P-05-222

Oskarshamn site investigation

Hydraulic injection tests in borehole KLX05, 2005

Subarea Laxemar

Nils Rahm, Golder Associates AB

Cristian Enachescu, Golder Associates GmbH

December 2005

Svensk Kärnbränslehantering AB

Swedish Nuclear Fuel and Waste Management Co Box 5864

SE-102 40 Stockholm Sweden Tel 08-459 84 00

+46 8 459 84 00 Fax 08-661 57 19 +46 8 661 57 19



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Keywords: Site/project, Hydrogeology, Hydraulic tests, Injection test, Hydraulic parameters, Transmissivity, Constant head.

This report concerns a study which was conducted for SKB. The conclusions and viewpoints presented in the report are those of the authors and do not necessarily coincide with those of the client.

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Abstract

Hydraulic injection tests have been performed in Borehole KLX05 at the Laxemar area, Oskarshamn. The tests are part of the general program for site investigations and specifically for the Laxemar subarea. The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties of the fractured zones and rock mass between them. Data is subsequently delivered for the site descriptive model.

This report describes the results and primary data evaluation of the hydraulic injection tests in borehole KLX05 performed between 1st of June and 17th of June 2005.

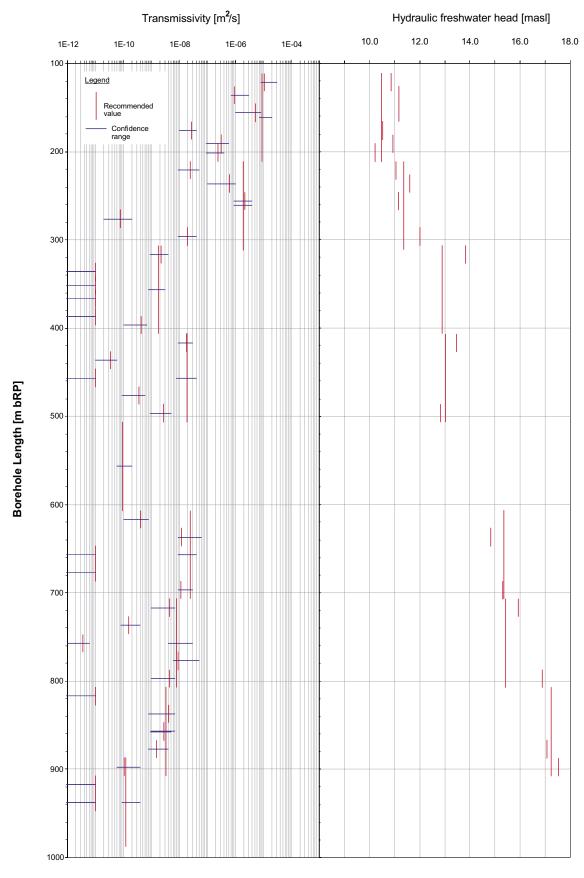
The objective of the hydrotests was to describe the rock around the borehole with respect of hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K) at different measurement scales of 100 m and 20 m sections. Transient evaluation during flow and recovery period provided additional information such as flow regimes, hydraulic boundaries and cross-over flows. Constant pressure injection tests were conducted between 111.30–947.34 m below ToC. The results of the test interpretation are presented as transmissivity, hydraulic conductivity and hydraulic freshwater head.

Sammanfattning

Injektionstester har utförts i borrhål KLX05 i delområde Laxemar, Oskarshamn. Testerna är en del av SKB:s platsundersökningar. Hydraultestprogrammet där injektionstesterna ingår har som mål att karakterisera berget med avseende på dess hydrauliska egenskaper av sprickzoner och mellanliggande bergmassa. Data från testerna används vid den platsbeskrivande modelleringen av området.

Denna rapport redovisar resultaten och utvärderingar av primärdata de hydrauliska injektionstesterna i borrhål KLX05. Testerna utfördes mellan den 1 juni till den 17 juni 2005.

Syftet med hydraultesterna var framförallt att beskriva bergets hydrauliska egenskaper runt borrhålet med avseende på hydrauliska parametrar, i huvudsak transmissvitet (T) och hydraulisk konduktivitet (K) vid olika mätskalor av 100 m och 20 m sektioner. Transient utvärdering under injektions- och återhämntningsfasen gav ytterligare information avseende flödesgeometri, hydrauliska gränser och sprickläckage. Injektionstester utfördes mellan 111,30–947,34 m borrhålslängd. Resultaten av testutvärderingen presenteras som transmissivitet, hydraulisk konduktivitet och grundvattennivå uttryckt i ekvivalent sötvattenpelare (freshwater head).



Borehole KLX05 – Summary of results.

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1 Introduction

A general program for site investigations presenting survey methods has been prepared /SKB 2001a/, as well as a site-specific program for the investigations in the Simpevarp area /SKB 2001b/. The hydraulic injection tests form part of the site characterization program under item 1.1.5.8 in the work breakdown structure of the execution programme, /SKB 2002/.

Measurements were carried out in borehole KLX05 during 1st of June and 17th of June 2005 following the methodology described in SKB MD 323.001 and in the activity plan AP PS 400-05-043 (SKB controlling documents). Data and results were delivered to the SKB site characterization database SICADA.

The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties of the fractured zones and rock mass between them. This report describes the results and primary data evaluation of the hydraulic injection tests in borehole KLX05. The commission was conducted by Golder Associates AB and Golder Associates GmbH.

Borehole KLX05 is situated in the Laxemar area approximately 2 km west of the nuclear power plant of Simpevarp, Figure 1-1. The borehole was drilled from August 2004 to January 2005 at 1,000.16 m length with an inner diameter of 76 mm and an inclination of approximately –65°. The upper 12.60 m is cased with large diameter telescopic casing ranging from diameter (outer diameter) 208–323 mm.

The work was carried out in accordance with activity plan AP PS 400-05-043. In Table 1-1 controlling documents for performing this activity are listed. Both activity plan and method descriptions are SKB's internal controlling documents. Measurements were conducted utilising SKB's custom made testing equipment PSS2.

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

Activity plan	Number	Version
Test pumping and hydraulic injection tests in borehole KLX05	AP PS 400-05-043	1.0
Method descriptions	Number	Version
Analysis of injection and single-hole pumping tests	SKB MD 320.004e	1.0
Hydraulic injection tests	SKB MD 323.001	1.0
Instruktion för rengöring av borrhålsutrustning och viss markbaserad utrustning	SKB MD 600.004	1.0
Instruktion för längdkalibrering vid undersökningar i kärnborrhål	SKB MD 620.010	1.0
Allmänna ordning-, skydds- och miljöregler för platsundersökningar Oskarshamn	SKB SDPO-003	1.0
Miljökontrollprogram Platsundersökningar	SKB SDP-301	1.0
Hantering av primärdata vid platsundersökningar	SKB SDP-508	1.0

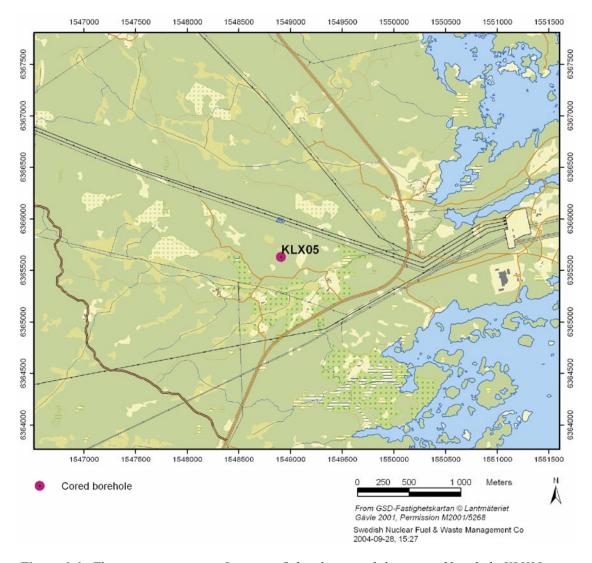


Figure 1-1. The investigation area Laxemar, Oskarshamn with location of borehole KLX05.

2 Objective

The objective of the hydrotests in borehole KLX05 is to describe the rock around the borehole with respect to hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K). This is done at different measurement scales of 100 m and 20 m sections. Among these parameters transient evaluation during the flow and recovery period provides additional information such as flow regimes, hydraulic boundaries and cross-over flows.

3 Scope of work

The scope of work consisted of preparation of the PSS2 tool which included cleaning of the down-hole tools, calibration and functional checks, injection tests of 100 m and 20 m test sections, analyses and reporting.

Preparation for testing was done according to the Quality plan. This step mainly consists of functions checks of the equipment to be used, the PSS2 tool. Calibration checks and function checks were documented in the daily log and/or relevant documents.

The following hydraulic injection tests were performed between 1st June and 17th June 2005.

Table 3-1. Performed injection tests at borehole KLX05.

No of injection tests	Interval	Positions	Time/test	Total test time
9	100 m	111.30–987.27 m	125 min	18.8 hrs
39*	20 m	111.30-947.34 m	90 min	58.5 hrs
Total				77.3 hrs

^{*} excluding repeated tests.

The initially planned 20 m tests between 947 and 987 m were not performed due to the response of the section below at the test from 927.34–947.34 m bToC. The response showed clearly, that this part of the borehole is very tight and below the rated measurement limit of the testing system. This was approved by SKB.

3.1 Borehole

The borehole is telescope drilled with specifications on its construction according to Table 3-2. The reference point of the borehole is the centre of top of casing (ToC), given as elevation in table below. The Swedish National coordinate system (RT90) is used in the x-y direction and RHB70 in the z-direction. Northing and Easting refer to the top of the boreholes at the ground surface. The borehole diameter in Table 3-2 refers to the final diameter of the drill bit after drilling to full depth.

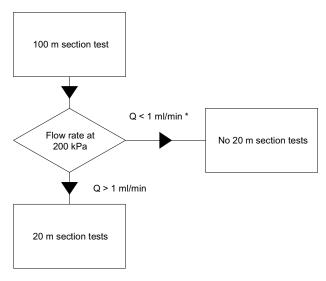
Table 3-2. Information about KLX05 (from SICADA 2005-05-18 09:11:01).

Title	Value				
Borehole length (m):	1,000.160				
Drilling period (s):	From date 2004-08-11 2004-10-01	To date 2004-08-25 2005-10-22	Secup (m) 0.000 100.300	Seclow (m) 100.300 1,000.160	Drilling type Percussion drilling Core drilling
Starting point coordinate: (centerpoint of TOC)	Length (m) 0.000 0.000 0.000	Northing (m) 6365632.555 6365633.374 5660.073	Easting (m) 1548909.477 1548909.431 –775.586	Elevation (masl) 17.538 17.608 17.580	Coord system RT38-RH00 Transformed RT90-RHB70 Measured ÄSPÖ96 Transformed
Angles:	Length (m) 0.000	Bearing 189.721	Inclination (- = -65.120	down)	RT90-RHB70
Borehole diameter:	Secup (m) 0.000 12.600 15.000 75.100 76.480	Seclow (m) 12.600 15.000 75.100 76.480 1,000.160	Hole Diam (m) 0.343 0.230 0.195 0.086 0.076		
Core diameter:	Secup (m) 75.100 76.480	Seclow (m) 76.480 1,000.160	Core diam (m) 0.072 0.050		
Casing diameter:	Secup (m) 0.000 0.000	Seclow (m) 15.000 12.600	Case in (m) 0.220 0.310	Case out (m) 0.208 0.323	
Cone dimensions:	Secup (m) 70.950	Seclow (m)	Cone in (m)	Cone out (m)	
Grove milling:	Length (m) 110.000 150.000 200.000 250.000 300.000 350.000 399.000 450.000 500.000 650.000 700.000 750.000 800.000 850.000 900.000	Trace detectate YES	ole		

During the 20 m testing campaign, the markers were not detected due to malfunctioning caliper sensor. Length correction was made with marker values detected during the 100 m testing!

3.2 Injection tests

Injection tests were conducted according to the Activity Plan AP PS 400-05-043 and the method description for hydraulic injection tests, SKB MD 323.001 (SKB internal documents). Tests were done in 100 m test sections between 111.30–987.27 m below ToC and in 20 m test sections between 111.30–947.37 m below ToC (see Table 3-3). The initial criteria for performing injection tests in 20 m test sections was a measurable flow of Q > 0.001 L/min in the previous measured 100 m tests covering the smaller 20 m sections (see Figure 3-1). The measurements were performed with SKBs custom made equipment for hydraulic testing called PSS2.



^{*} eventually tests performed after specific discussion with SKB

Figure 3-1. Flow chart for test sections.

Table 3-3. Tests performed.

