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Oskarshamn site investigation

Boremap mapping of core drilled borehole KLX08

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Januari 2006

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Abstract

KLX08 was mapped between 2005-10-11 and 2005-11-15 and the drill core is c 900 m long. Nine short core losses and one long. The longer core loss occurred in the interval 217.52–219.53 m which coincides with a crush zone. To prevent fall out that could disturb drilling and probing, a metal sheet had been placed over this crush zone before the BIPS-logging. The BIPS-image covers 101.002–991.899 m, except the section just mentioned (217.52–219.52 m) and a piece between 943.03–944.52 m (adjusted length) that was missing for unknown reason.

Ävrö granite (501044) make up 80% of the lithology and the rest constitutes of mainly diorite/gabbro (505102) and Quartz monzodiorite (501036). About 2% is composed by granite (511058), fine-grained diorite-gabbro (505102) and dioritoid (501030).

The drill core show a much more altered appearance down to 300 m depth and the fracture frequency in this section is higher than the average in KLX08. Five more sections with elevated fracture frequency and alteration are distinct enough to be high lighted. These sections vary in width between 15 and 40 m. Some of them seemed to be related to the lithology, such as rock contacts and short intervals with other lithology, and other were not.

Fracture mineralogy show three interesting minerals: prehnite, gypsum and amphibole. Fractures that hold gypsum show strikes E to NE and dips 60–80°. Prehnite holding fractures are very scattered and do not show a clear trend. The last mineral, amphibole, is still a bit uncertain. These fractures show a very clear trend, striking W and dipping about 45°.

Sammanfattning

KLX08 karterades mellan 2005-10-11 och 2005-11-15 och borrkärnan är ungefär 900 m lång. Nio korta samt en lång kärnförlust registrerades vid karteringen av KLX08. Den längre av dem sammanfaller med en krosszon mellan 217.52–219.53 m. Över denna krosszon har en plåt monterats för att hindra nedfall som kan ställa till problem vid borrningen och andra aktiviteter i borrhålet. Denna plåt placerades där innan BIPS-loggningen gjordes vilket medfört att det inte kunde registreras något i detta intervall. BIPS-filmen sträcker sig från 100.002 till 991.899 m, förutom i intervallet 943.03–944.52 m (korrigerad längd) som saknas av okänd anledning.

Ävrögranit (501044) utgör 80 % av litologin i KLX08 och omkring 20 % består i huvudsak av diorite/gabbro (505102) och kvartsmonzodiorit (501036). Ca 2 % är granit (511058), finkornig diorit-gabbro (505102) och dioritoid (501030).

Till ungefär 300 m längd ser kärnan mycket omvandlat och sprickfrekvensen i denna sektion är högre än genomsnittet i KLX08. Ytterligare fem sektioner med förhöjd sprickfrekvens och omvandling är tillräckligt framträdande för att beskrivas. Dessa sektioner varierar i bredd mellan 15 och 40 m. Vissa av de omnämnda sektionerna tycks vara relaterade till litologin, t ex bergartskontakter eller smala intervall med annan bergart, medan andra inte har sådan koppling.

Sprickmineralogin uppvisar tre intressanta mineral: prehnit, gips och amfibol. Gipssprickor visar ett relativt konformt mönster som stryker O till NO och stupar 60–80°. Prehnitsprickor har mycket spridda orienteringar och visar således ingen tydlig trend. Identifieringen av det sista mineralet amfibol är något osäker, men dessa sprickor som alla är läkta visar en tydlig trend: de stryker V och stupar 45°.

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1 Introduction

SKB investigates two potential sites for a deep repository for nuclear waste in the Swedish Precambrian basement at approximately 500 m depth. These places are Forsmark in northern Uppland and Oskarshamn in eastern Småland. In order to make a preliminary evaluation of the rock mass down to a depth of about 1,000 m at these sites, SKB has initiated a drilling program using core drilled boreholes. Every borehole usually starts with a percussion drilled part the first 100 m, where only drill cuttings can be examined together with BIPS, followed by core drilling down to 1,000 m depth.

Borehole KLX08 is situated within the Laxemar area (Figure 1-1). KLX08 is a telescopic borehole c 900 m long and was drilled between 2005-04-04 and 2005-06-13. Borehole orientation is 199/–60 and the borehole was mapped between 2005-10-11 and 2005-11-15. The aim for this borehole was to examine an interpreted lineament in the candidate area.

Detailed mapping of the drill cores is essential for a three dimensional modelling of the geology at depth. The mapping is based on the use of BIPS-image (Borehole Image Processing System) of the borehole wall and by the study of the drill core itself. The BIPS-image enables the study of orientations, since the Boremap software calculates strike and dip of planar features such as foliations, rock contacts and fractures.

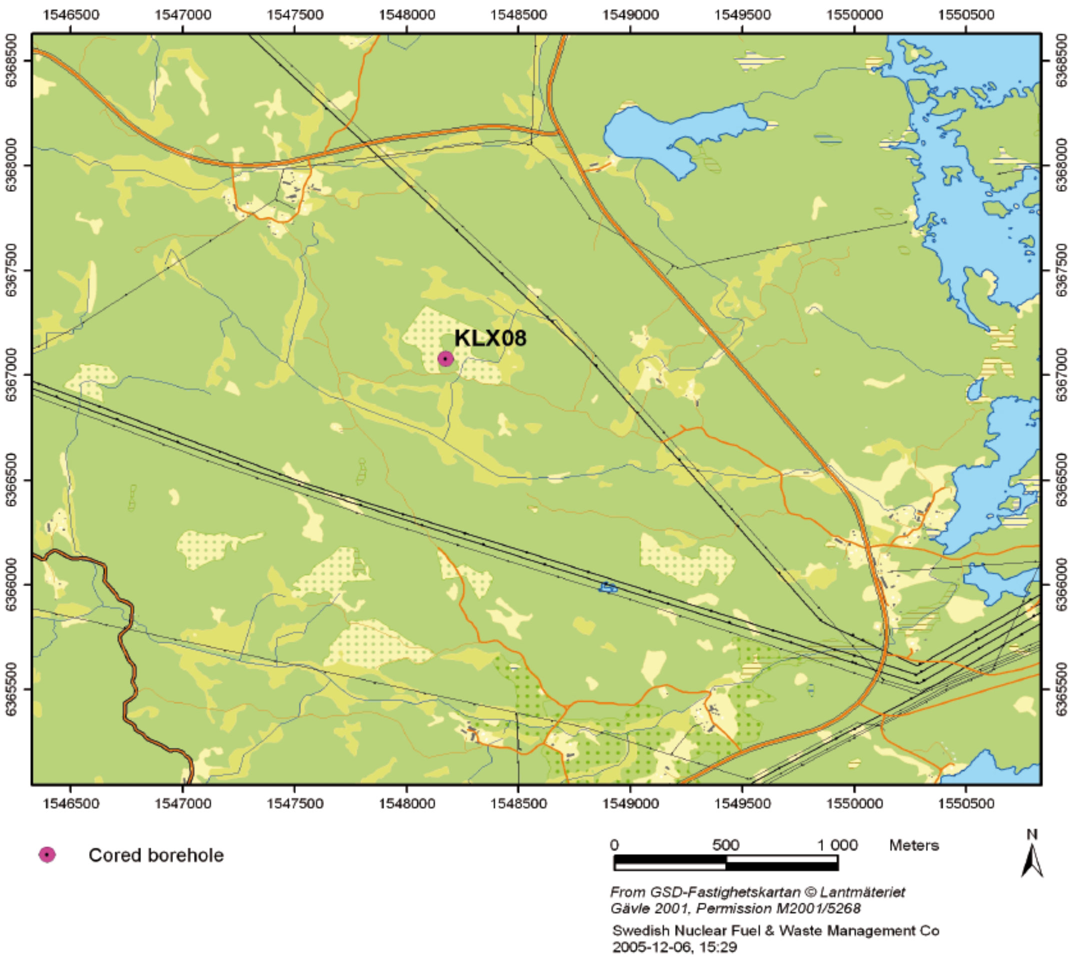


***Figure 1-1.** Location of the core drilled borehole KLX08.*

This report gives a brief presentation of the data gained by mapping of the borehole KLX08 in the Laxemar area, which is one of the activities performed within the site investigation at Oskarshamn. The work was carried out in accordance with activity plan AP PS 400-05-080. 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 term *oxidation* has been used as an alteration type until the mapping of KLX05. However, research has shown that the red colour of the bedrock is actually not only a result of oxidation. Since April 2005 the term *red staining* is used instead of the term *oxidation.*

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

Activity plan	Number	Version
Boremapkartering av KLX08	AP PS 400-05-080	1.0
Method descriptions	**Number**	**Version**
Nomenklatur vid Boremapkartering	SKB MD 143.008	1.0
Method Description for Boremap mapping	SKB MD 143.006	1.0
Mätsystembeskrivning för Boremap	SKB MD 146.001	1.0

2 Objective and scope

The principal aim of the mapping activities presented in this report is to obtain a documentation of geological structures and lithologies intersecting borehole KLX08. Geological structures will be correctly orientated in space along the borehole with the Boremap system. The results will serve as a platform for forthcoming investigations of the drill core, as well as various site descriptive modelling.

3 Equipment

3.1 Description of software

Software used for the mapping of KLX08 was Boremap version 3.7, with bedrock and mineral standards of SKB. The data presentation was made using StereoNet, WellCad version 4, Microsoft Access and Microsoft Excel. Boremap is the software that unites orthodox core mapping with modern video mapping, where Boremap shows the image from BIPS (Borehole Image Processing System) and extracts the geometrical parameters: length, width, strike and dip from the image.

3.2 Other equipment

The following equipment is used to facilitate the core mapping: folding rule and pen, diluted hydrochloric acid, knife, water-filled atomiser and hand lens.

3.3 BIPS-image sequences

The BIPS-image of KLX08 covers the interval 101.002–991.899 m, except 943.03–944.52 m (see 4.6 Nonconformities).

3.4 BIPS-image: resolution, contrast and quality

The visibility of thin fractures in BIPS depends on image resolution, image contrast and image quality. Resolution of the BIPS-image is perhaps the principal reason why very thin fractures as well as very thin apertures are not visible in the BIPS-image and the resolution depends on the BIPS video camera pixel size and illumination angle.

Thick fractures are always visible in both drill core and the BIPS-image. However, the visibility of thin fractures depends strongly on the contrast between the fracture and the wall rock. A bright fracture in a dark rock is clearly visible in the BIPS-image. But a bright coloured fracture in a bright coloured rock might, however, be clearly visible in the drill core but not visible in the BIPS-image, especially if the fracture and wall rock have the same colour. The opposite is true for dark fractures.

In very rare cases when the BIPS-image contrast between a very thin fracture and the wall rock is very strong the fracture might be visible in the BIPS-image even if it is not visible in the drill core.

BIPS-image quality is sometimes limited due to:

1) blackish coatings probably related to the drilling equipment,
2) vertical bleached bands from the clayey mixture of drill cuttings and water,
3) bright and dark bands at high angle to the drill hole related to the automatic aperture of the video camera,

4) vertical enlargements of pixels due to stick-slip movement of the camera probe.

Vertical bleached bands and blackish coatings are usually the main disturbances in the BIPS-image quality.

The image quality is classified into four levels; good, acceptable, bad and very bad. With good quality means a more or less clear image which is easy to interpret. If the quality is acceptable means that the image is not good, but that the mapping can be performed without any problems. An image of bad quality is somewhat difficult to interpret while an image of very bad quality cannot be interpreted except for very obvious and outstanding features. It should be remembered that even if only 10–20% of the image is visible, this is often enough for an acceptable interpretation. When the BIPS-image quality is so bad that fractures and structures cannot be identified they can still be oriented using the *guide-line method* (Section 4.3.3). The BIPS-image quality for KLX08 is presented in Table 3-1.

Table 3-1. BIPS-image quality in KLX08.

From (m)	To (m)	Interval (m)	Quality
101	120	19	Acc-Good
120	217	97	Good
217	220	2	No image
220	291	71	Good
291	305	14	Acc
305	307	2	Bad
307	380	73	Good
380	454	74	Acc-Good
454	538	84	Acc
538	587	49	Bad
587	992	405	Bad-Acc
943	944.5	1.5	No image

4 Execution

4.1 General

Mapping of the drill core of the telescopic drilled borehole KLX08 was performed and documented according to activity plan AP PS 400-05-080 (SKB, internal document) referring to the *Method Description for Boremap mapping* (SKB MD 143.006, version 1.0, SKB, internal controlling document) and *Nomenklatur vid Boremapkartering* (SKB MD 143.008, version 1.0).

The drill core was displayed on inclined roller tables and mapped in its entire length with the Boremap software. The core mapping was carried out without any detailed geological knowledge of the area but with access to geophysical logs from the borehole and rock samples.

The mapping was performed by Peter Dahlin (Geosigma AB) and Jan Ehrenborg (Mirab Mineral Resurser AB).

4.2 Preparations

Any depth registered in the BIPS-image deviates from the true depth in the borehole, a deviation which increases with depth, about 0.5 m/100 m. This problem is eliminated by adjusting the depth of the BIPS-image to reference slots cut into the borehole walls every fiftieth metre (Appendix 7). The level for each slot is measured in the BIPS-images and then adjusted to the correct level using the correct depth value from the SICADA database.

Necessary input data is borehole diameter, length and deviation; both collected from SICADA database (Appendices 5 and 7). The Boremap software uses the data from SICADA database to calculate the true orientations of the different observations.

4.3 Execution of measurements

Concepts used during the core mapping, are defined in this chapter.

4.3.1 Fracture definitions

Definitions of different fracture types and aperture, crush zones and sealed fracture network are found in *Nomenklatur vid Boremapkartering* (SKB MD 143.008, version 1.0). Apertures for broken fractures have been mapped in accordance with the definitions in MD 143.008 version 1.0.

Two types of fractures are mapped in Boremap; broken and unbroken. Broken are fractures 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 apertures are measured down to 1 mm in the BIPS-image. Smaller apertures, which are impossible to detect in the BIPS-image, are denoted a value of 0.5 mm. If the core pieces don't fit well, the aperture is considered "probable". If the core pieces do fit well, but the fracture surfaces are dull or altered, the aperture is considered "possible".

All fractures with apertures > 0 mm are treated as open in the SICADA database. Only a few broken fractures are given the aperture = 0 mm. Unbroken fractures usually have apertures = 0 mm. Unbroken fractures that have apertures > 0 mm are interpreted as partly open and are included in the open-category. Open and sealed fractures are finally frequency calculated and shown in Appendices 1 and 4.

4.3.2 Fracture alteration and joint alteration number

Joint alteration number is principally related to the thickness of, and the clay content in a fracture. Thick fractures rich in clay minerals are given joint alteration numbers between 2 and 3. The majority of the broken fractures are very thin to extremely thin and 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 based on fracture mineralogy as follows:

a) fracture wall alterations,

b) fracture mineral fillings assumed to have been deposited from circulating water-rich solutions,

c) fracture mineral fillings most likely resulting from altered wall rock material.

Joint alteration number equal to 1: Fractures with or without wall rock alteration, e.g. red staining or epidotization, and without mineral fillings is considered as fresh. The joint alteration number is thus set to 1.

Minerals such as calcite, quartz, fluorite, zeolites, laumontite and sulphides are regarded as deposited by circulating water-rich solutions and not as true fracture alteration minerals. The joint alteration number is thus set to 1.

Joint alteration number equal to 1.5: Epidote, prehnite, hematite, chlorite and/or clay minerals are regarded as fracture minerals most likely resulting from altered wall rock. A weak alteration is thus assumed and the joint alteration number was set to 1.5. Extra considerations have been given to clay minerals since the occurrence of these minerals often resulted in a higher joint alteration number.

Joint alteration numbers higher than 1.5: When the mineral fillings is thick and contain a few mm of clay minerals, often together with epidote and chlorite, the joint alteration number is set to 2. In rare cases, when a fracture contains 5–10 mm thick clay, together with chlorite, the joint alteration number is set to 3.

When the alteration of a fracture is too thick (and/or intense) to give the fracture the joint alteration number 1.5 and too thin and/or weak to give it a 2, 1.7 and 1.8 is used.

4.3.3 Mapping of fractures not visible in the BIPS-image

Not all fractures are visible in the BIPS-images, and these fractures are orientated by using the *guide-line method*, 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 orientation of the fracture trace, measured on the drill core and a well defined structure visible in the BIPS-image.
- Absolute depth.

Orientation of fractures and other structures with the *guide-line method* is done in the following way: The first step is to calculate the amplitude of the fracture trace in the BIPS-image (with 76 mm diameter) from the measured fracture amplitude in the drill core (with 50 mm diameter). The second step is the correction of strike and dip. This is done by rotating the fracture trace in the BIPS-image relative to a feature with known orientation. The fracture trace is then put at the correct depth according to the depth measured on the drill core.

The *guide-line method* can be used to orientate any feature that is not visible in the BIPS-image. It is also a valuable tool to control that the personnel working with the drill core is observing the same feature as the personnel delineating the trace in the BIPS-image, especially in intervals rich in fractures.

The error of orientating fractures using the *guide-line method* is not known but experience and an estimation using stereographic plots indicated that the error is most likely insignificant. Accordingly, the *guide-line method* is so far considered better than mapping lots of non-oriented fractures. The fractures in question are mapped as "non-visible in BIPS" and can therefore be separated from fractures visible in BIPS which probably have a more accurate orientation.

4.3.4 Definition of veins and dikes

Rock occurrence is the way Boremap handles the occurrence of lithology up to 1 m wide. Chiefly two different 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. Rock occurrences that covers more than 100 cm of the drill core are mapped under the feature *rock type.*

4.3.5 Mineral codes

In the case where properties and/or minerals are not represented in the mineral list, following mineral codes have been used in the mapping of KLX08:

X1 Gypsum.

X5 whitish, bleached feldspar.

X6 the drill core is broken at a right angle and the broken surfaces have a polished appearance. This is believed to indicate that a sealed fracture broke up during drilling and that the two drill core parts have rotated against each other wearing away the mineral fill.

X7 broken fracture with a fresh appearance and no mineral fill.

X8 fractures with epidotized walls.

4.4 Data handling

Mapping of the drill core is performed on-line on the SKB data network, in order to obtain the best possible data security. Before every break (> 15 minutes) a back-up is saved on the local disk. As a regular quality check every working day a Summary report (from Boremap) and a WellCad plot is printed in order to find possible misprints. The mapping is also quality checked by a routine in Boremap before it is exported to and archived in SICADA database. Personnel from SKB also perform spot test controls and regular quality revisions. All primary data is stored in SKB's database SICADA. Only these data are to be used for further interpretation and modelling.

4.5 Geological Summary table, general description

A Geological Summary table (Appendix 1) is an overview of the features mapped with the Boremap software. It also facilitates comparisons between Boremap information collected from different boreholes and is more objective than a pure descriptive borehole summary. The table is the result of cooperation between Jan Ehrenborg from the mapping personnel and Pär Kinnbom from PO (site investigation, Oskarshamn). The aim was to make a standard form in handy A4-size, where all information is taken directly from the Boremap database using simple and well defined search paths for each geological parameter (Appendix 2).

Data from the Boremap database cannot automatically be extracted into the Geological Summary table. First the data has to be sorted out and frequencies in the different column must be calculated in Microsoft Excel. WellCad is used to create the Geological Summary table from the frequency calculations of mapped features. From the SICADA database the data to the non-frequency columns are retrieved, i.e. lithology and red staining.

The Geological Summary table consists of 23 columns, each one representing a specific geological parameter, presented as either intervals or frequencies (see Section 4.5.1 for column description). Intervals are calculated for parameters with a width ≥ 1 m and frequencies for parameters with a width < 1 m. Frequency information is treated as treated as point observations. It should be noted that parameters with a thickness of only 1 mm get the same "value" as a similar parameter with a thickness of 999 mm since both are treated as point observations and used for frequency calculations.

Parameters are sometimes related in such a way that the mapping of one parameter cause a decrease in the frequency of another parameter. This type of intimate relationship between parameters has been noted for the following cases;

- There is a decrease in the frequency of *unbroken fractures* with oxidised walls and without mineral fillings in intervals mapped with *Alteration – Red staining.*
- No *unbroken fractures* are mapped in intervals of *sealed fracture network*.
- No *broken fractures* are mapped in intervals with *crush.*
- Hybrid rock and composite dikes generally include a large amount of fine to medium grained granite veins. These veins are not mapped and the frequency presented for veins + dikes in column 6 (Appendix 1) are lower than the true frequency in composite dike intervals.

4.5.1 Columns in the Geological Summary table

The Geological Summary table includes the following 23 columns:

Column 1: *Rock Type / Lithology*, interval column. Only lithologies longer than 1 m are presented here. Shorter lithologies are presented in column 6. This column is identical with the ordinary WellCad presentation.

Column 2: *Rock Type / Grain size*, interval column. Interval limits follows column 1. This column is identical with the ordinary WellCad presentation.

Column 3: *Rock Type / Texture*, interval column. Interval limits follows column 1. This column is identical with the ordinary WellCad presentation.

Column 4: *Alteration / Red staining*, interval column. No frequency column is presented for alteration/red staining. The alteration/red staining column is identical with the ordinary WellCad presentation.

Column 5: *Alteration / Intensity*, interval column. This column is identical with the ordinary WellCad presentation.

Column 6: *Rock Occurrence / Veins + Dikes < 1 m wide*, frequency column. This rock type column can be seen as the frequency complement to the rock type/lithology interval column. Only rock type sections that are thinner than 1 m can be described as rock occurrences in Boremap. Thicker rock type sections are mapped as rock type.

Column 7: *Structure / Shear Zone < 1 m wide*, frequency column. This column includes ductile shear structures as well as brittle-ductile shear structures and these are mapped as rock occurrences in Boremap. Ductile sections in mm – cm scale are mapped as shear structures and in dm – m scale as sections with foliation in column 12.

Column 8: *Structure / Brecciated < 1 m wide*, frequency column. Breccias < 1 m wide are mapped as rock occurrence in Boremap. Very thin micro breccias along sealed/natural fracture planes are generally not considered.

Column 9: *Structure / Brecciated ≥ 1 m wide*, interval column. Breccias > 1 m wide are mapped as rock type/structure in Boremap.

Column 10: *Structure / Mylonite < 1 m wide*, frequency column. Mylonites < 1 m wide are mapped as rock occurrence/structure in Boremap.

Column 11: *Structure / Mylonite ≥ 1 m wide* is an interval column. Mylonites > 1 m wide are mapped as rock type/structure in Boremap.

Column 12: *Structure / Foliation < 1 m wide* is a frequency column. Sections with foliation < 1 m wide are mapped as rock occurrence/structure in Boremap. Very thin sections with foliation are called ductile shear structures and presented in column 7.

