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Forsmark site investigation

Boremap mapping of telescopic drilled borehole KFM02A

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August 2003

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Keywords: KFM02A, geology, drill core mapping, BIPS, Boremap, fractures, Forsmark.

Contents

1 Introduction

Since 2002, SKB investigates two potential sites for a deep repository in the Swedish Precambrian basement. In order to characterise the rock mass down to a depth of about 1 km at one of these sites, the Forsmark test site area, SKB has initiated a drilling program starting with three deep telescopic boreholes (Figure 1-1). Each borehole starts with 100 m of percussion drilling, and is followed by core drilling down to about 1000 m depth.

A detailed mapping of the material obtained through the drilling program is essential for more specific sampling and for three-dimensional modelling of the site geology. For the purpose, the so-called Boremap system has been developed. The system integrates information from drill core mapping, or alternatively, the drill cuttings when a core is not available, with results from BIPS-logging (Borehole Image Processing System) and calculates the absolute position and orientation of fractures and various lithological markers.

Figure 2-1. *Location of telescopic drilled borehole KFM02A in the Forsmark test site area.*

The drilling of the second of these deep, telescopic boreholes, KFM02A, was finished in the middle of March 2003. The present report presents the results from the Boremap-mapping of this borehole. It also gives a brief discussion of the results in a larger context, relative to the data from borehole KFM01A and the surface geology.

2 Objective and scope

The aim of the mapping activities is to obtain a detailed documentation of *all* structures and lithologies intersected by telescopic borehole KFM02A. This in turn will serve as a platform for forthcoming analyses of the drill core, aimed at investigating geological, petrophysical and mechanical aspects of the rock volume, as well as site descriptive modellings.

3 Equipment

3.1 Description of equipment

All BIPS-based mapping was performed in Boremap v. 3.2. This software is loaded with the bedrock and mineral standard used by the Geological Survey of Sweden for surface mapping at the Forsmark investigation site to enable correlation with the surface geology. Additional software used during the course of the mapping was BIPS Viewer v. 1.10 and Microsoft Access. The final data presentation was made by Dips v. 5.050 and WellCad v. 3.2.

The following equipment was used to facilitate the core mapping: folding rule, hydrochloric acid, knife, water-filled atomizer, hand lens and sandpaper.

4 Execution

Telescopic borehole KFM02A starts with 100 m of percussion drilling, followed by core drilling down to about 1001.5 m depth. The soil cover is about 2.3 m.

The BIPS-image from the upper, percussion drilled part of KFM02A covers an interval between 12.00 to 94.80 m depth, whereas drill cuttings were collected at 1 m intervals between 3.00 and 100.00 m depth.

During the mapping, the 900 m drill core obtained from the interval 100–1001.5 m was available in its entirety on roller tables in the core-mapping accommodation at Forsmark (the Llentab hall, near the SKB/SFR-office). The BIPS-based mapping was preceded by an overview mapping and initial separation of induced and natural fractures made by Jesper Petersson. The SGU provided modal analysis of the main core lithology as well as reference samples from the surface mapping.

The mapping of KFM02A was done in Boremap v. 3.2 according to activity plan AP PF 400-03-06SKB (SKB internal controlling document) following the method description for Boremap mapping, SKB MD 143.006 (v. 1.0), with the exception that no geophysical logs were available.

4.1 Preparations

The length registered in the BIPS-image deviates from the true bore hole length with increasing depth, and the difference at the bottom of the bore hole is about 5 m. It was, therefore, necessary to adjust the length with reference to groove millings cut into the borehole wall at every 50th metre. The exact level of each reference mark can be found in SKB's database SICADA (Appendix 5). Unfortunately, there are no slots visible in the BIPS-image at 900 m depth, and the correction had to rely on values obtained through linear extrapolation. However, the adjusted length is still not completely identical with the one given at the drill core; in some intervals the difference may amount to some decimetres. After adjustment, the BIPS-image from the cored interval covers the depth between 101.74 and 1001.80 m.

The BIPS-image from the upper, percussion drilled 100 m, covers an interval from 12.00 to 94.80 m depth. Beneath this level the image becomes too blurred to reveal anything of interest. No length adjustment was done for this image, as the deviation from the true length is considered to be negligible (i.e. less than 0.5 m) at such shallow depths.

Data necessary for calculations of absolute orientation of structures in the borehole includes bore hole diameter, azimuth and inclination, and these data were collected from SKB's database SICADA (Appendices 3 and 4). Corrections for the deviation were done at every twelfth metre.

Drill cuttings were collected each metre in the upper, percussion drilled 100 m Each sample container hosts three such samples. Where lithological differences were distinguishable between the three samples a separation was made; otherwise the content was mixed to obtain a homogeneous 3 m interval sample. The data from the mapping of the drill cuttings are stored in SKB's database SICADA (Appendix 6).

4.2 Data handling

To obtain the best possible data security, the mapping was performed on the SKB intranet, with regular back ups on the local drive.

The mapping was quality checked by a routine in the Boremap software before it was archived. The data were subsequently exported to the SKB database SICADA and stored under field note Forsmark 160 (Boremap-mapping and mapping of drill cuttings).

4.3 Analyses and interpretation

The Boremap system has obviously some limitations, since all geological features must be represented by intersecting planes. Non-planar structures, such as small scale folding, linear objects (e.g. mineral lineations) and curved fractures can, therefore, not be correctly documented. The major problem is curved structures (e.g. fractures) which run almost parallel with the borehole axis. During the mapping sessions of KFM01A, such features were approximated by fitting the plane after one of their ends, usually the upper, in the bore hole. The fact that the structure did not actually intersect the borehole is only noted in the attached comment.

Another problem is geological features (mainly fractures) that can be observed only in the drill core. This problem usually arises from poor resolution in the BIPS-image, which in the present case often was caused by the presence of brownish black coating on the borehole walls. However, even in the most perfect BIPS-image, it is sometimes difficult to distinguish a thin fracture sealed by some low contrast mineral. All fractures and lithological contacts observed in the drill core from KFM02A, but not in the BIPS-image, have been registered perpendicular to the borehole axis, regardless of their actual orientation. Almost all fractures suspected to be drill induced fall within this category. To prevent fractures from this group to be used in forthcoming fracture orientation analysis, they were registered as 'not visible in BIPS', an alternative that has become possible in v. 3.2 of Boremap.

Even if reliable measurements of fracture widths/apertures less than 1 mm would be possible in the drill core, it is well beyond the BIPS-image resolution. For that reason, the minimum width/aperture given is 1 mm.

All fractures in the percussion drilled 100 m were mapped as 'natural fractures'. Except for calcite, it was not possible to distinguish individual infilling minerals in the BIPS-image for this interval, and the vast majority of the filling was mapped as 'unknown mineral'.

In some intervals, the mapping was somewhat hampered by the occurrence of brownish black coatings on the borehole walls, as mentioned above. The coating occurs sporadically throughout the core drilled interval of the borehole, and typically forms a spiral pattern along the borehole axis with a pitch ratio of about 12–13 cm (see Appendix 1). This phenomenon is obviously drill induced, although the mechanism behind it is not fully understood. One plausible explanation is that the coatings originate from metal fragments abraded from the drill pipes, and that the spiral pattern is a consequence of wobbling of the pipe string in the borehole.

Also the BIPS-image of the percussion drilled part of the borehole leaves a great deal to be desired: a diffuse, dark band, which obscures much of the borehole walls down to about 30 m depth, runs parallel with the borehole axis. A guess is that this phenomenon is related to the centration of the BIPS-camera. In addition, the BIPS-image is somewhat blurred throughout the percussion drilled interval, probably due to the presence of a slight suspension during the logging.

5 Results

5.1 Core lithology

The predominant rock in borehole KFM02A is a medium-grained metagranite which tends to be somewhat more granodioritic towards depth. Other rock units, including more fine grained metagranitoids, pegmatitic granites, amphibolites and minor dykes or veins of pegmatite, aplite and leucogranite, are frequent throughout the borehole and totals up to about 30%. Except for some late veins or dykes, all these rocks have experienced Svecofennian metamorphism under amphibolite facies conditions.

The medium-grained metagranite(-granodiorite) (rock code 101057) is equigranular and typically greyish red to reddish grey in colour. Four modal analyses made by SGU of various reddish members of this rock unit show that it is a true monzogranite. (The data will be published in a forthcoming SKB P-report). Completely grey varieties, lacking the reddish tint, are restricted to contact zones with amphibolites and the last hundred metres of the borehole. Modal analysis by SGU of one such grey variety at about 949.9 m depth, associated with an amphibolite, reveals that it is more K-feldspar deficient than the other four samples and should be classified as granodiorite. The grey variety found in the lowermost part of the borehole often contains macroscopically visible pyrite and pyrrhotite. Minor sections speckled by fine grains of whitish plagioclase occur sporadically in the reddish varieties throughout the cored interval.

Various fine- to finely medium-grained, equigranular granitoids (rock code 101051) occupy approximately 14% of the cored interval. This can be compared with borehole KFM01A where their volume are estimated at less than 4%. Generally, they can be separated into two rock types: (1) a grey to greyish red metagranite-granodiorite, and (2) a rather mafic, dark grey metatonalite-granodiorite. The latter is restricted to three major occurrences at 230.7–235.4, 624.8–633.1 and 902.9–938.6 m depth, which volumetrically totals up to one third of the fine-grained granitoids. The most shallow of these occurrences possesses small (up to a few centimetres wide), flattened enclaves of more mafic material (Figure 5-1a). Modal analysis by SGU of a sample from the deepest of the three occurrences (916.83–916.85 m) defines it as a tonalite, plotting close to the quartz diorite field in a QAP diagram. (The data will be published in a forthcoming SKB P-report). The more felsic variety (i.e. the metagranite-granodiorite) tends to form occurrences with a typical length of a few metres, and although external contacts are largely parallel with the tectonic fabric, different degrees of fabric development and abrupt colour changes suggest that this group composes more than one generation (cf. KFM01A /1/). According to two modal analyses made by SGU, rocks from this group are typically monzogranites. (The data will be published in a forthcoming SKB P-report).

Minor dykes, veins and patches of pegmatite, pegmatitic granite, aplite and leucogranitic material are frequent throughout the borehole, and occupy slightly more than 10% of the cored interval. Most occurrences are some decimetre or less, with a few pegmatitic granites ranging up to about two to three metres. The latter are generally texturally heterogeneous, with a highly variable grain-size. A majority of the rocks in this group exhibit a weak to faint tectonic fabric, although there are several examples of discordant and, what seems to be, massive pegmatites. However, it must be emphasized that it sometimes was difficult to distinguish tectonic fabric visually in the pegmatitic rocks, but the fact that they appear massive does not necessarily mean that they actually are post-kinematic. In the depth interval 730–770 m such late pegmatite dykes contain garnet; euhedral and up to 3–4 mm in diameter. Despite the textural variability and temporal span within this unit, these rocks were grouped as “pegmatite, pegmatitic granite” (101061) or “fine- to medium-grained granite” (111058).

Amphibolites (rock code 102017) occupy slightly more than 4% of the cored interval. Their extension and contacts are more or less always parallel with the tectonic foliation. The majority is fine grained, equigranular with a large proportion of biotite. However, there are a few minor, anomalous occurrences, including medium-grained biotite hornblendites and a variety composed of coarse- to medium-grained, euhedral hornblende with interstitial quartz ± feldspar. Another noteworthy feature is a highly chloritized biotite rock with veins of quartz-rich material that occurs in the depth interval 476.74–477.19 m.

Some kind of light greenish, skarn-like material coded as “calc-silicate rock” (108019) occurs at two intervals towards the end of the cored section: 958.64–958.79 m and 959.28–959.35 m.

5.2 Alteration

The most conspicuous alteration feature in borehole KFM02A is a syenitic rock, which according to the IUGS recommendations /1/ should be denoted ‘episyenite’ as it apparently was formed by hydrothermal processes involving the selective removal of quartz. The rock is easily distinguished by its brick-red colour and porous character in the following depth intervals: 171.34–171.99 m (medium), 174.27–175.22 m (weak to medium), 176.84–176.95 m (faint), 179.36–179.99 m (medium), 247.80–248.17 m (faint), the main occurrence at 248.78–296.68 m (generally medium to strong), 298.82–299.45 m (weak to strong) and 301.54–301.64 m (weak). Contacts with the metagranite-granodiorite host are sharp or gradual over a few centimetres. The alteration has affected all major rock types found in KFM02A and is clearly not bound either by lithological contacts or ductile structures.

The petrography of the episyenites is described in detail by Möller et al. /2/, but the gross mineralogical changes seem to involve: (1) Dissolution and removal of quartz, (2) albitization of plagioclase, and (3) precipitation of quartz and finely crystalline chlorite + hematite in the vugs left after the dissolved quartz. Except for an about 5 dm wide crush zone at 266.58–267.10 m depth (Figure 5-1b), there is no obvious connection between the occurrence of episyenite and more significant brittle structures. There is, however, a slight increase in the fracture intensity, but few fractures seem to be associated with the alteration and a considerable proportion of the fractures are most certainly drill induced.

The most common type of alteration encountered in borehole KFM02A is varying degrees of oxidation or red discolouration of feldspars. It is mainly associated with the episyenite occurrences described above and more intensely fractured intervals between 490 and 680 m depth. Fractures flanked by zones of oxidation within this latter interval are now generally sealed.

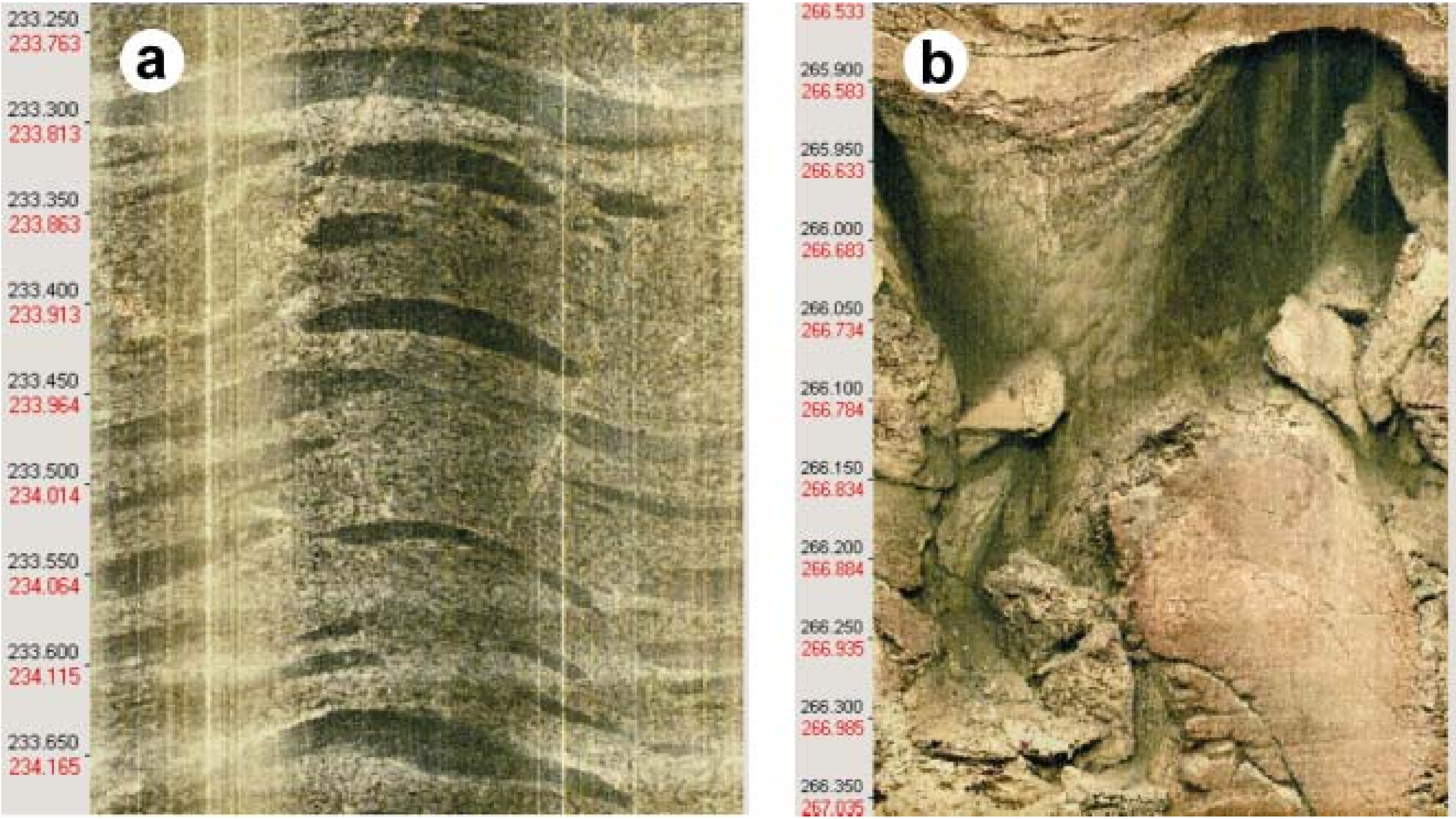


Figure 5-1. *BIPS-images from borehole KFM02A. a) A fine-grained, rather mafic metatonalite-granodiorite with flattened amphibolitic enclaves (233.75–234.20 m depth). b) An about 5 dm wide crush zone within the major episyenite occurrence (266.53–267.05 m depth).*

Another conspicuous feature, is an interval between 188.35 and 119.93 m depth of what seems to be some kind of argillitization (possibly kaolinitization) linked to a dense network of near-horizontal fractures. The rock is still rather coherent, but highly weakened.

5.3 Ductile structures

The composite S-L fabrics which characterise borehole KFM01A /3/, is less pronounced here; a weak to medium, gently dipping mineral lineation is ubiquitous, though the tectonic foliation is rather faint and distinguishable only locally. When measurable, the latter strikes from N–S to ESE with gentle dips towards east or south (Figure 5-2).

Between 800-900 m depth four intervals occur, each some decimetre wide, of more intense ductile deformation interpreted as minor shear zones. The rock in these zones seems to consist of a highly deformed and grain-size reduced variety of the normally medium-grained metagranite-granodiorite with some amphibolitic material. These minor shear zones strike 55–96° and dip 35–51° to the south (Figure 5-2), i.e. parallel with the tectonic foliation in the borehole.

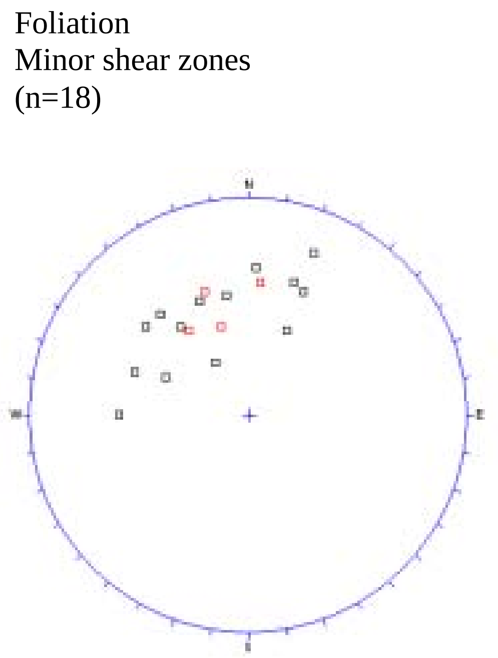


Figure 5-2. Lower hemisphere equal-area stereographic projection showing poles to ductile foliation planes (black squares) and minor shear zones (red squares) intersected by borehole KFM02A.

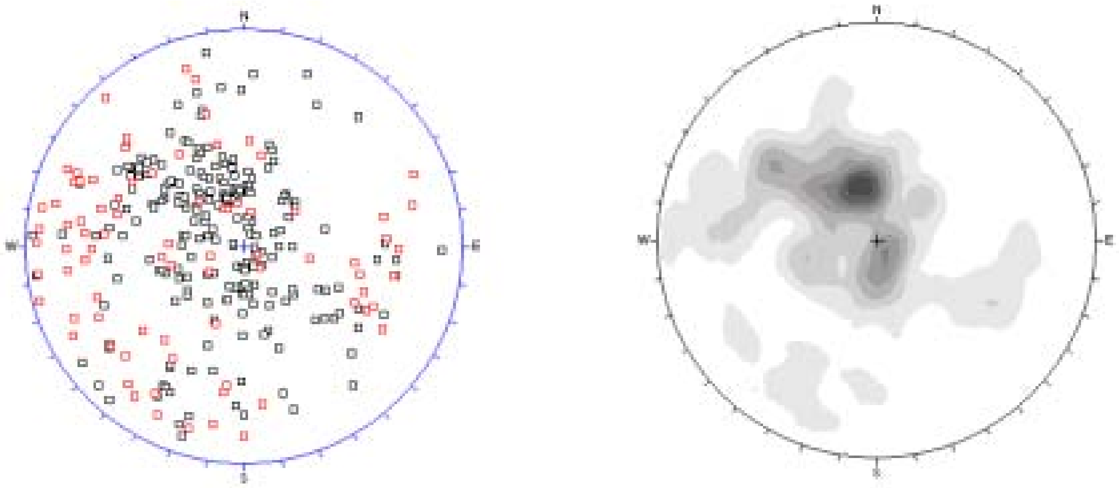
5.4 Fractures

5.4.1 Fracture frequencies and fracture orientation

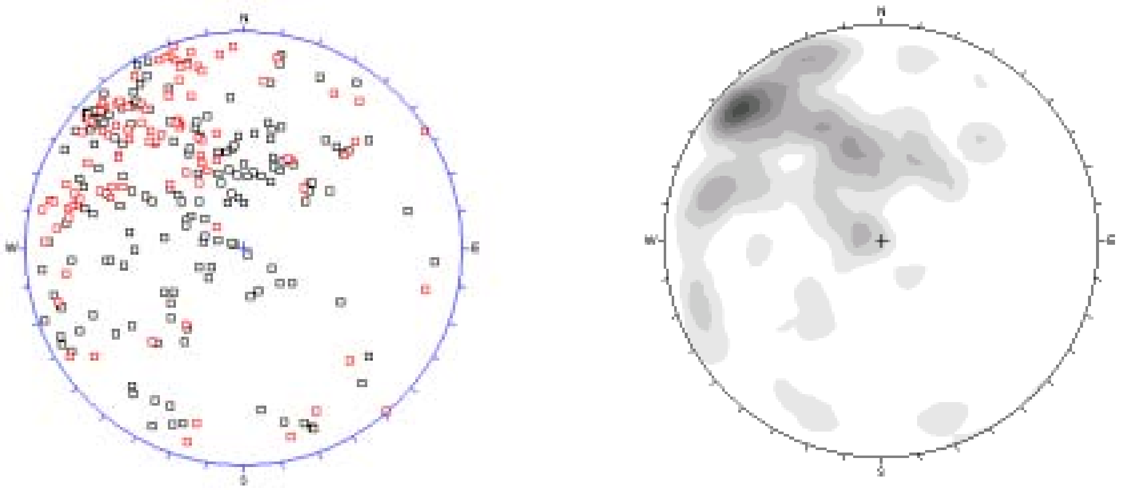
Except for a highly fractured depth interval from about 420 to 520 m, there is a striking concentration of natural fractures in the upper 320 m of the borehole (see Appendix 4). In addition, there is a slight increase in the fracture frequency below about 900 m depth. Generally, the frequency of natural and sealed fractures varies rather coherently, with an increased number of natural fractures in intervals with concentrations of sealed fractures. However, the two depth intervals with some of the highest concentrations of sealed fractures, 500–600 m and 655–675 m depth show no systematic increase in the number of natural fractures. Very few of the fractures encountered in KFM02A have measurable displacements, indicating that they were initiated or reactivated as shear fractures.

