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Oskarshamn site investigation

Boremap mapping of core drilled borehole KLX16A

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Keywords: KLX16A, Geology, Drill core mapping, Boremap, Fractures, BIPS, Laxemar.

Abstract

This report presents the Boremap mapping of KLX16A, which is a c 434 m long core drilled borehole. The borehole was drilled with the orientation 294/–65°. The mapping was conducted between 2007-03-01 and 2007-03-22.

The documentation of geological structures and lithologies intersecting borehole KLX16A was made using the drill core and BIPS-images. Geological structures are correctly oriented in space along the borehole with the Boremap system.

The lithology in KLX16A is dominated by quartz monzodiorite (501036). Subordinate rock types comprise fine-grained dioritoid (501030), fine-grained diorite-gabbro (505102), fine-grained granite (511058), pegmatite (501061) and granite (501058).

Eight sections have been highlighted based on increased fracture frequencies, alterations and structural features. These sections cover the following intervals: 31–34 m, 91–94 m, 140–143 m, 209–213 m, 228–231 m, 250–254 m, 258–265 m and 328–433 m.

Sammanfattning

Denna rapport presenterar boremapkarteringen av KLX16A som är ett ca 434 meter långt kärnborrhål. Borrhålet borrades med orienteringen 294/–65° och karterades mellan 2007-03-01 och 2007-03-22.

Dokumentationen av geologiska strukturer och litologi som genomskär borrhål KLX16A har utförts med borrkärna och BIPS-bilder. Geologiska strukturer har orienterats i rummet längs med borrhålet med Boremap systemet.

KLX16A domineras av kvartsmonzodiorit (501036). Underordnade bergarter utgörs av finkornig dioritoid (501030), finkornig diorit-gabbro (505102), finkornig granit (511058), pegmatit (501061) och granit (501058).

Åtta sektioner i KLX16A kan urskiljas baserat på förhöjd sprickfrekvens, bergets omvandlingar och geologiska strukturer. Dessa sektioner återfinns i följande intervall: 31–34 m, 91–94 m, 140–143 m, 209–213 m, 228–231 m, 250–254 m, 258–265 m och 328–433 m.

Contents

1 Introduction

This report gives a brief presentation of the data gained from the mapping of KLX16A 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 400-07-023. In Table 1-1 controlling documents for performing this activity are listed. Both Activity plan and Method descriptions are SKB's internal controlling documents. Rock type nomenclature that has been used is shown in Table 1-2.

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 are examined together with BIPS, followed by core drilling.

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

Activity plan	**Number**	**Version**
Boremapkartering av KLX16A	AP PS 400-07-023	1.0
Method descriptions	**Number**	**Version**
Nomenklatur vid Boremapkartering	SKB MD 143.008	1.0
Method Description for Boremap mapping	SKB MD 143.006	2.0
Mätsystembeskrivning för Boremap	SKB MD 146.005	1.0
Instruktion: Regler för bergarters benämningar vid platsundersökning i Oskarshamn	SKB MD 132.004	1.0
Instruktion för längdkalibrering vid undersökningar i kärnborrhål	SKB MD 620.010	2.0

Table 1-2. Rock type nomenclature for the site investigation at Oskarshamn.

Rock type	Rock code	Rock description
Dolerite	501027	Dolerite
Fine-grained Götemar granite	531058	Granite, fine- to medium-grained, ("Götemar granite")
Coarse-grained Götemar granite	521058	Granite, coarse-grained, ("Götemar granite")
Fine-grained granite	511058	Granite, fine- to medium-grained
Pegmatite	501061	Pegmatite
Granite	501058	Granite, medium- to coarse-grained
Ävrö granite	501044	Granite to quartz monzodiorite, generally porphyritic
Quartz monzodiorite	501036	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic
Diorite/gabbro	501033	Diorite to gabbro
Fine-grained dioritoid	501030	Intermediate magmatic rock
Fine-grained diorite-gabbro	505102	Mafic rock, fine-grained
Sulphide mineralization	509010	Sulphide mineralization
Sandstone	506007	Sandstone

Borehole KLX16A is situated within the Laxemar area (Figure 1-1). KLX16A is a c 434 m long telescopic borehole with the orientation 294/–65°. Mapping of the borehole was performed between 2007-03-01 and 2007-03-22.

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.

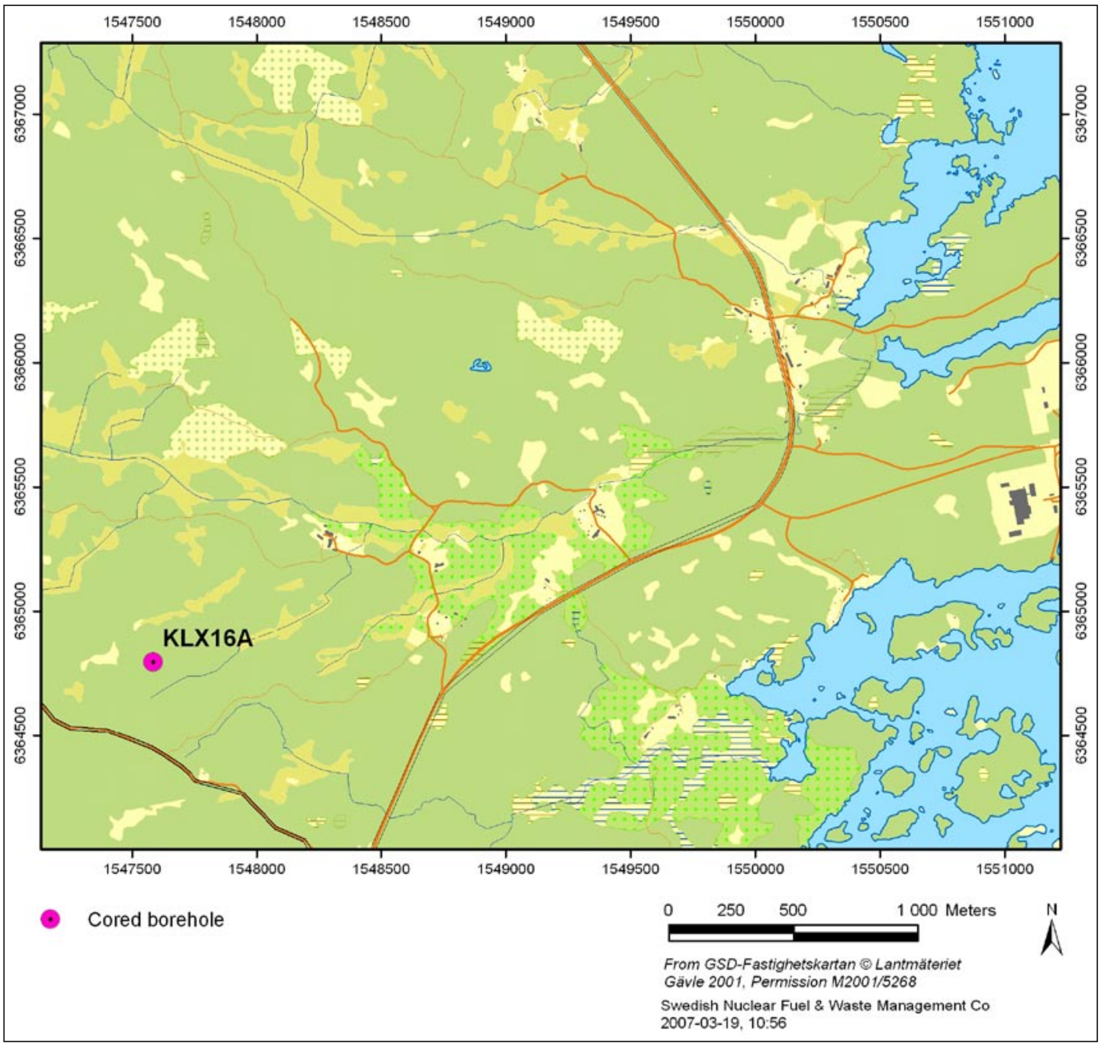


***Figure 1-1.** Location of the core drilled borehole KLX16A.*

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 KLX16A. Geological structures will be correctly orientated in space along the borehole with the Boremap system. The result 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 KLX16A was Boremap v. 3.9 with bedrock and mineral standards of SKB. The data presentation was made using WellCad v. 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, pen, diluted hydrochloric acid, knife, water-filled atomiser and hand lens.

3.3 BIPS-image video film sequences

The BIPS-image of KLX16A covers the interval 11.25 m–428.94 m.

3.4 BIPS-image video film quality

The visibility of thin fractures in BIPS depends on image resolution, image contrast and image quality.

3.4.1 BIPS-image resolution

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.

3.4.2 BIPS-image contrast

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 light 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.

3.4.3 BIPS-image quality

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) light 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. Good quality means a more or less clear image which is easy to interpret. If the quality is acceptable it 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 from very obvious and outstanding features. 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 KLX16A is presented in Table 3-1.

Table 3-1. BIPS-image quality in KLX16A.

From (m)	To (m)	Quality
11.25	388.54	Good
388.54	427.38	Acceptable

4 Execution

4.1 General

Mapping of the drill core of the telescopic drilled borehole was performed and documented according to Activity plan AP PS 400-07-023 (SKB, internal document) referring to the *Method Description for Boremap mapping* (SKB MD 143.006, v. 2.0), *Nomenklatur vid Boremapkartering* (SKB MD 143.008, v. 1.0), *Instruktion: Regler för bergarters benämningar vid platsundersökningen i Oskarshamn* (SKB MD 132.004, v. 1.0) and *Instruktion för längd-kalibrering vid undersökningar i kärnborrhål* (SKB MD 620.010, v. 2.0), all of them SKB internal documents.

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 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*.

The mapping was performed by Karl-Johan Mattsson, Peter Dahlin and Emil Lundberg (Geosigma 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, with approximately 0.4 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 meter (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 in data for length adjustment and orientation in space are borehole diameter, reference marks, length and deviation; all data is collected from SICADA database (Appendices 6–8).

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, v. 1.0), SKB internal document.

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 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 Appendix 1.

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. oxidation 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 or higher.

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 orientations 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 metre 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:

X5 Bleached fracture walls.

X7 Fractures with a fresh appearance and no detectable mineral.

X8 Fractures with epidotized/saussuritized walls.

X9 Fracture surface has a weathered appearance.

4.4 Data handling

Mapping of the drill core is performed on-line on the SKB network, in order to obtain the best possible data security. Before every break (> 15 minutes) a back-up is saved on the local disk. Regular quality controls are performed. Every working day a summary report (from Boremap) and a WellCad plot are 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 and only these data are later used for 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.

All information is taken directly from the Boremap database using simple and well defined search paths for each geological parameter (Appendix 2).

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 oxidized 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/Type*, interval column. No frequency column is presented for alteration/ type. The alteration/ type column are 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.

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/Foliated < 1 m wide* is a frequency column. Sections with foliation < 1 m wide are mapped as rock occurrence/structure in Boremap.

Column 13: *Structure/Foliated ≥ 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 as well as broken 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 ≥ 1 m 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 and > 0.5*, frequency column. This column includes fractures that certainly 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

The section at 0.93–11.25 m was mapped only with drill core, the section at 11.25–428.94 m with drill core and BIPS and the section at 428.94–433.55 m only with core.

Core loss occurs at 87.81–87.93 m and at 340.96–341.03 m.

The adjusted depth between the reference marks 350–400 m are corrupt, due to a “stop-slip” structure in the BIPS-image, which was caused by rapid movement of the BIPS-probe.

5 Results

5.1 General

Borehole KLX16A is oriented 294/–65°. The drill core covers the interval 0.93–433.55 m and the BIPS-image covers the interval 11.25–428.94 m.

All results from the mapping are principally found in the appendices. Information from the SICADA database is shown in the geological summary table in Appendix 1 and a search path to geological summary table is presented in Appendix 2. The BIPS-image is presented in Appendix 3, the WellCad diagram in Appendix 4 and In-data, such as borehole length, reference marks, deviation data and diameter are presented in Appendices 6–8.

Original data from the reported activity are stored in the primary database SICADA. Data are traceable in SICADA by the Activity Plan number (AP PS 400-07-023). Only data in databases are accepted for further interpretation and modelling. The data presented in this report are regarded as copies of the original data. Data in the databases may be revised, if needed. Such revisions will not necessarily result in a revision of the P-report, although the normal procedure is that major revisions entail a revision of the P-report. Minor revisions are normally presented as supplements, available at www.skb.se.

5.2 Lithology and structures

The lithology in KLX16A (Table 5-1) is dominated by quartz monzodiorite (501036). Subordinate rock types comprise fine-grained dioritoid (501030), fine-grained diorite-gabbro (505102), fine-grained granite (511058), pegmatite (501061) and granite (501058).

Eight sections in KLX16A are recognized by increased fracture frequencies, alterations and structural features.

Table 5-1. Lithology distribution in KLX16A.

Rock types	%
Quartz monzodiorite (501036)	90.3
Fine-grained dioritoid (501030)	3.2
Fine-grained diorite-gabbro (505102)	2.7
Fine-grained granite (511058)	1.8
Pegmatite (501061)	1.6
Granite (501058)	0.4

Section interval characteristics

1. 31–34 m. Increased frequency of sealed fractures, slight increase of open fractures and open fractures with aperture > 0.5 mm and sealed fracture networks. One crush zone occurs within the section. The section is partly red stained and saussuritizated.
2. 91–94 m. Increased frequency of open fractures and open fractures with aperture > 0.5 mm, sealed fractures and sealed fracture networks. The section is weak to medium red stained. The section is also related to a fine-grained diorite-gabbro (505102).
3. 140–143 m. Increased frequency of sealed fractures and sealed fracture networks. Slight increase of open fractures with aperture > 0.5 mm. Brittle-ductile shear zones, cataclasites and breccias. The section is partly red stained and epidotized.
4. 209–213 m. Increased frequency of sealed fractures, sealed fracture networks, slight increase of open fractures, ductile and brittle-ductile shear zones and one crush zone. The section is faint to weak saussuritizated and partly red stained.
5. 228–231 m. Increased frequency of sealed fractures and sealed fracture networks, slight increase in open fractures, ductile and ductile shear zones. One crush zone occurs. The section is faint to weak red stained.
6. 250–254 m. Increased frequency of sealed fractures and sealed fracture networks and ductile shear zones. The section is partly red stained.
7. 258–265 m. Increased frequency of open and sealed fractures, open fractures with aperture > 0.5 mm and sealed fracture networks. One crush zone occurs in the section. The section is also weakly saussuritizated and partly red stained.
8. 328–433 m. A moderate increase of open fractures. Increase of sealed fractures and sealed fracture networks, cataclasites, brittle-ductile shear zones, ductile shear zones and breccias. One core loss occurs within this section. The section is partly faint to strong red stained and partly faint to weak saussuritizated.

5.3 Fracture mineralogy

Tables 5-3 and 5-4 show the frequency of minerals and rock wall alteration in sealed fractures and open fractures respectively. Minerals less than 0.1% are not accounted for. For X-mineral classification, see Section 4.3.5.

Calcite and chlorite are the most frequently occurring minerals in open fractures. Subordinate minerals are hematite, clay minerals, epidote, pyrite and oxidized walls. In sealed fractures the dominating mineral is calcite. Subordinate minerals and rock wall alteration are oxidized walls, chlorite, epidote, hematite, X8 and prehnite.

Worth to notice is that the occurrences of hematite filled fractures are closely related to granites.

Table 5-3. Frequency of minerals and rock wall alteration in open fractures.

Mineral	%
Adularia	1.1
Calcite	85.4
Chlorite	72.0
Clay Minerals	22.7
Epidote	11.3
Flourite	0.1
Hematite	32.7
Iron Hydroxide	1.0
Laumontite	0.1
Oxidized Walls	8.1
Prehnite	2.3
Pyrite	9.3
Quartz	0.5
Red feldspar	0.1
Sulphides	0.1
X5	0.3
X7	2.3
X8	1.8
X9	0.3
Zeolite	0.1

Table 5-4. Frequency of minerals and rock wall alteration in sealed fractures.