Bh ID	Test section (m bToC)	Test type ¹	Test no	Test start date, time	Test stop date, time
KLX05	111.30–211.30	3	1	2005.06.01 17:37	2005.06.01 21:07
KLX05	211.14-311.14	3	1	2005.06.02 09:21	2005.06.02 11:45
KLX05	306.37-406.37	3	1	2005.06.02 13:30	2005.06.02 16:22
KLX05	406.54-506.54	3	1	2005.06.02 17:49	2005.06.02 23:32
KLX05	506.63-606.63	4	1	2005.06.03 09:11	2005.06.03 11:11
KLX05	606.82-706.82	3	1	2005.06.03 12:41	2005.06.03 15:26
KLX05	706.83-806.83	3	1	2005.06.03 16:56	2005.06.04 00:46
KLX05	807.11-907.11	3	1	2005.06.04 09:20	2005.06.04 12:18
KLX05	887.27-987.27	3	1	2005.06.04 14:00	2005.06.04 17:10
KLX05	111.30-131.30	3	1	2005.06.09 19:46	2005.06.09 22:00
KLX05	111.30-131.30	3	2	2005.06.10 13:12	2005.06.10 14:40
KLX05	126.02-146.02	3	1	2005.06.10 15:35	2005.06.10 17:02
KLX05	146.10-166.10	3	1	2005.06.10 17:47	2005.06.10 20:20
KLX05	166.12-186.12	3	1	2005.06.11 08:54	2005.06.11 10:27
KLX05	181.13-201.13	3	1	2005.06.11 11:14	2005.06.11 13:04
KLX05	191.14-201.14	3	1	2005.06.11 13:38	2005.06.11 15:11
KLX05	211.14-231.14	3	1	2005.06.11 15:55	2005.06.11 17:23
KLX05	226.14-246.14	3	1	2005.06.11 18:10	2005.06.11 19:59
KLX05	246.15-266.15	3	1	2005.06.12 08:10	2005.06.12 09:44
KLX05	266.21-286.21	4	1	2005.06.12 10:21	2005.06.12 11:49
KLX05	286.28-306.28	3	1	2005.06.12 12:29	2005.06.12 13:58
KLX05	306.37-326.37	3	1	2005.06.12 14:39	2005.06.12 16:22
KLX05	326.38-346.38	4	1	2005.06.12 17:03	2005.06.12 18:05
KLX05	341.40-361.40	3	1	2005.06.12 18:38	2005.06.12 19:40
KLX05	356.42-376.42	3	1	2005.06.13 07:26	2005.06.13 08:31
KLX05	376.47-396.47	3	1	2005.06.13 09:17	2005.06.13 10:23
KLX05	386.50-406.50	4	1	2005.06.13 11:00	2005.06.13:12:27
KLX05	406.54-426.54	3	1	2005.06.13 13:04	2005.06.13 14:46
KLX05	426.55-446.55	4	1	2005.06.13 15:32	2005.06.13 16:53
KLX05	446.57-466.57	3	1	2005.06.13 17:33	2005.06.13 18:38
KLX05	466.58-486.58	4	1	2005.06.13 19:13	2005.06.14 01:56
KLX05	486.59-506.59	3	1	2005.06.14 07:40	2005.06.14 09:27
KLX05	606.82-626.82	4	1	2005.06.14 11:09	2005.06.14 12:33
KLX05	626.85-646.85	3	1	2005.06.14 13:16	2005.06.14 15:26
KLX05	646.85-666.85	3	1	2005.06.14 16:07	2005.06.14 17:12
KLX05	666.85-686.85	3	1	2005.06.14 17:56	2005.06.14 18:57
KLX05	686.83-706.83	3	1	2005.06.14 19:48	2005.06.15 00:58
KLX05	706.83-726.83	3	1	2005.06.15 08:02	2005.06.15 09:58
KLX05	726.91-746.91	4	1	2005.06.15 10:40	2005.06.15 11:52
KLX05	747.00-767.00	4	1	2005.06.15 12:45	2005.06.15 14:11
KLX05	767.06-787.06	3	1	2005.06.15 14:50	2005.06.15 16:25
KLX05	787.07-807.07	3	1	2005.06.15 17:07	2005.06.16 01:36
KLX05	807.11-827.11	3	1	2005.06.16 08:05	2005.06.16 09:07
KLX05	827.15-847.15	3	1	2005.06.16 09:52	2005.06.16 12:29
KLX05	847.20-867.20	3	1	2005.06.16 13:09	2005.06.16 00:00
KLX05	867.24–887.24	3	1	2005.06.16 15:39	2005.06.16 17:25
KLX05	887.27–907.27	3	1	2005.06.16 18:07	2005.06.17 03:30
KLX05	907.30–927.30	4	1	2005.06.17 07:33	2005.06.17 08:27
KLX05	927.34–947.34	3	1	2005.06.17 09:13	2005.06.17 10:14
			-		

¹ 1: 3: Injection test; 4: Pulse injection test.

No other additional measurements except the actual hydraulic tests and related measurements of packer position and water level in annulus of borehole KLX05 were conducted.

3.3 Control of equipment

Control of equipment was mainly performed according to the Quality plan. The basis for equipment handling is described in the "Mätssystembeskrivning" SKB MD 345.101–123 which is composed of two parts 1) management description, 2) drawings and technical documents of the modified PSS2 tool.

Function checks were performed before and during the tests. Among these pressure sensors were checked at ground level and while running in the hole calculated to the static head. Temperature was checked at ground level and while running in. Leakage checks at joints in the pipe string were done at least every 100 m of running in.

Any malfunction was recorded, and measures were taken accordingly for proper operation. Approval was made according to SKB site manager, or Quality plan and the "Mätssystembeskrivning".

4 Equipment

4.1 Description of equipment

The equipment called PSS2 (Pipe String System 2) is a highly integrated tool for testing boreholes at great depth (see conceptual drawing in the next figure). The system is built inside a container suitable for testing at any weather. Briefly, the components consists of a hydraulic rig, down-hole equipment including packers, pressure gauges, shut-in tool and level indicator, racks for pump, gauge carriers, breakpins, etc shelfs and drawers for tools and spare parts.

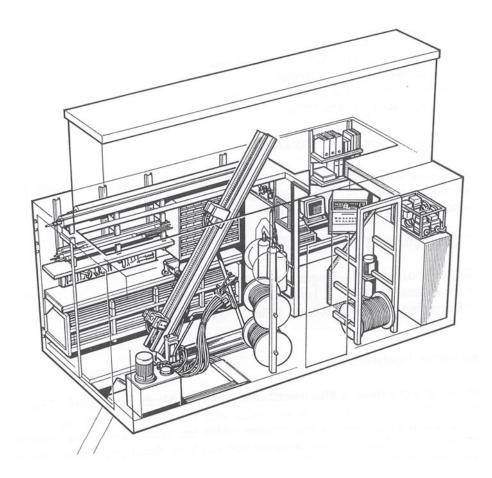


Figure 4-1. A view of the layout and equipment of PSS2.

There are three spools for a multi-signal cable, a test valve hose and a packer inflation hose. There is a water tank for injection purposes, pressure vessels for injection of packers, to open test valve and for low flow injection. The PSS2 has been upgraded with a computerized flow regulation system. The office part of the container consists of a computer, regulation valves for the nitrogen system, a 24 V back-up system in case of power shut-offs and a flow regulation board.

PSS2 is documented in photographs 1–6.



Photo 1. Hydraulic rig.



Photo 2. Rack for pump, down-hole equipment, workbench and drawers for tools.

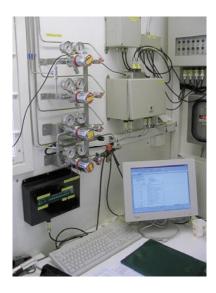


Photo 3. Computer room, displays and gas regulators.



Photo 4. Pressure vessels for test valve, packers and injection.





Photo 5. Positioner, bottom end of down-in-hole string.

Photo 6. Packer and gauge carrier.

The down-hole equipment consists from bottom to top of the following equipment:

- Level indicator SS 630 mm pipe with OD 73 mm with 3 plastic wheels connected to a Hallswitch.
- Gauge carrier SS 1.5 m carrying bottom section pressure transducer and connections from positioner.
- Lower packer SS and PUR 1.5 m with OD 72 mm, stiff ends, tightening length 1.0 m, maximum pressure 6.5 MPa, working pressure 1.6 MPa.
- Gauge carrier with breakpin SS 1.75 m carrying test section pressure transducer, temperature sensor and connections for sensors below. Breakpin with maximum load of 47.3 (± 1.0) kN. The gauge carrier is covered by split pipes and connected to a stone catcher on the top.
- Pop joint SS 1.0 or 0.5 m with OD 33 mm and ID 21 mm, double O-ring fittings, trapezoid thread, friction loss of 3 kPa/m at 50 L/min.
- Pipe string SS 3.0 m with OD 33 mm and ID 21 mm, double O-ring fittings, trapezoid thread, friction loss of 3 kPa/m at 50 L/min.
- Contact carrier SS 1.0 m carrying connections for sensors below.
- Upper packer SS and PUR 1.5 m with OD 72 mm, fixed ends, seal length 1.0 m, maximum pressure 6.5 MPa, working pressure 1.6 MPa.
- Breakpin SS 250 mm with OD 33.7 mm. Maximum load of $47.3 (\pm 1.0)$ kN.
- Gauge carrier SS 1.5 m carrying top section pressure transducer, connections from sensors below. Flow pipe is double bent at both ends to give room for sensor equipment. The pipe gauge carrier is covered by split pipes.
- Shut-in tool (test valve) SS 1.0 m with a OD of 48 mm, Teflon coated valve piston, friction loss of 11 kPa at 10 L/min (260 kPa–50 L/min). Working pressure 2.8–4.0 MPa. Breakpipe with maximum load of 47.3 (± 1.0) kN. The shut-in tool is covered by split pipes and connected to a stone catcher on the top.

The tool scheme is presented in Figure 4-2.

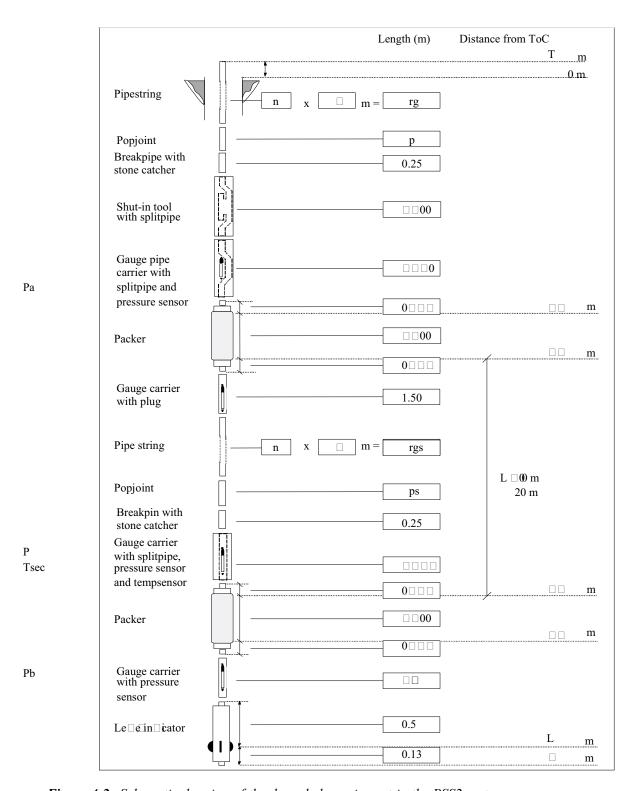


Figure 4-2. Schematic drawing of the down-hole equipment in the PSS2 system

4.2 Sensors

Table 4-1. Technical specifications of sensors.

Keyword	Sensor	Name	Value/range	Unit	Comments
p _{sec,a,b}	Pressure	Druck PTX 162- 1464abs	9–30 4–20 0–13.5 ± 0.1	VDC mA MPa % of FS	
$T_{sec,surf,air}$	Temperature	BGI	18–24 4–20 0–32 ± 0.1	VDC mA °C °C	
Q_{big}	Flow	Micro motion Elite sensor	0–100 ± 0.1	kg/min %	Massflow
$Q_{\text{small}} \\$	Flow	Micro motion Elite sensor	0–1,8 ± 0.1	kg/min %	Massflow
P _{air}	Pressure	Druck PTX 630	9–30 4–20 0–120 ± 0.1	VDC mA KPa % of FS	
p_{pack}	Pressure	Druck PTX 630	9–30 4–20 0–4 ± 0.1	VDC mA MPa % of FS	
$p_{\text{in,out}}$	Pressure	Druck PTX 1400	9–28 4–20 0–2,5 ± 0.15	VDC mA MPa % of FS	
L	Level Indicator				Length correction

Table 4-2. Sensor positions and wellbore storage (WBS) controlling factors.

Borehole	information		Senso	rs	Equipment af	Equipment affecting WBS coefficient		
ID	Test section (m)	Test no	Type	Position (m fr ToC)	Position	Function	Outer diameter (mm)	
KLX05	111.30–211.30	1	pa	110.30	Test section	Signal cable	9.1	
	p 210.53 T 210.28	Pump string	33					
			p _b L	213.31 214.68		Packer line	6	
KLX05	111.30-131.30	2	p_a	110.30	Test section	Signal cable	9.1	
			p T	130.53 130.28		Pump string	33	
			p _b L	133.31 134.68		Packer line	6	

4.3 Data acquisition system

The data acquisition system in the PSS2 container contains a stationary PC with the software Orchestrator, pump- and injection test parameters such as pressure, temperature and flow are monitored and sensor data collected. A second laptop PC is connected to the stationary PC through a network containing evaluation software, Flowdim. While testing, data from previously tested section is converted with IPPlot and entered in Flowdim for evaluation.

The data acquisition system starts and stops the test automatically or can be disengaged for manual operation of magnetic and regulation valves within the injection/pumping system. The flow regulation board is used for differential pressure and valve settings prior testing and for monitoring valves during actual test. An outline of the data acquisition system is outlined in Figure 4-3.

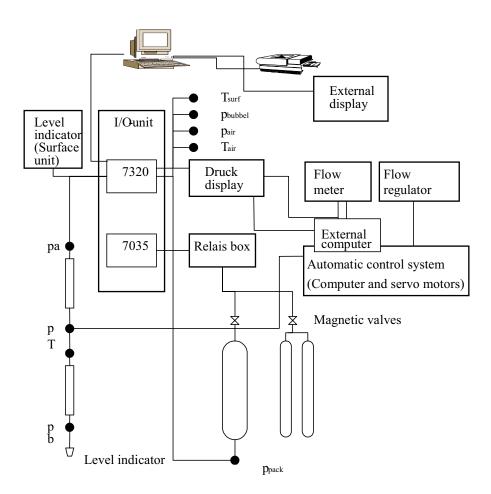


Figure 4-3. Schematic drawing of the data acquisition system and the flow regulation control system in PSS2.

5 Execution

5.1 Preparations

Following preparation work and functional checks were conducted prior to starting test activities:

- Place pallets and container, lifting rig up, installing fence on top of container, lifting tent on container.
- Clean and desinfect of Multikabel and hoses for packer and test valve. Clean the tubings with hot steam.
- Clean tanks with chloride dioxide. Filling injection tank with water out of the borehole KLX05.
- Filling buffer tank with water and tracer it with Uranin; take water sample.
- · Filling vessels.
- Filling the hoses for test valve and packer.
- Entering calibration constants to system and regulation unit.
- · Synchronize clocks on all computers.
- Function check of shut-in tool both ends, overpressure by 900 kPa for 5 min (OK).
- Check pressure gauges against atmospheric pressure and than on test depth against column of water.
- Translate all protocols into English (where necessary).
- Filling packers with water and de-air.
- Measure and assemble test tool.