Column 13: *Structure / Foliation ≥ 1 m wide* is an interval column. Sections with foliation ≥ 1 m wide are mapped as rock type/structure in Boremap.

Column 14: *Sealed fractures / All*, frequency column. This column includes all fractures mapped as unbroken in the Boremap system and this includes unbroken fractures where the drill core is not broken as well as unbroken fractures interpreted to have broken up artificially during/after drilling.

Column 15: *Sealed fractures / Broken fractures with aperture = 0*, frequency column. This column includes unbroken fractures interpreted to have broken up artificially during/after drilling.

Column 16: *Sealed fractures / Sealed Fracture Network < 1 m wide*, frequency column. The sealed fracture network parameter is the only parameter that is generally evaluated directly from observations of the drill core. These types of sealed fractures can only in rare cases be observed in the BIPS-image.

Column 17: *Sealed fractures / Sealed Fracture Network ≥ 1m wide*, interval column.

Column 18: *Open fractures / All Apertures > 0*, frequency column. This column includes all broken fractures, both fractures that with certainty were open before drilling and fractures that probably or possibly were open before drilling.

Column 19: *Open fractures / Uncertain, Aperture = 0.5 probable + 0.5 possible*, frequency column. This column includes fractures that probably or possibly open before drilling.

Column 20: *Open fractures / Certain Aperture = 0.5 certain and > 0.5*, frequency column. This column includes fractures that with certainty were open before drilling.

Column 21: *Open fractures / Joint alteration > 1.5*, frequency column. This column show fractures with stronger joint alteration than normal. This parameter is generally correlated with the location of lithologies with a more weathered appearance.

Column 22: *Open fractures / Crush < 1 m wide*, frequency column. This column includes shorter sections with crush.

Column 23: *Open fractures / Crush ≥ 1 m wide*, interval column. This column includes longer sections with crush.

4.6 Nonconformities

Unusually many core losses were mapped in KLX08 and they occur in the following short intervals: 158.15–158.25 m, 161.95–162.13 m, 526.13–526.23 m, 529.12–529.17 m, 613.25–613.32 m, 654.63–654.68 m, 655.39–655.42 m, 658.70–658.72 m and 737.05–737.11 m. There is a longer section of core loss somewhere in the interval 217.52–219.53 m. This interval coincides with a long crush zone and therefore the true length of the missing core is unknown. A metal sheet was placed in this section to prevent fall out. The metal sheet was placed there before the BIPS-logging was done (see Figure 4-1).

BIPS-image is missing on the depth of 938.77 m for about 1.5 m (see Figure 4-1). This interval had only two open fractures and two veins.

A number of adjoining core pieces did not match. The mapping crew revealed that several small pieces, usually around 10 cm long, of the drill core was turned the wrong way in the core boxes. The most outstanding case was that one whole three metre uptake between 793.46–796.51 m was turned the wrong way.

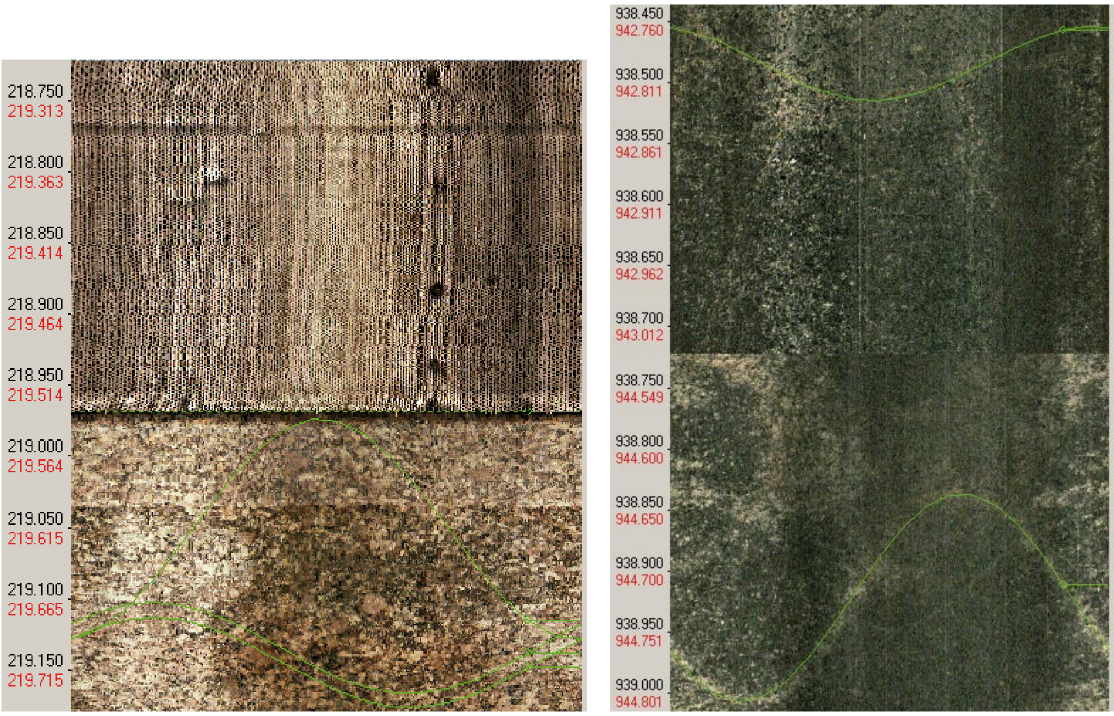


Figure 4-1. *Left – Picture of metal sheet placed in the KLX08 borehole. Right – Picture that shows the missing BIPS-image in KLX08. Notice the change from dark grey/black borehole wall to a brighter and diffuse image in the middle of the picture. The two green lines that marks two mapped features are actually c 2 m apart.*

5 Results

5.1 General

Borehole KLX08 has the bearing 199° and inclination –60°. The drill core is c 900 m long (100.33–1,000.41) while the BIPS-image covers the interval 101.002–991.899 m. The last piece of the core was not mapped due to lack of BIPS-image.

All results from the mapping are principally found in the appendices. Information from the Boremap database is shown in the Geological Summary table (Appendix 1) and the search paths to that table are presented in Appendix 2. In Appendix 3 the BIPS-images of KLX08 are shown and the corresponding WellCad diagrams in Appendix 4. In-data, as borehole length, diameter and deviation data are presented in Appendices 6–8.

5.2 Geological Summary table and WellCad-plot

Ävrö granite (501044) dominates the lithology in KLX08 to the extent of 4/5. The longest interval with Ävrö granite is 100–590 m depth, only interrupted for short sections with fine-grained diorite-gabbro (505102), fine-grained granite (511058) and fine-grained dioritoid (501030). Below 590 m depth the Ävrö granite is less dominating and 2/5 of the remaining consist of equal amount of Quartz monzodiorite (501036) and diorite/gabbro (501033). One interesting fact is that the upper section (100–590 m) is more oxidised than the lower section. Table 5-1 shows an overview of the percentage of the different lithologies in KLX08.

The upper part of the KLX08 borehole, i.e. 100–310 m, has generally an altered appearance. This interval contains a lot of fractures (total amount c 1,900 both sealed and open) which is over the average in the borehole (see Table 5-1). The most noticeable part in this section is an interval between 270 and 305 m, where the frequency of fractures is high and also thin crush zones occur. Fracture fillings in open fractures are dominated by chlorite, calcite, clay minerals and hematite, while the fracture fillings in the sealed fractures are dominated by calcite and chlorite. The fractures commonly have oxidised walls and to a lesser extent the sealed fractures holds hematite, quartz and prehnite.

A raise in frequency of both sealed and open fractures is obvious in the interval 400–420 m. Alteration such as red staining and saussuritization, sealed network and open fractures with higher J_a-number than normal is also common in this interval. This interval is in the vicinity of a fine-grained dioritoid (501030).

Around 475 m depth there is a small raise in frequency of sealed and open fractures. Also sealed network, crush zones and thin (< 1 m wide) breccias show higher frequencies and alterations, such as red staining and saussuritization, are common in this interval of about 8 m.

Between 650 and 690 m a modest raise in frequency of sealed fractures can be observed and a strong raise in the frequency of open fractures. One crush zone occurs in this interval and fractures with J_a-number higher than normal are present. This section coincides with the occurrence of Diorite/gabbro (501033).

In a 15 m interval starting on 765 m depth, the frequencies of both sealed and open fractures show a peak, together with sealed network, thin (< 1 m) breccias and crush zones. Open fractures with high J_a-number were mapped in this section. One strange looking rock was mapped as breccia due to lack of terminology in Boremap with the comment: "The breccia is banded and the different band seems to be layering. The layers show clear graded bedding but the rock is not conventional sediment."

Around the contact between Ävrö granite (501044) and Quartz monzodiorite (501036) on 925 m depth, the frequency of veins and dikes raise. Sealed fractures show a very strong increase in frequency together with sealed network. But open fractures do not share the same trend. Red staining and saussuritization is distinct in this interval which is about 20 m wide.

To clarify the sections described above, Table 5-2 shows the average of fractures per metre.

Transition from low to high frequency of fractures varies a lot, and two will be mentioned here. The interval that starts at 270 m has a gradual upper transition and a sharp lower transition. One other interval starts at 400 m and shows a sharp upper transition but a more gradual lower transition (see Appendix 4).

Table 5-1. Lithology distribution in KLX08.

%	Rock type
79.7	501044 Ävrö granite
10.4	501033 Diorite / gabbro
7.6	501036 Quartz monzodiorite
1.4	511058 Granite, fine- to medium-grained
0.7	505102 Fine-grained diorite-gabbro
0.3	501030 Fine-grained dioritoid

Table 5-2. Average fractures per metre in described sections.

Interval	sealed	open
100–995 (whole core)	**3.7**	**2.2**
100–310	5.2	4.0
270–305	5.4	4.9
400–420	7.3	6.0
650–690	4.2	3.8
765–780	5.1	2.7
925–945	7.7	1.9

5.3 Fracture mineralogy

KLX08 is interesting regarding the number of unusual fracture minerals. Prehnite normally occur together with sections of the drill core that show red staining. Fractures filled with prehnite (10.5% sealed and 4.2% open, see Table 5-3 and 5-4) are generally thicker than the average mineral fillings in KLX08. In a stereogram prehnite fractures are scattered but show a weak trend striking W (see Figure 5-1). The reason why prehnite has not been mapped earlier depends on the mapping crew's lack of knowledge how to identify this mineral. After a clarifying discussion with Henrik Drake (Gothenburg University), who is specialized in mineralogy, more prehnite filled fractures could be identified.

Gypsum is another rare mineral that occurred in KLX08. From 785 m depth and down this mineral were present preferentially in open fractures (4.2% and only 0.6% of the sealed fractures, see Table 5-4) together with chlorite and clay minerals. Characteristic for fractures with gypsum was the absence of calcite. The orientation of these open fractures were chiefly E to NE and dipping 60–80° (see Figure 5-2).

The third rare mineral is black, hard and occurs in fractures with clearly oxidised walls. When the expertise within mineralogy was consulted the answer was low temperature amphibole. Samples have been collected and this mineral will be examined with SEM and in thin section. The orientation of these fractures is almost parallel and strikes about W and dips around 45° (see Figure 5-2).

Table 5-3 and 5-4 shows the percentage of mineral found on open and in sealed fractures in KLX08.

Minerals as chlorite and calcite dominate the fillings of both open and sealed fractures. Pyrite and hematite is quite common when it comes to open fractures but not so common in sealed fractures. The quantity of open fractures with gypsum and prehnite are the same in KLX08. Clay minerals show a higher abundance in open fractures but is almost absent in sealed fractures. This may reflect the fact that it is easier to detect clay minerals on fracture surfaces than in sealed fractures.

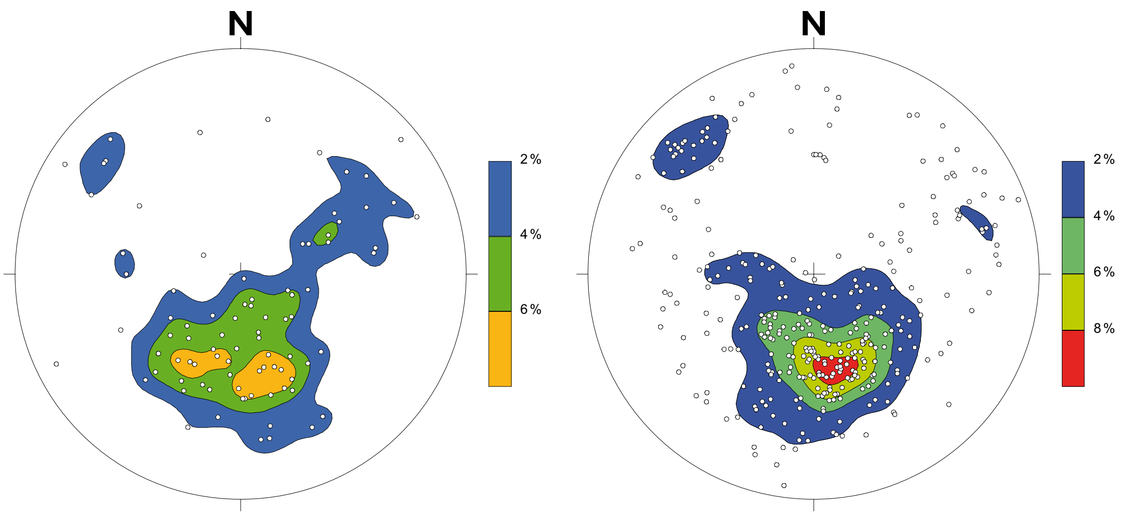


***Figure 5-1.** Lower hemisphere, stereographic projection showing poles to fractures with prehnite. Left – Open fractures n = 87. Right – sealed fracture n = 345.*

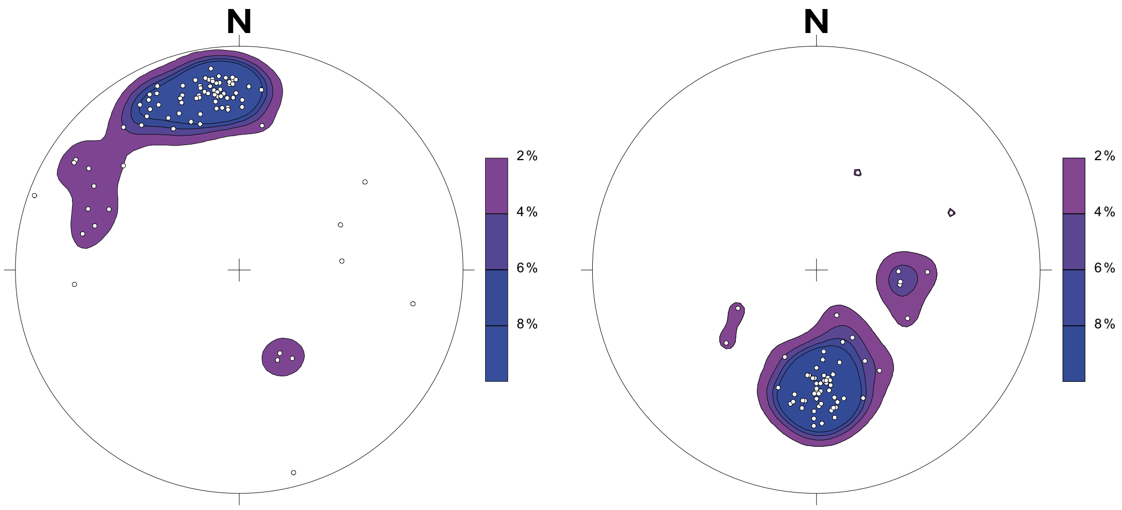


Figure 5-2. Lower hemisphere, stereographic projection showing poles to fractures. Left – open fractures with gypsum, n = 87. Right – fractures sealed with amphibole, n = 62.

Table 5-3. Minerals and rock wall alteration in open fractures.

%	Mineral
81.7	Calcite
78.9	Chlorite
54.5	Clay Minerals
20.7	Pyrite
20.2	Hematite
10.6	Oxidized Walls
4.2	Gypsum (X1)
4.2	Prehnite
2.5	No detectable mineral (X7)
1.4	Epidote
1.3	Adularia
1.2	Laumontite
1.0	Quartz
0.6	Epidotized walls (X8)
0.3	Fluorite
0.3	Unknown Mineral
0.3	Zeolite
0.3	Chalcopyrite
0.2	Sericite
0.1	Iron Hydroxide
0.1	Biotite
0.1	Red Feldspar
0.1	Bleached walls (X5)

Table 5-4. Minerals and rock wall alteration in sealed fractures.

%	Mineral
54.3	Oxidized Walls
45.4	Calcite
33.6	Chlorite
17.5	Quartz
10.5	Prehnite
7.6	Epidotized walls (X8)
5.6	Epidote
5.5	Hematite
4.9	Pyrite
2.8	Adularia
1.9	Clay Minerals
1.9	Amphibole
1.1	No detectable mineral (X7)
0.9	Laumontite
0.6	Gypsum (X1)
0.2	Fluorite
0.2	Bleached walls (X5)
0.2	White Feldspar
0.2	Sericite
0.1	Unknown Mineral
0.1	Red Feldspar
0.0	Muscovite

Appendix 1

Geological Summary table KLX08

GEOLOGICAL SUMMARY KLX08 (Draft plot Boremap) **APPENDIX 1**

Site	LAXEMAR
Borehole	KLX08
Coordinate System	RT90-RHB70
Date of mapping	2005-10-11 09:01:00

ROCKTYPE: Fine-grained granite; Ävrö granite; Quartz monzodiorite; Diorite / Gabbro; Fine-grained dioritoid; Fine-grained diorite-gabbro

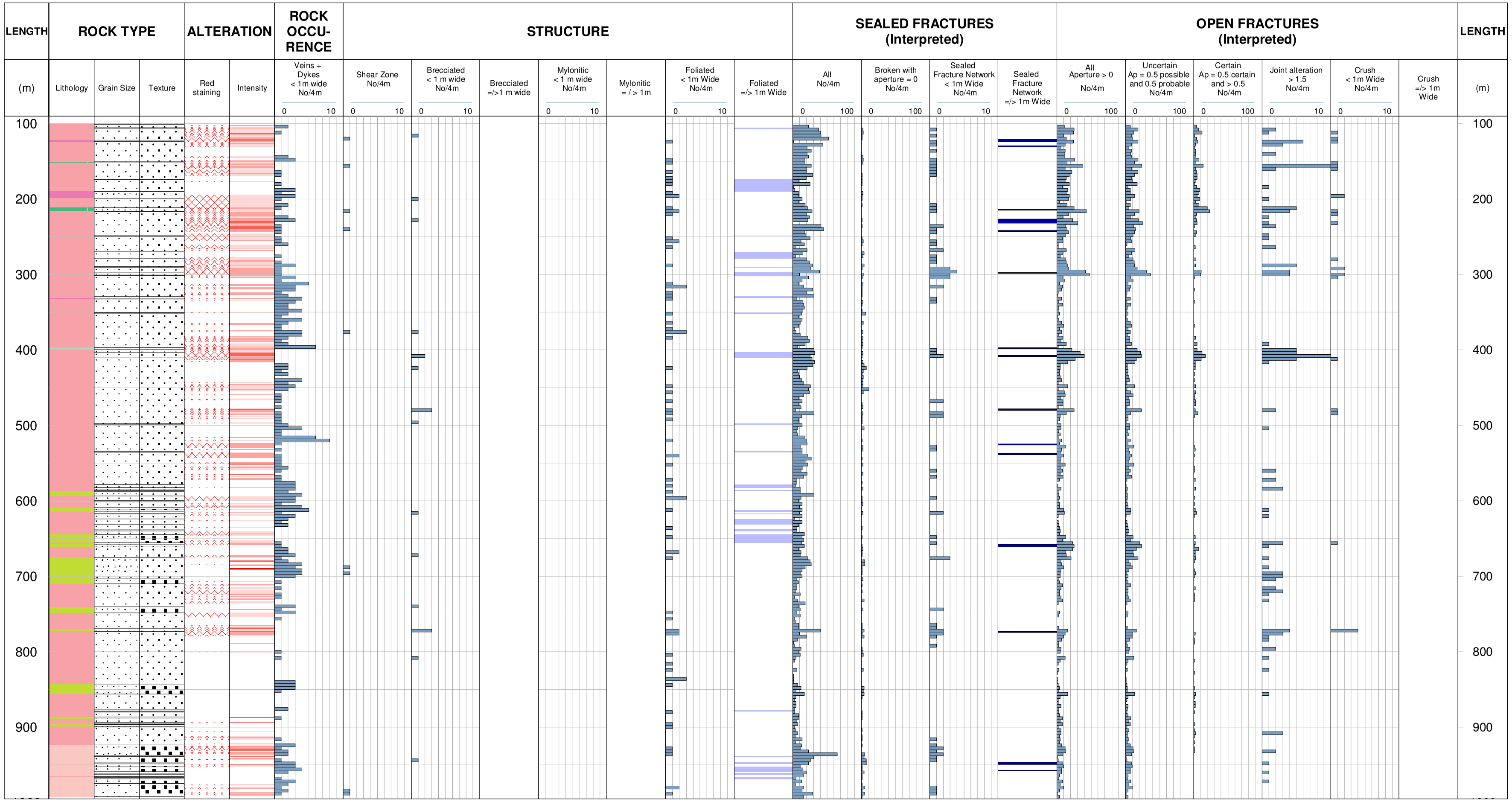
GRAINSIZE: Fine-grained; Fine to medium grained; Medium-grained