The orientation of the shallow fractures varies considerably, though most are near-horizontal to gently dipping (Figure 5-3a). Some of these fractures seem hydraulically open in the BIPS-image, though the aperture is normally less than a few millimetres. With increasing depth the fractures tend to obtain a roughly NE strike, whereas the dip becomes more steep towards SE (Figure 5-3b). In the depth interval around 400–520 m, there is a highly increased number of fractures striking from N–S to ENE, and dipping gently to moderately (20–60°) towards SE. Several fractures in this group seem hydraulically open in the BIPS-image, with apertures averaging about 1–2 mm. An additional set of fractures striking WNW and dipping steeply towards NNE can be distinguished in this interval (Figure 5-3c). The following depth interval, 520–700 m, is dominated by sealed fractures with roughly NE strike, which in contrast to the above mentioned fractures with NE strike, dip moderately towards SW (Figure 5-4d). A second, distinct set in this interval strikes SE and dips steeply to SW. Below 700 m depth the orientation becomes more variable with a few more intensely fractured zones below 900 m depth, striking roughly ENE and dipping moderately (40–50°) to the south (Figure 5-4e).

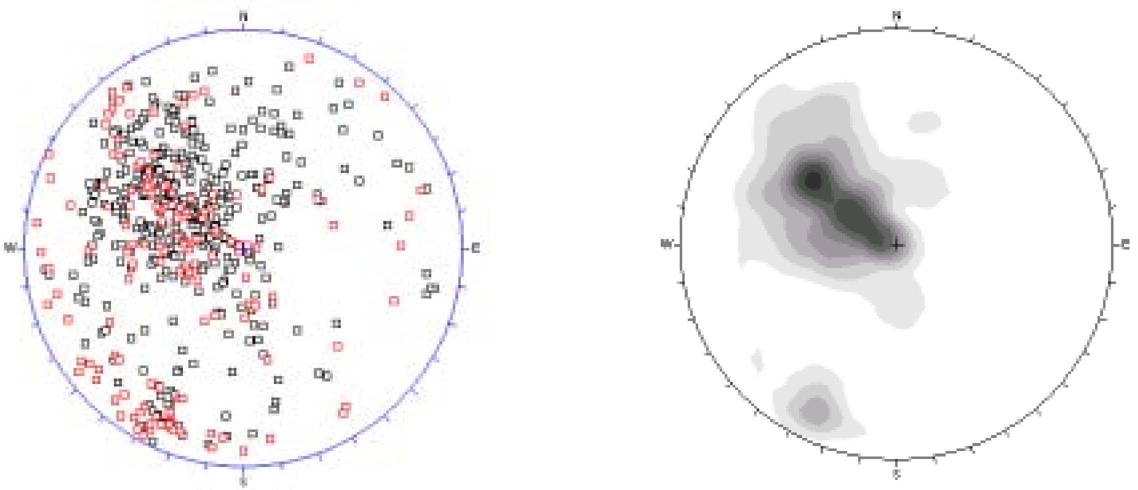
a) 100 – 200 m (n=302)



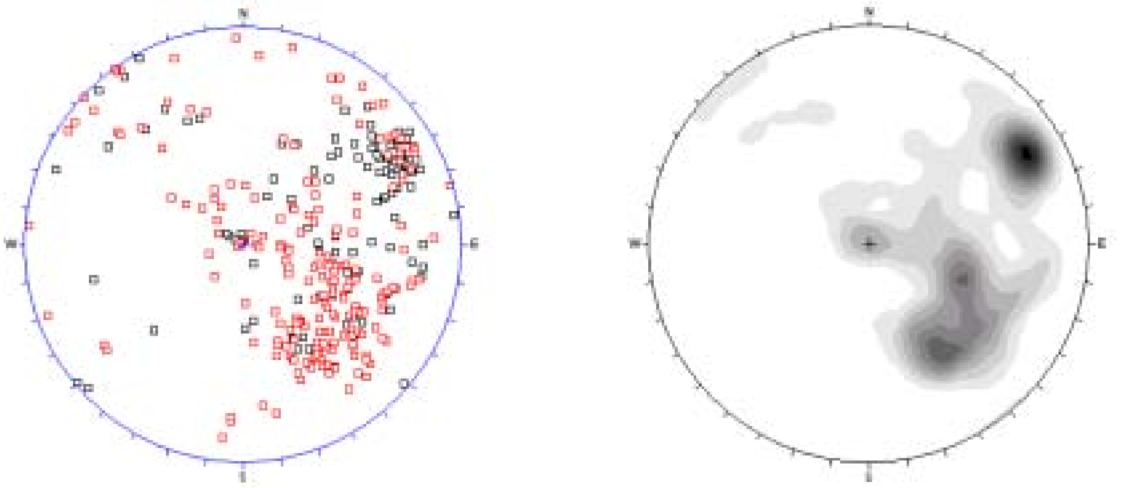
b) 200 – 400 m (n=265)



c) 400 – 520 m (n=573)



d) 520 – 700 m (n=313)



e) 700 – 1000 m (n=245)

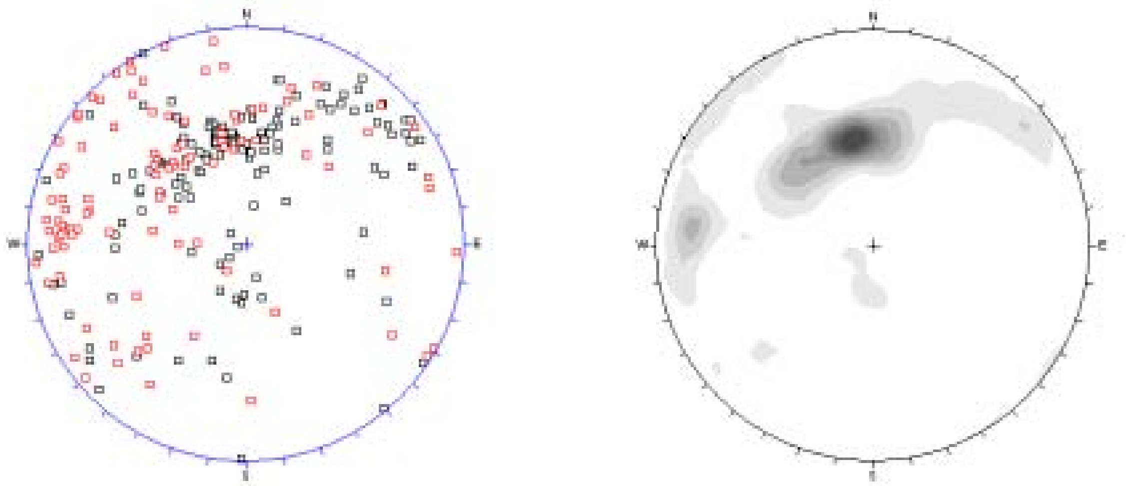


Figure 5-3. *Lower hemisphere equal-area stereographic projections showing the poles to natural (black squares) and sealed (red squares) fractures within borehole KFM02A: a) 100–200 m depth, b) 200–400 m depth, c) 400–520 m depth, d) 520–700 m depth, and e) 700–1000 m depth.*

5.4.2 Infilling mineralogy

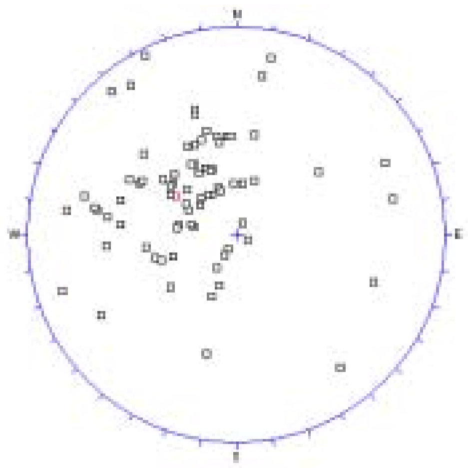
A majority of the fractures in the cored interval of KFM02A are filled by chlorite and/or calcite. Another important group, generally limited to the natural fractures, are those fractures virtually free from visible mineral coatings. Other infilling minerals, in order of decreasing abundance, include prehnite, quartz, undifferentiated clay minerals, hematite, epidote, laumontite, pyrite, zeolites (probably analcime) and feldspars. In addition, one fracture at 797.92 m depth was found to be coated by malachite. The occurrence of finely crystalline coatings interpreted as clay minerals are more or less restricted to natural fractures in the upper half of KFM02A (Figure 5-4a), often found in close association with chlorite and/or calcite. Quartz, prehnite and epidote, on the other hand, are with few exceptions limited to sealed fractures (Figure 5-4b, c and d). Also the occurrence of oxidized walls is preferentially associated with sealed fractures (Figure 5-4e). Most epidote sealed fractures exhibit oxidized walls and belong to a NE striking and NW steeping fracture set in a narrow interval between 565 and 675 m depth. Laumontite is found in both natural and sealed fractures (Figure 5-4f), but the mapping of borehole KFM01A showed that this filling tends to expand, and eventually crackle in the drill core /3/. Thus, some laumontite-bearing fractures mapped as natural may in fact represent originally sealed fractures.

Three major crush zones were found during the mapping of KFM02A at 118.80–119.40, 266.58–267.10, and 513.42–513.68 m depth. In addition, there are three minor zones at the following depths: 110.59–110.67, 118.29–118.32, and 163.05–163.08 m. Breccia zones, however, are virtually absent in KFM02A (cf. KFM01A /3/).

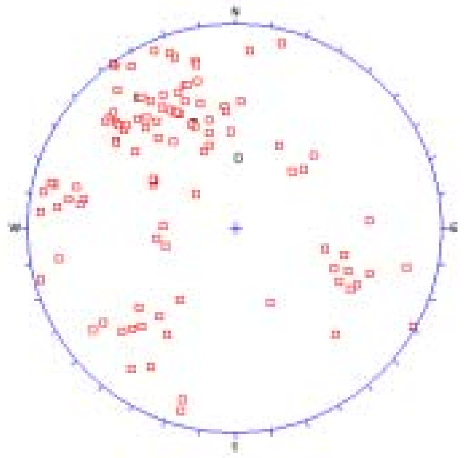
Litholological contacts provide mechanical discontinuities in the drill core. It is therefore reasonable to expect that high competence contrasts, such as between granitic material and amphibolite, may focus fracture formation. Slightly more than 35% of the amphibolite–metagranite contacts in the cored interval are fractured and less than 10% of these fractures are sealed. Only about 10% of the contacts within KFM01A are fractured /3/. However, the latter number is probably somewhat low as the proportion of fractured contacts is a reconstruction, estimated from the Access database when the drill core no longer was available.

Interestingly, most fractures in the upper, percussion drilled 100 m are rather steep. The apparent deficiency of the horizontal to gently dipping fracture category is probably an artefact, as the blurred BIPS-image often renders the recognition of such fracture almost impossible.

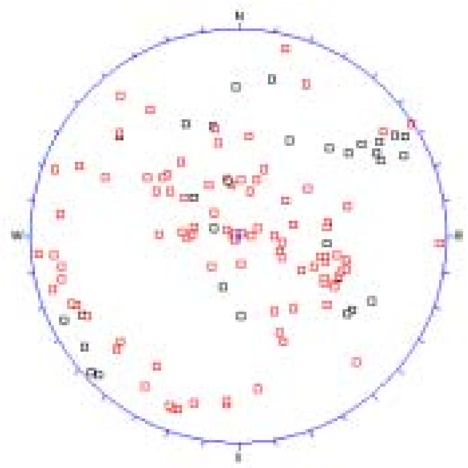
a) Clay minerals (n=77)



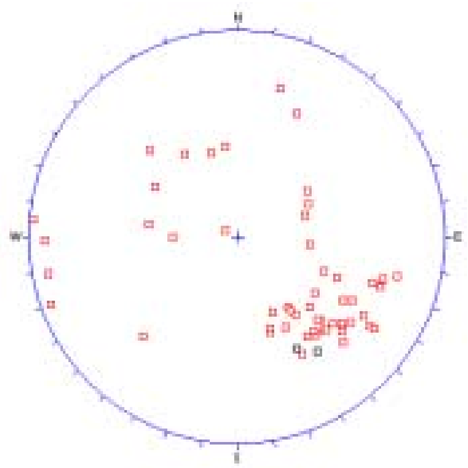
b) Quartz (n=102)



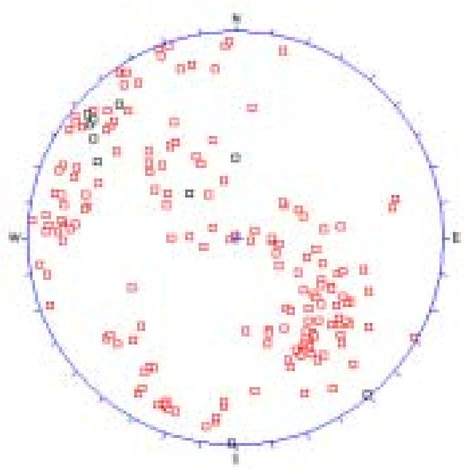
c) Prehnite (n=127)



d) Epidote (n=55)



e) Oxidized walls (n=178)



f) Laumontite (n=39)

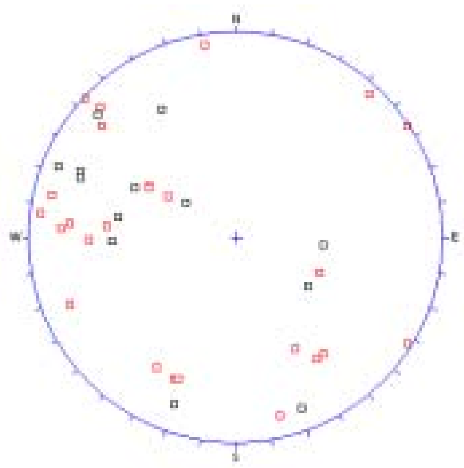


Figure 5-4. *Lower hemisphere equal-area stereographic projections showing the poles to natural (black squares) and sealed (red squares) fractures filled with: a) clay minerals, b) quartz, c) prehnite, d) epidote, e) surrounded by oxidized walls, and f) laumontite.*

5.5 Discussion

The lithology of KFM02A corresponds generally well with the surface geology in the area /2/, though the rock proportions differ slightly. Intrusions of fine-grained granitoids, for example, are more widespread than what might be expected from the regional surface mapping made by the SGU /4/. Also the ductile features, with a predominant mineral lineation plunging gently to moderately toward SE, are in close agreement with the surface structural trend in the area /4/. However, the orientation of the often weak tectonic foliation in KFM02A, striking roughly NE and dipping moderately towards the SE, is rather atypical for the area, though still recognizable, especially in the central part of the tectonic lens which extends from the Forsmark nuclear power station southeastwards to Kallrigafjärden, and thus predominates the Forsmark test site area. It provides, moreover, support for a major, SE plunging fold structure, inferred to be present within this lens /5/.

The fracture pattern and infilling mineralogy of KFM02A differ in several aspects from that in KFM01A. The most conspicuous difference is that the well defined set of subvertical, NE striking fractures, often sealed by laumontite and chlorite, which prevails in KFM01A /3/ has no equivalence in KFM02A. Borehole KFM01A, on the other hand, has few representatives from the roughly NE striking, but more gently to moderately dipping fracture groups, which typify KFM02A. Regarding the infilling mineralogy, there are no epidote filled fractures in KFM01A, and quartz and prehnite fillings occur only sparsely /3/. All steep fracture sets known from the region, especially the NW-set around reactor 3 and close to SFR /6/, are underrepresented in KFM02A. One plausible explanation to this is the orientation of the borehole, plunging steeply towards NW.

The highly fractured interval at about 400–520 m depth might be of importance in assessing the location of a deep repository in the Forsmark test site area. The fracture orientation within this zone correspond well with the NE (c. 50°) trend of some of the lineaments inferred to occur in the tectonic lens which predominate the test site area.

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/6/ **Carlsson A, Christiansson R, 1987.** Geology and tectonics at Forsmark. SKB Progress Report SFR 87-04, Svensk Kärnbränslehantering AB, 91 pp.

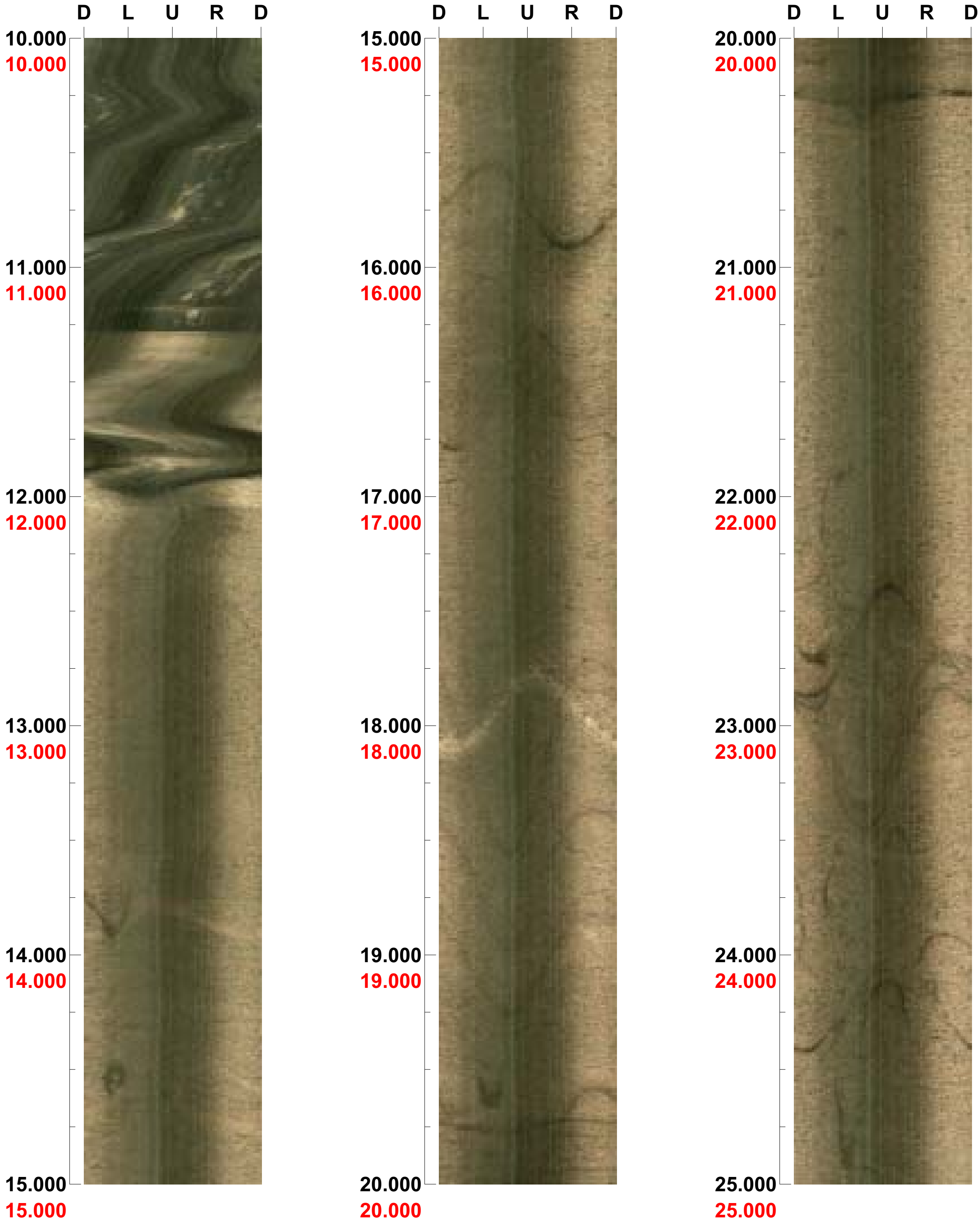
Appendix 1

Project name: Forsmark

Image file	: g:\skb\bips\forsmark\kfm02a\bips_~rl\kfm02a.bip
BDT file	: g:\skb\bips\forsmark\kfm02a\bips_~rl\kfm02a.bdt
Locality	: FORSMARK
Bore hole number	: KFM02A
Date	: 02/12/02
Time	: 21:39:00
Depth range	: 10.000 - 99.728 m
Azimuth	: 276
Inclination	: -85
Diameter	: 164.0 mm
Magnetic declination	: 0.0
Span	: 4
Scan interval	: 0.25
Scan direction	: To bottom
Scale	: 1/25
Aspect ratio	: 150 %
Pages	: 6
Color	: +0 +0 +0