5.2 Length correction

By running in with the test tool, a level indicator is incorporated at the bottom of the tool. The level indicator is able to record groves milled into the borehole wall. The depths of this groves are given by SKB in the activity plan (see Table 3-2) and the measured depth is counter checked against the number/length of the tubes build in. The achieved correction value, based on linear interpolation between the reference marks, is used to adjust the location of the packers for the testsections to avoid wrong placements and minimize elongation effects of the test string. Due to a technical problem with the level indicator, no markers were detected during the 20 m tests. It was decided to use the correction values received from the 100 m tests to adjust the depth for the 20 m tests. This was approved by SKB.

5.3 Execution of tests/measurements

5.3.1 Test principle

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a shut-in pressure recovery (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

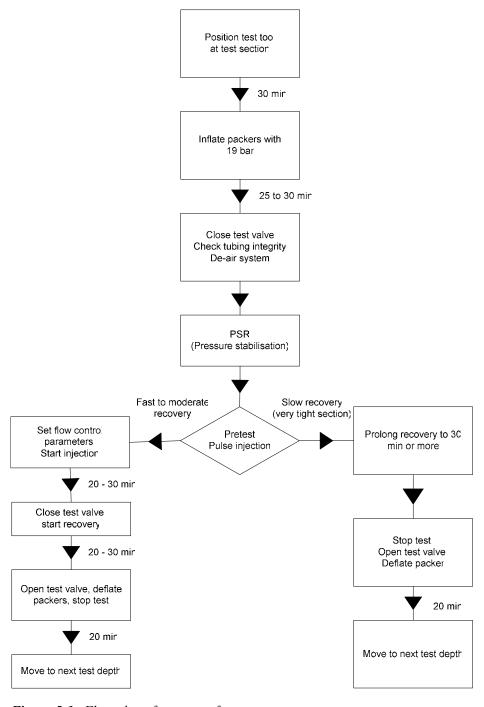


Figure 5-1. Flow chart for test performance.

5.3.2 Test procedure

A test cycle includes the following phases: 1) Transfer of down-hole equipment to the next section. 2) Packer inflation. 3) Pressure stabilisation. 4) Pulse injection. 5) Constant head injection. 6) Pressure recovery. 7) Packer deflation. The injection tests in KLX05 has been carried out by applying a constant injection pressure of approximately 200 kPa (20 m water column) above the static formation pressure in the test section. Before start of the injection tests, approximately stable pressure conditions prevailed in the test section. After the injection period, the pressure recovery in the section was measured. In cases, where small flow rates were expected, the automatic regulation unit was switched off and the test was performed manually. In those cases, the constant difference pressure was usually unequal to 200 kPa. In other cases, where the pressure recovery of the pulse injection test took very long, the recovery was extended and the pulse test was taken for the analysis. No injection test was performed in those sections.

The duration for each phase is presented in Table 5-1.

Table 5-1. Durations for packer inflation, pressure stabilisation, injection and recovery phase and packer deflation in KLX05.

•	Position test tool to new test section (correct position using the borehole markers)	Approx 30 min
•	Inflate packers with approx 1,900 kPa	25 min
•	Close test valve	10 min
•	Check tubing integrity with approx 800 kPa	5 min
•	De-air system	2 min
•	Pretest, pulse injection	2-30 min
•	Set automatic flow control parameters or setting for manual test	5 min
•	Start injection	20 to 45 min
•	Close test valve, start recovery	20 min or more
•	Open test valve	10 min
•	Deflate packers	25 min
•	Move to next test depth	-

5.4 Data handling

The data handling followed several stages. The data acquisition software (Orchestrator) produced an ASCII raw data file (*.ht2) which contains the data in voltage and milliampere format plus calibration coefficients. The *.ht2 files were processed to *.dat files using the SKB program called IPPlot. These files contain the time, pressure, flow rate and temperature data. The *.dat files were synthesised in Excel to a *.xls file for plotting purposes. Finally, the test data to be delivered to SKB were exported from Excel in *.csv format. These files were also used for the subsequent test analysis.

5.5 Analyses and interpretation

5.5.1 Analysis software

The tests were analysed using a type curve matching method. The analysis was performed using Golder's test analysis program FlowDim. FlowDim is an interactive analysis environment allowing the user to interpret constant pressure, constant rate and slug/pulse tests in source as well as observation boreholes. The program allows the calculation of type-curves for homogeneous, dual porosity and composite flow models in variable flow geometries from linear to spherical.

5.5.2 Analysis approach

Constant pressure tests are analysed using a rate inverse approach. The method initially known as the /Jacob and Lohman 1952/ method was further improved for the use of type curve derivatives and for different flow models.

Constant pressure recovery tests are analysed using the method described by /Gringarten 1986/ and /Bourdet et al. 1989/ by using type curve derivatives calculated for different flow models.

Pulse tests are analysed by using the pressure deconvolution method described by /Peres et al. 1989/ with improvements introduced by /Chakrabarty and Enachescu 1997/.

5.5.3 Analysis methodology

Each of the relevant test phases is subsequently analyzed using the following steps:

Injection Tests

- Identification of the flow model by evaluation of the derivative on the log-log diagnostic plot. Initial estimates of the model parameters are obtained by conventional straight-line analysis.
- Superposition type curve matching in log-log coordinates. A non-linear regression algorithm is used to provide optimized model parameters in the latter stages.
- Non-linear regression in semi-log coordinates (superposition HORNER plot) /Horner 1951/. In this stage of the analysis, the static formation pressure is selected for regression.

The test analysis methodology is best explained in /Horne 1990/.

Pulse Injection Tests

A test cycle always started with a pulse injection test whose goal it was to derive a first estimation of the formation transmissivity. If the pressure recovery of this brief injection was very slow, it indicated a very tight section. It is then decided to extend the recovery time and measure the pressure recovery (PI).

During the brief injection phase a small volume is injected (derived from the flowmeter measurements and/or replacement in injection vessel). This injected volume produces the pressure increase of dp. Using a dV/dp approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the

derived transmissivity. Figure 5-2 below show an example of a typical pressure versus time evolution for such a tight section.

- Calculation of initial estimates of the model parameters by using the Ramey Plot /Ramey et al. 1975/. This plot is typically not presented in the appendix.
- Flow model identification and type curve analysis in the deconvolution Peres Plot /Peres et al. 1989, Chakrabarty and Enachescu 1997/. A non-linear regression algorithm is used to provide optimized model parameters in the later stages. An Example of the type curves is presented in Figure 5-3.

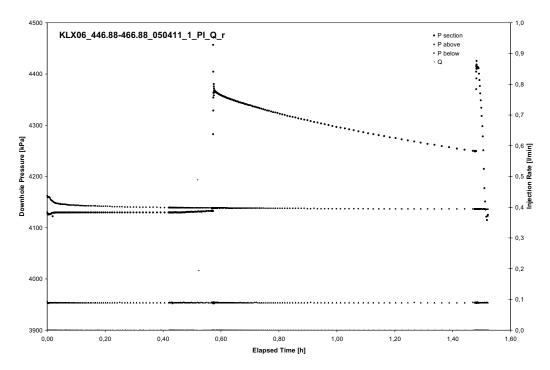


Figure 5-2. Typical pressure versus time plot of a Pulse injection test.

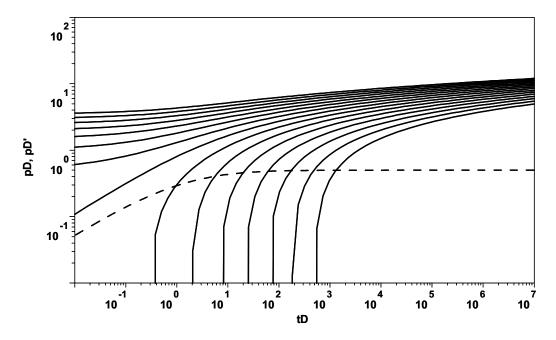


Figure 5-3. Deconvolution type curve set for pulse test analysis.

5.5.4 Steady state analysis

In addition to the type curve analysis, an interpretation based on the assumption of stationary conditions was performed as described by /Moye 1967/.

5.5.5 Flow models used for analysis

The flow models used in analysis were derived from the shape of the pressure derivative calculated with respect to log time and plotted in log-log coordinates.

In several cases the pressure derivative suggests a change of transmissivity with the distance from the borehole. In such cases a composite flow model was used in the analysis.

If there were different flow models matching the data in comparable quality, the simplest model was preferred.

The flow dimension displayed by the test can be diagnosed from the slope of the pressure derivative. A slope of 0.5 indicates linear flow, a slope of 0 (horizontal derivative) indicates radial flow and a slope of -0.5 indicates spherical flow. The flow dimension diagnosis was commented for each of the tests. At tests where a flow regime could not clearly identified from the test data, we assume in general a radial flow regime as the most simple flow model available. The value of p* was then calculated according to this assumption.

In cases when the infinite acting radial flow (IARF) phase was not supported by the data the derivative was extrapolated using the most conservative assumption, which is that the derivative would stabilise short time after test end. In such cases the additional uncertainty was accounted for in the estimation of the transmissivity confidence ranges.

5.5.6 Calculation of the static formation pressure and equivalent freshwater head

The static formation pressure (p*) measured at transducer depth, was derived from the pressure recovery (CHir) following the constant pressure injection phase by using straight line or type curve extrapolation in the Horner plot, assuming that infinite acting radial flow (IARF) occurred.

The equivalent freshwater head (expressed in metres above sea level) was calculated from the extrapolated static formation pressure (p*), corrected for athmospheric pressure measured by the surface gauge and corrected for the vertical depth considering the inclination of the drillhole, by assuming a water density of 1,000 kg/m³ (freshwater). The equivalent freshwater head is the static water level an individual test interval would show if isolated and connected to the surface by tubing full of freshwater. Figure 5-4 shows the methodology schematically.

The freshwater head in metres above sea level is calculated as following:

$$head = \frac{(p * - p_{atm})}{\rho \cdot g}$$

which is the p* value expressed in a water column of freshwater.

With consideration of the elevation of the reference point (RP) and the gauge depth (Gd), the freshwater head $h_{\rm iwf}$ is:

$$h_{iwf} = RP_{elev} - Gd + \frac{(p * - p_{atm})}{\rho \cdot g}$$

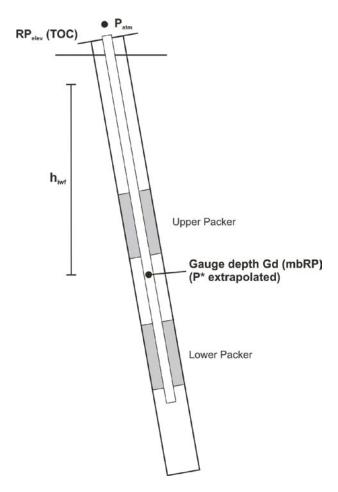


Figure 5-4. Schematic methodologies for calculation of the freshwater head.

5.5.7 Derivation of the recommended transmissivity and the confidence range

In most of the cases more than one analysis was conducted on a specific test. Typically both test phases were analysed (CHi and CHir) and in some cases the CHi or the CHir phase was analysed using two different flow models. The parameter sets (i.e. transmissivities) derived from the individual analyses of a specific test usually differ. In the case when the differences are small (which is typically the case) the recommended transmissivity value is chosen from the test phase that shows the best data and derivative quality.

In cases when the difference in results of the individual analyses was large (more than half order of magnitude) the test phases were compared and the phase showing the best derivative quality was selected.

The confidence range of the transmissivity was derived using expert judgement. Factors considered were the range of transmissivities derived from the individual analyses of the test as well as additional sources of uncertainty such as noise in the flow rate measurement, numeric effects in the calculation of the derivative or possible errors in the measurement of the wellbore storage coefficient. No statistical calculations were performed to derive the confidence range of transmissivity.

In cases when the infinite acting radial flow (IARF) phase was not supported by the data the additional uncertainty was accounted for in the estimation of the transmissivity confidence ranges.

6 Results

In the following, results of all tests are presented and analysed. Chapter 6.1 presents the 100 m tests and 6.2 the 20 m tests. The results are given as general comments to test performance, the identified flow regimes and calculated parameters. Finally, the parameters which are considered as most representative are chosen and justifications are given. All results are also summarised in Tables 7-1 and 7-2 of the Synthesis chapter.

6.1 100 m single-hole injection tests

In the following, the 100 m section tests conducted in borehole KLX05 are presented and analysed.

6.1.1 Section 111.30-211.30 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 215 kPa. A slight reaction between the test interval and the bottom zone was observed The injection rate decreased from 30.2 L/min at start of the CHi phase to 15.8 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a slight indication of horizontal stabilization at early times and a downward trend at middle times, followed by a new stabilization at late times, which is indicative for a transition to a zone of higher transmissivity at some distance from the borehole. The response of the CHir phase is consistent to the response of the CHi phase. A two shell radial composite flow model was chosen for the analysis of the CHi and CHir phase. The analysis is presented in Appendix 2-1.

Selected representative parameters

The recommended transmissivity of 9.1E–6 m²/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–6 to 2.0E–5 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,882.8 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.1.2 Section 211.14–311.14 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 200 kPa. No hydraulic connection between test interval and the adjacent zones was observed The injection rate decreased from 10.5 L/min at start of the CHi phase to 3.5 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at early times, followed by a downward trend at middle times and a stabilization at a lower level at late times, indicating a higher transmissivity away from the borehole and radial flow. The derivative of the CHir phase is compatible with the one of the CHi phase, except of the late time stabilization. Both phases were matched using a radial composite flow model. The analysis is presented in Appendix 2-2.

