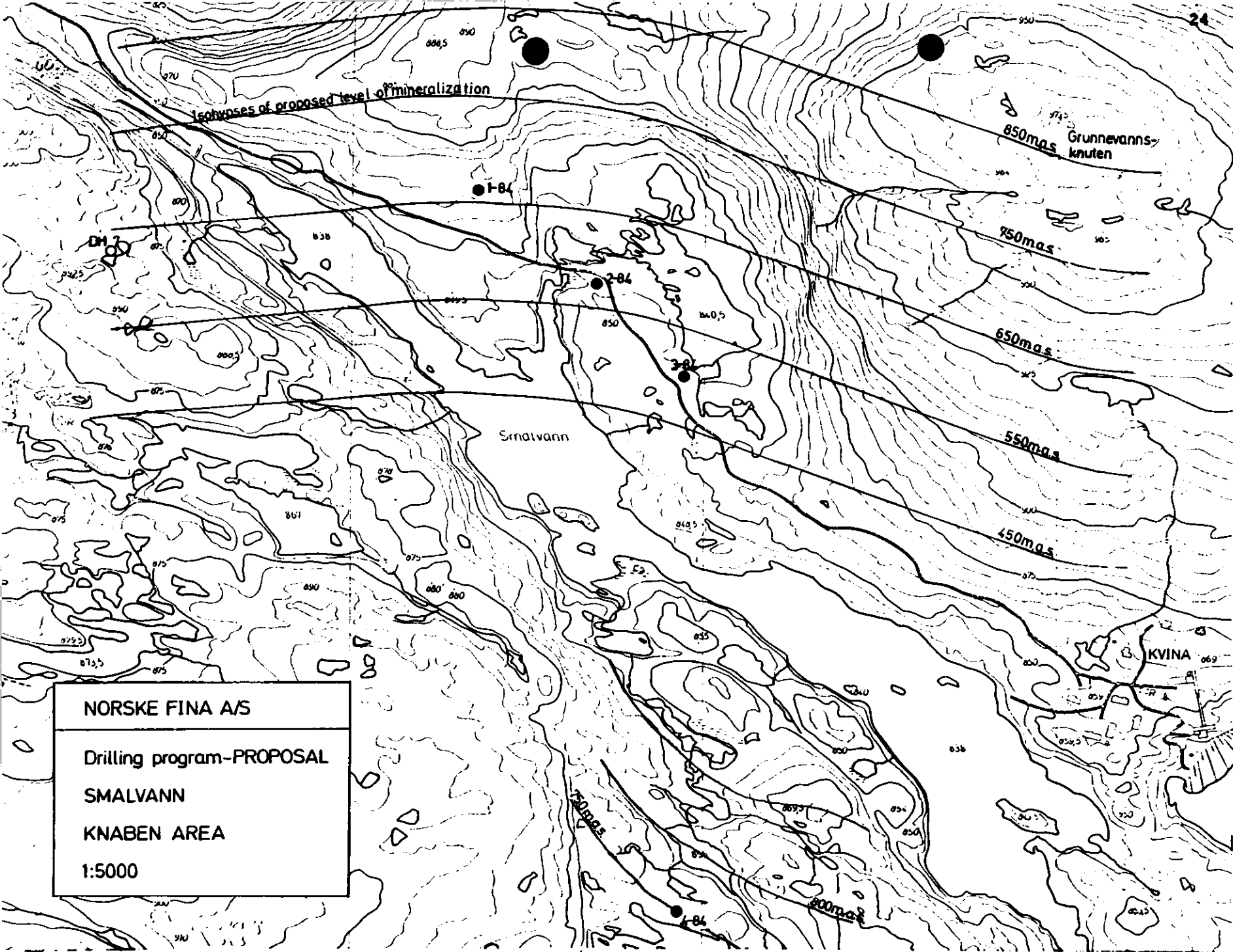
Proposed drilling program (Map next page)

Hole No. 1 shall be drilled to identify the position of the alteration zone. The position of hole No. 2 and 3, and a possible continuation of the program of the Sandtjern/Grunnevannsknuten structural level, has to be consecutive evaluated.

If the result of hole No. 1-3 are considered negative it is proposed to investigate the eastern zone of bleached red granite. The position of hole No. 4 is 100 m to east and between DH2 and DH4.

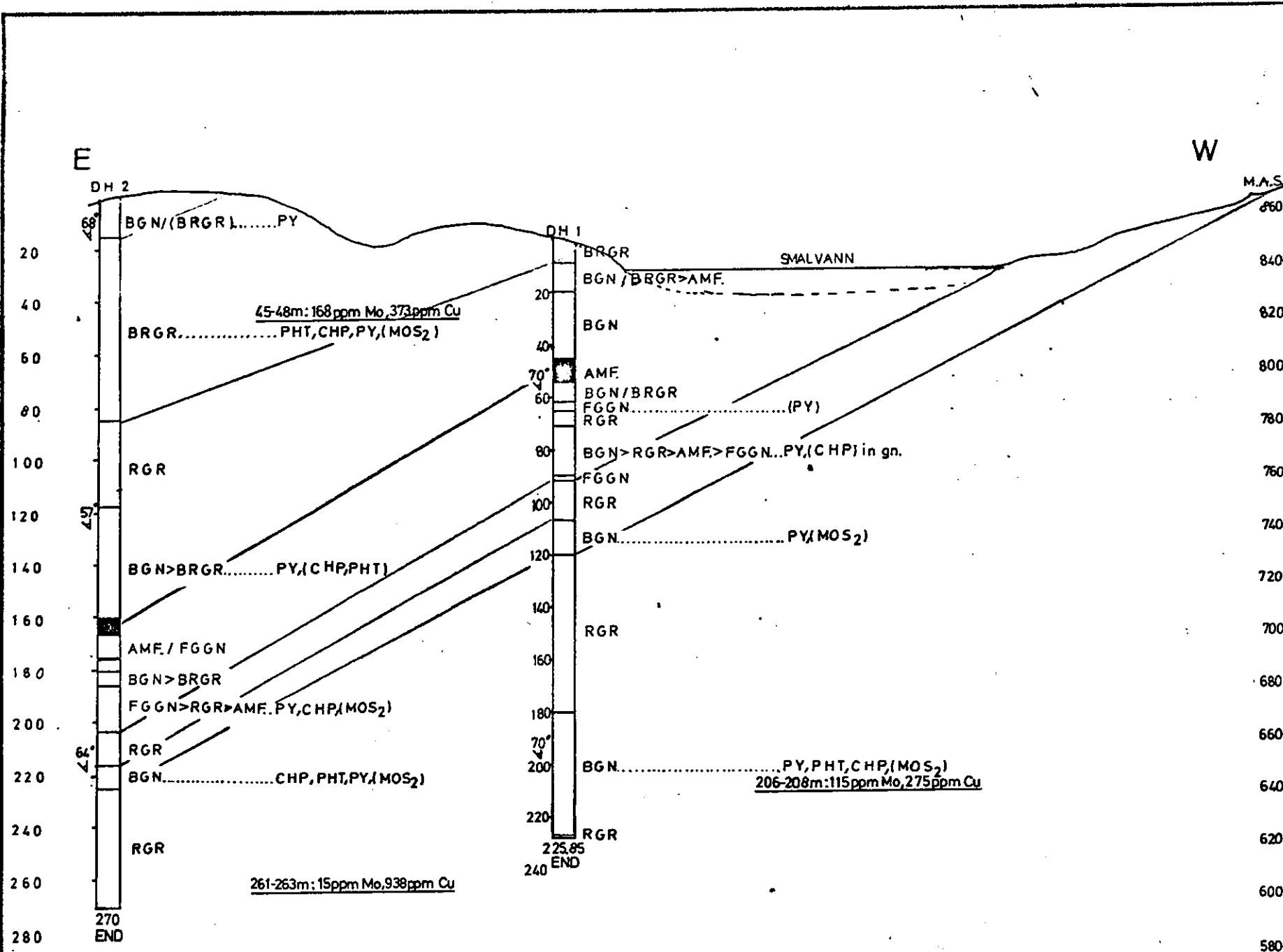
Locality	Hole No.	Strike/dip	Length of hole	Expected depth of mineralization
Smalvann W	1-84	-/90	300 m	200 m
"	2-84	-/90	250(+100?)m	250 m
"	3-84	-/90	400 m	340 m
Smalvann E	4-84	-/90	<u>200 m</u>	110 m
			<u>1150(+100?)m</u>	

Drillhole No. 2 is placed on the same site as drillhole No. 3-1966. This hole should be reopened and extended if possible. Present depth is 98,8 m.

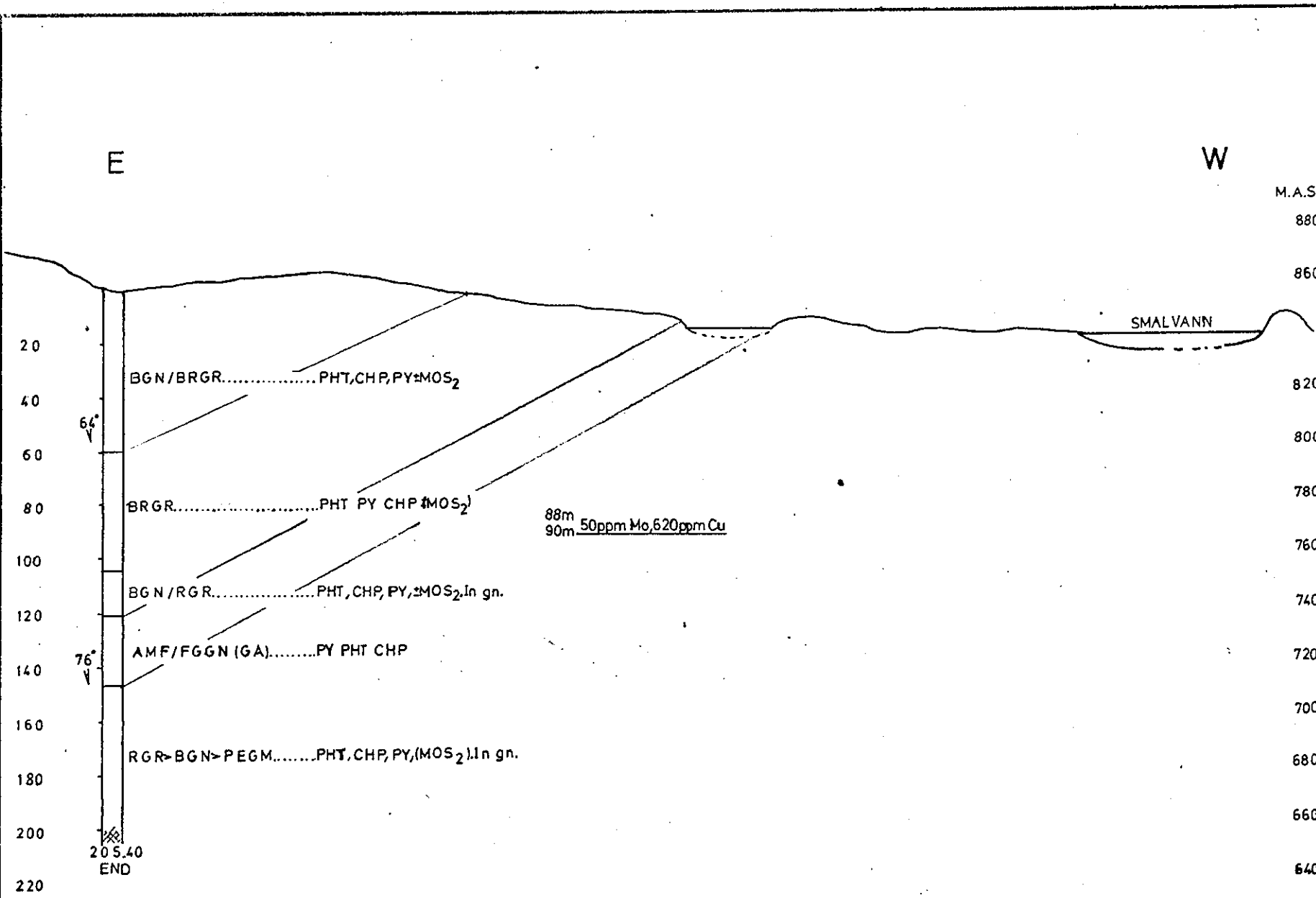


References

- Bugge A: Norges molybdenforekomster. Norges Geologiske Undersøkelse. No. 217 (1963).
- Gvein Ø: Field report, Knaben area. A/S Sydvaranger (1981).
- Lindal I: Knabeheiene molybdenfelt. En undersøkelse av Statens bergrettigheter. NGU rapport nr. 1650/52A (1978).
- Pedersen J: Field report, Knaben area. Joint Venture - Folldal Verk A/S Norske Fina A/S (1982).