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 276** **Inclination: -85**

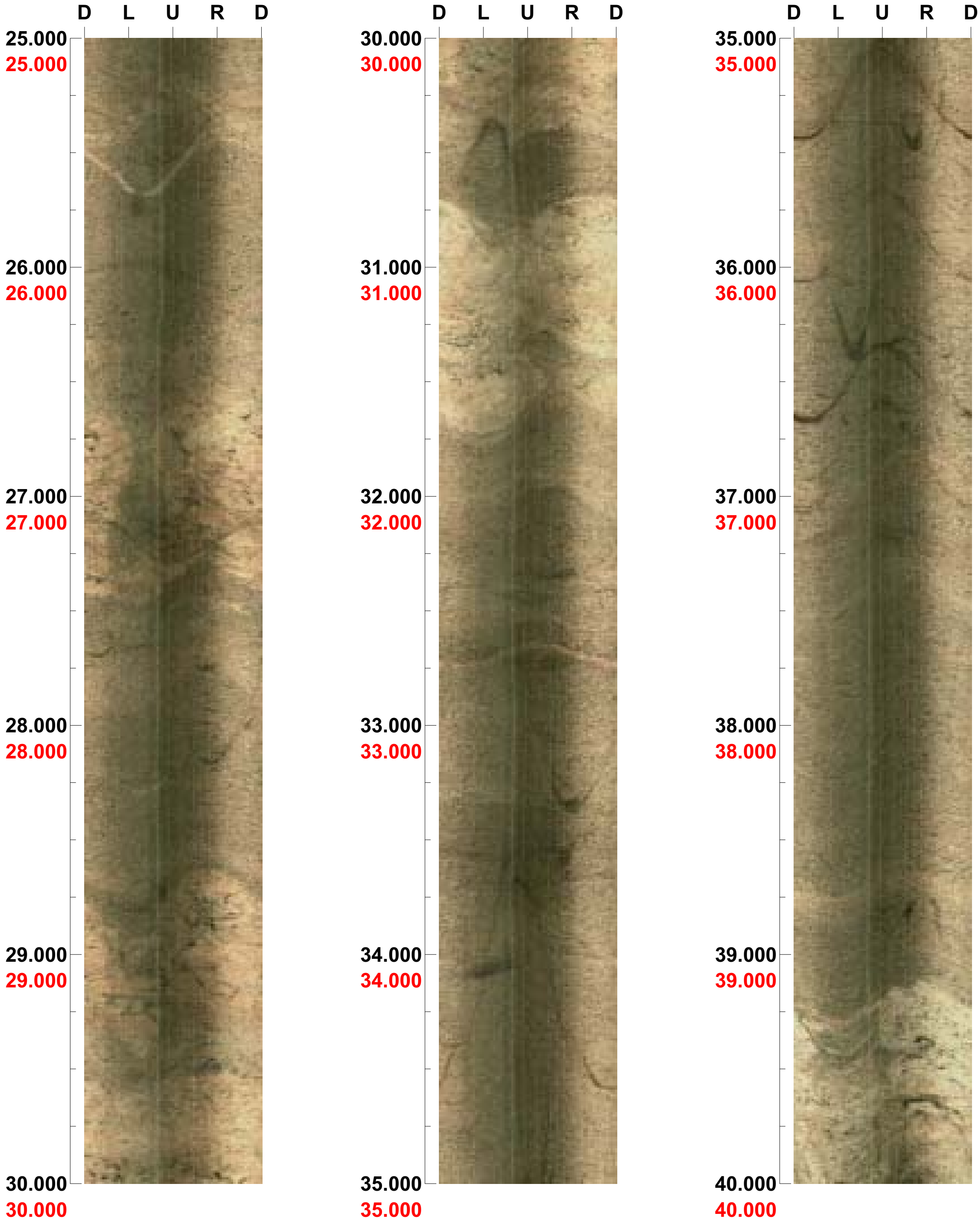
Depth range: 10.000 - 25.000 m



(1 / 6) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 276** **Inclination: -85**

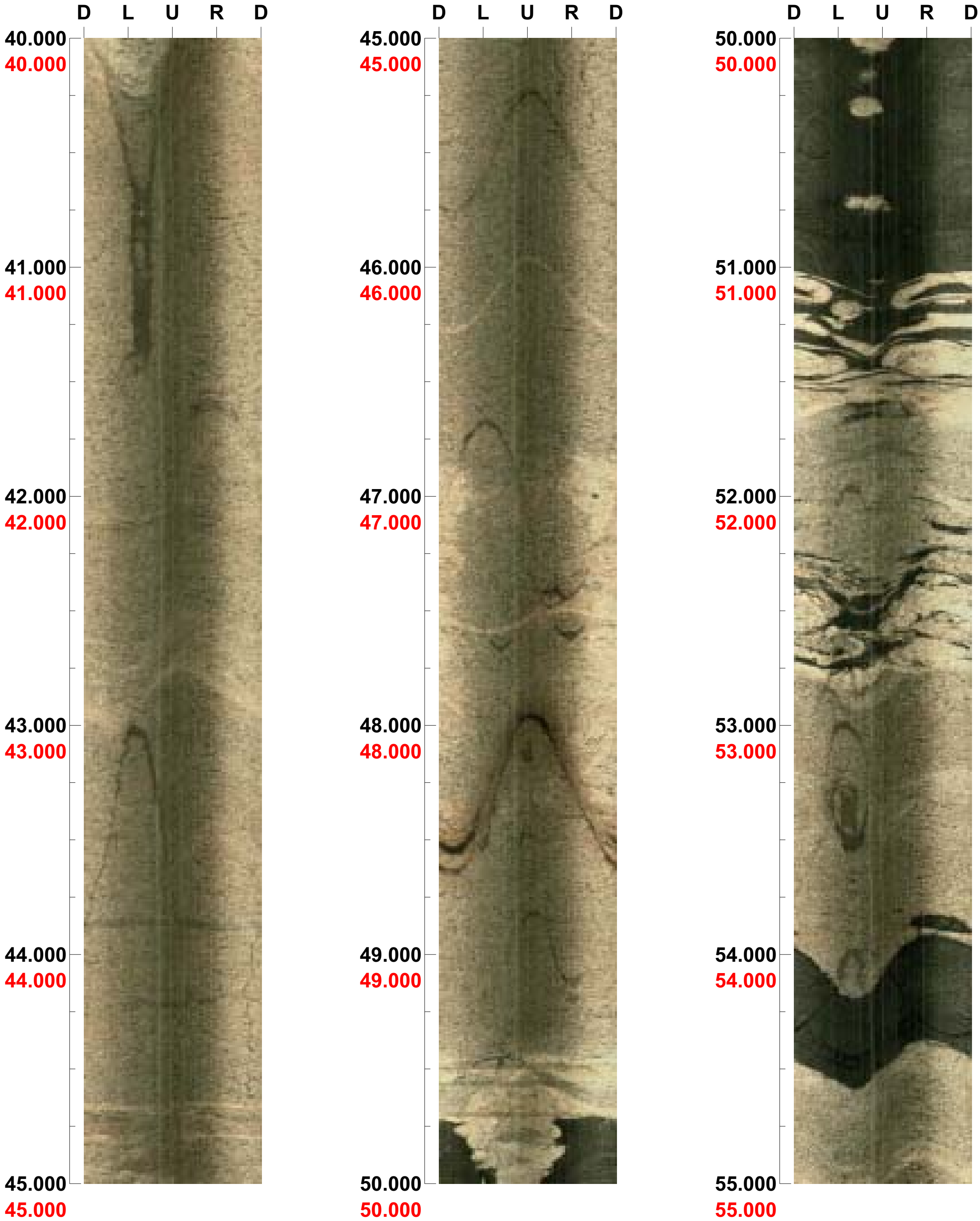
Depth range: 25.000 - 40.000 m



(2 / 6) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 276** **Inclination: -85**

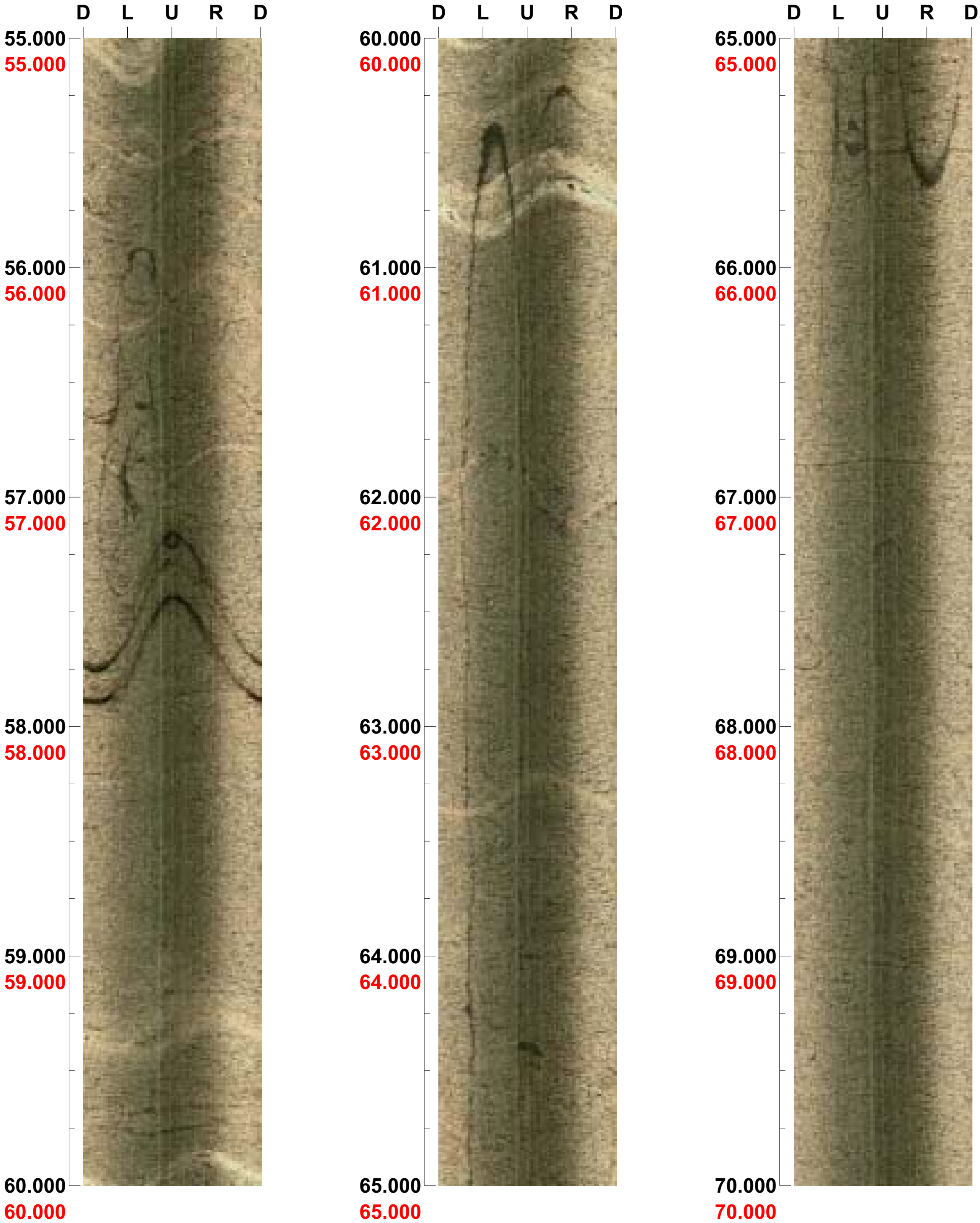
Depth range: 40.000 - 55.000 m



(3 / 6) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 274** **Inclination: -86**

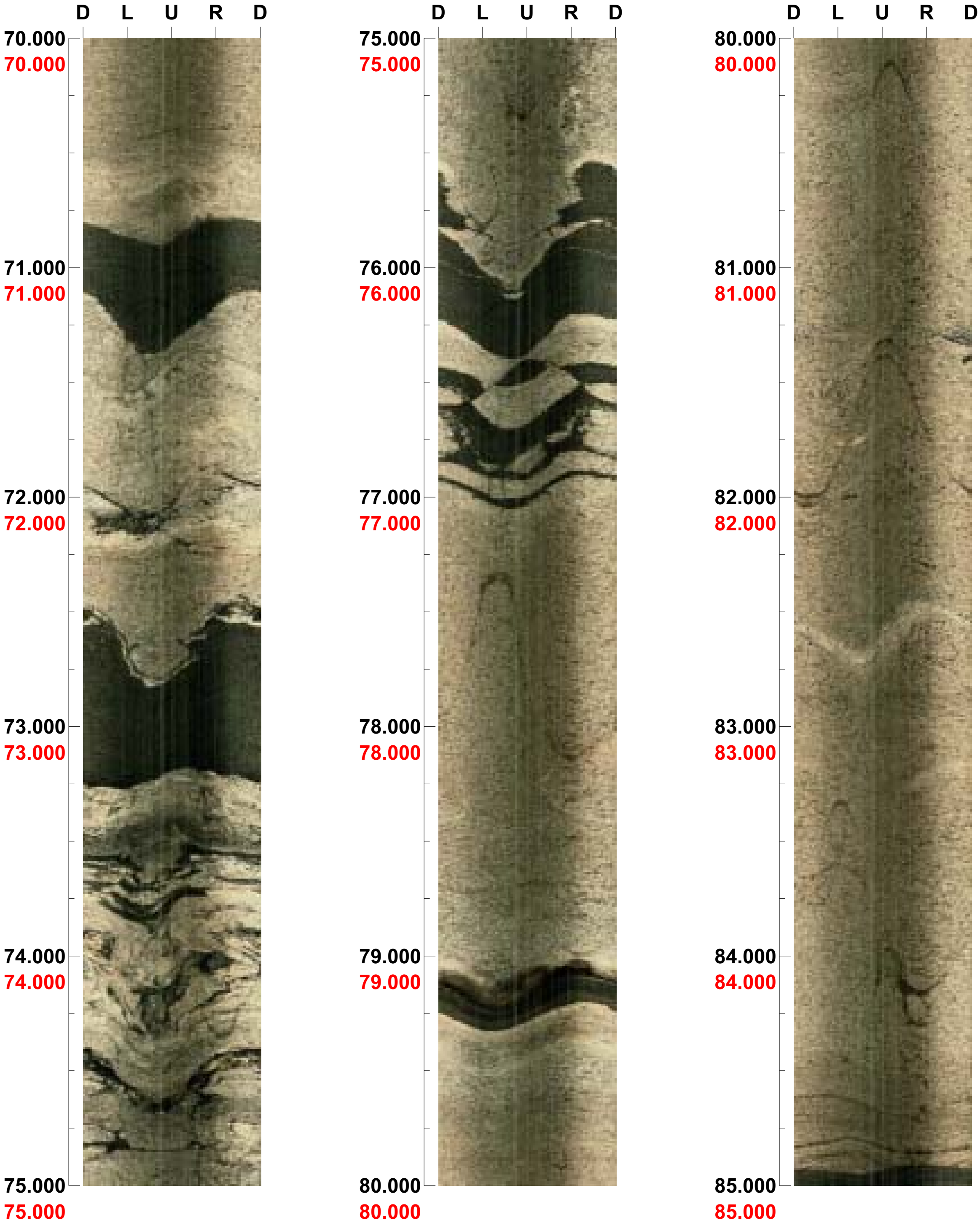
Depth range: 55.000 - 70.000 m



(4 / 6) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 273** **Inclination: -86**

Depth range: 70.000 - 85.000 m



(5 / 6) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 274** **Inclination: -86**

Depth range: 85.000 - 99.728 m

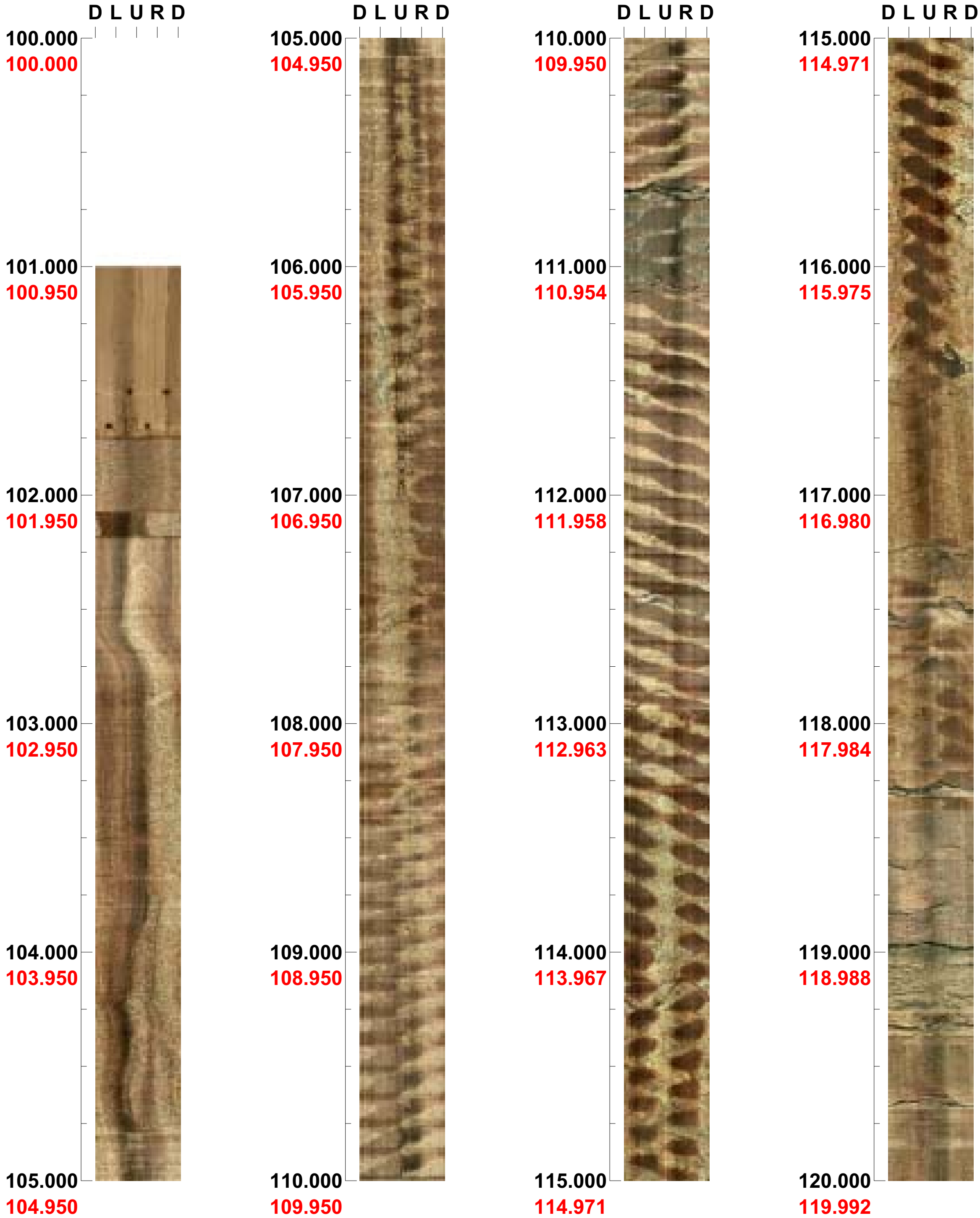
(6 / 6) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Image file	**: g:\skb\bips\forsmark\kfm02a\bipsl~94\kfm02a_1.bip**
BDT file	**: g:\skb\bips\forsmark\kfm02a\bipsl~94\kfm02a_1.bdt**
Locality	**: FORSMARK**
Bore hole number	**: KFM02A**
Date	**: 03/04/14**
Time	**: 20:46:00**
Depth range	**: 101.000 - 391.847 m**
Azimuth	**: 270**
Inclination	**: -86**
Diameter	**: 77.0 mm**
Magnetic declination	**: 0.0**
Span	**: 4**
Scan interval	**: 0.25**
Scan direction	**: To bottom**
Scale	**: 1/25**
Aspect ratio	**: 150 %**
Pages	**: 15**
Color	**: +0 +0 +0**

Project name: Forsmark
Bore hole No.: KFM02A Azimuth: 270 Inclination: -86

Depth range: 100.000 - 120.000 m



(1 / 15) Scale: 1/25 Aspect ratio: 150 %

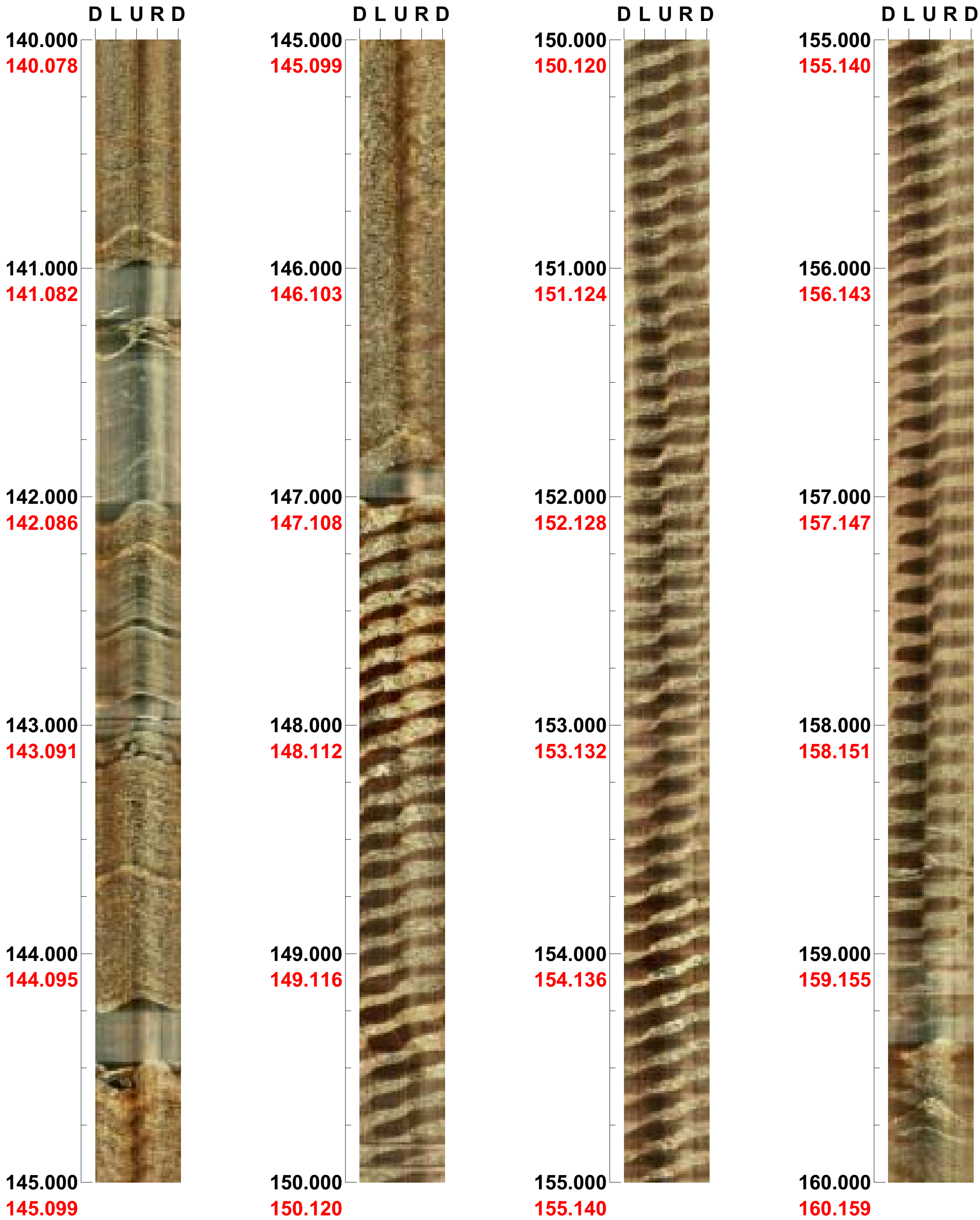
Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 277** **Inclination: -86**