Selected representative parameters

The recommended transmissivity of 1.9E–6 m²/s was derived from the analysis of the CHi phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–7 to 4.0E–6 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,770.3 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.1.3 Section 306.37–406.37 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. All test phases (Pi, CHi and CHir) were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 193 kPa. No hydraulic connection between test interval and the adjacent zones was observed. Due to the low

flow, the recorded flow rate is very noisy. However, the CHi phase is still amenable for qualitative analysis. The injection rate decreased from 10 mL/min at start of the CHi phase to 3 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems, but due to the fact that no radial flow was reached, the results should be regarded carefully. The Pi phase could be analysed quantitatively, too.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is quite noisy and does not allow flow model identification. The CHi phase was matched using an infinite acting radial homogeneous flow model. The CHir response shows a unit slop upward trend of the derivative at early and middle times without reaching a radial flow stabilization, which is typical for the transition from wellbore storage and skin dominated flow to pure formation flow. A radial homogeneous flow model with wellbore storage and skin was used for the analysis of the CHir phase. The Pi phase shows a flat derivative at middle times indicating a flow dimension of two (radial flow) and was analysed using a homogeneous flow model. The analysis is presented in Appendix 2-3.

Selected representative parameters

The recommended transmissivity of 1.8E–9 m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–10 to 3.0E–9 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,613.2 kPa.

The analysis of the Pi, CHi and CHir phases shows consistencies. No further analysis is recommended.

6.1.4 Section 406.54–506.54 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively moderate formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 192 kPa. No hydraulic connection between test interval and the adjacent zones was observed The injection rate decreased from 49 mL/min at start of the CHi phase to 14 mL/min at the end, indicating a relatively moderate to low transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the CHi phase shows a horizontal stabilization at early times, followed by an unit slope upward trend at middle

and late times, indicating either a transition to a zone of lower transmissivity or a change in flow dimension. The derivative of the CHir phase shows an upward trend at late times, too. Both phases were matched using a radial composite flow model with decreasing transmissivity away from the borehole. The analysis is presented in Appendix 2-4.

Selected representative parameters

The recommended transmissivity of 1.9E–8 m²/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–9 to 4.0E–8 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,517.7 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.1.5 Section 506.63-606.63 m, test no 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was prolonged and analysed.

After closing the testvalve, the pressure in the test section rose by 2 kPa. During the brief injection phase of the pulse injection phase, a total volume of about 39 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 195 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 2.0E–10 m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the deconvolved Pi pressure shows a continuing upward trend, which can be attributed to the fact that the dimensionless test time is to small and the semi-logarithmic asymptotic solution was not achieved (due to the very small transmissivity). The Pi phase was matched using a radial homogeneous flow model. The analysis is presented in Appendix 2-5.

Selected representative parameters

The recommended transmissivity of 9.4E–11 m²/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 6E–11 to 2E–10 m²/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

6.1.6 Section 606.82–706.82 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 195 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 48 mL/min at start of the CHi phase to 23 mL/min at the end, indicating a relatively medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a relatively flat derivative at middle and late times, which is typical for a flow dimension of two (radial flow). The CHi phase was matched using a radial homogeneous flow model. The derivative of the CHir phase shows a slight indication of horizontal stabilization at late times, indicating radial flow. A radial homogeneous flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-6.

Selected representative parameters

The recommended transmissivity of 2.5E–8 m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–9 to 4.0E–8 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,306.5 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.1.7 Section 706.83-806.83 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 181 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The CHi phase was conducted manually with the pressure vessel. The pressure was instable at the beginning and kept falling at the end of the perturbation phase. However, the CHi phase was analysed

quantitative. The injection rate decreased from 374 mL/min at start of the CHi phase to 20 mL/min at the end, indicating a relatively moderate interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data of the CHi phase is relatively poor. However, the CHi phase was matched using a two shell composite flow model with decreasing transmissivity away from the test section and a flow dimension of 2. The derivative of the CHir phase shows a steep upward trend at middle times, followed by a transition to a horizontal part at late times, indicating a transition to a zone of lower transmissivity. A radial composite flow model was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-7.

Selected representative parameters

The recommended transmissivity of 7.9E–9 m²/s was derived from the analysis of the CHir phase (outer zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E–9 to 3.0E–8 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 7,183.9 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended

6.1.8 Section 807.11-907.11 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 183 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 62 mL/min at start of the CHi phase to 8 mL/min at the end, indicating a relatively low interval transmissivity (consistent with the pulse recovery). Both phase show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the CHi phase shows a relatively flat derivative at late times, which indicates a flow dimension of 2 (radial flow). The derivative of the CHir phase shows a horizontal stabilization at middle times, indicating radial flow. Both phases were analysed using a radial homogeneous flow model. The analysis is presented in Appendix 2-8.

Selected representative parameters

The recommended transmissivity of 3.4E–9 m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–9 to 7.0E–9 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 8,082.9 kPa.

The analysis of the CHi and CHir phases shows relatively good consistency. No further analysis is recommended.

6.1.9 Section 887.27-987.27 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. All test phases (Pi, CHi and CHir) were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 175 kPa. No hydraulic connection between test interval and the adjacent zones was observed. Due to the low flow, the recorded flow rate is very noisy. However, the CHi phase is still amenable for analysis. The injection rate decreased from 10 mL/min at start of the CHi phase to 1 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems, but due to the fact that no radial flow was reached, the results should be regarded carefully. The Pi phase could be analysed quantitatively, too.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is quite noisy and does not allow for a specific determination of the flow model. The CHi phase was matched using an infinite acting radial homogeneous flow model. The CHir response shows a continues upward trend of the derivative at early times without reaching a radial flow stabilization, which is typical for wellbore storage dominated flow. Because the formation flow stabilisation was not observed, a radial homogeneous flow model with wellbore storage and skin was used for the analysis of the CHir phase. The derivative of the Pi phase shows a continuing upward trend, which can be attributed to the fact that the dimensionless test time is to small and the semi-logarithmic asymptotic solution was not achieved (due to the very small transmissivity). The Pi phase was matched using a radial homogeneous flow model. The analysis is presented in Appendix 2-9.

Selected representative parameters

The recommended transmissivity of 1.2E–10 m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–11 to 4.0E–10 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth was not calculated due to the tight formation.

The analysis of the Pi, CHi and CHir phases shows consistencies. No further analysis is recommended.

6.2 20 m single-hole injection tests

In the following, the 20 m section tests conducted in borehole KLX05 are presented and analysed.

6.2.1 Section 111.30-131.30 m, test no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the connections of the multikabel and resulting misreadings from the pressure transducers. The second test was conducted without problems. The Cartesian plot of the second test is shown in the Appendix 2-10. Only the second test was analysed.

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 210 kPa. The pressure in the bottom zone rose by 15 kPa during the injection phase, indicating a connection to the test interval. Due to the slow flow regulation at the beginning of the injection phase, the first part is very noisy. However, the second part of the CHi phase is amenable for qualitative analysis. The injection rate decreased from 24 L/min at start of the CHi phase to 13 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analyses.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. Due to the poor data quality of the CHi phase at early times, only the late time data was matched by using a radial composite flow model with increasing transmissivity away from the borehole. The response of the CHir phase is not consistent to the CHi response and a radial composite flow model with decreasing transmissivity away from the borehole was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-10.

Selected representative parameters

The recommended transmissivity of 1.6E–5 m²/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–06 to 3.0E–5 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,185.4 kPa.

The analysis of the CHi and CHir phases shows an inconsistency concerning the middle and late time response of the two phases. However, regarding the derived transmissivities, both phases show relatively good consistencies. In case further analysis is planned a total test simulation should attempt to clarify the inconsistency between the two phases.

6.2.2 Section 126.02-146.02 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively moderate formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 200 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The automatic rate control functioned well, the recorded flow rate is however noisy. The injection rate decreased from 1.7 L/min at start of the CHi phase to 1.1 L/min at the end, indicating a moderate interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relatively fast recovery. Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the CHi phase shows a downward trend at middle times, followed by a noisy stabilization at late times, which is indicative for a transition to a zone of higher transmissivity and a flow dimension of 2 (radial flow). The derivative of the CHir phase shows a horizontal stabilization at late times, too. Due to the fast recovery, the stabilisation level is linked to the smoothing factor of the data. So the derived transmissivity is uncertain. A two shell composite flow model with increasing transmissivity and a flow dimension of 2 (radial flow) was used for the analysis of both phases phase. The analysis is presented in Appendix 2-11.

Selected representative parameters

The recommended transmissivity of 9.3E–7 m²/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E–7 to 3.0E–6 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,317.5 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.3 Section 146.10–166.10 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 200 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The automatic rate control functioned well, the recorded flow rate is however noisy. The injection rate decreased

from 1.5 L/min at start of the CHi phase to 1.4 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relatively fast recovery.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the CHi phase shows a very noisy derivative. However, a radial homogeneous flow model was chosen for the analysis of this CHi phase. The derivative of the CHir phase shows a unit slope downward trend at middle times, indicating a large positive skin, and followed by a radial flow stabilization at late times. The CHir phase was matched using a radial homogeneous flow model with wellbore storage and skin. The analysis is presented in Appendix 2-12.

Selected representative parameters

The recommended transmissivity of 5.1E–6 m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–6 to 8.0E–6 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,492.6 kPa.

The analysis of the CHi and CHir phases shows consistency, with the exception of the very high skin derived from the CHir phase, which may be caused by non-Darcy flow effects in the formation. No further analysis is recommended.

6.2.4 Section 166.12–186.12 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a moderate formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 197 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 90 mL/min at start of the CHi phase to 27 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal stabilization at early times, followed by a unit slope upward trend at middle times and new radial flow stabilization at a higher level at late times, which is typical for a decrease of transmissivity at some distance from the borehole. The response of the CHir phase is consistent to the response of the CHi phase. A two shell radial composite flow model was used for the analysis of the CHi and CHir phase. The analysis is presented in Appendix 2-13.

Selected representative parameters

The recommended transmissivity of 2.7E–8 m²/s was derived from the analysis of the CHi phase (inner zone), which shows a clear derivative stabilization. The confidence range for the interval transmissivity is estimated to be 1.0E–8 to 4.0E–8 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,662.1 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.5 Section 181.13-201.13 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 200 kPa. The pressure in the bottom zone roses by 8 kPa during the injection phase indicating a connection to the test interval. The injection rate control during the beginning of the CHi phase was not very good. However, the second part of the CHi phase can be analysed quantitively. The injection rate decreased from 0.7 L/min at start of the CHi phase to 0.3 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal stabilization at middle times, followed by a unit slope downward trend at late times, indicating either a increase of transmissivity away from the borehole or a change of flow dimension. The response of the CHir phase is similar to the response of the CHi phase, with the difference that a slight indication of radial flow stabilization was observed at late times. A two shell composite flow model with a flow dimension of 2 (radial flow) was used for the analysis of the CHi and CHir phase. The analysis is presented in Appendix 2-14.

Selected representative parameters

he recommended transmissivity of 3.1E–7 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–8 to 6.0E–7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,797.9 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.6 Section 191.14–201.14 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 201 kPa. No hydraulic connection between the test interval and the adjacent zones was observed. The injection rate decreased from 2.4 L/min at start of the CHi phase to 0.7 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows an slight upward trend at early and middle times, followed by a short part that shows horizontal stabilization at late times, which is typical for a flow dimension of 2 (radial flow). The CHi phase was matched using an infinite acting radial homogeneous flow model. The derivative of the CHir phase shows an upward trend at middle times, followed by a horizontal stabilization at late times. The CHir phase was analysed using a composite flow model with decreasing transmissivity away from the borehole. The choice of the model is dictated by the log-log derivative plot of the CHir phase. This is consistent with the negative skin derived from the CHi phase. The analysis is presented in Appendix 2-15.

Selected representative parameters

The recommended transmissivity of 2.4E–7 m²/s was derived from the analysis of the CHir phase (outer zone), which shows a clear derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E–8 to 4.0E–7 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,878.7 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended

6.2.7 Section 211.14–231.14 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 201 kPa. No hydraulic connection between the test interval and the adjacent zones was observed. The injection rate control during the beginning of the CHi phase was not very good. However, the second part

of the CHi phase can be analysed quantitively. The injection rate decreased from approximately 0.5 L/min at start of the CHi phase to 0.1 L/min at the end, indicating a relatively medium interval transmissivity (consistent with the pulse recovery). The Chir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a downward trend at middle times, followed by a short part that shows radial flow stabilization at late times, indicating a transition to a zone of higher transmissivity at some distance from the borehole. The CHi phase was matched using a two shell radial composite flow model. The CHir phase shows a downward trend at late times indicating either an increase of transmissivity or a change of flow dimension. A radial composite flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-16.

Selected representative parameters

The recommended transmissivity of 2.5E–8 m²/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative. The confidence range for the interval transmissivity is estimated to be 9.0E–9 to 5.0E–8 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,062.5 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.8 Section 226.14-246.14 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 201 kPa. A slight reaction in the bottom zone was observed during the injection phase was observed, indicating a connection to the test interval. The automatic rate control functioned well, nevertheless the recorded flow rate is noisy. The injection rate decreased from 0.5 L/min at start of the CHi phase to 0.4 L/min at the end, indicating a relatively medium interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relatively fast recovery, but is still amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the CHi phase shows a noisy but flat derivative, which is typical for a flow dimension of 2 (radial flow). The derivative of the CHir phase shows a unit slope downward trend at middle times, indicating a large positive skin,

followed by a radial flow stabilization at late times. Both phases were matched using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-17.

Selected representative parameters

The recommended transmissivity of 6.2E–7 m²/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–7 to 1.0E–6 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,199.8 kPa.

The analysis of the CHi and CHir phases shows little inconsistency, regarding the derived transmissivities and the high skin of the CHir phase, which is attributed to the fast recovery of the CHir phase. This is probably caused by non-Darcy flow effects in the formation. No further analysis is recommended.

6.2.9 Section 246.15–266.15 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 210 kPa. No hydraulic connection between the test interval and the adjacent zones was observed. Due to the slow flow regulation at the beginning of the injection phase, the first part is very noisy. However, the second part of the CHi phase is amenable for qualitative analysis. The injection rate decreased from 10 L/min at start of the CHi phase to 4 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal stabilization at middle times, followed by a unit slope downward trend at late times, indicating either a transition to a zone of higher transmissivity at some distance from the borehole or a change in flow dimension. The CHi phase was matched using a two shell radial composite flow model. The CHir phase shows a slight stabilisation (inflexion) at middle times, followed by a downward trend at late times indicating whether an increase of transmissivity or a change of flow dimension. A radial composite flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-18.

