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# Forsmark site investigation

# Boremap mapping of telescopic drilled borehole KFM10A

Christin Döse, Eva Samuelsson
Geosigma AB

September 2006

**Svensk Kärnbränslehantering AB**
Swedish Nuclear Fuel
and Waste Management Co
Box 5864
SE-102 40 Stockholm Sweden
Tel 08-459 84 00
+46 8 459 84 00
Fax 08-661 57 19
+46 8 661 57 19

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# Abstract

This report presents the result from the Boremap mapping of telescopic drilled borehole KFM10A at drill site 10 in the Forsmark candidate area. Drill site 10 (DS 10) is situated in the western part of the tectonic lens that has been selected as a candidate area for deposition of nuclear waste. The borehole was drilled with the bearing 10.4° and the inclination –50.1°. The aims of the drilling were to receive geological data of the rock volumes in the south-western part of a potential nuclear waste repository, and to investigate the important deformation zone ZFMNE00A2, and also to determine the extistense of the two modelled deformation zones, ZFMNW0123 and ZFMNE103.

The dominant rock type in KFM10A is a generally foliated metagranite-granodiorite (~ 76%) followed by massive or lineated pegmatite or pegmatitic granite (~ 12%) and foliated amphibolite (~ 6%). Subordinate rock types are fine- to medium-grained metagranitoid (~ 3.5%), fine- to medium-grained granite (~ 1%), felsic- to intermediate metavolcanic rock (< 1%), aplitic metagranite (< 1%), quartz-dominated hydrothermal veins (< 1%) and calc-silicate rock (< 1%).

The borehole shows fracture frequencies of 2.3 open and partly open fractures/m (crush excluded) and 4.0 sealed fractures/m (sealed fracture networks excluded). The fractures are concentrated to the section 62.85–145 m, where also intersections of vuggy rock and argillization occur. The whole section is generally weakly to moderately oxidized. Other alteration types occur sporadically.

# Sammanfattning

Denna rapport redovisar resultatet från Boremapkartering av teleskopborrhålet KFM10A vid borrplats 10 i Forsmark kandidatområde. Borrplats 10 är belägen i den västra delen av den tektoniska linsen, som har valts som kandidatområde för deponering av kärnavfall. Borrhålet är borrat med bäringen 10,4° och inklinationen –50,1°. Syftet med borrningen är att erhålla geologiska data för bergvolymen i den sydvästra delen av ett potentiellt djupförvar, samt att undersöka den viktiga deformationszonen ZFMNE00A2, och existensen av de modellerade deformationszonerna, ZFMNW0123 och ZFMNE103.

Den dominerande bergarten i KFM10A är en generellt folierad metagranit-granodiorit (~ 76 %), följt av pegmatit till pegmatitisk granit (~ 12 %) och folierad amfibolit (~ 6 %). Underordnade bergarter är fin- till medelkornig metagranitoid (~ 3,5 %), fin- till medelkornig granit (~ 1 %), felsisk- till intermediär metavulkanit (< 1 %), aplitisk metagranit (< 1 %), kvartsdominerad hydrotermal gångbergart (< 1 %) och skarn (< 1 %).

Borrhålet uppvisar sprickfrekvenser på 2,3 öppna och delvis öppna sprickor/m (krossar exkluderade) och 4,0 läkta sprickor/m (läkta spricknätverk exkluderade). Sprickorna är koncentrerade till sektionen 62,85–145 m, där även porösa bergarter och leromvandling förekommer. Hela sektionen är generellt svagt till moderat oxiderat. Andra omvandlingstyper förekommer sporadiskt.

# Contents

# 1 Introduction

This document reports the data gained by the Boremap mapping of the telescopic drilled borehole KFM10A, which is one of the activities performed within the site investigation at Forsmark. The work was carried out in accordance with activity plan SKB PF 400-06-059. In Table 1-1 controlling documents for performing this activity are listed. Both activity plan and method descriptions are SKB's internal controlling documents.

The borehole KFM10A was drilled from drill site 10 (DS 10) in the western part of the tectonic lens which is of interest for future nuclear waste disposal (Figure 2-1) /1/. The borehole was drilled in order to verify the existence of the deformation zone A2. The drilling of KFM10A was finished on June 1$^{st}$. The Boremap mapping of the borehole started on June 20$^{th}$ and was finished on August 31$^{st}$. Some details in the mapping were revised on September 15$^{th}$.

The geological documentation of core drilled boreholes according to the Boremap method is based on the use of BIPS-images of the borehole wall and the simultaneous study of the drill core. Position, aperture and orientation data of features are based on the adjusted BIPS-image, while other data such as rock type, alteration, fracture mineralogy and surface are observed in the drill core. The Boremap mapping will be used for further 3D-modelling in the Forsmark area.

**Table 1-1. Controlling documents for the performance of the activity.**

| Activity plan | Number | Version |
|---|---|---|
| Boremapkartering av teleskopborrhål KFM10A | AP PF 400-06-059 | 1.0 |
| **Method descriptions** | **Number** | **Version** |
| Metodbeskrivning för Boremapkartering | SKB MD 143.006 | 2.0 |
| Mätsystembeskrivning för Boremap | SKB MD 146.001 | 1.0 |
| Nomenklatur vid Boremapkartering | SKB MD 143.008 | 1.0 |
| Instruktion: Regler för bergarters benämningar vid platsundersökningen i Forsmark | SKB MD 132.005 | 1.0 |

# 2 Objective and scope

The aim of this activity was to document lithologies, alterations, ductile structures and the occurrence and character of fractures in the bedrock penetrated by the telescopic drilled borehole KFM10A with the Boremap method. The detailed documentation will be used in 3D-modelling of the area.

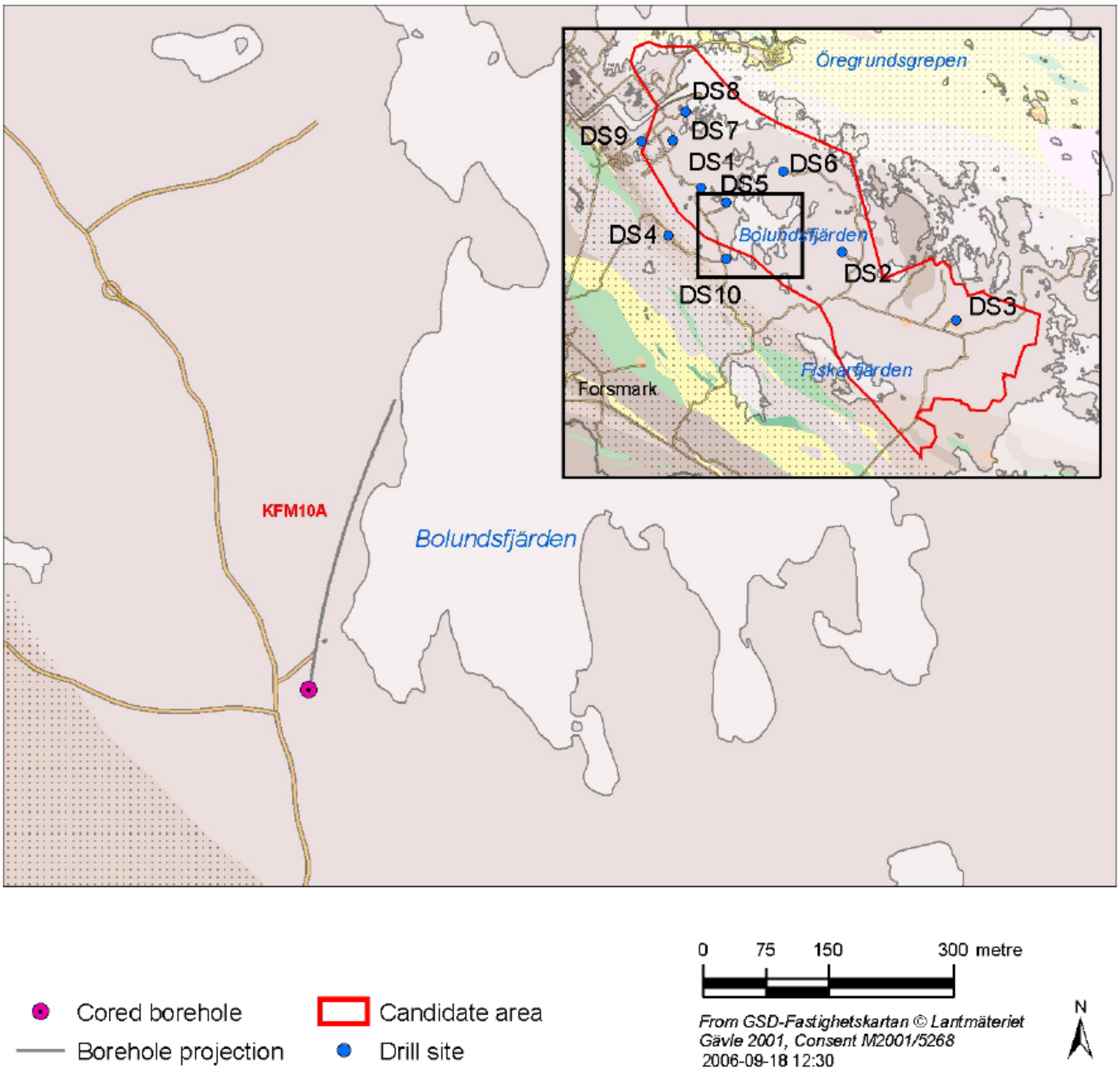


*Figure 2-1. Location of borehole KFM10A, (DS 10).*

# 3 Equipment

## 3.1 Description of equipment and interpretation tools

Mapping of BIPS-images and drill core was performed with the software Boremap v. 3.7.5.4. The Boremap software is loaded with the bedrock and mineral standard, used for surface mapping at the Forsmark investigation site, to enable correlation with the surface geology. The Boremap software calculates actual directions (strike and dip) of planar structures penetrated by the borehole (foliations, fractures, fracture zones, rock contacts etc). Data for inclination, bearing and diameter of the borehole, are used as in-data for the calculations (Table 4-2, Appendix 2). The BIPS-image lengths were calibrated (Table 4-1).