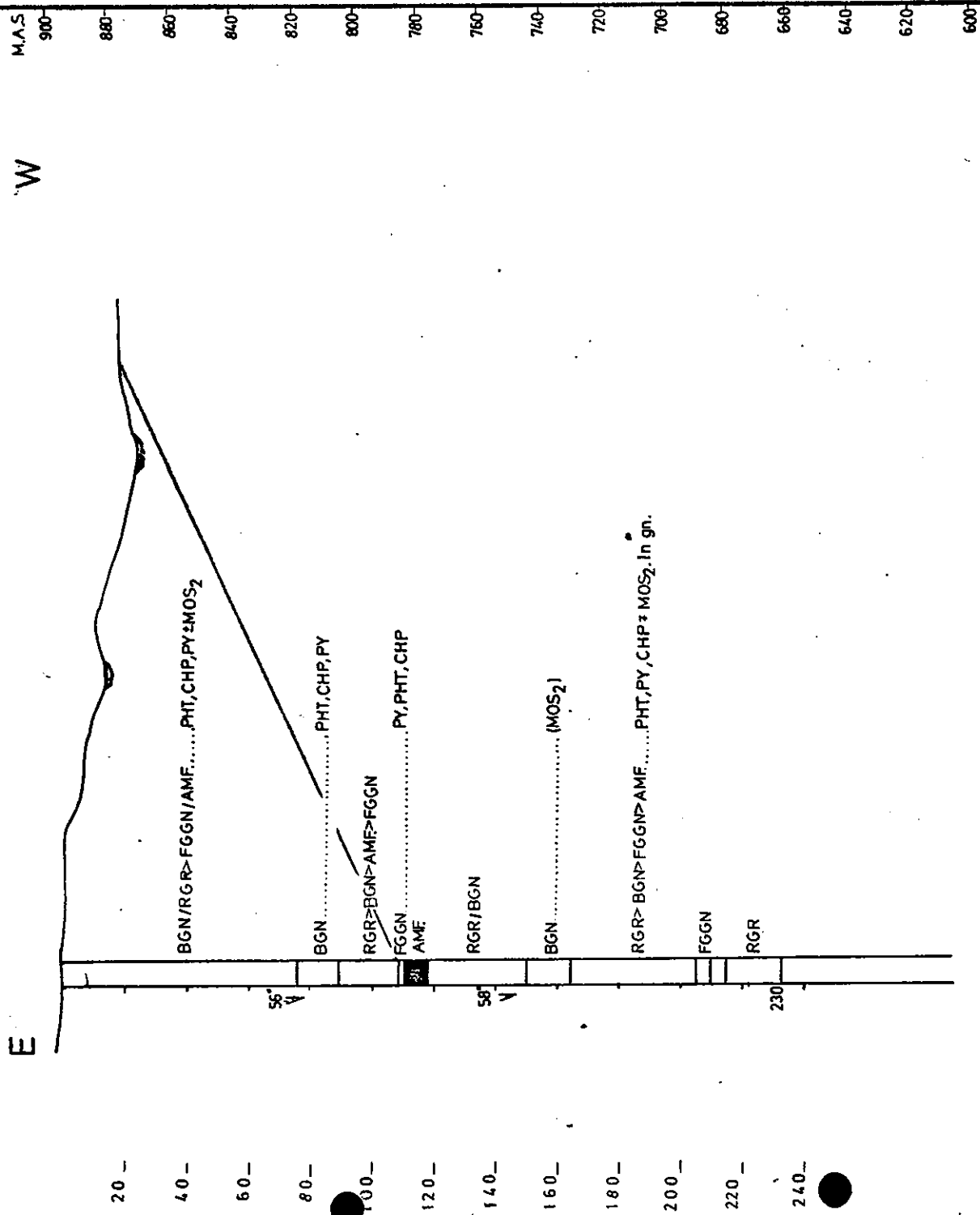
Målestokk	Tegn.	Trac.	Klr.
1:2000			
Erstatning for:			
JOINT VENTURE			
FOLLDAL VERK A.S.			
NORSKE FINA A.S.			
Erstattet av:			
CROSS SECTION DH 1,2			
KNABEN I-KVINA			
KNABEN AREA			



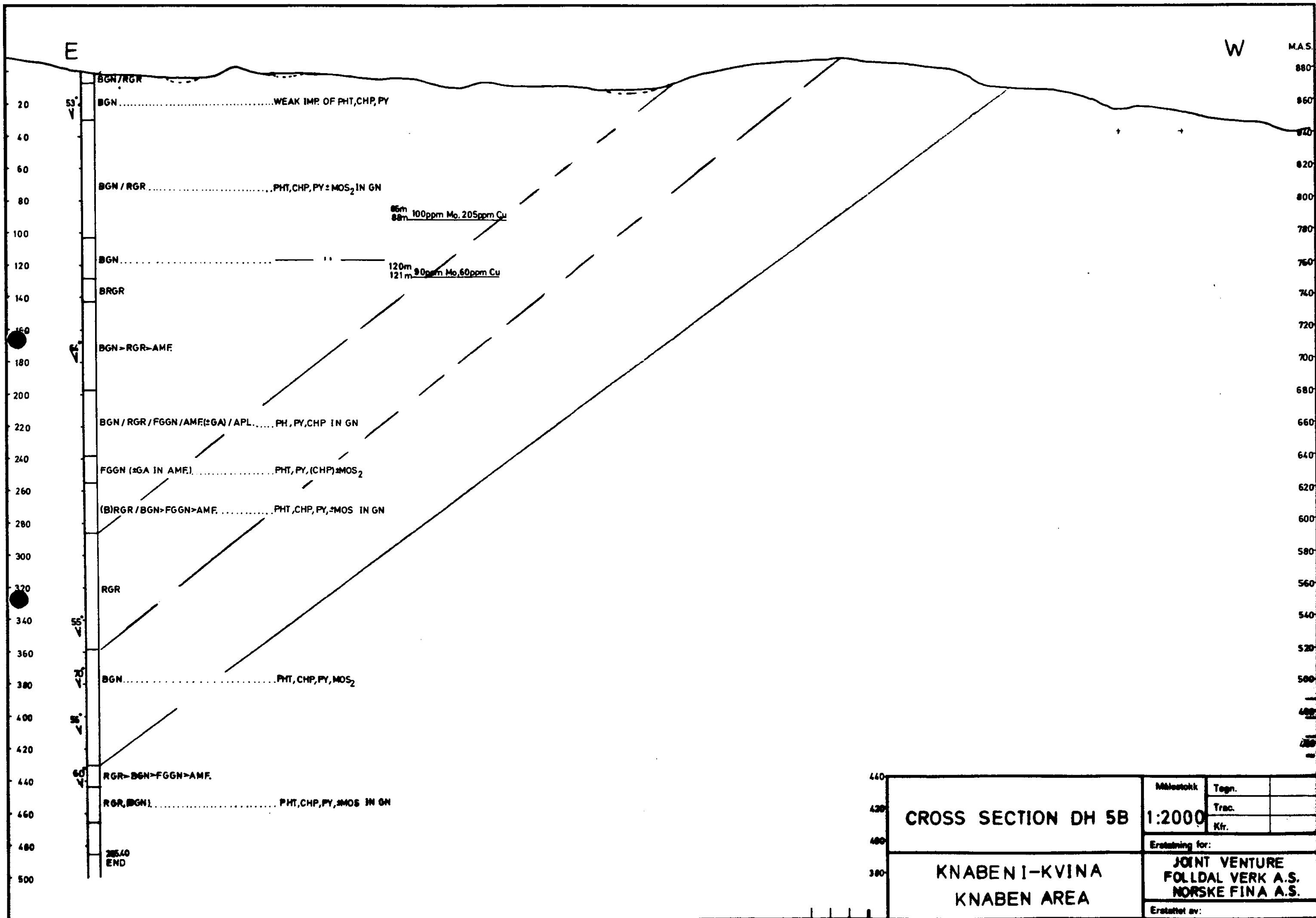
Målestokk	Tegn.	
	Trac.	
1:2000		Kfr.
Erstatning for:		
JOINT VENTURE FOLLDAL VERK A.S. NORSKE FINA A.S.		
Erstattet av:		

CROSS SECTION DH 4

KNABEN I-KVINA
KNABEN AREA



CROSS SECTION DH 5	Målestokk		Tegn.	
	1:2000		Trac.	
			Kfr.	
Erstatning for:				
JOINT VENTURE				
FOLLDAL VERK A.S.				
NORSKE FINA A.S.				
Erstattet av:				
KNABEN I-KVINA				
KNABEN AREA				



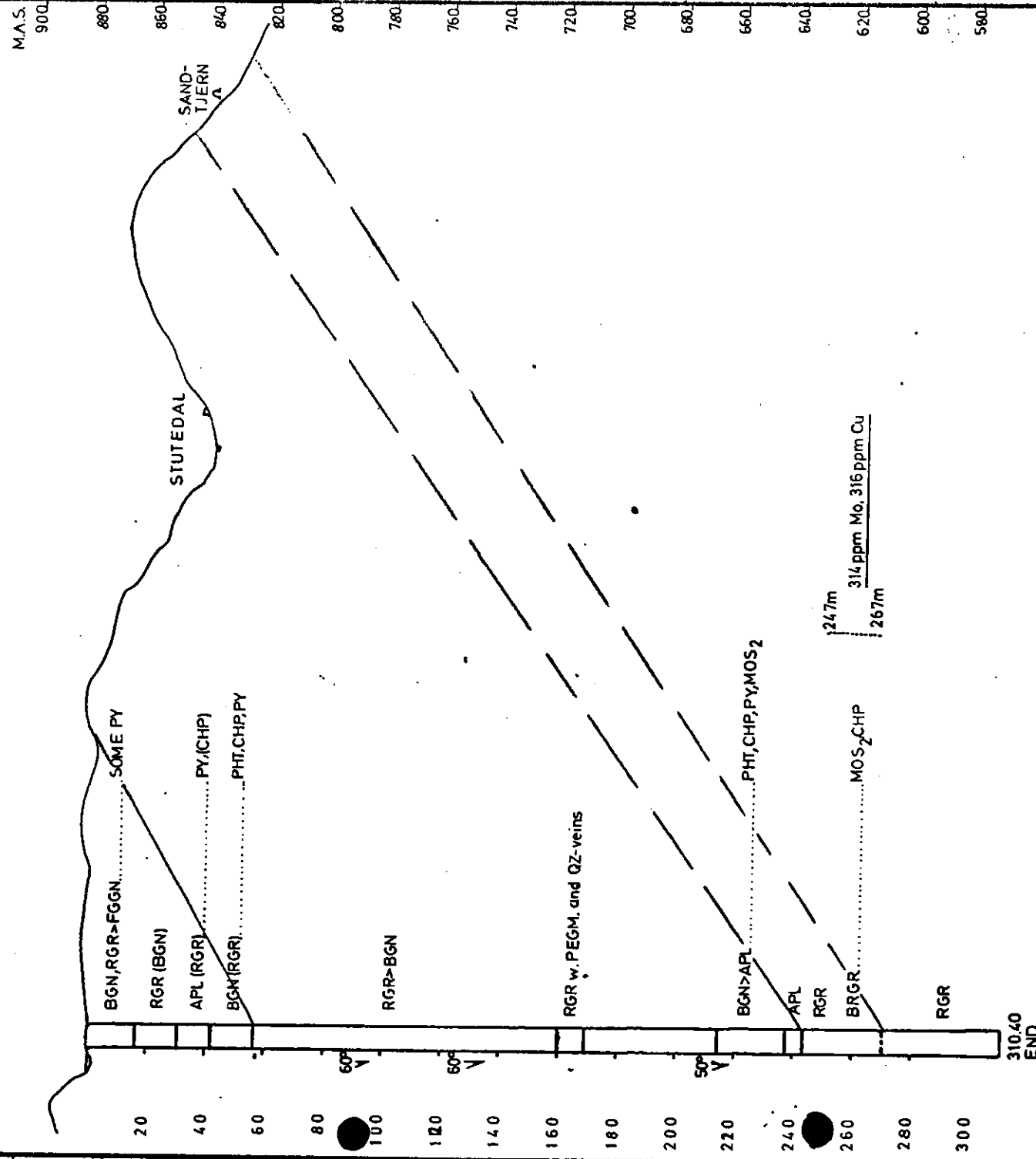
CROSS SECTION DH 5B

Målestokk	Tegn.	
	Trac.	
	Kfr.	
Ersattning for:		
JOINT VENTURE FOLLDAL VERK A.S. NORSKE FINA A.S.		
Ersattning av:		

PROFILE N70W FROM DH7

E

W



CROSS SECTION DH 7

KNABEN I-KVINA
KNABEN AREA

Målestokk	Tegn.	Trac.	Kfr.
1:2000			
Erstating for:			
JOINT VENTURE FOLLDAL VERK A.S. NORSKE FINA A.S.			
Erstattet av:			

CORE
LOG
DH1

ANALYSIS OF SAMPLES

Samplenames are constructed this way:247-248-7,first number is from m depth in hole.Second number is to m depth in hole.Last number is name of drillhole.

Sample name	Mo ppm	Cu ppm	Mo/Cu
247-248-7	90	160	0.56
248-249-7	400	150	2.67
249-250-7	90	250	0.36
250-251-7	760	330	2.30
251-252-7	130	260	0.50
252-253-7	1100	310	3.55
253-254-7	50	540	0.09
254-255-7	100	1100	0.09
255-256-7	5	210	0.02
256-257-7	<5	25	-
257-258-7	<5	25	--
258-259-7	780	150	5.20
259-260-7	45	50	0.90
260-261-7	260	100	2.60
261-262-7	1000	140	7.14
262-263-7	190	120	1.58
263-264-7	290	1500	0.19
264-265-7	380	510	0.75
265-266-7	410	180	2.28
266-267-7	200	200	1.00
Average	314	316	1.01
86- 87-5B	50	230	0.22
87- 88-5B	150	140	1.07
120-121-5B	90	60	1.50
88- 89-4	60	670	0.09
89- 90-4	40	570	0.07
261-262-2	30	1800	0.02
262-263-2	<5	75	-
45- 46-2	310	600	0.52
46- 47-2	5	250	0.02
47- 48-2	190	270	0.70
206-207-1	130	330	0.39
207-208-1	100	220	0.45
83- 84-7	200	550	0.36

LEGEND



RGR-RED GRANITE



BRGR-BLEACHED RED GRANITE



BGN-BANDED GNEISS



FGGN-FINEGRAINED GNEISS



Amf.-AMFIBOLITE



Pegm.-PEGMATITE



Qz.-vein

KVINA GRUVER.