Depth range: 120.000 - 140.000 m

(2 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 280** **Inclination: -85**

Depth range: 140.000 - 160.000 m



(3 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 282** **Inclination: -85**

Depth range: 160.000 - 180.000 m

(4 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 284** **Inclination: -85**

Depth range: 180.000 - 200.000 m

(5 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 288** **Inclination: -85**

Depth range: 200.000 - 220.000 m

(6 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 289** **Inclination: -85**

Depth range: 220.000 - 240.000 m

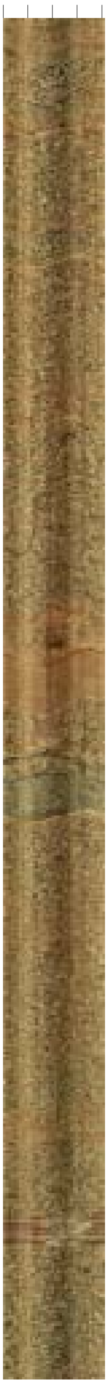
D L U R D

220.000
220.433

221.000
221.439
222.000
222.445
223.000
223.451
224.000
224.457
225.000
225.463

D L U R D

225.000
225.463



226.000
226.469
227.000
227.475
228.000
228.481
229.000
229.487
230.000
230.493

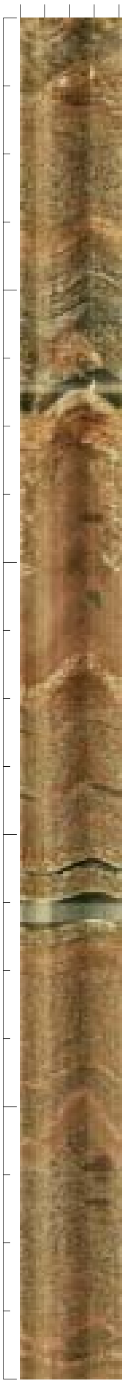
D L U R D

230.000
230.493

231.000
231.499
232.000
232.505
233.000
233.511
234.000
234.517
235.000
235.523

D L U R D

235.000
235.523



236.000
236.529
237.000
237.535
238.000
238.541
239.000
239.547
240.000
240.553

(7 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 291** **Inclination: -85**

Depth range: 240.000 - 260.000 m

(8 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

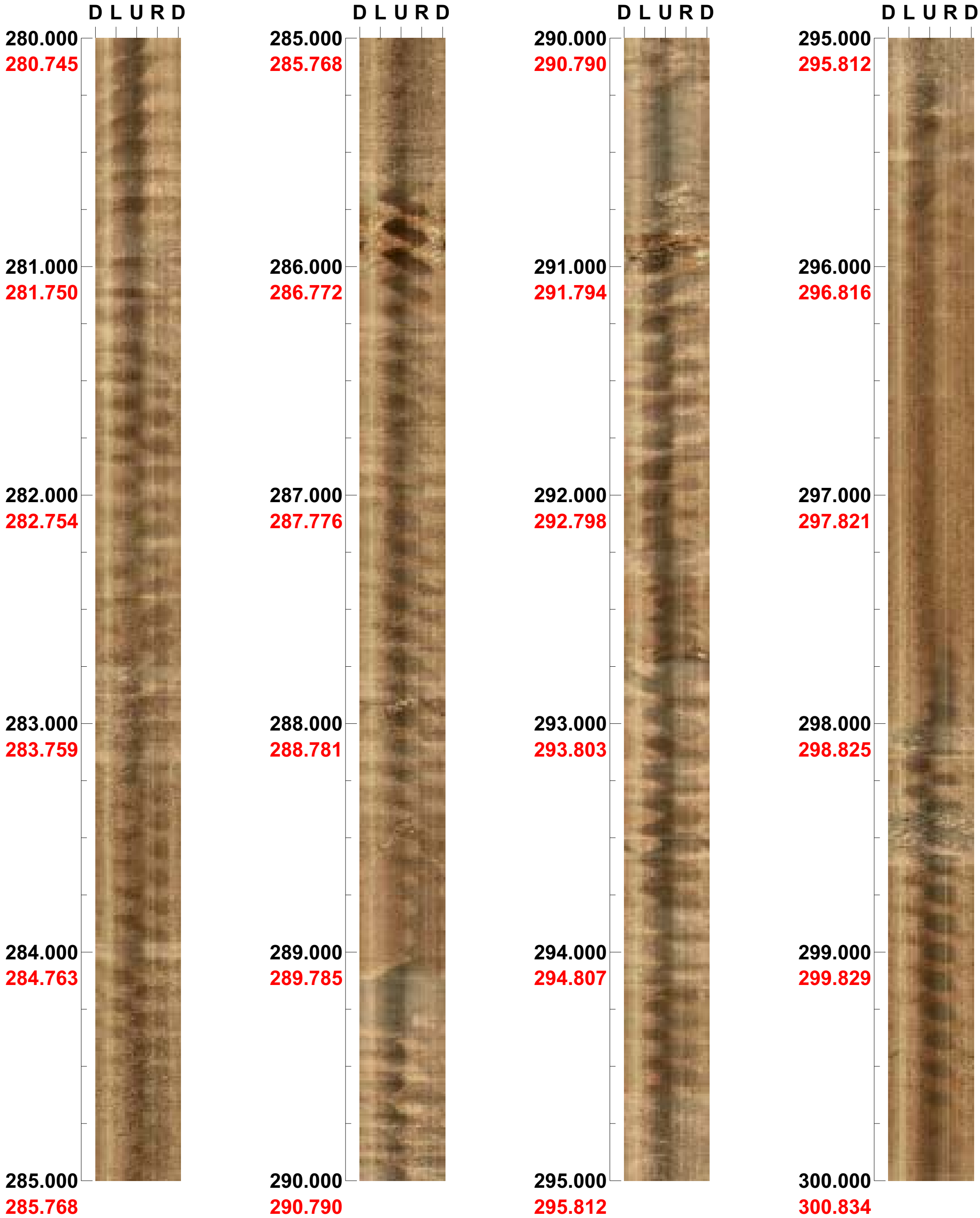
Project name: Forsmark
Bore hole No.: KFM02A Azimuth: 291 Inclination: -84

Depth range: 260.000 - 280.000 m

(9 / 15) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 292** **Inclination: -85**

Depth range: 280.000 - 300.000 m



(10 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 291** **Inclination: -85**

Depth range: 300.000 - 320.000 m

(11 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 291** **Inclination: -85**

Depth range: 320.000 - 340.000 m

(12 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 291** **Inclination: -84**

Depth range: 340.000 - 360.000 m

(13 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 292** **Inclination: -84**

Depth range: 360.000 - 380.000 m

(14 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 293** **Inclination: -84**

Depth range: 380.000 - 391.847 m

(15 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Image file	: g:\skb\bips\forsmark\kfm02a\bipsl~94\kfm02a_2.bip
BDT file	: g:\skb\bips\forsmark\kfm02a\bipsl~94\kfm02a_2.bdt
Locality	: FORSMARK
Bore hole number	: KFM02A
Date	: 03/04/15
Time	: 09:25:00
Depth range	: 380.000 - 590.012 m
Azimuth	: 293
Inclination	: -84
Diameter	: 77.0 mm
Magnetic declination	: 0.0
Span	: 4
Scan interval	: 0.25
Scan direction	: To bottom
Scale	: 1/25
Aspect ratio	: 150 %
Pages	: 10
Color	: +0 +0 +0

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 293** **Inclination: -84**

Depth range: 392.000 - 412.000 m

(1 / 10) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 277** **Inclination: -86**

Depth range: 120.000 - 140.000 m

(2 / 15) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A
Azimuth: 295 Inclination: -84

Depth range: 432.000 - 452.000 m

(3 / 10) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 296** **Inclination: -84**

Depth range: 452.000 - 472.000 m

(4 / 10) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 297** **Inclination: -84**

Depth range: 472.000 - 492.000 m

(5 / 10) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 301** **Inclination: -84**

Depth range: 492.000 - 512.000 m

(6 / 10) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 301** **Inclination: -84**

Depth range: 512.000 - 532.000 m

(7 / 10) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 300** **Inclination: -84**

Depth range: 532.000 - 552.000 m

(8 / 10) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 299** **Inclination: -83**

Depth range: 552.000 - 572.000 m

(9 / 10) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 300** **Inclination: -83**

Depth range: 572.000 - 590.012 m

(10 / 10) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Image file	**: g:\skb\bips\forsmark\kfm02a\bipsl~94\kfm02a_3.bip**
BDT file	**: g:\skb\bips\forsmark\kfm02a\bipsl~94\kfm02a_3.bdt**
Locality	**: FORSMARK**
Bore hole number	**: KFM02A**
Date	**: 03/04/15**
Time	**: 11:49:00**
Depth range	**: 590.000 - 999.191 m**
Azimuth	**: 303**
Inclination	**: -82**
Diameter	**: 77.0 mm**
Magnetic declination	**: 0.0**
Span	**: 4**
Scan interval	**: 0.25**
Scan direction	**: To bottom**
Scale	**: 1/25**
Aspect ratio	**: 150 %**
Pages	**: 21**
Color	**: +0 +0 +0**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 303** **Inclination: -82**

Depth range: 590.000 - 610.000 m

(1 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 303** **Inclination: -82**

Depth range: 610.000 - 630.000 m

(2 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 304** **Inclination: -82**

Depth range: 630.000 - 650.000 m

(3 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

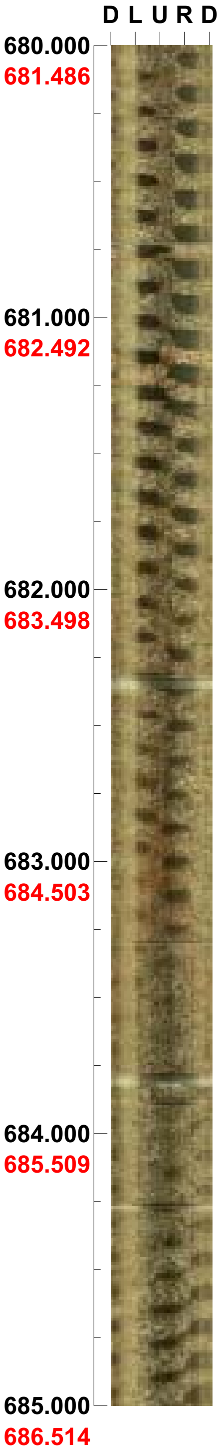
Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 303** **Inclination: -82**

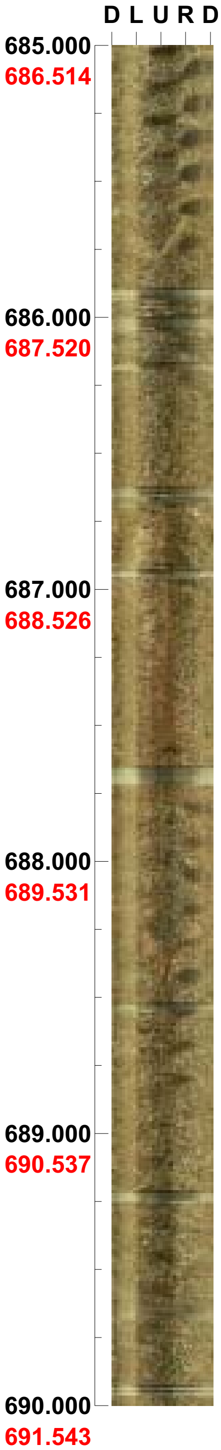
Depth range: 650.000 - 670.000 m

(4 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 303** **Inclination: -82**

Depth range: 670.000 - 690.000 m





(5 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 304** **Inclination: -82**

Depth range: 690.000 - 710.000 m

(6 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A
Azimuth: 304
Inclination: -82

Depth range: 710.000 - 730.000 m

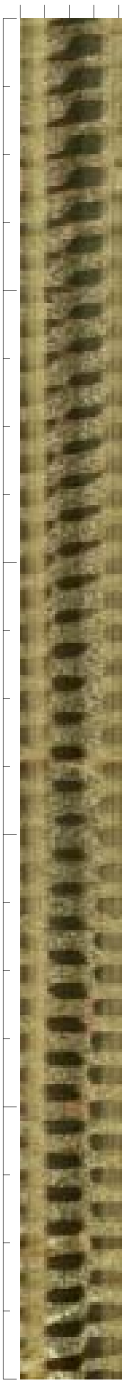
(7 / 21)
Scale: 1/25
Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 305** **Inclination: -82**

Depth range: 730.000 - 750.000 m

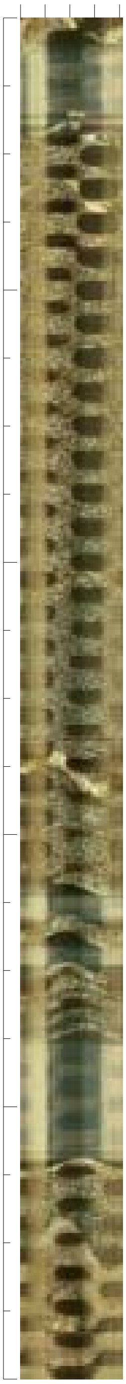
D L U R D

730.000 731.698
731.000 732.701
732.000 733.705
733.000 734.708
734.000 735.711
735.000 736.715



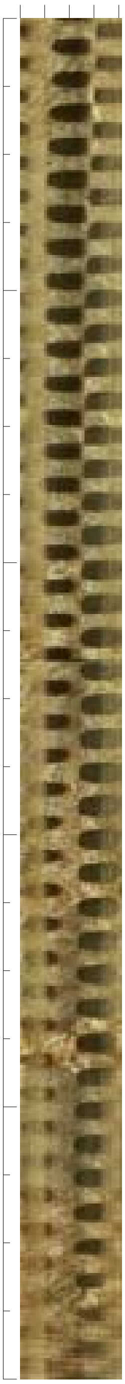
D L U R D

735.000 736.715
736.000 737.718
737.000 738.722
738.000 739.725
739.000 740.728
740.000 741.732



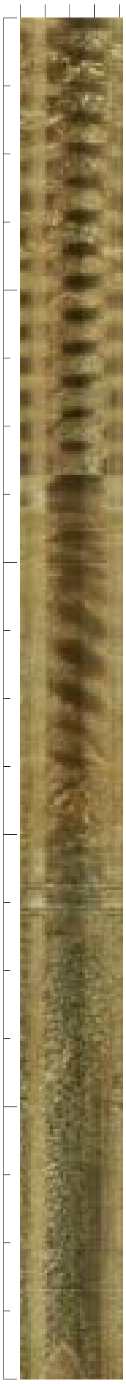
D L U R D

740.000 741.732
741.000 742.735
742.000 743.739
743.000 744.742
744.000 745.746
745.000 746.749



D L U R D

745.000 746.749
746.000 747.752
747.000 748.756
748.000 749.759
749.000 750.763
750.000 751.767



(8 / 21) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 305** **Inclination: -82**

Depth range: 750.000 - 770.000 m

(9 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 305** **Inclination: -82**

Depth range: 770.000 - 790.000 m

(10 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 305** **Inclination: -82**

Depth range: 790.000 - 810.000 m

(11 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 306** **Inclination: -81**

Depth range: 810.000 - 830.000 m

(12 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 306** **Inclination: -81**

Depth range: 830.000 - 850.000 m

(13 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A

Azimuth: 306 Inclination: -81

Depth range: 850.000 - 870.000 m

(14 / 21) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 307** **Inclination: -81**

Depth range: 870.000 - 890.000 m

(15 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 307** **Inclination: -81**

Depth range: 890.000 - 910.000 m

(16 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 308** **Inclination: -81**

Depth range: 910.000 - 930.000 m

(17 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 309** **Inclination: -81**

Depth range: 930.000 - 950.000 m

(18 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 309** **Inclination: -81**

Depth range: 950.000 - 970.000 m

(19 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark
Bore hole No.: KFM02A **Azimuth: 310** **Inclination: -80**

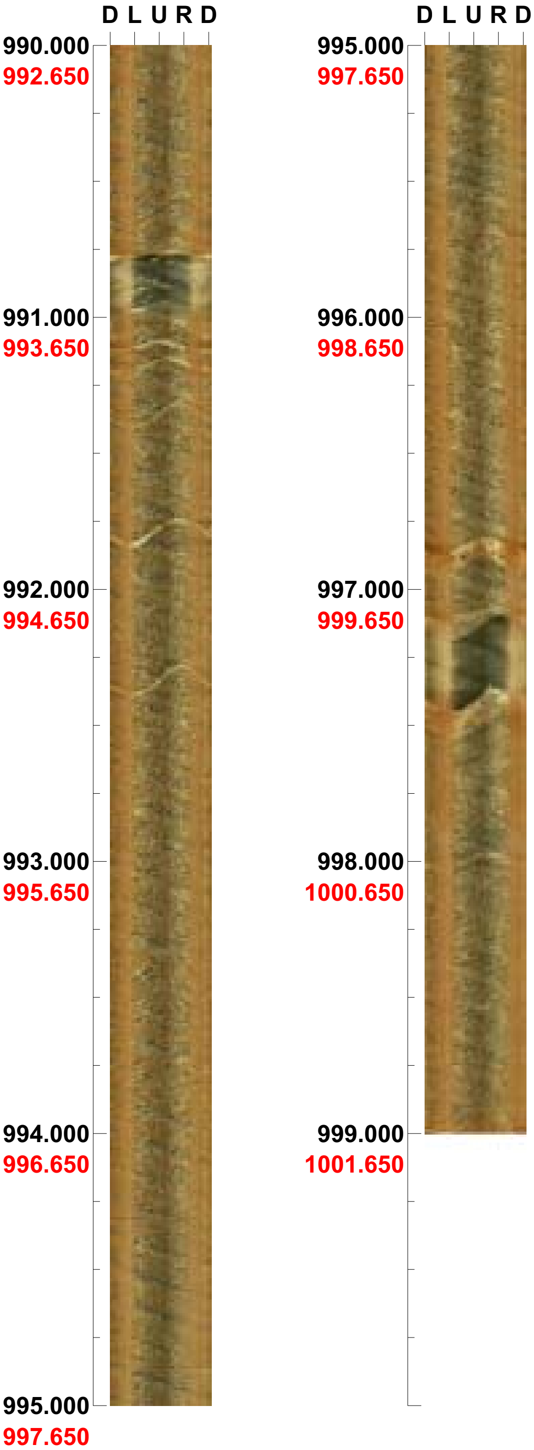
Depth range: 970.000 - 990.000 m

(20 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Project name: Forsmark

Bore hole No.: KFM02A **Azimuth: 310** **Inclination: -80**

Depth range: 990.000 - 999.191 m



(21 / 21) **Scale: 1/25** **Aspect ratio: 150 %**

Appendix 2

Title LEGEND FOR FORSMARK KFM02A

Site FORSMARK
Borehole KFM02A
Plot Date 2003-11-21 14:49:48

ROCKTYPE FORSMARK
- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granitoid, metamorphic
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite, metamorphic, aplitic
- Granite to granodiorite, metamorphic, medium-grained
- Granodiorite, metamorphic
- Tonalite to granodiorite, metamorphic
- Diorite, quarts diorite and gabbro, metamorphic
- Ultramafic rock, metamorphic
- Amphibolite
- Calc-silicate rock (skarn)
- Magnetite mineralization associated with calc-silicate rock (skarn)
- Sulphide mineralization
- Felsic to intermediate volcanic rock, metamorphic
- Mafic volcanic rock, metamorphic
- Sedimentary rock, metamorphic

STRUCTURE
- Schistose
- Gneissic
- Mylonitic
- Ductile Shear Zone
- Brittle-Ductile Zone
- Veined
- Banded
- Massive
- Foliated
- Brecciated
- Lineated

TEXTURE
- Hornfelsed
- Porphyritic
- Ophitic
- Equigranular
- Augen-Bearing
- Non_equigranular
- Metamorphic

GRAINSIZE
- Aphanitic
- Fine grained
- Fine to Medium Grained
- Medium coarse
- Coarse grained
- Medium grained

STRUCTURE ORIENTATION
- Bedded
- Gneissic
- Schistose
- Brittle-Ducktile Shear Zone
- Ductile Shear Zone
- Lineated
- Banded
- Viened
- Brecciated
- Massive
- Foliated
- Mylonitic

ROCK ALTERATION
- Oxidized
- Cloritisized
- Epidotisized
- Weathered
- Tectonized
- Sericitisized
- Miarolitic
- Silicification
- Argillization
- Albitization
- Carbonatization
- Saussuritization
- Steatitization
- Uralitization

INTENSITY
- No intensity
- Faint
- Weak
- Medium
- Strong

ROUGHNESS
- Planar
- Undulating
- Stepped
- Irregular

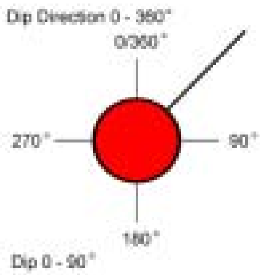
SURFACE
- Rough
- Smooth
- Slickensided

CRUSH ALTERATION
- Slightly Altered
- Moderately Altered
- Highly Altered
- Completley Altered
- Gouge
- Fresh

MINERAL
- Epidote
- Hematite
- Calcite
- Chlorite
- Quartz
- Unknown
- Pyrite
- Clay Minerals
- Laumontite
- Zeolite
- Prehnite
- Iron Hydroxide