Additional software used during mapping are BIPS Image Viewer and MicroSoft Access 2002. The schematic data presentation was made in WellCad v. 4.0.

The following equipment has been used to facilitate the core documentation: folding rule, 10% hydrochloric acid, rock hardness tool, hand lens, paint brush and a tap of water.

***Figure 3-1**. Geosigma's mapping facilities in Uppsala. When the picture was taken it was still under construction.*

### 3.1.1 BIPS-image quality

The following factors may disturb the mapping:

- blackish coatings probably related to the drilling equipment,
- vertical bleached bands on the borehole walls, from the drill cuttings in suspension,
- light and dark bands at high angle to the borehole related to the automatic aperture of the video camera,
- vertical enlargements of pixels due to stick-slip movement of the camera probe.

The BIPS-image of KFM10A suffers from blackish coatings from the drill rod and dark bands of unknown origin, mostly on the right side of the borehole image. The BIPS-image quality is listed in Table 3-1.

**Table 3-1. BIPS Image Quality.**

| From | To | % visiability | Comment |
|---|---|---|---|
| 62.89 | 66 | 50 | Bad. Center of image diffuse. Camera probably not centralized. |
| 66 | 71 | 80 | Good. Center of image slightly diffuse. Camera probably not centralized. Also black coatings from drill rod. |
| 71 | 111.5 | 60–100 | Good. Sporadic blackish coatings from drill rod. |
| 111.5 | 118.7 | 50–100 | Acceptable. Central part of image dark to black. Could be coating from drill rod or a combination of this and non-centralized camera. |
| 118.7 | 137.08 | 70–100 | Good. Sporadic dark coatings from drill rod. |
| 137.08 | 212.60 | 60–100 | Acceptable. Continuous dark strip in the center part of image and in the end of section on the right side of image. Reason unknown. In lower part also dark coatings from drill rod. |
| 212.60 | 214.88 | 40 | Bad. 60% of image non-visible. |
| 214.88 | 219.00 | 60–100 | Acceptable. Continuous dark strip on the right side of image. Reason unknown. |
| 219.00 | 224.40 | 50 | Bad. 50% of image non-visible. |
| 224.40 | 229.6 | 60–70 | Acceptable. Dark strip on the right side of image. |
| 229.60 | 258.00 | 30–60 | Bad. Blackish coatings. |
| 258.00 | 262 | 70–80 | Good. Blackish coatings. |
| 262.00 | 273.00 | 40–60 | Bad. Blackish coatings. |
| 273.00 | 277.00 | 70 | Acceptable. Right side of image in dark, probably because the camera has not been centralized. |
| 277.00 | 298.30 | 40–60 | Bad. Dark right side of image, but with shorter better intervals. |
| 298.30 | 312.40 | 70 | Acceptable. Dark right side of image. |
| 312.40 | 324.30 | 30–50 | Bad. But with shorter better intervals. |
| 324.30 | 394.45 | 30–70 | Acceptable. Dark/Black with shorter better intervals. |
| 394.45 | 426.10 | 60–80 | Good. Darker right side of image. Over-exposed edges. |
| 426.10 | 445.00 | 60–70 | Acceptable. Mud on lower side of borehole. Upper side dark due to bad lightning. |
| 445.00 | 457.00 | 70 | Acceptable, but slightly diffuse image. |
| 457.00 | 458 | 0 | Bad. Diffuse and mud. |
| 458 | 475 | 70 | Acceptable, but slightly diffuse image. |
| 475 | 485.15 | 30–40 | Bad. Mud and diffuse image. |
| 485.15 | 491.00 | 40–60 | Acceptable. Diffuse image and mud. |
| 491.00 | 496.32 | 0–10 | Bad. Mud and very diffuse image. |
| 496.32 | 500.16 | 0 | No BIPS image available. |

# 4 Execution

## 4.1 General

Boremap mapping of the drill core KFM10A was performed and documented in accordance with the activity plan AP PF 400-06-059 (SKB internal document), following the method description for Boremap mapping SKB, MD 143.006 (v. 2.0) and SKB, MD 143.008 (v. 1.0). The mapping was preceded by an overview geological mapping of the cores by Kenneth Åkerström. All observations are made on ocular inspection, since no other data were available.

The mapping was performed in Geosigma's facilities in Uppsala (Figure 3-1) between June 20th and August 31st in 2006 by Christin Döse and Eva Samuelsson from Geosigma AB. Jan Ehrenborg, Mirab, aided the mapping for a shorter period. The last section of the borehole, ca 4 metres, was mapped without BIPS-image (Table 4-2).

## 4.2 Preparations

The lengths registered during the BIPS-logging deviates from the true length, which usually increases with depth. Therefore length adjustments were made. The length of the BIPS-image was adjusted with reference to slots cut into the borehole wall approximately every 50th meter and with reference to the end of casing (see Table 4-1).

Geometrical data for the borehole is given in Table 4-2. Background data (Appendix 2) prior to the Boremap mapping included:

- Borehole diameter.
- Reference slots for length adjustments.
- Borehole deviation.

**Table 4-1. Length adjustments.**

| Rec. length (m) | Adj. length (m) | Difference (m) |
|---|---|---|
| 62.86 | 62.85 | –0.01 |
| 100.356 | 100 | –0.356 |
| 150.376 | 150 | –0.376 |
| 200.39 | 200 | –0.390 |
| 250.308 | 250 | –0.308 |
| 300.257 | 300 | –0.257 |
| 350.09 | 350 | –0.090 |
| 399.859 | 400 | +0.141 |
| 449.774 | 450 | +0.226 |

**Table 4-2. Borehole data for KFM10A.**

| Mapping Nr | Interval | Northing | Easting | Bearing (degrees) | Inclination (degrees) | Diameter (mm) | Borehole length (m) | BIPS-image interval (m) | End of casing |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 62.85–496.32 | 6698669.43 | 1631722.67 | 8.97 | –49.14 | 76 | | 62.00–496.32 | 62.85 |
| 2 | 496.32–500.16 | 6698970.07 | 1631816.39 | 23.89 | –34.3 | 76 | 500.16 | No image | |

## 4.3 Execution of measurements

### 4.3.1 Fracture definitions

Definitions of different fracture types and apertures, crush zones and sealed fracture network are found in SKB MD 143.008 (v. 1.0).

Two types of fractures are mapped in Boremap; broken and unbroken. Broken fractures are those that split the core, while unbroken fractures do not split the core. All fractures are described with their fracture minerals and other characteristics, e.g. width, aperture and roughness. Visible aperture is measured down to 1 mm in the BIPS-image. Aperture less than 1 mm, which is impossible to detect in the BIPS-image, are denoted a value of 0.5 mm. If the core pieces do not fit well, the confidence of appearance for the aperture is considered "probable". If the core pieces do fit well, but the fracture surfaces are dull or altered, the confidence of appearance for the aperture is considered "possible".

All fractures with aperture > 0 mm are presented as open in the SICADA database. Unbroken fractures have normally apertures = 0 mm, but some have apertures > 0 mm. These are presented as partly open, and are included in the open fracture category in SICADA. The frequency of open and sealed fractures are calculated and shown in the WellCad-diagram, Appendix 1.

### 4.3.2 Fracture alteration and joint alteration number

Joint alteration number is mainly related to the thickness of, and the clay content in a fracture /2/. Fractures > 1 mm wide and rich in clay minerals, are usually given joint alteration numbers between 2 and 4. The majority of the broken fractures are very thin to extremely thin and do seldom contain clay minerals. These fractures receive joint alteration numbers between 1 and 2.

A subdivision of fractures with joint alteration numbers between 1 and 2 was introduced to facilitate both the evaluation process for fracture alterations, and the possibility to compare the alterations between different fractures in the boreholes. The subdivision is in accordance with the subdivision introduced by Ehrenborg and Steiskal /3/.

### 4.3.3 Mapping of fractures not visible in the BIPS-image

Not all fractures are visible in the BIPS-image, and these fractures are oriented using the *guide-line method* /3/, with one modification. The orientation performed in this work is based on the following data:

- Amplitude (measured along the drill core) which is the interval between fracture extremes along the drill core.
- The relation between the rotation of the fracture trace, and a well defined structure visible in both drill core and BIPS-image. This rotation is measured with measuring tape on the drill core.
- Absolute depth relative to a well defined structure visible in both drill core and BIPS-image.

The fractures mapped with the guide-line method are registered in Boremap as "not-visible in BIPS", and can therefore be separated from fractures visible in BIPS.

### 4.3.4 Definition of veins and dikes

A rock sequence that covers less than 1 m of the drill core is mapped as a "rock occurrence" in Boremap. Rock occurrences that cover more than 1 m of the drill core are mapped as a separate *rock type*.