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

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

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
↑ 1m					
		Weak green chlo.	Py. (chp)		
			u		
			Sprad frac. w. py.		
3	BRGR				
	Amf.				
3					
	Amf. BGN	Amf. partly alt. to gl			
3	BRGR w. Amf.				
600 3	BGN Apl.				
	BRGR				
	BGN				

DATO: 1-7-83

sign

JIT-83

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

KASSER NR.: 2,3,4

FRA 15 m TIL 30 m

DATA: 1-7-83

JIT-83

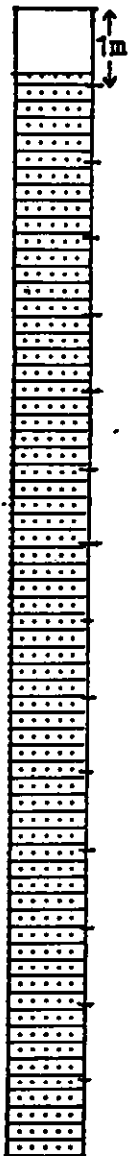
KVINA GRUVER.

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

HULL NR.: 1

KASSER NR.: 4.5.

FRA 30 m TIL 45 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BRGR		Spread py in dark bands		4/1
	Green colo,	Py(chp) in the dark bands of the GN.		
BGN				5/1

DATO: 1-7-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 1KASSER NR.: 5,6,7FRA 45 m TIL 60 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN				5/1
Amf.				
BRGR		Py.(chp) in dark bands.		
Amf.	Partly alt. to glimmer.			6/1
	Frac. w. chl.			
BGN				
BRGR				7/1
BGN				

DATO: 1-7-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 1KASSER NR.: 7.8FRA 60 m TIL 75 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
3 ↑ 1m ↓	BRGR				
690	EGGN		Conc. py		
	RGR		Grains of py diss. in rock.		
700	BGN		Py in dark bans of GN		
	Amf. RGR				
	Dark grey GN				

DATO: 8-7-83si n

JIT-83

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

KASSER NR.: 8,9,10

FRA 75 m TIL 90 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
Garnet-amf.				8/1
Grey GN w.amfibolte.				
BGN	Brecciated	Weak imp of MoS ₂ , chp. MoS ₂ in 5mm disc. qz-v.		9/1
RGR				
BGN	20cm zone green colo.	Py in dark bands of GN		
(B)RGR w. qz-veins				
Conc. amf. w. disc.apl.				
FGGN	Red alt. fsp.			
RGR				
BGN				
RGR				10/1
EGGN		Py in dark bands.		

DATA: 8-7-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 1KASSER NR.: 10.11FRA 90 m TIL 105 m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
FGGN		Some py in dark bands.		10/1
RGR				11/1
BGN				11/1
Inhomog. RGR.				11/1

DATO: 8-7-83

JIT-83

si

KVINA GRUVER.

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

HULL NR.: 1KASSER NR.: 11.12.13FRA 105m TIL 120 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
Inhomog. RGR	10cm amf. alt. to glim.	5cm conc.qz-vein w. MoS ₂		11/1
BGN	Brecciated, ep.-alt.	Py in dark bands of GN		12/1
	Ep.-alt.	Diss. grains of MoS ₂		
		Py, (chp) in thin conc. veins.		13/1

DATO: 6-7-83

sin

JIT-83

KVINA GRUVER.

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

HULL NR.: 1

KASSER NR.: 13.14

FRA 120 m TIL 135m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				13/1
	Red alt. fsp.			
FGGN	"			
	"			
	"			
RGR				14/1
	Fracture zone chl., ep.			
	Close to vertical frac.			

DATO: 6-7-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 1

KASSER NR.: 14.15.16

FRA 135 m TIL 150 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
↑ 1m ↓					14/1
		Close to vert. Fractures			
					15/1
	RGR		Weak py min. in fract.		
					16/1

DATO: 18-7-83

JIT-83

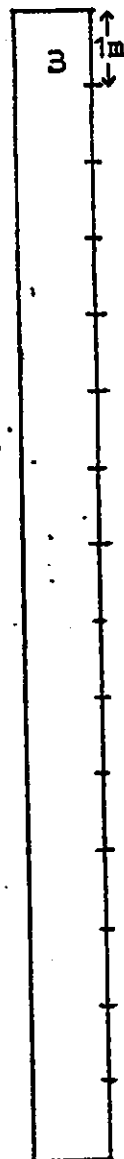
KVINA GRUVER.

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

HULL NR.: 1

KASSER NR.: 16.17

FRA 150 m TIL 165m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BRGR				16/1
	Fractured (yong)	Py in frac.		
RGR	-----"			17/1
	Close to vert. frac. (yong)			
	Fractured (yong)			

DATO: 18-7-83

si n

JIT-83

KVINA GRUVER.

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

HULL NR.: 1

KASSER NR.: 17.18.19

FRA 165 m TIL 180 m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
.RGR	Vertical frac.			17/1
				18/1
	Ep. alt.			
RGR				
				19/1
	Red alt fsp.			19/1
	Ep. alt.			

DATO: 18-7-83

si n

JIT-83

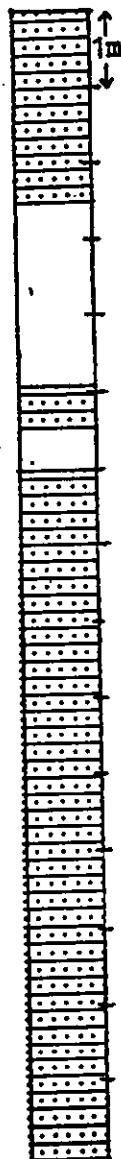
KVINA GRUVER.

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

HULL NR.: 1

KASSER NR.: 19.20

FRA 180 m TIL 195 m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
Alt. GN(?)	EP.-alt. chl.			19/1
RGR				
Grey GN w. fsp. blast. RGR				
		Traces of py, chp, pht, some grains of MoS ₂		20/1
BGN				
	Weak green colo.			

DATO: 31-7-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 1KASSER NR.: 20.21.22FRA 195 m TIL 210m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	BGN		Traces of MoS ₂ , py, chp		20/1
		Yong fract.			
	Pegm.		Grains of MoS ₂ , py in upper part of pegm.		
	BGN				2171
	Amf.	Partly alt. to glimmer.			
			Py, some MoS ₂ in cm, conc bands in GN. (py, pht.)	ppm Mo ppm Cu	
				130 330	
				100 220	
				$\bar{x}$: 115 275	22/1
		yong frac.			

DATO: 31-7-83

JIT-83

si.

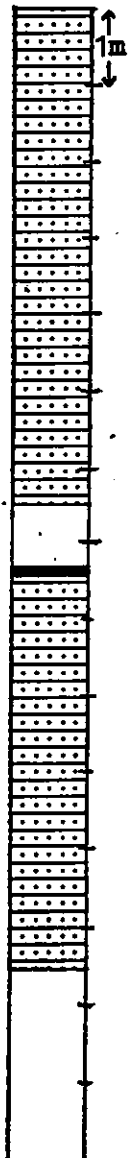
KVINA GRUVER.

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

HULL NR.: 1

KASSER NR.: 22.23

FRA 210 m TIL 225 m (225,85)



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				22/1
	Old breccia			
BGN				
				23/1
RGR				
Amf.cm qz on each side.				
BGN				
(B)RGR				

225,85
END

DATO: 31-7-83

JIT-83

si

CORE
LOG
DH 2

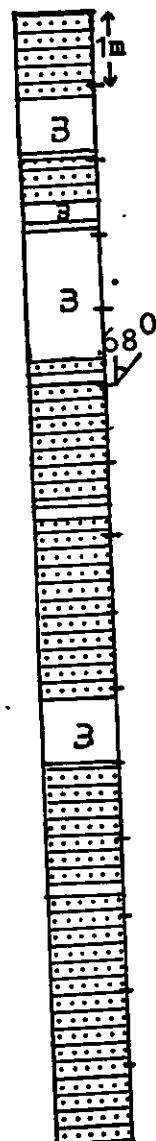
KVINA GRUVER.

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

HULL NR.: 2

KASSER NR.: 1,2

FRA 0 m TIL 15 m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN	Fractures w. py	Some py, chp.		1/2
BRGR - Qz-vein		Qz w. py, chp. Traces of MoS ₂ , mm big grains.		
BRGR		Py in GN dark bands.		
BGN RGR		-----"		
BGN BRGR	Close to vert. frac. w. rust.			2/2
BGN	-----"			
BRGR	Fract. w. rust.			
BGN				
RGR	Weak green colour Frac w. rust.	Some py in dark bands of GN		
BGN	-----"			

DATO: 24-7-83

sign

JIT-83

KVINA GRUVER.

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

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

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
↑ 1m ↓	BGN				
	RGR	5cm green colour	py.grain of MoS ₂ .		2/2
		10cm--"--	py.pht, chp.		
3	BRGR				
	BGN	Frac. w. rust	Py in frac.		
	BRGR	"	"		
	BGN		"		
3	(B)RGR	50cm green colo.			
3	5cm amf	amf. partly alt. to gl.			
	qz-vein		Qz w. py chp.		
	BRGR	green colo. BRGR	Py, chp		3/2
	Amf.	Partly alt. to glimmer.	Py, chp.		
3	(B)RGR		Weak min. of py, (chp).		

DATO: 24-7-83

JIT-83

si n

KVINA GRUVER.

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

HULL NR.: 2KASSER NR.: 4.5FRA 30 m TIL 45 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
3		Weak green colour.			4/2
			Traces of MoS_2 , also py chp, pht in concordant bands 1-5cm. Py also as more diss. grains		
	BRGR		cm concordant zone w. mm grains of MoS_2		
	Grey apl.				
3	BRGR	Green colo. in 15-20cm zones.	Traces of MoS_2		5/2
			"		
			"		
			"		

DATO: 24-7-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 2KASSER NR.: 5.6FRA 45 m TIL 60 m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE		KASSE
			ppm Mo	ppm Cu	
		Traces of MoS_2 , also weak min. of pht, py, chp	310	600	5/2
		MoS_2	5	250	
			190	270	
		MoS_2	$\bar{x}$: 168	373	
		MoS_2 on border of qz - vein.			
BRGR	Green colour of rock.				6/2
		Grain of MoS_2			
		MoS_2 in cm amf.-band.			
		Grains of MoS_2			
		--"--			
		--"--			
		--"--			

DATO: 24-7-83

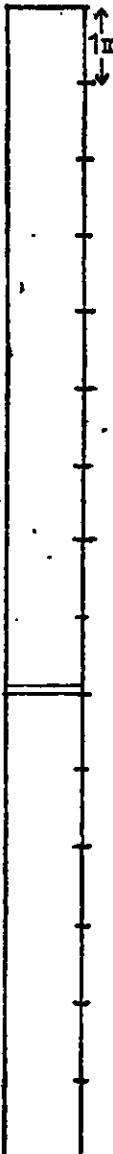
JIT-83

sign

KVINA GRUVER.

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

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

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	Ep.-alt..10-15cm qz-veins w. py, chp.	Py, chp, traces of MoS ₂ Some pht.		7/2
	Ep.-alt.	Traces of MoS ₂		
BRGR				8/2
10cm qz-vein.	Old breccia	Chp, py in qz-vein. Traces of MoS ₂		
	Old breccia	Traces of MoS ₂ in frac. of breccia.		
		Py chp imp. in rock		

DATO: 24-7-83

JIT-83

si.

KVINA GRUVER.

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

HULL NR.: 2KASSER NR.: 8,9FRA 75 m TIL 90m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BRGR	Weak green colo.	Py, chp imp. in rock. Py in frac.		8/2
Grey GN(?) w. fsp. blst No clear banding.		Traces of MoS ₂ , py, chp in old frac.		9/2
Qz-rich vein	Green colo.	Py, chp, traces of MoS ₂		
FGGN, dark grey.				
RGR				
Inhomogen. RGR				

DATO: 24-7-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 2

KASSER NR.: 10,11

FRA 90 m TIL 105m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	Red alt. fsp.			10/2
	Crushed zone ep., chl.			
	Red, alt. fsp.			
RGR				11/2

DATO: 26-7-83

JIT-83

sign

KVINA GRUVER.

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

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

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				11/2
RGR				12/2
3cm qz-vein, conc.		Py, chp, 2mm grains of MoS ₂ on border of qz.		
RGR				
FGGN	Green colo.			
RGR BGN	Red alt. fsp.			
RGR BGN		Py, (chp), grain of MoS ₂ in 5mm dark band.		

DATO: 27-7-83

JIT-83

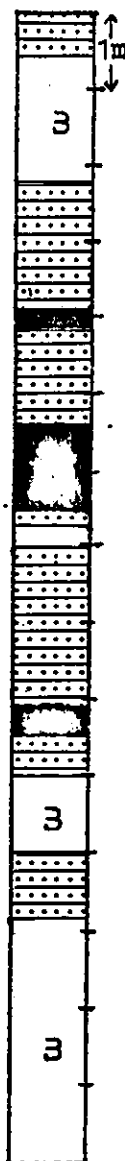
KVINA GRUVER.