TEXTURE: Porphyritic; Equigranular

ALTERATION: Red staining

INTENSITY: Faint; Weak; Medium; Strong

STRUCTURE INTENSITY: Weak; Sealed network



Appendix 2

Search paths for the Geological Summary table

TABLE HEAD LINES		INFORMATION SOURCE			PRESENTATION
Head lines	**Sub head lines**	**Varcode**	**First suborder**	**Second suborder**	**Interval / frequence**
Rock type	Lithology	5	Sub 1		Interval
	Grain size	5	Sub 5		Interval
	Texture	5	Sub 6		Interval
Alteration	Oxidation	7	Sub 1 = 700		Interval
	Oxidation intensity	7	Sub 1 = 700	Sub 2	Interval
Rock occurrence	Vein + dyke	31	Sub 1 = 2 and 18		Frequence
Structure	Shear zone	31	Sub 4 = 41 and 42		Frequence
	Brecciated, < 1m wide	31	Sub 4 = 7		Frequence
	Brecciated, >/= 1m wide	5 5	Sub 3 = 7 Sub 3 = 7	Sub 4; 101 and 102 = 102 Sub 4; 103 and 104 = 104	Interval
	Mylonite, < 1 m wide	31	Sub 4 = 34		Frequence
	Mylonite, >/= 1 m wide	5 5	Sub 3 = 34 Sub 3 = 34	Sub 4; 101 and 102 = 102 Sub 4; 103 and 104 = 104	Interval
	Foliation zone, < 1 m wide	31	Sub 4 = 81		Frequence
	Foliation zone, >/= 1 m wide	5 5	Sub 3 = 81 Sub 3 = 81	Sub 4; 101 and 102 = 102 Sub 4; 103 and 104 = 104	Interval
Sealed fracture	All unbroken fractures and broken fractures	3 2	 SNUM 11= 0		Frequence
	Broken fractures, Aperture = 0	2	SNum 11 = 0		Frequence
	Sealed fracture network < 1 m wide	32			Frequence
	Sealed fracture network>/= 1 m wide	32			Interval
Open fractures	All, Aperture > 0	2 and 3	SNum 11>0		Frequence
	Uncertain, Aperture = 0.5 possible and 0.5 probable	2 and 3 2 and 3	SNum 11>0 SNum 11>0	Sub 12 = 3 Sub 12 = 2	Frequence
	Certain, Aperture = 0.5 certain	2 and 3	SNum 11>0	Sub 12 = 1	Frequence
	Joint alteration > 1.5	2	SNum16 > 1.5		Frequence
	Crush < 1 m wide	4			Frequence
	Crush >/= 1 m wide	4			Interval

Appendix 3

BIPS-image of KLX08

Borehole Image Report

Borehole Name:	KLX08
Mapping Name:	KLX08_JE_PD_1
Mapping Range:	100.000 - 996.000 m
Diameter:	76.0 mm
Printed Range:	100.000 - 985.888
Pages:	37

Image File Information:

File:	D:\BIPSbilder\KLX08\KLX08_100-986m.BIP
Date/Time:	2005-09-26 18:15:00
Start Depth:	100.000 m
End Depth:	985.888 m
Resolution:	1.00 mm/pixel (depth)
Orientation:	Gravmetric
Image height:	885888 pixels
Image width:	360 pixels
BIP Version:	BIP-III
Locality:	LAXEMAR
Borehole:	KLX08
Scan Direction:	Down
Color adjust:	0 0 0 (RGB)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 100.000 - 125.000 m
Azimuth: 0.0
Inclination: -90.0

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 2 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 125.000 - 150.000 m
Azimuth: 0.0
Inclination: -90.0

125.000 / 125.137
125.500 / 125.639
126.000 / 126.142
126.500 / 126.644
127.000 / 127.146
127.500 / 127.648
128.000 / 128.150
128.500 / 128.652
129.000 / 129.155
129.500 / 129.657

130.000 / 130.159
130.500 / 130.661
131.000 / 131.163
131.500 / 131.666
132.000 / 132.168
132.500 / 132.670
133.000 / 133.172
133.500 / 133.674
134.000 / 134.176
134.500 / 134.679

135.000 / 135.181
135.500 / 135.683
136.000 / 136.185
136.500 / 136.687
137.000 / 137.189
137.500 / 137.692
138.000 / 138.194
138.500 / 138.696
139.000 / 139.198
139.500 / 139.700

140.000 / 140.203
140.500 / 140.705
141.000 / 141.207
141.500 / 141.709
142.000 / 142.211
142.500 / 142.713
143.000 / 143.216
143.500 / 143.718
144.000 / 144.220
144.500 / 144.722

145.000 / 145.224
145.500 / 145.726
146.000 / 146.229
146.500 / 146.731
147.000 / 147.233
147.500 / 147.735
148.000 / 148.237
148.500 / 148.740
149.000 / 149.242
149.500 / 149.744

Printed: 2005-10-16 13:14:46   Scale: 1 : 25   Aspect: 150 %   3 (37)

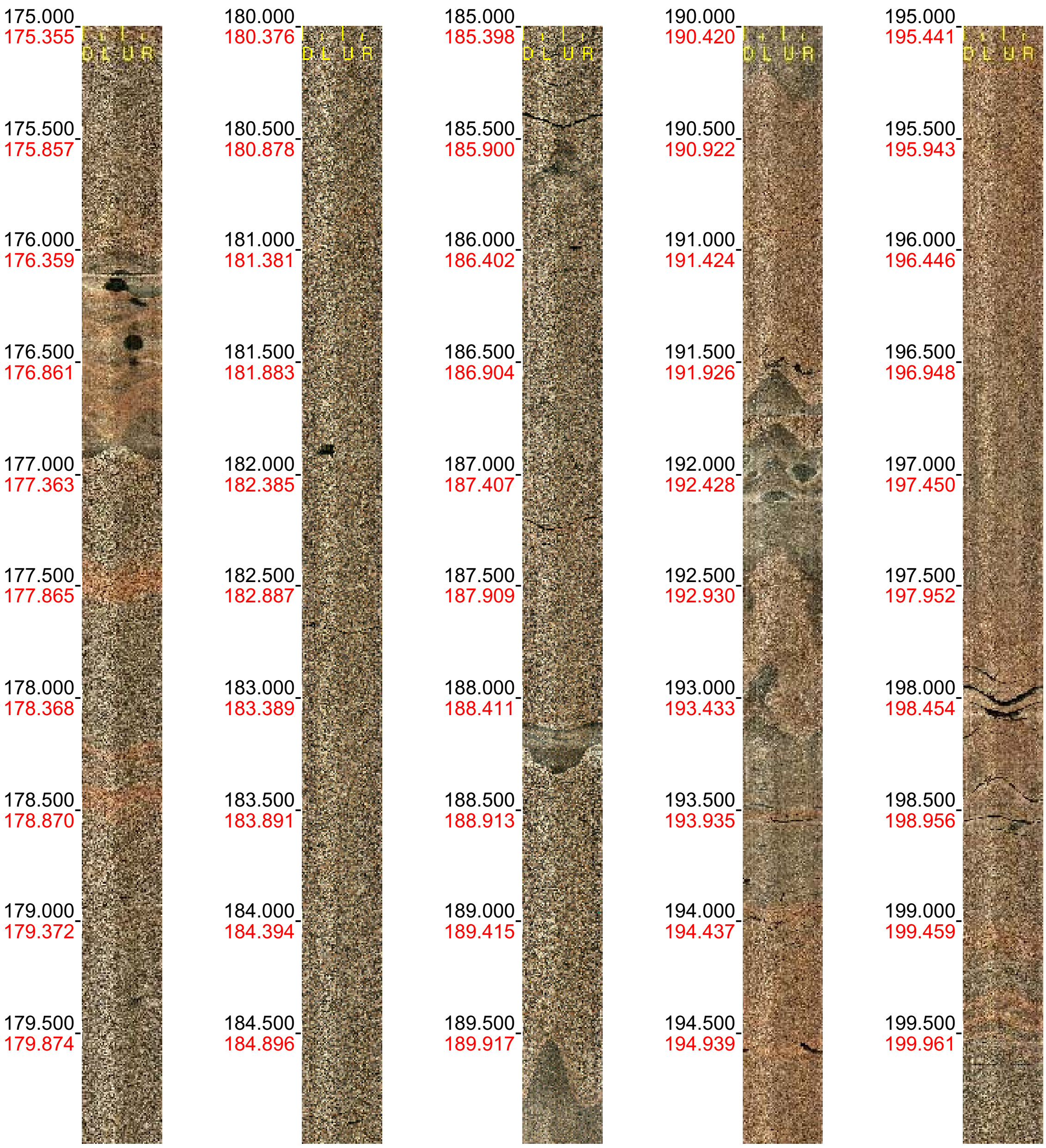
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 150.000 - 175.000 m
Azimuth: 0.0
Inclination: -90.0

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 4 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 175.000 - 200.000 m
Azimuth: 0.0
Inclination: -90.0



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Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 200.000 - 225.000 m
Azimuth: 0.0
Inclination: -90.0

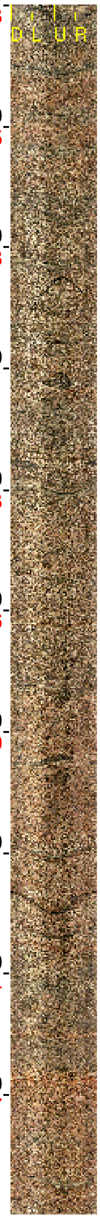
Printed: 2005-10-16 13:14:46   Scale: 1 : 25   Aspect: 150 %   6 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 225.000 - 250.000 m
Azimuth: 0.0
Inclination: -90.0

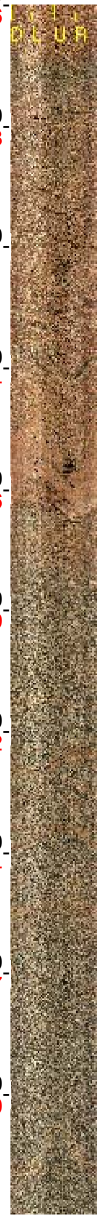
225.000 / 225.596
225.500 / 226.099
226.000 / 226.601
226.500 / 227.104
227.000 / 227.607
227.500 / 228.109
228.000 / 228.612
228.500 / 229.115
229.000 / 229.617
229.500 / 230.120

230.000 / 230.623
230.500 / 231.125
231.000 / 231.628
231.500 / 232.131
232.000 / 232.633
232.500 / 233.136
233.000 / 233.639
233.500 / 234.141
234.000 / 234.644
234.500 / 235.147



235.000 / 235.649
235.500 / 236.152
236.000 / 236.655
236.500 / 237.157
237.000 / 237.660
237.500 / 238.163
238.000 / 238.665
238.500 / 239.168
239.000 / 239.670
239.500 / 240.173

240.000 / 240.676
240.500 / 241.178
241.000 / 241.681
241.500 / 242.184
242.000 / 242.686
242.500 / 243.189
243.000 / 243.692
243.500 / 244.194
244.000 / 244.697
244.500 / 245.200



245.000 / 245.702
245.500 / 246.205
246.000 / 246.708
246.500 / 247.210
247.000 / 247.713
247.500 / 248.216
248.000 / 248.718
248.500 / 249.221
249.000 / 249.724
249.500 / 250.226

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 7 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 250.000 - 275.000 m
Azimuth: 0.0
Inclination: -90.0

250.000
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250.500
251.229
251.000
251.730
251.500
252.231
252.000
252.733
252.500
253.234
253.000
253.736
253.500
254.237
254.000
254.739
254.500
255.240

255.000
255.742
255.500
256.243
256.000
256.744
256.500
257.246
257.000
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259.252
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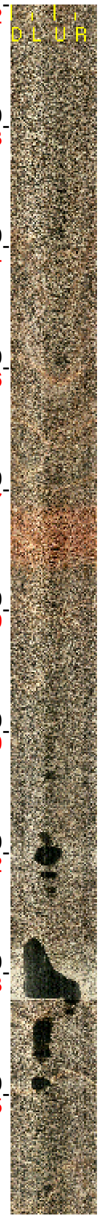
259.500
260.255



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262.260
262.000
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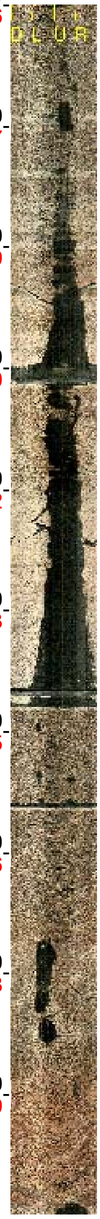
264.768
264.500
265.269



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266.000
266.773
266.500
267.275
267.000
267.776
267.500
268.278
268.000
268.779
268.500
269.281
269.000
269.782
269.500
270.283

270.000
270.785
270.500
271.286
271.000
271.788
271.500
272.289
272.000
272.791
272.500
273.292
273.000
273.794
273.500
274.295
274.000
274.796
274.500
275.298

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 8 (37)

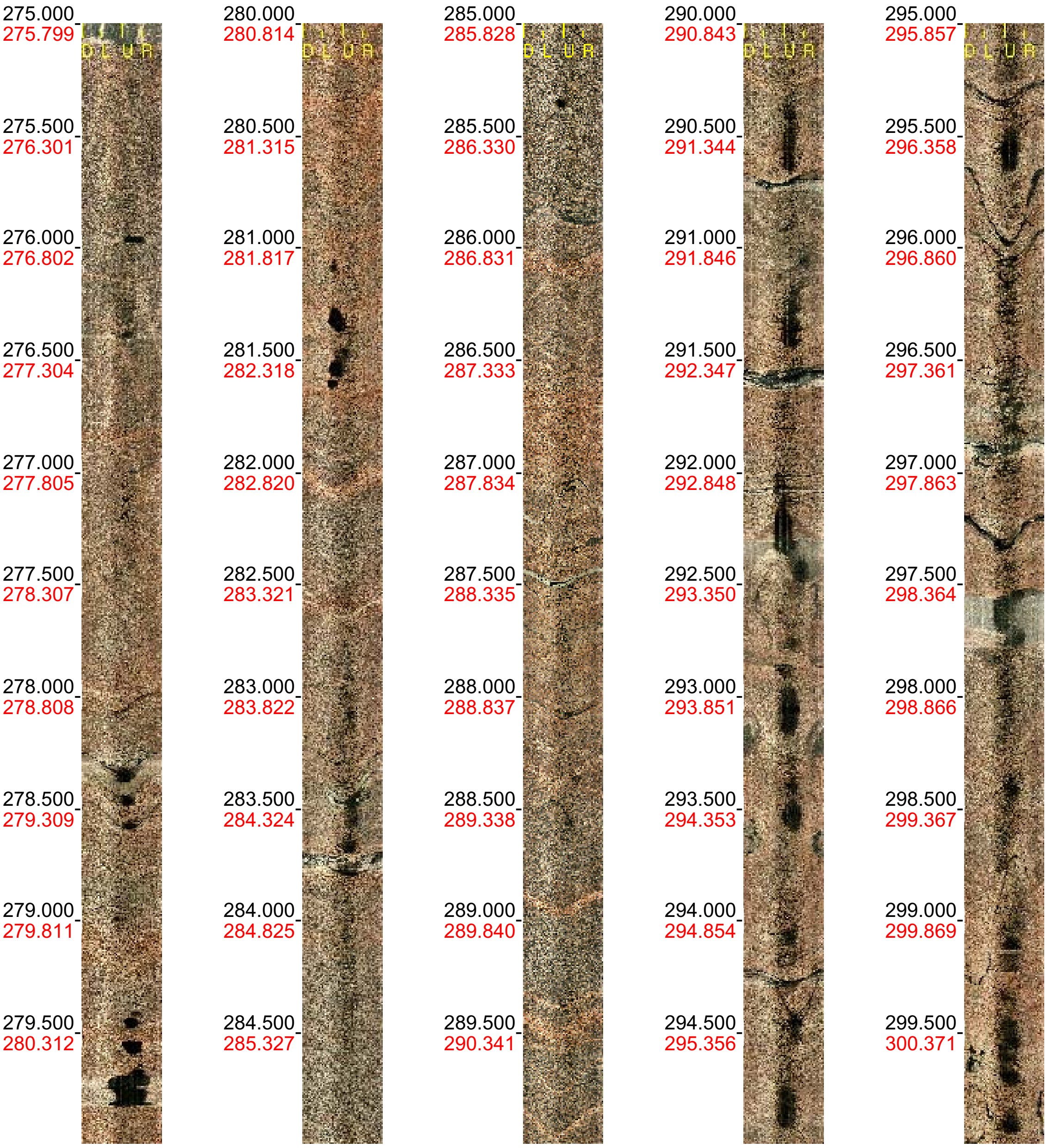
Borehole: KLX08

Mapping: KLX08_JE_PD_1

Depth range: 275.000 - 300.000 m

Azimuth: 0.0

Inclination: -90.0



Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 9 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 300.000 - 325.000 m
Azimuth: 0.0
Inclination: -90.0

300.000
300.873
300.500
301.375
301.000
301.877
301.500
302.379
302.000
302.881
302.500
303.383
303.000
303.885
303.500
304.387
304.000
304.889
304.500
305.391

305.000
305.893
305.500
306.395
306.000
306.897
306.500
307.399
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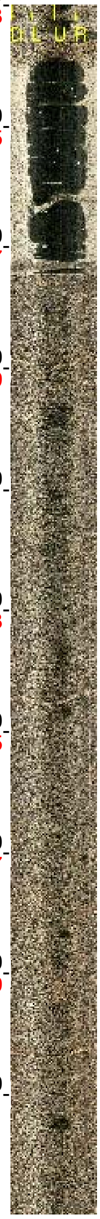
309.909
309.500
310.411



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312.420
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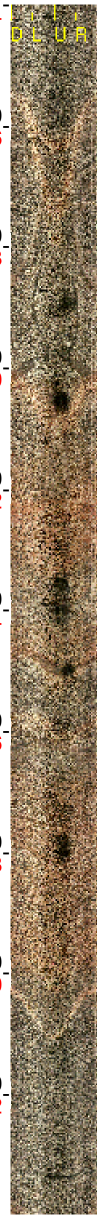
314.930
314.500
315.432



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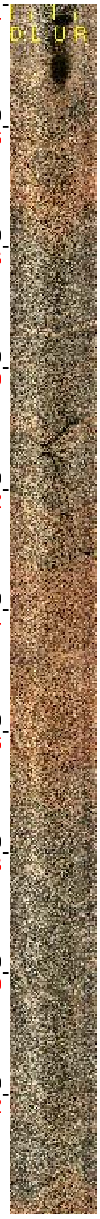
319.950
319.500
320.452



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322.461
322.000
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323.967
323.500
324.469
324.000
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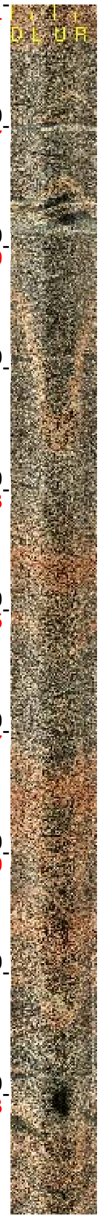
324.500
325.473



Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 10 (37)

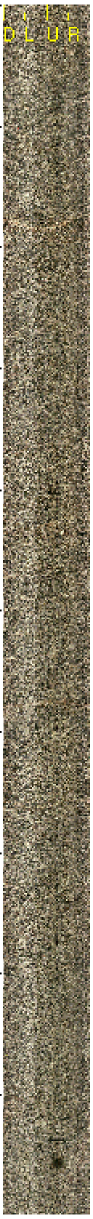
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 325.000 - 350.000 m
Azimuth: 0.0
Inclination: -90.0

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 350.000 - 375.000 m
Azimuth: 0.0
Inclination: -90.0

350.000
351.079
350.500
351.581
351.000
352.084
351.500
352.587
352.000
353.089
352.500
353.592
353.000
354.095
353.500
354.597
354.000
355.100
354.500
355.602



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357.110
356.500
357.613
357.000
358.116
357.500
358.618
358.000
359.121
358.500
359.624
359.000
360.126
359.500
360.629

360.000
361.132
360.500
361.634
361.000
362.137
361.500
362.639
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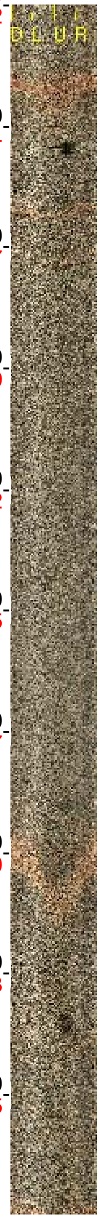
365.655



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367.666
367.000
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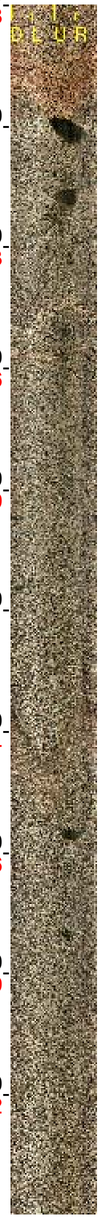
370.179
369.500
370.682



370.000
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372.190
371.500
372.692
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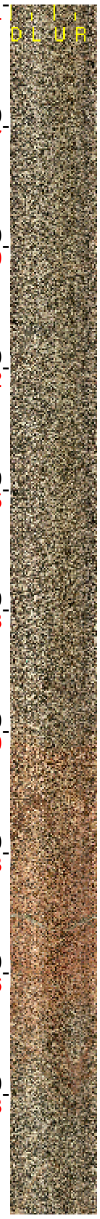
375.206
374.500
375.708



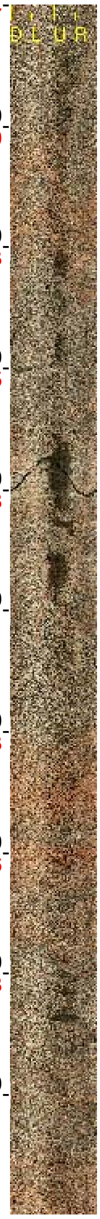
Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 12 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 375.000 - 400.000 m
Azimuth: 0.0
Inclination: -90.0

375.000 376.211
375.500 376.714
376.000 377.216
376.500 377.719
377.000 378.221
377.500 378.724
378.000 379.227
378.500 379.729
379.000 380.232
379.500 380.735

380.000 381.237
380.500 381.740
381.000 382.243
381.500 382.745
382.000 383.248
382.500 383.751
383.000 384.253
383.500 384.756
384.000 385.258
384.500 385.761



385.000 386.264
385.500 386.766
386.000 387.269
386.500 387.772
387.000 388.274
387.500 388.777
388.000 389.280
388.500 389.782
389.000 390.285
389.500 390.788

390.000 391.290
390.500 391.793
391.000 392.295
391.500 392.798
392.000 393.301
392.500 393.803
393.000 394.306
393.500 394.809
394.000 395.311
394.500 395.814

395.000 396.317
395.500 396.819
396.000 397.322
396.500 397.825
397.000 398.327
397.500 398.830
398.000 399.332
398.500 399.835
399.000 400.337
399.500 400.839

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 13 (37)

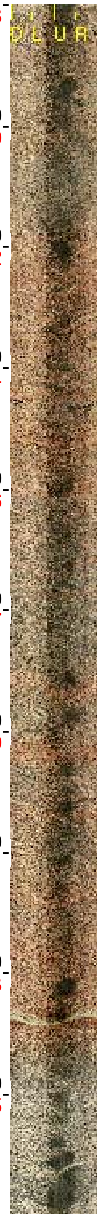
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 400.000 - 425.000 m
Azimuth: 0.0
Inclination: -90.0

400.000
401.341
400.500
401.843
401.000
402.345
401.500
402.847
402.000
403.348
402.500
403.850
403.000
404.352
403.500
404.854
404.000
405.356
404.500
405.858