Mainly two different types of rock occurrences are mapped: veins and dikes. These two are separated by their respectively length in the drill core; veins are set to 0–20 cm and dikes are set to 20–100 cm, if evidence for intrusion is visible in the drill core. If the rock occurrence cannot be classified as a vein or a dyke, the occurrence type is mapped as "unspecified". In Forsmark there are boudinated veins, xenoliths, blobs etc and the occurrence type is usually difficult to determine from the drill core.

### 4.3.5 Mineral codes

In cases where properties or minerals are not represented in the mineral list, the following mineral codes have been used in the mapping of KFM10A:

- X1 = Bleached fracture walls.
- X2 = Interpreted grouting, which is only observed in the borehole wall and hence in the BIPS-image (not used in this borehole).
- X3 = The drill core is broken at a right angle, and the broken surfaces have a polished appearance. This is caused by rotation of two core pieces along an intermediate fracture wearing away possible mineral filling. It is impossible to decide whether this fracture was open or sealed in situ.
- X4 = Dull fracture surface, no visible fracture mineral.
- X5 = Fresh fracture surface, no detectable fracture mineral.
- X6 = Striated surfaces, probably slickensided.

## 4.4 Data handling

In order to obtain the best possible data security, the mapping was performed on the Geosigma's network, with regular back-ups on the local drive in accordance with the consultant's quality plan. After each mapping session, a summary report was printed in order to find possible misprints. If misprints were observed, they were corrected before the mapping proceeded. A WellCad-diagram was also plotted before the drill cores were taken away from the roller table. When the mapping was completed, data was checked once more for misprints. Before exporting data to SICADA, borehole lengths, mapping lengths, down-hole deviation measurement data and length adjustments were checked again, as well as by a routine in Boremap, which detects logical errors.

## 4.5 Nonconformities

### 4.5.1 Late in-data

Not all necessary in-data were available in the SICADA database, neither when the mapping was performed, nor when this report was written. Lacking technical data were received straight from the persons responsible for drilling and measurements /4/.

BIPS-image is missing for the last section in KFM10A (496.32–500.16 m) and the mapping in this interval is based solely on the drill core. Therefore orientation data is missing; only angle to drill core is registered.

### 4.5.2 Core loss

Shorter sections with missing core occur mainly in the intervals 76–90 m and 483–486 m. In the latter the exact position of the core losses are quite uncertain. This is because problems during drilling, which resulted in core pieces rotating against each other and therefore cannot be puzzled together, and because there are only few clearly recognized features in both drill core and BIPS-image.

### 4.5.3 Overrepresented fracture mineral

The frequency of calcite in fractures is overrepresented relative to other minerals, since it is detected by reaction with diluted hydrochloric acid even though it is macroscopically invisible.

### 4.5.4 Fracture roughness and surface

The estimation of roughness of fractures in this work diverges rather much from the estimations made by Vattenfall Power Consultant. For example, Geosigma considers over half of the fractures as undulating, while the rest are stepped, planar and irregular. The proportion of planar, undulating, stepped and irregular fractures in the mappings of Vattenfall Power Consultant is different. They generally map few undulating fractures and many irregular fractures. This is because the personal interpretation of the definitions of fractures /5/, since the definitions are made for another scale, i.e. tunnels and excavations, and not for boreholes. Work has been started to synchronize the mapping teams.

### 4.5.5 Foliation intensity

Foliation intensity is not classified with the same scale as that used by Vattenfall Power Consultant. Geosigma's, intensity class "weak," has a much broader spectrum relative to that of Vattenfall Power Consultant. Therefore the change in strain is not as clear in Geosigma's mapping as in Vattenfall Power Consultant's. This will be changed in future. In KFM10A, borehole intervals with foliation intensity that would be classified as medium by Vattenfall Power Consultant are classified as weak by Geosigma, but with fine- to medium grain-size, instead of medium grain-size.

# 5 Results

The Boremap mapping of KFM10A is stored in SICADA, and it is only these data that shall be used for further interpretation and modelling. The interpreter should be aware of the assumptions mentioned in Chapter 4.

Results from the Boremap mapping are briefly described in this chapter and the graphical presentation of the data is given in Appendix 1 (WellCad-diagram).

## 5.1 Rock type

The dominant rock type of KFM10A is a foliated metagranite-granodiorite (~ 76%) followed by massive or lineated pegmatite or pegmatitic granite (~ 12%) and foliated amphibolite (~ 6%). Subordinate rock types are fine- to medium-grained metagranitoid (~ 3.5%), fine- to medium grained granite (~ 1%), felsic- to intermediate metavolcanic rock (< 1%), aplitic metagranite (< 1%), quartz-dominated hydrothermal veins (< 1%) and calc-silicate rock (< 1%).

## 5.2 Fractures and crushed sections

A total amount of 1,825 unbroken and 927 broken fractures were documented in KFM10A (62.85–500.16 m). Observe that the core drilled part of the borehole starts at 62.85 m. Of the unbroken fractures 123 show an aperture, while 51 of the broken fractures are considered artificial and have an aperture = 0. This result in the following interpreted fracture frequencies: 4.0 sealed fractures/m (sealed network excluded), 2.0 open fractures/m (crushed sections excluded) and 0.3 partly open fractures/m.

The open and sealed fractures are concentrated to the interval 62.85–145 m. In this interval a few fracture apertures range up to 10 mm, and some fractures show moderate to strong alteration on the fracture surfaces. The most frequent fracture minerals are calcite, adularia, hematite, chlorite and clay minerals.

Three crushed borehole sections coincide with the fracture rich section above. They occur at 85.78–85.92 m, 105.83–105.93 m and 144.23–144.25 m, and are oriented 113/67, 122/60 and 094/63 respectively. They contain clay minerals and also calcite or chlorite. The crushed section at the interval 105.83–105.93 m, shows moderate alteration.

Borehole intervals rich in sealed fractures and sealed fracture networks occur at 212–218 m, 275–283 m, 323–328 m and 429–449 m. Minor sections rich in open fractures occur at 431–442 m and 478–488 m. In the latter interval, the interpretation of fractures has been aggravated by problems during drilling, where the drill core pieces have rotated against each other and grinded the rock. Only few fractures in this interval show apertures in BIPS. The most frequent open fracture minerals are calcite, prehnite, chlorite, adularia, quartz, clay minerals and pyrite (Figure 5-1).

*Figure 5-1. Typical fracture mineral filling in the interval 478–488 m borehole length.*

## 5.3 Sealed brittle to ductile deformation

The rock types in borehole KFM10A show commonly weak to moderate foliation. The main orientation of the foliation is 143/72, although the foliation is undulating along the borehole (see Appendix 1). The strain trend in the borehole is from relatively high in the upper part of the borehole (Figure 5-2), to low in the lower part of the borehole. In the last 50 m of the borehole, lineation is dominating over foliation, and in the lowermost part lineation is the only clearly visible structure.

64 very thin deformation bands occur throughout the borehole ranging in character from brittle- to ductile. Of these, 43 thin deformation bands occur in the interval 62.85–198 m (brittle to ductile), while the rest are concentrated to the intervals 247–282 m (mostly ductile), 342–361 m (ductile) and 416–486 m (mostly brittle).

*Figure 5-2. Metagranite to granodiorite showing relatively high strain, 71 m borehole length. Scale 9:10.*

## 5.4 Alteration

The rock in the interval 62.85 – 145 m is generally weak to moderately oxidized, with argillization between 108.80–124.00 m, and recurrent altered vuggy rock between 86.93–118.56 m (Figure 5-3). In the interval 94.31–94.45 m the metagranite-granodiorite becomes poor in biotite, but relatively rich in calcite in the matrix.

Almost the same relation is observed in the oxidized interval 479.47–487.97 m, where argillization occurs between 483.56 and 484.26 m and faintly altered vuggy rock between 483.55–487.78 m.

Albitization is usually observed in the contacts to amphibolites /6/. Other alteration types are sporadic and usually very minor, such as epidotization, chloritization and silicification.

## 5.5 Core discing and other probably drill induced features

One minor section with core discing is observed at 373.40–373.46 m (Figure 5-4).

Fractures with no visible fracture mineral, very fresh surfaces and visible aperture in the BIPS-image, are relatively common in KFM10A. This kind of fractures can be observed for instance in the interval 94–95 m. They are mapped as open fractures with aperture, but suspicions occur that these fractures are drill induced, especially when two fractures cannot be found in the drill core, even if they have clear apertures in the BIPS-image (107.73 and 108.02 m).

Mechanical crush occur in the interval 431.59–432.50 m.