Selected representative parameters

The recommended transmissivity of 2.2E–6 m²/s was derived from the analysis of the CHir phase (outer zone), which shows the best data and derivative. The confidence range for the interval transmissivity is estimated to be 9.0E–7 to 4.0E–6 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was

derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,371.3 kPa.

The analysis of the CHi and CHir phases shows relatively good consistency. No further analysis is recommended.

6.2.10 Section 266.21-286.21 m, test no 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was analysed.

After closing the testvalve, the pressure in the test section rose by 2 kPa. During the brief injection phase of the pulse injection, a total volume of about 14 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 199 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 6.9E–11 m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity. Due to a probably not proper working testvalve, the start of the pulse recovery shows a nontypical behaviour. However, the Pi phase shows no further problems and is amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the deconvolved Pi pressure shows a short horizontal stabilization at middle times, followed by a unit slope downward trend at late times, indicating a change either of transmissivity or of flow dimension. The analysis of the Pi phase was conducted using a two shell composite flow model with increasing transmissivity away from the borehole and a flow dimension of 2 (radial flow). The analysis is presented in Appendix 2-19.

Selected representative parameters

The recommended transmissivity of 7.6E–11 m²/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 2E–11 to 2E–10 m²/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

No further analysis recommended.

6.2.11 Section 286.28-306.28 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of

a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 205 kPa. No hydraulic connection between the test interval and the adjacent zones was observed. The injection rate decreased from 82 mL/min at start of the CHi phase to 30 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the CHi phase shows a horizontal stabilization at early times, followed by a unit slope downward trend at middle times and a new stabilization at a lower level at late times, indicating an increase of transmissivity at some distance from the borehole and a flow dimension of 2 (radial flow). The CHi phase was matched using a two shell radial composite flow model. The CHir phase shows a downward trend at middle and late times indicating either an increase of transmissivity or a change of flow dimension. A radial composite flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-20.

Selected representative parameters

The recommended transmissivity of 2.0E–8 m²/s was derived from the analysis of the CHi phase (outer zone), which shows the clearest derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E–9 to 4.0E–8 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,733.6 kPa.

The analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.12 Section 306.37-326.37 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 205 kPa. No hydraulic connection between test interval and the adjacent zones was observed. Due to the low flow, the recorded flow rate is very noisy. However, the CHi phase is still amenable for qualitative analysis. The injection rate decreased from 7 mL/min at start of the CHi phase to 2 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is quite noisy and does not allow flow model identification. The CHi phase was matched using a two shell composite radial flow model with decreasing transmissivity away from the test section. The CHir response shows a downward trend of the derivative at middle and late times, which is typical for the transition from wellbore storage and skin dominated flow to pure formation flow. Because the formation flow stabilisation was not observed, a radial homogeneous flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-21.

Selected representative parameters

The recommended transmissivity of 2.2E–9 m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–10 to 4.0E–9 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,929.0 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, regarding the chosen flow models. However, regarding the derived inner zone transmissivities, both phases show very good consistencies. No further analysis is recommended.

6.2.13 Section 326.38-346.38 m, test no 1, pulse injection

Comments to test

The intention was to design the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and opening/closing the test valve for conducting the preliminary pulse injection, no pulse recovery was observed and the pressure stayed stable for 20 minutes. This phenomenon is caused by a combination of prolonged packer expansion and a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-22.

Selected representative parameters

Based on the test response the interval transmissivity is lower than 1E-11 m²/s.

No further analysis recommended.

6.2.14 Section 341.40-361.40 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 35 kPa in 30 minutes. This phenomenon

is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-23.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m²/s.

No further analysis recommended.

6.2.15 Section 356.42-376.42 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 25 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-24.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.2.16 Section 376.47-396.47 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 21 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-24.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m²/s.

No further analysis recommended.

6.2.17 Section 386.50-406.50 m, test no 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was analysed.

After closing the testvalve for conducting the pressure stabilization phase (PSR), the pressure in the test section rose by 10 kPa. This can be explained, either by prolonged packer expansion in a relatively tight section or by the fact that the initial formation pressure is higher than the pressure measured on test depth.

During the brief injection phase a total volume of about 14 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 197 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 7.0E–11 m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the deconvolved Pi pressure shows a horizontal stabilization at early and middle times which is typical for a flow dimension of 2. Due to the uncertainty of the initial formation pressure only the early and middle time data was matched using an infinite acting radial flow model. The analysis is presented in Appendix 2-26.

Selected representative parameters

The recommended transmissivity of 4.4E–10 m²/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 1E–10 to 7E–10 m²/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

No further analysis recommended.

6.2.18 Section 406.54-426.54 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 196 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 90 mL/min at start of the CHi phase to 14 mL/min at the end, indicating a relatively low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the CHi phase shows a horizontal stabilization at early times and a unit slope upward trend at middle and late times, which is indicative either for transition to a zone of lower transmissivity away from the borehole or a change of flow dimension. The response of the CHir phase is compatible with the response of the CHi phase. A two shell composite flow model with decreasing transmissivity and a flow dimension of 2 (radial flow) was chosen for the analysis of both phases. The analysis is presented in Appendix 2-27.

Selected representative parameters

The recommended transmissivity of 1.8E–8 m²/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–9 to 3.0E–8 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,827.3 kPa.

The analysis of the CHi and CHir phases shows very good consistencies. No further analysis is recommended.

6.2.19 Section 426.55-446.55 m, test no 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was analysed.

After closing the testvalve for conducting the pressure stabilization phase (PSR), the pressure in the test section rose by 5 kPa. This can be explained, either by prolonged packer expansion in a relatively tight section or by the fact that the initial formation pressure is higher than the pressure measured on test depth.

During the brief injection phase a total volume of about 12 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 207 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 5.6E–11 m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the deconvolved Pi pressure shows a horizontal stabilization at middle times indicating a flow dimension of 2. Due to the noisy derivative at late times, only the middle time data was matched using an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-28.

Selected representative parameters

The recommended transmissivity of 3.4E–11 m²/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 1E–11 to 6E–11 m²/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

No further analysis recommended.

6.2.20 Section 446.57-466.57 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 20 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-29.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m²/s.

No further analysis recommended.

6.2.21 Section 466.58-486.58 m, test no 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was prolonged and analysed.

During the brief injection phase a total volume of about 13 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 206 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 6.1E–11 m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the deconvolved Pi pressure shows a horizontal stabilization (although noisy) at early times, followed by a upward trend at middle times and a new radial flow stabilization at a higher level at late times, which is consistent to an increase of transmissivity at some distance from the borehole. For the analysis of the Pi phase a two shell composite radial flow model was chosen. The analysis is presented in Appendix 2-30.

Selected representative parameters

The recommended transmissivity of 3.7E–10 m²/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 9.0E–11 to 6.0E–10 m²/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

No further analysis recommended.

6.2.22 Section 486.59-506.59 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

After closing the testvalve, the pressure in the test section rose by 5 kPa. The CHi phase was conducted using a pressure difference of 202 kPa. No hydraulic connection between test interval and the adjacent zones was observed. Due to the low flow, the recorded flow rate is very noisy. The injection rate decreased from 4 mL/min at start of the CHi phase

to 2 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is quite noisy and does not allow for a specific determination of the flow model. The CHi phase was matched using an infinite acting radial homogeneous flow model. The CHir response shows a unit slop downward trend of the derivative at middle and late times, which is typical for the transition from wellbore storage and skin dominated flow to pure formation flow. Because the formation flow stabilisation was not observed, a radial homogeneous flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-31.

Selected representative parameters

The recommended transmissivity of 2.7E–9 m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–10 to 5.0E–9 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,516.0 kPa.

The analysis of the CHi and CHir phases shows good consistencies. No further analysis is recommended.

6.2.23 Section 606.82-626.82 m, test no 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was analysed.

After closing the testvalve, the pressure in the test section rose by 2 kPa. During the brief injection phase of the pulse injection, a total volume of about 11 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 203 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 5.2E–11 m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the deconvolved Pi pressure shows a horizontal stabilization at early and middle times which is typical for a flow dimension of 2. Due to the uncertainty of the initial formation pressure only the early and middle time data was matched using an infinite acting radial flow model. The analysis is presented in Appendix 2-32.

Selected representative parameters

The recommended transmissivity of 4.1E–10 m²/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 1E–10 to 8E–10 m²/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

No further analysis recommended.

6.2.24 Section 626.85-646.85 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 170 kPa. No hydraulic connections between the test interval and the adjacent zones were observed. The injection rate control during the beginning of the CHi phase was not very good. After the oscillating start period, the flow rate got stable and the automatic rate control functioned well, nevertheless, the recorded flow rate is noisy. The injection rate decreased from 33 mL/min at start of the CHi phase to 10 mL/min at the end, indicating a relatively low interval transmissivity (consistent with the pulse recovery). The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the CHi phase shows a very noisy derivative and does not allow flow model identification. However, the late time data of the CHi was matched using a radial homogeneous flow model. The CHir response shows a unit slop downward trend of the derivative at middle and late times, which is typical for the transition from wellbore storage and skin dominated flow to pure formation flow. Because the formation flow stabilisation was not observed, a radial homogeneous flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-33.

Selected representative parameters

The recommended transmissivity of 1.2E–8 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–9 to 6.0E–8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,774.7 kPa.

The analysis of the CHi and CHir phases shows consistency. No further analysis is recommended.

6.2.25 Section 646.85-666.85 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 40 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-34.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m²/s.

No further analysis recommended.

6.2.26 Section 666.85-706.85 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 65 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-23.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m²/s.

No further analysis recommended.

6.2.27 Section 686.83-706.83 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively low formation transmissivity. Based on this result a sequence consisting of

a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 204 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 27 mL/min at start of the CHi phase to 13 mL/min at the end, indicating a relatively low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the, derivative of the CHi phase shows a horizontal stabilization at middle times and a unit slope upward trend late times, indicating either a transition to a zone of lower transmissivity away from the borehole or a change of flow dimension. The response of the CHir phase is consistent to the response of the CHi phase. A two shell composite radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-36.

Selected representative parameters

The recommended transmissivity of 1.2E–8 m²/s was derived from the analysis of the CHi phase (inner zone), which shows the clearest derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E–9 to 3.0E–8 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,306.3 kPa.

The analysis of the CHi and CHir phases shows good consistencies. No further analysis is recommended.

6.2.28 Section 706.83-726.83 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 208 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 29 mL/min at start of the CHi phase to 10 mL/min at the end, indicating a relatively low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the CHi phase shows a horizontal stabilization at early times, followed by a unit slope upward trend middle times and slight indication of radial flow stabilization at late times. The derivative of the CHir

shows a slight indication of horizontal stabilization at late times, too. A two shell composite flow model with decreasing transmissivity and a flow dimension of 2 (radial flow) was chosen for the analysis of both phases. The analysis is presented in Appendix 2-37.

Selected representative parameters

The recommended transmissivity of 4.5E–9 m²/s was derived from the analysis of the CHir phase (outer zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–9 to 7.0E–9 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,487.4 kPa.

The analysis of the CHi and CHir phases shows good consistencies. No further analysis is recommended.

6.2.29 Section 726.91-746.91 m, test no 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was prolonged and analysed.

After closing the testvalve, the pressure in the test section rose by 10 kPa. During the brief injection phase of the pulse injection, a total volume of about 8 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 200 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 4.1E–11 m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the deconvolved Pi pressure shows a horizontal stabilization late times indicating a flow dimension of 2. The Pi phase was analysed using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-38.

Selected representative parameters

The recommended transmissivity of 1.6E–10 m²/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 8E–11 to 4E–10 m²/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

No further analysis recommended.

6.2.30 Section 747.00-767.00 m, test no 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The very slow recovery of the pulse test indicated a very low formation transmissivity. Based on this result no constant pressure injection test was performed. Instead, the recovery of the pulse injection test was analysed.

After closing the testvalve, the pressure in the test section rose by 17 kPa. During the brief injection phase of the pulse injection, a total volume of about 13 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 198 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 6.8E–11 m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the deconvolved Pi pressure shows a continuing upward trend, which can be attributed to the fact that the dimensionless test time is to small and the semi-logarithmic asymptotic solution was not achieved (due to the very small transmissivity). The Pi phase was matched using a radial homogeneous flow model. The analysis is presented in Appendix 2-39.

Selected representative parameters

The recommended transmissivity of 3.6E–12 m²/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 1E–12 to 6E–12 m²/s. The flow dimension displayed during the test is 2. No static pressure could be derived.

No further analysis recommended.

6.2.31 Section 767.06-787.06 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 223 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The automatic rate control functioned well, the recorded flow rate is however noisy. The injection rate decreased from 39 mL/min at start of the CHi phase to 11 mL/min at the end, indicating a relatively low interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relatively fast recovery.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a relatively flat derivative (although noisy), typical for radial flow geometry. The CHi phase was matched using an infinite acting homogeneous radial flow model. The CHir response shows a steep downward trend of the derivative at middle times, which is consistent with the high positive skin factor. The CHir phase was matched using a radial homogeneous flow model with wellbore storage and skin. The analysis is presented in Appendix 2-40.

Selected representative parameters

The recommended transmissivity of 9.2E–9 m²/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E–9 to 5.0E–8 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 7,038.9 kPa.

The analysis of the CHi and CHir phases shows little inconsistencies in the derived transmissivities, which is probably attributed to the relatively fast recovery of the CHir phase, and inconsistencies in the derived high skin from the CHir phase, which may be caused by non-Darcy flow effects in the formation. No further analysis is recommended.

6.2.32 Section 787.07-807.07 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a relatively low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 140 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 26 mL/min at start of the CHi phase to 12 mL/min at the end, indicating a relatively low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivatives of both test phases show an upward trend at middle and late times, indicating either a decreasing of transmissivity at some distance form the borehole or a change of flow dimension. A two shell composite radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-41.

Selected representative parameters

The recommended transmissivity of 4.3E–9 m²/s was derived from the analysis of the CHir phase (outer zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–9 to 7.0E–9 m²/s. The flow

dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 7,200.4 kPa.

The analysis of the CHi and CHir phases show consistency. No further analysis is recommended.