Mineral	%
Adularia	1.4
Calcite	64.1
Chlorite	19.6
Clay Minerals	0.4
Epidote	19.0
Hematite	13.5
Iron Hydroxide	0.2
Laumontite	0.2
Oxidized Walls	30.0
Prehnite	8.5
Pyrite	1.0
Quartz	6.5
Red Feldspar	0.8
White Feldspar	3.4
X5	4.0
X7	0.3
X8	10.5

Appendix 1

Geological summary table for KLX16A

GEOLOGICAL SUMMARY KLX16A — **APPENDIX: 1**

Site	LAXEMAR
Borehole	KLX16A
Coordinate System	RT90-RHB70
Date of mapping	2007-03-01 09:13:00

Signed data

ROCKTYPE SIMPEVARP
- Fine-grained granite
- Pegmatite
- Granite
- Quartz monzodiorite
- Fine-grained dioritoid
- Fine-grained diorite-gabbro

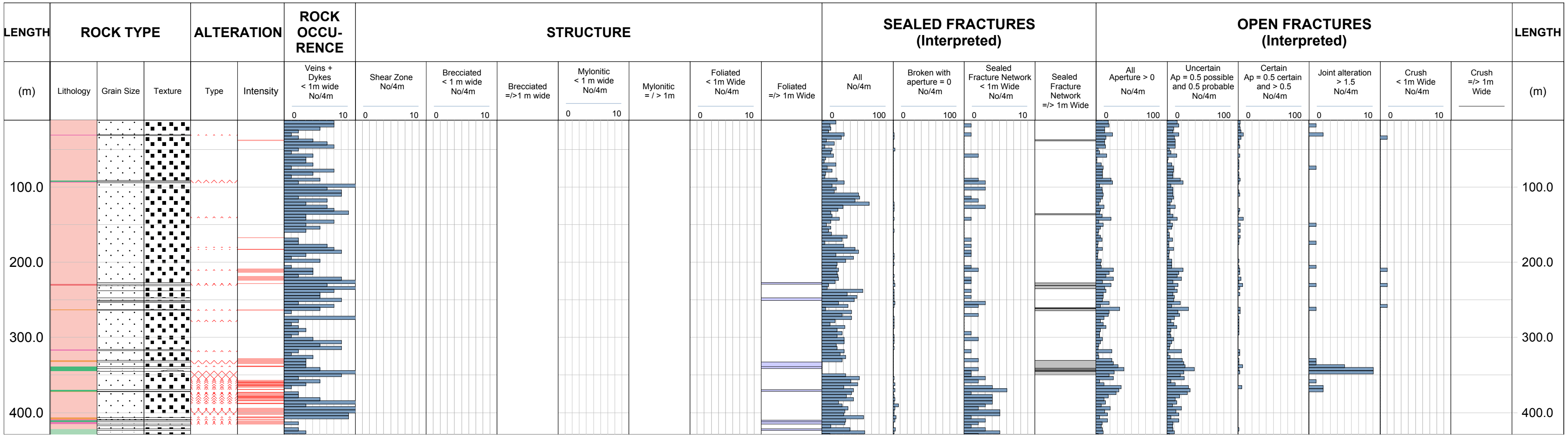
GRAINSIZE
- Fine-grained
- Fine to medium grained
- Medium to coarse grained
- Medium-grained

TEXTURE
- Porphyritic
- Equigranular
- Unequigranular
- Metamorphic

ALTERATION TYPE
- Red Staining

ALTRATION INTENSITY
- Weak
- Medium

STRUCTURE INTENSITY
- Weak



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	Type	7	Sub 1 = 700		Interval
	Intensity	7	Sub 1 = 700	Sub 2	Interval
Rock occurrence	Vein + dyke	31	Sub 1 = 2 and 18		Frequence
Structure	Shear zone, < 1m wide	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
	Foliated, < 1 m wide	31	Sub 4 = 81		Frequence
	Foliated, >/= 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 and >0.5	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 for KLX16A

Borehole Image Report

Borehole Name:	KLX16A
Mapping Name:	KLX16A_Geosigma_3
Mapping Range:	11.250 - 427.378 m
Diameter:	76.0 mm
Printed Range:	11.000 - 427.512
Pages:	22

Image File Information:

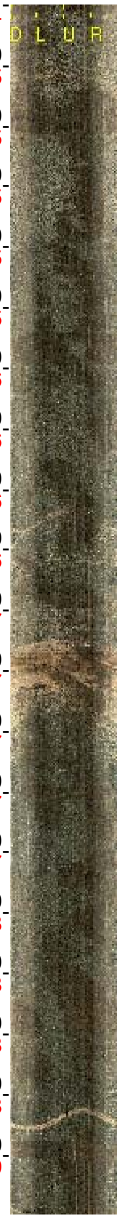
File:	G:\skb\bips\oskarshamn\KLX16A\KLX16A.BIP
Date/Time:	2007-01-30 17:14:00
Start Depth:	11.000 m
End Depth:	427.512 m
Resolution:	1.00 mm/pixel (depth)
Orientation:	Gravmetric
Image height:	416512 pixels
Image width:	360 pixels
BIP Version:	BIP-III
Locality:	LAXEMAR
Borehole:	KLX16A
Scan Direction:	Down
Color adjust:	0 0 0 (RGB)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

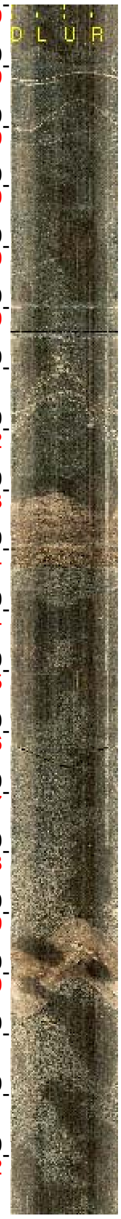
Depth range: 11.000 - 31.000 m
Azimuth: 294.9
Inclination: -65.0

11.000	
11.200	
11.400	11.400
11.600	11.600
11.800	11.801
12.000	12.001
12.200	12.201
12.400	12.401
12.600	12.602
12.800	12.802
13.000	13.002
13.200	13.202
13.400	13.402
13.600	13.603
13.800	13.803
14.000	14.003
14.200	14.203
14.400	14.404
14.600	14.604
14.800	14.804

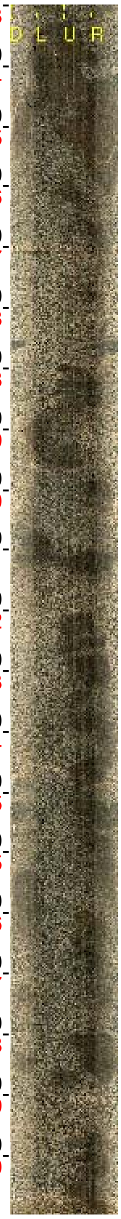
15.000	15.004
15.200	15.205
15.400	15.405
15.600	15.605
15.800	15.805
16.000	16.005
16.200	16.206
16.400	16.406
16.600	16.606
16.800	16.806
17.000	17.007
17.200	17.207
17.400	17.407
17.600	17.607
17.800	17.807
18.000	18.008
18.200	18.208
18.400	18.408
18.600	18.608
18.800	18.809



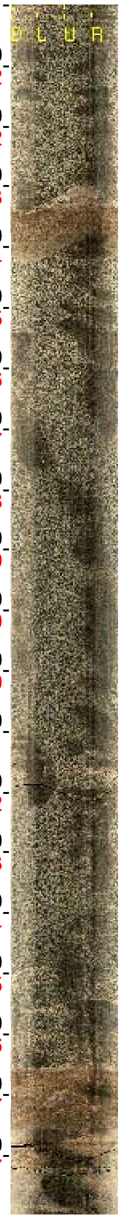
19.000	19.009
19.200	19.209
19.400	19.409
19.600	19.610
19.800	19.810
20.000	20.010
20.200	20.211
20.400	20.412
20.600	20.613
20.800	20.814
21.000	21.014
21.200	21.215
21.400	21.416
21.600	21.617
21.800	21.818
22.000	22.019
22.200	22.220
22.400	22.421
22.600	22.621
22.800	22.822



23.000	23.023
23.200	23.224
23.400	23.425
23.600	23.626
23.800	23.827
24.000	24.028
24.200	24.228
24.400	24.429
24.600	24.630
24.800	24.831
25.000	25.032
25.200	25.233
25.400	25.434
25.600	25.635
25.800	25.835
26.000	26.036
26.200	26.237
26.400	26.438
26.600	26.639
26.800	26.840



27.000	27.041
27.200	27.242
27.400	27.442
27.600	27.643
27.800	27.844
28.000	28.045
28.200	28.246
28.400	28.447
28.600	28.648
28.800	28.849
29.000	29.050
29.200	29.250
29.400	29.451
29.600	29.652
29.800	29.853
30.000	30.054
30.200	30.255
30.400	30.456
30.600	30.657
30.800	30.857



Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 2 (22)

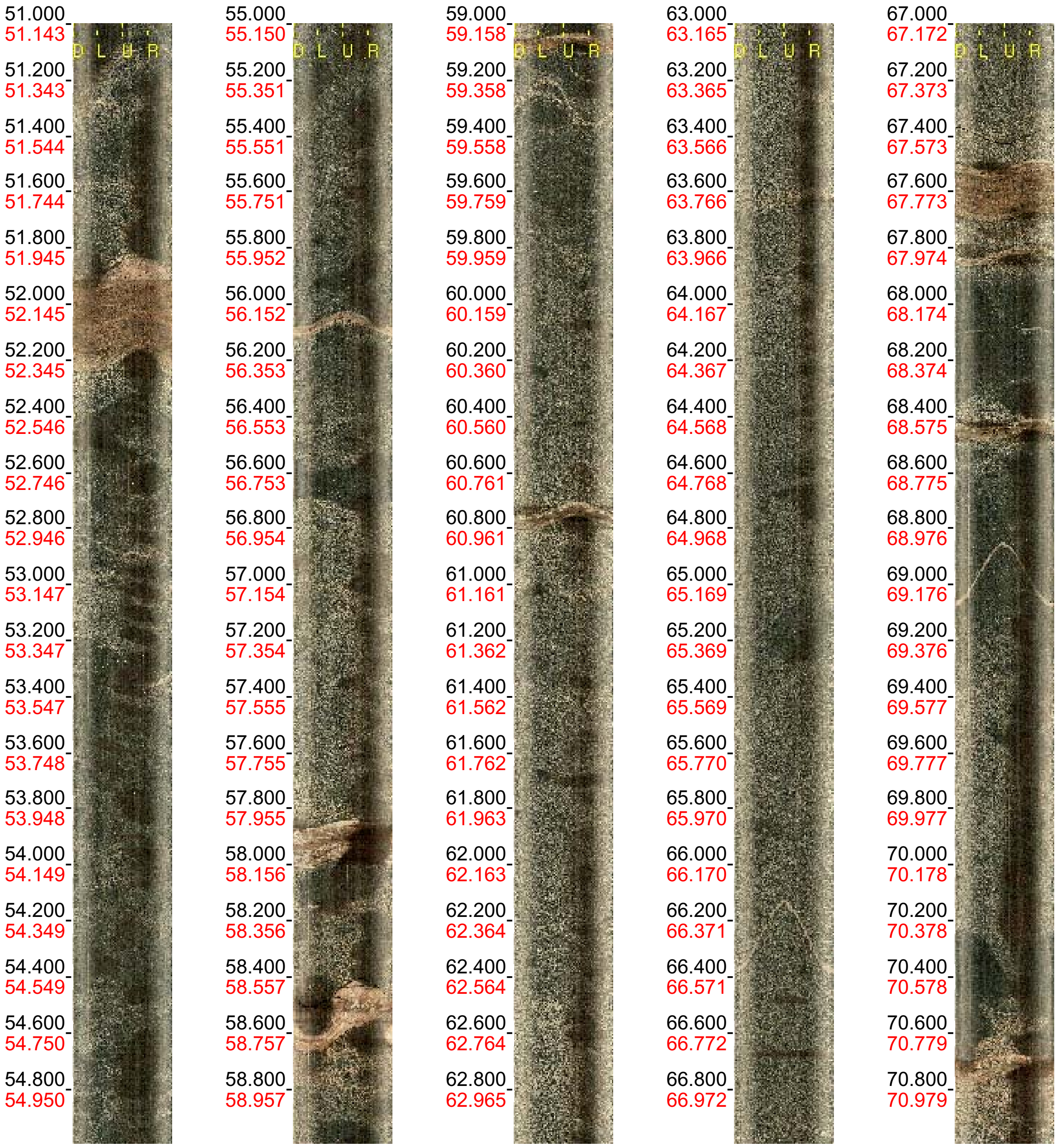
Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 31.000 - 51.000 m
Azimuth: 295.1
Inclination: -64.9

Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 3 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 51.000 - 71.000 m
Azimuth: 295.7
Inclination: -65.0



Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 4 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 71.000 - 91.000 m
Azimuth: 295.8
Inclination: -64.9

71.000
71.180
71.200
71.380
71.400
71.580
71.600
71.781
71.800
71.981
72.000
72.181
72.200
72.382
72.400
72.582
72.600
72.782
72.800
72.983
73.000
73.183
73.200
73.384
73.400
73.584
73.600
73.784
73.800
73.985
74.000
74.185
74.200
74.385
74.400
74.586
74.600
74.786
74.800
74.986

75.000
75.187
75.200
75.387
75.400
75.588
75.600
75.788
75.800
75.988
76.000
76.189
76.200
76.389
76.400
76.589
76.600
76.790
76.800
76.990
77.000
77.190
77.200
77.391
77.400
77.591
77.600
77.792
77.800
77.992
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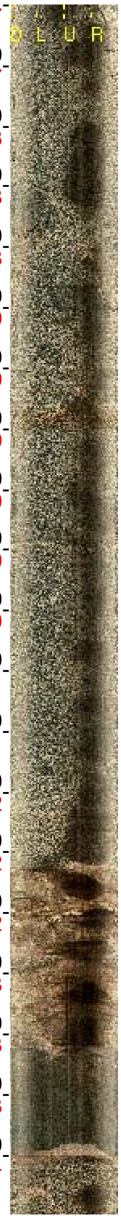
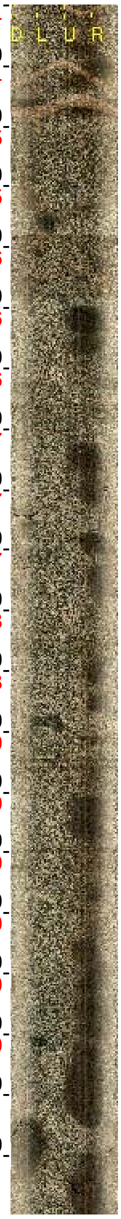
78.192
78.200
78.393
78.400
78.593
78.600
78.793
78.800
78.994



79.000
79.194
79.200
79.394
79.400
79.595
79.600
79.795
79.800
79.996
80.000
80.196
80.200
80.396
80.400
80.597
80.600
80.797
80.800
80.997
81.000
81.198
81.200
81.398
81.400
81.599
81.600
81.799
81.800
81.999
82.000
82.200
82.200
82.400
82.400
82.600
82.600
82.801
82.800
83.001



83.000
83.201
83.200
83.402
83.400
83.602
83.600
83.803
83.800
84.003
84.000
84.203
84.200
84.404
84.400
84.604
84.600
84.804
84.800
85.005
85.000
85.205
85.200
85.405
85.400
85.606
85.600
85.806
85.800
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86.200
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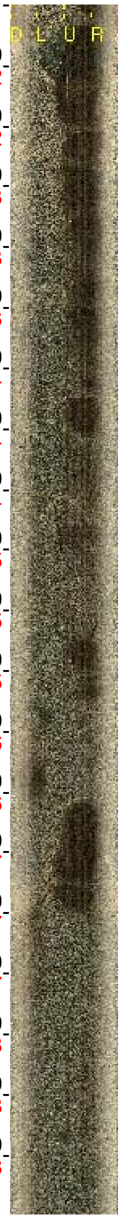
86.400
86.608
86.600
86.808
86.800
87.008