***Figure 5-3.*** *Altered vuggy pegmatite, 112 m borehole length. Scale 5:7.*

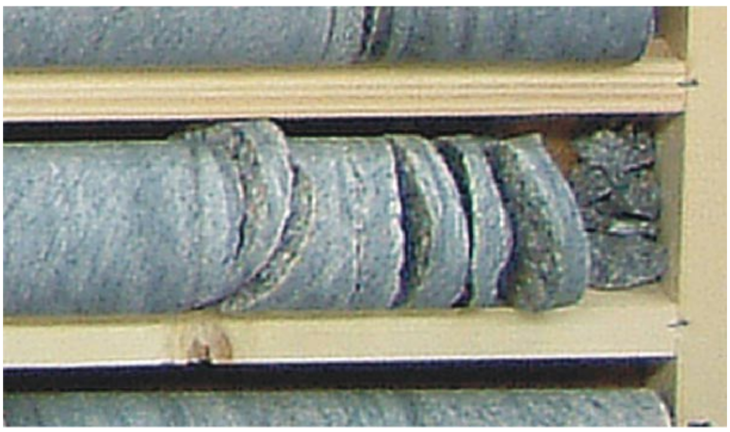

***Figure 5-4.*** *Core discing at 373.40–373.46 m borehole length. Rough scale 1:2.*

# References


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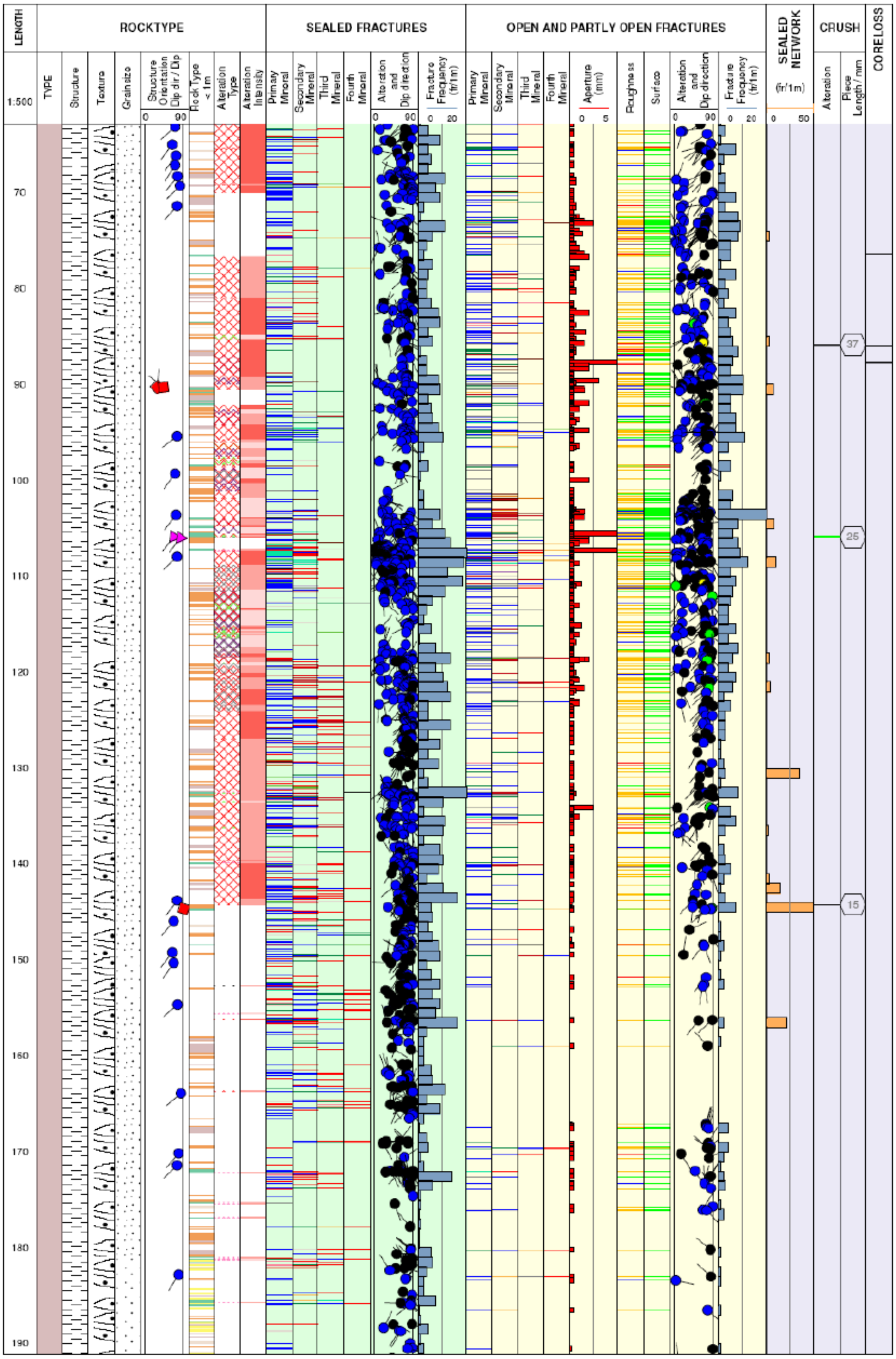
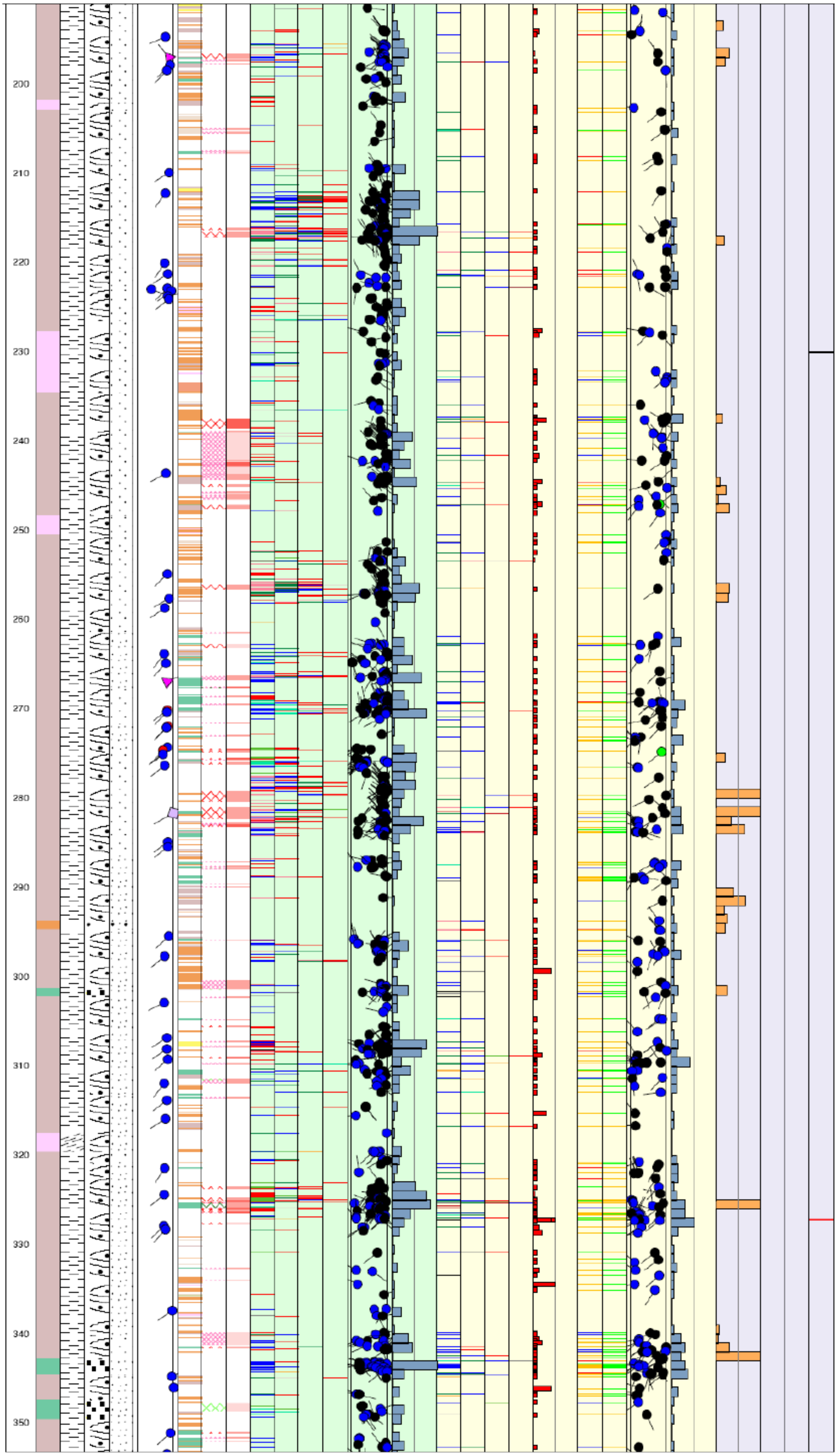
/6/ **Petersson J, Berglund J, Danielsson P, Skogsmo G, 2005.** Forsmark Site Investigation. Petrographic and geochemical characterisitics of bedrock samples from boreholes KFM04A-06A, and a whitened alteration rock. SKB-P-05-156. Svensk Kärnbränslehantering AB.