6.2.33 Section 807.11-827.11 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 55 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-42.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.2.34 Section 827.15-847.15 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a very low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. All test phases (Pi, CHi and CHir) were analysed quantitatively.

After closing the testvalve , the pressure in the test section rose by 10 kPa. During the following test phases a slight reaction in the bottom zone was observed. During the brief injection of the pulse injection a total volume of about 11 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 204 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $5.6E-11~\text{m}^3/\text{Pa}$. The Pi phase shows no problems and is adequate for quantitative analysis.

The CHi phase was conducted using a pressure difference of 153 kPa. After 7 minutes of injection the flow rate dropped down below a flow of 1 mL/min, indicating a very low interval transmissivity (consistent with the pulse recovery), and the injection phase was aborted. Due to the low flow, the recorded flow rate is very noisy and the results should be regarded very carefully. The CHir phase shows no problems.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present tests, the derivative of the Pi phase shows a steep upward trend at middle and late times, indicating a small inner zone with a much higher transmissivity than the outer zone. The formation reacts like a closed system. The responses of the CHi phase and CHir phase are relatively similar to the Pi response. Due to the low transmissivity and due to the fact that no horizontal stabilization was observed at late times, the derived outer zones transmissivities are very uncertain. All three test phases were matched using a two shell composite flow model with decreasing transmissivity away from the borehole and a flow dimension of 2. The analysis is presented in Appendix 2-43.

Selected representative parameters

The recommended transmissivity of 4.3E–09 m²/s was derived from the analysis of the Pi phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–10 to 7.0E–09 m²/s (which includes the values derived from inner zones of the CHi and CHir phase). The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the very low interval transmissivity.

The analysis of the Pi, CHi and CHir phases show little inconsistencies in the derived transmissivities. No further analysis is recommended.

6.2.35 Section 847.20-867.20 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 209 kPa. A slight connection between the bottom zone and test interval was observed. Due to the low flow, the recorded data of the flow rate is very noisy. The injection rate decreased from 16 mL/min at start of the CHi phase to 5 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is quite noisy and does not allow flow model identification. The CHi phase was matched using an infinite acting radial homogeneous flow model. The CHir response shows a unit slop downward trend of the derivative at middle times, followed by slight indication of radial flow stabilization at late times, indicating radial flow geometry. A radial homogeneous flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-44.

Selected representative parameters

The recommended transmissivity of 2.8E–9 m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E–10 to 5.0E–9 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 7,747.4 kPa.

The analyses of the CHi and CHir phases show good consistency. No further analysis is recommended.

6.2.36 Section 867.24-887.24 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

After closing the testvalve for conducting the pressure stabilization phase (PSR), the pressure in the test section rose by 4 kPa. This can be explained, either by prolonged packer expansion in a relatively tight section or by the fact that the initial formation pressure is higher than the pressure measured on test depth.

The CHi phase was conducted using a pressure difference of 214 kPa. A slight reaction between the bottom zone and test interval was observed. The difference pressure was not stable at the beginning of the injection phase. However, the pressure stays relatively stable during the second part of the CHi phase. Due to the low flow, the recorded flow rate is noisy. The injection rate decreased from 19 mL/min at start of the CHi phase to 5 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the both phases show a slight indication of horizontal stabilization at late times. A two shell composite flow model with decreasing transmissivity at some distance from the borehole and a flow dimension of 2 (radial flow) was chosen for the analysis of both test phases. The analysis is presented in Appendix 2-45.

Selected representative parameters

The recommended transmissivity of 1.5E–9 m²/s was derived from the analysis of the CHir phase (outer zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–10 to 4.0E–9 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 7,907.0 kPa.

The analyses of the CHi and CHir phases show consistency. No further analysis is recommended.

6.2.37 Section 887.27–907.27 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

After closing the testvalve, the pressure in the test section rose by 10 kPa. The CHi phase was conducted using a pressure difference of 170 kPa. A slight connection between the bottom zone and test interval was observed. Due to the low flow, the recorded flow rate is noisy. After 15 minutes of injection the flow rate drops down below a flow of 1 mL/min, indicating a very low interval transmissivity (consistent with the pulse recovery), and the perturbation phase was aborted. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the CHi phase is noisy due to the low flow rate. However, a two shell composite flow model with decreasing transmissivity at some distance from the borehole and a flow dimension of 2 (radial flow) was chosen for the analysis of the Chi phase. The CHir phase shows a relatively flat derivative at late times, indicating radial flow geometry, and was matched using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-46.

Selected representative parameters

The recommended transmissivity of 1.1E–10 m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E–11 to 4.0E–10 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 8,087.3 kPa.

The analyses of the CHi and CHir phases shows some inconsistencies, regarding the derived transmissivities and the chosen flow models, which is attributed to the poor data quality of the CHi phase. No further analysis is recommended.

6.2.38 Section 907.30-927.30 m, test no 1, pulse injection

Comments to test

The intention was to design the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and opening/closing the test valve for conducting the preliminary pulse injection, no pulse recovery was observed and the pressure stayed stable for 20 minutes. This phenomenon is caused by a combination of prolonged packer expansion and a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-22.

Selected representative parameters

Based on the test response the interval transmissivity is lower than 1E–11 m²/s.

No further analysis recommended.

6.2.39 Section 927.34-947.34 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 80 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-48.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m²/s.

No further analysis recommended.

7 Synthesis

The synthesis chapter summarizes the basic test parameters and analysis results. In addition, the correlation between steady state and transient transmissivities as well as between the matched and the theoretical wellbore storage (WBS) coefficient are presented and discussed.

7.1 Summary of results

Table 7-1. General test data from constant head injection tests in KLX05.

Borehole	Borehole	Date and time for test. start	Date and time for test. stop	ď	ď	♣	44	p _o	ā	ď	Ā.	Te _w	Test phases measured Analysed test phases
(E)	(m)	YYYYMMDD hh:mm	hh:mm	(m**3/s)	(m**3/s)	(s)	(s)	(kPa)	(kPa)	(kPa)	(kPa)	(၁့)	marked bold
111.30	211.30	20050601 17:37	20050601 21:07	2.63E-04	2.87E-04	1,800	7,200	1,887	1,884	2,099	1,885	10.0	CHi / CHir
211.14	311.14	20050602 09:21	20050602 11:45	5.80E-05	6.63E-05	1,800	3,600	2,774	2,772	2,972	2,777	11.2	CHI / CHir
306.37	406.37	20050602 13:30	20050602 16:22	5.00E-08	8.33E-08	1,800	1,800	3,623	3,630	3,823	3,673	12.5	CHI / CHir
406.54	506.54	20050602 17:49	20050602 23:32	2.33E-07	3.17E-07	1,800	14,400	4,521	4,528	4,720	4,529	13.9	CHI / CHir
506.63	606.63	20050603 09:11	20050603 11:11	>N#	>N#	~	3,840	5,410	5,421	5,623	5,529	15.2	Ā
606.82	706.82	20050603 12:41	20050603 15:26	3.83E-07	4.67E-07	1,800	3,600	6,304	6,305	6,500	6,313	16.6	CHI / CHir
706.83	806.83	20050603 16:56	20050604 00:46	3.33E-07	8.33E-07	1,800	21,600	7,191	7,201	7,382	7,196	18.0	CHI / CHir
807.11	907.11	20050604 09:20	20050604 12:18	1.67E-07	1.67E-07	1,800	3,600	8,078	8,086	8,269	8,108	19.5	CHi / CHir
887.27	987.27	20050604 14:00	20050604 17:10	1.67E-08	6.67E-08	1,800	1,800	8,791	8,847	9,022	8,938	20.6	CHi / CHir
111.30	131.30	20050610 13:12	20050610 14:40	2.22E-04	2.37E-04	1,200	1,200	1,191	1,188	1,398	1,192	8.9	CHI / CHir
126.02	146.02	20050610 15:35	20050610 17:02	1.87E-05	1.90E-05	1,200	1,200	1,320	1,318	1,518	1,318	9.1	CHI / CHir
146.10	166.10	20050610 17:47	20050610 20:20	2.28E-05	2.35E-05	1,800	2,400	1,497	1,494	1,694	1,494	9.4	CHI / CHir
166.12	186.12	20050611 08:54	20050611 10:27	4.50E-07	5.33E-07	1,200	1,200	1,669	1,669	1,866	1,674	9.6	CHi / CHir
181.13	201.13	20050611 11:14	20050611 13:04	8.83E-06	9.33E-06	1,200	2,400	1,801	1,801	2,001	1,802	9.8	CHi / CHir
191.14	211.14	20050611 13:38	20050611 15:11	1.15E-05	1.40E-05	1,200	1,200	1,890	1,892	2,093	1,914	9.9	CHi / CHir
211.14	231.14	20050611 15:55	20050611 17:23	2.00E-06	2.17E-06	1,200	1,200	2,068	2,067	2,268	2,067	10.2	CHI / CHir
226.14	246.14	20050611 18:10	20050611 19:59	6.33E-06	6.50E-06	1,200	2,400	2,200	2,200	2,401	2,200	10.4	CHI / CHir
246.15	266.15	20050612 08:10	20050612 09:44	6.08E-05	7.00E-05	1,200	1,200	2,377	2,376	2,586	2,387	10.6	CHI / CHir
266.21	286.21	20050612 10:21	20050612 11:49	>N#	>N#	~	2,700	2,557	2,565	2,773	2,613	10.9	Ā
286.28	306.28	20050612 12:29	20050612 13:58	5.00E-07	5.00E-07	1,200	1,200	2,735	2,736	2,941	2,743	11.1	CHI / CHir
306.37	326.37	20050612 14:39	20050612 16:22	5.00E-08	6.67E-08	1,200	1,200	2,915	2,926	3,131	2,956	11.4	CHI / CHir
326.38	346.38	20050612 17:03	20050612 18:05	0.00E+00	0.00E+00	0	0	3,092	>N#	>N#	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	11.7	NN#
341.40	361.40	20050612 18:38	20050612 19:40	0.00E+00	0.00E+00	0	0	3,226	>N#	>N#	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	11.9	NN#
356.42	376.42	20050613 07:26	20050613 08:31	0.00E+00	0.00E+00	0	0	3,356	>N#	>N#	\N#	12.1	NN#

Borehole	Borehole	Date and time	Date and time	ď	ď	₽	ٿ	b ₀	ā	ď	рғ	Te _w	Test phases measured
secup (m)	seclow (m)	for test, start YYYYMMDD hh:mm	for test, stop YYYYMMDD hh:mm	(m**3/s)	(m**3/s)	(s)	(s)	(kPa)	(kPa)	(kPa)	(kPa)	(၁့	Analysed test phases marked bold
376.42	396.42	20050613 09:17	20050613 10:23	0.00E+00	0.00E+00	0	0	3,536	NW#	>N#	>N#	12.3	NN#
386.50	406.50	20050613 11:00	20050613:12:27	>N#	>N#	_	2,400	3,626	3,642	3,837	3,668	12.5	Pi
406.54	426.54	20050613 13:04	20050613 14:46	2.33E-07	3.00E-07	1,200	1,800	3,807	3,812	4,008	3,849	12.8	CHi / CHir
426.55	446.55	20050613 15:32	20050613 16:53	>N#	>N#	_	2,400	3,986	3,999	4,204	4,030	13.1	Pi
446.57	466.57	20050613 17:33	20050613 18:38	0.00E+00	0.00E+00	0	0	4,166	>N#	>N#	NX#	13.3	NN#
466.58	486.58	20050613 19:13	20050614 01:56	>N#	>N#	_	21,600	4,351	4,351	4,563	4,337	13.6	Pi
486.59	506.59	20050614 07:40	20050614 09:27	3.33E-08	3.33E-08	1,200	1,200	4,520	4,533	4,735	4,539	13.9	CHi / Chir
606.82	626.82	20050614 11:09	20050614 12:33	>N#	>N#	_	2,400	5,599	5,608	5,811	5,610	15.5	CHi / Chir
626.85	646.85	20050614 13:16	20050614 15:26	1.67E-07	1.67E-07	1,800	1,800	5,777	5,777	5,947	5,782	15.9	CHi / CHir
646.85	666.85	20050614 16:07	20050614 17:12	0.00E+00	0.00E+00	0	0	5,956	\N#	>N#	>N#	16.1	NN#
666.85	686.85	20050614 17:56	20050614 18:57	0.00E+00	0.00E+00	0	0	6,135	\N#	>N#	>N#	16.4	NN#
686.83	706.83	20050614 19:48	20050615 00:58	2.17E-07	2.50E-07	1,200	14,400	6,312	6,315	6,519	6,312	16.7	CHi / CHir
706.83	726.83	20050615 08:02	20050615 09:58	1.67E-07	2.17E-07	1,200	2,400	6,483	6,488	969'9	6,505	16.9	CHi / CHir
726.91	746.91	20050615 10:40	20050615 11:52	>N#	>N#	_	2,400	6,664	6,679	6,889	6,705	17.2	Ē
747.00	767.00	20050615 12:45	20050615 14:11	>N#	>N#	_	2,400	6,845	6,868	7,069	7,034	17.5	Ē
90'.292	90'.181	20050615 14:50	20050615 16:25	1.83E-07	2.00E-07	1,200	1,200	7,025	7,027	7,250	7,046	17.8	CHi / CHir
787.07	807.07	20050615 17:07	20050616 01:36	2.00E-07	4.83E-07	1,200	21,600	7,203	7,267	7,407	7,239	18.1	CHi / CHir
807.11	827.11	20050616 08:05	20050616 09:07	0.00E+00	0.00E+00	0	0	7,372	>N#	>N#	>N#	18.3	NN#
827.15	847.15	20050616 09:52	20050616 12:29	1.67E-08	5.00E-08	420	3,600	7,556	7,625	7,778	969'2	18.6	CHi / CHir
847.20	867.20	20050616 13:09	20050616 00:00	1.00E-07	1.17E-07	1,200	1,200	7,737	7,744	7,953	7,770	18.9	CHi / CHir
867.24	887.24	20050616 15:39	20050616 17:25	8.33E-08	1.17E-07	1,200	1,200	7,914	7,930	8,144	7,960	19.2	CHi / CHir
887.27	907.27	20050616 18:07	20050617 03:30	1.67E-08	1.67E-08	1,200	28,800	8,094	8,137	8,306	8,097	19.5	CHi / CHir
907.30	927.30	20050617 07:33	20050617 08:27	0.00E+00	0.00E+00	0	0	8,261	>N#	>N#	>N#	19.8	NN#
927.34	947.34	20050617 09:13	20050617 10:14	0.00E+00	0.00E+00	0	0	8,439	\N#	\N#	\N#	20.0	NN#

#NV: Not analysed.
CHi: Constant Head injection phase.
CHir: Recovery phase following the constant head injection phase.
Pi: Pulse injection.