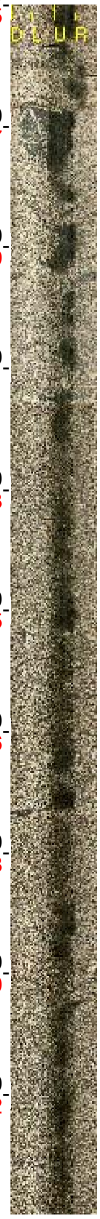
405.000
406.360
405.500
406.861
406.000
407.363
406.500
407.865
407.000
408.367
407.500
408.869
408.000
409.371
408.500
409.873
409.000
410.374
409.500
410.876

410.000
411.378
410.500
411.880
411.000
412.382
411.500
412.884
412.000
413.386
412.500
413.887
413.000
414.389
413.500
414.891
414.000
415.393
414.500
415.895



415.000
416.397
415.500
416.899
416.000
417.400
416.500
417.902
417.000
418.404
417.500
418.906
418.000
419.408
418.500
419.910
419.000
420.412
419.500
420.913

420.000
421.415
420.500
421.917
421.000
422.419
421.500
422.921
422.000
423.423
422.500
423.925
423.000
424.426
423.500
424.928
424.000
425.430
424.500
425.932



Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 %

Borehole: KLX08
Mapping: KLX08_JE_PD_1

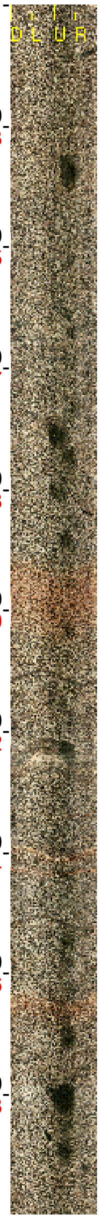
Depth range: 425.000 - 450.000 m
Azimuth: 0.0
Inclination: -90.0

425.000
426.434


425.500
426.936
426.000
427.438
426.500
427.939
427.000
428.441
427.500
428.943
428.000
429.445
428.500
429.947
429.000
430.449
429.500
430.951

430.000
431.452

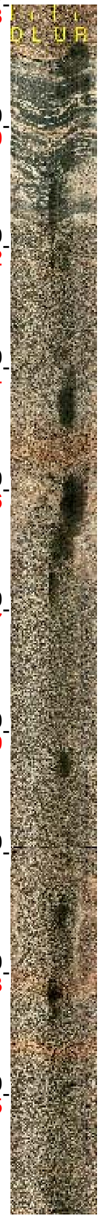

430.500
431.954
431.000
432.456
431.500
432.958
432.000
433.460
432.500
433.962
433.000
434.464
433.500
434.965
434.000
435.467
434.500
435.969

435.000
436.471


435.500
436.973
436.000
437.475
436.500
437.977
437.000
438.478
437.500
438.980
438.000
439.482
438.500
439.984
439.000
440.486
439.500
440.988

440.000
441.490


440.500
441.991
441.000
442.493
441.500
442.995
442.000
443.497
442.500
443.999
443.000
444.501
443.500
445.003
444.000
445.504
444.500
446.006

445.000
446.508


445.500
447.010
446.000
447.512
446.500
448.014
447.000
448.516
447.500
449.017
448.000
449.519
448.500
450.021
449.000
450.523
449.500
451.025

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 15 (37)

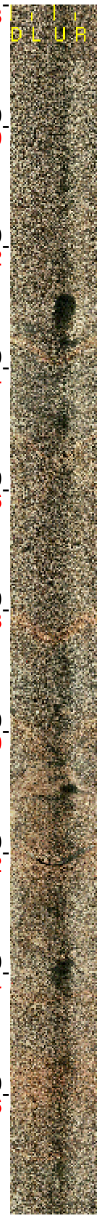
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 450.000 - 475.000 m
Azimuth: 0.0
Inclination: -90.0

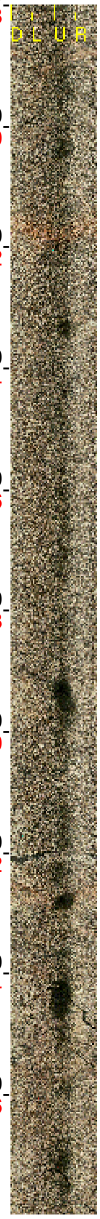
450.000
451.527
450.500
452.029
451.000
452.531
451.500
453.033
452.000
453.535
452.500
454.037
453.000
454.539
453.500
455.041
454.000
455.543
454.500
456.045

455.000
456.547
455.500
457.049
456.000
457.551
456.500
458.053
457.000
458.555
457.500
459.057
458.000
459.559
458.500
460.061
459.000
460.563
459.500
461.065

460.000
461.568
460.500
462.070
461.000
462.572
461.500
463.074
462.000
463.576
462.500
464.078
463.000
464.580
463.500
465.082
464.000
465.584
464.500
466.086



465.000
466.588
465.500
467.090
466.000
467.592
466.500
468.094
467.000
468.596
467.500
469.098
468.000
469.600
468.500
470.102
469.000
470.604
469.500
471.106



470.000
471.608
470.500
472.110
471.000
472.612
471.500
473.114
472.000
473.616
472.500
474.118
473.000
474.620
473.500
475.122
474.000
475.624
474.500
476.126

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 16 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 475.000 - 500.000 m
Azimuth: 0.0
Inclination: -90.0

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 17 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

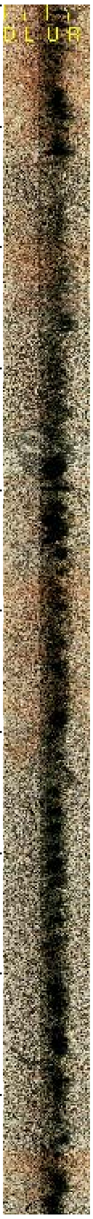
Depth range: 500.000 - 525.000 m
Azimuth: 0.0
Inclination: -90.0

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 18 (37)

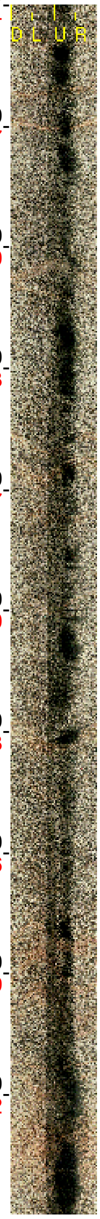
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 525.000 - 550.000 m
Azimuth: 0.0
Inclination: -90.0

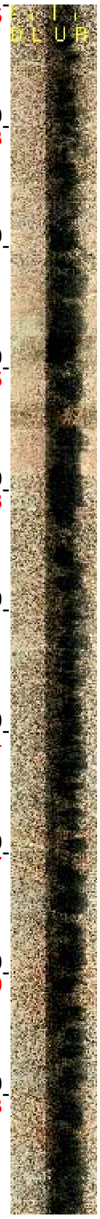
525.000 527.423
525.500 527.936
526.000 528.449
526.500 528.962
527.000 529.475
527.500 529.989
528.000 530.502
528.500 531.015
529.000 531.528
529.500 532.041



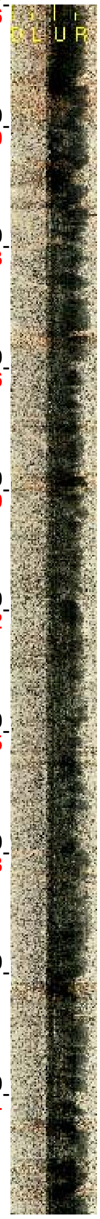
530.000 532.554
530.500 533.067
531.000 533.580
531.500 534.093
532.000 534.607
532.500 535.120
533.000 535.633
533.500 536.146
534.000 536.659
534.500 537.172



535.000 537.685
535.500 538.198
536.000 538.711
536.500 539.225
537.000 539.738
537.500 540.251
538.000 540.764
538.500 541.277
539.000 541.790
539.500 542.303



540.000 542.816
540.500 543.330
541.000 543.843
541.500 544.356
542.000 544.869
542.500 545.382
543.000 545.895
543.500 546.408
544.000 546.921
544.500 547.434



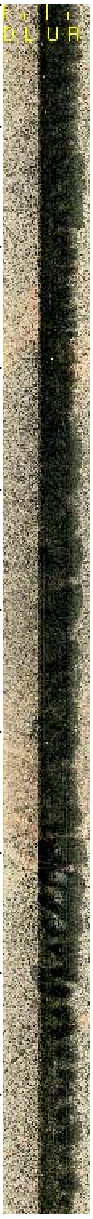
545.000 547.948
545.500 548.461
546.000 548.974
546.500 549.487
547.000 550.000
547.500 550.492
548.000 550.985
548.500 551.477
549.000 551.970
549.500 552.462

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 19 (37)

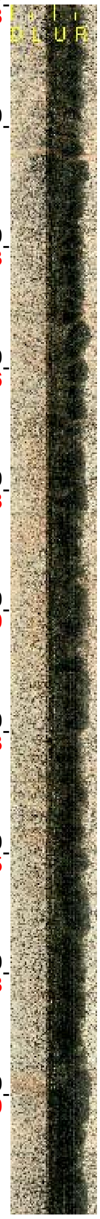
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 550.000 - 575.000 m
Azimuth: 0.0
Inclination: -90.0

550.000 552.954
550.500 553.447
551.000 553.939
551.500 554.432
552.000 554.924
552.500 555.416
553.000 555.909
553.500 556.401
554.000 556.894
554.500 557.386

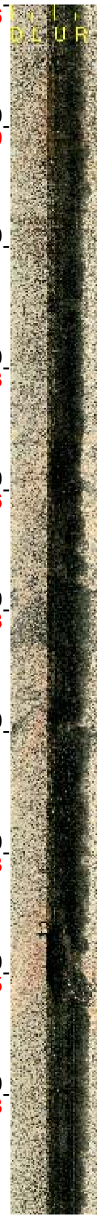


555.000 557.878
555.500 558.371
556.000 558.863
556.500 559.356
557.000 559.848
557.500 560.340
558.000 560.833
558.500 561.325
559.000 561.818
559.500 562.310

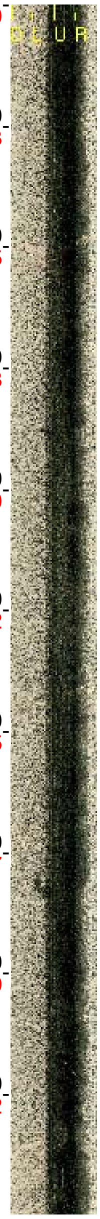


560.000 562.802
560.500 563.295
561.000 563.787
561.500 564.280
562.000 564.772
562.500 565.264
563.000 565.757
563.500 566.249
564.000 566.742
564.500 567.234

565.000 567.726
565.500 568.219
566.000 568.711
566.500 569.203
567.000 569.696
567.500 570.188
568.000 570.681
568.500 571.173
569.000 571.665
569.500 572.158



570.000 572.650
570.500 573.143
571.000 573.635
571.500 574.128
572.000 574.620
572.500 575.112
573.000 575.605
573.500 576.097
574.000 576.589
574.500 577.082

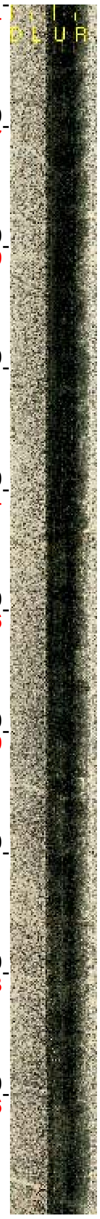


Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 20 (37)

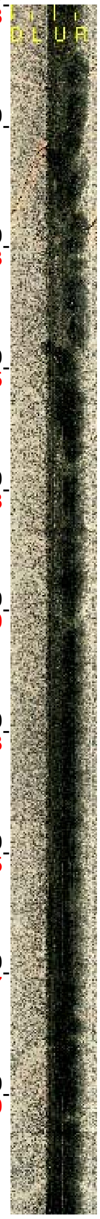
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 575.000 - 600.000 m
Azimuth: 0.0
Inclination: -90.0

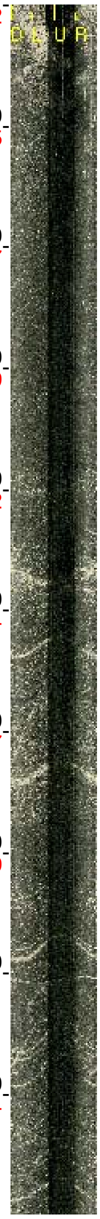
575.000
577.574
575.500
578.067
576.000
578.559
576.500
579.051
577.000
579.544
577.500
580.036
578.000
580.529
578.500
581.021
579.000
581.513
579.500
582.006



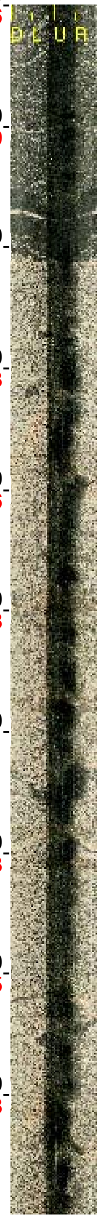
580.000
582.498
580.500
582.991
581.000
583.483
581.500
583.975
582.000
584.468
582.500
584.960
583.000
585.453
583.500
585.945
584.000
586.437
584.500
586.930



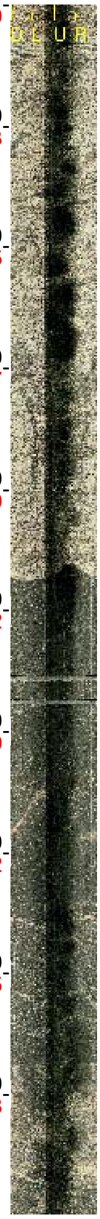
585.000
587.422
585.500
587.915
586.000
588.407
586.500
588.899
587.000
589.392
587.500
589.884
588.000
590.377
588.500
590.869
589.000
591.361
589.500
591.854



590.000
592.346
590.500
592.839
591.000
593.331
591.500
593.823
592.000
594.316
592.500
594.808
593.000
595.301
593.500
595.793
594.000
596.285
594.500
596.778



595.000
597.270
595.500
597.763
596.000
598.255
596.500
598.747
597.000
599.240
597.500
599.732
598.000
600.229
598.500
600.732
599.000
601.235
599.500
601.738



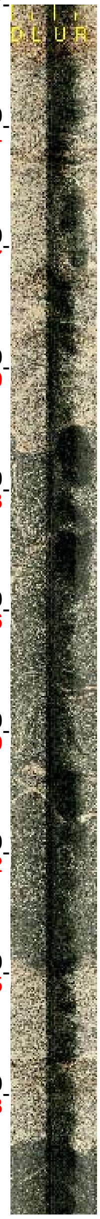
Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 21 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

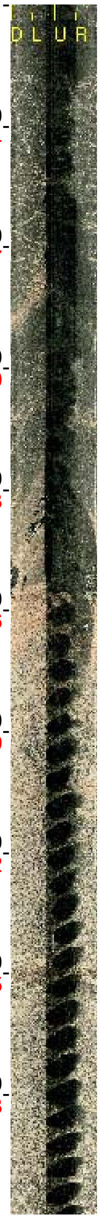
Depth range: 600.000 - 625.000 m
Azimuth: 0.0
Inclination: -90.0

600.000 602.241
600.500 602.744
601.000 603.247
601.500 603.750
602.000 604.253
602.500 604.756
603.000 605.259
603.500 605.762
604.000 606.265
604.500 606.768

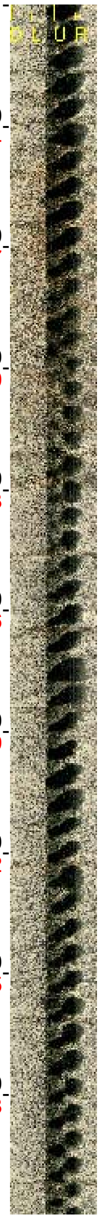
605.000 607.271
605.500 607.774
606.000 608.277
606.500 608.780
607.000 609.283
607.500 609.786
608.000 610.289
608.500 610.792
609.000 611.295
609.500 611.798



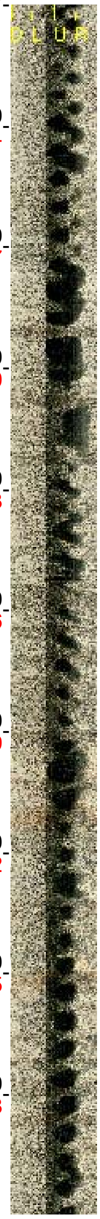
610.000 612.301
610.500 612.804
611.000 613.307
611.500 613.810
612.000 614.313
612.500 614.816
613.000 615.319
613.500 615.822
614.000 616.325
614.500 616.828



615.000 617.331
615.500 617.834
616.000 618.337
616.500 618.840
617.000 619.343
617.500 619.846
618.000 620.349
618.500 620.852
619.000 621.355
619.500 621.858



620.000 622.361
620.500 622.864
621.000 623.367
621.500 623.870
622.000 624.373
622.500 624.876
623.000 625.379
623.500 625.882
624.000 626.385
624.500 626.888



Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 22 (37)

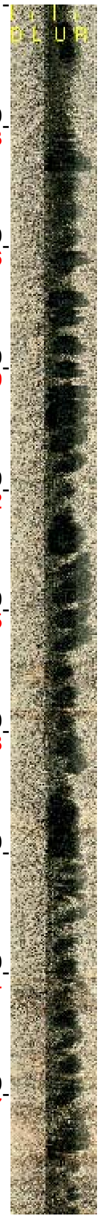
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 625.000 - 650.000 m
Azimuth: 0.0
Inclination: -90.0

625.000
627.391
625.500
627.894
626.000
628.397
626.500
628.900
627.000
629.403
627.500
629.906
628.000
630.409
628.500
630.912
629.000
631.415
629.500
631.918

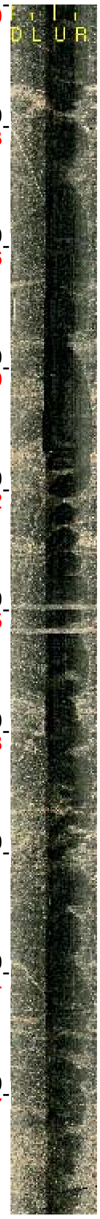
630.000
632.421
630.500
632.924
631.000
633.427
631.500
633.930
632.000
634.433
632.500
634.936
633.000
635.439
633.500
635.942
634.000
636.445
634.500
636.948

635.000
637.451
635.500
637.953
636.000
638.456
636.500
638.959
637.000
639.462
637.500
639.965
638.000
640.468
638.500
640.971
639.000
641.474
639.500
641.977



640.000
642.480
640.500
642.983
641.000
643.486
641.500
643.989
642.000
644.492
642.500
644.995
643.000
645.498
643.500
646.001
644.000
646.504
644.500
647.007

645.000
647.510
645.500
648.013
646.000
648.516
646.500
649.019
647.000
649.522
647.500
650.025
648.000
650.528
648.500
651.031
649.000
651.534
649.500
652.037

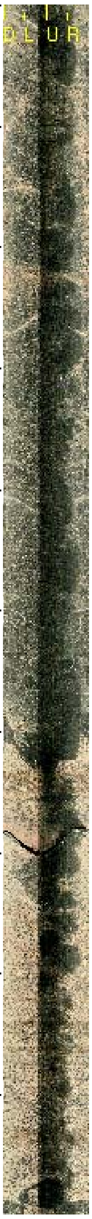


Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 23 (37)

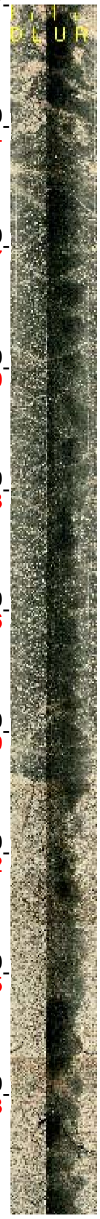
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 650.000 - 675.000 m
Azimuth: 0.0
Inclination: -90.0

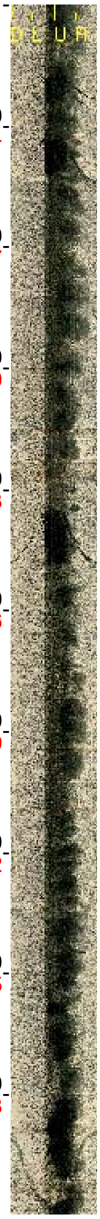
650.000 652.540
650.500 653.043
651.000 653.546
651.500 654.049
652.000 654.553
652.500 655.056
653.000 655.559
653.500 656.062
654.000 656.565
654.500 657.068



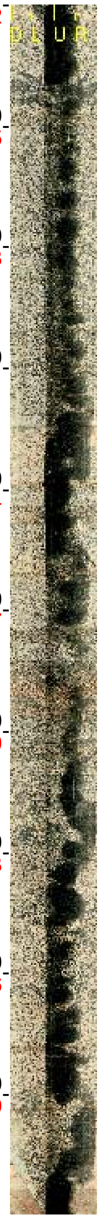
655.000 657.571
655.500 658.074
656.000 658.577
656.500 659.080
657.000 659.583
657.500 660.086
658.000 660.589
658.500 661.092
659.000 661.595
659.500 662.098



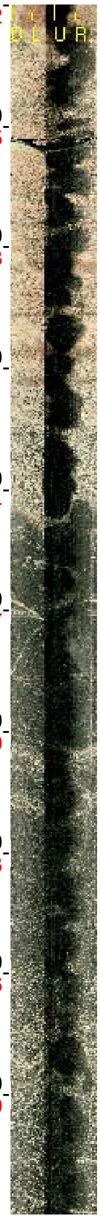
660.000 662.601
660.500 663.104
661.000 663.607
661.500 664.110
662.000 664.613
662.500 665.116
663.000 665.619
663.500 666.122
664.000 666.625
664.500 667.128



665.000 667.632
665.500 668.135
666.000 668.638
666.500 669.141
667.000 669.644
667.500 670.147
668.000 670.650
668.500 671.153
669.000 671.656
669.500 672.159



670.000 672.662
670.500 673.165
671.000 673.668
671.500 674.171
672.000 674.674
672.500 675.177
673.000 675.680
673.500 676.183
674.000 676.686
674.500 677.189

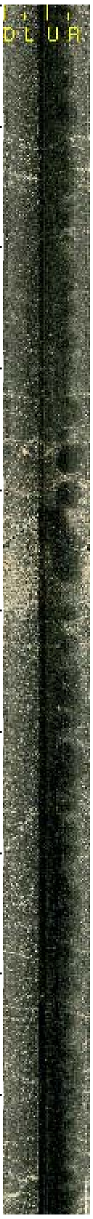


Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 24 (37)