## WellCad-diagram of KFM10A

| Title | GEOLOGY IN KFM10A | | Appendix: |
|---|---|---|---|
| Site | FORSMARK | Coordinate System | RT90-RHB70 |
| Borehole | KFM10A | Northing [m] | 6698629.17 |
| Diameter [mm] | 16 | Easting [m] | 1631715.90 |
| Length [m] | 500.160 | Elevation [m.a.s.l.] | 4.51 |
| Bearing [°] | 10.42 | Drilling Start Date | 2005-12-06 09:00:00 |
| Inclination [°] | -50.04 | Drilling Stop Date | 2006-02-19 15:00:00 |
| Date of coremapping | 2006-06-20 10:59:00 | Plot Date | 2006-10-02 21:14:08 |
| Rocktype data from | p_rock | Signed data | |

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260
270
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290
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310
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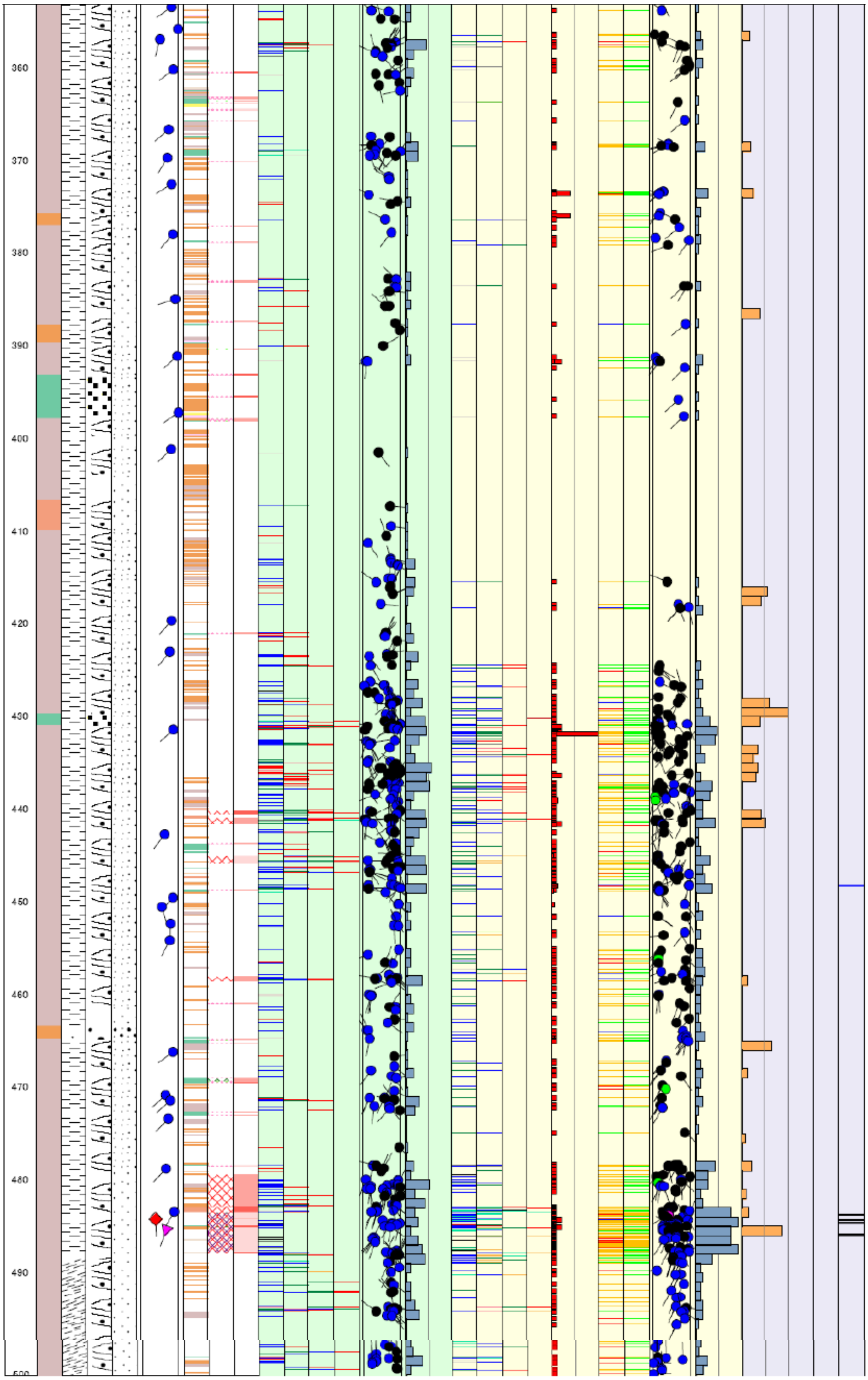
330
340
350


360
370
380
390
400
410
420
430
440
450
460
470
480
490

# Appendix 2

## Indata: Length reference marks, borehole diameter and borehole length

### Reference Mark T – Reference mark in drillhole.

**KFM10A, 2006-06-05 13:00:00–2006-06-15 13:07:00 (150.000–750.000 m).**

| Bhlen (m) | Rotation Speed (rpm) | Start Flow (l/h) | Stop Flow (l/h) | Stop Pressure | Cutter Diameter (mm) | Cutter Time (s) | Trace Detectable | Comment (bar) |
|---|---|---|---|---|---|---|---|---|
| 100.00 | 400.00 | 600 | 400 | 32.0 | 45 | JA/ | | 100.01/100.11 |
| 150.00 | 400.00 | 600 | 400 | 32.0 | 52 | JA/ | | 150.11/150.21 |
| 200.00 | 400.00 | 600 | 400 | 32.0 | 53 | JA/ | | 200.32/200.42 |
| 250.00 | 400.00 | 600 | 400 | 32.0 | 52 | JA/ | | 250.47/250.57 |
| 300.00 | 400.00 | 600 | 400 | 32.0 | 64 | JA/ | | 300.47/300.57 |
| 350.00 | 400.00 | 600 | 400 | 32.0 | 68 | JA/ | | 350.57/350.67 |
| 400.00 | 400.00 | 600 | 400 | 32.0 | 74 | JA/ | | 400.79/400.89 |
| 450.00 | 400.00 | 600 | 400 | 34.0 | 115 | JA/ | | 450.97/451.07 |

Printout from SICADA 2006-09-20 13:31:32.

### Hole Diam T – Drilling: Borehole diameter.

**KFM10A, 2006-03-14 15:15:00–2006-06-01 12:25:00 (60.730–500.160 m).**

| Sub Secup (m) | Sub Seclow (m) | Hole Diam (m) | Comment |
|---|---|---|---|
| 60.730 | 62.680 | 0.0860 | |
| 62.680 | 500.160 | 0.0758 | |

Printout from SICADA 2007-02-01 16:19:55.

### Maxibor T – Borehole deviation: Maxibor.

**KFM10A, 2006-06-06 08:00:00–2006-06-06 16:00:00 (0.000–498.000 m).**

| Length (m) | Northing (m) | Easting (m) | Elevation (m) | Coord system | Inclination (degrees) | Bearing (degrees) | Local A (m) | Local B (m) | Local C (m) | Extra-pol flag |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 6698629.17 | 1631715.90 | –4.51 | RT90-RHB70 | –50.05 | 10.42 | | | | |
| 3.00 | 6698631.07 | 1631716.25 | –2.21 | RT90-RHB70 | –50.05 | 10.42 | 0.0000 | 0.0000 | 0.0000 | |
| 6.00 | 6698632.96 | 1631716.60 | 0.09 | RT90-RHB70 | –49.89 | 10.24 | 1.9300 | 0.0000 | 0.0000 | |
| 9.00 | 6698634.86 | 1631716.94 | 2.39 | RT90-RHB70 | –49.85 | 10.13 | 3.8600 | –0.0100 | 0.0100 | |
| 12.00 | 6698636.77 | 1631717.28 | 4.68 | RT90-RHB70 | –49.81 | 10.05 | 5.7900 | –0.0200 | 0.0200 | |
| 15.00 | 6698638.67 | 1631717.62 | 6.97 | RT90-RHB70 | –49.66 | 9.86 | 7.7300 | –0.0300 | 0.0300 | |
| 18.00 | 6698640.59 | 1631717.95 | 9.26 | RT90-RHB70 | –49.53 | 9.67 | 9.6700 | –0.0500 | 0.0500 | |
| 21.00 | 6698642.51 | 1631718.28 | 11.54 | RT90-RHB70 | –49.54 | 9.59 | 11.6200 | –0.0700 | 0.0800 | |
| 24.00 | 6698644.43 | 1631718.60 | 13.82 | RT90-RHB70 | –49.68 | 9.58 | 13.5600 | –0.1000 | 0.1000 | |
| 27.00 | 6698646.34 | 1631718.93 | 16.11 | RT90-RHB70 | –49.70 | 9.56 | 15.5100 | –0.1300 | 0.1200 | |
| 30.00 | 6698648.25 | 1631719.25 | 18.40 | RT90-RHB70 | –49.60 | 9.50 | 17.4500 | –0.1600 | 0.1400 | |
| 33.00 | 6698650.17 | 1631719.57 | 20.68 | RT90-RHB70 | –49.52 | 9.46 | 19.3900 | –0.1900 | 0.1700 | |
| 36.00 | 6698652.09 | 1631719.89 | 22.97 | RT90-RHB70 | –49.55 | 9.43 | 21.3400 | –0.2200 | 0.1900 | |
| 39.00 | 6698654.01 | 1631720.21 | 25.25 | RT90-RHB70 | –49.57 | 9.35 | 23.2800 | –0.2600 | 0.2200 | |
| 42.00 | 6698655.93 | 1631720.52 | 27.53 | RT90-RHB70 | –49.52 | 9.17 | 25.2300 | –0.2900 | 0.2400 | |
| 45.00 | 6698657.86 | 1631720.83 | 29.81 | RT90-RHB70 | –49.45 | 9.09 | 27.1800 | –0.3300 | 0.2700 | |
| 48.00 | 6698659.78 | 1631721.14 | 32.09 | RT90-RHB70 | –49.39 | 9.16 | 29.1300 | –0.3800 | 0.3000 | |