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

HULL NR.: 2

KASSER NR.: 13.14

FRA 120 m TIL 135m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN				13/2
BRGR				
BGN				
Amf.				
BGN				
Amf.				
BGN				
BRGR				
BGN				
				14/2
Amf.				
BGN				
BRGR				
BGN				
BRGR				

DATO: 26-7-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 2KASSER NR.: 14.15FRA 135 m TIL 150 m

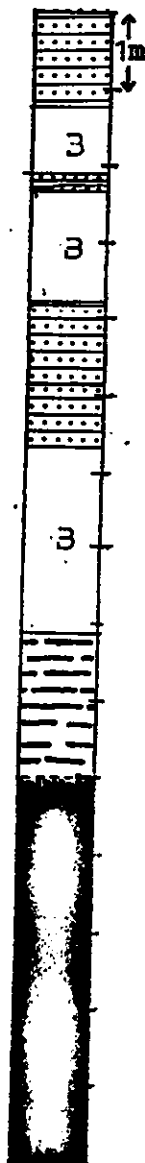
	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
1m					
	BGN		Pht, py, (chp)		
			-----"		14/2
620	BRGR				
3	BGN		Py, (chp) in dark bands og the GN		
3	BRGR		"		
3	BGN				
3	BRGR		Py, (chp) in dark band		
			Py, chp		
	BGN				15/2
			Chp. pht (py in dark bands)		
3	BRGR				
	BGN				

DATO:

JIT-83

KVINA GRUVER.

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

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

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN				16/2
BRGR		py, pht chp in cm bands in GN		
10cm conc. apl.				
BGN				
Dark grey GN w. fsp. bl.		Imp. py.		
BRGR				
Dark (amfibolitic) GN w. eyes of qz, fsp.				
				17/2
Amf.				

DATO: 1-8-83sign:

JIT-83

KVINA GRUVER.

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

HULL NR.: 2

KASSER NR.: 17,18

FRA 165m TIL 180 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				17/2
Mixing w. bands of FGGN and amf..Both rocks partly w. garnet.				
				18/2
Amf.				
FGGN w. bands of amf. both rocks partly w. ga.				
BGN				

DATO: 1-8-83

JIT-83

si n

KVINA GRUVER.

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

HULL NR.: 2KASSER NR.: 19,20FRA 180 m TIL 195m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	BGN		Pht, chp.		19/2
3	BRGR				
	BGN				
3	BRGR				
	FGGN		Chp, (py). Chp in mm frac. 12° and conc. 68° V.		
3	BRGR				
3	Amf. BRGR	Partly alt to glimmerit	Py, chp, grain of MoS ₂ ---"--- grains of MoS ₂		
	RGR		Py, chp in bands and frac.		20/2
	FGGN		Py in frac.		
	RGR				
	FGGN				
	Amf.				

DATO: 1-8-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 2KASSER NR.: 20,21FRA 195m TIL 210m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
1m	Amf.				
	FGGN				
	RGR				
640	FGGN		Weak imp. of py, chp conc. in FGGN:		20/2
	RGR				
	FGGN				
	RGR				
	FGGN				
	Amf.				
	RGR				
	Amf./FGGN.				
	RGR				
	Amf.				21/2
	RGR				

DATO: 2-8-83si n

JIT-83

KVINA GRUVER.

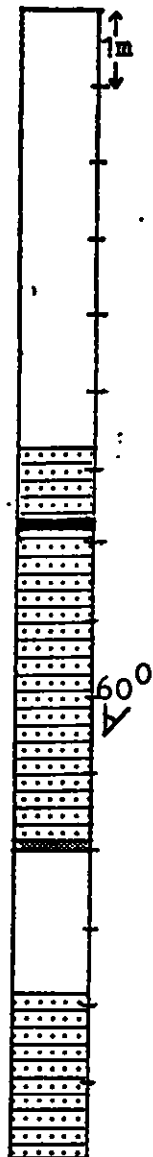
JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 2

KASSER NR.: 22.23

FRA 210m TIL 225 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				22/2
RGR				
BGN Amf.		MoS ₂ in cm disc. qz-ve.		23/2
		Weak imp. of pht.py.chr		
BGN				
Dark apl.				
RGR				
				23/2
BGN				



DATO: 3-8-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 2

KASSER NR.: 23, 24

FRA 225m TIL 240m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN		Py, chp, grain of MoS ₂ .		23/2
		Py, chp.		
FGGN				
RGR				
FGGN				
		Chp, py in amf. band.		24/2
RGR				
FGGN				
Amf.				
RGR				

DATO: 4-8-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 2

KASSER NR.: 25,26

FRA 240m TIL 255 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				25/2
RGR				
				26/2

DATO: 5-8-83

sign

JIT-83

KVINA GRUVER.

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

HULL NR.: 2KASSER NR.: 26,27FRA 255 m TIL 270 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				26/2
RGR				
				27/2
Amf.	Partly alt. to glimmer.		ppm Mo ppm Cu 30 1800	
			-5 75	
Amf.	-----"		$\bar{x}$: 13 938	
RGR				

DATO: 9-8-83

JIT-83

sign

CORE
LOG
DH 4

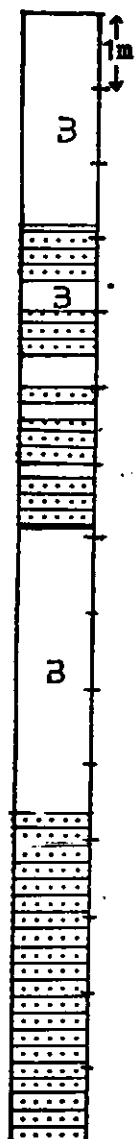
KVINA GRUVER.

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

HULL NR.: 4

KASSER NR.: 1,2

FRA 0 m TIL 15m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	BRGR				
	BGN				
	BRGR BGN		.MoS ₂ cm band w. pht, chp, py.		1/4
	BRGR				
	BGN				1/4

DATO: 11-8-83

JIT-83

KVINA GRUVER.

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

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

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
1m	BGN		Weak imp. of py (chp)		2/4
3	BRGR				
	BGN		-----"		3/4
	BRGR	Close to vertical fractures w. rust.	Py in fractures.		
3	Amf.				
	Amf.				
3					
	BGN				3/4
3	BRGR				
	Amf.	Partly alt to glimmeri	Chp, py, pht in cm. band in amf consisting of mm thick veins.		

DATO: 11-8-83sign

JIT-83

KVINA GRUVER.

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

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

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	Amf. partly alt. to glimmerite.		Py, chp.		4/4
	BRGR		Chp, pht.		
	BGN				
	BRGR				
	10cm. disc(?) qz-vein.		Pht, chp, py 2mm grains of MoS ₂		
	Amf./glimmeite.				
B	(B)RGR		: Small grains of MoS ₂ : Imp. of Py, chp pht. :		
B	BGN BRGR				
	BGN				5/4
6	BRGR				
	BGN		Py, chp, (pht)		
6	BRGR		MoS ₂ py, chp in 2cm disc qz.		

DATO: 12-8-83

JIT-83

sign

KVINA GRUVER.

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

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

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
↑ 1m	Amf.	Alt. to glimmerite			
	BGN				
3	BRGR				
	Amf.				
	BGN				
3	BRGR				
	BGN				
3	BRGR				
	BGN				
3	BRGR				
	BGN				
3	BRGR				
64°	BGN		Qz-vein w. chp, py		
			Weak imp. pht, chp, py in BGN		
3	BRGR		Chp, MoS ₂ in old brecc.		
	FGGN				
3	BRGR				

DATO: 12-8-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 4

KASSER NR.: 7,8

FRA 60 m TIL 75 m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
↑ ↓ 1m 3		Green coloured	Py, chp, grains of MoS ₂		7/4
		Ep.-alt.	Qz-vein w. py, chp, pht		
			Pht, chp in BRGR		
			Qz-vein w. py, MoS ₂		
	BRGR				8/4

DATO: 13-8-83

JIT-83

si n

KVINA GRUVER.

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

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

BERGARTSTYPE		OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
3	1m	Green colour.	Py.		8/4
		BRGR			
		Fract. w. red alt colo. on fsp.			
			Py, pht, (chp).		
3			Py, chp, on limit of cm qz-vein.		9/4
		Weak green colour.	Py, chp, grains of MoS ₂ .		
			Chp, py diss. in rock, 15 cm.		
3		Medium grained BRGR.			
		4cm zone w. green colo.	Pht, py, chp, MoS ₂ Chp in fract.		
			Chp, pht diss. in rock. Grains of MoS ₂ .		
			cm bands w. pht, chp ⁺ MoS ₂ , not alt.	ppm Mo ppm Cu	
		Green colo. in 5cm zon	Py, chp, pht, grains of MoS ₂ .	60 670	
				40 570	

DATO: 11-8-83

JIT-83

KVINA GRUVER.

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

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

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
Medium grained, grey BRGR		Weak spread imp. of pht, chp, (py).		10/4
EGGN		Pht, py, chp, few grains of MoS ₂ . Py in yong frac.		
BRGR Pegm.	Weak green colour.	Pht, py, chp in qz-rich bands, grain of MoS ₂ .		
RGR		Pht, py, chp in thin band of BGN. Pht, py chp in old frac.		11/4
BGN				

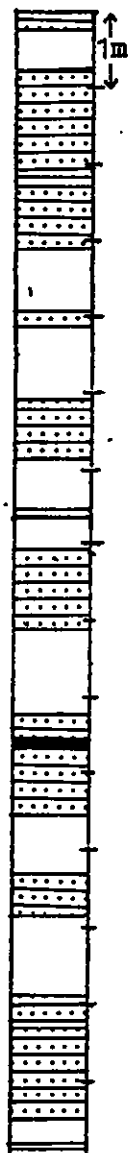
DATO: 11-8-83

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sign

KVINA GRUVER.

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

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

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
		Py, chp, MoS ₂ in qz in BGN		11/4
		Chp, py, pht, grains of MoS ₂ on border of qz-ve.		
		Spréd py, chp pht, in dark bands of the GN.		
Highly mixed zone w. BGN/RGR.				12/4
Amf.	Alt. to glimmerite.	Chp in amf.		
	Green colo. in 2cm zone	Py, pht, chp.		
		3cm qz-vein w. chp, pht py.		
15cm qz-vein		MoS ₂ , chp, py on border of qz-vein.		
EGGN		Pht, chp, py in dark bands of BGN.		

DATO: 17-8-83

JIT-83

sign

KVINA GRUVER.

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

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

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
		: Spread miner. of pht : chp, py, some gra. of Mo : All sulfides in qz-ve- : in.		13/4
	Weak green colour			
FGGN		Weak imp. of pht, chp, py also in cm thick bands in FGGN.		
	-----"			
RGR				
FGGN w. garnet.	-----"			
Amf.	Alt. to glimmer. in ba- nds.			
FGGN				
FGGN w. pieces of amf.				
				14/4
Amf.				

DATO: 17-8-83

JIT-83

si.n

KVINA GRUVER.

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

HULL NR.: 4KASSER NR.: 14.15FRA 135 m TIL 150 m


BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
Amf.				14/4
FGGN		Pht,py,chnp conc. imp. in FGGN		
		Pht,py,chnp,mainly py imp. in FGGN.		15/4
Amf.	Alt. to glimmerite in bands.			
RGR				
Mixed RGR, FGGN, amf.				
RGR				

DATO: 17-8-83

JIT-83

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

KASSER NR.: 16,17

FRA 150m TIL 165 m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				
Amf.				
				16/4
BGN				
Amf.				
BGN				
RGR				
Finegrained grey GN w. fsp. blast.				
RGR				
				17/4
BGN				
Apf.		Pht, chp, py grain of MoS ₂ in BGN.		

sign

JIT-83

KVINA GRUVER.

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

HULL NR.: 4

KASSER NR.: 17,18

FRA 165m TIL 180m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
↑ 164 ↓	BGN		Py, pht, chp, mainly py.		
			Chp in mm frac. 22 ⁰ .		
XXXX	Pegm.				17/4

DATO: 17-8-83

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JIT-83

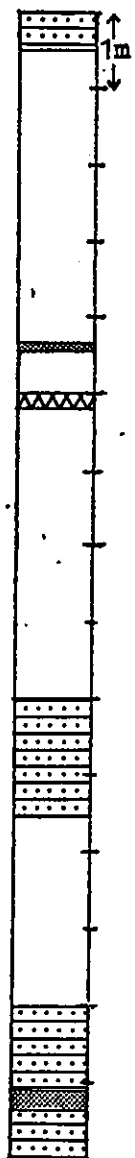
KVINA GRUVER.

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

HULL NR.: 4

KASSER NR.: 19,20

FRA 180 m TIL 195 m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN				19/4
BGR				
FGGN				
Pegmatite				
BGR				20/4
BGN	Weak green colour.	Py, chp, pht in the dark bands of the GN.		
Fract. rock w. qz-veins, fsp blast. Probably a granite.				20/4
BGN				
Grey apl.				

DATO: 18-8-83

JIT-83

sign

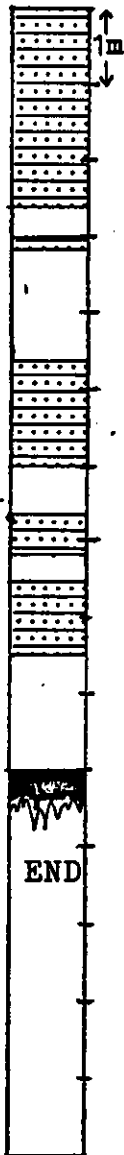
KVINA GRUVER.

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

HULL NR.: 4

KASSER NR.: 20.21

FRA 195m TIL 210 m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN				20/4
RGR				
BGN				
RGR				
BGN				21/4
RGR				
BGN				
RGR				
BGN				
RGR				
Alt. amf.				

DATO: 18-8-83

sign

JIT-83

CORE
LOG
DH5

KVINA GRUVER.