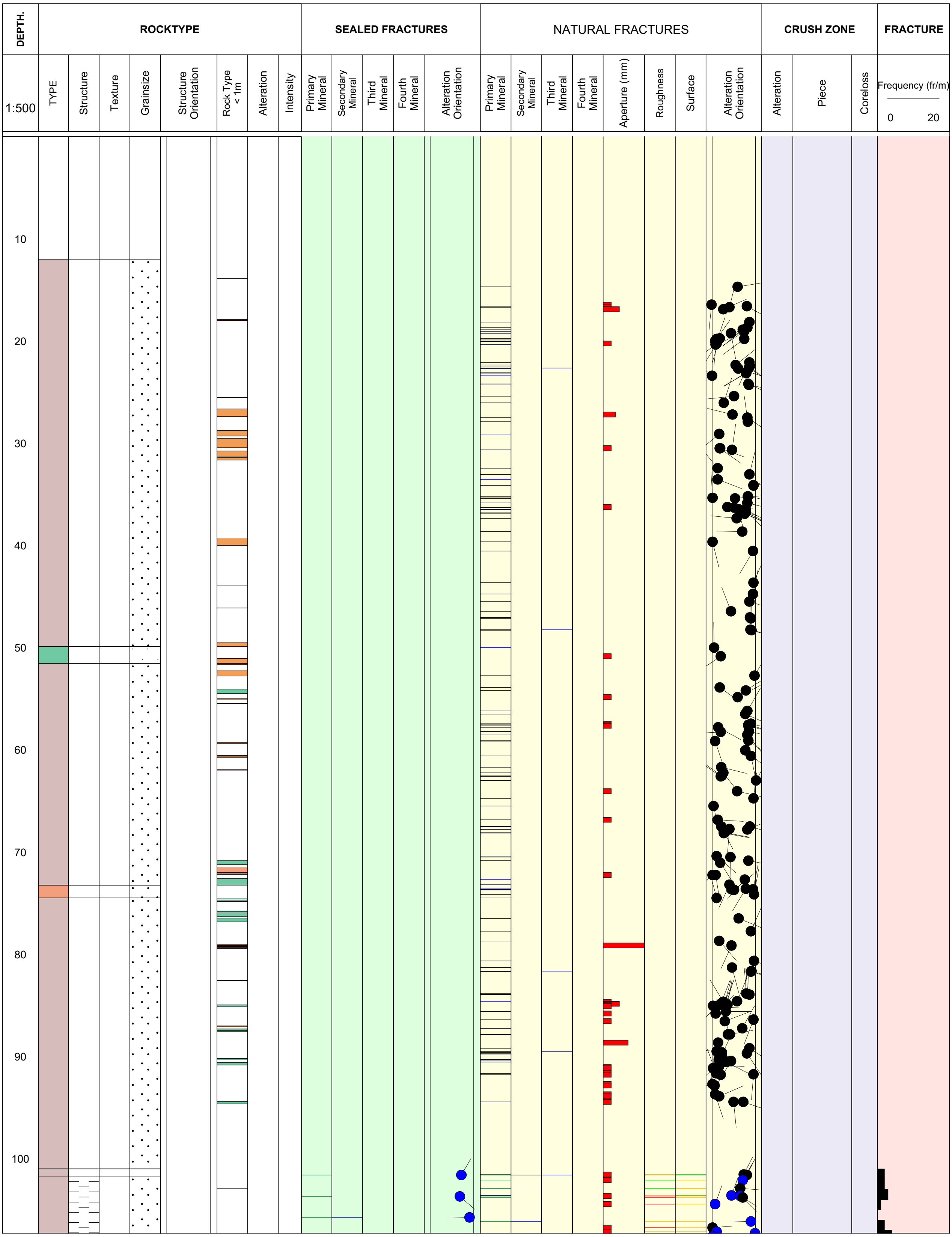
FRACTURE ALTERATION
- Slightly Altered
- Moderately Altered
- Highly Altered
- Completely Altered
- Gouge
- Fresh

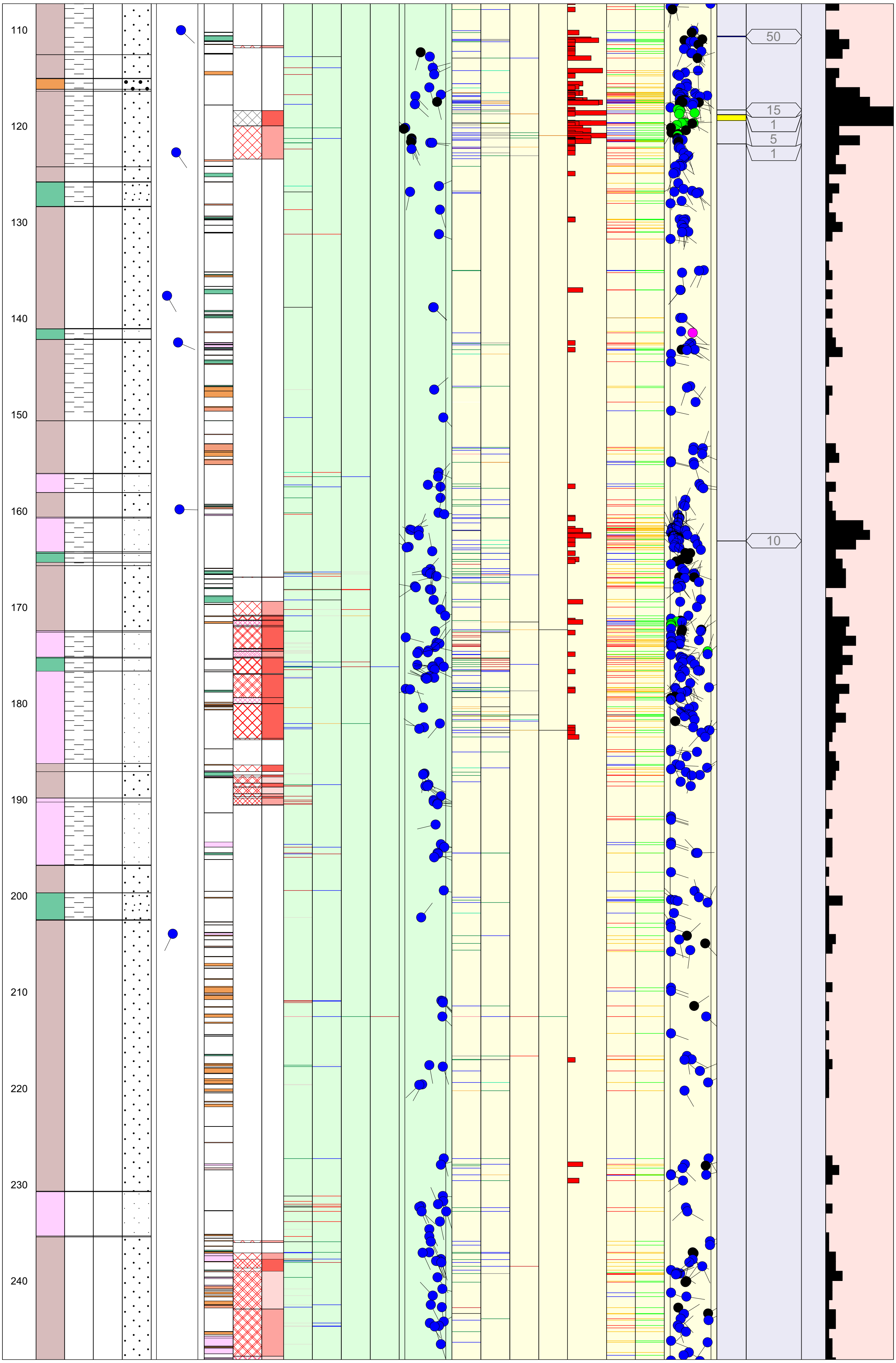
FRACTURE DIRECTION



Title **GEOLOGY KFM02A**

Site	FORSMARK	**Coordinate System**	RT90-RHB70
Borehole	KFM02A	**Northing [m]**	6698712.501
Diameter [m]	0.077	**Easting [m]**	1633182.863
Length [m]	1002.44	**Elevation [m.a.s.l.]**	7.353
Bearing [°]	275.7645	**Drilling Start Date**	2002-11-20 14:03:00
Inclination [°]	-85.3847	**Drilling Stop Date**	2003-03-12 21:30:00
Remark		**Plot Date**	2003-10-21 17:02:27





110
120
130
140
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160
170
180
190
200
210
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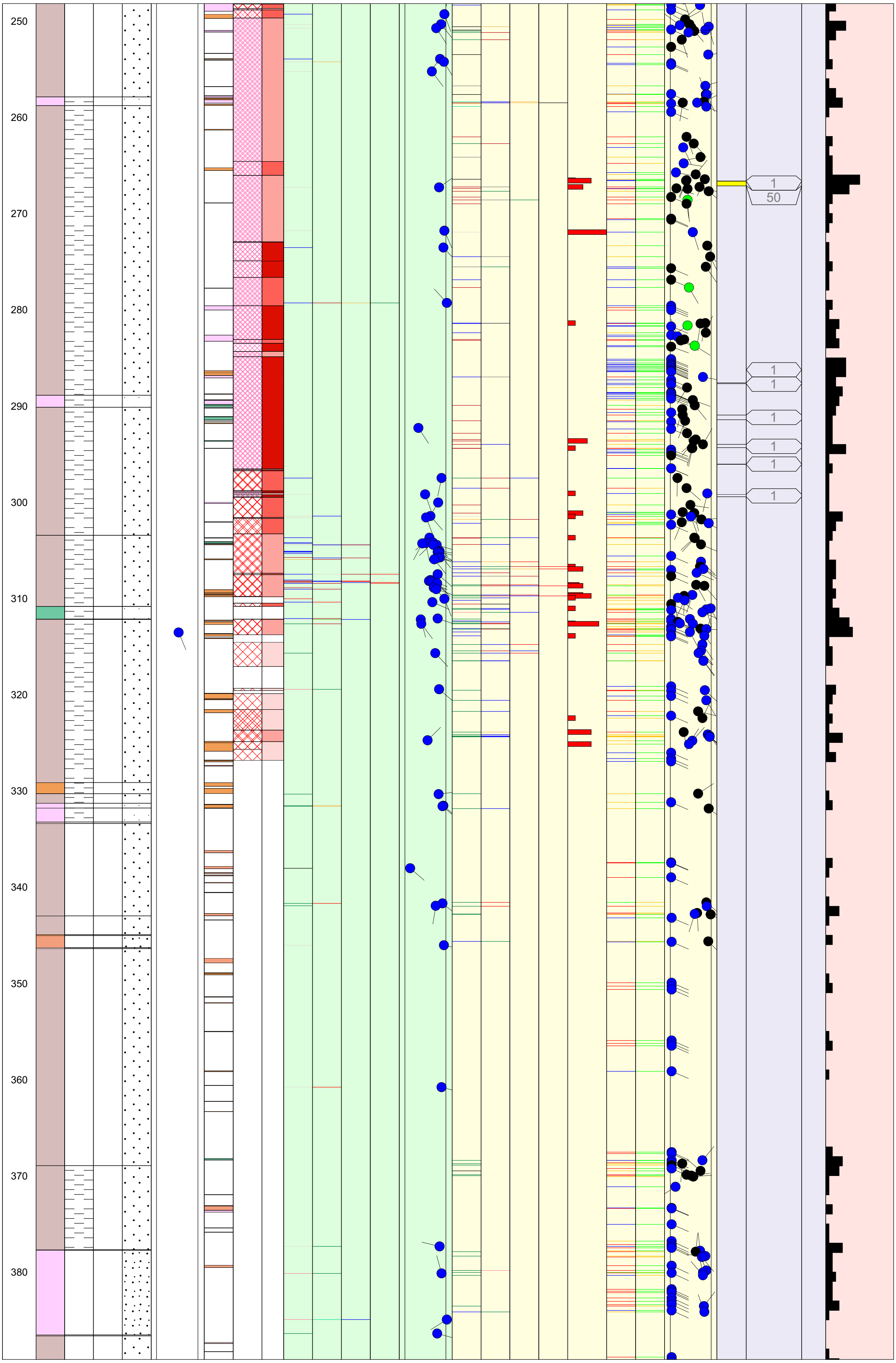
230
240
50
15
1
5
1
10


250
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270
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330
340
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380
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50
1
1
1
1
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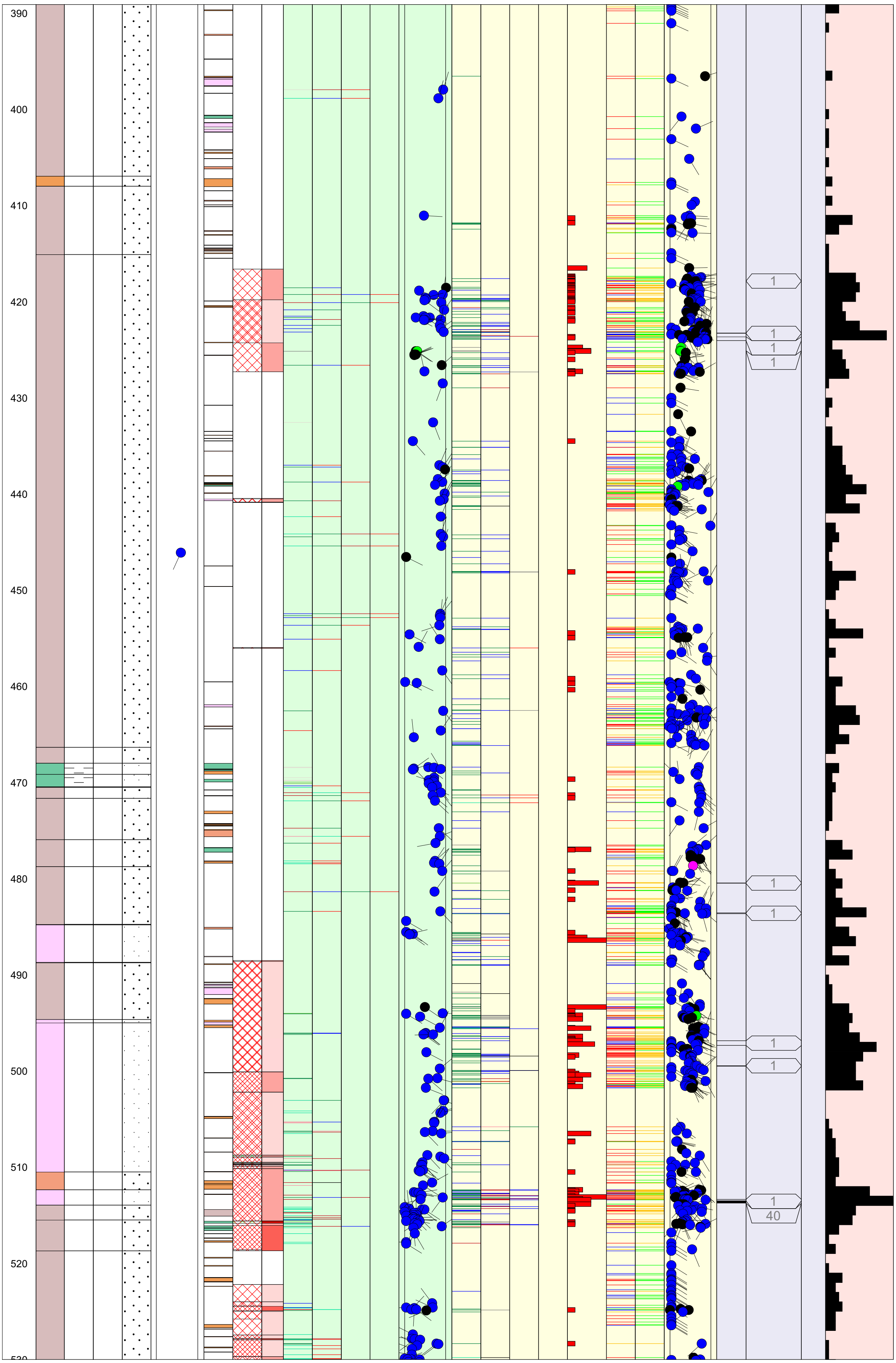

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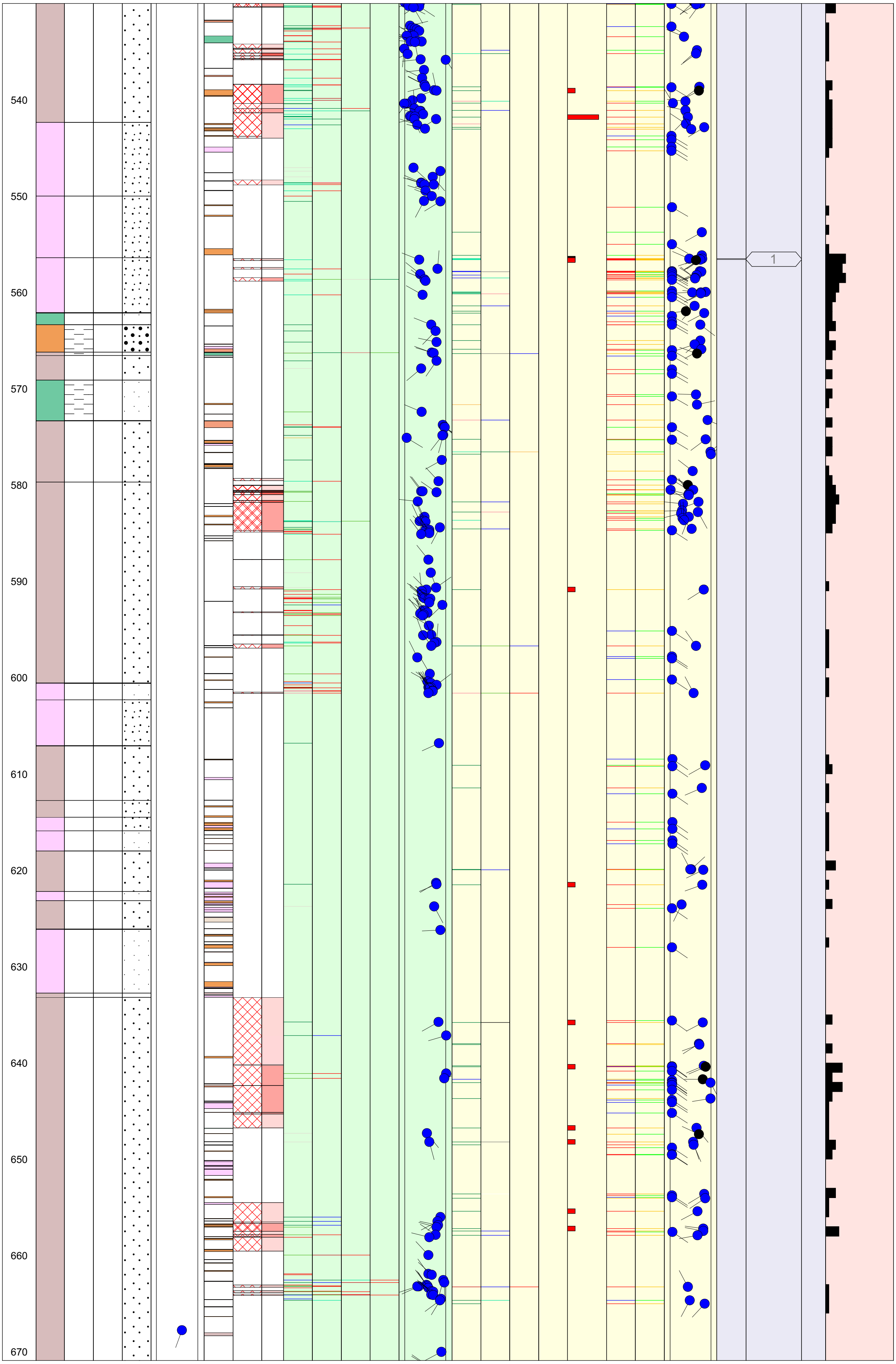
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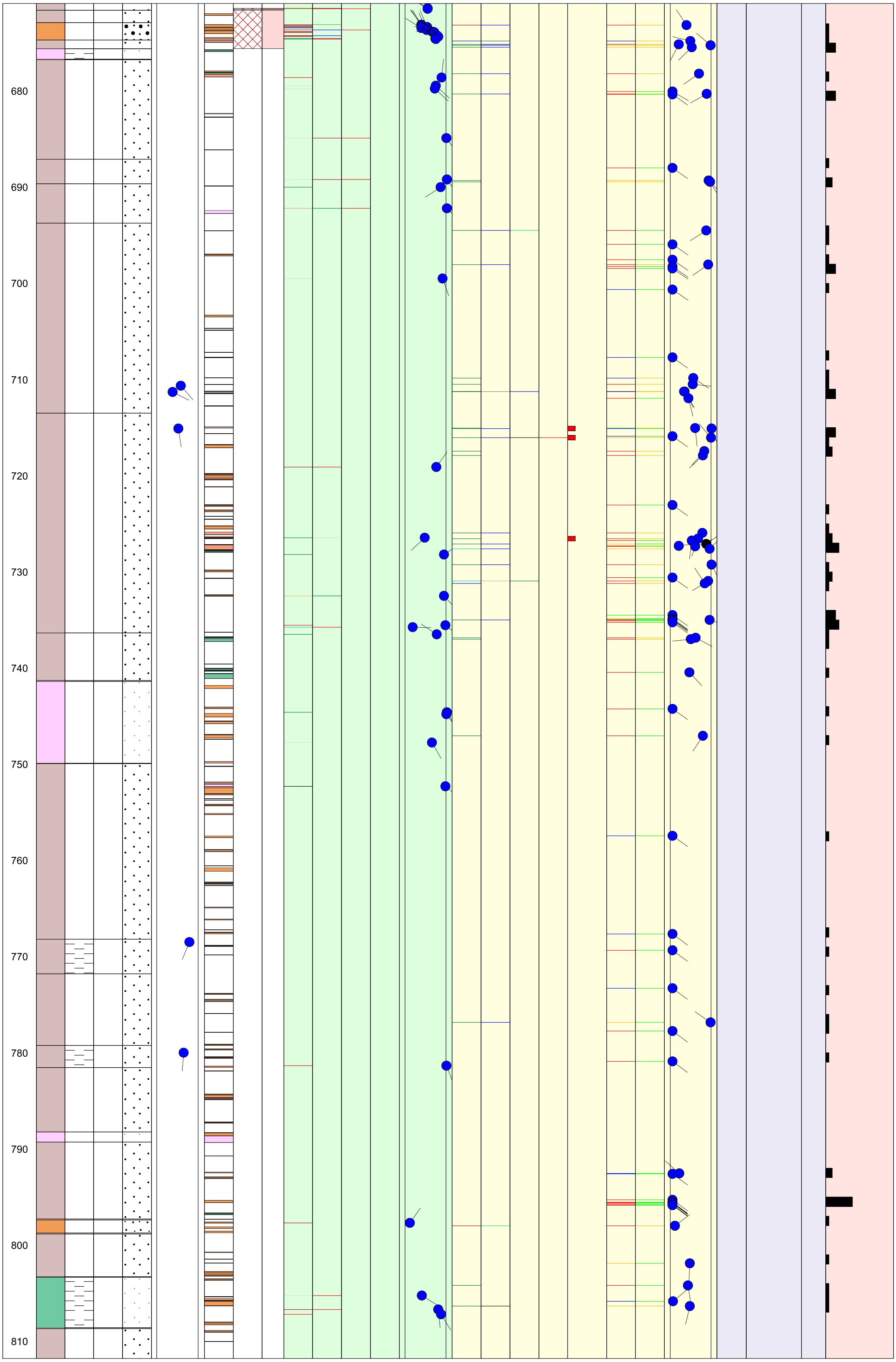
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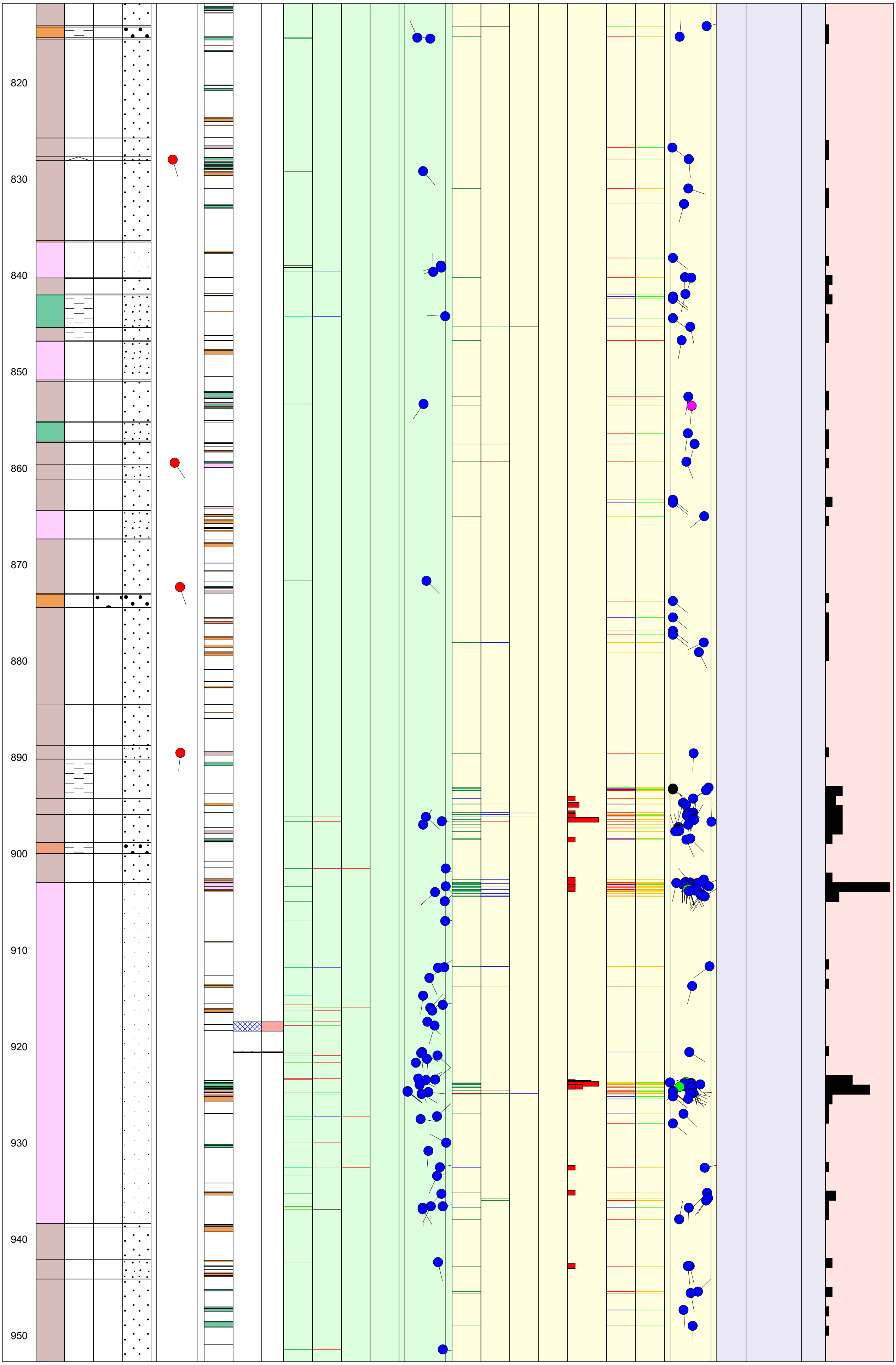
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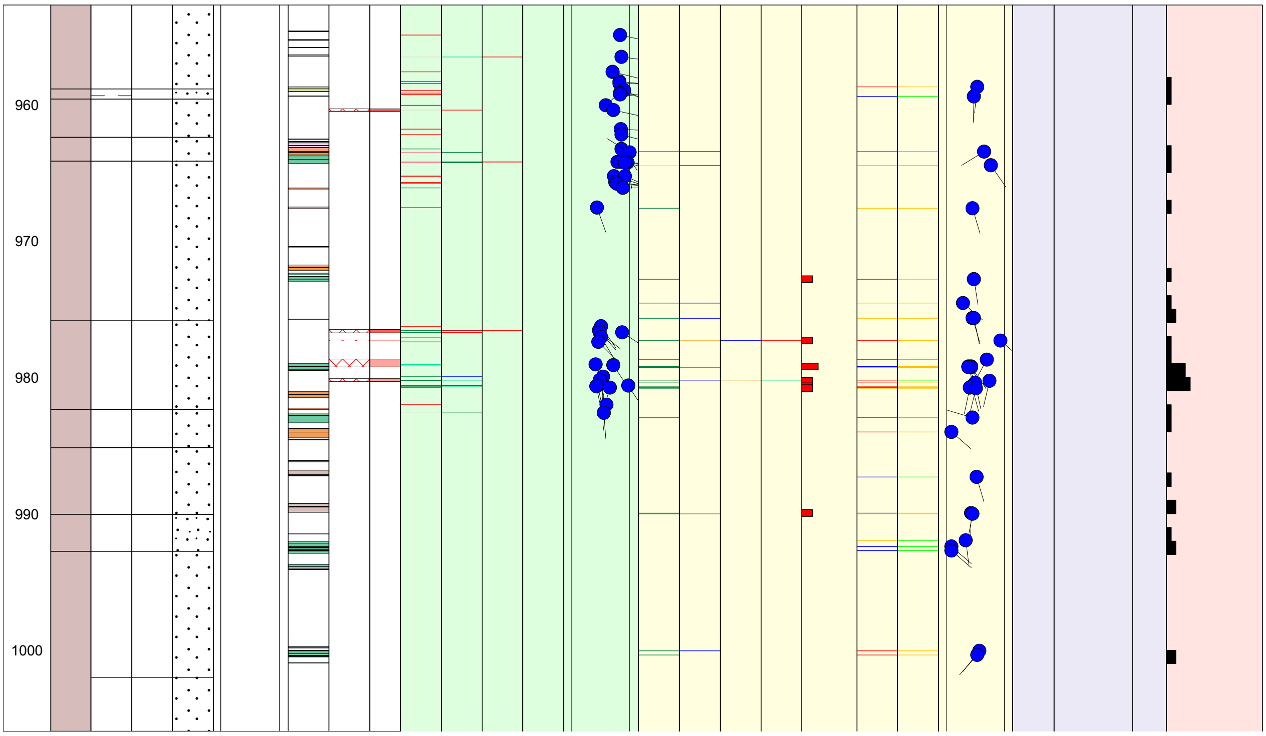
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Appendix 3