| Length (m) | Northing (m) | Easting (m) | Elevation (m) | Coord system | Inclination (degrees) | Bearing (degrees) | Local A (m) | Local B (m) | Local C (m) | Extra-pol flag |
|---|---|---|---|---|---|---|---|---|---|---|
| 51.00 | 6698661.71 | 1631721.45 | 34.37 | RT90-RHB70 | –49.37 | 9.17 | 31.0800 | –0.4200 | 0.3400 | |
| 54.00 | 6698663.64 | 1631721.77 | 36.65 | RT90-RHB70 | –49.45 | 8.98 | 33.0300 | –0.4700 | 0.3700 | |
| 57.00 | 6698665.56 | 1631722.07 | 38.93 | RT90-RHB70 | –49.41 | 8.89 | 34.9800 | –0.5100 | 0.4000 | |
| 60.00 | 6698667.49 | 1631722.37 | 41.21 | RT90-RHB70 | –49.25 | 8.89 | 36.9300 | –0.5700 | 0.4400 | |
| 63.00 | 6698669.43 | 1631722.67 | 43.48 | RT90-RHB70 | –49.14 | 8.97 | 38.8900 | –0.6200 | 0.4800 | |
| 66.00 | 6698671.37 | 1631722.98 | 45.75 | RT90-RHB70 | –49.06 | 9.10 | 40.8500 | –0.6700 | 0.5200 | |
| 69.00 | 6698673.31 | 1631723.29 | 48.01 | RT90-RHB70 | –49.00 | 9.23 | 42.8200 | –0.7100 | 0.5800 | |
| 72.00 | 6698675.25 | 1631723.61 | 50.28 | RT90-RHB70 | –48.92 | 9.33 | 44.7800 | –0.7500 | 0.6300 | |
| 75.00 | 6698677.19 | 1631723.93 | 52.54 | RT90-RHB70 | –48.83 | 9.45 | 46.7500 | –0.7900 | 0.6900 | |
| 78.00 | 6698679.14 | 1631724.25 | 54.80 | RT90-RHB70 | –48.76 | 9.61 | 48.7300 | –0.8300 | 0.7500 | |
| 81.00 | 6698681.09 | 1631724.58 | 57.05 | RT90-RHB70 | –48.68 | 9.78 | 50.7100 | –0.8500 | 0.8200 | |
| 84.00 | 6698683.04 | 1631724.92 | 59.31 | RT90-RHB70 | –48.62 | 9.95 | 52.6900 | –0.8800 | 0.8900 | |
| 87.00 | 6698685.00 | 1631725.26 | 61.56 | RT90-RHB70 | –48.54 | 10.12 | 54.6700 | –0.8900 | 0.9700 | |
| 90.00 | 6698686.95 | 1631725.61 | 63.81 | RT90-RHB70 | –48.48 | 10.28 | 56.6600 | –0.9000 | 1.0400 | |
| 93.00 | 6698688.91 | 1631725.96 | 66.05 | RT90-RHB70 | –48.43 | 10.38 | 58.6400 | –0.9100 | 1.1300 | |
| 96.00 | 6698690.87 | 1631726.32 | 68.30 | RT90-RHB70 | –48.40 | 10.38 | 60.6400 | –0.9100 | 1.2100 | |
| 99.00 | 6698692.83 | 1631726.68 | 70.54 | RT90-RHB70 | –48.33 | 10.42 | 62.6300 | –0.9100 | 1.3000 | |
| 102.00 | 6698694.79 | 1631727.04 | 72.78 | RT90-RHB70 | –48.26 | 10.49 | 64.6200 | –0.9100 | 1.3900 | |
| 105.00 | 6698696.75 | 1631727.41 | 75.02 | RT90-RHB70 | –48.20 | 10.59 | 66.6200 | –0.9100 | 1.4800 | |
| 108.00 | 6698698.72 | 1631727.77 | 77.26 | RT90-RHB70 | –48.12 | 10.71 | 68.6200 | –0.9000 | 1.5800 | |
| 111.00 | 6698700.69 | 1631728.15 | 79.49 | RT90-RHB70 | –48.02 | 10.83 | 70.6200 | –0.8900 | 1.6800 | |
| 114.00 | 6698702.66 | 1631728.52 | 81.72 | RT90-RHB70 | –47.91 | 10.93 | 72.6300 | –0.8800 | 1.7900 | |
| 117.00 | 6698704.63 | 1631728.90 | 83.95 | RT90-RHB70 | –47.76 | 11.05 | 74.6400 | –0.8600 | 1.9000 | |
| 120.00 | 6698706.61 | 1631729.29 | 86.17 | RT90-RHB70 | –47.64 | 11.10 | 76.6600 | –0.8400 | 2.0200 | |
| 123.00 | 6698708.59 | 1631729.68 | 88.38 | RT90-RHB70 | –47.56 | 11.12 | 78.6800 | –0.8100 | 2.1400 | |
| 126.00 | 6698710.58 | 1631730.07 | 90.60 | RT90-RHB70 | –47.49 | 11.19 | 80.7000 | –0.7900 | 2.2700 | |
| 129.00 | 6698712.57 | 1631730.46 | 92.81 | RT90-RHB70 | –47.41 | 11.29 | 82.7300 | –0.7600 | 2.4100 | |
| 132.00 | 6698714.56 | 1631730.86 | 95.02 | RT90-RHB70 | –47.35 | 11.40 | 84.7600 | –0.7300 | 2.5500 | |
| 135.00 | 6698716.55 | 1631731.26 | 97.22 | RT90-RHB70 | –47.24 | 11.54 | 86.7900 | –0.7000 | 2.6900 | |
| 138.00 | 6698718.55 | 1631731.67 | 99.43 | RT90-RHB70 | –47.14 | 11.65 | 88.8300 | –0.6600 | 2.8300 | |
| 141.00 | 6698720.55 | 1631732.08 | 101.63 | RT90-RHB70 | –47.08 | 11.76 | 90.8700 | –0.6100 | 2.9900 | |
| 144.00 | 6698722.55 | 1631732.50 | 103.82 | RT90-RHB70 | –47.02 | 11.89 | 92.9100 | –0.5600 | 3.1400 | |
| 147.00 | 6698724.55 | 1631732.92 | 106.02 | RT90-RHB70 | –46.95 | 12.01 | 94.9500 | –0.5100 | 3.3000 | |
| 150.00 | 6698726.55 | 1631733.35 | 108.21 | RT90-RHB70 | –46.89 | 12.08 | 97.0000 | –0.4500 | 3.4600 | |
| 153.00 | 6698728.56 | 1631733.77 | 110.40 | RT90-RHB70 | –46.85 | 12.18 | 99.0500 | –0.4000 | 3.6200 | |
| 156.00 | 6698730.56 | 1631734.21 | 112.59 | RT90-RHB70 | –46.80 | 12.31 | 101.1000 | –0.3300 | 3.7900 | |
| 159.00 | 6698732.57 | 1631734.65 | 114.78 | RT90-RHB70 | –46.73 | 12.44 | 103.1500 | –0.2600 | 3.9600 | |
| 162.00 | 6698734.58 | 1631735.09 | 116.96 | RT90-RHB70 | –46.64 | 12.59 | 105.2100 | –0.1900 | 4.1300 | |
| 165.00 | 6698736.59 | 1631735.54 | 119.14 | RT90-RHB70 | –46.53 | 12.77 | 107.2700 | –0.1100 | 4.3100 | |
| 168.00 | 6698738.60 | 1631735.99 | 121.32 | RT90-RHB70 | –46.42 | 12.95 | 109.3300 | –0.0300 | 4.4900 | |
| 171.00 | 6698740.61 | 1631736.46 | 123.49 | RT90-RHB70 | –46.31 | 13.10 | 111.3900 | 0.0600 | 4.6800 | |
| 174.00 | 6698742.63 | 1631736.93 | 125.66 | RT90-RHB70 | –46.21 | 13.26 | 113.4600 | 0.1600 | 4.8800 | |
| 177.00 | 6698744.65 | 1631737.40 | 127.83 | RT90-RHB70 | –46.09 | 13.43 | 115.5400 | 0.2600 | 5.0700 | |
| 180.00 | 6698746.68 | 1631737.89 | 129.99 | RT90-RHB70 | –45.97 | 13.61 | 117.6200 | 0.3700 | 5.2800 | |
| 183.00 | 6698748.70 | 1631738.38 | 132.15 | RT90-RHB70 | –45.85 | 13.77 | 119.7000 | 0.4900 | 5.4900 | |
| 186.00 | 6698750.73 | 1631738.87 | 134.30 | RT90-RHB70 | –45.74 | 13.92 | 121.7800 | 0.6100 | 5.7100 | |
| 189.00 | 6698752.77 | 1631739.38 | 136.45 | RT90-RHB70 | –45.63 | 14.06 | 123.8700 | 0.7400 | 5.9300 | |
| 192.00 | 6698754.80 | 1631739.89 | 138.59 | RT90-RHB70 | –45.55 | 14.19 | 125.9700 | 0.8700 | 6.1600 | |
| 195.00 | 6698756.84 | 1631740.40 | 140.73 | RT90-RHB70 | –45.46 | 14.32 | 128.0600 | 1.0100 | 6.3900 | |
| 198.00 | 6698758.88 | 1631740.92 | 142.87 | RT90-RHB70 | –45.36 | 14.44 | 130.1600 | 1.1500 | 6.6300 | |