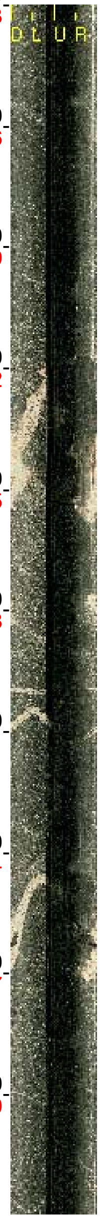
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 675.000 - 700.000 m
Azimuth: 0.0
Inclination: -90.0

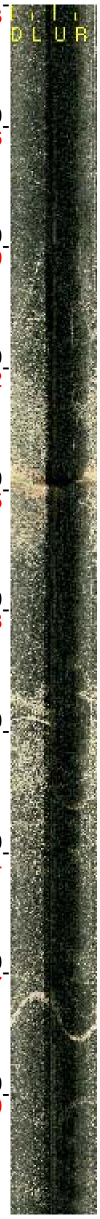
675.000 677.692
675.500 678.195
676.000 678.698
676.500 679.201
677.000 679.704
677.500 680.207
678.000 680.711
678.500 681.214
679.000 681.717
679.500 682.220



680.000 682.723
680.500 683.226
681.000 683.729
681.500 684.232
682.000 684.735
682.500 685.238
683.000 685.741
683.500 686.244
684.000 686.747
684.500 687.250

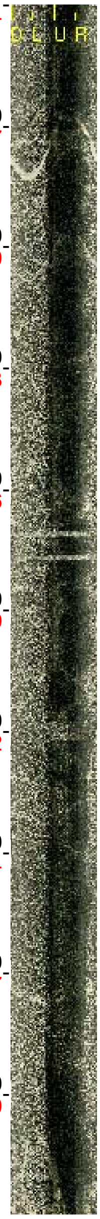


685.000 687.753
685.500 688.256
686.000 688.759
686.500 689.262
687.000 689.765
687.500 690.268
688.000 690.771
688.500 691.274
689.000 691.777
689.500 692.280



690.000 692.783
690.500 693.286
691.000 693.789
691.500 694.293
692.000 694.796
692.500 695.299
693.000 695.802
693.500 696.305
694.000 696.808
694.500 697.311

695.000 697.814
695.500 698.317
696.000 698.820
696.500 699.323
697.000 699.826
697.500 700.329
698.000 700.832
698.500 701.334
699.000 701.837
699.500 702.340

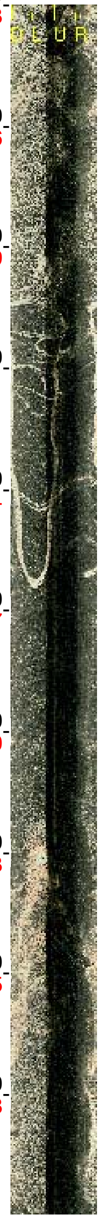


Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 25 (37)

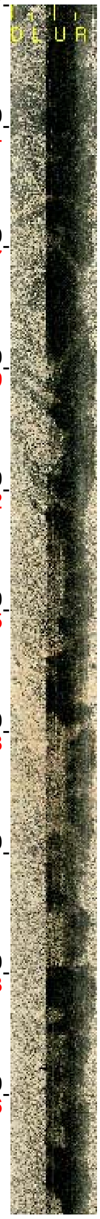
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 700.000 - 725.000 m
Azimuth: 0.0
Inclination: -90.0

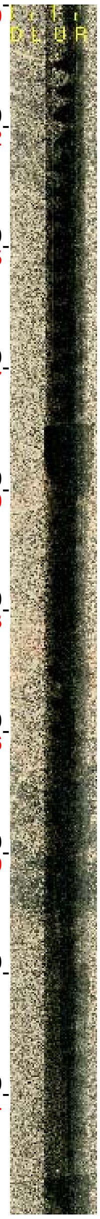
700.000
702.843
700.500
703.346
701.000
703.849
701.500
704.351
702.000
704.854
702.500
705.357
703.000
705.860
703.500
706.363
704.000
706.865
704.500
707.368



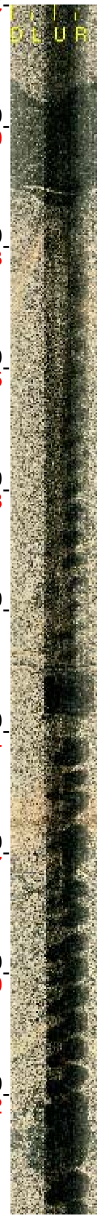
705.000
707.871
705.500
708.374
706.000
708.877
706.500
709.379
707.000
709.882
707.500
710.385
708.000
710.888
708.500
711.391
709.000
711.893
709.500
712.396



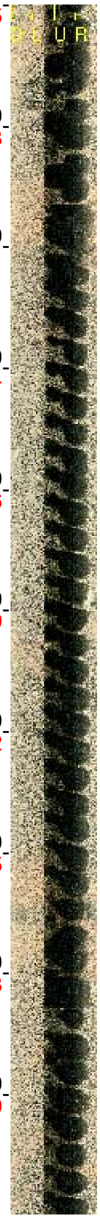
710.000
712.899
710.500
713.402
711.000
713.905
711.500
714.407
712.000
714.910
712.500
715.413
713.000
715.916
713.500
716.419
714.000
716.921
714.500
717.424



715.000
717.927
715.500
718.430
716.000
718.933
716.500
719.435
717.000
719.938
717.500
720.441
718.000
720.944
718.500
721.447
719.000
721.950
719.500
722.452



720.000
722.955
720.500
723.458
721.000
723.961
721.500
724.464
722.000
724.966
722.500
725.469
723.000
725.972
723.500
726.475
724.000
726.978
724.500
727.480



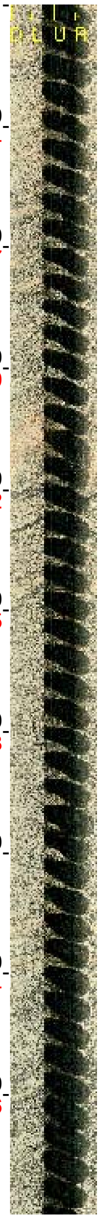
Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 26 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 725.000 - 750.000 m
Azimuth: 0.0
Inclination: -90.0

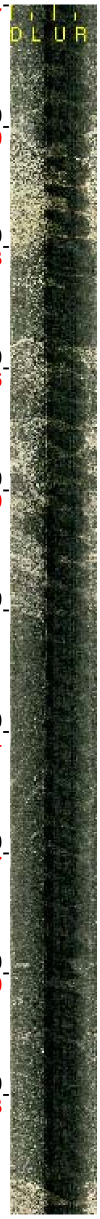
725.000 727.983
725.500 728.486
726.000 728.989
726.500 729.492
727.000 729.994
727.500 730.497
728.000 731.000
728.500 731.503
729.000 732.006
729.500 732.508

730.000 733.011
730.500 733.514
731.000 734.017
731.500 734.520
732.000 735.022
732.500 735.525
733.000 736.028
733.500 736.531
734.000 737.034
734.500 737.536

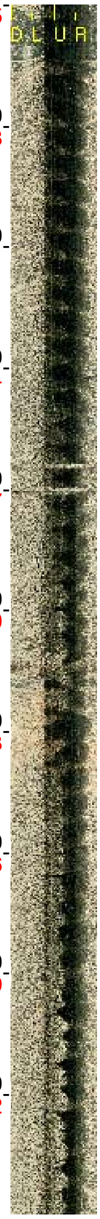


735.000 738.039
735.500 738.542
736.000 739.045
736.500 739.548
737.000 740.050
737.500 740.553
738.000 741.056
738.500 741.559
739.000 742.062
739.500 742.565

740.000 743.067
740.500 743.570
741.000 744.073
741.500 744.576
742.000 745.079
742.500 745.581
743.000 746.084
743.500 746.587
744.000 747.090
744.500 747.593



745.000 748.095
745.500 748.598
746.000 749.101
746.500 749.604
747.000 750.107
747.500 750.610
748.000 751.113
748.500 751.616
749.000 752.119
749.500 752.622



Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 27 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

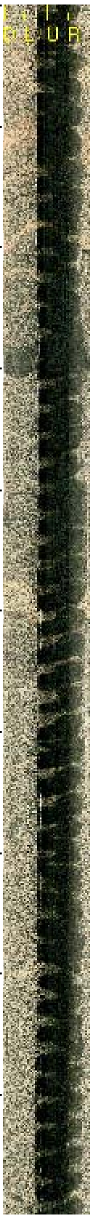
Depth range: 750.000 - 775.000 m
Azimuth: 0.0
Inclination: -90.0

Printed: 2005-10-16 13:14:46   Scale: 1 : 25   Aspect: 150 %   28 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

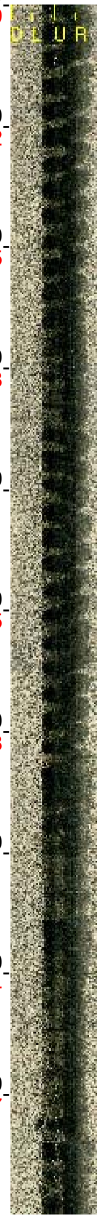
Depth range: 775.000 - 800.000 m
Azimuth: 0.0
Inclination: -90.0

775.000
778.279



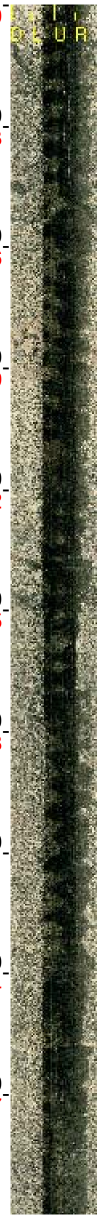
775.500
778.782
776.000
779.285
776.500
779.788
777.000
780.291
777.500
780.794
778.000
781.297
778.500
781.800
779.000
782.303
779.500
782.806

780.000
783.309



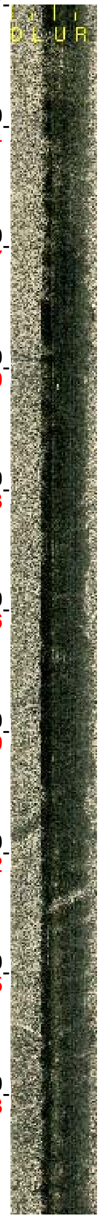
780.500
783.812
781.000
784.315
781.500
784.818
782.000
785.321
782.500
785.825
783.000
786.328
783.500
786.831
784.000
787.334
784.500
787.837

785.000
788.340



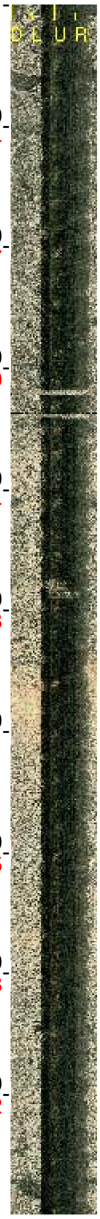
785.500
788.843
786.000
789.346
786.500
789.849
787.000
790.352
787.500
790.855
788.000
791.358
788.500
791.861
789.000
792.364
789.500
792.867

790.000
793.371



790.500
793.874
791.000
794.377
791.500
794.880
792.000
795.383
792.500
795.886
793.000
796.389
793.500
796.892
794.000
797.395
794.500
797.898

795.000
798.401



795.500
798.904
796.000
799.407
796.500
799.910
797.000
800.414
797.500
800.918
798.000
801.421
798.500
801.925
799.000
802.428
799.500
802.932

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 29 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 800.000 - 825.000 m
Azimuth: 0.0
Inclination: -90.0

800.000
803.435

800.500
803.939

801.000
804.443

801.500
804.946

802.000
805.450

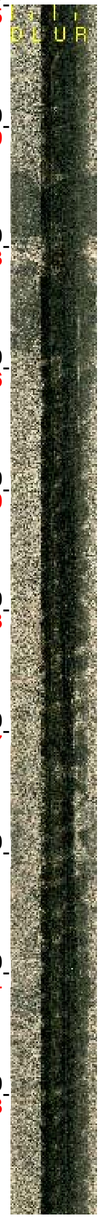
802.500
805.953

803.000
806.457

803.500
806.961

804.000
807.464

804.500
807.968



805.000
808.471

805.500
808.975

806.000
809.479

806.500
809.982

807.000
810.486

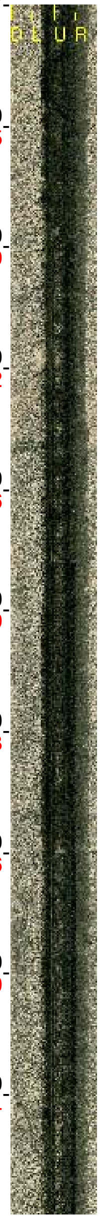
807.500
810.989

808.000
811.493

808.500
811.996

809.000
812.500

809.500
813.004



810.000
813.507

810.500
814.011

811.000
814.514

811.500
815.018

812.000
815.522

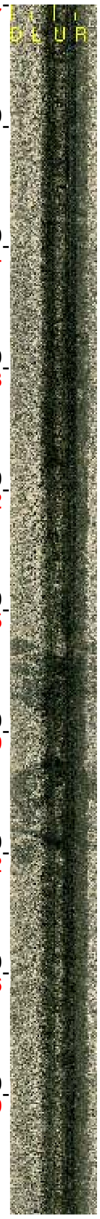
812.500
816.025

813.000
816.529

813.500
817.032

814.000
817.536

814.500
818.039



815.000
818.543

815.500
819.047

816.000
819.550

816.500
820.054

817.000
820.557

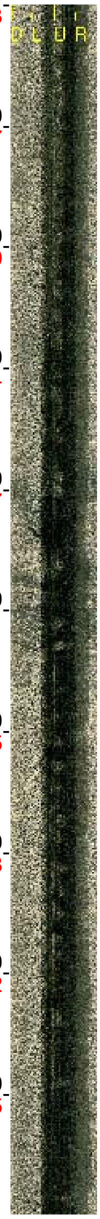
817.500
821.061

818.000
821.565

818.500
822.068

819.000
822.572

819.500
823.075



820.000
823.579

820.500
824.082

821.000
824.586

821.500
825.090

822.000
825.593

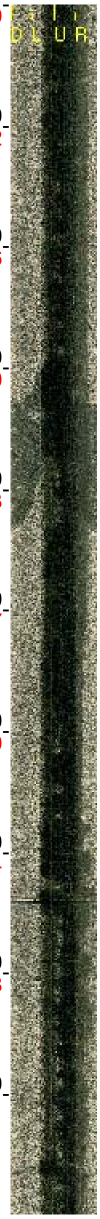
822.500
826.097

823.000
826.600

823.500
827.104

824.000
827.608

824.500
828.111



Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 30 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 825.000 - 850.000 m
Azimuth: 0.0
Inclination: -90.0

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 31 (37)

Borehole: KLX08

Mapping: KLX08_JE_PD_1

Depth range: 850.000 - 875.000 m

Azimuth: 0.0

Inclination: -90.0

850.000
853.789

850.500
854.292

851.000
854.795

851.500
855.298

852.000
855.801

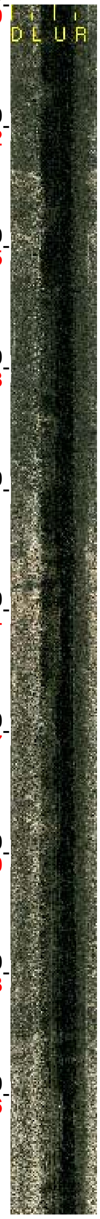
852.500
856.304

853.000
856.807

853.500
857.310

854.000
857.813

854.500
858.316



855.000
858.819

855.500
859.322

856.000
859.825

856.500
860.328

857.000
860.831

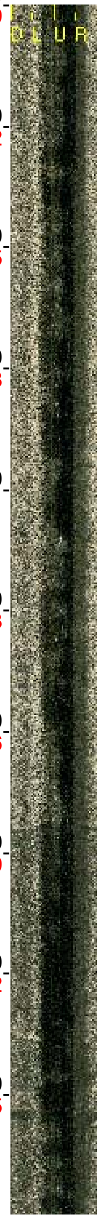
857.500
861.333

858.000
861.836

858.500
862.339

859.000
862.842

859.500
863.345



860.000
863.848

860.500
864.351

861.000
864.854

861.500
865.357

862.000
865.860

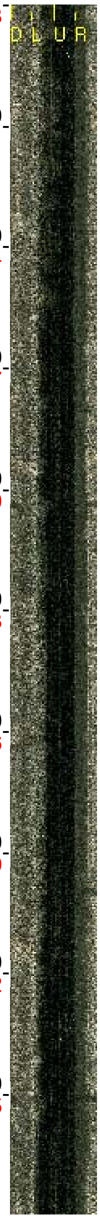
862.500
866.363

863.000
866.866

863.500
867.369

864.000
867.872

864.500
868.375



865.000
868.878

865.500
869.381

866.000
869.884

866.500
870.386

867.000
870.889

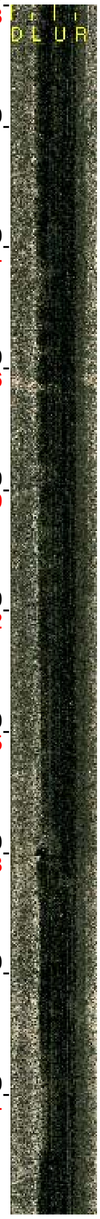
867.500
871.392

868.000
871.895

868.500
872.398

869.000
872.901

869.500
873.404



870.000
873.907

870.500
874.410

871.000
874.913

871.500
875.416

872.000
875.919

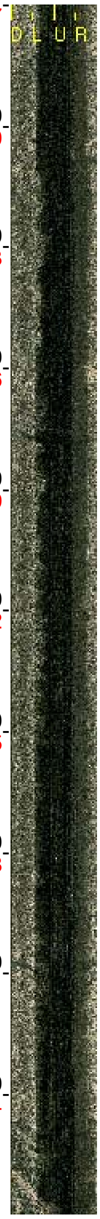
872.500
876.422

873.000
876.925

873.500
877.428

874.000
877.931

874.500
878.434



Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 32 (37)

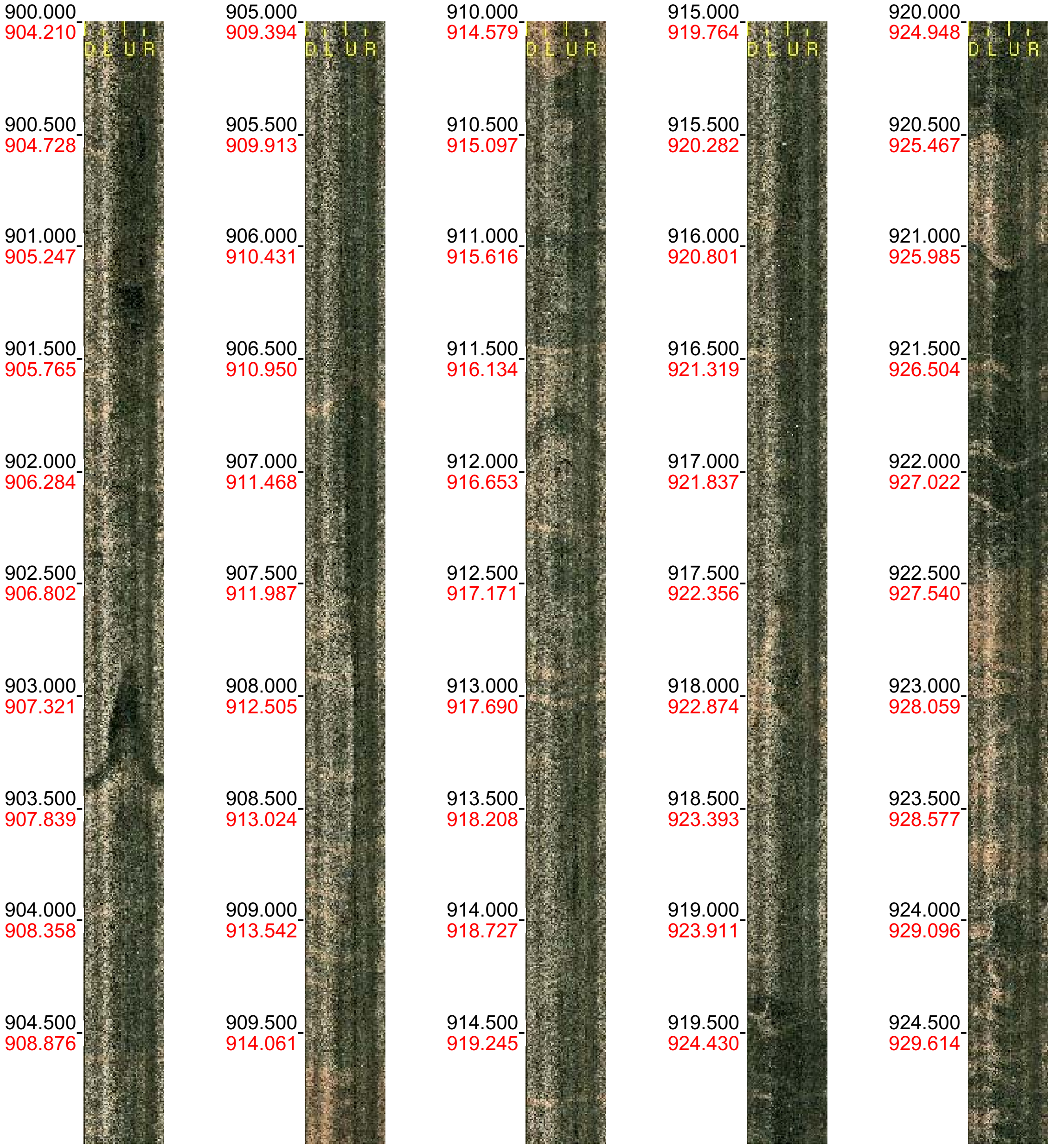
Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 875.000 - 900.000 m
Azimuth: 0.0
Inclination: -90.0

Printed: 2005-10-16 13:14:46 | Scale: 1 : 25 | Aspect: 150 % | 33 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

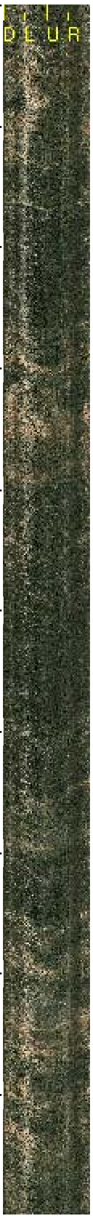
Depth range: 900.000 - 925.000 m
Azimuth: 0.0
Inclination: -90.0



Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 925.000 - 950.000 m
Azimuth: 0.0
Inclination: -90.0

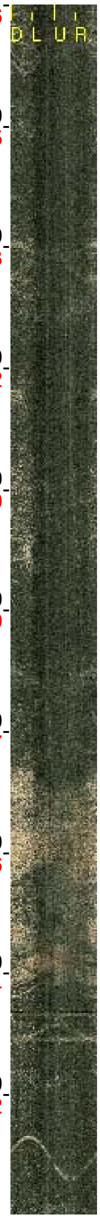
925.000
930.133
925.500
930.651
926.000
931.170
926.500
931.688
927.000
932.207
927.500
932.725
928.000
933.243
928.500
933.762
929.000
934.280
929.500
934.799



930.000
935.317
930.500
935.836
931.000
936.354
931.500
936.873
932.000
937.391
932.500
937.910
933.000
938.428
933.500
938.947
934.000
939.465
934.500
939.983

935.000
940.502
935.500
941.020
936.000
941.539
936.500
942.057
937.000
942.576
937.500
943.094
938.000
943.613
938.500
944.131
939.000
944.650
939.500
945.168

940.000
945.686
940.500
946.205
941.000
946.723
941.500
947.242
942.000
947.760
942.500
948.279
943.000
948.797
943.500
949.316
944.000
949.834
944.500
950.342



945.000
950.846
945.500
951.349
946.000
951.852
946.500
952.356
947.000
952.859
947.500
953.362
948.000
953.866
948.500
954.369
949.000
954.872
949.500
955.376

Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 35 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

Depth range: 950.000 - 975.000 m
Azimuth: 0.0
Inclination: -90.0

950.000
955.879

950.500
956.382

951.000
956.886

951.500
957.389

952.000
957.892

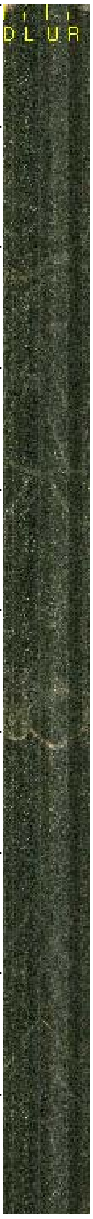
952.500
958.396

953.000
958.899

953.500
959.402

954.000
959.906

954.500
960.409



955.000
960.912

955.500
961.416

956.000
961.919

956.500
962.422

957.000
962.926

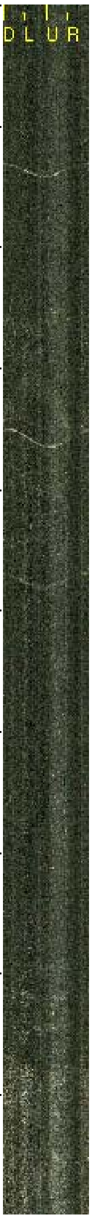
957.500
963.429

958.000
963.932

958.500
964.436

959.000
964.939

959.500
965.442



960.000
965.946

960.500
966.449

961.000
966.952

961.500
967.456

962.000
967.959

962.500
968.462

963.000
968.966

963.500
969.469

964.000
969.972

964.500
970.476

965.000
970.979

965.500
971.482

966.000
971.986

966.500
972.489

967.000
972.993

967.500
973.496

968.000
973.999

968.500
974.503

969.000
975.006

969.500
975.509

970.000
976.013

970.500
976.516

971.000
977.019

971.500
977.523

972.000
978.026

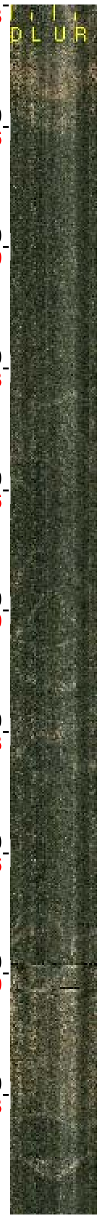
972.500
978.529

973.000
979.033

973.500
979.536

974.000
980.039

974.500
980.543

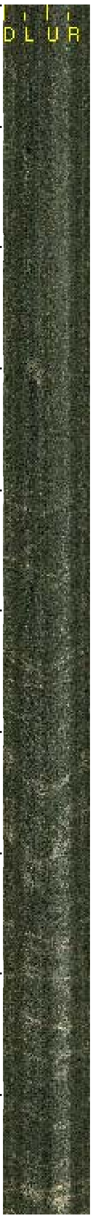


Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 36 (37)

Borehole: KLX08
Mapping: KLX08_JE_PD_1

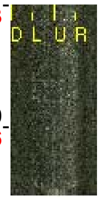
Depth range: 975.000 - 985.888 m
Azimuth: 0.0
Inclination: -90.0

975.000	981.046
975.500	981.549
976.000	982.053
976.500	982.556
977.000	983.059
977.500	983.563
978.000	984.066
978.500	984.569
979.000	985.073
979.500	985.576



980.000	986.079
980.500	986.583
981.000	987.086
981.500	987.589
982.000	988.093
982.500	988.596
983.000	989.099
983.500	989.603
984.000	990.106
984.500	990.609

985.000	991.113
985.500	991.616
986.000	992.119
986.500	992.623
987.000	993.126
987.500	993.629
988.000	994.133
988.500	994.636
989.000	995.139
989.500	995.643



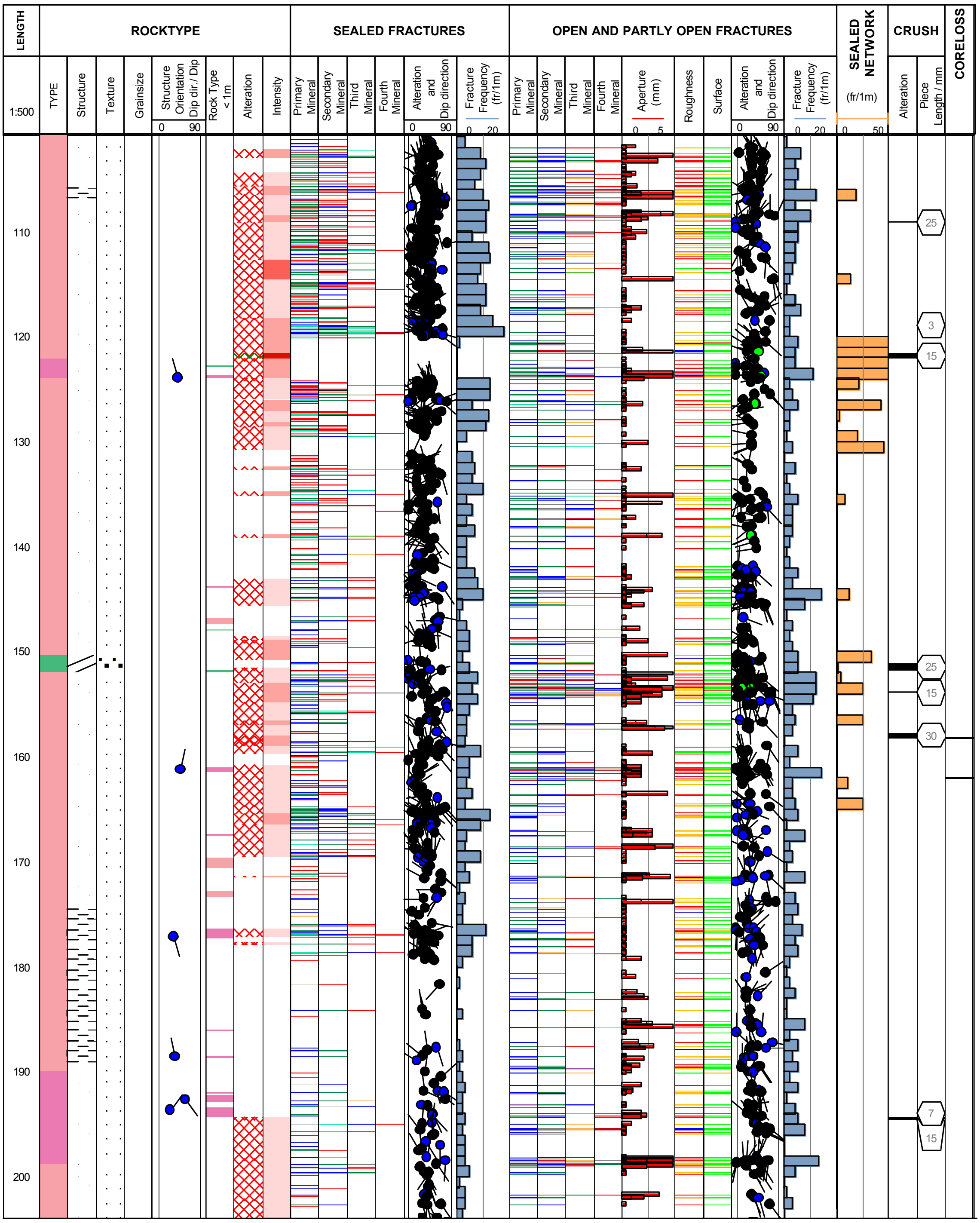
Printed: 2005-10-16 13:14:46 Scale: 1 : 25 Aspect: 150 % 37 (37)

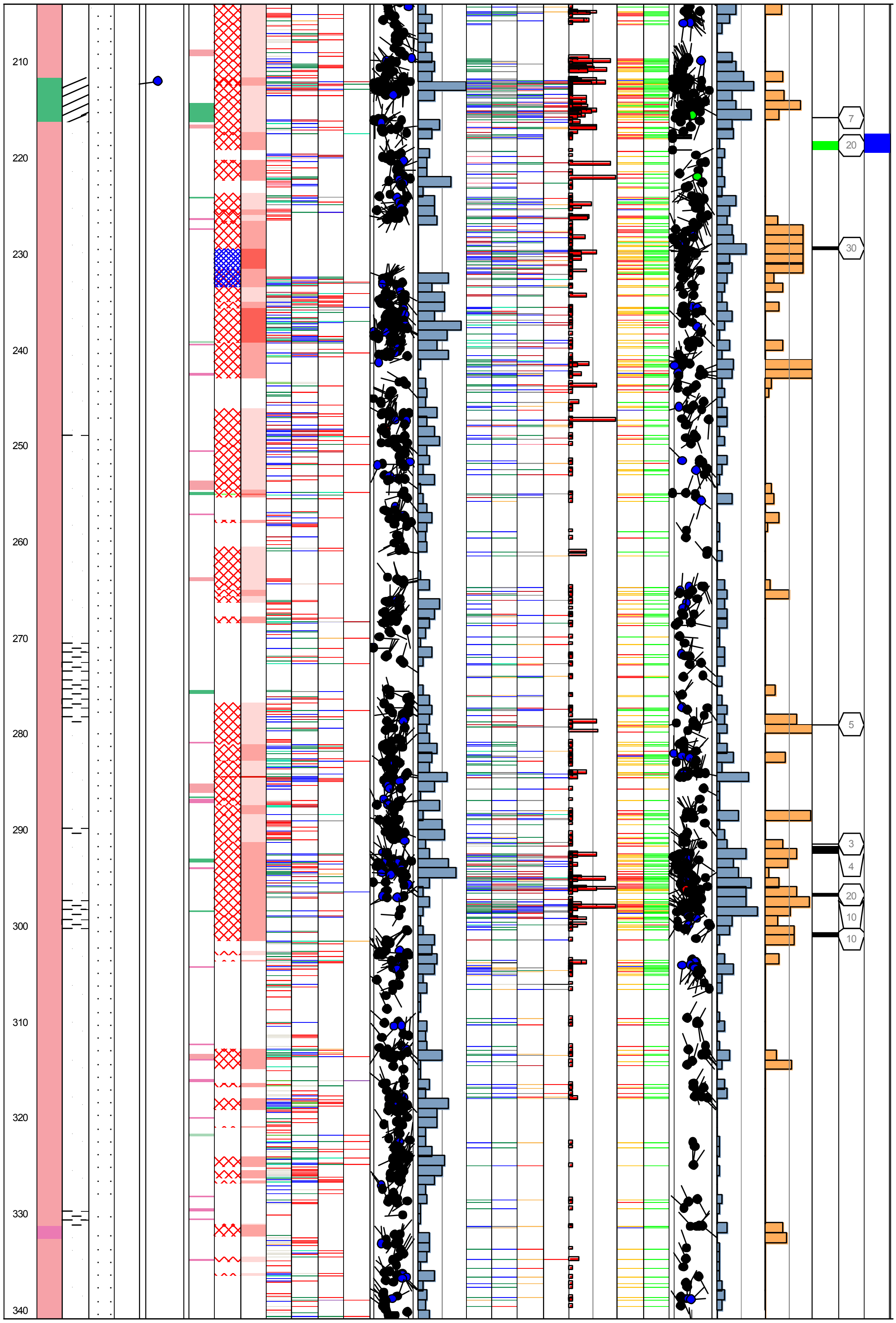
Appendix 4

WellCad diagram of KLX08

Title GEOLOGY IN KLX08 **Appendix: 4**

Site	LAXEMAR	**Coordinate System**	RT90-RHB70
Borehole	KLX08	**Northing [m]**	6367078.28
Diameter [mm]	76	**Easting [m]**	1548176.76
Length [m]	1000.410	**Elevation [m.a.s.l.]**	24.24
Bearing [°]	199.17	**Drilling Start Date**	2005-01-12 14:00:00
Inclination [°]	-60.24	**Drilling Stop Date**	2005-06-13 14:00:00
Date of coremapping	2005-10-11 09:01:00	**Plot Date**	2005-11-22 00:59:30
Rocktype data from	p_rock	**Signed data**	