87.000
87.209
87.200
87.409
87.400
87.609
87.600
87.810
87.800
88.010
88.000
88.211
88.200
88.411
88.400
88.611
88.600
88.812
88.800
89.012
89.000
89.212
89.200
89.413
89.400
89.613
89.600
89.813
89.800
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90.214
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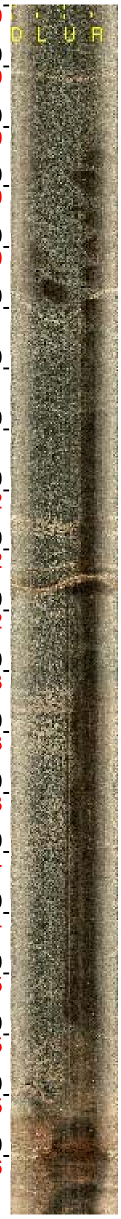
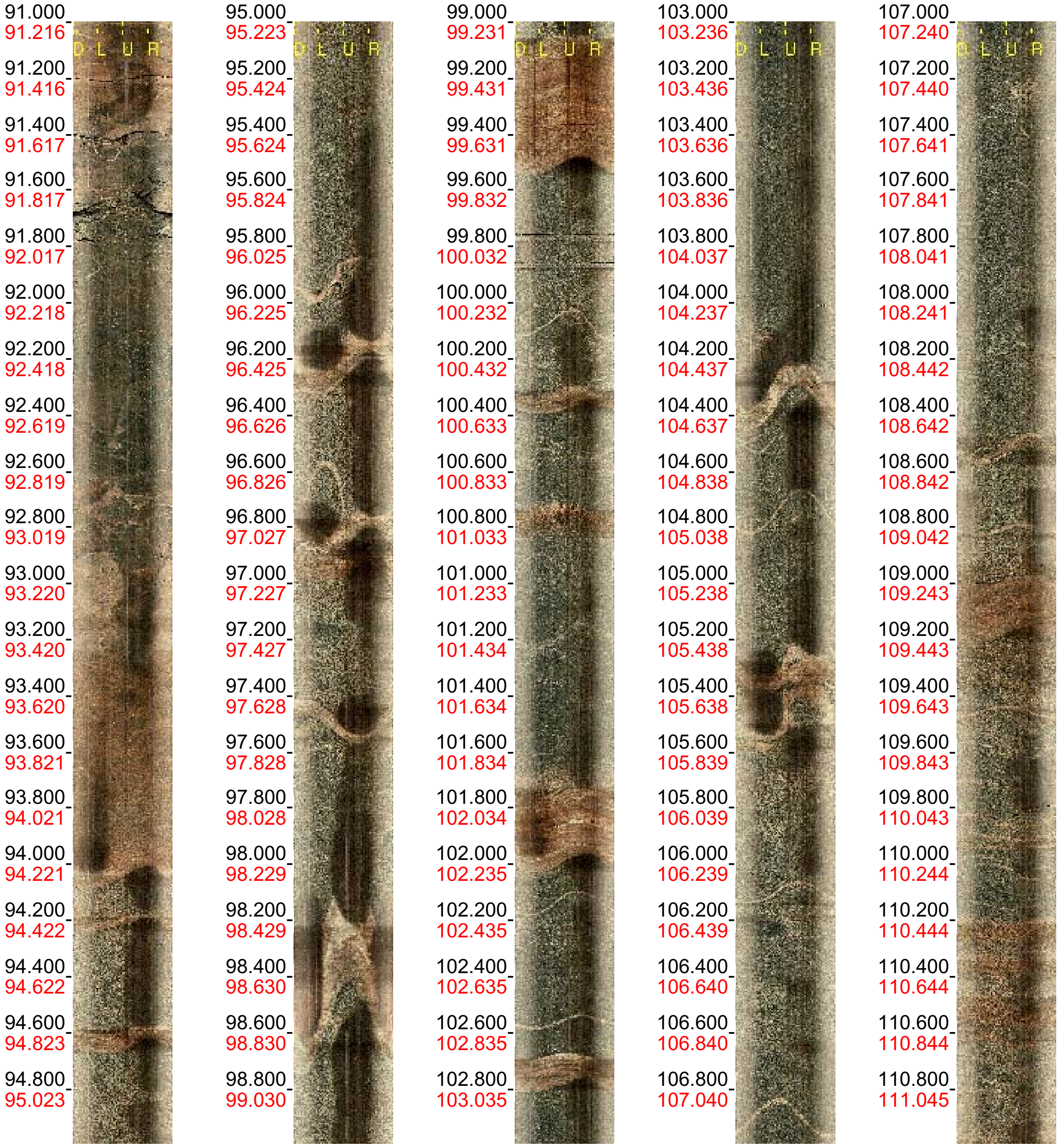
90.600
90.815
90.800
91.016



Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 5 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 91.000 - 111.000 m
Azimuth: 296.1
Inclination: -64.8



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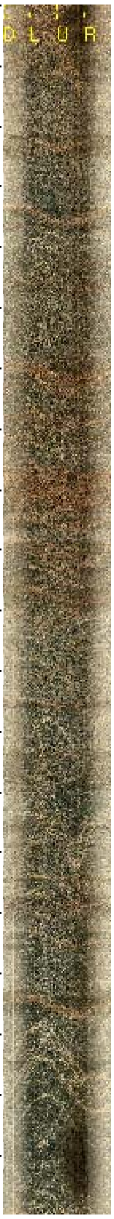
Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 111.000 - 131.000 m
Azimuth: 296.5
Inclination: -64.7

111.000
111.245
111.200
111.445
111.400
111.645
111.600
111.846
111.800
112.046
112.000
112.246
112.200
112.446
112.400
112.646
112.600
112.847
112.800
113.047
113.000
113.247
113.200
113.447
113.400
113.648
113.600
113.848
113.800
114.048
114.000
114.248
114.200
114.448
114.400
114.649
114.600
114.849
114.800
115.049



115.000
115.249
115.200
115.450
115.400
115.650
115.600
115.850
115.800
116.050
116.000
116.251
116.200
116.451
116.400
116.651
116.600
116.851
116.800
117.051
117.000
117.252
117.200
117.452
117.400
117.652
117.600
117.852
117.800
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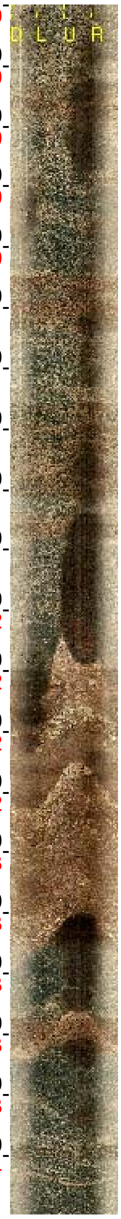
118.200
118.453
118.400
118.653
118.600
118.853
118.800
119.054



119.000
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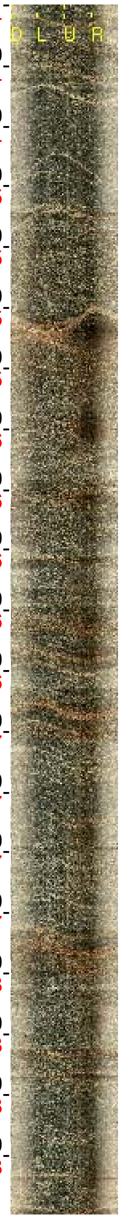
119.200
119.454
119.400
119.654
119.600
119.855
119.800
120.055
120.000
120.255
120.200
120.455
120.400
120.656
120.600
120.856
120.800
121.056
121.000
121.256
121.200
121.456
121.400
121.657
121.600
121.857
121.800
122.057
122.000
122.257
122.200
122.458
122.400
122.658
122.600
122.858
122.800
123.058



123.000
123.259
123.200
123.459
123.400
123.659
123.600
123.859
123.800
124.059
124.000
124.260
124.200
124.460
124.400
124.660
124.600
124.860
124.800
125.061
125.000
125.261
125.200
125.461
125.400
125.661
125.600
125.861
125.800
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126.262
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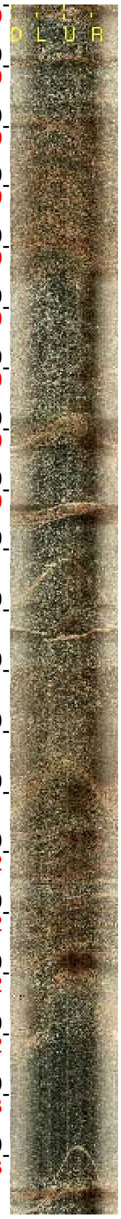
126.863
126.800
127.063



127.000
127.263
127.200
127.463
127.400
127.664
127.600
127.864
127.800
128.064
128.000
128.264
128.200
128.464
128.400
128.665
128.600
128.865
128.800
129.065
129.000
129.265
129.200
129.466
129.400
129.666
129.600
129.866
129.800
130.066
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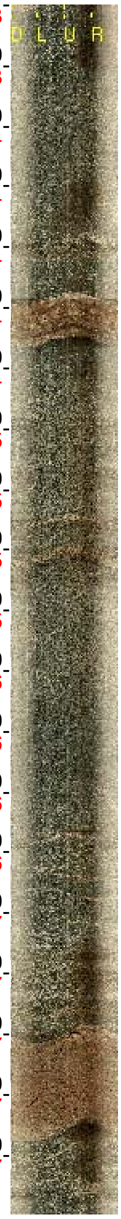
130.267
130.200
130.467
130.400
130.667
130.600
130.867
130.800
131.067



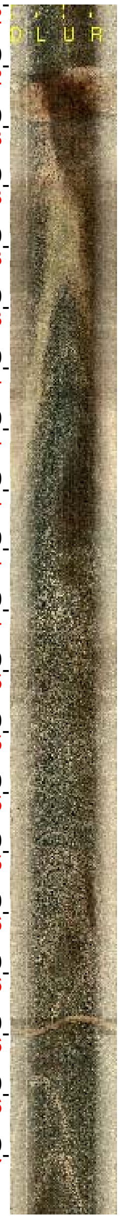
Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 7 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 131.000 - 151.000 m
Azimuth: 295.8
Inclination: -64.7

131.000	131.268
131.200	131.468
131.400	131.668
131.600	131.868
131.800	132.069
132.000	132.269
132.200	132.469
132.400	132.669
132.600	132.869
132.800	133.070
133.000	133.270
133.200	133.470
133.400	133.670
133.600	133.871
133.800	134.071
134.000	134.271
134.200	134.471
134.400	134.672
134.600	134.872
134.800	135.072

135.000	135.272
135.200	135.472
135.400	135.673
135.600	135.873
135.800	136.073
136.000	136.273
136.200	136.474
136.400	136.674
136.600	136.874
136.800	137.074
137.000	137.274
137.200	137.475
137.400	137.675
137.600	137.875
137.800	138.075
138.000	138.276
138.200	138.476
138.400	138.676
138.600	138.876
138.800	139.077



139.000	139.277
139.200	139.477
139.400	139.677
139.600	139.877
139.800	140.078
140.000	140.278
140.200	140.478
140.400	140.678
140.600	140.879
140.800	141.079
141.000	141.279
141.200	141.479
141.400	141.680
141.600	141.880
141.800	142.080
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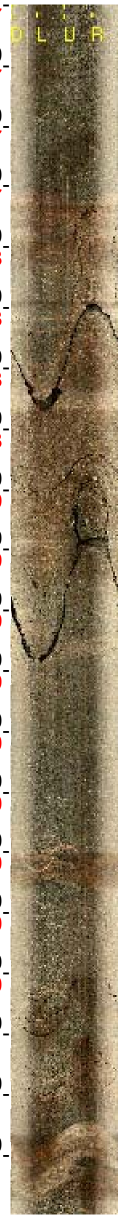
142.200	142.480
142.400	142.681
142.600	142.881
142.800	143.081



143.000	143.281
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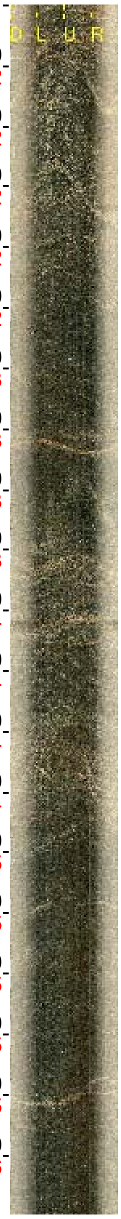
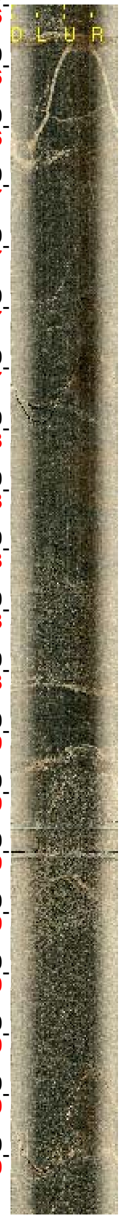
143.400	143.682
143.600	143.882
143.800	144.082
144.000	144.282
144.200	144.483
144.400	144.683
144.600	144.883
144.800	145.083
145.000	145.284
145.200	145.484
145.400	145.684
145.600	145.884
145.800	146.085
146.000	146.285
146.200	146.485
146.400	146.685
146.600	146.885
146.800	147.086



147.000	147.286
147.200	147.486
147.400	147.686
147.600	147.887
147.800	148.087
148.000	148.287
148.200	148.487
148.400	148.688
148.600	148.888
148.800	149.088
149.000	149.288
149.200	149.488
149.400	149.689
149.600	149.889
149.800	150.089
150.000	150.289
150.200	150.490
150.400	150.690
150.600	150.890
150.800	151.090



Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 8 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 151.000 - 171.000 m
Azimuth: 295.7
Inclination: -64.6

151.000 151.291
151.200 151.491
151.400 151.691
151.600 151.891
151.800 152.092
152.000 152.292
152.200 152.492
152.400 152.692
152.600 152.893
152.800 153.093
153.000 153.293
153.200 153.493
153.400 153.694
153.600 153.894
153.800 154.094
154.000 154.294
154.200 154.495
154.400 154.695
154.600 154.895
154.800 155.096

155.000 155.296
155.200 155.496
155.400 155.696
155.600 155.897
155.800 156.097
156.000 156.297
156.200 156.497
156.400 156.698
156.600 156.898
156.800 157.098
157.000 157.298
157.200 157.499
157.400 157.699
157.600 157.899
157.800 158.099
158.000 158.300
158.200 158.500
158.400 158.700
158.600 158.900
158.800 159.101

159.000 159.301
159.200 159.501
159.400 159.701
159.600 159.902
159.800 160.102
160.000 160.302
160.200 160.502
160.400 160.703
160.600 160.903
160.800 161.103
161.000 161.303
161.200 161.504
161.400 161.704
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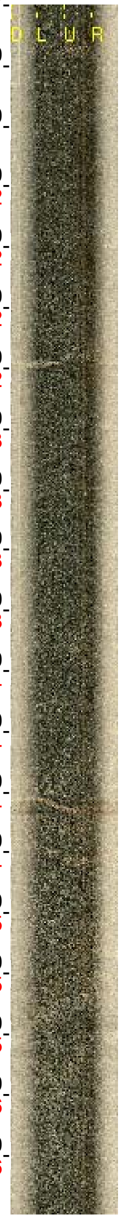
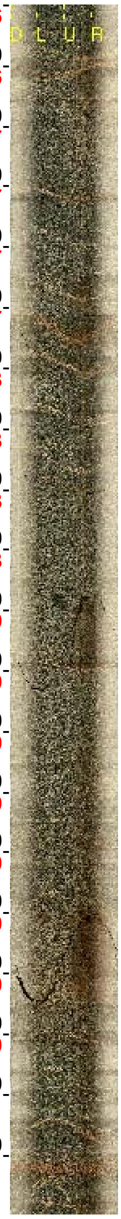
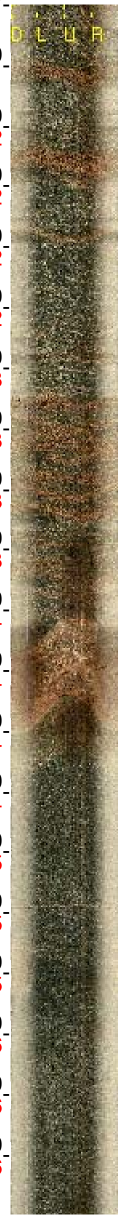
162.000 162.305
162.200 162.505
162.400 162.705
162.600 162.906
162.800 163.106