| Length (m) | Northing (m) | Easting (m) | Elevation (m) | Coord system | Inclination (degrees) | Bearing (degrees) | Local A (m) | Local B (m) | Local C (m) | Extra-pol flag |
|---|---|---|---|---|---|---|---|---|---|---|
| 201.00 | 6698760.92 | 1631741.45 | 145.01 | RT90-RHB70 | –45.26 | 14.51 | 132.2700 | 1.3000 | 6.8700 | |
| 204.00 | 6698762.96 | 1631741.98 | 147.14 | RT90-RHB70 | –45.17 | 14.61 | 134.3700 | 1.4500 | 7.1100 | |
| 207.00 | 6698765.01 | 1631742.51 | 149.26 | RT90-RHB70 | –45.07 | 14.76 | 136.4800 | 1.6000 | 7.3700 | |
| 210.00 | 6698767.06 | 1631743.05 | 151.39 | RT90-RHB70 | –44.94 | 14.91 | 138.5900 | 1.7600 | 7.6200 | |
| 213.00 | 6698769.11 | 1631743.60 | 153.51 | RT90-RHB70 | –44.82 | 15.06 | 140.7100 | 1.9300 | 7.8800 | |
| 216.00 | 6698771.16 | 1631744.15 | 155.62 | RT90-RHB70 | –44.70 | 15.19 | 142.8300 | 2.1000 | 8.1500 | |
| 219.00 | 6698773.22 | 1631744.71 | 157.73 | RT90-RHB70 | –44.59 | 15.28 | 144.9600 | 2.2800 | 8.4200 | |
| 222.00 | 6698775.28 | 1631745.27 | 159.84 | RT90-RHB70 | –44.48 | 15.40 | 147.0900 | 2.4600 | 8.7000 | |
| 225.00 | 6698777.35 | 1631745.84 | 161.94 | RT90-RHB70 | –44.31 | 15.53 | 149.2200 | 2.6500 | 8.9900 | |
| 228.00 | 6698779.41 | 1631746.41 | 164.04 | RT90-RHB70 | –44.19 | 15.61 | 151.3600 | 2.8400 | 9.2800 | |
| 231.00 | 6698781.49 | 1631746.99 | 166.13 | RT90-RHB70 | –44.16 | 15.67 | 153.5000 | 3.0300 | 9.5800 | |
| 234.00 | 6698783.56 | 1631747.57 | 168.22 | RT90-RHB70 | –44.16 | 15.72 | 155.6400 | 3.2300 | 9.8800 | |
| 237.00 | 6698785.63 | 1631748.16 | 170.31 | RT90-RHB70 | –44.14 | 15.81 | 157.7800 | 3.4300 | 10.1800 | |
| 240.00 | 6698787.70 | 1631748.74 | 172.40 | RT90-RHB70 | –44.09 | 15.85 | 159.9300 | 3.6300 | 10.4900 | |
| 243.00 | 6698789.77 | 1631749.33 | 174.48 | RT90-RHB70 | –44.04 | 15.93 | 162.0700 | 3.8300 | 10.7900 | |
| 246.00 | 6698791.85 | 1631749.92 | 176.57 | RT90-RHB70 | –43.98 | 16.05 | 164.2200 | 4.0400 | 11.1000 | |
| 249.00 | 6698793.92 | 1631750.52 | 178.65 | RT90-RHB70 | –43.87 | 16.17 | 166.3700 | 4.2500 | 11.4100 | |
| 252.00 | 6698796.00 | 1631751.12 | 180.73 | RT90-RHB70 | –43.74 | 16.28 | 168.5200 | 4.4700 | 11.7200 | |
| 255.00 | 6698798.08 | 1631751.73 | 182.81 | RT90-RHB70 | –43.64 | 16.39 | 170.6800 | 4.6900 | 12.0400 | |
| 258.00 | 6698800.16 | 1631752.34 | 184.88 | RT90-RHB70 | –43.53 | 16.51 | 172.8400 | 4.9200 | 12.3700 | |
| 261.00 | 6698802.25 | 1631752.96 | 186.94 | RT90-RHB70 | –43.41 | 16.65 | 175.0000 | 5.1500 | 12.7000 | |
| 264.00 | 6698804.34 | 1631753.59 | 189.00 | RT90-RHB70 | –43.29 | 16.80 | 177.1600 | 5.3800 | 13.0400 | |
| 267.00 | 6698806.43 | 1631754.22 | 191.06 | RT90-RHB70 | –43.17 | 16.93 | 179.3300 | 5.6300 | 13.3800 | |
| 270.00 | 6698808.52 | 1631754.86 | 193.11 | RT90-RHB70 | –43.07 | 17.06 | 181.5100 | 5.8700 | 13.7300 | |
| 273.00 | 6698810.62 | 1631755.50 | 195.16 | RT90-RHB70 | –42.96 | 17.19 | 183.6900 | 6.1300 | 14.0800 | |
| 276.00 | 6698812.71 | 1631756.15 | 197.21 | RT90-RHB70 | –42.85 | 17.30 | 185.8700 | 6.3900 | 14.4400 | |
| 279.00 | 6698814.81 | 1631756.80 | 199.25 | RT90-RHB70 | –42.73 | 17.43 | 188.0500 | 6.6500 | 14.8000 | |
| 282.00 | 6698816.92 | 1631757.46 | 201.28 | RT90-RHB70 | –42.56 | 17.53 | 190.2400 | 6.9200 | 15.1700 | |
| 285.00 | 6698819.02 | 1631758.13 | 203.31 | RT90-RHB70 | –42.40 | 17.64 | 192.4300 | 7.1900 | 15.5500 | |
| 288.00 | 6698821.13 | 1631758.80 | 205.33 | RT90-RHB70 | –42.27 | 17.75 | 194.6300 | 7.4700 | 15.9400 | |
| 291.00 | 6698823.25 | 1631759.47 | 207.35 | RT90-RHB70 | –42.15 | 17.85 | 196.8300 | 7.7500 | 16.3300 | |
| 294.00 | 6698825.37 | 1631760.16 | 209.36 | RT90-RHB70 | –42.04 | 17.94 | 199.0300 | 8.0400 | 16.7300 | |
| 297.00 | 6698827.49 | 1631760.84 | 211.37 | RT90-RHB70 | –41.93 | 18.04 | 201.2400 | 8.3300 | 17.1300 | |
| 300.00 | 6698829.61 | 1631761.53 | 213.38 | RT90-RHB70 | –41.79 | 18.15 | 203.4600 | 8.6300 | 17.5400 | |
| 303.00 | 6698831.73 | 1631762.23 | 215.38 | RT90-RHB70 | –41.67 | 18.25 | 205.6700 | 8.9300 | 17.9500 | |
| 306.00 | 6698833.86 | 1631762.93 | 217.37 | RT90-RHB70 | –41.54 | 18.38 | 207.8900 | 9.2400 | 18.3800 | |
| 309.00 | 6698835.99 | 1631763.64 | 219.36 | RT90-RHB70 | –41.40 | 18.49 | 210.1200 | 9.5500 | 18.8000 | |
| 312.00 | 6698838.13 | 1631764.35 | 221.35 | RT90-RHB70 | –41.26 | 18.57 | 212.3400 | 9.8600 | 19.2400 | |
| 315.00 | 6698840.26 | 1631765.07 | 223.32 | RT90-RHB70 | –41.15 | 18.67 | 214.5800 | 10.1800 | 19.6800 | |
| 318.00 | 6698842.40 | 1631765.80 | 225.30 | RT90-RHB70 | –41.02 | 18.75 | 216.8100 | 10.5100 | 20.1200 | |
| 321.00 | 6698844.55 | 1631766.52 | 227.27 | RT90-RHB70 | –40.92 | 18.88 | 219.0500 | 10.8300 | 20.5800 | |
| 324.00 | 6698846.69 | 1631767.26 | 229.23 | RT90-RHB70 | –40.81 | 19.02 | 221.2900 | 11.1700 | 21.0300 | |
| 327.00 | 6698848.84 | 1631768.00 | 231.19 | RT90-RHB70 | –40.70 | 19.14 | 223.5400 | 11.5100 | 21.5000 | |
| 330.00 | 6698850.99 | 1631768.74 | 233.15 | RT90-RHB70 | –40.60 | 19.28 | 225.7900 | 11.8500 | 21.9600 | |
| 333.00 | 6698853.14 | 1631769.49 | 235.10 | RT90-RHB70 | –40.46 | 19.37 | 228.0400 | 12.2000 | 22.4300 | |
| 336.00 | 6698855.29 | 1631770.25 | 237.05 | RT90-RHB70 | –40.35 | 19.49 | 230.2900 | 12.5600 | 22.9100 | |
| 339.00 | 6698857.45 | 1631771.01 | 238.99 | RT90-RHB70 | –40.23 | 19.60 | 232.5500 | 12.9200 | 23.4000 | |
| 342.00 | 6698859.60 | 1631771.78 | 240.93 | RT90-RHB70 | –40.14 | 19.71 | 234.8100 | 13.2800 | 23.8900 | |
| 345.00 | 6698861.76 | 1631772.56 | 242.86 | RT90-RHB70 | –40.01 | 19.83 | 237.0700 | 13.6500 | 24.3800 | |
| 348.00 | 6698863.92 | 1631773.34 | 244.79 | RT90-RHB70 | –39.90 | 19.93 | 239.3400 | 14.0300 | 24.8800 | |