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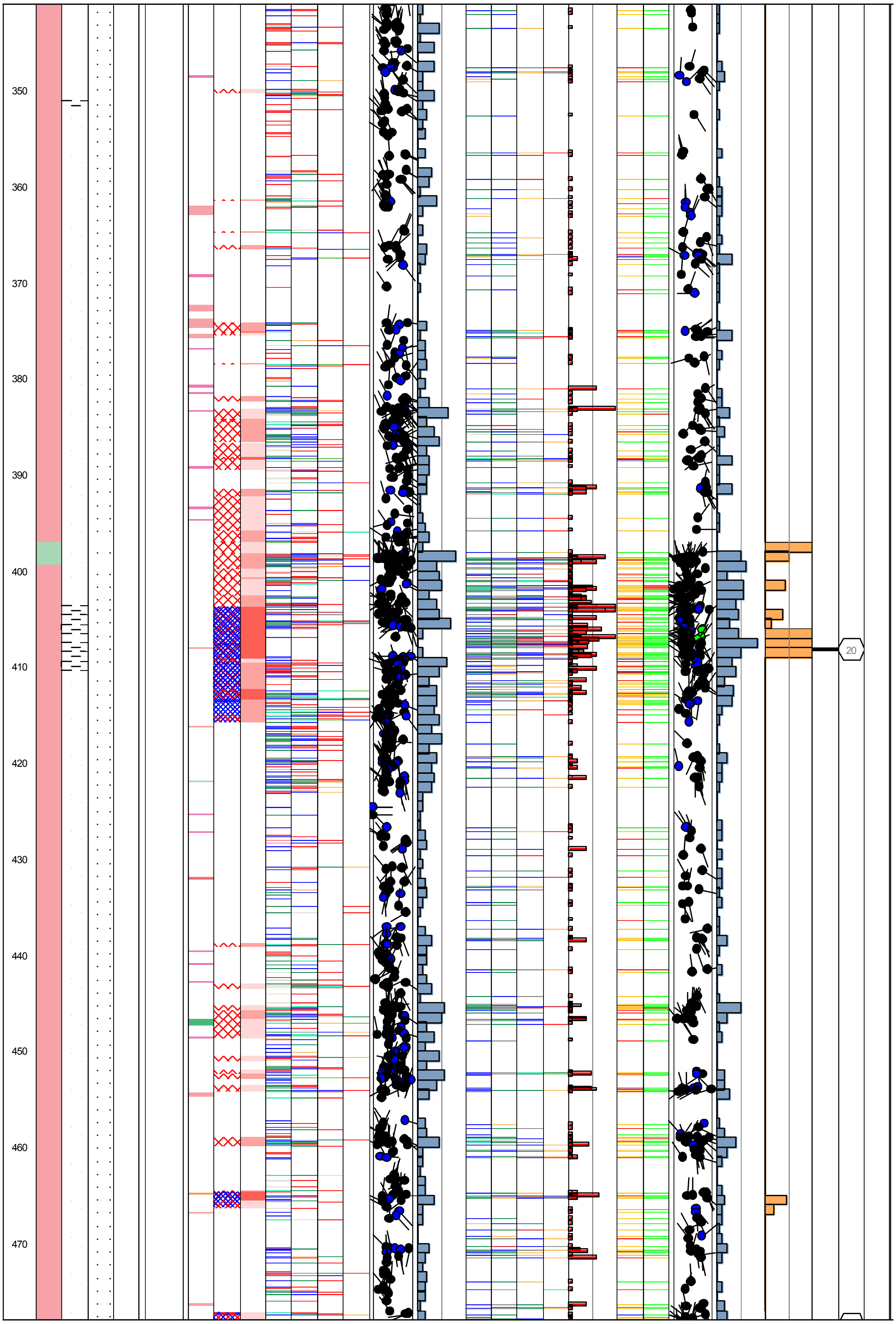
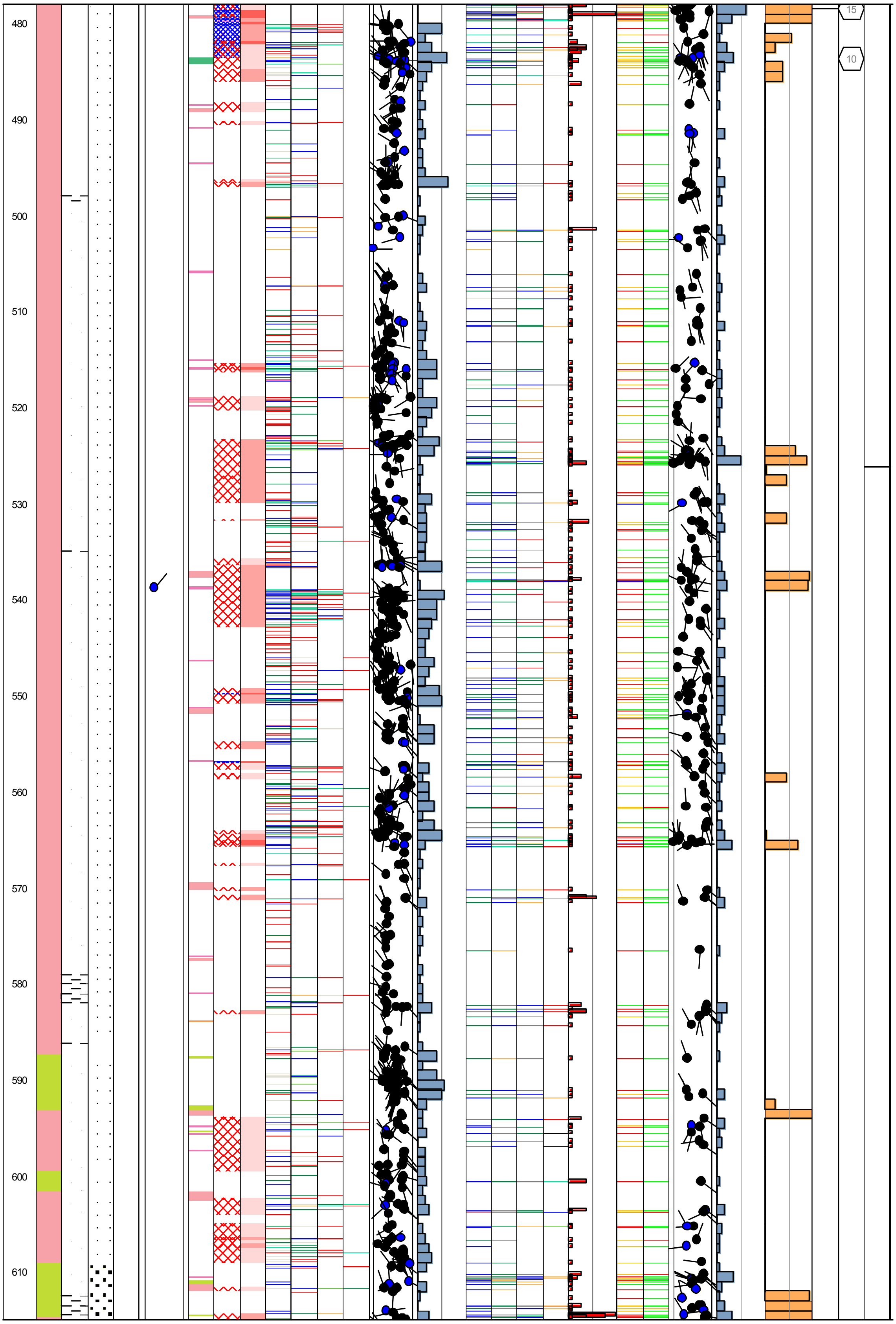
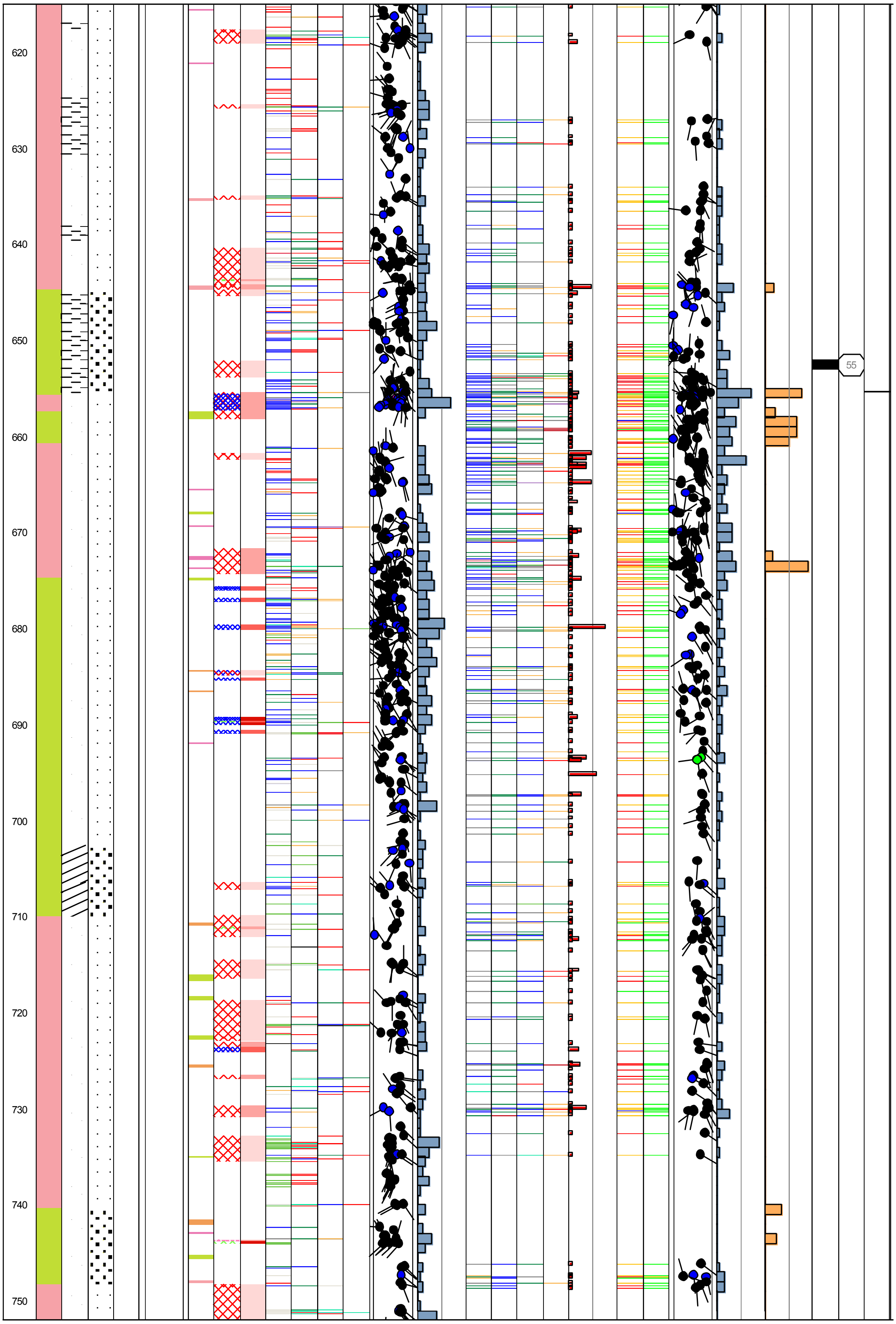
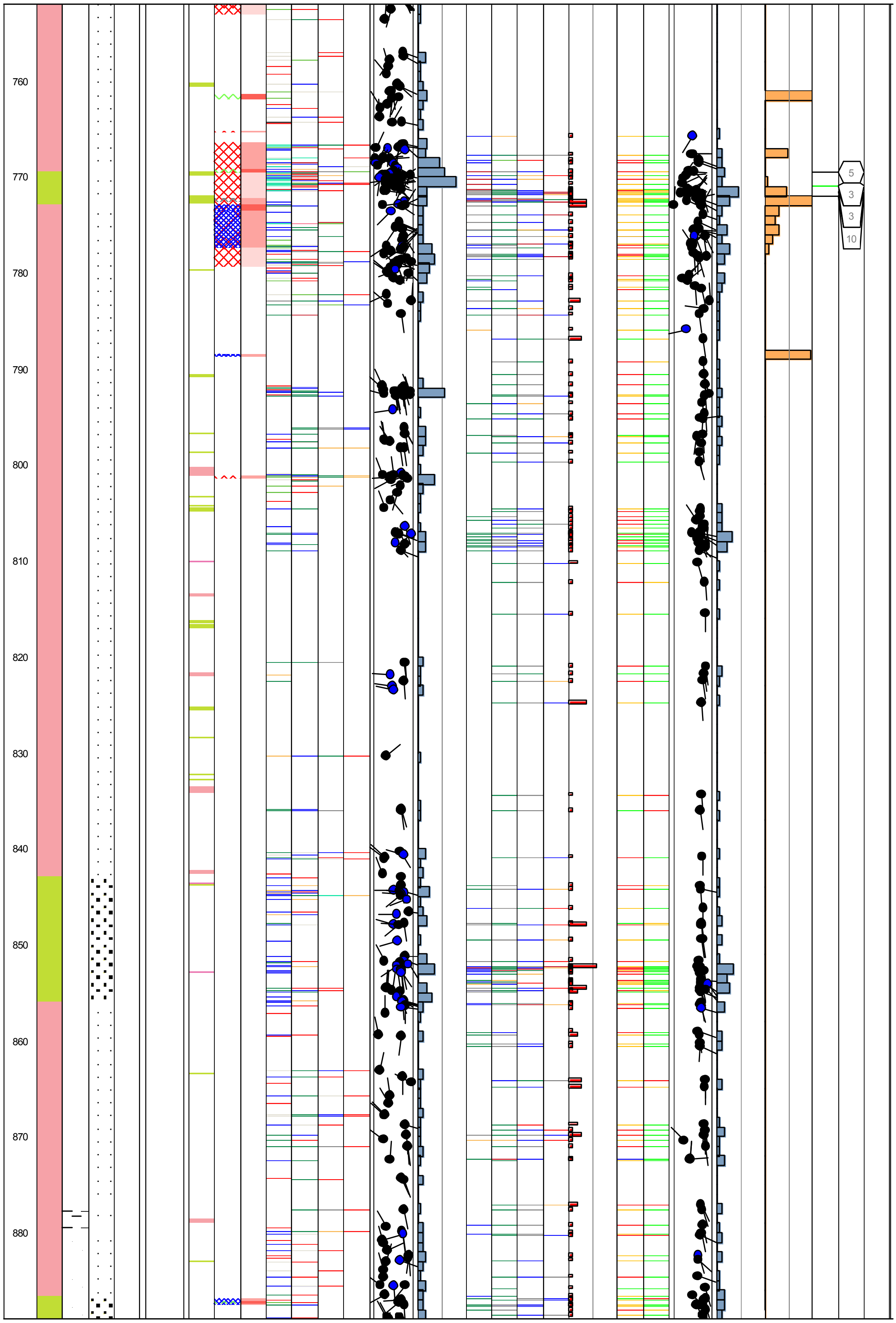
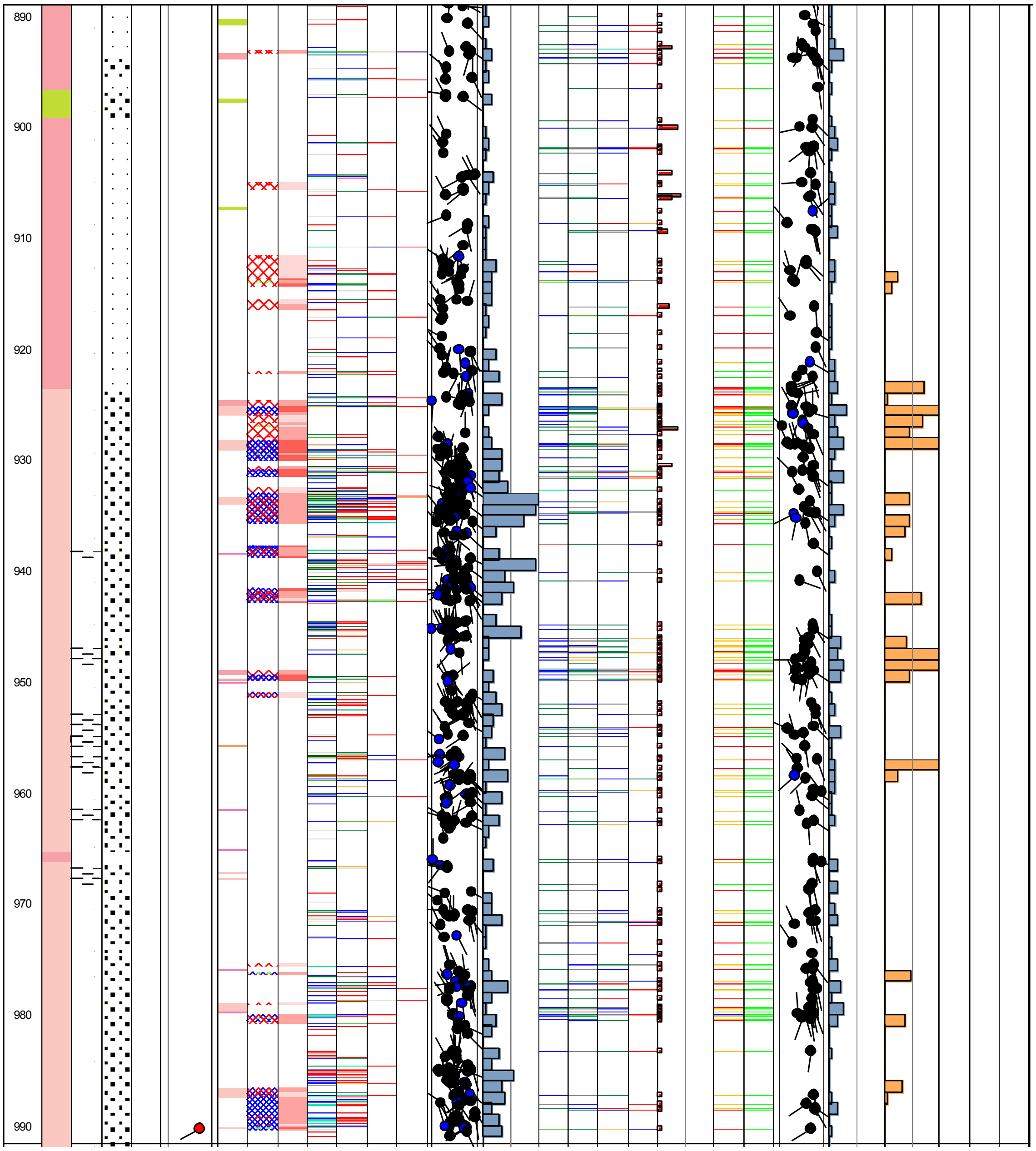
220
230
240
250
260
270
280
290
300
310
320
330
340
7
20
30
5
3
4
20
10
10


350
360
370
380
390
400
410
420
430
440
450
460
470
20


480
490
500
510
520
530
540
550
560
570
580
590
600
610
15
10


620
630
640
650
660
670
680
690
700
710
720
730
740
750
55


760
770
780
790
800
810
820
830
840
850
860
870
880
5
3
3
10


890
900
910
920
930
940
950
960
970
980
990

Appendix 5

Legend to WellCad Diagram KLX08

Title	LEGEND FOR LAXEMAR	KLX08
Site	LAXEMAR	
Borehole	KLX08	
Plot Date	2005-11-22 00:59:30	
Signed data		

ROCKTYPE LAXEMAR

- Dolerite / Diabas
- Fine-grained Götemargranite
- Coarse-grained Götemargranite
- Fine-grained granite
- Pegmatite
- Granite
- Ävrö granite
- Quartz monzodiorite
- Diorite / Gabbro
- Fine-grained dioritoid
- Fine-grained diorite-gabbro
- Sulphide mineralization
- Sandstone
- Soil

ROCK ALTERATION

- Oxidized
- Chloritisized
- Epidotisized
- Weathered
- Tectonized
- Sericitisized
- Quartz dissolution
- Silicification
- Argillization
- Albitization
- Carbonatization
- Saussuritization
- Steatitization
- Uralitization
- Laumontitization
- Fract zone alteration

MINERAL

- Biotite
- Epidote
- Flourite
- Hematite
- Calcite
- Chlorite
- Quartz
- Red Feldspar
- Unknown
- Pyrite
- Clay Minerals
- Laumontite
- Zeolite
- Prehnite
- Oxidized Walls

STRUCTURE

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

TEXTURE

- Hornfelsed
- Porphyritic
- Ophitic
- Equigranular
- Augen-Bearing
- Unequigranular
- Metamorphic

GRAINSIZE

- Aphanitic
- Fine-grained
- Fine to medium grained
- Medium to coarse grained
- Coarse-grained
- Medium-grained

STRUCTURE ORIENTATION

- Cataclastic
- Bedded
- Gneissic
- Schistose
- Brittle-Ductile Shear Zone
- Ductile Shear Zone
- Lineated
- Banded
- Veined
- Brecciated
- Foliated
- Mylonitic

ROCK ALTERATION INTENSITY

- No intensity
- Faint
- Weak
- Medium
- Strong

ROUGHNESS

- Planar
- Undulating
- Stepped
- Irregular

SURFACE

- Rough
- Smooth
- Slickensided

CRUSH ALTERATION

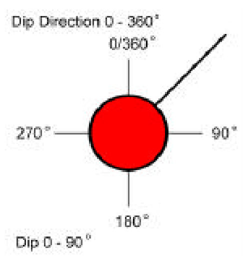
- Slightly Altered
- Moderately Altered
- Highly Altered
- Completley Altered
- Gouge
- Fresh

FRACTURE ALTERATION

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

FRACTURE DIRECTION

STRUKTURE ORIENTATION



Appendix 6

In-data: Borehole length and diameter for KLX08

Hole Diam T - Drilling: Borehole diameter

KLX08, 2005-04-04 13:30:00 - 2005-06-13 14:00:00 (100.330 - 1000.410 m)

Sub Secup (m)	Sub Seclow (m)	Hole Diam (m)	Comment
100.330	101.010	0.086	T-86
101.010	1000.410	0.076	Corac N/3

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Appendix 7

In-data: Reference marks for depth adjustments for KLX08

Reference Mark T - Reference mark in drillhole

KLX08, 2005-06-19 10:00:00 - 2005-06-20 12:10:00 (111.000 - 980.000 m)

Bhlen (m)	Rotation Speed (rpm)	Start Flow (l/min)	Stop Flow (l/min)	Stop Pressure (bar)	Cutter Time (s)	Trace Detectable	Cutter Diameter (mm)	Comment
111.00	400.00	100	1000	36.0	150	Yes		
150.00	400.00	100	1000	42.0	180	Yes		
200.00	400.00	120	1000	38.0	180	Yes		
250.00	400.00	140	1000	40.0	180	Yes		
300.00	400.00	140	1000	40.0	150	Yes		
350.00	400.00	140	1000	38.0	150	Yes		
400.00	400.00	140	1000	38.0	180	Yes		
450.00	400.00	160	1000	41.0	180	Yes		
500.00	400.00	150	1000	39.0	72	Yes		
550.00	400.00	200	1000	41.0	82	Yes		
600.00	400.00	230	1000	39.0	78	Yes		
650.00	400.00	200	1000	38.0	145	Yes		
700.00	400.00	190	1000	39.0	72	Yes		
750.00	400.00	250	1000	42.0	120	Yes		
800.00	400.00	280	1000	42.0	88	Yes		
850.00	400.00	300	1000	42.0	77	Yes		
900.00	400.00	250	1000	42.0	86	Yes		
950.00	400.00	300	1000	43.0	84	Yes		
980.00	400.00	250	1000	41.0	71	Yes		

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Appendix 8

In-data: Borehole deviation data for KLX08
Maxibor T - Borehole deviation: Maxibor

KLX08, 2005-07-07 00:00:00 (0.000 - 996.000 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	6367079.10	1548176.71	-24.31	RT90-RHB70	-60.25	199.17				
3.00	6367077.70	1548176.22	-21.71	RT90-RHB70	-60.25	199.17				
6.00	6367076.29	1548175.73	-19.11	RT90-RHB70	-59.93	199.00				
9.00	6367074.87	1548175.24	-16.51	RT90-RHB70	-59.71	198.89				
12.00	6367073.44	1548174.75	-13.92	RT90-RHB70	-59.69	198.90				
15.00	6367072.01	1548174.26	-11.33	RT90-RHB70	-59.68	198.95				
18.00	6367070.58	1548173.77	-8.74	RT90-RHB70	-59.70	198.98				
21.00	6367069.14	1548173.28	-6.15	RT90-RHB70	-59.80	198.98				
24.00	6367067.72	1548172.79	-3.56	RT90-RHB70	-59.85	199.11				
27.00	6367066.29	1548172.29	-0.96	RT90-RHB70	-59.87	199.27				
30.00	6367064.87	1548171.80	1.63	RT90-RHB70	-59.94	199.34				
33.00	6367063.45	1548171.30	4.23	RT90-RHB70	-60.00	199.32				
36.00	6367062.04	1548170.80	6.83	RT90-RHB70	-60.02	199.27				
39.00	6367060.62	1548170.31	9.43	RT90-RHB70	-60.05	199.21				
42.00	6367059.21	1548169.81	12.03	RT90-RHB70	-60.14	199.22				
45.00	6367057.80	1548169.32	14.63	RT90-RHB70	-60.10	199.28				
48.00	6367056.39	1548168.83	17.23	RT90-RHB70	-59.95	199.34				
51.00	6367054.97	1548168.33	19.82	RT90-RHB70	-59.91	199.31				
54.00	6367053.55	1548167.83	22.42	RT90-RHB70	-59.98	199.30				
57.00	6367052.13	1548167.34	25.02	RT90-RHB70	-59.93	199.24				
60.00	6367050.71	1548166.84	27.61	RT90-RHB70	-59.92	199.17				
63.00	6367049.29	1548166.35	30.21	RT90-RHB70	-60.02	199.15				
66.00	6367047.88	1548165.86	32.81	RT90-RHB70	-60.07	199.21				
69.00	6367046.46	1548165.36	35.41	RT90-RHB70	-60.10	199.28				
72.00	6367045.05	1548164.87	38.01	RT90-RHB70	-60.19	199.24				
75.00	6367043.64	1548164.38	40.61	RT90-RHB70	-60.28	199.18				
78.00	6367042.24	1548163.89	43.22	RT90-RHB70	-60.20	199.07				
81.00	6367040.83	1548163.40	45.82	RT90-RHB70	-59.99	198.92				
84.00	6367039.41	1548162.92	48.42	RT90-RHB70	-59.94	198.83				
87.00	6367037.99	1548162.43	51.01	RT90-RHB70	-59.98	198.84				
90.00	6367036.57	1548161.95	53.61	RT90-RHB70	-60.00	198.91				
93.00	6367035.15	1548161.46	56.21	RT90-RHB70	-60.06	199.04				
96.00	6367033.73	1548160.97	58.81	RT90-RHB70	-60.04	199.04				
99.00	6367032.32	1548160.48	61.41	RT90-RHB70	-60.00	198.82				
102.00	6367030.90	1548160.00	64.01	RT90-RHB70	-60.01	198.84				
105.00	6367029.48	1548159.52	66.61	RT90-RHB70	-60.03	198.95				

108.00	6367028.06	1548159.03	69.20	RT90-RHB70	-60.07	199.13
111.00	6367026.65	1548158.54	71.80	RT90-RHB70	-60.13	199.33
114.00	6367025.24	1548158.04	74.41	RT90-RHB70	-60.20	199.48
117.00	6367023.83	1548157.55	77.01	RT90-RHB70	-60.24	199.63
120.00	6367022.43	1548157.05	79.61	RT90-RHB70	-60.24	199.84
123.00	6367021.03	1548156.54	82.22	RT90-RHB70	-60.22	200.07
126.00	6367019.63	1548156.03	84.82	RT90-RHB70	-60.20	200.29
129.00	6367018.23	1548155.51	87.42	RT90-RHB70	-60.17	200.53
132.00	6367016.83	1548154.99	90.03	RT90-RHB70	-60.16	200.77
135.00	6367015.44	1548154.46	92.63	RT90-RHB70	-60.16	201.02
138.00	6367014.04	1548153.92	95.23	RT90-RHB70	-60.14	201.26
141.00	6367012.65	1548153.38	97.83	RT90-RHB70	-60.10	201.48
144.00	6367011.26	1548152.84	100.43	RT90-RHB70	-60.08	201.51
147.00	6367009.87	1548152.29	103.03	RT90-RHB70	-60.14	201.52
150.00	6367008.48	1548151.74	105.64	RT90-RHB70	-60.15	201.66
153.00	6367007.09	1548151.19	108.24	RT90-RHB70	-60.13	201.81
156.00	6367005.70	1548150.63	110.84	RT90-RHB70	-60.13	201.96
159.00	6367004.32	1548150.07	113.44	RT90-RHB70	-60.16	202.14
162.00	6367002.93	1548149.51	116.04	RT90-RHB70	-60.19	202.32
165.00	6367001.56	1548148.94	118.65	RT90-RHB70	-60.21	202.52
168.00	6367000.18	1548148.37	121.25	RT90-RHB70	-60.23	202.76
171.00	6366998.80	1548147.80	123.85	RT90-RHB70	-60.26	202.98
174.00	6366997.43	1548147.22	126.46	RT90-RHB70	-60.28	203.12
177.00	6366996.07	1548146.63	129.06	RT90-RHB70	-60.31	203.22
180.00	6366994.70	1548146.05	131.67	RT90-RHB70	-60.36	203.32
183.00	6366993.34	1548145.46	134.28	RT90-RHB70	-60.38	203.50
186.00	6366991.98	1548144.87	136.88	RT90-RHB70	-60.39	203.72
189.00	6366990.62	1548144.27	139.49	RT90-RHB70	-60.37	203.96
192.00	6366989.27	1548143.67	142.10	RT90-RHB70	-60.35	204.19
195.00	6366987.91	1548143.06	144.71	RT90-RHB70	-60.34	204.43
198.00	6366986.56	1548142.45	147.32	RT90-RHB70	-60.32	204.64
201.00	6366985.21	1548141.83	149.92	RT90-RHB70	-60.29	204.87
204.00	6366983.86	1548141.20	152.53	RT90-RHB70	-60.27	205.13
207.00	6366982.52	1548140.57	155.13	RT90-RHB70	-60.27	205.38
210.00	6366981.17	1548139.93	157.74	RT90-RHB70	-60.27	205.57
213.00	6366979.83	1548139.29	160.34	RT90-RHB70	-60.27	205.74
216.00	6366978.49	1548138.65	162.95	RT90-RHB70	-60.28	205.93
219.00	6366977.15	1548137.99	165.55	RT90-RHB70	-60.27	206.15
222.00	6366975.82	1548137.34	168.16	RT90-RHB70	-60.24	206.35
225.00	6366974.48	1548136.68	170.76	RT90-RHB70	-60.19	206.57
228.00	6366973.15	1548136.01	173.37	RT90-RHB70	-60.17	206.80
231.00	6366971.82	1548135.34	175.97	RT90-RHB70	-60.16	207.01
234.00	6366970.49	1548134.66	178.57	RT90-RHB70	-60.13	207.18