163.000 163.306
163.200 163.506
163.400 163.707
163.600 163.907
163.800 164.107
164.000 164.307
164.200 164.508
164.400 164.708
164.600 164.908
164.800 165.108
165.000 165.309
165.200 165.509
165.400 165.709
165.600 165.909
165.800 166.110
166.000 166.310
166.200 166.510
166.400 166.710
166.600 166.911
166.800 167.111



167.000 167.311
167.200 167.511
167.400 167.712
167.600 167.912
167.800 168.112
168.000 168.312
168.200 168.513
168.400 168.713
168.600 168.913
168.800 169.113
169.000 169.314
169.200 169.514
169.400 169.714
169.600 169.914
169.800 170.115
170.000 170.315
170.200 170.515
170.400 170.716
170.600 170.916
170.800 171.116



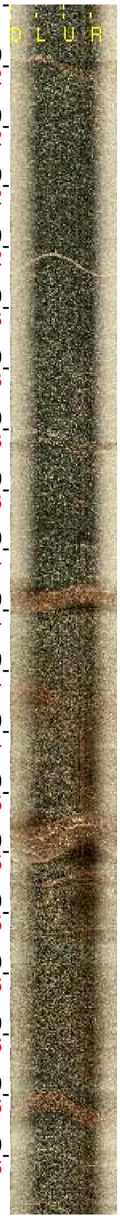
Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 9 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

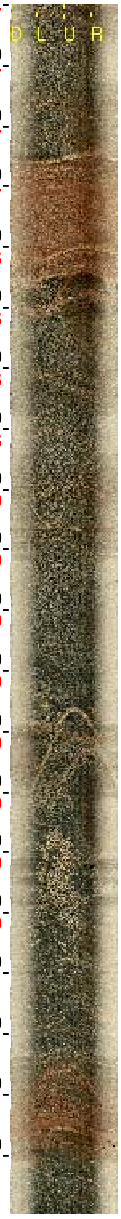
Depth range: 171.000 - 191.000 m
Azimuth: 296.4
Inclination: -64.5

171.000
171.316
171.200
171.517
171.400
171.717
171.600
171.917
171.800
172.117
172.000
172.318
172.200
172.518
172.400
172.718
172.600
172.918
172.800
173.119
173.000
173.319
173.200
173.519
173.400
173.719
173.600
173.920
173.800
174.120
174.000
174.320
174.200
174.520
174.400
174.721
174.600
174.921
174.800
175.121

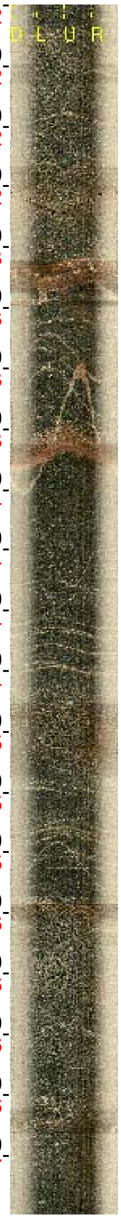
175.000
175.321
175.200
175.522
175.400
175.722
175.600
175.922
175.800
176.122
176.000
176.323
176.200
176.523
176.400
176.723
176.600
176.923
176.800
177.124
177.000
177.324
177.200
177.524
177.400
177.724
177.600
177.925
177.800
178.125
178.000
178.325
178.200
178.526
178.400
178.726
178.600
178.926
178.800
179.126



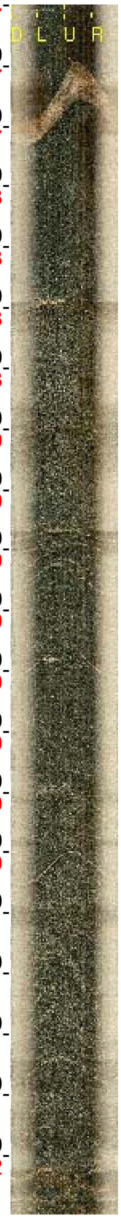
179.000
179.327
179.200
179.527
179.400
179.727
179.600
179.927
179.800
180.128
180.000
180.328
180.200
180.528
180.400
180.728
180.600
180.929
180.800
181.129
181.000
181.329
181.200
181.529
181.400
181.730
181.600
181.930
181.800
182.130
182.000
182.330
182.200
182.531
182.400
182.731
182.600
182.931
182.800
183.131



183.000
183.332
183.200
183.532
183.400
183.732
183.600
183.932
183.800
184.133
184.000
184.333
184.200
184.533
184.400
184.733
184.600
184.934
184.800
185.134
185.000
185.334
185.200
185.534
185.400
185.735
185.600
185.935
185.800
186.135
186.000
186.336
186.200
186.536
186.400
186.736
186.600
186.936
186.800
187.137



187.000
187.337
187.200
187.537
187.400
187.737
187.600
187.938
187.800
188.138
188.000
188.338
188.200
188.538
188.400
188.739
188.600
188.939
188.800
189.139
189.000
189.339
189.200
189.540
189.400
189.740
189.600
189.940
189.800
190.140
190.000
190.341
190.200
190.541
190.400
190.741
190.600
190.941
190.800
191.142



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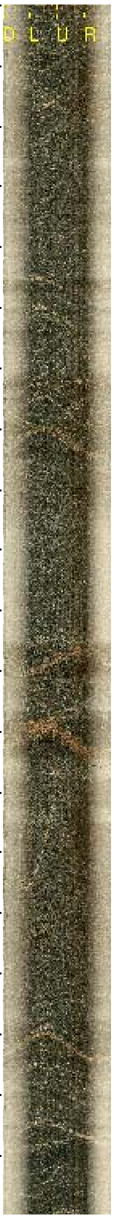
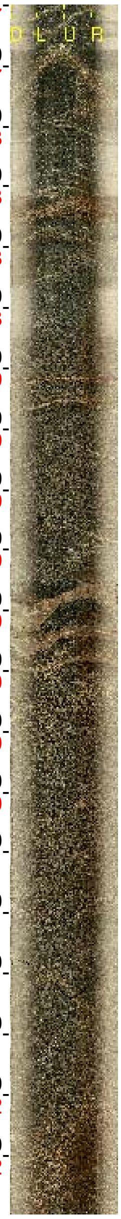
Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 191.000 - 211.000 m
Azimuth: 296.8
Inclination: -64.4

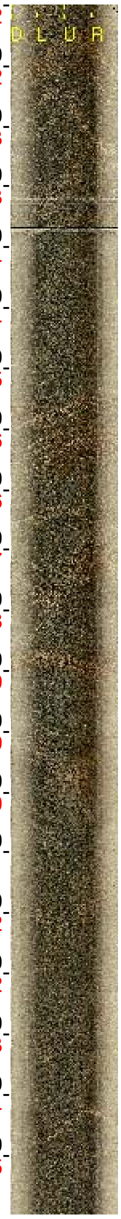
191.000	191.342
191.200	191.542
191.400	191.742
191.600	191.943
191.800	192.143
192.000	192.343
192.200	192.543
192.400	192.744
192.600	192.944
192.800	193.144
193.000	193.344
193.200	193.545
193.400	193.745
193.600	193.945
193.800	194.146
194.000	194.346
194.200	194.546
194.400	194.746
194.600	194.947
194.800	195.147



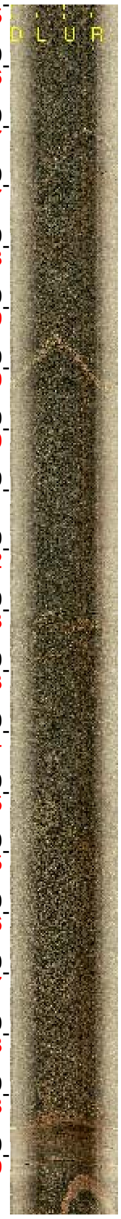
195.000	195.347
195.200	195.547
195.400	195.748
195.600	195.948
195.800	196.148
196.000	196.348
196.200	196.549
196.400	196.749
196.600	196.949
196.800	197.149
197.000	197.350
197.200	197.550
197.400	197.750
197.600	197.950
197.800	198.151
198.000	198.351
198.200	198.551
198.400	198.751
198.600	198.952
198.800	199.152



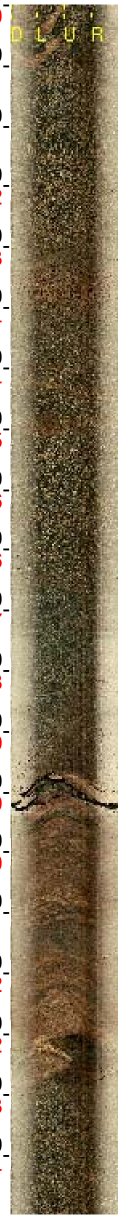
199.000	199.352
199.200	199.552
199.400	199.753
199.600	199.953
199.800	200.154
200.000	200.354
200.200	200.555
200.400	200.756
200.600	200.956
200.800	201.157
201.000	201.358
201.200	201.559
201.400	201.759
201.600	201.960
201.800	202.161
202.000	202.362
202.200	202.562
202.400	202.763
202.600	202.964
202.800	203.165



203.000	203.365
203.200	203.566
203.400	203.767
203.600	203.967
203.800	204.168
204.000	204.369
204.200	204.570
204.400	204.770
204.600	204.971
204.800	205.172
205.000	205.373
205.200	205.573
205.400	205.774
205.600	205.975
205.800	206.175
206.000	206.376
206.200	206.577
206.400	206.778
206.600	206.978
206.800	207.179



207.000	207.380
207.200	207.581
207.400	207.781
207.600	207.982
207.800	208.183
208.000	208.384
208.200	208.584
208.400	208.785
208.600	208.986
208.800	209.186
209.000	209.387
209.200	209.588
209.400	209.789
209.600	209.989
209.800	210.190
210.000	210.391
210.200	210.592
210.400	210.792
210.600	210.993
210.800	211.194



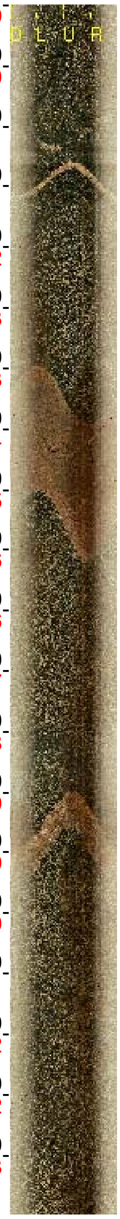
Printed: 2007-04-02 09:38:41   Scale: 1 : 20   Aspect: 150 %   11 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

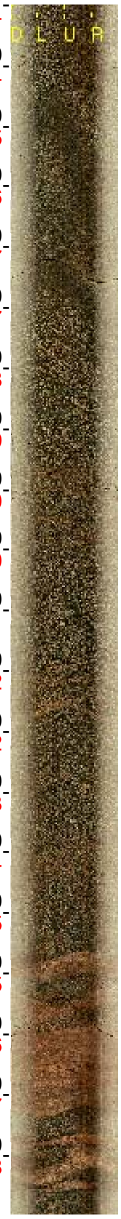
Depth range: 211.000 - 231.000 m
Azimuth: 296.6
Inclination: -64.3

211.000	211.394
211.200	211.595
211.400	211.796
211.600	211.997
211.800	212.197
212.000	212.398
212.200	212.599
212.400	212.800
212.600	213.000
212.800	213.201
213.000	213.402
213.200	213.603
213.400	213.803
213.600	214.004
213.800	214.205
214.000	214.405
214.200	214.606
214.400	214.807
214.600	215.008
214.800	215.208

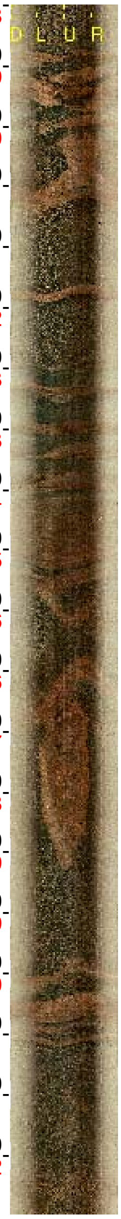
215.000	215.409
215.200	215.610
215.400	215.811
215.600	216.011
215.800	216.212
216.000	216.413
216.200	216.613
216.400	216.814
216.600	217.015
216.800	217.216
217.000	217.416
217.200	217.617
217.400	217.818
217.600	218.019
217.800	218.219
218.000	218.420
218.200	218.621
218.400	218.822
218.600	219.022
218.800	219.223



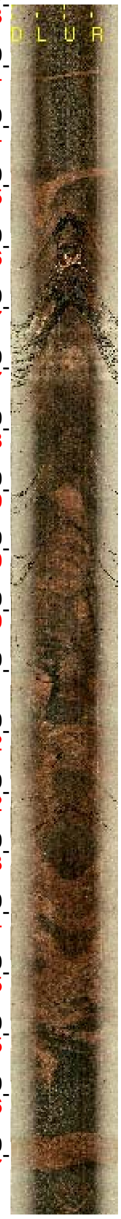
219.000	219.424
219.200	219.624
219.400	219.825
219.600	220.026
219.800	220.227
220.000	220.427
220.200	220.628
220.400	220.829
220.600	221.030
220.800	221.230
221.000	221.431
221.200	221.632
221.400	221.832
221.600	222.033
221.800	222.234
222.000	222.435
222.200	222.635
222.400	222.836
222.600	223.037
222.800	223.238



223.000	223.438
223.200	223.639
223.400	223.840
223.600	224.041
223.800	224.241
224.000	224.442
224.200	224.643
224.400	224.843
224.600	225.044
224.800	225.245
225.000	225.446
225.200	225.646
225.400	225.847
225.600	226.048
225.800	226.249
226.000	226.449
226.200	226.650
226.400	226.851
226.600	227.051
226.800	227.252



227.000	227.453
227.200	227.654
227.400	227.854
227.600	228.055
227.800	228.256
228.000	228.457
228.200	228.657
228.400	228.858
228.600	229.059
228.800	229.260
229.000	229.460
229.200	229.661
229.400	229.862
229.600	230.062
229.800	230.263
230.000	230.464
230.200	230.665
230.400	230.865
230.600	231.066
230.800	231.267



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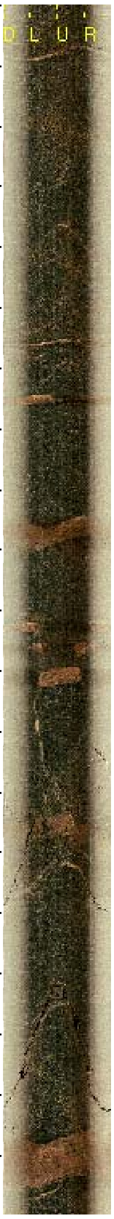
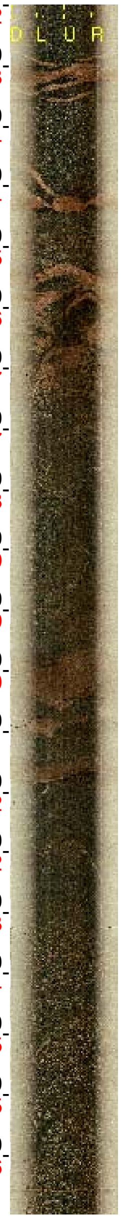
Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 231.000 - 251.000 m
Azimuth: 296.4
Inclination: -64.4

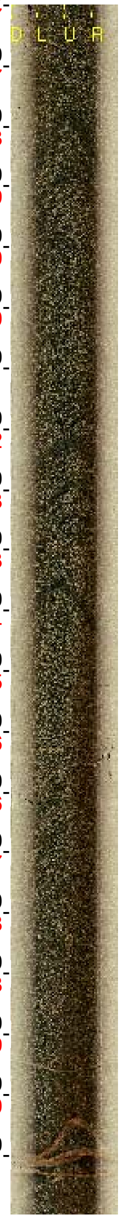
231.000
231.468
231.200
231.668
231.400
231.869
231.600
232.070
231.800
232.270
232.000
232.471
232.200
232.672
232.400
232.873
232.600
233.073
232.800
233.274
233.000
233.475
233.200
233.676
233.400
233.876
233.600
234.077
233.800
234.278
234.000
234.479
234.200
234.679
234.400
234.880
234.600
235.081
234.800
235.281