| Length (m) | Northing (m) | Easting (m) | Elevation (m) | Coord system | Inclination (degrees) | Bearing (degrees) | Local A (m) | Local B (m) | Local C (m) | Extra-pol flag |
|---|---|---|---|---|---|---|---|---|---|---|
| 351.00 | 6698866.09 | 1631774.12 | 246.72 | RT90-RHB70 | –39.79 | 20.01 | 241.6100 | 14.4100 | 25.3800 | |
| 354.00 | 6698868.25 | 1631774.91 | 248.64 | RT90-RHB70 | –39.68 | 20.13 | 243.8800 | 14.7900 | 25.8900 | |
| 357.00 | 6698870.42 | 1631775.70 | 250.55 | RT90-RHB70 | –39.54 | 20.24 | 246.1600 | 15.1800 | 26.4100 | |
| 360.00 | 6698872.59 | 1631776.50 | 252.46 | RT90-RHB70 | –39.42 | 20.31 | 248.4400 | 15.5800 | 26.9300 | |
| 363.00 | 6698874.77 | 1631777.31 | 254.37 | RT90-RHB70 | –39.32 | 20.35 | 250.7200 | 15.9800 | 27.4500 | |
| 366.00 | 6698876.94 | 1631778.12 | 256.27 | RT90-RHB70 | –39.23 | 20.41 | 253.0100 | 16.3800 | 27.9900 | |
| 369.00 | 6698879.12 | 1631778.93 | 258.16 | RT90-RHB70 | –39.11 | 20.54 | 255.3000 | 16.7800 | 28.5200 | |
| 372.00 | 6698881.30 | 1631779.74 | 260.06 | RT90-RHB70 | –39.00 | 20.66 | 257.5900 | 17.1900 | 29.0600 | |
| 375.00 | 6698883.48 | 1631780.57 | 261.94 | RT90-RHB70 | –38.87 | 20.80 | 259.8800 | 17.6000 | 29.6100 | |
| 378.00 | 6698885.66 | 1631781.39 | 263.83 | RT90-RHB70 | –38.75 | 20.95 | 262.1800 | 18.0200 | 30.1600 | |
| 381.00 | 6698887.85 | 1631782.23 | 265.70 | RT90-RHB70 | –38.65 | 21.09 | 264.4800 | 18.4500 | 30.7200 | |
| 384.00 | 6698890.04 | 1631783.07 | 267.58 | RT90-RHB70 | –38.55 | 21.21 | 266.7800 | 18.8900 | 31.2800 | |
| 387.00 | 6698892.22 | 1631783.92 | 269.45 | RT90-RHB70 | –38.46 | 21.31 | 269.0900 | 19.3200 | 31.8500 | |
| 390.00 | 6698894.41 | 1631784.78 | 271.31 | RT90-RHB70 | –38.37 | 21.44 | 271.4000 | 19.7700 | 32.4200 | |
| 393.00 | 6698896.60 | 1631785.64 | 273.18 | RT90-RHB70 | –38.24 | 21.56 | 273.7000 | 20.2200 | 32.9900 | |
| 396.00 | 6698898.79 | 1631786.50 | 275.03 | RT90-RHB70 | –38.08 | 21.64 | 276.0200 | 20.6700 | 33.5700 | |
| 399.00 | 6698900.99 | 1631787.37 | 276.88 | RT90-RHB70 | –38.00 | 21.72 | 278.3300 | 21.1300 | 34.1600 | |
| 402.00 | 6698903.18 | 1631788.25 | 278.73 | RT90-RHB70 | –37.91 | 21.84 | 280.6500 | 21.6000 | 34.7500 | |
| 405.00 | 6698905.38 | 1631789.13 | 280.57 | RT90-RHB70 | –37.83 | 21.95 | 282.9700 | 22.0600 | 35.3500 | |
| 408.00 | 6698907.58 | 1631790.01 | 282.41 | RT90-RHB70 | –37.73 | 22.05 | 285.2900 | 22.5400 | 35.9500 | |
| 411.00 | 6698909.78 | 1631790.91 | 284.25 | RT90-RHB70 | –37.61 | 22.11 | 287.6200 | 23.0200 | 36.5500 | |
| 414.00 | 6698911.98 | 1631791.80 | 286.08 | RT90-RHB70 | –37.50 | 22.14 | 289.9400 | 23.5000 | 37.1600 | |
| 417.00 | 6698914.18 | 1631792.70 | 287.91 | RT90-RHB70 | –37.41 | 22.18 | 292.2700 | 23.9800 | 37.7700 | |
| 420.00 | 6698916.39 | 1631793.60 | 289.73 | RT90-RHB70 | –37.30 | 22.25 | 294.6100 | 24.4700 | 38.3900 | |
| 423.00 | 6698918.60 | 1631794.50 | 291.55 | RT90-RHB70 | –37.20 | 22.30 | 296.9400 | 24.9600 | 39.0100 | |
| 426.00 | 6698920.81 | 1631795.41 | 293.36 | RT90-RHB70 | –37.10 | 22.34 | 299.2800 | 25.4500 | 39.6400 | |
| 429.00 | 6698923.02 | 1631796.32 | 295.17 | RT90-RHB70 | –37.01 | 22.40 | 301.6200 | 25.9400 | 40.2700 | |
| 432.00 | 6698925.24 | 1631797.23 | 296.98 | RT90-RHB70 | –36.90 | 22.50 | 303.9700 | 26.4400 | 40.9100 | |
| 435.00 | 6698927.46 | 1631798.15 | 298.78 | RT90-RHB70 | –36.76 | 22.55 | 306.3100 | 26.9400 | 41.5500 | |
| 438.00 | 6698929.67 | 1631799.07 | 300.57 | RT90-RHB70 | –36.62 | 22.61 | 308.6600 | 27.4500 | 42.2000 | |
| 441.00 | 6698931.90 | 1631799.99 | 302.36 | RT90-RHB70 | –36.46 | 22.67 | 311.0100 | 27.9600 | 42.8600 | |
| 444.00 | 6698934.12 | 1631800.93 | 304.14 | RT90-RHB70 | –36.33 | 22.75 | 313.3700 | 28.4700 | 43.5200 | |
| 447.00 | 6698936.35 | 1631801.86 | 305.92 | RT90-RHB70 | –36.20 | 22.84 | 315.7300 | 28.9800 | 44.1900 | |
| 450.00 | 6698938.58 | 1631802.80 | 307.69 | RT90-RHB70 | –36.07 | 22.92 | 318.1000 | 29.5000 | 44.8600 | |
| 453.00 | 6698940.82 | 1631803.74 | 309.46 | RT90-RHB70 | –35.93 | 23.00 | 320.4700 | 30.0300 | 45.5400 | |
| 456.00 | 6698943.05 | 1631804.69 | 311.22 | RT90-RHB70 | –35.80 | 23.06 | 322.8400 | 30.5600 | 46.2300 | |
| 459.00 | 6698945.29 | 1631805.65 | 312.98 | RT90-RHB70 | –35.66 | 23.13 | 325.2100 | 31.0900 | 46.9200 | |
| 462.00 | 6698947.53 | 1631806.60 | 314.72 | RT90-RHB70 | –35.55 | 23.17 | 327.5900 | 31.6300 | 47.6200 | |
| 465.00 | 6698949.78 | 1631807.56 | 316.47 | RT90-RHB70 | –35.44 | 23.23 | 329.9700 | 32.1700 | 48.3300 | |
| 468.00 | 6698952.02 | 1631808.53 | 318.21 | RT90-RHB70 | –35.32 | 23.28 | 332.3500 | 32.7100 | 49.0400 | |
| 471.00 | 6698954.27 | 1631809.50 | 319.94 | RT90-RHB70 | –35.18 | 23.35 | 334.7400 | 33.2500 | 49.7500 | |
| 474.00 | 6698956.52 | 1631810.47 | 321.67 | RT90-RHB70 | –35.06 | 23.42 | 337.1300 | 33.8000 | 50.4800 | |
| 477.00 | 6698958.78 | 1631811.44 | 323.39 | RT90-RHB70 | –34.95 | 23.51 | 339.5200 | 34.3500 | 51.2000 | |
| 480.00 | 6698961.03 | 1631812.42 | 325.11 | RT90-RHB70 | –34.84 | 23.59 | 341.9200 | 34.9100 | 51.9400 | |
| 483.00 | 6698963.29 | 1631813.41 | 326.83 | RT90-RHB70 | –34.72 | 23.66 | 344.3100 | 35.4700 | 52.6700 | |
| 486.00 | 6698965.55 | 1631814.40 | 328.54 | RT90-RHB70 | –34.62 | 23.75 | 346.7100 | 36.0400 | 53.4200 | |
| 489.00 | 6698967.81 | 1631815.39 | 330.24 | RT90-RHB70 | –34.51 | 23.84 | 349.1200 | 36.6100 | 54.1600 | |
| 492.00 | 6698970.07 | 1631816.39 | 331.94 | RT90-RHB70 | –34.39 | 23.89 | 351.5200 | 37.1800 | 54.9200 | |
| 498.00 | 6698974.60 | 1631818.40 | 335.32 | RT90-RHB70 | –34.21 | 23.99 | 356.3400 | 38.3400 | 56.4400 | |

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