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

HULL NR.: 5

KASSER NR.: 1,2

FRA 0 m TIL 15 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
1m	BGN				
	Qz-vein		MoS ₂ at lower limit of Qz-vein.		
	BGN		MoS ₂		
	BRGR				
	BGN				
	BRGR				
	BGN				
	BRGR				
	BGN				
	BRGR				
	BGN				
	BRGR				
	BGN				
	BRGR				
	BGN				
	BRGR				
	BGN				
	BRGR				
	BGN				
	BGN				

DATO: 22-8-83

si

JIT-83

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

FRA 15 m TIL 30m

JIT-83

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

FRA 30m TIL 45m

JIT-83

KVINA GRUVER.

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

HULL NR.: 5KASSER NR.: 5.6FRA 45m TIL 60 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				5/5
Amf.				
BGN				
RGR				
BGN RGR				
BGN				6/5
RGR				
Disc. 10cm grey aplite.				
BGN	Greenish colour.			
RGR				
Pegmatite				
Dark grey GN w, fsp bl.				
BRGR				
Dark gr. GN w. fsp, bl.		Pht, py chp imp. Grains MoS ₂ in dark GN.		
RGR				
BGN	Weak green colour. Thin amf. in GN partly alt. to glimmerite.	Some py impr..		
RGR				
BGN	Greenish colour.	Some py impr.		

DATO: 23-8-83

JIT-83

KVINA GRUVER.

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

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

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	Red-grey aplite-granite				7/5
	BGN				
	RGR				
	BGN				
	RGR				
	BGN				
	Amf.	Weak, green colour on rock	MoS ₂ (chp,) in glimmerite-Qz.-bands between BGN and BRGR		8/5
	Aplite-granite				
	Glimmerite w. qz.-fsp-lenses.	Amf. altered to gli.(?)	Pht-, chp- dissem. in rock		
	BGN				
	FGRG w. 5-10cm thick bands of FGGN				
	BGN	Weak, green-colour-on rock	Weak impreg of py.		
	RGR				
	BGN				
	RGR				

DATO: 24. 8. 83

sign

JIT-83

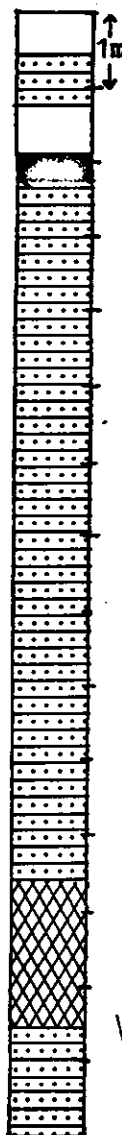
KVINA GRUVER.

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

HULL NR.: 5

KASSER NR.: 8,9

FRA 75m TIL 90 m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				
BGN				
RGR Amf.	Amf. altered to glim.	.Weak impr. of pht., chp :and py., in dark bands :of BGN		8/5
BGN		-----"		9/5
Pegmatite				
BGN				

DATO: 28-8-83

sign

JIT-83

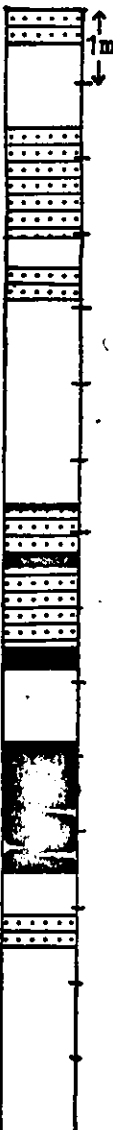
KVINA GRUVER.

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

HULL NR.: 5

KASSER NR.: 10,11

FRA 90 m TIL 105 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	BGN				10/5
	RGR				
	BGN	Ep.-altered	Py., chp. in qz.-vein		
	RGR				
	BGN				
	RGR				
	Amf.				
	BGN				
	Amf.				
	BGN				
	Amf.				
	RGR				
	Amf. w. qz.-veins				11/5
	RGR				
	BGN				
	RGR				

DATO: 28-8-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 5

KASSER NR.: 11,12

FRA 105 m TIL 120 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
 -RGR w. 5-10cm bands of FGGN		Py in fracture, py, chp impr. in FGGN		11/5
FGGN		Fract. w. py., chp. Pht., py., (chp.) diss. in FGGN. Py. in close to vertical frac.		
Amf.	Banded alter. to glim.	Clusters of py. in amf		12/5
RGR	Crushed RGR w. red altered fsp.			

DATO: 24-8-83

JIT-83

size

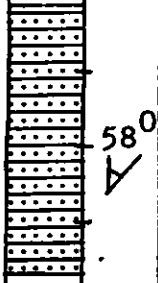
KVINA GRUVER.

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

HULL NR.: 5

KASSER NR.: 13.14

FRA 120 m TIL 135 m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	QZ				
	BRGR	weak green colour			
	BGN				13/5
	(B)RGR				
	Amf.				
	BGN				14/5

DATO: 26-8-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 5

KASSER NR.: 14,15

FRA 135 m TIL 150 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	(B)RGR				14/5
	BGN				
	RGR				15/5
	BGN				
	Dark grey gn. w. qz.- fsp.-blastesis.				
	RGR				
	BGN				
	RGR				

DATO: 26-8-83

JIT-83

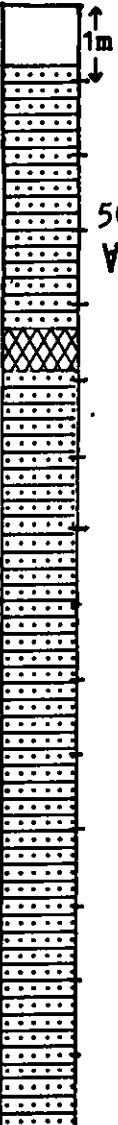
KVINA GRUVER.

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

HULL NR.: 5

KASSER NR.: 16,17

FRA 150 m TIL 165 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	RGR				
	BGN	greenish colour on GN	Grains of MoS_2 in the dark bands of the GN.		
	Pegmatite				16/5
	BGN				17/5

DATO: 26-8-83

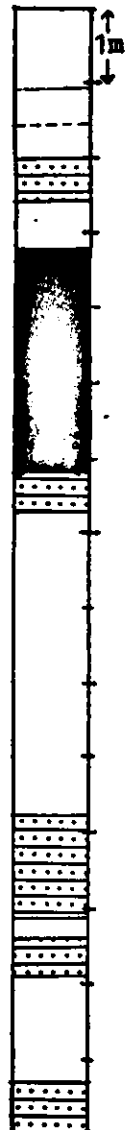
JIT-83

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KVINA GRUVER.

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

HULL NR.: 5KASSER NR.: 17,18FRA 165m TIL 180 m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
 1m RGR Altered zone between GR/BGN BGN RGR Amf. BGN RGR BGN RGR BGN RGR BGN	Hazy texture, weak green colour on fsp.	Spot with chp., py. Grains of MoS_2, impreg. of pht., chp., py. 1-5cm wide qz-veins w. MoS_2 along border against amf..Chp., (py). Weak imp:pht., chp., (py) Pegm. w. pht., chp. Imp. in GN over pegm. MoS_2 along border GN/pegm.		17/5 18/5

DATO: 30-8-83

JIT-83

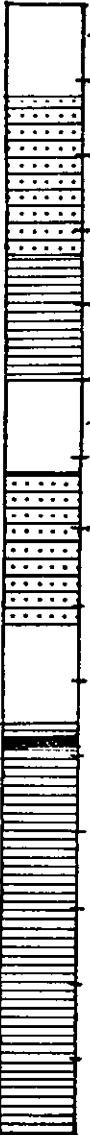
KVINA GRUVER.

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

HULL NR.: 5

KASSER NR.: 20.21

FRA 195m TIL 210m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	FG grey GN-GR		3cm qz w. grains of MoS ₂ and pht, chp, py.		20/5
	BGN				
	FGGN		Weak impreg. of pht, chp, py. in GN.		
	RGR				21/5
	BGN				
	RGR				
	Amf.				
	FGGN				

DATO: 30-8-83

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JIT-83

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

FRA 225m TIL 230m

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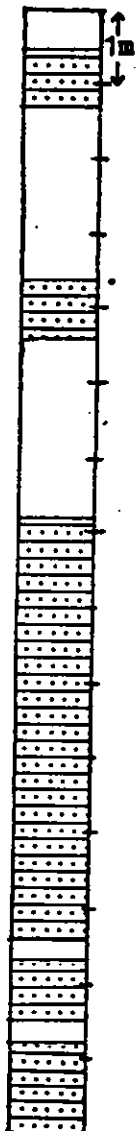
KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 1.2

FRA 0m TIL 15m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				1/5B
BGN				
RGR				
BGN	Weak green colour.	Weak impr. of pht, chp. py.		
RGR				
BGN-dark grey w. fsp.-blastesis				
BGN				2/5B
RGR				
BGN				
RGR				
BGN	20cm zn. of ep. alt.	Weak imp. of chp, py.		

DATO: 1-9-83

sign

JIT-83

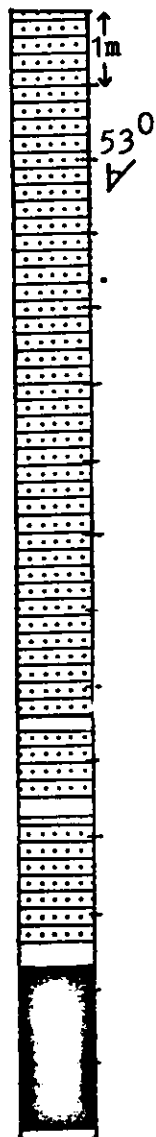
KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 2,3

FRA 15 m TIL 30 m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				2/5B
BGN				3/5B
10cm pegmatite	Green alt.	2,1.5cm ² spots of MoS ₂ py in altered spot.		
BRGR				
BGN RGR				
BGN RGR		.mm thick fract. 56° w. chp. Small qz-veins w. chp and grains of MoS ₂ . pht impr. in rock under qz-veins.		
Amf.				

DATO: 1-9-83

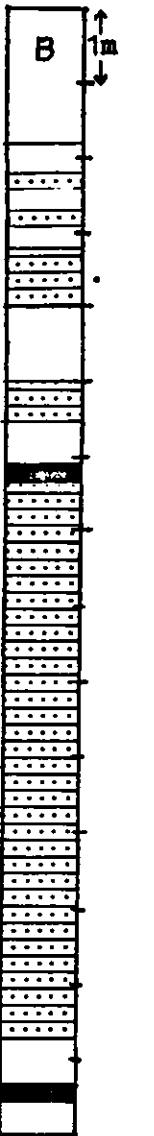
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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 4,5FRA 30m TIL 45 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	BRGR				
	Alternating BGN/RGR.		qz w. chp.in upper part		
	BGN				
	RGR	Vertical frac. w. rust			4/5B
	BGN				
	RGR Amf.	Ep. alt.	Weak impr. of py (pht), also in fract.		
	BGN		Grains of MoS ₂ on border of qz-rich ² band in GN		
			Grains of MoS ₂		
			Impreg. of pht.py.		5/5B
	RGR Amf. RGR		Grains of MoS ₂ in qz-v.		

DATO: 1-9-83

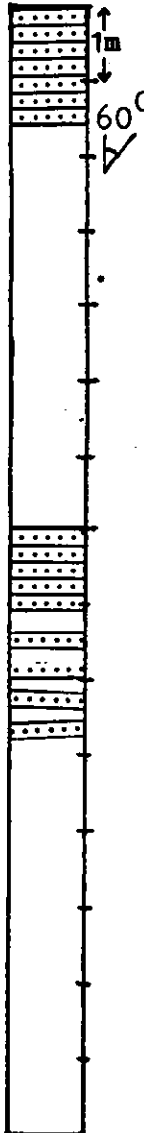
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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 5.6FRA 45m TIL 60m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	BGN		Pht, grains of MoS_2 in biotite-rich bands. MoS_2 in qz-vein. 2mm vein w. py (chp).		5/5B
	RGR				
	BGN		impreg. of pht, (chp, py)		
	Alternating RGR/BGN, w. 1-2cm bands of glimmerite.		Grains of MoS_2 in qz. Pht, chp. MoS_2 on border qz/glimmerite band (cm).		5/5B
	Pegmatite				

DATO: 2-9-83sign

JIT-83

KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 7.8

FRA 60m TIL 75m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	RGR				7/5B
	BGN		3cm qz w. MoS ₂ , qz-vein discordant.		
			: Imp. of <u>pht</u> , (py, chp) : in GN.		
	RGR				
	BGN				
	RGR				8/5B
	BGN				
	BGN		Chp, pht in biotite rich band.		
	RGR		-----"-----+MoS ₂		
	FGGN				
	RGR				
	BGN				

DATO: 2-9-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 8.9FRA 75 m TIL 90m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				ppm Mo ppm Cu	
B	BGN				8/5B
	RGR				
	BGN		4cm imp. of pht Pht imp. in biotite rich bands.		
	RGR				
	BRGR				9/5B
	Grey-green apl.-GR.	Green alt.	Pht in qz -rich band. -----"		
	RGR				
	Dark grey GN w. fsp.-blastesis.	Frac w. ep. alt.	:Pht, chp, py in rock, py in fracture. grains of MoS ₂		

DATO: 2-9-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 10,11FRA 90m TIL 105 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
1m	BGN	Ep. alt.	Grains of MoS ₂ . Pht, chp.		
	RGR		Pht, chp, py imp. especially in biotite-rich bands in BGN.		
	BGN	--"--	-----"		
	RGR				
	BGN	--"--	-----"		
	RGR				10/5B
	BGN	--"--	-----"		
	RGR				
	BGN	--"--	2 grains of MoS ₂ Pht, chp, py in BGN.		
	RGR				
	BGN				
	RGR				
	BGN				
	RGR				
	BGN				
	RGR				11/5B
	BGN				

DATO: 2-9-83

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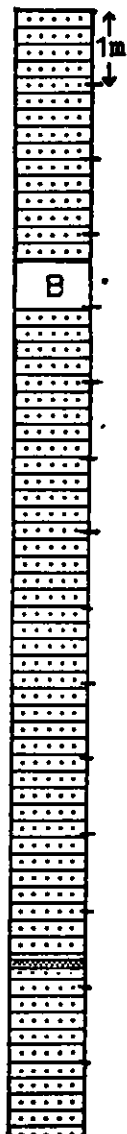
KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 11.12

FRA 105m TIL 120m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN	Weak green colour.	Pht, chp, (py), imp. in GN		11/5B
BRGR				
Grey inh. GN w. fsp.- blastesis.				
BGN		3cm qz w. MoS ₂ pht, chp, py.		12/5B
Apl.	Green colo. on GN	Qz-vein w. MoS ₂ Qz-vein w. MoS ₂ , pht, chp, py.		