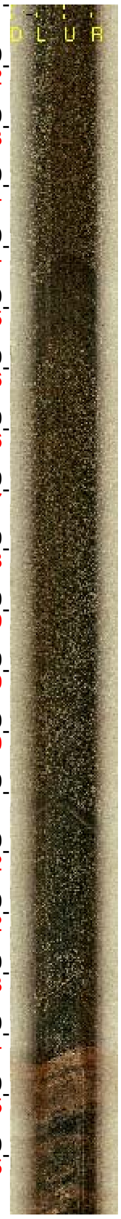
235.000
235.482
235.200
235.683
235.400
235.884
235.600
236.084
235.800
236.285
236.000
236.486
236.200
236.687
236.400
236.887
236.600
237.088
236.800
237.289
237.000
237.489
237.200
237.690
237.400
237.891
237.600
238.092
237.800
238.292
238.000
238.493
238.200
238.694
238.400
238.895
238.600
239.095
238.800
239.296



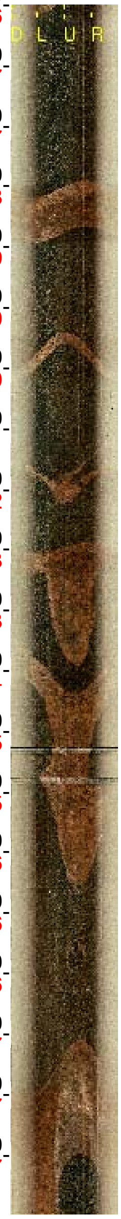
239.000
239.497
239.200
239.697
239.400
239.898
239.600
240.099
239.800
240.300
240.000
240.500
240.200
240.701
240.400
240.902
240.600
241.103
240.800
241.303
241.000
241.504
241.200
241.705
241.400
241.906
241.600
242.106
241.800
242.307
242.000
242.508
242.200
242.708
242.400
242.909
242.600
243.110
242.800
243.311



243.000
243.511
243.200
243.712
243.400
243.913
243.600
244.114
243.800
244.314
244.000
244.515
244.200
244.716
244.400
244.916
244.600
245.117
244.800
245.318
245.000
245.519
245.200
245.719
245.400
245.920
245.600
246.121
245.800
246.322
246.000
246.522
246.200
246.723
246.400
246.924
246.600
247.125
246.800
247.325



247.000
247.526
247.200
247.727
247.400
247.927
247.600
248.128
247.800
248.329
248.000
248.530
248.200
248.730
248.400
248.931
248.600
249.132
248.800
249.333
249.000
249.533
249.200
249.734
249.400
249.935
249.600
250.135
249.800
250.336
250.000
250.536
250.200
250.736
250.400
250.937
250.600
251.137
250.800
251.337



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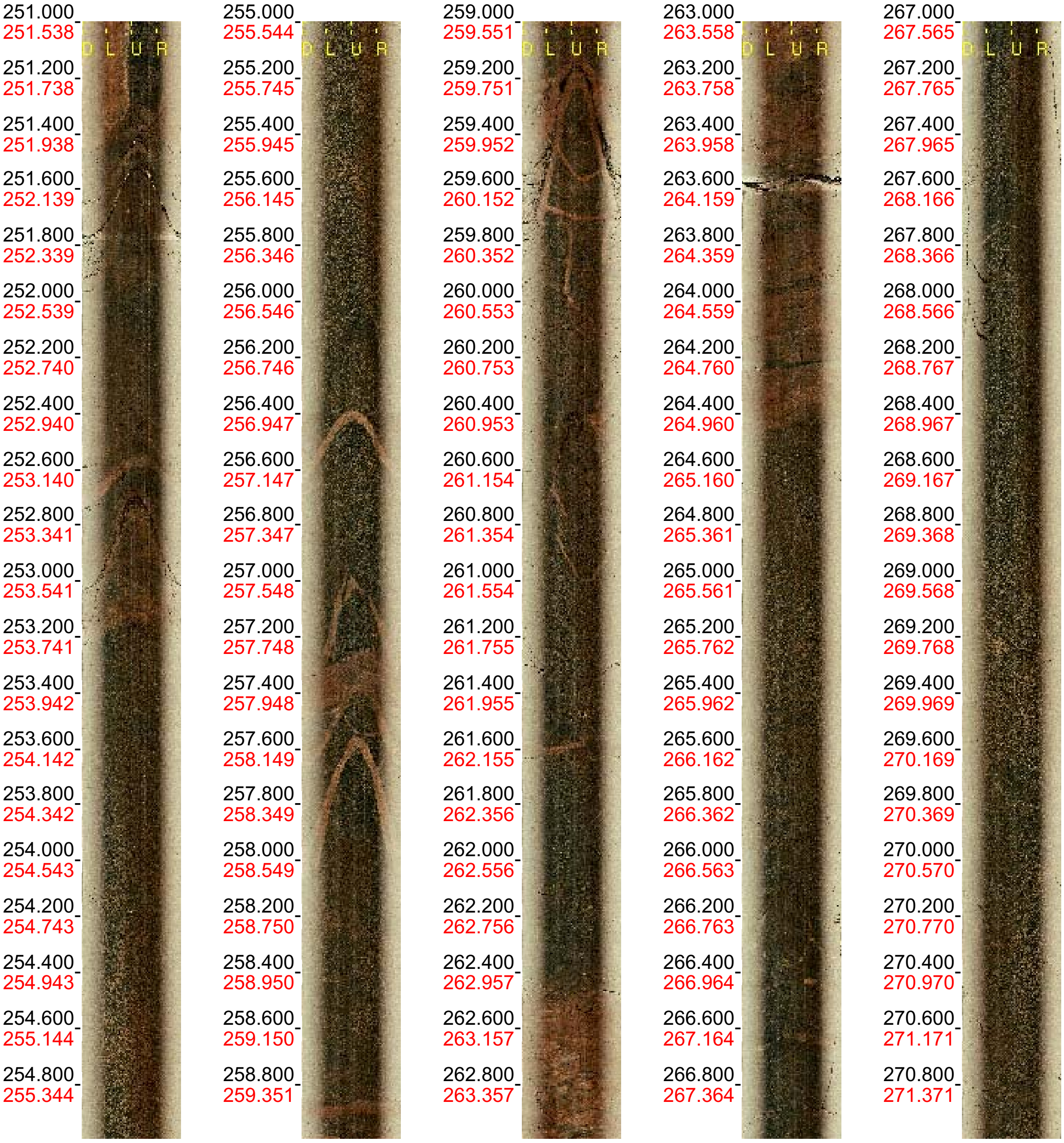
Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 251.000 - 271.000 m
Azimuth: 296.2
Inclination: -64.4



Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

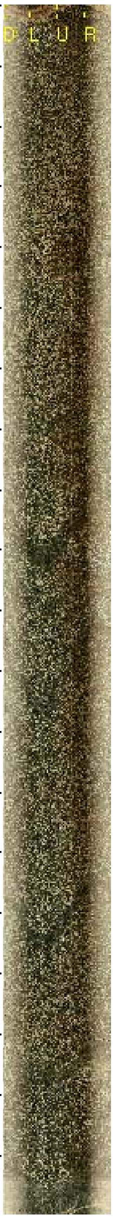
Depth range: 271.000 - 291.000 m
Azimuth: 296.0
Inclination: -64.4

Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 15 (22)

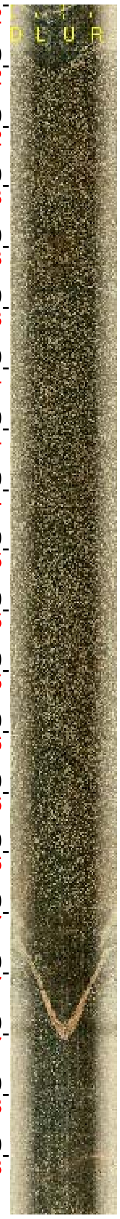
Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 291.000 - 311.000 m
Azimuth: 295.3
Inclination: -64.2

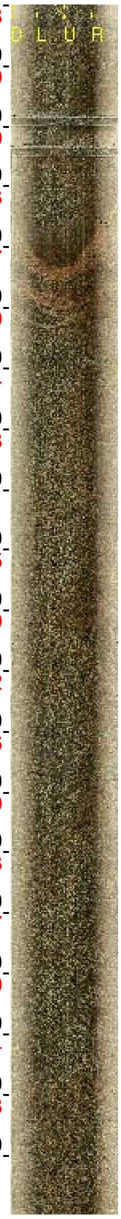
291.000
291.605
291.200
291.805
291.400
292.006
291.600
292.206
291.800
292.406
292.000
292.607
292.200
292.807
292.400
293.007
292.600
293.208
292.800
293.408
293.000
293.608
293.200
293.809
293.400
294.009
293.600
294.209
293.800
294.410
294.000
294.610
294.200
294.810
294.400
295.011
294.600
295.211
294.800
295.411



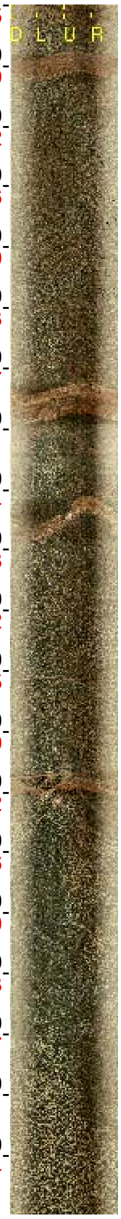
295.000
295.612
295.200
295.812
295.400
296.012
295.600
296.213
295.800
296.413
296.000
296.613
296.200
296.814
296.400
297.014
296.600
297.214
296.800
297.415
297.000
297.615
297.200
297.815
297.400
298.016
297.600
298.216
297.800
298.416
298.000
298.617
298.200
298.817
298.400
299.017
298.600
299.218
298.800
299.418



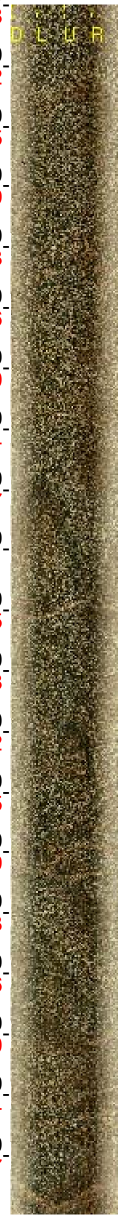
299.000
299.618
299.200
299.819
299.400
300.019
299.600
300.223
299.800
300.427
300.000
300.630
300.200
300.834
300.400
301.038
300.600
301.241
300.800
301.445
301.000
301.649
301.200
301.852
301.400
302.056
301.600
302.259
301.800
302.463
302.000
302.667
302.200
302.870
302.400
303.074
302.600
303.278
302.800
303.481



303.000
303.685
303.200
303.889
303.400
304.092
303.600
304.296
303.800
304.500
304.000
304.703
304.200
304.907
304.400
305.111
304.600
305.314
304.800
305.518
305.000
305.722
305.200
305.925
305.400
306.129
305.600
306.332
305.800
306.536
306.000
306.740
306.200
306.943
306.400
307.147
306.600
307.351
306.800
307.554



307.000
307.758
307.200
307.962
307.400
308.165
307.600
308.369
307.800
308.573
308.000
308.776
308.200
308.980
308.400
309.184
308.600
309.387
308.800
309.591
309.000
309.795
309.200
309.998
309.400
310.202
309.600
310.405
309.800
310.609
310.000
310.813
310.200
311.016
310.400
311.220
310.600
311.424
310.800
311.627

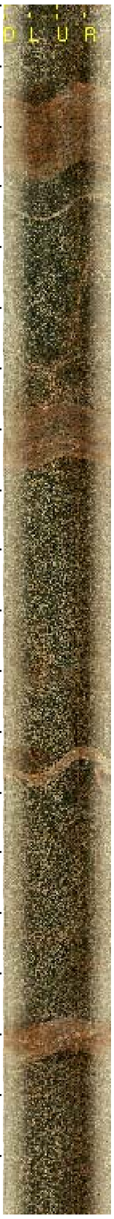


Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 16 (22)

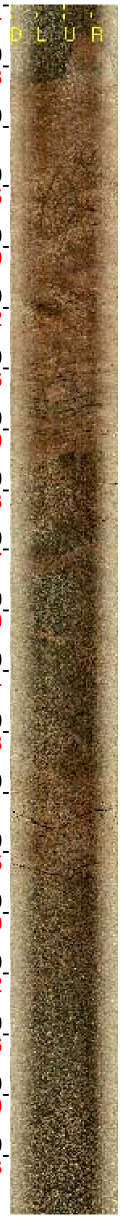
Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 311.000 - 331.000 m
Azimuth: 295.6
Inclination: -64.1

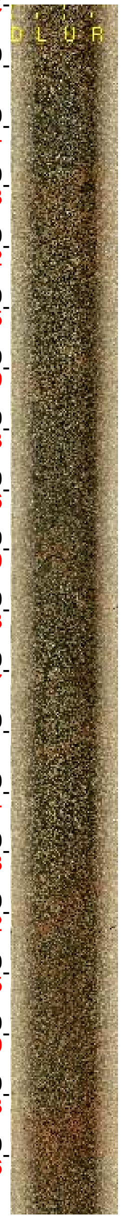
311.000
311.831
311.200
312.035
311.400
312.238
311.600
312.442
311.800
312.646
312.000
312.849
312.200
313.053
312.400
313.257
312.600
313.460
312.800
313.664
313.000
313.867
313.200
314.071
313.400
314.275
313.600
314.478
313.800
314.682
314.000
314.886
314.200
315.089
314.400
315.293
314.600
315.497
314.800
315.700



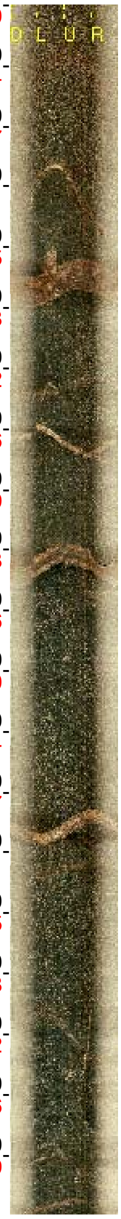
315.000
315.904
315.200
316.108
315.400
316.311
315.600
316.515
315.800
316.719
316.000
316.922
316.200
317.126
316.400
317.330
316.600
317.533
316.800
317.737
317.000
317.940
317.200
318.144
317.400
318.348
317.600
318.551
317.800
318.755
318.000
318.959
318.200
319.162
318.400
319.366
318.600
319.570
318.800
319.773



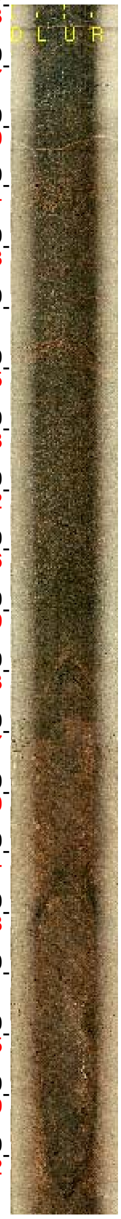
319.000
319.977
319.200
320.181
319.400
320.384
319.600
320.588
319.800
320.792
320.000
320.995
320.200
321.199
320.400
321.403
320.600
321.606
320.800
321.810
321.000
322.013
321.200
322.217
321.400
322.421
321.600
322.624
321.800
322.828
322.000
323.032
322.200
323.235
322.400
323.439
322.600
323.643
322.800
323.846



323.000
324.050
323.200
324.254
323.400
324.457
323.600
324.661
323.800
324.865
324.000
325.068
324.200
325.272
324.400
325.476
324.600
325.679
324.800
325.883
325.000
326.086
325.200
326.290
325.400
326.494
325.600
326.697
325.800
326.901
326.000
327.105
326.200
327.308
326.400
327.512
326.600
327.716
326.800
327.919



327.000
328.123
327.200
328.327
327.400
328.530
327.600
328.734
327.800
328.938
328.000
329.141
328.200
329.345
328.400
329.548
328.600
329.752
328.800
329.956
329.000
330.159
329.200
330.363
329.400
330.567
329.600
330.770
329.800
330.974
330.000
331.178
330.200
331.381
330.400
331.585
330.600
331.789
330.800
331.992