Hole Diam T - Drilling: Borehole diameter

KFM02A, 2002-11-20 14:20:00 - 2002-11-26 11:35:00 (0.000 - 100.500 m)

Sub Secup (m)	Sub Seclow (m)	Hole Diam (m)	Comment
0.000	2.390	0.440	
2.390	11.800	0.358	
11.800	100.400	0.251	Hålet pilotborrades med 164 mm:s diameter

Printout from SICADA 2003-08-12 15:01:20.

Maxibor T - Borehole deviation: Maxibor

KFM02A, 2003-03-18 00:00:00 (0.000 - 999.000 m)

Length (m)	Northing (m)	Easting (m)	Elevation (m)	Coord System	Inclination (degrees)	Bearing (degrees)	Local A (m)	Local B (m)	Local C (m)	Extrapol Flag
0.00	6698712.501	1633182.863	-7.353	RT90-RHB70	-85.3800	275.7600	0.0000	0.0000	0.0000	
3.00	6698712.525	1633182.623	-4.363	RT90-RHB70	-85.3700	275.9400	0.2400	0.0000	0.0000	
6.00	6698712.550	1633182.382	-1.373	RT90-RHB70	-85.3700	276.1900	0.4800	0.0000	0.0000	
9.00	6698712.576	1633182.141	1.618	RT90-RHB70	-85.3600	276.2900	0.7300	0.0000	0.0000	
12.00	6698712.603	1633181.900	4.608	RT90-RHB70	-85.3700	276.3700	0.9700	0.0100	0.0000	
15.00	6698712.630	1633181.659	7.598	RT90-RHB70	-85.3700	276.2600	1.2100	0.0100	0.0000	
18.00	6698712.656	1633181.418	10.588	RT90-RHB70	-85.4000	276.4600	1.4500	0.0100	0.0100	
21.00	6698712.683	1633181.179	13.579	RT90-RHB70	-85.4100	276.8500	1.6900	0.0100	0.0000	
24.00	6698712.712	1633180.941	16.569	RT90-RHB70	-85.4200	276.9600	1.9300	0.0200	0.0000	
27.00	6698712.741	1633180.703	19.559	RT90-RHB70	-85.4700	276.6600	2.1700	0.0200	0.0000	
30.00	6698712.769	1633180.467	22.550	RT90-RHB70	-85.5300	276.7800	2.4100	0.0300	0.0000	
33.00	6698712.796	1633180.235	25.541	RT90-RHB70	-85.6000	276.0600	2.6400	0.0300	-0.0100	
36.00	6698712.820	1633180.006	28.532	RT90-RHB70	-85.7100	275.8500	2.8700	0.0300	-0.0200	
39.00	6698712.843	1633179.783	31.524	RT90-RHB70	-85.7700	276.0400	3.1000	0.0300	-0.0400	
42.00	6698712.867	1633179.563	34.515	RT90-RHB70	-85.8300	275.8800	3.3200	0.0300	-0.0600	
45.00	6698712.889	1633179.346	37.508	RT90-RHB70	-85.9600	275.4300	3.5400	0.0300	-0.0800	
48.00	6698712.909	1633179.136	40.500	RT90-RHB70	-86.0500	274.8800	3.7500	0.0300	-0.1100	
51.00	6698712.927	1633178.930	43.493	RT90-RHB70	-86.1600	274.4900	3.9600	0.0300	-0.1500	
54.00	6698712.942	1633178.730	46.486	RT90-RHB70	-86.2000	274.2100	4.1600	0.0200	-0.1900	
57.00	6698712.957	1633178.531	49.480	RT90-RHB70	-86.2600	274.1400	4.3600	0.0200	-0.2300	
60.00	6698712.971	1633178.336	52.473	RT90-RHB70	-86.3300	273.7100	4.5500	0.0100	-0.2800	
63.00	6698712.983	1633178.145	55.467	RT90-RHB70	-86.3500	273.9200	4.7400	0.0100	-0.3300	
66.00	6698712.996	1633177.954	58.461	RT90-RHB70	-86.3500	273.3200	4.9300	0.0000	-0.3800	
69.00	6698713.007	1633177.764	61.455	RT90-RHB70	-86.3400	274.1600	5.1200	-0.0100	-0.4300	
72.00	6698713.021	1633177.573	64.449	RT90-RHB70	-86.3100	273.8400	5.3200	-0.0100	-0.4800	
75.00	6698713.034	1633177.380	67.443	RT90-RHB70	-86.3700	273.8100	5.5100	-0.0200	-0.5300	
78.00	6698713.047	1633177.191	70.437	RT90-RHB70	-86.3800	274.2600	5.7000	-0.0300	-0.5800	
81.00	6698713.061	1633177.002	73.431	RT90-RHB70	-86.3400	274.9400	5.8900	-0.0300	-0.6300	
84.00	6698713.077	1633176.812	76.425	RT90-RHB70	-86.3000	275.3100	6.0800	-0.0300	-0.6800	
87.00	6698713.095	1633176.619	79.418	RT90-RHB70	-86.3100	274.8800	6.2700	-0.0400	-0.7300	
90.00	6698713.112	1633176.426	82.412	RT90-RHB70	-86.3300	274.8200	6.4700	-0.0400	-0.7800	
93.00	6698713.128	1633176.235	85.406	RT90-RHB70	-86.3300	273.9100	6.6600	-0.0400	-0.8300	
96.00	6698713.141	1633176.044	88.400	RT90-RHB70	-86.3500	272.4300	6.8500	-0.0500	-0.8800	
99.00	6698713.149	1633175.853	91.394	RT90-RHB70	-86.2600	271.3500	7.0400	-0.0600	-0.9300	
102.00	6698713.154	1633175.657	94.387	RT90-RHB70	-86.1700	270.6900	7.2400	-0.0700	-0.9800	

105.00	6698713.156	1633175.456	97.381	RT90-RHB70	-86.1400	271.2400	7.4400	-0.0900	-1.0200
108.00	6698713.160	1633175.254	100.374	RT90-RHB70	-86.1800	272.0800	7.6400	-0.1100	-1.0600
111.00	6698713.168	1633175.055	103.367	RT90-RHB70	-86.2400	274.3600	7.8400	-0.1200	-1.1000
114.00	6698713.183	1633174.858	106.361	RT90-RHB70	-86.2000	277.2600	8.0300	-0.1300	-1.1400
117.00	6698713.208	1633174.661	109.354	RT90-RHB70	-86.0900	279.0200	8.2300	-0.1200	-1.1900
120.00	6698713.240	1633174.459	112.347	RT90-RHB70	-86.0300	279.6600	8.4400	-0.1100	-1.2200
123.00	6698713.275	1633174.254	115.340	RT90-RHB70	-85.9800	279.9400	8.6400	-0.1000	-1.2600
126.00	6698713.311	1633174.047	118.332	RT90-RHB70	-85.9700	279.7000	8.8500	-0.0800	-1.2900
129.00	6698713.346	1633173.839	121.325	RT90-RHB70	-85.9400	279.5900	9.0600	-0.0700	-1.3200
132.00	6698713.382	1633173.630	124.317	RT90-RHB70	-85.9200	279.8000	9.2800	-0.0500	-1.3500
135.00	6698713.418	1633173.420	127.310	RT90-RHB70	-85.8900	280.0700	9.4900	-0.0400	-1.3800
138.00	6698713.456	1633173.208	130.302	RT90-RHB70	-85.8600	280.2200	9.7000	-0.0200	-1.4100
141.00	6698713.494	1633172.995	133.294	RT90-RHB70	-85.8400	280.4700	9.9200	0.0000	-1.4300
144.00	6698713.534	1633172.781	136.286	RT90-RHB70	-85.7800	280.6800	10.1400	0.0200	-1.4600
147.00	6698713.575	1633172.564	139.278	RT90-RHB70	-85.7700	281.4400	10.3600	0.0300	-1.4800
150.00	6698713.619	1633172.347	142.270	RT90-RHB70	-85.6900	282.4700	10.5800	0.0600	-1.5000
153.00	6698713.667	1633172.127	145.262	RT90-RHB70	-85.6600	282.6200	10.8000	0.0800	-1.5200
156.00	6698713.717	1633171.905	148.253	RT90-RHB70	-85.6500	283.4400	11.0300	0.1100	-1.5300
159.00	6698713.770	1633171.684	151.244	RT90-RHB70	-85.6400	283.3900	11.2500	0.1400	-1.5500
162.00	6698713.823	1633171.462	154.236	RT90-RHB70	-85.6200	283.5900	11.4800	0.1700	-1.5600
165.00	6698713.876	1633171.239	157.227	RT90-RHB70	-85.5900	283.6000	11.7000	0.2000	-1.5800
168.00	6698713.931	1633171.015	160.218	RT90-RHB70	-85.5700	283.7600	11.9300	0.2300	-1.5900
171.00	6698713.986	1633170.790	163.209	RT90-RHB70	-85.5000	284.7200	12.1600	0.2700	-1.6000
174.00	6698714.045	1633170.563	166.200	RT90-RHB70	-85.4300	284.7900	12.3900	0.3000	-1.6100
177.00	6698714.107	1633170.331	169.190	RT90-RHB70	-85.3700	285.3900	12.6300	0.3400	-1.6200
180.00	6698714.171	1633170.098	172.181	RT90-RHB70	-85.3300	285.7200	12.8700	0.3800	-1.6200
183.00	6698714.237	1633169.863	175.171	RT90-RHB70	-85.2900	286.1300	13.1100	0.4200	-1.6200
186.00	6698714.305	1633169.627	178.160	RT90-RHB70	-85.2600	286.0900	13.3500	0.4700	-1.6200
189.00	6698714.374	1633169.388	181.150	RT90-RHB70	-85.2100	286.8100	13.6000	0.5100	-1.6200
192.00	6698714.446	1633169.149	184.140	RT90-RHB70	-85.1800	287.2400	13.8400	0.5600	-1.6100
195.00	6698714.521	1633168.908	187.129	RT90-RHB70	-85.1800	287.9300	14.0900	0.6100	-1.6100
198.00	6698714.599	1633168.668	190.119	RT90-RHB70	-85.1300	288.4800	14.3300	0.6600	-1.6000
201.00	6698714.679	1633168.426	193.108	RT90-RHB70	-85.1300	288.9500	14.5800	0.7200	-1.6000
204.00	6698714.762	1633168.185	196.097	RT90-RHB70	-85.0800	289.2300	14.8300	0.7800	-1.5900
207.00	6698714.847	1633167.943	199.086	RT90-RHB70	-85.0900	289.3900	15.0800	0.8400	-1.5800
210.00	6698714.932	1633167.701	202.075	RT90-RHB70	-85.0500	289.5600	15.3300	0.9000	-1.5700
213.00	6698715.019	1633167.457	205.064	RT90-RHB70	-85.0400	289.4700	15.5800	0.9600	-1.5600
216.00	6698715.105	1633167.212	208.052	RT90-RHB70	-85.0400	289.9800	15.8300	1.0200	-1.5500
219.00	6698715.194	1633166.969	211.041	RT90-RHB70	-85.0300	290.2500	16.0900	1.0800	-1.5400
222.00	6698715.284	1633166.725	214.030	RT90-RHB70	-85.0800	290.2600	16.3400	1.1500	-1.5300
225.00	6698715.373	1633166.483	217.019	RT90-RHB70	-85.0500	290.5600	16.5900	1.2100	-1.5200
228.00	6698715.464	1633166.241	220.008	RT90-RHB70	-85.0500	291.0400	16.8400	1.2800	-1.5100
231.00	6698715.557	1633165.999	222.996	RT90-RHB70	-85.0500	291.3000	17.0900	1.3500	-1.5100

234.00	6698715.651	1633165.758	225.985	RT90-RHB70	-85.0500	291.2600	17.3400	1.4200	-1.5000
237.00	6698715.745	1633165.517	228.974	RT90-RHB70	-85.0400	291.4300	17.5800	1.4900	-1.4900
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243.00	6698715.934	1633165.033	234.952	RT90-RHB70	-85.0300	291.6400	18.0900	1.6200	-1.4700
246.00	6698716.029	1633164.792	237.940	RT90-RHB70	-84.9900	291.6800	18.3300	1.7000	-1.4600
249.00	6698716.126	1633164.548	240.929	RT90-RHB70	-84.9900	292.0200	18.5900	1.7700	-1.4500
252.00	6698716.224	1633164.306	243.917	RT90-RHB70	-84.9800	292.0700	18.8400	1.8400	-1.4400
255.00	6698716.323	1633164.062	246.906	RT90-RHB70	-84.9200	292.3100	19.0900	1.9100	-1.4300
258.00	6698716.424	1633163.816	249.894	RT90-RHB70	-84.9100	291.8900	19.3500	1.9900	-1.4200
261.00	6698716.523	1633163.569	252.882	RT90-RHB70	-84.9200	292.2100	19.6000	2.0600	-1.4000
264.00	6698716.624	1633163.323	255.870	RT90-RHB70	-84.9200	292.3000	19.8600	2.1400	-1.3900
267.00	6698716.724	1633163.077	258.859	RT90-RHB70	-84.9500	292.0300	20.1100	2.2200	-1.3800
270.00	6698716.823	1633162.833	261.847	RT90-RHB70	-84.9700	292.2700	20.3600	2.2900	-1.3600
273.00	6698716.923	1633162.589	264.835	RT90-RHB70	-84.9600	292.0600	20.6200	2.3600	-1.3500
276.00	6698717.022	1633162.345	267.824	RT90-RHB70	-85.0000	291.7800	20.8700	2.4400	-1.3400
279.00	6698717.119	1633162.102	270.812	RT90-RHB70	-84.9700	291.5400	21.1200	2.5100	-1.3300
282.00	6698717.215	1633161.858	273.801	RT90-RHB70	-84.9700	291.3200	21.3700	2.5800	-1.3200
285.00	6698717.311	1633161.613	276.789	RT90-RHB70	-84.9800	291.5600	21.6300	2.6500	-1.3100
288.00	6698717.408	1633161.369	279.778	RT90-RHB70	-85.0000	291.6400	21.8800	2.7200	-1.3000
291.00	6698717.504	1633161.125	282.766	RT90-RHB70	-85.0200	291.7000	22.1300	2.7900	-1.2900
294.00	6698717.600	1633160.883	285.755	RT90-RHB70	-85.0200	291.8400	22.3800	2.8700	-1.2800
297.00	6698717.697	1633160.642	288.744	RT90-RHB70	-85.0400	292.0900	22.6300	2.9400	-1.2700
300.00	6698717.795	1633160.401	291.733	RT90-RHB70	-85.0800	292.1500	22.8800	3.0100	-1.2600
303.00	6698717.892	1633160.163	294.722	RT90-RHB70	-85.0600	292.1000	23.1300	3.0800	-1.2600
306.00	6698717.989	1633159.924	297.710	RT90-RHB70	-85.0600	291.9700	23.3800	3.1600	-1.2500
309.00	6698718.086	1633159.684	300.699	RT90-RHB70	-85.0700	292.1000	23.6200	3.2300	-1.2400
312.00	6698718.183	1633159.445	303.688	RT90-RHB70	-85.0700	292.0600	23.8700	3.3000	-1.2400
315.00	6698718.279	1633159.206	306.677	RT90-RHB70	-85.0500	291.7400	24.1200	3.3700	-1.2300
318.00	6698718.375	1633158.966	309.666	RT90-RHB70	-85.0300	291.9200	24.3700	3.4400	-1.2200
321.00	6698718.472	1633158.725	312.655	RT90-RHB70	-84.9800	291.8800	24.6200	3.5200	-1.2100
324.00	6698718.570	1633158.481	315.643	RT90-RHB70	-84.9500	291.8300	24.8700	3.5900	-1.2000
327.00	6698718.668	1633158.236	318.631	RT90-RHB70	-84.9300	291.6300	25.1200	3.6600	-1.1900
330.00	6698718.766	1633157.989	321.620	RT90-RHB70	-84.8800	291.8200	25.3800	3.7400	-1.1800
333.00	6698718.866	1633157.741	324.608	RT90-RHB70	-84.8600	292.0000	25.6300	3.8100	-1.1600
336.00	6698718.966	1633157.492	327.596	RT90-RHB70	-84.8700	292.3400	25.8900	3.8800	-1.1400
339.00	6698719.068	1633157.244	330.584	RT90-RHB70	-84.8300	292.7700	26.1500	3.9600	-1.1300
342.00	6698719.173	1633156.994	333.571	RT90-RHB70	-84.8100	292.9600	26.4100	4.0400	-1.1100
345.00	6698719.279	1633156.744	336.559	RT90-RHB70	-84.8100	293.1900	26.6700	4.1200	-1.0900
348.00	6698719.386	1633156.495	339.547	RT90-RHB70	-84.7800	293.1500	26.9300	4.2000	-1.0700
351.00	6698719.493	1633156.244	342.534	RT90-RHB70	-84.7900	292.8200	27.1900	4.2800	-1.0600
354.00	6698719.599	1633155.993	345.522	RT90-RHB70	-84.7800	292.9300	27.4500	4.3600	-1.0400
357.00	6698719.705	1633155.741	348.510	RT90-RHB70	-84.7700	293.0700	27.7100	4.4400	-1.0200
360.00	6698719.812	1633155.490	351.497	RT90-RHB70	-84.7600	292.7300	27.9700	4.5300	-1.0000