DATO: 5-9-83

JIT-83

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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 13.14FRA 120 m TIL 135 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE		KASSE
				ppm Mo	ppm Cu	
	BGN		2-3mm grains of MoS ₂ diss. in the more coar-grained parts of the rock. MoS ₂ in qz vein.	90	60	13/5B
	Red-grey apl.-GR.					
	RGR					
	BGN		MoS ₂ on border of qz-vein in glimmerite band.			
	RGR					
	BGN					
	(B)RGR		Grains of MoS ₂ in cm veins of qz-fsp. cm band w. pht chp.			14/5B
	Grey apl.-granite with some, cm big fsp. grains. Weak foliation	The GN gradually becomes more altered, with greenish fsp.	1-10 cm bands w. imp. of pht and chp.			
			Traces of MoS ₂ in conc bands, not together w. pht and chp.			

DATO: 5-9-83

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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 14.15FRA 135 m TIL 150m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
1m	Grey apl-GR.	Ep. alt.	10cm band w. imp. of pht,py,chp.		
	RGR				14/5B
	BGN				
	RGR				
	BGN Pegm				
	Altern RGR/BGN				
	BGN		Pht,chp,py in fract. 26°		
	Amf.				
	RGR				15/5B
	BGN,w.3-10cm qz-veins.				

DATO: 6-9-83

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KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 16,17

FRA 150m TIL 165m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
 BGN Amf. Qz-vein Amf. BGN Altern. BRGR/BGN		Pht, chp impr. in BGN Traces of MoS₂ under qz-vein. MoS₂ in qz-veins upper part.		16/5B
				17/5B

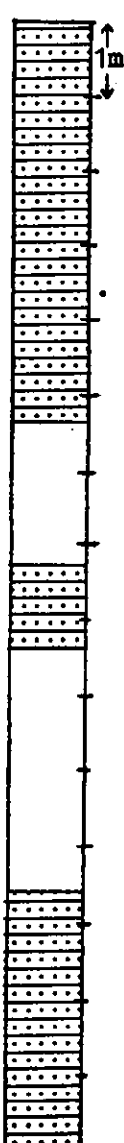
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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 17.18FRA 165 m TIL 180 m


BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN		Weak imp. of pht, chp, py in BGN		17/5B
GRG				
BGN		2cm qz-vein w. MoS ₂ Py in GN and Fract.		
RGR		4cm qz w. chp 2cm qz w. MoS ₂		18/5B
BGN		Traces of MoS ₂ and chp in dark band in GN.		

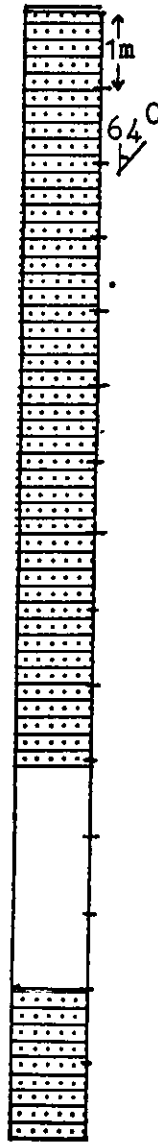
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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 19.20FRA 180m TIL 195 m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
 BGN	5cm ep-alt, biotite rich conc. band w. py. 4cm conk. qz-vein above alt. zone, not minerali.			19/5B
RGR	2cm qz-vein w. 10cm ep. alt	Weak imp. of chp, pht, py Py, pht in alt. zone.		
BGN	15cm ep.-alt. w. 4cm 4cm qz-vein.	impr. of py, pht, chp. MoS ₂ (py) in conc. pegm.		20/5B

DATO: 9-8-83

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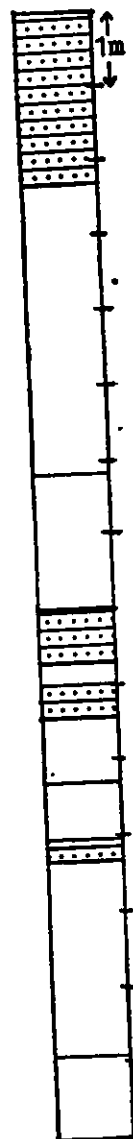
KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 20,21

FRA 195 m TIL 210 m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN	Ep.-alt w. 2cm qz-vein	pht, chp in alt. zone.		20/5B
RGR	ep.-alt (4cm).			
No core				
BGN w. bands of gar.-amf red apl-GR BGN RGR	Weak ep.-alt.	pht, chp, py in the dark bands of GN		21/5B
No core BGN	ep.-alt., fractures	Py, pht, (chp).		
RGR				
No core				

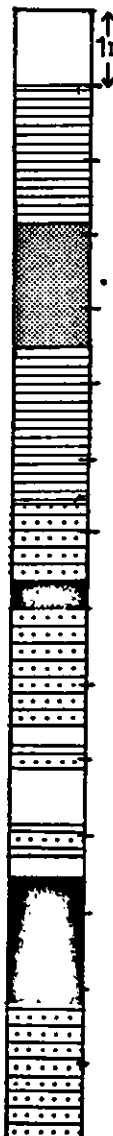
DATO: 9-9-83

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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 21,22FRA 210m TIL 225m


BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
No core				
FGGR				
Grey apl				
FGGR				21/5B
BGN	Fractured w. red alt fsp			
Amf.	Weak green colour	MoS ₂ in biotite-rich band. Py, some chp in amf.		
BGN				
BRGR				
BGN				
BRGR				
BGN				
BRGR				
Amf.				22/5B
BGN		Impreg. of pht.		

DATO: 9-9-83

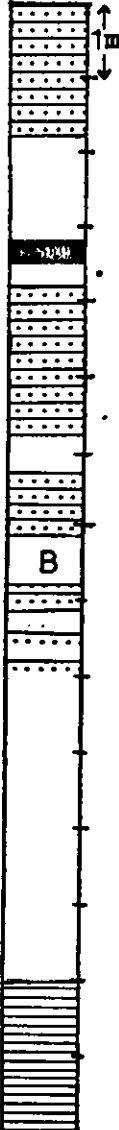
JIT-83

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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 24,24FRA 225m TIL 240 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	Dark grey BGN		Impr. of pht,py,chp		23/5B
	RGR				
	Conc. amf. RGR				
	BGN	Weak green colo. on fsp.	4cm conc. imp. of pht.		
	(B)RGR				24/5B
	BGN	Ep.-alt w. qz-vein.	MoS ₂ in 3cm qz-vein (py ₂ ,chp)		
	BRGR				
	BGN				
	RGR				
		Ep.-alt.	py		
	EGGN				

DATO: 9-9-83

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

KASSER NR.: 25.26

FRA 240m TIL 255 m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	FGGN		Py in fractures down to 247m		25/5B
	Garnet-amf.				
	FGGN				
	Amf.	10cm ep.-alt.	Disc. pht,py		
	FGGN	Ep.-alt.	Py,grains of MoS ₂		
	Disc.apl		4mm conc. bandtw. pht (py), traces of MoS ₂ :		
	Disc.apl		4mm conc. bands w. pht. some cht.		26/5B
	Amf.	Weak ep. alt.	Py,(chp) in GN.		
	FGGN				
	BCB				

DATA: 12-9-83

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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 26,27FRA 255 m TIL 270 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	RGR w. 2-5cm bands of FGGN				26/5B
	(B)RGR	Weak green colour	Pht, chp, traces of MoS_2 in GN, on contact to RGR		
	BGN				
	(B)RGR				
	BGN	-----"-----in GN	Vein w. chp, pht, py.		27/5B
	BRGR				
	BGN				
	BRGR		Pht, chp, (py) + traces of MoS_2 diss. in rock.		
	FGGN w. 1-5cm bands of GR.				
	BRGR				
	Amf.				
	BGN	3cm-----"	4cm qz-vein w. MoS_2 . Chp in yong vertical mm. fracture. Pht, pt, chp in alt. zone		

DATO: 12-9-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 28,29FRA 270 m TIL 285 m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	BGN	Ep ^{alt.} in disc. zone 20% w. py	4cm biotite-rich band w.conc. pht, chp(py) 10cm vertical qz-vein w.py.		28/5B
	BRGR				
	FGGN				
	BRGR				
	RGR		biotite-rich band(1cm) (conc.), w. pht, chp.		
	BGN				
	RGR				
	FGGN				
	RGR				
	BGN	Weak green colour in narrow zones 40cm.	Pht, chp, (py)		
	RGR	Hazy, white alt. fsp. close to vertical frac. w. qz, py. Fsp.-blast. Fsp red-bro- wn in colour, some plac- es greenish.	Pht, chp, , py, traces of MoS ₂ in dark bands of the ² GN.		29/5B
	BGN		Qz-vein w. pht. chp.		

DATO: 13-9-83

JIT-83

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

KASSER NR.: 29,30

FRA 285m TIL 300 m

DATA: 14-9-83

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KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 31, 32

FRA 300m TIL 315m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				31/5B
RGR				32/5B

DATO: 19-9-83

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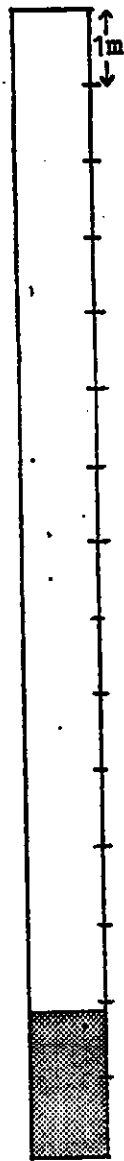
KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 32, 33

FRA 315 m TIL 330m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				32/5B
RGR				33/5B
Red grey apl. w. cm red fsp. blastesis.				

DATO: 19-9-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 34.35

FRA 330m TIL 345 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
					34/5B
	RGR				35/5B

DATO: 19-9-83

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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 35.36FRA 345m TIL 360 m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				35/5B
BGN		Pht, chp in dark bands of gn.		
RGR				
Red grey apl. w. red fsp. blast. RGR				36/5B
Pegm. w. band of pegm.	252.38: mm frac. w. py. V 34			
RGR				
V55 ⁰ BGN		0.5-1cm conc. bands w. pht, chp + MoS ₂ in gn.		

DATO: 20-9-83

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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 37.38FRA 360 m TIL 375m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
		Pht, chp, py in pegm. veir		37/5B
	Green colo.	Chp, pht, grains of MoS ₂		
	Red brown fsp.	Imp. weakens.		
BGN				38/5B

DATE: 22-9-83

JIT-83

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KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 38, 39FRA 375 m TIL 390m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN	10cm dark grey apl. crossing gn. w. fall 45° in opposit dir. Light apl. w. strike 90° on grey apl. and fall 50°. Miner. in gn is cut by apl.	Pht, chp, (py) + grains of MoS ₂ .		38/5B
RGR				
Dark grey apl w. red fsp blastesis.				
RGR				39/5B
3cm zone of greencolo.		py, pht, chp + grains of MoS ₂ . MoS ₂ also alone.		
BGN				
	Weak gr. colo. of gn.			

DATO: 22-9-83

JIT-83

si n

KVINA GRUVER.

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

HULL NR.:5B

KASSER NR.:40.41

FRA 390m TIL 405 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				40/5B
BGN				
		Pht, chp, py, some grains MoS ₂ .		
				41/5B
BGN				

DATO:27-9-83

JIT-83

KVINA GRUVER.

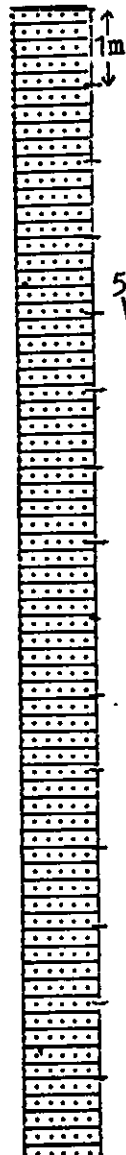
JOINT VENTURE, FOLLDAL VERK A/S - NORSKE FINA A/S

HULL NR.: 5B

KASSER NR.: 41.42

FRA 405m TIL 420m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN	20cm ep alt. Close to vertical frac. w. Chp, grains of MoS ₂ .	Chp, pht, often in cm bands. Some MoS ₂ together w. other sulfides or alone as spread grains making up conc. "bands"		41/5B
BGN				42/5B



DATO: 18-10-83

JIT-83

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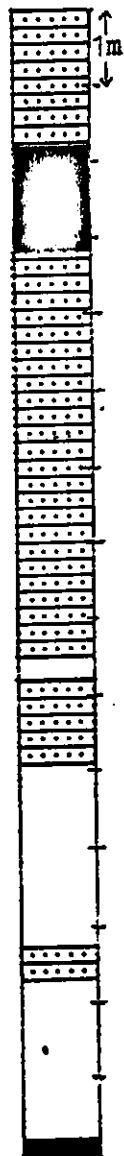
KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 43,44

FRA 420m TIL 435m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN				43/5B
Amf.				
BGN	mm frac. w. chp, pht V18 ⁰	Mineraliz. as described last page.		
(B)RGR				44/5B
BGN				
RGR				
BGN				
RGR				44/5B
Amf.				