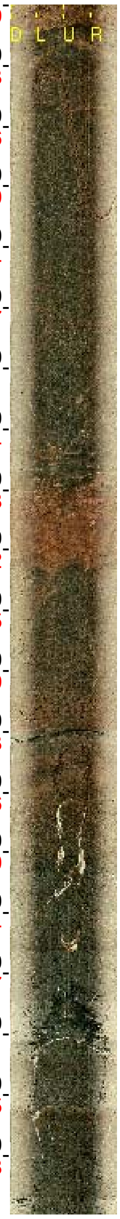
Printed: 2007-04-02 09:38:41   Scale: 1 : 20   Aspect: 150 %   17 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

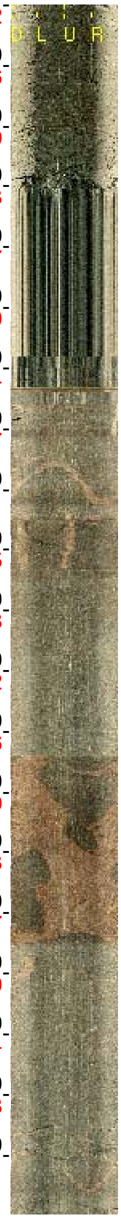
Depth range: 331.000 - 351.000 m
Azimuth: 295.7
Inclination: -63.9

331.000
332.196
331.200
332.400
331.400
332.603
331.600
332.807
331.800
333.011
332.000
333.214
332.200
333.418
332.400
333.621
332.600
333.825
332.800
334.029
333.000
334.232
333.200
334.436
333.400
334.640
333.600
334.843
333.800
335.047
334.000
335.251
334.200
335.454
334.400
335.658
334.600
335.862
334.800
336.065

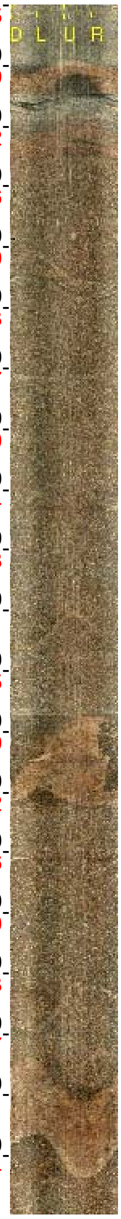
335.000
336.269
335.200
336.473
335.400
336.676
335.600
336.880
335.800
337.084
336.000
337.287
336.200
337.491
336.400
337.694
336.600
337.898
336.800
338.102
337.000
338.305
337.200
338.509
337.400
338.713
337.600
338.916
337.800
339.120
338.000
339.324
338.200
339.527
338.400
339.731
338.600
339.935
338.800
340.138



339.000
340.342
339.200
340.546
339.400
340.749
339.600
340.953
339.800
341.157
340.000
341.360
340.200
341.564
340.400
341.767
340.600
341.971
340.800
342.175
341.000
342.378
341.200
342.582
341.400
342.786
341.600
342.989
341.800
343.193
342.000
343.397
342.200
343.600
342.400
343.804
342.600
344.008
342.800
344.211



343.000
344.415
343.200
344.619
343.400
344.822
343.600
345.026
343.800
345.230
344.000
345.433
344.200
345.637
344.400
345.840
344.600
346.044
344.800
346.248
345.000
346.451
345.200
346.655
345.400
346.859
345.600
347.062
345.800
347.266
346.000
347.470
346.200
347.673
346.400
347.877
346.600
348.081
346.800
348.284

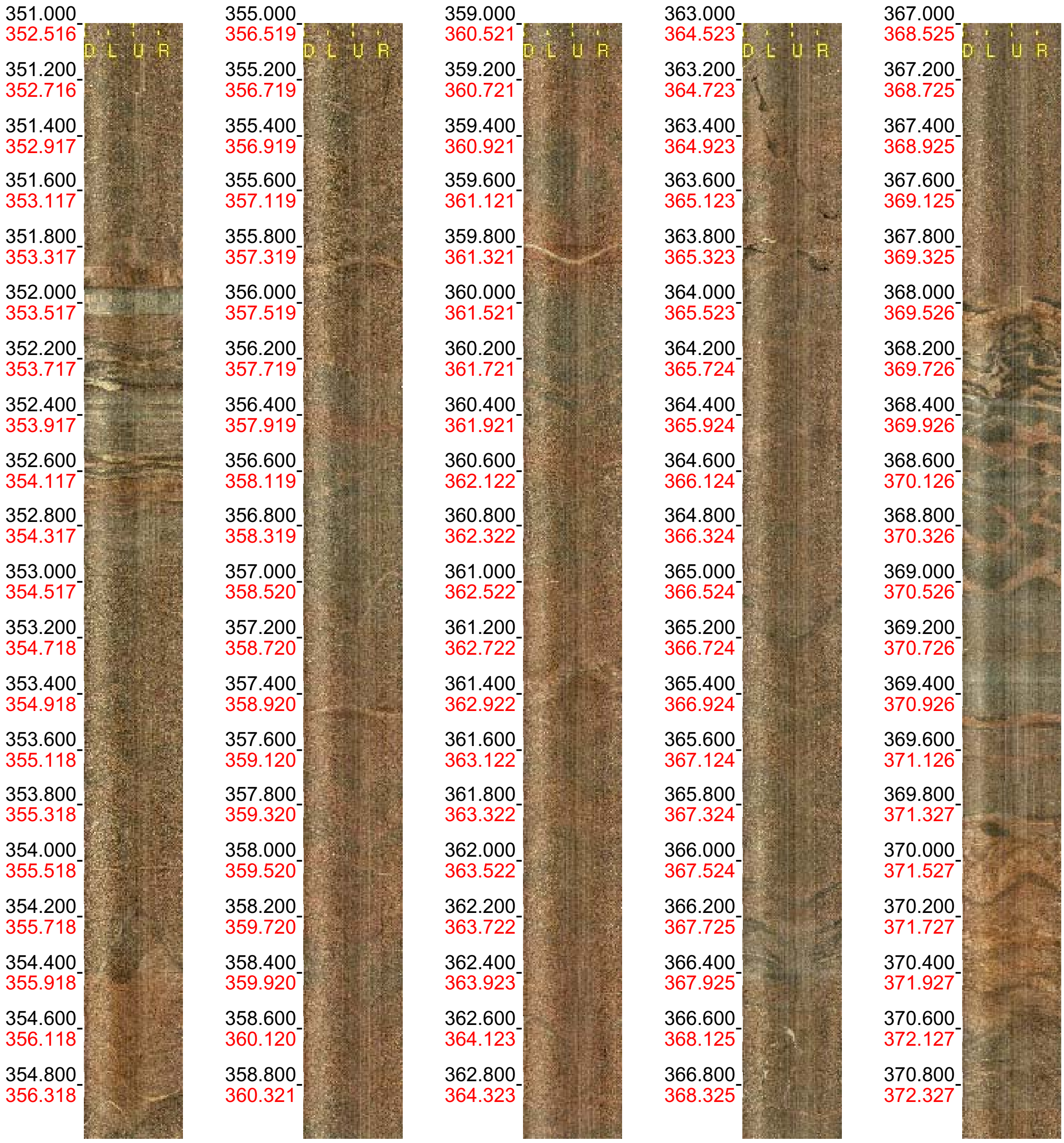


347.000
348.488
347.200
348.692
347.400
348.895
347.600
349.099
347.800
349.302
348.000
349.506
348.200
349.710
348.400
349.913
348.600
350.115
348.800
350.315
349.000
350.515
349.200
350.715
349.400
350.915
349.600
351.116
349.800
351.316
350.000
351.516
350.200
351.716
350.400
351.916
350.600
352.116
350.800
352.316

Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 18 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 351.000 - 371.000 m
Azimuth: 295.9
Inclination: -63.8

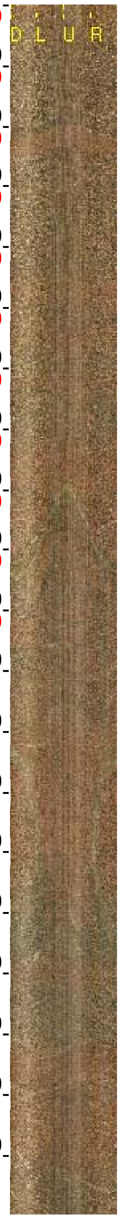


Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 371.000 - 391.000 m
Azimuth: 295.6
Inclination: -63.8

371.000 372.527
371.200 372.727
371.400 372.927
371.600 373.128
371.800 373.328
372.000 373.528
372.200 373.728
372.400 373.928
372.600 374.128
372.800 374.328
373.000 374.528
373.200 374.728
373.400 374.928
373.600 375.129
373.800 375.329
374.000 375.529
374.200 375.729
374.400 375.929
374.600 376.129
374.800 376.329

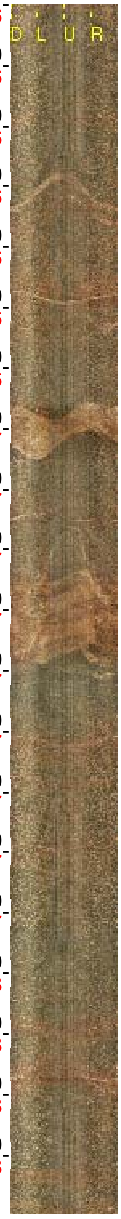
375.000 376.529
375.200 376.729
375.400 376.930
375.600 377.130
375.800 377.330
376.000 377.530
376.200 377.730
376.400 377.930
376.600 378.130
376.800 378.330
377.000 378.530
377.200 378.731
377.400 378.931
377.600 379.131
377.800 379.331
378.000 379.531
378.200 379.731
378.400 379.931
378.600 380.131
378.800 380.331



379.000 380.531
379.200 380.732
379.400 380.932
379.600 381.132
379.800 381.332
380.000 381.532
380.200 381.732
380.400 381.932
380.600 382.132
380.800 382.332
381.000 382.533
381.200 382.733
381.400 382.933
381.600 383.133
381.800 383.333
382.000 383.533
382.200 383.733
382.400 383.933
382.600 384.133
382.800 384.334

383.000 384.534
383.200 384.734
383.400 384.934
383.600 385.134
383.800 385.334
384.000 385.534
384.200 385.734
384.400 385.934
384.600 386.135
384.800 386.335
385.000 386.535
385.200 386.735
385.400 386.935
385.600 387.135
385.800 387.335
386.000 387.535
386.200 387.735
386.400 387.935
386.600 388.136
386.800 388.336

387.000 388.536
387.200 388.736
387.400 388.936
387.600 389.136
387.800 389.336
388.000 389.536
388.200 389.736
388.400 389.937
388.600 390.137
388.800 390.337
389.000 390.537
389.200 390.737
389.400 390.937
389.600 391.137
389.800 391.337
390.000 391.537
390.200 391.738
390.400 391.938
390.600 392.138
390.800 392.338



Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 20 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 391.000 - 411.000 m
Azimuth: 295.7
Inclination: -63.8

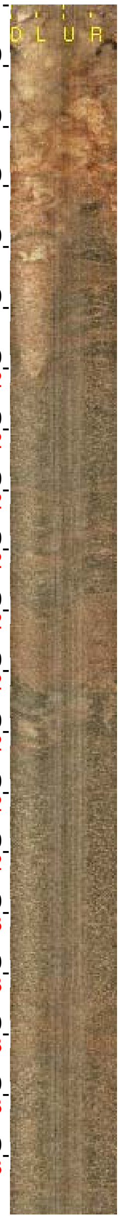
Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 21 (22)

Borehole: KLX16A
Mapping: KLX16A_Geosigma_3

Depth range: 411.000 - 427.512 m
Azimuth: 296.0
Inclination: -63.8

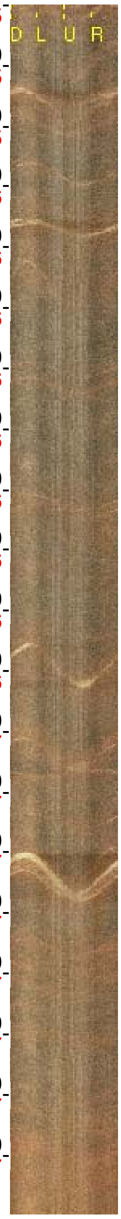
411.000	412.549
411.200	412.749
411.400	412.949
411.600	413.149
411.800	413.349
412.000	413.549
412.200	413.749
412.400	413.950
412.600	414.150
412.800	414.350
413.000	414.550
413.200	414.750
413.400	414.950
413.600	415.150
413.800	415.350
414.000	415.550
414.200	415.750
414.400	415.951
414.600	416.151
414.800	416.351

415.000	416.551
415.200	416.751
415.400	416.951
415.600	417.151
415.800	417.351
416.000	417.551
416.200	417.752
416.400	417.952
416.600	418.152
416.800	418.352
417.000	418.552
417.200	418.752
417.400	418.952
417.600	419.152
417.800	419.352
418.000	419.553
418.200	419.753
418.400	419.953
418.600	420.153
418.800	420.353



419.000	420.553
419.200	420.753
419.400	420.953
419.600	421.153
419.800	421.354
420.000	421.554
420.200	421.754
420.400	421.954
420.600	422.154
420.800	422.354
421.000	422.554
421.200	422.754
421.400	422.954
421.600	423.154
421.800	423.355
422.000	423.555
422.200	423.755
422.400	423.955
422.600	424.155
422.800	424.355

423.000	424.555
423.200	424.755
423.400	424.955
423.600	425.156
423.800	425.356
424.000	425.556
424.200	425.756
424.400	425.956
424.600	426.156
424.800	426.356
425.000	426.556
425.200	426.756
425.400	426.957
425.600	427.157
425.800	427.357
426.000	427.557
426.200	427.757
426.400	427.957
426.600	428.157
426.800	428.357



427.000	428.557
427.200	428.758
427.400	
427.600	
427.800	
428.000	
428.200	
428.400	
428.600	
428.800	
429.000	
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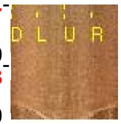
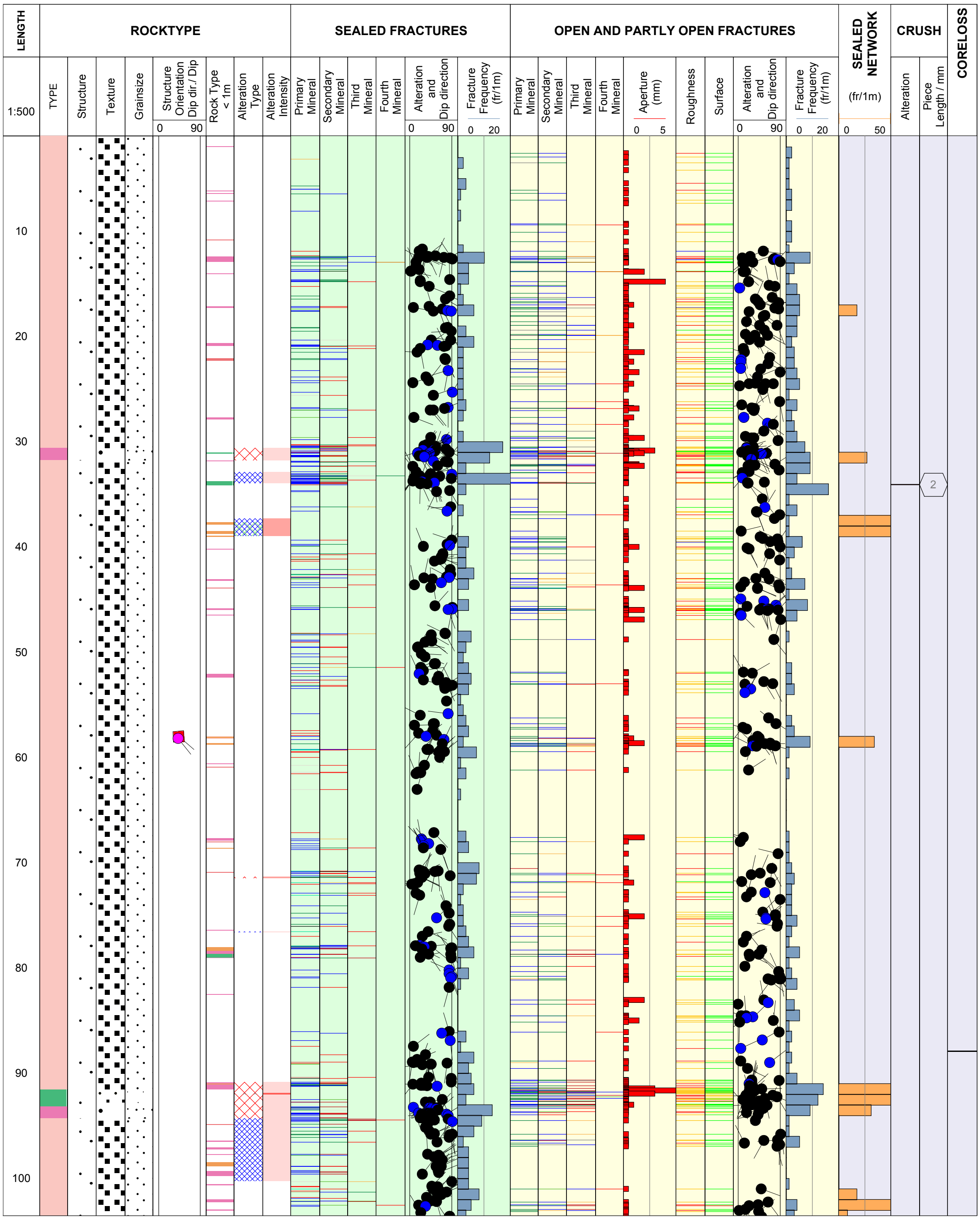
430.000	
430.200	
430.400	
430.600	
430.800	