Table 7-2. Results from analysis of constant head tests in KLX05.

Interval position	osition	Stationary flow	flow	Transient analysis	nalysis													
		parameters		Flow regime	9	Formation	parameters										Static conditions	ditions
up m btoc	low m btoc	Q/s m²/s	T _м m²/s	Perturb. phase	Recovery phase	T _{rt} m²/s	T _{f2} m²/s	T _{s1} m²/s	T _{s2} m²/s	T _T m²/s	T _{TMIN} m²/s	T _{TMAX} m²/s	c m³/Pa	w ı	a, dt	m dt²	p* KPa	h _{wif} masl
111.30	211.30	1.20E-05	1.56E-05	22	WBS22	1.11E-05	1.44E-05	9.1E-06	1.3E-05	9.1E-06	7.0E-06	2.0E-05	1.4E-08	-3.6	0.3	0.7	1,882.8	10.49
211.14	311.14	2.84E-06	3.70E-06	22	WBS22	1.9E-06	2.8E-06	6.1E-07	1.9E-06	1.9E-06	9.0E-07	4.0E-06	7.3E-10	3.4	6.1	4.3	2,770.3	11.37
306.37	406.37	2.54E-09	3.31E-09	2	WBS2	1.7E-09	>N#	1.8E-09	>N#	1.8E-09	8.0E-10	3.0E-09	2.5E-10	-0.7	16.9	29.5	3,613.2	12.90
406.54	506.54	1.19E-08	1.55E-08	22	WBS22	1.2E-08	4.3E-09	1.9E-08	4.3E-09	1.9E-08	8.0E-09	4.0E-08	3.1E-10	9.0	1.8	4.2	4,517.7	13.04
506.63	606.63	>N#	>N#	>N#	WBS2	>N#	>N#	9.4E-11	>N#	9.4E-11	6.0E-11	2.0E-10	2.0E-10	-1.5	>N#	>N#	>N#	>N #
606.82	706.82	1.93E-08	2.51E-08	2	WBS2	1.4E-08	>N#	2.5E-08	>N#	2.5E-08	9.0E-09	4.0E-08	3.5E-10	1.2	4.8	4.1	6,306.5	15.34
706.83	806.83	1.81E-08	2.35E-08	22	WBS22	9.7E-08	1.7E-08	2.5E-07	7.9E-09	7.9E-09	4.0E-09	3.0E-08	7.9E-10	-2.2	>N#	>N#	7,183.9	15.42
807.11	907.11	8.93E-09	1.16E-08	2	WBS2	2.2E-09	>N#	3.4E-09	>N#	3.4E-09	1.0E-09	7.0E-09	3.1E-10	-2.8	11.2	34.1	8,082.9	17.23
887.27	987.27	9.34E-10	1.22E-09	2	WBS2	1.8E-10	>N#	1.2E-10	>N#	1.2E-10	9.0E-11	4.0E-10	2.9E-10	-2.3	>N#	>N#	>N#	>N #
111.30	131.30	1.04E-05	1.08E-05	22	WBS22	1.3E-05	1.8E-05	1.6E-05	1.1E-05	1.6E-05	8.0E-06	3.0E-05	1.6E-08	-0.3	2.8	2.0	1,185.4	10.86
126.02	146.02	9.16E-07	9.58E-07	22	WBS22	8.0E-07	2.1E-06	9.3E-07	3.2E-06	9.3E-07	7.0E-07	3.0E-06	3.2E-10	1.7	>N#	>N#	1,317.5	11.19
146.10	166.10	1.12E-06	1.17E-06	2	WBS2	2.9E-06	>N#	5.1E-06	>N#	5.1E-06	1.0E-06	8.0E-06	1.0E-10	20.7	0.2	9.6	1,492.6	11.18
166.12	186.12	2.24E-08	2.34E-08	22	WBS22	2.7E-08	1.4E-08	4.0E-08	2.6E-08	2.7E-08	1.0E-08	4.0E-08	5.2E-11	[-	0.2	[-	1,662.1	10.53
181.13	201.13	4.33E-07	4.53E-07	22	WBS22	5.2E-07	7.7E-07	3.1E-07	5.6E-07	3.1E-07	9.0E-08	6.0E-07	2.4E-10	-1.6	0.5	[:	1,797.9	10.94
191.14	211.14	5.61E-07	5.87E-07	2	WBS22	2.0E-07	>N#	5.4E-07	2.4E-07	2.4E-07	9.0E-08	4.0E-07	3.8E-10	-3.6	6.4	18.3	1,878.7	10.22
211.14	231.14	9.76E-08	1.02E-07	22	WBS22	9.6E-08	2.3E-07	2.5E-08	2.1E-07	2.5E-08	9.0E-09	5.0E-08	1.3E-10	-3.1	0.7	1.78	2,062.5	11.06
226.14	246.14	3.09E-07	3.23E-07	2	WBS2	6.2E-07	>N#	1.4E-06	>N#	6.2E-07	1.0E-07	1.0E-06	7.3E-11	5.5	0.2	14.6	2,199.8	11.61
246.15	266.15	2.84E-06	2.97E-06	22	WBS22	1.7E-06	2.5E-06	7.8E-07	2.2E-06	2.2E-06	9.0E-07	4.0E-06	2.8E-09	-5.2	8.7	18.3	2,371.3	11.15
266.21	286.21	>N#	>N#	>N#	WBS22	>N#	>N#	2.3E-11	7.6E-11	7.6E-11	2.0E-11	2.0E-10	6.9E-11	-2.4	18.9	36.3	>N#	>N #
286.28	306.28	2.39E-08	2.50E-08	22	WBS22	1.5E-08	2.0E-08	2.0E-08	2.9E-08	2.0E-08	9.0E-09	4.0E-08	7.9E-11	8.0-	1.9	8.8	2,733.6	12.01
306.37	326.37	2.39E-09	2.50E-09	22	WBS2	2.1E-09	8.4E-10	2.2E-09	>N#	2.2E-09	9.0E-10	4.0E-09	5.0E-11	0.3	>N#	>N#	2,929.0	13.82
326.38	346.38	>N#	>N#	>N#	>N#	>N#	>N#	>N#	>N#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	>N#	>N#	>N #
341.40	361.40	>N#	>N#	>N#	>N#	>N#	>N#	>N#	>N#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	>N#	>N#	>N #
356.42	376.42	>N#	>N#	>N#	>N#	>N#	>N#	>N#	>N#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	>N#	>N#	>N #
376.47	396.47	>N#	>N#	>N#	>N#	>N#	>N#	>N#	NX#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	>N#	>N#	>N #
386.50	406.50	>N#	>N#	>N#	WBS2	>N#	>N#	4.4E-10	>N#	4.4E-10	1.0E-10	7.0E-10	7.0E-11	0.7	9.0	11.0	>N#	>N #

Interval	Interval position	Stationary flow	flow	Transient analysis	analysis													
		parameters	ø	Flow regime	me	Formation	parameters										Static conditions	ditions
up m btoc	low m btoc	Q/s m²/s	T _M m²/s	Perturb. phase	Recovery phase	T _{r1} m²/s	T _{r2} m²/s	T _{s1} m²/s	T _{s2} m²/s	T _T m²/s	T _{TMIN} m²/s	T _{TMAX} m²/s	C m³/Pa	~ I	m dt	dt ₂	p* kPa	h _{wif} masl
406.54	426.54	1.17E-08	1.22E-08	22	WBS22	1.3E-08	4.6E-09	1.8E-08	4.5E-09	1.8E-08	9.0E-09	3.0E-08	5.8E-11	0.5	2.0	4.5	3,827.3	13.46
426.55	446.55	>N#	>N#	>N#	WBS2	>N#	>N#	3.4E-11	>N #	3.4E-11	1.0E-11	6.0E-11	5.6E-11	9.0	7.	7.4	>N#	>N #
446.57	466.57	>N#	>N#	/N#	>N#	>N#	>N#	>N#	>N#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	>N#	>N#	>N#
466.58	486.58	>N#	>N#	>N#	WBS22	> N #	>N#	3.7E-10	2.5E-10	3.7E-10	9.0E-11	6.0E-10	6.1E-11	9.0	0.5	6.9	>N#	>N#
486.59	506.59	1.62E-09	1.69E-09	7	WBS2	1.5E-09	>N#	2.7E-09	>N#	2.7E-09	9.0E-10	5.0E-09	4.8E-11	5.0	>N#	>N#	4,516.0	12.82
606.82	626.82	>N#	>N#	>N#	WBS2	> N #	>N#	4.1E-10	>N#	4.1E-10	1.0E-10	8.0E-10	5.2E-11	9.0-	4.	5.5	>N#	>N#
626.85	646.85	9.62E-09	1.01E-08	7	WBS2	9.69E-09	>N#	1.2E-08	>N#	1.2E-08	9.0E-09	6.0E-08	9.5E-11	2.3	12.7	25.6	5,774.7	14.82
646.85	666.85	>N#	>N#	>N#	>N#	>N#	>N#	>N#	>N#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	N#	>N#	>N#
666.85	686.85	>N#	>N#	>N#	>N#	>N#	>N#	>N#	>N#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	>N#	>N#	>N#
686.83	706.83	1.04E-08	1.09E-08	22	WBS22	1.2E-08	5.9E-09	2.2E-08	4.2E-09	1.2E-08	9.0E-09	3.0E-08	7.6E-11	1.2	9.4	2.9	6,306.3	15.31
706.83	726.83	7.86E-09	8.22E-09	22	WBS22	7.62E-09	3.8E-09	7.5E-09	4.49E-09	4.5E-09	1.0E-09	7.0E-09	3.9E-11	7.0-	13.2	34.8	6,487.4	15.92
726.91	746.91	>N#	>N#	^N#	WBS2	>N#	>N#	1.6E-10	NX#	1.6E-10	8.0E-11	4.0E-10	4.2E-11	1.	7.4	35.0	>N#	>N#
747.00	767.00	>N#	>N#	N× *	WBS2	>N#	>N#	3.6E-12	NX#	3.6E-12	1.0E-12	6.0E-12	6.8E-11	-1.6	>N#	N#	>N#	>N#
767.06	787.06	8.07E-09	8.44E-09	7	WBS22	9.18E-09	>N#	3.2E-08	>N#	9.2E-09	6.0E-09	5.0E-08	4.1E-11	2.2	9.0	14.4	7,038.9	18.33
787.07	807.07	1.40E-08	1.47E-08	22	WBS22	3.62E-08	4.3E-09	3.7E-07	3.29E-09	4.3E-09	1.0E-09	7.0E-09	2.0E-10	-3.0	> <u>N</u> #	>N#	7,200.4	16.89
807.11	827.11	>N#	>N#	N× *	>N#	>N#	>N#	>N#	NX#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	>N#	>N#	>N#
827.15	847.15	1.07E-09	1.12E-09	>N#	WBS2	>N#	>N#	4.3E-09	>N#	4.3E-09	8.0E-10	7.0E-09	5.6E-11	1.0	>N#	>N#	>N#	>N#
847.20	867.20	4.69E-09	4.91E-09	7	WBS2	2.1E-09	>N#	2.8E-09	>N#	2.8E-09	9.0E-10	5.0E-09	5.2E-11	6.0-	8.6	17.8	7,747.4	18.75
867.24	887.24	3.82E-09	4.00E-09	22	WBS22	2.2E-09	1.2E-09	2.7E-09	1.5E-09	1.5E-09	8.0E-10	4.0E-09	6.9E-11	-1.6	9.8	19.8	7,907.0	17.07
887.27	907.27	9.67E-10	1.01E-09	22	WBS2	5.1E-10	9.8E-11	1.1E-10	>N#	1.1E-10	6.0E-11	4.0E-10	3.6E-11	-1.3	37.4	112.4	8,087.3	17.53
907.30	927.30	>N#	/N#	>N#	>N#	>N#	>N#	>N#	>N#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	>N#	>N#	>N#
927.34	947.34	N#	>N#	>N#	NV#	>N#	^N#	>N#	>N#	1.0E-11	1.0E-13	1.0E-11	>N#	>N#	>N#	>N#	>N#	N/#

1

¹ T1 and T2 refer to the transmissivity(s) derived from the analysis while using the recommended flow model. In case a homogeneous flow model was recommended only one T value is reported, in case a two zones composite model was recommended both T1 and T2 are given T₇ denotes the recommended transmissivity.

² The parameter p* denoted the static formation pressure (measured at transducer depth) and was derived from the HORNER plot of the CHIR phase using straight line or type-curve extrapolation.

³ The flow regime description refers to the recommended model used in the transient analysis. WBS denotes wellbore storage and skin and is followed by a set of numbers describing the flow dimension used in the analysis (1 = linear flow, 2 = radial flow, 3 = spherical flow). If only one number is used (e.g. WBS22 or 2) a homogeneous flow model (1 composite zone) was used in the analysis, if two numbers are given (WBS22 or 22) a 2 zones composite model was used.

The Figures 7-1 to 7-3 present the transmissivity, conductivity and hydraulic freshwater head profiles.