237.00	6366969.16	1548133.98	181.17	RT90-RHB70	-60.07	207.35
240.00	6366967.83	1548133.29	183.77	RT90-RHB70	-60.03	207.50
243.00	6366966.50	1548132.60	186.37	RT90-RHB70	-60.01	207.70
246.00	6366965.17	1548131.90	188.97	RT90-RHB70	-59.97	207.94
249.00	6366963.84	1548131.20	191.57	RT90-RHB70	-59.90	208.21
252.00	6366962.52	1548130.49	194.16	RT90-RHB70	-59.86	208.50
255.00	6366961.19	1548129.77	196.76	RT90-RHB70	-59.81	208.81
258.00	6366959.87	1548129.04	199.35	RT90-RHB70	-59.79	208.98
261.00	6366958.55	1548128.31	201.94	RT90-RHB70	-59.82	208.96
264.00	6366957.23	1548127.58	204.53	RT90-RHB70	-59.83	208.90
267.00	6366955.91	1548126.85	207.13	RT90-RHB70	-59.84	208.98
270.00	6366954.59	1548126.12	209.72	RT90-RHB70	-59.86	209.15
273.00	6366953.28	1548125.39	212.32	RT90-RHB70	-59.85	209.34
276.00	6366951.96	1548124.65	214.91	RT90-RHB70	-59.83	209.56
279.00	6366950.65	1548123.90	217.50	RT90-RHB70	-59.84	209.77
282.00	6366949.34	1548123.16	220.10	RT90-RHB70	-59.86	209.95
285.00	6366948.04	1548122.40	222.69	RT90-RHB70	-59.85	210.18
288.00	6366946.74	1548121.65	225.29	RT90-RHB70	-59.81	210.45
291.00	6366945.44	1548120.88	227.88	RT90-RHB70	-59.78	210.72
294.00	6366944.14	1548120.11	230.47	RT90-RHB70	-59.75	210.99
297.00	6366942.84	1548119.33	233.06	RT90-RHB70	-59.70	211.28
300.00	6366941.55	1548118.55	235.65	RT90-RHB70	-59.63	211.51
303.00	6366940.26	1548117.75	238.24	RT90-RHB70	-59.55	211.63
306.00	6366938.96	1548116.96	240.83	RT90-RHB70	-59.47	211.66
309.00	6366937.66	1548116.16	243.41	RT90-RHB70	-59.43	211.67
312.00	6366936.37	1548115.36	246.00	RT90-RHB70	-59.43	211.62
315.00	6366935.07	1548114.56	248.58	RT90-RHB70	-59.44	211.57
318.00	6366933.77	1548113.76	251.16	RT90-RHB70	-59.44	211.55
321.00	6366932.47	1548112.96	253.75	RT90-RHB70	-59.44	211.56
324.00	6366931.17	1548112.16	256.33	RT90-RHB70	-59.45	211.57
327.00	6366929.87	1548111.36	258.91	RT90-RHB70	-59.45	211.54
330.00	6366928.57	1548110.57	261.50	RT90-RHB70	-59.44	211.50
333.00	6366927.27	1548109.77	264.08	RT90-RHB70	-59.42	211.49
336.00	6366925.97	1548108.97	266.66	RT90-RHB70	-59.41	211.47
339.00	6366924.66	1548108.17	269.24	RT90-RHB70	-59.41	211.44
342.00	6366923.36	1548107.38	271.83	RT90-RHB70	-59.41	211.41
345.00	6366922.06	1548106.58	274.41	RT90-RHB70	-59.42	211.40
348.00	6366920.76	1548105.79	276.99	RT90-RHB70	-59.44	211.38
351.00	6366919.45	1548104.99	279.58	RT90-RHB70	-59.45	211.35
354.00	6366918.15	1548104.20	282.16	RT90-RHB70	-59.45	211.34
357.00	6366916.85	1548103.41	284.74	RT90-RHB70	-59.44	211.36
360.00	6366915.55	1548102.61	287.33	RT90-RHB70	-59.43	211.36
363.00	6366914.24	1548101.82	289.91	RT90-RHB70	-59.40	211.37

366.00	6366912.94	1548101.02	292.49	RT90-RHB70	-59.38	211.38
369.00	6366911.64	1548100.23	295.07	RT90-RHB70	-59.36	211.41
372.00	6366910.33	1548099.43	297.65	RT90-RHB70	-59.35	211.44
375.00	6366909.03	1548098.63	300.24	RT90-RHB70	-59.35	211.45
378.00	6366907.72	1548097.83	302.82	RT90-RHB70	-59.36	211.42
381.00	6366906.42	1548097.04	305.40	RT90-RHB70	-59.36	211.42
384.00	6366905.11	1548096.24	307.98	RT90-RHB70	-59.36	211.46
387.00	6366903.81	1548095.44	310.56	RT90-RHB70	-59.36	211.44
390.00	6366902.50	1548094.65	313.14	RT90-RHB70	-59.36	211.38
393.00	6366901.20	1548093.85	315.72	RT90-RHB70	-59.37	211.35
396.00	6366899.89	1548093.05	318.30	RT90-RHB70	-59.37	211.35
399.00	6366898.59	1548092.26	320.88	RT90-RHB70	-59.38	211.31
402.00	6366897.28	1548091.46	323.47	RT90-RHB70	-59.37	211.26
405.00	6366895.98	1548090.67	326.05	RT90-RHB70	-59.35	211.28
408.00	6366894.67	1548089.88	328.63	RT90-RHB70	-59.32	211.31
411.00	6366893.36	1548089.08	331.21	RT90-RHB70	-59.32	211.27
414.00	6366892.05	1548088.29	333.79	RT90-RHB70	-59.32	211.24
417.00	6366890.74	1548087.49	336.37	RT90-RHB70	-59.30	211.26
420.00	6366889.43	1548086.70	338.95	RT90-RHB70	-59.26	211.30
423.00	6366888.12	1548085.90	341.53	RT90-RHB70	-59.23	211.30
426.00	6366886.81	1548085.10	344.10	RT90-RHB70	-59.21	211.27
429.00	6366885.50	1548084.31	346.68	RT90-RHB70	-59.19	211.25
432.00	6366884.19	1548083.51	349.26	RT90-RHB70	-59.17	211.29
435.00	6366882.87	1548082.71	351.83	RT90-RHB70	-59.16	211.34
438.00	6366881.56	1548081.91	354.41	RT90-RHB70	-59.16	211.34
441.00	6366880.25	1548081.11	356.99	RT90-RHB70	-59.16	211.32
444.00	6366878.93	1548080.31	359.56	RT90-RHB70	-59.14	211.34
447.00	6366877.62	1548079.51	362.14	RT90-RHB70	-59.10	211.38
450.00	6366876.30	1548078.71	364.71	RT90-RHB70	-59.07	211.38
453.00	6366874.99	1548077.91	367.28	RT90-RHB70	-59.05	211.35
456.00	6366873.67	1548077.10	369.86	RT90-RHB70	-59.04	211.34
459.00	6366872.35	1548076.30	372.43	RT90-RHB70	-59.01	211.38
462.00	6366871.03	1548075.50	375.00	RT90-RHB70	-58.99	211.43
465.00	6366869.71	1548074.69	377.57	RT90-RHB70	-58.96	211.42
468.00	6366868.39	1548073.88	380.14	RT90-RHB70	-58.95	211.39
471.00	6366867.07	1548073.08	382.71	RT90-RHB70	-58.93	211.39
474.00	6366865.75	1548072.27	385.28	RT90-RHB70	-58.92	211.44
477.00	6366864.43	1548071.46	387.85	RT90-RHB70	-58.93	211.43
480.00	6366863.11	1548070.66	390.42	RT90-RHB70	-58.93	211.39
483.00	6366861.78	1548069.85	392.99	RT90-RHB70	-58.93	211.39
486.00	6366860.46	1548069.04	395.56	RT90-RHB70	-58.93	211.43
489.00	6366859.14	1548068.24	398.13	RT90-RHB70	-58.93	211.43
492.00	6366857.82	1548067.43	400.70	RT90-RHB70	-58.93	211.38

495.00	6366856.50	1548066.62	403.27	RT90-RHB70	-58.92	211.38
498.00	6366855.18	1548065.82	405.84	RT90-RHB70	-58.91	211.42
501.00	6366853.86	1548065.01	408.41	RT90-RHB70	-58.90	211.41
504.00	6366852.53	1548064.20	410.98	RT90-RHB70	-58.90	211.37
507.00	6366851.21	1548063.39	413.55	RT90-RHB70	-58.88	211.36
510.00	6366849.89	1548062.59	416.11	RT90-RHB70	-58.87	211.41
513.00	6366848.56	1548061.78	418.68	RT90-RHB70	-58.86	211.42
516.00	6366847.24	1548060.97	421.25	RT90-RHB70	-58.86	211.40
519.00	6366845.91	1548060.16	423.82	RT90-RHB70	-58.85	211.38
522.00	6366844.59	1548059.35	426.39	RT90-RHB70	-58.84	211.41
525.00	6366843.26	1548058.55	428.95	RT90-RHB70	-58.82	211.45
528.00	6366841.94	1548057.74	431.52	RT90-RHB70	-58.82	211.44
531.00	6366840.61	1548056.92	434.09	RT90-RHB70	-58.81	211.40
534.00	6366839.29	1548056.12	436.65	RT90-RHB70	-58.80	211.39
537.00	6366837.96	1548055.31	439.22	RT90-RHB70	-58.81	211.42
540.00	6366836.64	1548054.50	441.78	RT90-RHB70	-58.81	211.40
543.00	6366835.31	1548053.69	444.35	RT90-RHB70	-58.78	211.38
546.00	6366833.98	1548052.88	446.92	RT90-RHB70	-58.75	211.39
549.00	6366832.65	1548052.07	449.48	RT90-RHB70	-58.74	211.43
552.00	6366831.33	1548051.25	452.05	RT90-RHB70	-58.74	211.45
555.00	6366830.00	1548050.44	454.61	RT90-RHB70	-58.73	211.45
558.00	6366828.67	1548049.63	457.17	RT90-RHB70	-58.72	211.45
561.00	6366827.34	1548048.82	459.74	RT90-RHB70	-58.72	211.50
564.00	6366826.01	1548048.00	462.30	RT90-RHB70	-58.72	211.55
567.00	6366824.68	1548047.19	464.87	RT90-RHB70	-58.72	211.56
570.00	6366823.36	1548046.37	467.43	RT90-RHB70	-58.72	211.59
573.00	6366822.03	1548045.56	469.99	RT90-RHB70	-58.71	211.62
576.00	6366820.70	1548044.74	472.56	RT90-RHB70	-58.70	211.65
579.00	6366819.38	1548043.92	475.12	RT90-RHB70	-58.69	211.63
582.00	6366818.05	1548043.11	477.68	RT90-RHB70	-58.68	211.59
585.00	6366816.72	1548042.29	480.25	RT90-RHB70	-58.68	211.60
588.00	6366815.39	1548041.47	482.81	RT90-RHB70	-58.69	211.67
591.00	6366814.07	1548040.65	485.37	RT90-RHB70	-58.70	211.71
594.00	6366812.74	1548039.83	487.94	RT90-RHB70	-58.70	211.68
597.00	6366811.41	1548039.01	490.50	RT90-RHB70	-58.68	211.65
600.00	6366810.09	1548038.20	493.06	RT90-RHB70	-58.66	211.65
603.00	6366808.76	1548037.38	495.62	RT90-RHB70	-58.64	211.64
606.00	6366807.43	1548036.56	498.19	RT90-RHB70	-58.64	211.60
609.00	6366806.10	1548035.74	500.75	RT90-RHB70	-58.64	211.57
612.00	6366804.77	1548034.92	503.31	RT90-RHB70	-58.63	211.61
615.00	6366803.44	1548034.10	505.87	RT90-RHB70	-58.62	211.65
618.00	6366802.11	1548033.28	508.43	RT90-RHB70	-58.61	211.66
621.00	6366800.78	1548032.46	510.99	RT90-RHB70	-58.61	211.63

624.00	6366799.45	1548031.64	513.55	RT90-RHB70	-58.59	211.60
627.00	6366798.12	1548030.83	516.11	RT90-RHB70	-58.58	211.60
630.00	6366796.78	1548030.01	518.67	RT90-RHB70	-58.56	211.62
633.00	6366795.45	1548029.19	521.23	RT90-RHB70	-58.54	211.59
636.00	6366794.12	1548028.37	523.79	RT90-RHB70	-58.52	211.54
639.00	6366792.78	1548027.55	526.35	RT90-RHB70	-58.49	211.49
642.00	6366791.45	1548026.73	528.91	RT90-RHB70	-58.49	211.47
645.00	6366790.11	1548025.91	531.47	RT90-RHB70	-58.50	211.53
648.00	6366788.77	1548025.09	534.02	RT90-RHB70	-58.53	211.58
651.00	6366787.44	1548024.27	536.58	RT90-RHB70	-58.55	211.58
654.00	6366786.10	1548023.45	539.14	RT90-RHB70	-58.54	211.60
657.00	6366784.77	1548022.63	541.70	RT90-RHB70	-58.54	211.65
660.00	6366783.44	1548021.81	544.26	RT90-RHB70	-58.54	211.69
663.00	6366782.11	1548020.98	546.82	RT90-RHB70	-58.56	211.69
666.00	6366780.77	1548020.16	549.38	RT90-RHB70	-58.55	211.68
669.00	6366779.44	1548019.34	551.94	RT90-RHB70	-58.52	211.66
672.00	6366778.11	1548018.52	554.50	RT90-RHB70	-58.50	211.63
675.00	6366776.77	1548017.70	557.05	RT90-RHB70	-58.51	211.62
678.00	6366775.44	1548016.87	559.61	RT90-RHB70	-58.51	211.58
681.00	6366774.10	1548016.05	562.17	RT90-RHB70	-58.49	211.56
684.00	6366772.77	1548015.23	564.73	RT90-RHB70	-58.46	211.53
687.00	6366771.43	1548014.41	567.29	RT90-RHB70	-58.42	211.53
690.00	6366770.09	1548013.59	569.84	RT90-RHB70	-58.40	211.53
693.00	6366768.75	1548012.77	572.40	RT90-RHB70	-58.40	211.54
696.00	6366767.41	1548011.95	574.95	RT90-RHB70	-58.39	211.56
699.00	6366766.07	1548011.12	577.51	RT90-RHB70	-58.36	211.58
702.00	6366764.73	1548010.30	580.06	RT90-RHB70	-58.36	211.60
705.00	6366763.39	1548009.47	582.61	RT90-RHB70	-58.39	211.67
708.00	6366762.05	1548008.65	585.17	RT90-RHB70	-58.41	211.73
711.00	6366760.72	1548007.82	587.73	RT90-RHB70	-58.39	211.74
714.00	6366759.38	1548007.00	590.28	RT90-RHB70	-58.36	211.75
717.00	6366758.04	1548006.17	592.83	RT90-RHB70	-58.34	211.78
720.00	6366756.70	1548005.34	595.39	RT90-RHB70	-58.33	211.81
723.00	6366755.36	1548004.51	597.94	RT90-RHB70	-58.31	211.85
726.00	6366754.02	1548003.68	600.49	RT90-RHB70	-58.30	211.86
729.00	6366752.69	1548002.84	603.05	RT90-RHB70	-58.28	211.86
732.00	6366751.35	1548002.01	605.60	RT90-RHB70	-58.27	211.87
735.00	6366750.01	1548001.18	608.15	RT90-RHB70	-58.25	211.87
738.00	6366748.67	1548000.35	610.70	RT90-RHB70	-58.24	211.85
741.00	6366747.32	1547999.51	613.25	RT90-RHB70	-58.24	211.84
744.00	6366745.98	1547998.68	615.80	RT90-RHB70	-58.25	211.84
747.00	6366744.64	1547997.85	618.35	RT90-RHB70	-58.25	211.85
750.00	6366743.30	1547997.01	620.90	RT90-RHB70	-58.23	211.87

753.00	6366741.96	1547996.18	623.45	RT90-RHB70	-58.21	211.90
756.00	6366740.62	1547995.34	626.00	RT90-RHB70	-58.19	211.92
759.00	6366739.28	1547994.51	628.55	RT90-RHB70	-58.17	211.95
762.00	6366737.93	1547993.67	631.10	RT90-RHB70	-58.14	211.96
765.00	6366736.59	1547992.83	633.65	RT90-RHB70	-58.12	211.97
768.00	6366735.25	1547991.99	636.20	RT90-RHB70	-58.12	211.95
771.00	6366733.90	1547991.16	638.75	RT90-RHB70	-58.12	211.93
774.00	6366732.56	1547990.32	641.29	RT90-RHB70	-58.11	211.93
777.00	6366731.21	1547989.48	643.84	RT90-RHB70	-58.10	211.94
780.00	6366729.87	1547988.64	646.39	RT90-RHB70	-58.08	211.96
783.00	6366728.52	1547987.80	648.93	RT90-RHB70	-58.05	211.96
786.00	6366727.17	1547986.96	651.48	RT90-RHB70	-58.03	211.96
789.00	6366725.83	1547986.12	654.02	RT90-RHB70	-58.02	211.98
792.00	6366724.48	1547985.28	656.57	RT90-RHB70	-58.01	212.00
795.00	6366723.13	1547984.44	659.11	RT90-RHB70	-58.00	212.03
798.00	6366721.78	1547983.59	661.66	RT90-RHB70	-57.98	212.05
801.00	6366720.43	1547982.75	664.20	RT90-RHB70	-57.96	212.06
804.00	6366719.09	1547981.90	666.74	RT90-RHB70	-57.93	212.08
807.00	6366717.74	1547981.06	669.29	RT90-RHB70	-57.90	212.10
810.00	6366716.39	1547980.21	671.83	RT90-RHB70	-57.87	212.10
813.00	6366715.03	1547979.36	674.37	RT90-RHB70	-57.85	212.13
816.00	6366713.68	1547978.51	676.91	RT90-RHB70	-57.83	212.14
819.00	6366712.33	1547977.66	679.45	RT90-RHB70	-57.80	212.15
822.00	6366710.98	1547976.81	681.99	RT90-RHB70	-57.78	212.15
825.00	6366709.62	1547975.96	684.52	RT90-RHB70	-57.75	212.16
828.00	6366708.27	1547975.11	687.06	RT90-RHB70	-57.71	212.16
831.00	6366706.91	1547974.26	689.60	RT90-RHB70	-57.68	212.17
834.00	6366705.55	1547973.40	692.13	RT90-RHB70	-57.64	212.19
837.00	6366704.19	1547972.55	694.67	RT90-RHB70	-57.60	212.21
840.00	6366702.83	1547971.69	697.20	RT90-RHB70	-57.57	212.21
843.00	6366701.47	1547970.83	699.73	RT90-RHB70	-57.55	212.23
846.00	6366700.11	1547969.97	702.26	RT90-RHB70	-57.53	212.24
849.00	6366698.75	1547969.12	704.79	RT90-RHB70	-57.53	212.27
852.00	6366697.39	1547968.26	707.33	RT90-RHB70	-57.52	212.29
855.00	6366696.02	1547967.39	709.86	RT90-RHB70	-57.51	212.31
858.00	6366694.66	1547966.53	712.39	RT90-RHB70	-57.48	212.31
861.00	6366693.30	1547965.67	714.92	RT90-RHB70	-57.44	212.32
864.00	6366691.93	1547964.81	717.45	RT90-RHB70	-57.40	212.34
867.00	6366690.57	1547963.94	719.97	RT90-RHB70	-57.38	212.37
870.00	6366689.20	1547963.08	722.50	RT90-RHB70	-57.32	212.34
873.00	6366687.83	1547962.21	725.02	RT90-RHB70	-57.23	212.27
876.00	6366686.46	1547961.34	727.55	RT90-RHB70	-57.18	212.25
879.00	6366685.09	1547960.48	730.07	RT90-RHB70	-57.14	212.22

882.00	6366683.71	1547959.61	732.59	RT90-RHB70	-57.12	212.22
885.00	6366682.33	1547958.74	735.11	RT90-RHB70	-57.09	212.18
888.00	6366680.95	1547957.87	737.63	RT90-RHB70	-57.04	212.18
891.00	6366679.57	1547957.00	740.14	RT90-RHB70	-57.01	212.18
894.00	6366678.19	1547956.13	742.66	RT90-RHB70	-56.98	212.18
897.00	6366676.81	1547955.26	745.18	RT90-RHB70	-56.94	212.20
900.00	6366675.42	1547954.39	747.69	RT90-RHB70	-56.91	212.24
903.00	6366674.03	1547953.52	750.20	RT90-RHB70	-56.88	212.26
906.00	6366672.65	1547952.64	752.72	RT90-RHB70	-56.85	212.28
909.00	6366671.26	1547951.77	755.23	RT90-RHB70	-56.83	212.30
912.00	6366669.87	1547950.89	757.74	RT90-RHB70	-56.81	212.34
915.00	6366668.49	1547950.01	760.25	RT90-RHB70	-56.79	212.37
918.00	6366667.10	1547949.13	762.76	RT90-RHB70	-56.77	212.40
921.00	6366665.71	1547948.25	765.27	RT90-RHB70	-56.76	212.42
924.00	6366664.32	1547947.37	767.78	RT90-RHB70	-56.75	212.45
927.00	6366662.94	1547946.49	770.29	RT90-RHB70	-56.73	212.47
930.00	6366661.55	1547945.60	772.80	RT90-RHB70	-56.70	212.50
933.00	6366660.16	1547944.72	775.30	RT90-RHB70	-56.68	212.54
936.00	6366658.77	1547943.83	777.81	RT90-RHB70	-56.67	212.59
939.00	6366657.38	1547942.94	780.32	RT90-RHB70	-56.66	212.63
942.00	6366655.99	1547942.05	782.82	RT90-RHB70	-56.63	212.64
945.00	6366654.60	1547941.16	785.33	RT90-RHB70	-56.61	212.64
948.00	6366653.21	1547940.27	787.83	RT90-RHB70	-56.59	212.65
951.00	6366651.82	1547939.38	790.34	RT90-RHB70	-56.56	212.66
954.00	6366650.43	1547938.49	792.84	RT90-RHB70	-56.54	212.67
957.00	6366649.04	1547937.60	795.34	RT90-RHB70	-56.51	212.69
960.00	6366647.64	1547936.70	797.85	RT90-RHB70	-56.48	212.72
963.00	6366646.25	1547935.81	800.35	RT90-RHB70	-56.45	212.73
966.00	6366644.85	1547934.91	802.85	RT90-RHB70	-56.41	212.73
969.00	6366643.46	1547934.01	805.35	RT90-RHB70	-56.39	212.73
972.00	6366642.06	1547933.12	807.84	RT90-RHB70	-56.36	212.76
975.00	6366640.66	1547932.22	810.34	RT90-RHB70	-56.34	212.78
978.00	6366639.27	1547931.32	812.84	RT90-RHB70	-56.32	212.80
981.00	6366637.87	1547930.42	815.34	RT90-RHB70	-56.29	212.84
984.00	6366636.47	1547929.51	817.83	RT90-RHB70	-56.27	212.89
987.00	6366635.07	1547928.61	820.33	RT90-RHB70	-56.25	212.92
990.00	6366633.67	1547927.70	822.82	RT90-RHB70	-56.23	212.96
996.00	6366630.87	1547925.88	827.81	RT90-RHB70	-56.19	213.02

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