363.00	6698719.918	1633155.237	354.484	RT90-RHB70	-84.7800	292.7800	28.2300	4.6100	-0.9800
366.00	6698720.024	1633154.985	357.472	RT90-RHB70	-84.7700	293.4200	28.4900	4.6900	-0.9600
369.00	6698720.132	1633154.734	360.460	RT90-RHB70	-84.7600	293.1300	28.7500	4.7700	-0.9400
372.00	6698720.240	1633154.482	363.447	RT90-RHB70	-84.7600	293.0800	29.0100	4.8500	-0.9200
375.00	6698720.348	1633154.230	366.434	RT90-RHB70	-84.7500	293.4900	29.2800	4.9300	-0.9000
378.00	6698720.457	1633153.978	369.422	RT90-RHB70	-84.7100	293.5200	29.5400	5.0200	-0.8800
381.00	6698720.567	1633153.725	372.409	RT90-RHB70	-84.7200	293.3800	29.8000	5.1000	-0.8500
384.00	6698720.677	1633153.471	375.396	RT90-RHB70	-84.7200	293.4900	30.0600	5.1800	-0.8300
387.00	6698720.787	1633153.218	378.384	RT90-RHB70	-84.6800	293.7100	30.3300	5.2700	-0.8100
390.00	6698720.899	1633152.963	381.371	RT90-RHB70	-84.6500	293.4300	30.5900	5.3500	-0.7900
393.00	6698721.010	1633152.707	384.358	RT90-RHB70	-84.6700	294.0200	30.8600	5.4400	-0.7600
396.00	6698721.124	1633152.452	387.345	RT90-RHB70	-84.6400	294.1600	31.1200	5.5200	-0.7400
399.00	6698721.238	1633152.196	390.331	RT90-RHB70	-84.6400	293.9800	31.3900	5.6100	-0.7100
402.00	6698721.352	1633151.940	393.318	RT90-RHB70	-84.6700	294.2300	31.6600	5.7000	-0.6900
405.00	6698721.467	1633151.686	396.305	RT90-RHB70	-84.6400	294.4600	31.9200	5.7900	-0.6600
408.00	6698721.583	1633151.431	399.292	RT90-RHB70	-84.6100	294.4100	32.1900	5.8800	-0.6400
411.00	6698721.699	1633151.174	402.279	RT90-RHB70	-84.6100	294.5400	32.4500	5.9700	-0.6100
414.00	6698721.816	1633150.918	405.266	RT90-RHB70	-84.6200	294.6300	32.7200	6.0600	-0.5900
417.00	6698721.933	1633150.662	408.253	RT90-RHB70	-84.6100	295.0300	32.9900	6.1500	-0.5600
420.00	6698722.052	1633150.407	411.239	RT90-RHB70	-84.6200	294.8400	33.2500	6.2400	-0.5400
423.00	6698722.170	1633150.152	414.226	RT90-RHB70	-84.6600	295.1700	33.5200	6.3400	-0.5100
426.00	6698722.289	1633149.899	417.213	RT90-RHB70	-84.6400	295.4200	33.7800	6.4300	-0.4900
429.00	6698722.409	1633149.646	420.200	RT90-RHB70	-84.6200	295.3100	34.0400	6.5200	-0.4700
432.00	6698722.530	1633149.392	423.187	RT90-RHB70	-84.6000	295.0200	34.3100	6.6200	-0.4500
435.00	6698722.649	1633149.136	426.173	RT90-RHB70	-84.6000	295.5700	34.5800	6.7100	-0.4200
438.00	6698722.771	1633148.881	429.160	RT90-RHB70	-84.5700	296.0500	34.8400	6.8100	-0.4000
441.00	6698722.896	1633148.626	432.147	RT90-RHB70	-84.5700	295.8600	35.1100	6.9000	-0.3700
444.00	6698723.020	1633148.371	435.133	RT90-RHB70	-84.6400	295.8300	35.3700	7.0000	-0.3500
447.00	6698723.142	1633148.119	438.120	RT90-RHB70	-84.6100	296.5700	35.6400	7.1000	-0.3200
450.00	6698723.268	1633147.866	441.107	RT90-RHB70	-84.5600	296.4600	35.9000	7.2000	-0.3000
453.00	6698723.394	1633147.612	444.093	RT90-RHB70	-84.5600	296.5600	36.1700	7.3000	-0.2800
456.00	6698723.522	1633147.358	447.080	RT90-RHB70	-84.5700	296.7300	36.4300	7.4000	-0.2500
459.00	6698723.649	1633147.104	450.066	RT90-RHB70	-84.5600	297.0300	36.7000	7.5000	-0.2300
462.00	6698723.778	1633146.851	453.053	RT90-RHB70	-84.5600	297.5000	36.9600	7.6000	-0.2000
465.00	6698723.910	1633146.599	456.039	RT90-RHB70	-84.5000	298.0100	37.2300	7.7100	-0.1800
468.00	6698724.045	1633146.345	459.026	RT90-RHB70	-84.4900	298.6100	37.4900	7.8200	-0.1600
471.00	6698724.183	1633146.092	462.012	RT90-RHB70	-84.4400	299.4100	37.7600	7.9300	-0.1300
474.00	6698724.325	1633145.839	464.998	RT90-RHB70	-84.3800	299.8900	38.0200	8.0500	-0.1100
477.00	6698724.472	1633145.584	467.983	RT90-RHB70	-84.3100	300.2300	38.2900	8.1700	-0.0800
480.00	6698724.622	1633145.327	470.968	RT90-RHB70	-84.2600	300.7300	38.5600	8.2900	-0.0500
483.00	6698724.775	1633145.069	473.953	RT90-RHB70	-84.3000	300.8100	38.8400	8.4200	-0.0200
486.00	6698724.928	1633144.813	476.938	RT90-RHB70	-84.3000	301.0400	39.1100	8.5400	0.0100
489.00	6698725.081	1633144.558	479.924	RT90-RHB70	-84.2700	301.2300	39.3800	8.6700	0.0400

492.00	6698725.237	1633144.302	482.909	RT90-RHB70	-84.2400	301.3700	39.6500	8.8000	0.0700
495.00	6698725.393	1633144.045	485.893	RT90-RHB70	-84.2200	301.0800	39.9200	8.9300	0.1000
498.00	6698725.549	1633143.786	488.878	RT90-RHB70	-84.2300	300.5100	40.1900	9.0600	0.1300
501.00	6698725.703	1633143.526	491.863	RT90-RHB70	-84.2300	300.5700	40.4600	9.1800	0.1600
504.00	6698725.856	1633143.266	494.848	RT90-RHB70	-84.2300	301.1100	40.7400	9.3100	0.2000
507.00	6698726.012	1633143.008	497.833	RT90-RHB70	-84.2100	301.2500	41.0100	9.4400	0.2300
510.00	6698726.169	1633142.749	500.817	RT90-RHB70	-84.1500	301.3500	41.2800	9.5700	0.2600
513.00	6698726.328	1633142.488	503.802	RT90-RHB70	-84.0600	301.1900	41.5600	9.7000	0.3000
516.00	6698726.489	1633142.223	506.786	RT90-RHB70	-83.9900	300.8400	41.8400	9.8400	0.3300
519.00	6698726.650	1633141.953	509.769	RT90-RHB70	-83.9600	300.8900	42.1300	9.9700	0.3800
522.00	6698726.812	1633141.682	512.752	RT90-RHB70	-83.9500	300.6400	42.4100	10.1000	0.4200
525.00	6698726.973	1633141.410	515.736	RT90-RHB70	-83.9700	300.5300	42.7000	10.2400	0.4700
528.00	6698727.133	1633141.139	518.719	RT90-RHB70	-83.9400	300.5200	42.9800	10.3700	0.5100
531.00	6698727.294	1633140.866	521.702	RT90-RHB70	-83.9300	300.7600	43.2700	10.5000	0.5600
534.00	6698727.456	1633140.593	524.686	RT90-RHB70	-83.8800	300.5900	43.5600	10.6300	0.6100
537.00	6698727.619	1633140.318	527.668	RT90-RHB70	-83.8200	300.2600	43.8500	10.7700	0.6600
540.00	6698727.782	1633140.039	530.651	RT90-RHB70	-83.7500	299.8000	44.1400	10.9000	0.7100
543.00	6698727.944	1633139.755	533.633	RT90-RHB70	-83.7200	299.7800	44.4400	11.0400	0.7700
546.00	6698728.107	1633139.471	536.615	RT90-RHB70	-83.6600	299.3600	44.7400	11.1700	0.8300
549.00	6698728.269	1633139.182	539.597	RT90-RHB70	-83.6700	299.0400	45.0400	11.3000	0.8900
552.00	6698728.430	1633138.893	542.579	RT90-RHB70	-83.6800	298.9300	45.3500	11.4300	0.9500
555.00	6698728.590	1633138.604	545.560	RT90-RHB70	-83.6700	299.1100	45.6500	11.5600	1.0100
558.00	6698728.751	1633138.314	548.542	RT90-RHB70	-83.6700	299.1500	45.9600	11.6900	1.0800
561.00	6698728.912	1633138.025	551.524	RT90-RHB70	-83.6500	299.3900	46.2600	11.8200	1.1400
564.00	6698729.074	1633137.736	554.505	RT90-RHB70	-83.6500	299.9100	46.5600	11.9600	1.2000
567.00	6698729.240	1633137.449	557.487	RT90-RHB70	-83.6200	300.1300	46.8700	12.0900	1.2600
570.00	6698729.407	1633137.161	560.468	RT90-RHB70	-83.5500	300.4900	47.1700	12.2300	1.3300
573.00	6698729.578	1633136.870	563.449	RT90-RHB70	-83.4500	300.9000	47.4800	12.3700	1.3900
576.00	6698729.754	1633136.577	566.430	RT90-RHB70	-83.2800	301.2400	47.7900	12.5200	1.4600
579.00	6698729.936	1633136.277	569.409	RT90-RHB70	-83.1100	301.6000	48.1000	12.6700	1.5400
582.00	6698730.124	1633135.970	572.388	RT90-RHB70	-83.0100	301.8800	48.4300	12.8200	1.6200
585.00	6698730.317	1633135.660	575.365	RT90-RHB70	-82.9800	302.1300	48.7500	12.9900	1.7100
588.00	6698730.512	1633135.349	578.343	RT90-RHB70	-82.9600	302.3100	49.0800	13.1500	1.8000
591.00	6698730.709	1633135.039	581.320	RT90-RHB70	-82.9500	302.6800	49.4100	13.3100	1.8800
594.00	6698730.908	1633134.729	584.297	RT90-RHB70	-82.9100	303.0100	49.7400	13.4800	1.9700
597.00	6698731.109	1633134.418	587.274	RT90-RHB70	-82.8800	303.3100	50.0700	13.6500	2.0600
600.00	6698731.314	1633134.107	590.251	RT90-RHB70	-82.8600	303.4000	50.4000	13.8200	2.1500
603.00	6698731.519	1633133.796	593.228	RT90-RHB70	-82.8600	303.4300	50.7300	13.9900	2.2400
606.00	6698731.724	1633133.485	596.205	RT90-RHB70	-82.8400	303.7500	51.0600	14.1700	2.3300
609.00	6698731.932	1633133.174	599.181	RT90-RHB70	-82.8500	303.9200	51.3900	14.3400	2.4200
612.00	6698732.140	1633132.864	602.158	RT90-RHB70	-82.8500	303.9200	51.7200	14.5200	2.5100
615.00	6698732.349	1633132.554	605.135	RT90-RHB70	-82.8400	303.8300	52.0500	14.6900	2.6000
618.00	6698732.557	1633132.244	608.111	RT90-RHB70	-82.8600	303.9600	52.3800	14.8700	2.6800

621.00	6698732.765	1633131.935	611.088	RT90-RHB70	-82.8700	304.2000	52.7100	15.0500	2.7700
624.00	6698732.974	1633131.627	614.065	RT90-RHB70	-82.8900	304.0300	53.0300	15.2200	2.8600
627.00	6698733.182	1633131.319	617.042	RT90-RHB70	-82.9000	303.9300	53.3600	15.4000	2.9500
630.00	6698733.389	1633131.012	620.019	RT90-RHB70	-82.9200	304.0700	53.6900	15.5700	3.0300
633.00	6698733.596	1633130.705	622.996	RT90-RHB70	-82.9400	304.0300	54.0100	15.7500	3.1200
636.00	6698733.802	1633130.400	625.973	RT90-RHB70	-82.9600	303.8900	54.3400	15.9200	3.2000
639.00	6698734.007	1633130.094	628.951	RT90-RHB70	-82.9300	303.7200	54.6600	16.1000	3.2800
642.00	6698734.213	1633129.787	631.928	RT90-RHB70	-82.8700	303.2800	54.9900	16.2700	3.3700
645.00	6698734.417	1633129.476	634.905	RT90-RHB70	-82.8200	303.4200	55.3200	16.4400	3.4600
648.00	6698734.623	1633129.163	637.881	RT90-RHB70	-82.7700	303.4200	55.6500	16.6200	3.5500
651.00	6698734.831	1633128.848	640.857	RT90-RHB70	-82.7400	303.5000	55.9900	16.7900	3.6500
654.00	6698735.040	1633128.532	643.833	RT90-RHB70	-82.7300	303.5600	56.3200	16.9700	3.7400
657.00	6698735.250	1633128.216	646.809	RT90-RHB70	-82.7400	303.8100	56.6600	17.1500	3.8400
660.00	6698735.461	1633127.901	649.785	RT90-RHB70	-82.7400	303.7300	56.9900	17.3200	3.9300
663.00	6698735.672	1633127.585	652.761	RT90-RHB70	-82.7500	303.5100	57.3300	17.5000	4.0200
666.00	6698735.881	1633127.270	655.737	RT90-RHB70	-82.7400	303.3800	57.6600	17.6800	4.1200
669.00	6698736.089	1633126.953	658.713	RT90-RHB70	-82.7100	303.5200	58.0000	17.8500	4.2100
672.00	6698736.300	1633126.636	661.689	RT90-RHB70	-82.6600	303.6200	58.3300	18.0300	4.3100
675.00	6698736.512	1633126.317	664.664	RT90-RHB70	-82.6500	303.9300	58.6700	18.2100	4.4100
678.00	6698736.726	1633125.998	667.640	RT90-RHB70	-82.6800	304.3400	59.0100	18.3900	4.5100
681.00	6698736.942	1633125.683	670.615	RT90-RHB70	-82.6800	304.1600	59.3500	18.5700	4.6000
684.00	6698737.156	1633125.366	673.591	RT90-RHB70	-82.6700	303.8400	59.6800	18.7600	4.7000
687.00	6698737.369	1633125.049	676.566	RT90-RHB70	-82.6700	303.9300	60.0200	18.9400	4.7900
690.00	6698737.583	1633124.731	679.542	RT90-RHB70	-82.6300	303.9500	60.3600	19.1200	4.8900
693.00	6698737.798	1633124.412	682.517	RT90-RHB70	-82.6300	304.0600	60.7000	19.3000	4.9900
696.00	6698738.014	1633124.093	685.492	RT90-RHB70	-82.6300	304.1700	61.0400	19.4800	5.0900
699.00	6698738.230	1633123.774	688.467	RT90-RHB70	-82.6600	304.1500	61.3700	19.6600	5.1900
702.00	6698738.445	1633123.457	691.443	RT90-RHB70	-82.6300	304.0900	61.7100	19.8500	5.2800
705.00	6698738.661	1633123.138	694.418	RT90-RHB70	-82.6200	304.0200	62.0500	20.0300	5.3800
708.00	6698738.876	1633122.819	697.393	RT90-RHB70	-82.6200	304.1400	62.3900	20.2100	5.4800
711.00	6698739.093	1633122.500	700.368	RT90-RHB70	-82.6400	304.4700	62.7300	20.3900	5.5800
714.00	6698739.310	1633122.183	703.343	RT90-RHB70	-82.6100	304.3600	63.0700	20.5800	5.6800
717.00	6698739.528	1633121.864	706.318	RT90-RHB70	-82.5600	304.2400	63.4100	20.7600	5.7700
720.00	6698739.747	1633121.543	709.293	RT90-RHB70	-82.5400	304.7000	63.7500	20.9500	5.8800
723.00	6698739.969	1633121.222	712.268	RT90-RHB70	-82.5400	305.1900	64.0900	21.1400	5.9800
726.00	6698740.193	1633120.904	715.242	RT90-RHB70	-82.5300	304.9800	64.4300	21.3300	6.0700
729.00	6698740.417	1633120.584	718.217	RT90-RHB70	-82.4900	305.1200	64.7700	21.5200	6.1700
732.00	6698740.642	1633120.264	721.191	RT90-RHB70	-82.4600	305.1000	65.1100	21.7100	6.2800
735.00	6698740.869	1633119.942	724.165	RT90-RHB70	-82.4600	305.2300	65.4500	21.9000	6.3800
738.00	6698741.096	1633119.620	727.139	RT90-RHB70	-82.4400	305.0000	65.8000	22.1000	6.4800
741.00	6698741.322	1633119.297	730.113	RT90-RHB70	-82.4000	305.0300	66.1400	22.2900	6.5900
744.00	6698741.550	1633118.972	733.087	RT90-RHB70	-82.3800	305.1400	66.4900	22.4900	6.6900
747.00	6698741.779	1633118.647	736.060	RT90-RHB70	-82.3700	305.2100	66.8300	22.6800	6.8000

750.00	6698742.008	1633118.322	739.034	RT90-RHB70	-82.3400	305.0400	67.1800	22.8800	6.9000
753.00	6698742.238	1633117.994	742.007	RT90-RHB70	-82.3300	305.0500	67.5300	23.0700	7.0100
756.00	6698742.468	1633117.666	744.980	RT90-RHB70	-82.3000	305.3800	67.8800	23.2700	7.1200
759.00	6698742.701	1633117.339	747.953	RT90-RHB70	-82.2700	305.3200	68.2300	23.4700	7.2300
762.00	6698742.934	1633117.009	750.926	RT90-RHB70	-82.2400	305.5900	68.5800	23.6700	7.3400
765.00	6698743.170	1633116.680	753.898	RT90-RHB70	-82.2300	305.5300	68.9300	23.8700	7.4500
768.00	6698743.405	1633116.350	756.871	RT90-RHB70	-82.2200	305.3000	69.2800	24.0700	7.5600
771.00	6698743.640	1633116.018	759.843	RT90-RHB70	-82.1700	305.3500	69.6300	24.2700	7.6800
774.00	6698743.877	1633115.685	762.815	RT90-RHB70	-82.1600	305.8000	69.9900	24.4700	7.7900
777.00	6698744.116	1633115.353	765.787	RT90-RHB70	-82.1800	305.8900	70.3400	24.6700	7.9100
780.00	6698744.355	1633115.022	768.759	RT90-RHB70	-82.1400	305.6700	70.7000	24.8800	8.0200
783.00	6698744.595	1633114.689	771.731	RT90-RHB70	-82.1200	305.5300	71.0500	25.0800	8.1300
786.00	6698744.834	1633114.354	774.703	RT90-RHB70	-82.1000	305.6200	71.4100	25.2900	8.2500
789.00	6698745.074	1633114.019	777.674	RT90-RHB70	-82.0800	305.4100	71.7700	25.4900	8.3700
792.00	6698745.313	1633113.682	780.646	RT90-RHB70	-82.0500	305.5100	72.1300	25.7000	8.4900
795.00	6698745.554	1633113.344	783.617	RT90-RHB70	-82.0600	305.5600	72.4900	25.9000	8.6100
798.00	6698745.795	1633113.007	786.588	RT90-RHB70	-82.0500	305.4700	72.8500	26.1100	8.7300
801.00	6698746.036	1633112.669	789.559	RT90-RHB70	-82.0100	305.5100	73.2100	26.3200	8.8500
804.00	6698746.278	1633112.330	792.530	RT90-RHB70	-82.0000	305.7600	73.5700	26.5200	8.9700
807.00	6698746.522	1633111.991	795.501	RT90-RHB70	-81.9500	305.7400	73.9300	26.7300	9.0900
810.00	6698746.767	1633111.650	798.471	RT90-RHB70	-81.9400	306.2000	74.2900	26.9400	9.2100
813.00	6698747.016	1633111.311	801.442	RT90-RHB70	-81.9700	306.3200	74.6600	27.1500	9.3400
816.00	6698747.264	1633110.974	804.412	RT90-RHB70	-81.9600	306.2000	75.0200	27.3700	9.4600
819.00	6698747.512	1633110.635	807.383	RT90-RHB70	-81.9200	306.3600	75.3800	27.5800	9.5800
822.00	6698747.762	1633110.295	810.353	RT90-RHB70	-81.9000	306.5100	75.7400	27.7900	9.7000
825.00	6698748.013	1633109.955	813.323	RT90-RHB70	-81.8800	306.3400	76.1100	28.0100	9.8200
828.00	6698748.264	1633109.614	816.293	RT90-RHB70	-81.8700	306.7200	76.4700	28.2300	9.9500
831.00	6698748.518	1633109.274	819.263	RT90-RHB70	-81.8800	306.6100	76.8300	28.4400	10.0700
834.00	6698748.771	1633108.934	822.233	RT90-RHB70	-81.8200	306.4700	77.2000	28.6600	10.2000
837.00	6698749.025	1633108.590	825.202	RT90-RHB70	-81.8100	306.8400	77.5700	28.8800	10.3200
840.00	6698749.281	1633108.248	828.172	RT90-RHB70	-81.8300	306.7500	77.9300	29.1000	10.4500
843.00	6698749.536	1633107.907	831.141	RT90-RHB70	-81.8100	306.9400	78.3000	29.3200	10.5700
846.00	6698749.793	1633107.565	834.111	RT90-RHB70	-81.8100	306.8300	78.6600	29.5400	10.7000
849.00	6698750.049	1633107.223	837.080	RT90-RHB70	-81.7700	306.9400	79.0300	29.7600	10.8300
852.00	6698750.307	1633106.880	840.049	RT90-RHB70	-81.7600	307.3200	79.4000	29.9800	10.9500
855.00	6698750.568	1633106.538	843.018	RT90-RHB70	-81.7400	307.4600	79.7600	30.2100	11.0800
858.00	6698750.830	1633106.196	845.987	RT90-RHB70	-81.6900	307.6100	80.1300	30.4400	11.2100
861.00	6698751.094	1633105.852	848.956	RT90-RHB70	-81.7000	307.6500	80.5000	30.6600	11.3300
864.00	6698751.359	1633105.510	851.924	RT90-RHB70	-81.7100	307.3700	80.8700	30.8900	11.4600
867.00	6698751.622	1633105.166	854.893	RT90-RHB70	-81.6600	307.4500	81.2300	31.1200	11.5900
870.00	6698751.886	1633104.820	857.861	RT90-RHB70	-81.6500	307.4100	81.6000	31.3500	11.7200
873.00	6698752.151	1633104.474	860.829	RT90-RHB70	-81.6200	307.4400	81.9800	31.5800	11.8500
876.00	6698752.417	1633104.127	863.797	RT90-RHB70	-81.6000	307.7900	82.3500	31.8100	11.9800