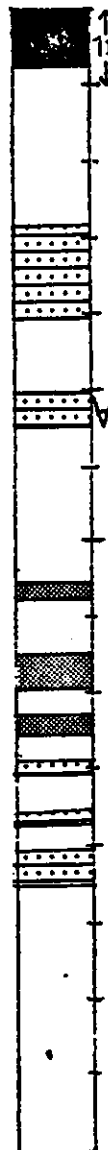
DATO: 18-10-83

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JIT-83

KVINA GRUVER.

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

HULL NR.: 5BKASSER NR.: 44,45FRA 435m TIL 450m


BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
Amf.				44/5B
RGR		mm biotite-rich bands w. py, chp, pht in gn and rgr.		
BGN (B)RGR		Grains of MoS ₂ in GN		
V60° BGN				45/5B
RGR				
Conc red gr. apl.				
RGR Conc. red-grey apl.				
Mixed zone				
BGN	Fsp.-blast. 3 x 2cm	Some conc. pht. chp. py.		
RGR				

DATO: 18-10-83

JIT-83

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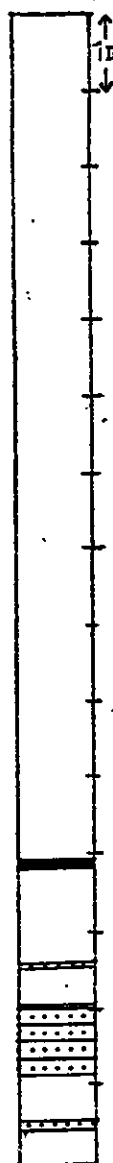
KVINA GRUVER.

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

HULL NR.: 5B

KASSER NR.: 46.47

FRA 450m TIL 465m



BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				46/5B
RGR				
Amf.				47/5B
RGR				
BGN	Weak green colo. of gn.	Pht, chp, py and grains of MoS ₂ in gn.		
BGN				
BGN				

DATO: 18-10-83

JIT-83

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

KASSER NR.: 47,48

FRA 465 m TIL 480 m

DATA: 18-10-83

sign

JIT-83

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

KASSER NR.: 49

FRA 480m TIL 495 m

DATA: 18-10-83

JIT-83

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CORE
LOG
DH 7

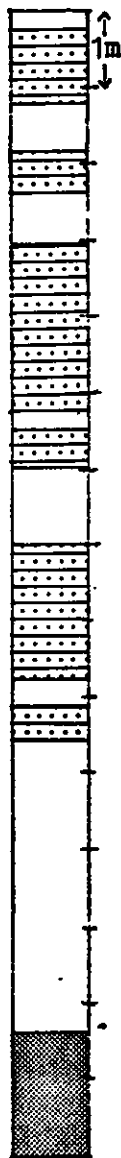
KVINA GRUVER.

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

HJLL NR.: 7

KASSER NR.: 1,2

FRA 0 m TIL 15m



BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR (Rusty)				1/7
BGN				
BRGR	Green colo.			
BGN				
BRGR				
BGN				
BRGR		Some py imp.		
BGN				
RGR				
BGN				
RGR				2/7
BGN				
RGR				2/7
Red grey apl..				

DATO: 18-10-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 2,3

FRA 15 m TIL 30 m

BERGARTSType	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
Grey apl.				2/7
				3/7
RGR (rusty) w. bands of GN	Fractured zone			

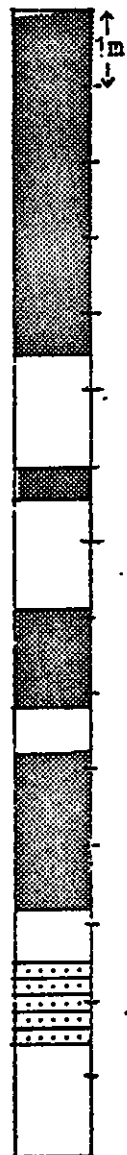
DATO: 18-10-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 7KASSER NR.: 4.5FRA 30 m TIL 45 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				4/7
Red-grey apl.				
RGR				4/7
Red-grey apl.				
RGR				
Grey apl.				5/7
RGR				
Grey apl.		Fine grained imp. of sulfides. Conc. cm band w. py, chp.		
RGR				
BGN				5/7
RGR				

DATO: 18-10-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 5,6

FRA 45 m TIL 60 m

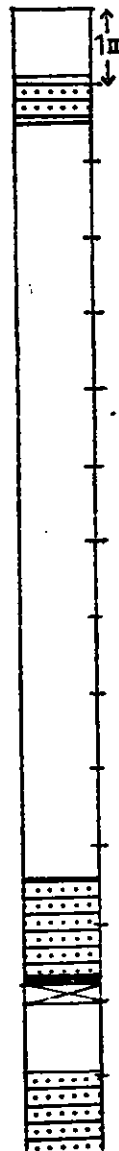
BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR	Green colo.	0.5-3cm conc. bands w. pht, chp, py.		5/7
BGN	Weak green colo.	Weak imp. of pht, chp, py		6/7
Dark biotite-rich GN				
BGN				
Dark, biotite-rich GN				
BGN				
RGR				

DATO: 18-10-83

JIT-83

KVINA GRUVER.

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

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


BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				7/7
BGN				
RGR				
BRGR		Conc. cm band w. py.chp and MoS ₂ .		
RGR				
BRGR				
RGR				
				8/7
BGN	Greenish colo.	Py.grains of MoS ₂ on bo rder between amf. and Qz.weak min. in the GN.		
Amf.				
RGR				
BGN				

DATO: 18-10-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 7KASSER NR.: 8,9FRA 75 m TIL 90 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
BGN				
Conc. apl.				
BGN				8/7
Conc. red-grey apl.fsp.	bl.			
RGR				
BGN		Weak imp. of py, chp, pht.		
RGR				
BGN				
RGR				
BGN	Weak, green colo. on GN	pht, chp, conc. imp. in GN		
RGR		Small grains of MoS ₂ in GN		
BGN				
RGR				

DATO: 18-10-83

JIT-83

sign

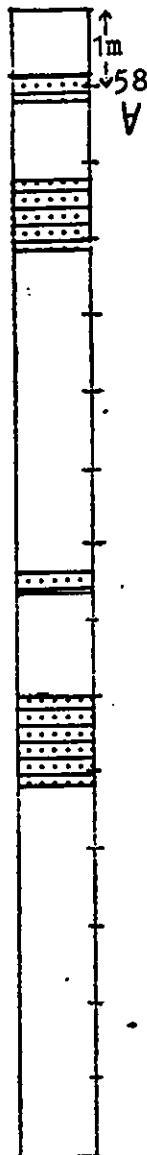
KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 10.11

FRA 90 m TIL 105 m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	RGR				10/7
	BGN		Weak min. of pht, py, chp		
	RGR		Cm conc. band w. chp.		
	BGN		Pht, py, chp, grains of MoS ₂		
	RGR				
	BGN				
	RGR				
	BGN		10cm pegm w. chp, py V20 ⁰		11/7
	RGR				

DATO: 18-10-83

JIT-83

si.

KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 11.12

FRA 105m TIL 120m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
1m	RGR				11/7
BGN					12/7
RGR					

DATO: 18-10-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 13,14

FRA 120m TIL 135m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
					13/7
	RGR				
					14/7
	BGN				
	RGR				
	Amf.	Partly altered to glim.			14/7
	BGN				
	RGR				
	Red-grey apl. (disc.?)				

DATO: 18-10-83

sign

JIT-83

KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 14,15

FRA 135m TIL 150 m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
↑ 1m ↓					14/7
V62°	RGR				15/7
	BGN				
			Cm qz-vein w. chp(conc?)		

DATO: 18-10-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 7KASSER NR.: 16.17FRA 150 m TIL 165 m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
RGR				
mm-cm bands w. glim. Qz conc. spots w. chp.		Chp. in conc. spot.		16/7
RGR				
BRGR				
(B)RGR w. 5-30cm qz and pegmatite veins.				
				17/7

DATO: 18-10-83

JIT-83

si

KVINA GRUVER.

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

HULL NR.: 7KASSER NR.: 17,18FRA 165 m TIL 180 m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
(B)RGR w. 5-10cm qz and pegmatite veins, apparently conc.		Weak imp. of pht, py, chp in lower part of qz-ve.		17/7
BGN		Conc. py, chp.		18/7
RGR				
				18/7
				18/7
				18/7

DATO: 18-10-83

sign

JIT-83

KVINA GRUVER.

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

HULL NR.: 7KASSER NR.: 19,20FRA 180m TIL 195m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				19/7
RGR w. apl.-bands		Apl. weak min.		
Grey-white apl.		Chp, pht., MoS ₂ . MoS ₂ alone spread in rock as 2-3mm conc. grains, or together with other sulfides in cm qz-rich conc. bands.	200ppm Mo 550ppm Cu	
RGR				
				20/7
Inhomog. RGR				

DATO: 18-10-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 20.21

FRA 195m TIL 210m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
↑ 1m ↓					20/7
	Inhomog. RGR. Aplittic to normal granittic				
.....	BGN				21/7
	RGR				

DATO: 18-10-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 7KASSER NR.: 22,23FRA 210m TIL 225 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
	RGR				
50°	BGN				22/7
V	Grey apl.				
		Weak green colo.			
	BGN				
			Conc. pht.chp.py.		
500°		-----"-----			23/7
V	Qz		Traces of MoS ₂ on border of 10cm qz-vein.		

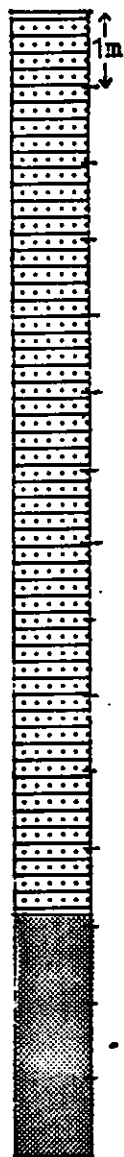
DATO: 18-10-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 7KASSER NR.: 23.24FRA 225 m TIL 240 m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				23/7
	Weak green colo:			
BGN.		Conc. chp, pht, py, also in mm disc. frac. Traces of MoS ₂		24/7
Grey apl.		Chp. diss. in rock (py) Traces of MoS ₂ in conc. 2cm qz-veins.		

DATO: 18-10-83

JIT-83

sign

KVINA GRUVER.

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

HULL NR.: 7KASSER NR.: 25.26FRA 240 m TIL 255m

BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE		KASSE
Grey apl.					25/7
	White alt. fsp.				
RGR(fractured)	Crisscrossed by open fractures, filled w. cal.	Trac. of MoS ₂ in qz-ve.			25/7
			ppm Mo	ppm Cu	
		MoS ₂ in 3mm disc. qz.-vein cut by yong frac.	90	160	
10cm qz-vein		Qz and MoS ₂ brecciat. Some py, chp. Also conc. MoS ₂ miner.	400	150	
	Vertical frac.		90	250	
			760	330	26/7
			130	260	
RGR(fractured)	White alt. fsp.	Traces of MoS ₂	1100	310	
			50	540	
			100	1100	

DATO: 14-11-83

JIT-83

KVINA GRUVER.

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

HULL NR.: 7KASSER NR.: 26,27FRA 255 m TIL 270 m

	BERGARTSTYPER	OMVANDLING	MINERALISERING	M. TIL ANALYSE		KASSE
				ppm Mo	ppm Cu	
3				5	210	26/7
				-5	25	
				-5	25	
				780	150	
				45	50	
3				260	100	27/7
				1000	140	
	BRGR(fractured)	White alt. fsp.	Traces of MoS ₂ in disc. qz-veins and diss. in rock. 10cm qz-w. chp.py	190	120	
				290	1500	
				380	510	
3				410	180	
				200	200	
	BRGR			$\bar{x}$: 314	316	

DATO: 14-11-83sign

JIT-83

KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 28.29

FRÅ 270 m TIL 285 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				28/7
RGR				
	White alt. fsp.			29/7
	Open frac. w. calcs.			

DATO: 14-11-83

JIT-83

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KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 29.30

FRA 285 m TIL 300 m

	BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
1m		Vertical-fræe w. calc.			29/7
	RGR				30/7
		Fractured and rusty			

DATO: 14-11-83

sign

JIT-83

KVINA GRUVER.