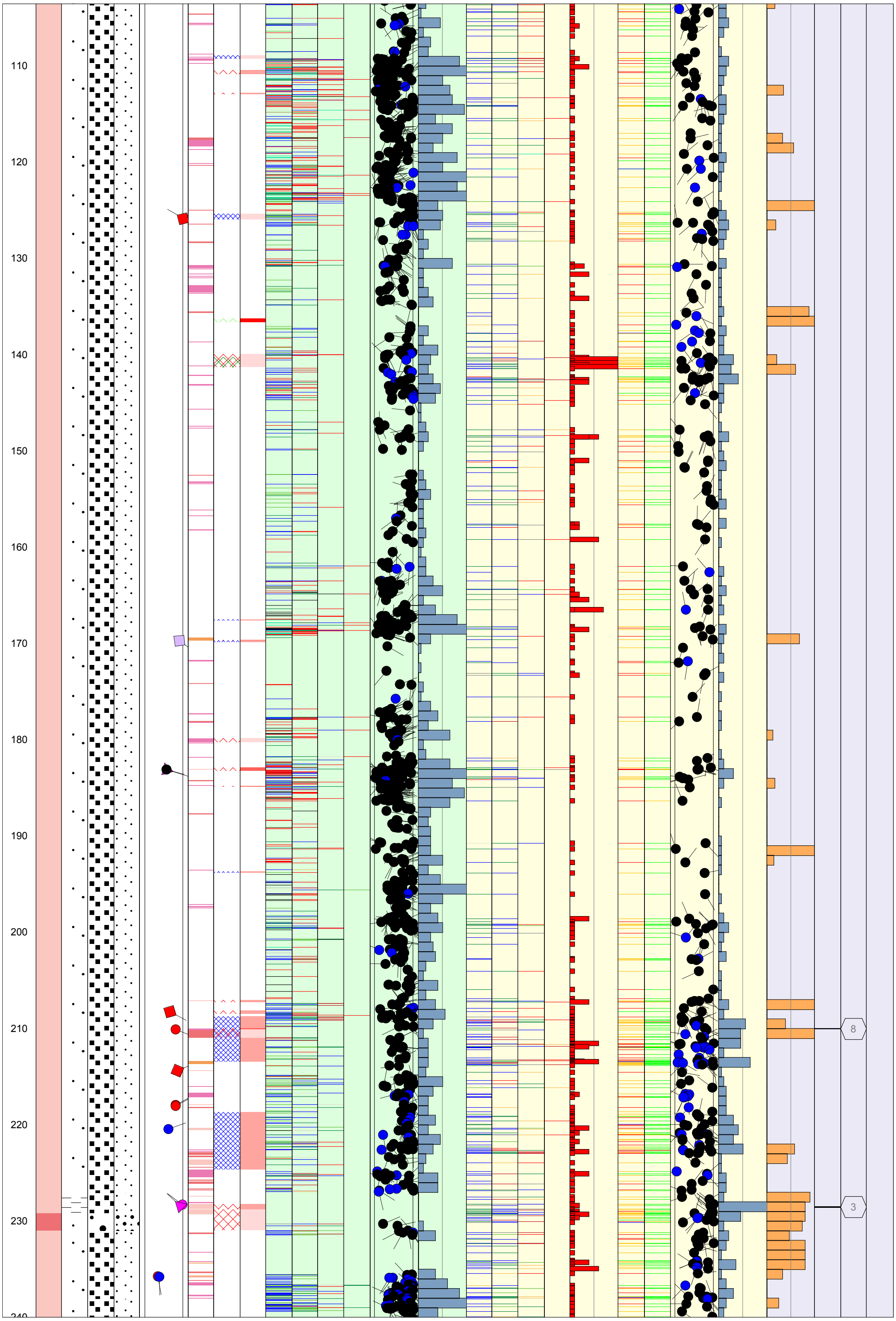


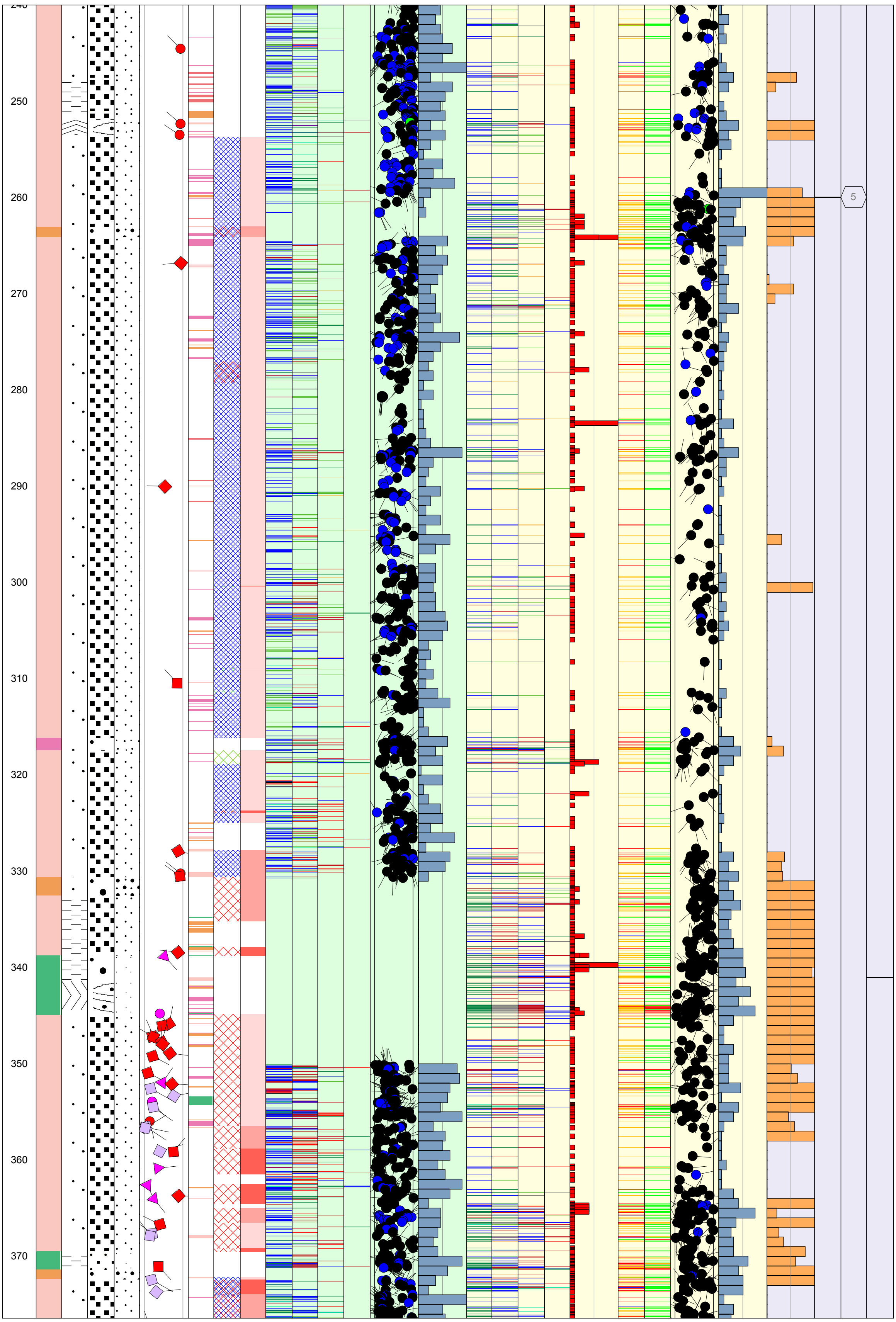
Printed: 2007-04-02 09:38:41 Scale: 1 : 20 Aspect: 150 % 22 (22)

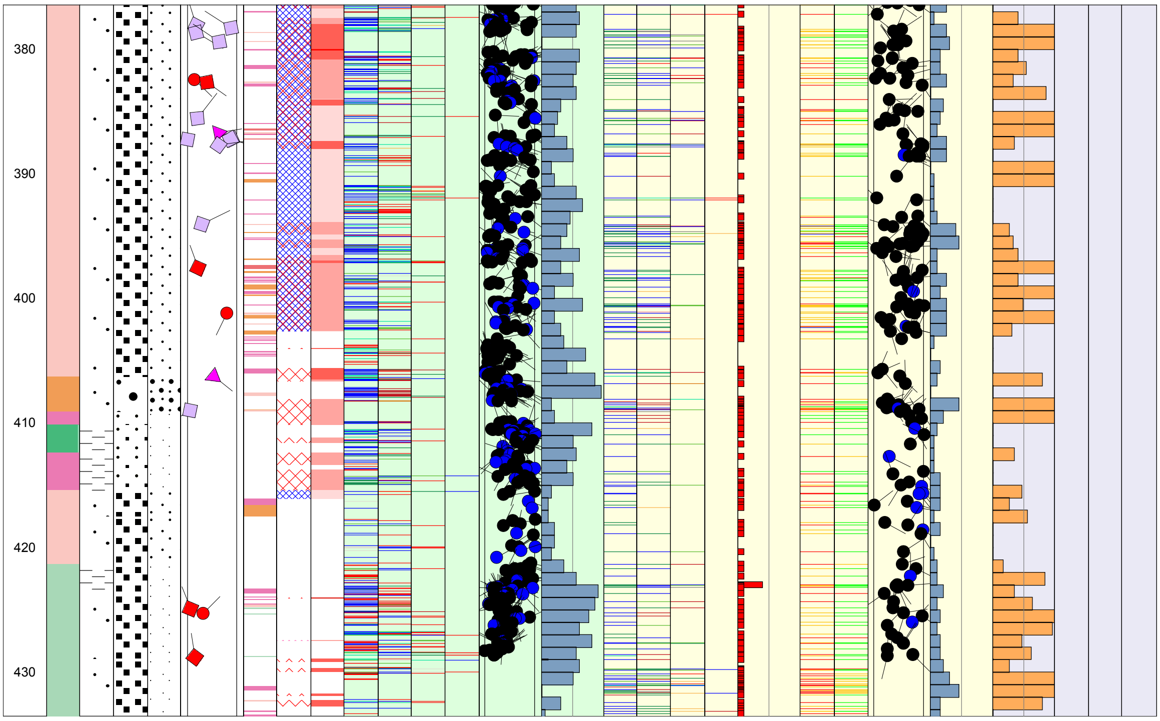
WellCad diagram for KLX16A

Title	GEOLOGY IN KLX16A		Appendix:
Site	LAXEMAR	Coordinate System	RT90-RHB70
Borehole	KLX16A	Northing [m]	6364797.69
Diameter [mm]	76	Easting [m]	1547584.06
Length [m]	433.550	Elevation [m.a.s.l.]	18.85
Bearing [°]	294.37	Drilling Start Date	2006-11-28 13:00:00
Inclination [°]	-64.97	Drilling Stop Date	2007-01-09 13:00:00
Date of coremapping	2007-03-01 09:13:00	Plot Date	2007-10-25 22:03:45
Rocktype data from	p_rock	Signed data	




110
120
130
140
150
160
170
180
190
200
210
220
230
8
3


240
250
260
270
280
290
300
310
320
330
340
350
360
370
5


380
390
400
410
420
430

Legend to WellCad diagram for KLX16A

Title	LEGEND FOR LAXEMAR	KLX16A
Site	LAXEMAR	
Borehole	KLX16A	
Plot Date	2007-10-25 22:03:45	
Signed data		

ROCKTYPE LAXEMAR

- Äspö Diorite
- Dolerite
- 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
- Ävrö quartz monzodiorite
- Ävrö granodiorite

ROCK ALTERATION TYPE

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

MINERAL

- Epidote
- Flourite
- Hematite
- Calcite
- Chlorite
- Quartz
- Pyrite
- Clay Minerals
- 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

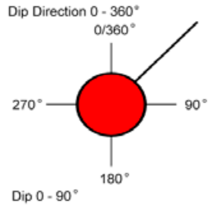
- Slightly Altered
- Moderately Altered
- Highly Altered
- Completley Altered
- Gouge
- Fresh

FRACTURE ALTERATION

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

FRACTURE DIRECTION

STRUKTURE ORIENTATION



Appendix 6

In-data: Borehole length and diameter for KLX16A

Hole Diam T - Drilling: Borehole diameter

KLX16A, 2006-11-28 13:00:00 - 2007-01-09 13:00:00 (0.300 - 433.550 m)

Sub Secup (m)	Sub Seclow (m)	Hole Diam (m)	Comment
0.300	11.250	0.0960	HQ
11.250	433.550	0.0758	Corac N/3

Printout from SICADA 2007-04-02 09:33:37.

Appendix 7

In-data: Reference marks for length adjustments for KLX16A

Reference Mark T - Reference mark in drillhole

KLX16A, 2007-01-14 13:30:00 - 2007-01-14 15:45:00 (20.000 - 400.000 m)

Bhlen (m)	Rotation Speed (rpm)	Start Flow (l/h)	Stop Flow (l/h)	Stop Pressure (bar)	Cutter Time (s)	Trace Detectable	Cutter Diameter (mm)	Comment
20.00	400.00			35.0	32	Yes		Ingen flödesgivare 13/1
50.00	400.00			30.0	40	Yes		Ingen flödesgivare 13/1
100.00	400.00			30.0	40	Yes		Ingen flödesgivare 13/1
150.00	400.00			28.0	23	Yes		Ingen flödesgivare 13/1
200.00	400.00			28.0	27	Yes		Ingen flödesgivare 13/1
250.00	400.00			29.0	24	Yes		Ingen flödesgivare 13/1
300.00	400.00			29.0	27	Yes		Ingen flödesgivare 13/1
350.00	400.00			30.0	32	Yes		Ingen flödesgivare 13/1
400.00	400.00			31.0	30	Yes		Ingen flödesgivare 13/1, Släppte kulan 9:55

Printout from SICADA 2007-04-02 09:17:42.