879.00	6698752.685	1633103.781	866.765	RT90-RHB70	-81.5700	307.5600	82.7200	32.0400	12.1100
882.00	6698752.953	1633103.432	869.733	RT90-RHB70	-81.5600	307.9200	83.0900	32.2700	12.2500
885.00	6698753.224	1633103.085	872.700	RT90-RHB70	-81.5700	307.7400	83.4700	32.5000	12.3800
888.00	6698753.493	1633102.737	875.668	RT90-RHB70	-81.5400	307.9400	83.8400	32.7400	12.5100
891.00	6698753.764	1633102.389	878.635	RT90-RHB70	-81.5600	308.3000	84.2100	32.9700	12.6500
894.00	6698754.037	1633102.044	881.603	RT90-RHB70	-81.5400	308.2800	84.5800	33.2100	12.7800
897.00	6698754.310	1633101.697	884.570	RT90-RHB70	-81.5400	308.1800	84.9500	33.4500	12.9100
900.00	6698754.583	1633101.350	887.537	RT90-RHB70	-81.5200	308.0800	85.3300	33.6800	13.0400
903.00	6698754.856	1633101.002	890.505	RT90-RHB70	-81.4700	308.1700	85.7000	33.9200	13.1800
906.00	6698755.131	1633100.652	893.471	RT90-RHB70	-81.4300	308.1600	86.0800	34.1600	13.3100
909.00	6698755.407	1633100.301	896.438	RT90-RHB70	-81.3700	308.3200	86.4500	34.4000	13.4500
912.00	6698755.687	1633099.947	899.404	RT90-RHB70	-81.3000	308.2900	86.8300	34.6400	13.5900
915.00	6698755.968	1633099.591	902.369	RT90-RHB70	-81.2700	308.6000	87.2200	34.8800	13.7300
918.00	6698756.252	1633099.236	905.335	RT90-RHB70	-81.2300	308.9000	87.6000	35.1300	13.8800
921.00	6698756.539	1633098.880	908.300	RT90-RHB70	-81.2000	309.0800	87.9800	35.3800	14.0200
924.00	6698756.829	1633098.523	911.264	RT90-RHB70	-81.1400	309.0600	88.3700	35.6300	14.1600
927.00	6698757.120	1633098.164	914.228	RT90-RHB70	-81.0900	309.1600	88.7500	35.8900	14.3100
930.00	6698757.413	1633097.804	917.192	RT90-RHB70	-81.0600	309.2900	89.1400	36.1400	14.4600
933.00	6698757.708	1633097.443	920.156	RT90-RHB70	-81.0300	309.5200	89.5300	36.4000	14.6100
936.00	6698758.006	1633097.083	923.119	RT90-RHB70	-81.0100	309.5600	89.9200	36.6600	14.7600
939.00	6698758.305	1633096.721	926.082	RT90-RHB70	-80.9700	309.8000	90.3100	36.9200	14.9100
942.00	6698758.606	1633096.359	929.045	RT90-RHB70	-80.9800	309.7500	90.7000	37.1800	15.0600
945.00	6698758.907	1633095.998	932.008	RT90-RHB70	-80.9400	309.8700	91.0900	37.4500	15.2100
948.00	6698759.210	1633095.635	934.971	RT90-RHB70	-80.8900	309.8400	91.4800	37.7100	15.3600
951.00	6698759.514	1633095.270	937.933	RT90-RHB70	-80.8500	310.0800	91.8700	37.9800	15.5100
954.00	6698759.821	1633094.905	940.895	RT90-RHB70	-80.8300	310.1000	92.2700	38.2500	15.6700
957.00	6698760.129	1633094.540	943.856	RT90-RHB70	-80.8400	309.9700	92.6600	38.5200	15.8200
960.00	6698760.436	1633094.173	946.818	RT90-RHB70	-80.8100	310.2400	93.0600	38.7900	15.9800
963.00	6698760.746	1633093.807	949.779	RT90-RHB70	-80.8100	310.3500	93.4500	39.0600	16.1300
966.00	6698761.056	1633093.442	952.741	RT90-RHB70	-80.7800	310.3600	93.8500	39.3300	16.2900
969.00	6698761.367	1633093.076	955.702	RT90-RHB70	-80.7700	310.2200	94.2400	39.6000	16.4400
972.00	6698761.678	1633092.709	958.663	RT90-RHB70	-80.7200	310.6100	94.6400	39.8700	16.6000
975.00	6698761.993	1633092.341	961.624	RT90-RHB70	-80.7000	310.6600	95.0400	40.1500	16.7600
978.00	6698762.309	1633091.973	964.585	RT90-RHB70	-80.6400	310.7400	95.4300	40.4300	16.9200
981.00	6698762.627	1633091.604	967.545	RT90-RHB70	-80.6100	310.6500	95.8300	40.7100	17.0800
984.00	6698762.946	1633091.232	970.504	RT90-RHB70	-80.5800	310.8100	96.2300	40.9900	17.2400
987.00	6698763.266	1633090.861	973.464	RT90-RHB70	-80.5400	310.8400	96.6400	41.2700	17.4000
990.00	6698763.589	1633090.488	976.423	RT90-RHB70	-80.5300	310.7100	97.0400	41.5500	17.5700
993.00	6698763.911	1633090.114	979.382	RT90-RHB70	-80.5000	310.8100	97.4400	41.8300	17.7300
999.00	6698764.561	1633089.364	985.300	RT90-RHB70	-80.4700	310.9900	98.2600	42.4100	18.0600

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LÄNGDMARKERING

Blankett______av______

Område	Projekt	Borrhålsbeteckning
Område **Forsmark**	Projekt **IPLU**	Borrhålsbeteckning **KFM02A**
Borrfirma **Drillcon Core AB**	Borrförman **Jarmo Mäkinen**	Aktivitetsplans nr: **AP PF 400-03-42**
Start datum/tid **2003-02-13 06:00**	Stop datum/tid **2003-02-13 14:00**	Grundvattenyta 7.00m

Borrhålslängd (m)	Varvtal (rpm)	Startflöde Vid 12-14 bar (L/h)	Stoppflöde (L/h)	Stopptryck (bar)	Frästid (min)	Spår detekterbart (JA/NEJ)	Fräsdiameter mätt över kutsar (mm)	Noteringar
110	400	350	600	48-50	3:00			OK klar signal
150	400	380	650	48-50	1:25			OK klar signal
200	400	480	780	45	1:30			OK klar signal
250	400	500	800	35-36	2:40			OK klar signal porös granit
304.5	400	500	900	45	2:45			OK klar signal
350	400	600	1000	40	2:30			OK klar signal
400	400	600	900	40	2:10			OK klar signal
506	400	700	1000	25-36	3:00			Diffus signal
550	400	700	1000	38	2:00			Diffus signal

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av	Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

Version1.0.0

LÄNGDMARKERING

Blankett______ av______

Område **Forsmark**	Projekt **IPLU**	Borrhålsbeteckning **KFM02A**
Borrfirma **Drillcon Core AB**	Borrförman **Jarmo Mäkinen, Inge Olsson, Kalle Olestam**	Aktivitetsplans nr: **AP PF 400-03-42**
Start datum/tid **2003-03-13 06:00**	Stop datum/tid **2003-03-13 14:00**	Grundvattenyta 7.00m

Borrhålslängd (m)	Varvtal (rpm)	Startflöde Vid 12-14 bar (L/h)	Stoppflöde (L/h)	Stopptryck (bar)	Frästid (min)	Spår detekterbart (JA/NEJ)	Fräsdiameter mätt över kutsar (mm)	Noteringar
450	400	700	1000	34	2:00			OK klar signal
600	400	>1000	>1000	24	2:00			För stort läckage,inte tillräckligt tryck.
600	400	1200	3300	55	4:00			Ingen signal, OBS borrmaskinens pump fr.o m. denna fräsning.

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av	Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

Version1.0.0

SPÅRFRÄSDETEKTERING

Blankett 1 av 2

Område **Forsmark**	Projekt **I-PLU**	Borrhålsbeteckning **KFM02A**
Företag **StudsvikEcosafe, MIRAB**	Utförare **Rolf Sandström, Kenneth Åkerström**	Aktivitetsplans nr: **AP PF 400-02-42**
Start datum/tid **2003-03-17 16:50**	Stop datum/tid **2003-03-18 01:00**	Grundvattenyta

Borrhålslängd (m)	Varvtal (rpm)	Startflöde Vid 12-14 bar (L/h)	Stoppflöde (L/h)	Stopptryck (bar)	Frästid (min)	Spår detekterbart (JA/NEJ)	Fräsdiameter mätt över kutsar (mm)	Noteringar
110						Ja, 110,10-110,20		
150						Ja, 150,20-150,30		
200						Ja, 200,40-250,60		
250						Ja, 250,60-250,70		
304,50						Ja, 305,35-305,45		
350						Ja, 351,05-351,15		
400						Ja, 401,25-401,35		
450						Ja, 451,45-451,55		
506						Ja, 507,70-507,80		
550						Ja, 551,70-551,80		
600						Ja, 602,15-602,25		
650						Ja, 652,45-652,55		
700						Ja, 702,65-702,75		
750						Ja, 752,95-753,05		
800						Ja, 803,20-803,30		

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av	Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

Version1.0.0

SPÅRFRÄSDETEKTERING

Blankett 2 av 2

Område **Forsmark**	Projekt **I-PLU**	Borrhålsbeteckning **KFM02A**
Företag **StudsvikEcosafe, MIRAB**	Utförare **Rolf Sandström, Kenneth Åkerström**	Aktivitetsplans nr: **AP PF 400-02-42**
Start datum/tid **2003-03-17 16:50**	Stop datum/tid **2003-03-18 01:00**	Grundvattenyta

Borrhålslängd (m)	Varvtal (rpm)	Startflöde Vid 12-14 bar (L/h)	Stoppflöde (L/h)	Stopptryck (bar)	Frästid (min)	Spår detekterbart (JA/NEJ)	Fräsdiameter mätt över kutsar (mm)	Noteringar
850						Ja, 853,45-853,55		
900						Nej		Ingen signal, varken ner eller upp.
950						Ja, 954,00-954,10		

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av	Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

LÄNGDMARKERING

Blankett 1 av 1

Område **Forsmark**	Projekt **IPLU**	Borrhålsbeteckning **KFM02A**
Borrfirma **Drillcon Core AB**	Borrförman **Jarmo Mäkinen, Anders Ljunggren, Kalle Olestam**	Aktivitetsplans nr: **AP PF 400-03-42**
Start datum/tid **2003-03-17 06:00**	Stop datum/tid **2003-03-17 18:00**	Grundvattenyta

Borrhålslängd (m)	Varvtal (rpm)	Startflöde Vid 12-14 bar (L/h)	Stoppflöde (L/h)	Stopptryck (bar)	Frästid (min)	Spår detekterbart (JA/NEJ)	Fräsdiameter mätt över kutsar (mm)	Noteringar
650	400	700	> 1000	52	2			12:30, klar sänkning. JM, NK
700	400	700	> 1000	54	2			12:55, klar sänkning. JM, NK, KÅ
750	400	750	> 1000	54	2			13:20, litet tryckfall vid 50bar. Vid 54 bar utlöstes säkring/motorskydd. JM, NK, KÅ
800	400	800	> 1000	52	2,30			13:55, ingen indikering. Vid 52 bar utlöstes säkring/motorskydd. Ändrade vid eldosan för start/stopp för att förhindra att säkring/motor-skydd utlöses. JM, NK, KÅ
850	400	800	> 1000	54	4			14:25, ingen indikering vid 54 bar. När vi sänkte trycket till 12-14 bar var flödet 500 l. JM, NK, KÅ.
900	400	800	> 1000	54	4			14:49, ingen indikering vid 54 bar. När vi sänkte trycket till 12-14 bar var flödet 500 l. JM, NK, KÅ.
950	400	800	> 1000	54	4			15:10:30, ingen indikering vid 54 bar. När vi sänkte trycket till 12-14 bar var flödet 460 l. JM, NK, KÅ.

Uppdragstagares signaturer samt datum		SKB:s signaturer samt datum	
Upprättad av	Kvalitetsgodkänd för leverans	Leverans godkänd	Införd i SICADA

Drill cuttings Date: 2003-10-22 Sign.: Jesper Petersson

Hole	From	To	Untreated drill cuttings sample Lightn.	Chrom.	Hue	Grainsize	Washed and sieved drill cuttings sample Lightn.	Chrom.	Hue	Grainsize	Rock type A	Rock type B	Min-1	Min-2	Min-3	Min-4	Min-5	Distr.	Kommentar
KFM02A	**3**	**4**	100; Light	80; Greyish	1; Pink	8; Medium to coarse grained	100; Light	10; Pinkish	7; White	4; Coarse-grained (> 5 mm)	101061; Pegmatite, pegmatitic granite		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	**4**	5	100; Light	20; Reddish	8; Grey	6; Fine-to medium grained	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	5	8	100; Light	20; Reddish	8; Grey	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	8	9	100; Light	20; Reddish	8; Grey	8; Medium to coarse grained	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	9	10	100; Light		8; Grey	6; Fine-to medium grained	100; Light		8; Grey	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	10	11	200; Dark		8; Grey	2; Fine-grained (<1 mm)	200; Dark	80; Greyish	9; Black	2; Fine-grained (<1 mm)	102017; Amphibolite	101057; Granite to granodiorite, metamorphic, medium grained, medium grained	49; Plagioclase	10; Biotite	28; Hornblende	32; Potash Feldspar	36; Quartz	90; 90/10	Rock type B: <15 vol%
KFM02A	11	12	100; Light		8; Grey	2; Fine-grained (<1 mm)	100; Light		8; Grey	9; Medium-grained (1-5 mm)	101054; Tonalite to granodiorite, metamorphic		49; Plagioclase	36; Quartz	10; Biotite	32; Potash Feldspar			
KFM02A	12	14	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light		2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	14	17	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light		2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	17	19	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light		2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	19	20			2; Red	9; Medium-grained (1-5 mm)			2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	20	22	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light		2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	22	23			2; Red	9; Medium-grained (1-5 mm)			2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	23	26	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light		2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	26	29	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light		2; Red	8; Medium to coarse grained	101057; Granite to granodiorite, metamorphic, medium grained, medium grained	101061; Pegmatite, pegmatitic granite	32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite		80; 80/20	Rock type B: ~20 vol%
KFM02A	29	30	100; Light	80; Greyish	2; Red	8; Medium to coarse grained	100; Light		2; Red	4; Coarse-grained (> 5 mm)	101061; Pegmatite, pegmatitic granite		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	30	31	100; Light	20; Reddish	8; Grey	8; Medium to coarse grained	100; Light	80; Greyish	2; Red	8; Medium to coarse grained	101061; Pegmatite, pegmatitic granite	101057; Granite to granodiorite, metamorphic, medium grained, medium grained	32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite		70; 70/30	Rock type B: 20-30 vol%
KFM02A	31	32	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	32	35	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light		2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	35	38	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light		2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	38	41	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	41	44	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	44	47	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			

Hole	From	To	Untreated drill cuttings sample Lightn.	Chrom.	Hue	Grainsize	Washed and sieved drill cuttings sample Lightn.	Chrom.	Hue	Grainsize	Rock type A	Rock type B	Min-1	Min-2	Min-3	Min-4	Min-5	Distr.	Kommentar
KFM02A	47	50	100; Light	20; Reddish	8; Grey	6; Fine-to medium grained	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained	102017; Amphibolite	32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite	28; Hornblende	90; 90/10	Rock type B: <5 vol%
KFM02A	50	51			9; Black	2; Fine-grained (<1 mm)	100; Light	80; Greyish	9; Black	2; Fine-grained (<1 mm)	102017; Amphibolite		49; Plagioclase	28; Hornblende	10; Biotite				
KFM02A	51	52	100; Light	20; Reddish	8; Grey	6; Fine-to medium grained	100; Light	20; Reddish	8; Grey	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	52	53	100; Light	20; Reddish	8; Grey	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	53	56	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	56	59	100; Light	20; Reddish	8; Grey	6; Fine-to medium grained	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	59	62	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	62	65	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	65	68	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	68	71	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	71	72	100; Light		8; Grey	2; Fine-grained (<1 mm)	100; Light	10; Pinkish	8; Grey	9; Medium-grained (1-5 mm)	111058; Granite, fine to medium grained	102017; Amphibolite	36; Quartz	32; Potash Feldspar	49; Plagioclase	10; Biotite	28; Hornblende	90; 90/10	Rock type A: Leucogranite, slightly pegmatitic Rock type B: ~10 vol%
KFM02A	72	73	200; Dark	80; Greyish	9; Black	2; Fine-grained (<1 mm)	200; Dark		8; Grey	6; Fine-to medium grained	102017; Amphibolite	111058; Granite, fine to medium grained	49; Plagioclase	28; Hornblende	10; Biotite	36; Quartz	32; Potash Feldspar	80; 80/20	Rock type B: 20-25 vol% Leucogranite
KFM02A	73	74		20; Reddish	8; Grey	6; Fine-to medium grained		10; Pinkish	8; Grey	6; Fine-to medium grained	111058; Granite, fine to medium grained	102017; Amphibolite	36; Quartz	32; Potash Feldspar	49; Plagioclase	10; Biotite	28; Hornblende	70; 70/30	Rock type A: Leucogranite Rock type B: 25-30 vol%
KFM02A	74	76	100; Light	20; Reddish	8; Grey	6; Fine-to medium grained	100; Light	20; Reddish	8; Grey	6; Fine-to medium grained	101057; Granite to granodiorite, metamorphic, medium grained, medium grained	102017; Amphibolite	32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite	28; Hornblende	90; 90/10	Rock type B: ~ 5 vol%
KFM02A	76	77	200; Dark	80; Greyish	9; Black	6; Fine-to medium grained	200; Dark		8; Grey	6; Fine-to medium grained	102017; Amphibolite	101057; Granite to granodiorite, metamorphic, medium grained, medium grained	49; Plagioclase	10; Biotite	32; Potash Feldspar	28; Hornblende	36; Quartz	60; 60/40	Rock type B: 30-40 vol%
KFM02A	77	80	100; Light	80; Greyish	2; Red	6; Fine-to medium grained	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	80	83	100; Light	80; Greyish	2; Red	8; Medium to coarse grained	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	83	86	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	86	89		80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	6; Fine-to medium grained	101057; Granite to granodiorite, metamorphic, medium grained, medium grained	102017; Amphibolite	32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite	28; Hornblende	90; 90/10	Rock type B: 5-10 vol%
KFM02A	89	92		80; Greyish	2; Red	9; Medium-grained (1-5 mm)		80; Greyish	2; Red	6; Fine-to medium grained	101057; Granite to granodiorite, metamorphic, medium grained, medium grained	102017; Amphibolite	32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite	28; Hornblende	80; 80/20	Rock type B: ~20 vol% biotite-rich
KFM02A	92	95		80; Greyish	2; Red	9; Medium-grained (1-5 mm)		80; Greyish	2; Red	6; Fine-to medium grained	101057; Granite to granodiorite, metamorphic, medium grained, medium grained	102017; Amphibolite	32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite	28; Hornblende	80; 80/20	Rock type B: 20-25 vol%
KFM02A	95	98	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			
KFM02A	98	100	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	100; Light	80; Greyish	2; Red	9; Medium-grained (1-5 mm)	101057; Granite to granodiorite, metamorphic, medium grained, medium grained		32; Potash Feldspar	36; Quartz	49; Plagioclase	10; Biotite			

			Untreated drill cuttings sample				Washed and sieved drill cuttings sample													
Hole	From	To	Lightn.	Chrom.	Hue	Grainsize	Lightn.	Chrom.	Hue	Grainsize	Rock type A	Rock type B	Min-1	Min-2	Min-3	Min-4	Min-5	Distr.	Kommentar
KFM02A	100	103																	
KFM02A	103	106																	
KFM02A	106	109																	
KFM02A	109	112																	
KFM02A	112	115																	
KFM02A	115	118																	
KFM02A	118	121																	
KFM02A	121	124																	
KFM02A	124	127																	
KFM02A	127	130																	
KFM02A	130	133																	
KFM02A	133	136																	
KFM02A																			
KFM02A																			
KFM02A																			
KFM02A																			