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

HULL NR.: 7

KASSER NR.: 31.32

FRA 300m TIL 315 m

BERGARTSTYPE	OMVANDLING	MINERALISERING	M. TIL ANALYSE	KASSE
				31/7
RGR				310.4 END
Inhomog. RGR				

DATO:14-11-83

sign

JIT-83

DIARY FOR JAN INGE TOLLEFSRUD

FIELDWORK, KNABEN, 27/6-28/9-83

- 27/6 Departure from Oslo 9.30 a.m..Knaben 3.30 p.m.
Limyr had already arrived, and left at 9.30p.m..
- 28/6 Follidal Verks diamond-driller, Trond dal, arrived
at 9.15 a.m. Backe Maskin-instructor, Ola Holstad,
arrived at 2.00 p.m.. T. Dal and T.T. Røynestad is
rigging up the drilling-machine. I myself did some
reco. in the Knaben II-area.
- 29/6 Reco. in the area around Knabeåni. An electrician
and T. Dal on drill-site (DH-1) to adapt the volt-
age from the aggregate. Rigg 380V, pump 220V.
T.T. Røynestad and K. Røyseland starts to transport
barracks from Knaben to camp-site at southern end
Smalvann. O. Holstad waited for necessary equipment
to drilling-machine (cables, corepipes, corepipe-
holder) that was missing in the first consignment
from Follidal Verk. Equipment arrived at 8.50p.m..
- 30/6 Drillers finished mounting of drilling-equipment
at 1.30p.m.. Drilled about 10m.
I followed the gneiss-horizon from 1km south of -
Knaben II to Kvina mine. Returned via Knaben I and
Reinshommen.
- 1/7 Maps arrived yesterday evening. Reco. and mapping
in Kvina mine area. T. dal and K. Røyseland drilled.
O. Holstad and T.T. Røynestad took over at 2p.m.
DH 1:43m. Moped has arrived.
- 2/7 Fog, rain and wind. Reco. in the Kvina area. Took
over as assistant on rigg after T.T. Røynestad at
3.00p.m.. DH 1:60m.
- 3/7 Fog, rain and wind. Assisted O. Holstad on rigg.
DH 1:76m.
- 4/7 Fog, rain and wind. Tried to map western shore of
Smalvann. First barrack has arrived camp-site.
100m of core is transported down to storehouse,
Knaben II mine.
- 5/7 Mapped west of Kvina. Second barrack has arrived
camp-site. Problems w. DH 1 because of faults and
loss of water. DH 1:139m.
- 6/7 Assisted T. Dal on rigg until 2p.m. Johan Heim
visited us for 3 hours. Still problems with the
hole. T.T. Røynestad took over at 2.30p.m.
I logged cores in the storehouse in the evening.

- 7/7 Mapped eastern part of gneiss-zone from Kvina towards north.
- 8/7 Should assist T.Dal on rigg, but after heavy problems w. breccia in the hole it was decided to try cementing. Continued to map the area from DH 1 towards Knaben I.
- 9/7 Mapping on w. side of Smalvann. A try to drill failed.
- 10/7 Mapping on east side of Smalvann.
- 11/7 Mapped west of DH 1. Met Limyr at 1.30p.m. Limyr left at 4.00p.m.
I took the night train from Snartemo to Oslo.
- 12/7 Oslo. Train to Snartemo at 10p.m..
- 13/7 Back in Knaben at 6.30a.m. Mapping on west side of Smalvann.
- 14/7 Assisted T.Dal on rigg. Repaired water-pump, which was blocked by sand. Mapped in Kvina area.
- 15/7 Tried to couple elec. to barracks. Missed some 16A contacts. Ordered 16A and 32A contacts from Kvinesdal.
- 16/7 Bjarne Valen and his son Stig arrived at 9.15a.m. Bought some food and equipment at the shop, and transported everything to the camp-site with the Deutz tractor. Showed Valen the drilling machine. Drove back to Knaben at 1.45p.m. Got new battery to the aggregate and contacts to the barracks. Drove back to camp and mounted the battery.
- 17/7 The owner of the house in Knaben, O.K. Reiersen, arrived at 9.00a.m. He repaired the gully in the bathroom. Drove up to camp at 11.00a.m., and coupled el. to the rest of the barracks. Logged cores down to 190m on drillsite.
- 18/7 Logged cores in the storehouse until 12.00a.m. The house has been broken into. Repaired the lock. Waited for Limyr and Svindal. They arrived at 4.30p.m. Limyr and I walked to drillsite because of a message about MoS_2 in the cores. Decided to continue the drilling in hole 1.

- 19/7 Svindal, Limyr and I up to camp. Starter on aggregate has broken down. Limyr and Røynestad tries to get a new aggregate, while me and Svindal put out the claim-marks. Svindal went back to Knaben at 2.00p.m. Limyr and I follow the drilling.
- 20/7 Finished DH 1 at 225,85m. Started removal to DH 2. Svindal left Knaben around mid-day. Heim made a short visit to the camp around 2.00p.m..
- 21/7 Mapping north of Kvina. Removal to DH 2 continues, and 11m is drilled before end of day.
- 22/7 Mapping in the area north of Knaben I.B. and S. Valen are drilling. Røynestad and T. Risøen transport materials to build a small cabin on drill-site.
- 23/7 Short trip to drill-site. Met Valen on his way down for a trip to Kvinesdal. DH 2:69m.
- 24/7 Corelogging on drill-site, mapping in Knaben I-area.
- 25/7 Limyr on drill-site at 1.00p.m. Mapping in area south of DH 2.
- 26/7 Logging in the morning. Mapping in the area Smalvann Knaben I the rest of the day.
- 27/7 Mapped the eastern border of gneiss-horizon in DH 2-area. DH 2:124m in the morning. Packing on rotation-unit on rigg was damaged last night. Oven and lamp for the new cabin has arrived.
- 28/7 Logging down to 140m. Mapping se. of DH 2.
- 29/7 Day off. Kristiansand.
- 30/7 Day off. Kvifjord.
- 31/7 Logging in storehouse.
- 1/8 Logging on drill-site. 190m. Move the cores from the storehouse to house in Knaben, because the storehouse has been broken into once again. Terje Risøen helped me.
- 2/8 Logging on drill-site. 210m. Mapping in the Knaben I area.
- 3/8 Moped on strike. Mapping in the area Knaben-Bergetjern. DH 2:220.

- 4/8 Fog and rain. Mapped east of Knaben I. DH 2:238m.
- 5/8 Tellef Risøen and Røynestad transported the new sledge for the drilling-machine to the drill-site. Mapped eastern border of gneiss-horizon, between Bergetjern and plateau. DH 2:242.30m.
- 6/8 Mapping north of Bergetjern.
- 7/8 Tried to repair the moped. Housework.
- 8/8 Mapping northeast of DH 2. Limyr short visit. Measured out the location of DH 4.
- 9/8 DH 2 stopped at 270m. Removal to DH 4 started. Mapping in the area NE of Knaben I.
- 10/8 Rigg and aggregate removed to DH 4 yesterday. Waited for O. Samskott from E. Kiil A/S in the afternoon.
- 11/8 Samskott arrived at 9.15 a.m. Drove up to camp w. tractor. Changed damaged valve on the drilling-machine. Everything worked when Samskott left, but collapsed short after. It still functions in a way. Mapping north of Knaben I.
- 12/8 Slow progression in drilling. Continued mapping north of Knaben I.
- 13/8 Continued mapping in same area. DH 4:70m.
- 14/8 Office-work. (sunday)
- 15/8 Fog, rain and wind. Office-work.
- 16/8 Mapping in the Knaben I-area.
- 17/8 Mapping south of DH 4. Found that adit (rubens-mine) is not a mine, but a try to find the continuation of the mineralizations in the prospecting pit above.
- 18/8 Mapping on plateau. Assisted Røynestad on the rig for a couple of hours, while Terje Risøen tried to repair the moped. Need spare parts for the moped. DH 4:200m.
- 19/8 Røynestad has talked to Limyr in the phone because of heavy problems w. a frac. zone in DH 4. It was decided to leave DH 4 (205,40m), and to remove the equipment to DH 5. Mapping in the area of DH 5. Diesel and aggregate is removed the same day.

- 20/8 Mounting of equipment on drillsite 5. Mapping on plateau in the DH 5-area. Cores from DH 4 is transported to house in Knaben.
- 21/8 Mapping in the area around DH 4. Two reindeers shot at 1.00p.m. (by local people)
- 22/8 Drilling on DH 5 started at 11.00a.m. Mapping N of Kvina mine.
- 23/8 Worked in the Knaben I-area. DH 5:60m at 1.30p.m. Limyr arrived at 11.30p.m.
- 24/8 Discuss with Limyr. Decides to set out a new hole further south, and that i shall stay in Knabe until end of sept. DH 5:70m. Limyr leaves at 6p.m.
- 25/8 Follows the drilling, to decide when to finish. DH 5:150m.
- 26/8 Standby on drillsite. Some MoS₂ decides to continue. DH 5:190m.
- 27/8 Cloudberry-trip to Glupen. 13hrs. 3/41.
- 28/8 Office work. Short trip to Flekkefjord.
- 29/8 Drilling continues. Mapping in Kvina area.
- 30/8 Fog and rain. After 20m of red granite it is decided to stop. DH 5:229.80m. DH 5B is marked and removal starts.
- 31/8 Removal continues and is finished. Looked on MoS - mineralizations in the area between Sandtjønn and Grunnevensnuten. Conc. qz.-veins in granite. DH 5B:30m. Cores from DH 5 transported down to Knaben.
- 1/9 DH 5B:40m at 7.30 in the morning. Mapping in the area south of Kvina.
- 2/9 Fog and rain. DH 5B:80m in the morning. Tried to map the shores of Smalvann.
- 3/9 Fog, wind and rain. Logged to 120m on drillsite.
- 4/9 Fog, wind and rain. Mounted the rock-saw in the cellar. Need some contacts.
- 5/9 Fog, wind and rain. Mapping in the Kvina area.
- 6/9 Snow in the morning. Mapping in the Kvina-area. Brought 180m cores down to Knaben.

- 7/9 Limyr and John Pedersen arrived at 2.00p.m.
- 8/9 Discussed with Limyr and J. Pedersen. Short sight-seeing in the Knaben I-area. Showed Pedersen various types of MoS_2 -mineralizations. DH 5B:205m. Decided to drill DH 6 and DH 7. Limyr and Pedersen left at 2p.m.
- 9/9 Logging to 240m on drill-site. DH 5B:245m. Bad weather. Office work.
- 10/9 Fog, wind and rain. Office work.
- 11/9 Fog, wind and rain. Office work.
- 12/9 Mapping on east side of Grunnevensnuten. Logging on drillsite to 270m.
- 13/9 Mark DH 6, and find the best to transport the equipment to this place. Describe adit east of Knaben I. Find that the mineralization consists of discordant boudinaged qz-veins in gneiss.. Logging to 290m.
- 14/8 Describe cu prospecting pit in NE end of Småvann. Qz-lense discordant in gneiss, dipping 14° SSE. Mapping in the Kvina mine area. Logging to 300m, drilled to 326m.
- 15/9 Fog, wind and rain. Office work. A visit to the rig in the evening. 335m.
- 16/9 Fog, wind and rain. Deliver some equipment to the drilling-machine in the morning. Office-work.
- 17/9 Office-work.
- 18/9 Fog, wind and rain. Office-work. Neighbour repaired the rock-saw, price kr 50,-.
- 19/9 Visit on rig. Office-work. Split samples from DH 2.
- 20/9 Standby on rig. Find some MoS_2 in gneiss. no more pipes. Limyr arrived at 2.00p.m. DH 5B:370m.
- 21/9 Discuss w. Limyr, 20 new pipes are ordered. Split samples from DH 1 and DH 4. Limyr left at 1.00p.m.
- 22/9 Office-work.
- 23/9 Mapping "rests". Logging to 380m. Pipes arrived yesterday evening.

- 24/9 Logging to 390m. Still gneiss with some MoS_2
Mapping in the DH 7-area.
- 25/9 Officework.
- 26/9 Last inspection of the mapped area. Decides to
order 20 more pipes, and to drill through the
gneiss horizon. Then remove directly to DH 7, and
if time, drill DH 6 as a last try.
- 27/9 Clear the house and Pack.
- 28/9 Left Knaben at 12.30p.m.

- 24/9 Logging to 390m. Still gneiss with some MoS_2 .
Mapping in the DH7-area.
- 25/9 Officework.
- 26/9 Last inspection of the mapped area. Decides to order 20 more
pipes, and to drill through the gneiss horizon. Then remove
directly to DH7, and if time, drill DH6 as a last try.
- 27/9 Clear the house and Pack.
- 28/9 Left Knaben at 12.30 p.m.
- 17/10 Limyr and I travelled by car to Knaben in the evening.
- 18/10 Logged DH5B from 405-485.4 m depth, and DH7 from 0-240 m.
Back to Oslo in the evening.
- 13/11 Night train from Oslo to Store Kvina.
- 14/11 Tellef and Terje Rispen met me at the station. Breakfast
with T.T. Røynestad. Travelled by car up to Knaben.
Logged cores: DH7 240-310,4 m. Prepared samples for analysis.
Left Knaben in the evening.
- 15/11 Arrived Oslo in the morning.



LEGEND

APPROXIMATE BORDER OF GNEISSBAND HORIZON (gneisses mixed with granite)	
YONG DOLERITE DIKE	
DIAMOND DRILLHOLE -/90:strike/dip,(210,50):length	
ADIT W. MOS ₂ SHOWING	
PROSPECTION PIT W. MOS ₂ SHOWING	
MOS ₂ SHOWING	
STRIKE /DIP OF FOLIATION	

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

1:5000
Ekv. 5m

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

Konstuert av Widerøe's Flyveselskap
etter fotografier oppatt' aug. 1961

LEGEND (1:2000 maps)

Banded gneiss, BGN



Finegrained gneiss, FGGN



Amphibolite



Aplite



Bleached red granite, BRGR



Adit w. MoS_2 showing



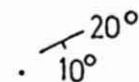
Prospection pit w. MoS_2 showing



MoS_2 showing



Strike/dip of foliation.



Yong dolerite dike



<u>MAP1</u>	<u>MAP2</u>	<u>MAP3</u> GRUNNEVANNS- KNUTEN
<u>MAP4</u> BERGE- TJERN	<u>MAP5</u>	<u>MAP6</u> KVINA





2.

3.