Appendix 8

In-data: Borehole deviation data for KLX16A

SICADA - object_location

Idcode	Coord System	Northing (m)	Easting (m)	Elevation (m.a.s.l.)	Length (m)	Vertical Depth (m)	Inclination (degrees)	Bearing (degrees)	Inclination Uncert (degrees)	Bearing Uncert (degrees)	Radius Uncert (m)	Origin	Indat
KLX16A	RT90-RHB70	6364797.69	1547584.06	18.85	0.00	0.00	-64.98	294.37	0.265	2.113	0.00	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364798.22	1547582.90	16.13	3.00	2.72	-64.98	294.37	0.265	2.113	0.05	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364798.74	1547581.75	13.42	6.00	5.44	-64.98	294.58	0.265	2.113	0.09	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364799.27	1547580.59	10.70	9.00	8.16	-64.95	294.80	0.265	2.113	0.14	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364799.81	1547579.44	7.98	12.00	10.87	-64.93	295.01	0.265	2.113	0.19	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364800.35	1547578.29	5.26	15.00	13.59	-64.94	295.23	0.265	2.113	0.23	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364800.89	1547577.14	2.55	18.00	16.31	-64.94	295.44	0.265	2.113	0.28	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364801.44	1547576.00	-0.17	21.00	19.03	-64.92	295.66	0.265	2.113	0.33	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364801.99	1547574.85	-2.89	24.00	21.74	-64.89	295.87	0.265	2.113	0.37	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364802.55	1547573.70	-5.61	27.00	24.46	-64.88	295.80	0.265	2.113	0.42	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364803.10	1547572.55	-8.32	30.00	27.17	-64.84	295.31	0.265	2.113	0.47	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364803.64	1547571.40	-11.04	33.00	29.89	-64.82	294.84	0.265	2.113	0.52	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364804.17	1547570.24	-13.75	36.00	32.60	-64.83	294.88	0.265	2.113	0.56	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364804.71	1547569.08	-16.47	39.00	35.32	-64.84	294.91	0.265	2.113	0.61	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364805.25	1547567.93	-19.18	42.00	38.03	-64.86	295.61	0.265	2.113	0.66	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364805.81	1547566.78	-21.90	45.00	40.75	-64.86	296.02	0.265	2.113	0.70	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364806.37	1547565.63	-24.61	48.00	43.47	-64.84	295.71	0.265	2.113	0.75	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364806.92	1547564.49	-27.33	51.00	46.18	-64.84	295.72	0.265	2.113	0.80	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364807.47	1547563.34	-30.04	54.00	48.90	-64.83	295.72	0.265	2.113	0.85	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364808.03	1547562.19	-32.76	57.00	51.61	-64.81	295.87	0.265	2.113	0.89	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364808.59	1547561.04	-35.47	60.00	54.33	-64.80	296.11	0.265	2.113	0.94	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364809.14	1547559.89	-38.19	63.00	57.04	-64.78	295.47	0.265	2.113	0.99	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364809.69	1547558.73	-40.90	66.00	59.75	-64.77	295.47	0.265	2.113	1.03	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364810.24	1547557.58	-43.62	69.00	62.47	-64.77	295.47	0.265	2.113	1.08	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364810.80	1547556.43	-46.33	72.00	65.18	-64.78	296.10	0.265	2.113	1.13	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364811.36	1547555.28	-49.04	75.00	67.90	-64.77	296.23	0.265	2.113	1.17	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364811.93	1547554.13	-51.76	78.00	70.61	-64.75	296.10	0.265	2.113	1.22	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364812.49	1547552.98	-54.47	81.00	73.32	-64.72	296.12	0.265	2.113	1.27	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364813.05	1547551.83	-57.18	84.00	76.04	-64.71	296.03	0.265	2.113	1.32	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364813.62	1547550.68	-59.89	87.00	78.75	-64.70	296.08	0.265	2.113	1.36	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364814.18	1547549.53	-62.61	90.00	81.46	-64.66	296.05	0.265	2.113	1.41	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364814.74	1547548.37	-65.32	93.00	84.17	-64.65	296.06	0.265	2.113	1.46	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364815.31	1547547.22	-68.03	96.00	86.88	-64.61	296.07	0.265	2.113	1.51	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364815.88	1547546.06	-70.74	99.00	89.59	-64.59	296.32	0.265	2.113	1.55	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364816.45	1547544.91	-73.45	102.00	92.30	-64.58	296.49	0.265	2.113	1.60	Measured	2007-07-10 09:38

KLX16A	RT90-RHB70	6364817.02	1547543.76	-76.16	105.00	95.01	-64.57	296.49	0.265	2.113	1.65	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364817.60	1547542.60	-78.87	108.00	97.72	-64.55	296.51	0.265	2.113	1.70	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364818.17	1547541.45	-81.58	111.00	100.43	-64.54	296.48	0.265	2.113	1.74	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364818.75	1547540.30	-84.28	114.00	103.14	-64.54	296.48	0.265	2.113	1.79	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364819.32	1547539.14	-86.99	117.00	105.85	-64.53	296.47	0.265	2.113	1.84	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364819.90	1547537.99	-89.70	120.00	108.55	-64.53	296.38	0.265	2.113	1.89	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364820.47	1547536.83	-92.41	123.00	111.26	-64.52	296.31	0.265	2.113	1.93	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364821.04	1547535.67	-95.12	126.00	113.97	-64.51	296.23	0.265	2.113	1.98	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364821.61	1547534.51	-97.83	129.00	116.68	-64.51	295.82	0.265	2.113	2.03	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364822.17	1547533.35	-100.53	132.00	119.39	-64.50	295.74	0.265	2.113	2.08	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364822.73	1547532.19	-103.24	135.00	122.09	-64.50	295.74	0.265	2.113	2.12	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364823.29	1547531.02	-105.95	138.00	124.80	-64.50	295.74	0.265	2.113	2.17	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364823.85	1547529.86	-108.66	141.00	127.51	-64.50	295.79	0.265	2.113	2.22	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364824.42	1547528.70	-111.36	144.00	130.22	-64.49	295.95	0.265	2.113	2.27	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364824.98	1547527.54	-114.07	147.00	132.92	-64.48	295.92	0.265	2.113	2.31	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364825.55	1547526.37	-116.78	150.00	135.63	-64.47	295.72	0.265	2.113	2.36	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364826.11	1547525.21	-119.49	153.00	138.34	-64.45	295.71	0.265	2.113	2.41	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364826.67	1547524.04	-122.19	156.00	141.05	-64.44	295.70	0.265	2.113	2.46	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364827.23	1547522.87	-124.90	159.00	143.75	-64.42	295.90	0.265	2.113	2.51	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364827.80	1547521.71	-127.60	162.00	146.46	-64.41	296.27	0.265	2.113	2.55	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364828.37	1547520.55	-130.31	165.00	149.16	-64.40	296.26	0.265	2.113	2.60	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364828.95	1547519.39	-133.02	168.00	151.87	-64.39	296.26	0.265	2.113	2.65	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364829.52	1547518.22	-135.72	171.00	154.57	-64.38	296.25	0.265	2.113	2.70	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364830.10	1547517.06	-138.43	174.00	157.28	-64.36	296.57	0.265	2.113	2.74	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364830.68	1547515.90	-141.13	177.00	159.98	-64.34	296.44	0.265	2.113	2.79	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364831.26	1547514.74	-143.83	180.00	162.69	-64.32	296.45	0.265	2.113	2.84	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364831.84	1547513.57	-146.54	183.00	165.39	-64.28	296.45	0.265	2.113	2.89	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364832.42	1547512.41	-149.24	186.00	168.09	-64.27	296.77	0.265	2.113	2.94	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364833.01	1547511.24	-151.94	189.00	170.80	-64.25	296.76	0.265	2.113	2.98	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364833.59	1547510.08	-154.64	192.00	173.50	-64.22	296.76	0.265	2.113	3.03	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364834.18	1547508.91	-157.35	195.00	176.20	-64.21	296.18	0.265	2.113	3.08	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364834.75	1547507.74	-160.05	198.00	178.90	-64.18	295.52	0.265	2.113	3.13	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364835.31	1547506.56	-162.75	201.00	181.60	-64.16	295.52	0.265	2.113	3.18	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364835.87	1547505.38	-165.45	204.00	184.30	-64.13	295.52	0.265	2.113	3.23	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364836.44	1547504.20	-168.14	207.00	187.00	-64.10	296.25	0.265	2.113	3.27	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364837.03	1547503.02	-170.84	210.00	189.70	-64.07	296.68	0.265	2.113	3.32	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364837.62	1547501.85	-173.54	213.00	192.39	-64.06	296.49	0.265	2.113	3.37	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364838.20	1547500.67	-176.24	216.00	195.09	-64.03	296.37	0.265	2.113	3.42	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364838.78	1547499.50	-178.94	219.00	197.79	-64.03	296.38	0.265	2.113	3.47	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364839.37	1547498.32	-181.63	222.00	200.49	-64.09	296.37	0.265	2.113	3.52	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364839.95	1547497.15	-184.33	225.00	203.19	-64.12	296.35	0.265	2.113	3.56	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364840.53	1547495.98	-187.03	228.00	205.89	-64.19	296.38	0.265	2.113	3.61	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364841.11	1547494.81	-189.73	231.00	208.59	-64.18	296.38	0.265	2.113	3.66	Measured	2007-07-10 09:38

KLX16A	RT90-RHB70	6364841.69	1547493.63	-192.43	234.00	211.29	-64.17	296.39	0.265	2.113	3.71	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364842.27	1547492.46	-195.13	237.00	213.99	-64.16	296.39	0.265	2.113	3.76	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364842.85	1547491.29	-197.83	240.00	216.69	-64.15	296.38	0.265	2.113	3.80	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364843.43	1547490.12	-200.53	243.00	219.39	-64.16	296.33	0.265	2.113	3.85	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364844.01	1547488.95	-203.23	246.00	222.09	-64.19	296.26	0.265	2.113	3.90	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364844.59	1547487.78	-205.93	249.00	224.79	-64.19	296.24	0.265	2.113	3.95	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364845.17	1547486.60	-208.63	252.00	227.49	-64.19	296.23	0.265	2.113	4.00	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364845.74	1547485.43	-211.34	255.00	230.19	-64.17	296.17	0.265	2.113	4.05	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364846.32	1547484.26	-214.04	258.00	232.89	-64.16	296.13	0.265	2.113	4.09	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364846.90	1547483.08	-216.74	261.00	235.59	-64.15	296.10	0.265	2.113	4.14	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364847.47	1547481.91	-219.44	264.00	238.29	-64.16	295.95	0.265	2.113	4.19	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364848.04	1547480.73	-222.14	267.00	240.99	-64.16	295.93	0.265	2.113	4.24	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364848.61	1547479.56	-224.84	270.00	243.69	-64.16	295.91	0.265	2.113	4.29	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364849.19	1547478.38	-227.53	273.00	246.39	-64.14	296.02	0.265	2.113	4.34	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364849.76	1547477.21	-230.23	276.00	249.09	-64.14	296.06	0.265	2.113	4.38	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364850.33	1547476.03	-232.93	279.00	251.79	-64.15	295.95	0.265	2.113	4.43	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364850.91	1547474.85	-235.63	282.00	254.49	-64.13	295.91	0.265	2.113	4.48	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364851.48	1547473.67	-238.33	285.00	257.19	-64.11	295.82	0.265	2.113	4.53	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364852.05	1547472.49	-241.03	288.00	259.88	-64.08	295.71	0.265	2.113	4.58	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364852.61	1547471.31	-243.73	291.00	262.58	-64.02	295.29	0.265	2.113	4.63	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364853.17	1547470.12	-246.43	294.00	265.28	-63.98	295.26	0.265	2.113	4.67	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364853.73	1547468.93	-249.12	297.00	267.97	-63.95	295.07	0.265	2.113	4.72	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364854.29	1547467.73	-251.82	300.00	270.67	-63.92	295.04	0.265	2.113	4.77	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364854.85	1547466.54	-254.51	303.00	273.36	-63.91	295.02	0.265	2.113	4.82	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364855.41	1547465.35	-257.20	306.00	276.06	-63.89	295.62	0.265	2.113	4.87	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364855.99	1547464.15	-259.90	309.00	278.75	-63.86	295.70	0.265	2.113	4.92	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364856.56	1547462.96	-262.59	312.00	281.44	-63.85	295.57	0.265	2.113	4.97	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364857.13	1547461.77	-265.28	315.00	284.14	-63.81	295.55	0.265	2.113	5.01	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364857.70	1547460.57	-267.97	318.00	286.83	-63.77	295.51	0.265	2.113	5.06	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364858.27	1547459.38	-270.67	321.00	289.52	-63.75	295.58	0.265	2.113	5.11	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364858.84	1547458.18	-273.36	324.00	292.21	-63.72	295.57	0.265	2.113	5.16	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364859.42	1547456.98	-276.05	327.00	294.90	-63.67	295.58	0.265	2.113	5.21	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364859.99	1547455.78	-278.73	330.00	297.59	-63.64	295.73	0.265	2.113	5.26	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364860.57	1547454.58	-281.42	333.00	300.27	-63.60	295.76	0.265	2.113	5.31	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364861.16	1547453.38	-284.11	336.00	302.96	-63.55	295.88	0.265	2.113	5.36	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364861.74	1547452.18	-286.79	339.00	305.65	-63.53	295.92	0.265	2.113	5.41	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364862.32	1547450.97	-289.48	342.00	308.33	-63.51	295.99	0.265	2.113	5.46	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364862.91	1547449.77	-292.16	345.00	311.02	-63.53	296.00	0.265	2.113	5.51	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364863.50	1547448.57	-294.85	348.00	313.70	-63.53	296.00	0.265	2.113	5.56	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364864.08	1547447.37	-297.54	351.00	316.39	-63.53	295.88	0.265	2.113	5.60	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364864.67	1547446.16	-300.22	354.00	319.07	-63.53	295.87	0.265	2.113	5.65	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364865.25	1547444.96	-302.91	357.00	321.76	-63.52	295.89	0.265	2.113	5.70	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364865.84	1547443.76	-305.59	360.00	324.44	-63.52	296.26	0.265	2.113	5.75	Measured	2007-07-10 09:38

KLX16A	RT90-RHB70	6364866.43	1547442.56	-308.28	363.00	327.13	-63.51	296.16	0.265	2.113	5.80	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364867.02	1547441.36	-310.96	366.00	329.81	-63.51	296.16	0.265	2.113	5.85	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364867.60	1547440.15	-313.65	369.00	332.50	-63.52	295.64	0.265	2.113	5.90	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364868.18	1547438.95	-316.33	372.00	335.19	-63.53	295.65	0.265	2.113	5.95	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364868.76	1547437.74	-319.02	375.00	337.87	-63.55	295.69	0.265	2.113	6.00	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364869.34	1547436.54	-321.70	378.00	340.56	-63.55	296.08	0.265	2.113	6.05	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364869.93	1547435.34	-324.39	381.00	343.24	-63.56	296.09	0.265	2.113	6.10	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364870.52	1547434.14	-327.08	384.00	345.93	-63.56	296.03	0.265	2.113	6.15	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364871.10	1547432.94	-329.76	387.00	348.62	-63.56	295.79	0.265	2.113	6.20	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364871.68	1547431.74	-332.45	390.00	351.30	-63.56	295.79	0.265	2.113	6.25	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364872.26	1547430.53	-335.14	393.00	353.99	-63.58	295.61	0.265	2.113	6.29	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364872.84	1547429.33	-337.82	396.00	356.68	-63.60	295.60	0.265	2.113	6.34	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364873.42	1547428.13	-340.51	399.00	359.36	-63.61	295.66	0.265	2.113	6.39	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364874.00	1547426.93	-343.20	402.00	362.05	-63.62	295.89	0.265	2.113	6.44	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364874.58	1547425.73	-345.88	405.00	364.74	-63.61	295.93	0.265	2.113	6.49	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364875.16	1547424.53	-348.57	408.00	367.42	-63.59	295.95	0.265	2.113	6.54	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364875.75	1547423.33	-351.26	411.00	370.11	-63.58	296.00	0.265	2.113	6.59	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364876.33	1547422.13	-353.94	414.00	372.80	-63.55	296.02	0.265	2.113	6.64	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364876.92	1547420.93	-356.63	417.00	375.48	-63.52	296.02	0.265	2.113	6.69	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364877.51	1547419.73	-359.32	420.00	378.17	-63.51	296.34	0.265	2.113	6.74	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364878.11	1547418.53	-362.00	423.00	380.86	-63.74	296.89	0.265	2.113	6.79	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364878.70	1547417.34	-364.69	426.00	383.54	-63.48	296.05	0.265	2.113	6.84	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364879.29	1547416.14	-367.37	429.00	386.23	-63.48	296.05	0.265	2.113	6.89	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364879.87	1547414.92	-370.06	432.00	388.91	-63.22	295.11	0.265	2.113	6.93	Measured	2007-07-10 09:38
KLX16A	RT90-RHB70	6364880.17	1547414.29	-371.44	433.55	390.29	-63.22	295.11	0.265	2.113	6.96	Measured	2007-07-10 09:38

Number of rows: 146.
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