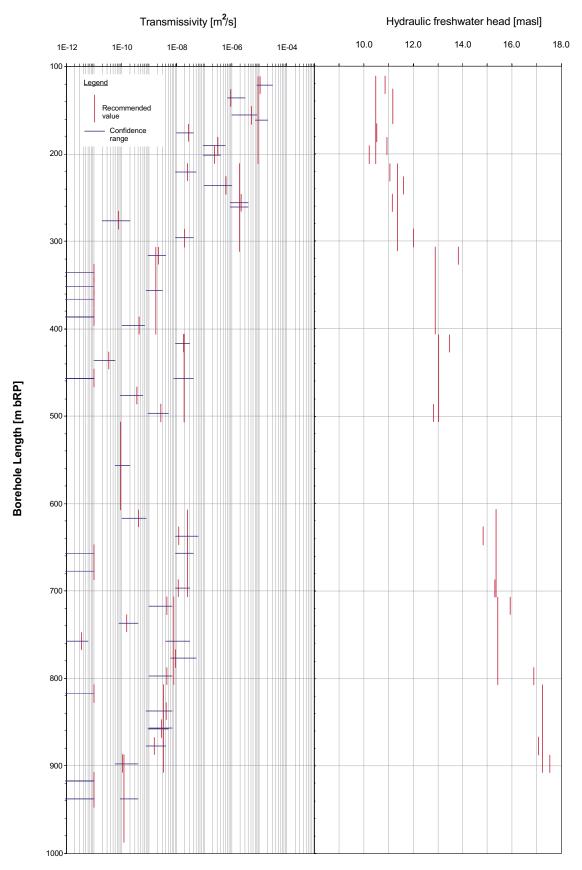


Figure 7-1. Results summary – profiles of transmissivity and equivalent freshwater head, transmissivities derived from injectiontests, freshwater head extrapolated.

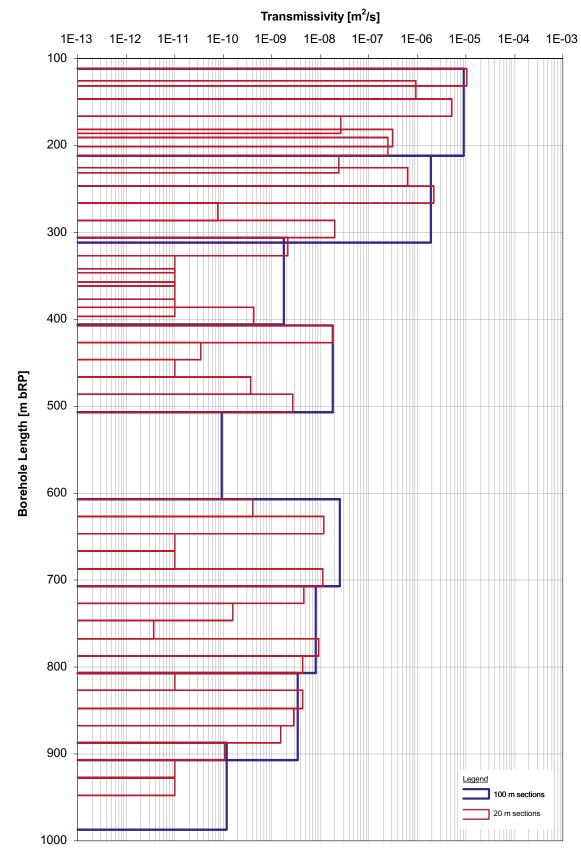


Figure 7-2. Results summary – profile of transmissivity.

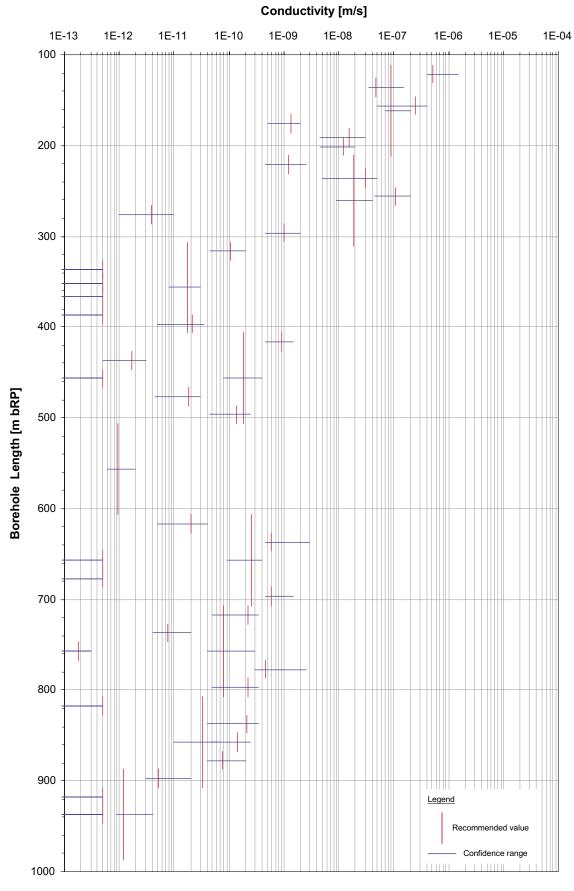


Figure 7-3. Results summary – profile of hydraulic conductivity.

7.2 Correlation analysis

A correlation analysis was used with the aim of examining the consistency of results and deriving general conclusion regarding the testing and analysis methods used.

7.2.1 Comparison of steady state and transient analysis results

The steady state derived transmissivities (T_M and Q/s) were compared in a cross-plot with the recommended transmissivity values derived from the transient analysis (see following figure).

The correlation analysis shows that all of the steady state derived transmissivities differ by less than one order of magnitude from the transmissivities derived from the transient analysis. The values of the steady state analysis are in the most cases slightly higher than the recommended values.

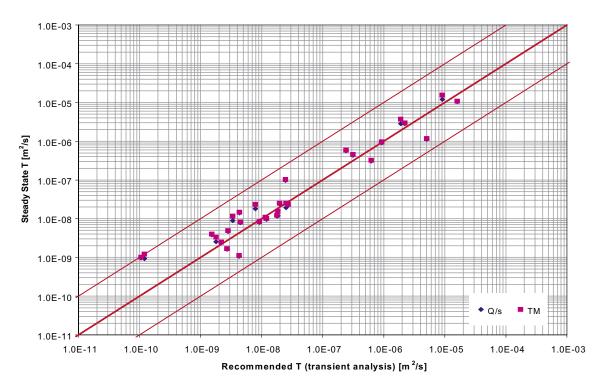


Figure 7-4. Correlation analysis of transmissivities derived by steady state and transient methods.

7.2.2 Comparison between the matched and theoretical wellbore storage coefficient

The wellbore storage coefficient describes the capacity of the test interval to store fluid as result to an unit pressure change in the interval. For a closed system (i.e. closed downhole valve) the theoretical value of the wellbore storage coefficient is given by the product between the interval volume and the test zone compressibility. The interval volume is calculated from the borehole radius and interval length. There are uncertainties concerning the interval volume calculation. Cavities or high transmissivity fractures intersecting the interval may enlarge the effective volume of the interval. The test zone compressibility is given by the sum of compressibilities of the individual components present in the interval (water, packer elements, other test tool components, and the borehole wall). A minimum value for the test zone compressibility is given by the water compressibility which is approximately 5E–10 1/Pa. For the calculation of the theoretical wellbore storage coefficient a test zone compressibility of 7E–10 1/Pa was used. The matched wellbore storage coefficient is derived from the transient type curve analysis by matching the unit slope early times derivative plotted in log-log coordinates.

The following figure presents a cross-plot of the matched and theoretical wellbore storage coefficients.

It can be seen that the matched wellbore storage coefficients are up to three orders of magnitude larger than the theoretical values. This phenomenon was already observed at the previous boreholes. A three orders of magnitude increase is difficult to explain by volume uncertainty. Even if large fractures are connected to the interval, a volume increase by three orders of magnitude does not seem probable. The discrepancy can be more likely explained by increased compressibility of the packer system. In order to better understand this phenomenon, a series of tool compressibility tests should be conducted in order to measure the tool compressibility and to assess to what extent the system behaves elastically.

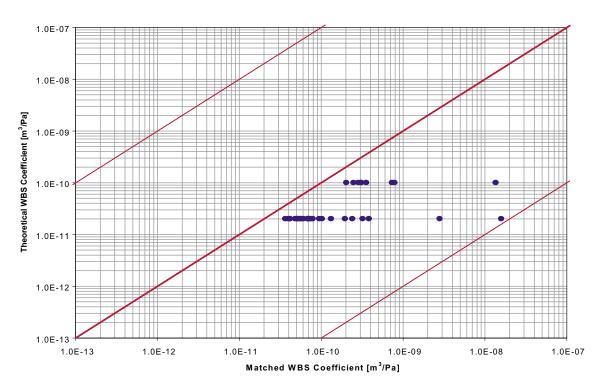


Figure 7-5. Correlation analysis of theoretical and matched wellbore storage coefficients.

8 Conclusions

8.1 Transmissivity

Figure 7-1 presents a profile of transmissivity, including the confidence ranges derived from the transient analysis. The method used for deriving the recommended transmissivity and its confidence range is described in Section 5.5.7.

Whenever possible, the transmissivities derived are representative for the "undisturbed formation" further away from the borehole. The borehole vicinity was typically described by using a skin effect.

In some cases, no injection test were performed due to the fact that the preliminary pulse was showing a slow recovery indicating a low transmissivity. In such cases the preliminary pulse injection (Pi) was prolonged and analysed. One pulse injection test in the 100 m sections and eight Pulse injection tests in the 20 m sections were conducted without performing a constant head injection test. The recommended transmissivities of these sections range between 3.6E–12 m²/s and 4.4E–10 m²/s. Eight constat head injection tests were performed in 100 m sections and 22 in 20 m sections. The derived transmissivities of these injection tests range between 1.2E–10 m²/s and 1.6E–5 m²/s.

The transmissivity profiles in Figures 7.1 and 7.2 show transmissivities that ranges between 9.4E–11 m²/s and 9.1E–6 m²/s for the 100 m sections. The lowest transmissivities were derived in the test sections 506.63–606.63 m and 887.27–987.27 m with values of 9.6E–11 m²/s and 1.2E–10 m²/s, respectively. From 111.30 m to 311.14 m the highest transmissivities were observed (9.1E–6 m²/s and 1.9E–6 m²/s).

For the 20 m sections, the transmissivities range from 3.6E–12 m²/s to 1.6E–5 m²/s. The results form the 20 m section are consistent to the results of the appropriate longer intervals. Only four 20 m sectios show larger transmissivities. The differences are small and are covered by the confidence range.

8.2 Equivalent freshwater head

Figure 7-1 presents a profile of the derived equivalent freshwater head expressed in metres above sea level. The method used for deriving the equivalent freshwater head is described in Section 5.5.6.

The head profile shows a freshwater head that ranges from 10.20 m for the upper part of the borehole to 17.50 m for the lower part. It shows a continuesly increase of the freshwater head with increase of depth. This can be explained by higher salinity of the water. The profile shows no distinct zones, which means that there is a good vertical connectivity in the formation around the borehole.

The uncertainty related to the derived freshwater heads is dependent on the test section transmissivity, Due to the relatively short pressure recovery phase, the static pressure extrapolation becomes increasingly uncertain at lower transmissivities.

8.3 Flow regimes encountered

The flow models used in analysis were derived from the shape of the pressure derivative calculated with respect to log time and plotted in log-log coordinates.

In several cases the pressure derivative suggests a change of transmissivity with the distance from the borehole. In such cases a composite flow model was used in the analysis.

If there were different flow models matching the data in comparable quality, the simplest model was preferred.

In few cases very large skins has been observed. This is unusual and should be further examined. There are several possible explanations to this behaviour:

- If the behaviour is to be completely attributed to changes of transmissivity in the formation, this indicates the presence of larger transmissivity zones in the borehole vicinity, which could be caused by steep fractures that do not intersect the test interval, but are connected to the interval by lower transmissivity fractures. The fact that in many cases the test derivatives of adjacent test sections converge at late times seems to support this hypothesis.
- A further possibility is that the large skins are caused by turbulent flow taking place in the tool or in fractures connected to the test interval. This hypothesis is more difficult to examine. However, considering the fact that some high skins were observed in sections with transmissivities as low as 1E–8 m²/s (which imply low flow rates) seems to speak against this hypothesis.

The flow dimension displayed by the test can be diagnosed from the slope of the pressure derivative. A slope of 0.5 indicates linear flow, a slope of 0 (horizontal derivative) indicates radial flow and a slope of -0.5 indicates spherical flow. The flow dimension diagnosis was commented for each of the tests. In all of the cases it was possible to get a good match quality by using radial flow geometry. In no cases an alternative analysis with a flow dimension unequal to two was performed. Those analyses are presented in Appendix 2.

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Borehole: KLX05

APPENDIX 1

File Description Table

Borehole: KLX05	Page 1/1

HYDROTESTING WITH PSS				PSS	DRILLHOLE IDENTIFICATION	NO.: KLX05						
TEST-	TEST- AND FILEPROTOCOL				Testorder dated: 2005-05-31							
Teststart		Interval boundari	ies	Name	e of Datafiles	Testtype	Copied to	Plotted	Sign.			
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)				
2005-06-01	17:37	111.30	211.30	KLX05_0111.30_200506011737.ht2	KLX05_111.30-211.30_050601_1_CHir_Q_r.csv	Chir		2005-06-02				
2005-06-02	09:21	211.14	311.14	KLX05_0211.14_200506020921.ht2	KLX05_211.14-311.14_050602_1_CHir_Q_r.csv	Chir		2005-06-02				
2005-06-02	13:30	306.37	406.37	KLX05_0306.37_200506021330.ht2	KLX05_306.37-406.37_050602_1_CHir_Q_r.csv	Chir		2005-06-02				
2005-06-02	17:49	406.54	506.54	KLX05_0406.54_200506021749.ht2	KLX05_406.54-506.54_050602_1_CHir_Q_r.csv	Chir		2005-06-03				
2005-06-03	09:11	506.63	606.63	KLX05_0506.63_200506030911.ht2	KLX05_506.63-606.63_050603_1_Pi_Q_r.csv	Pi		2005-06-03				
2005-06-03	12:41	606.82	706.82	KLX05_0606.82_200506031241.ht2	KLX05_606.82-706.82_050603_1_CHir_Q_r.csv	Chir		2005-06-03				
2005-06-03	16:56	706.83	806.83	KLX05_0706.83_200506031656.ht2	KLX05_706.83-806.83_050603_1_CHir_Q_r.csv	Chir		2005-06-03				
2005-06-04	09:20	807.11	907.11	KLX05_0807.11_200506040920.ht2	KLX05_807.11-907.11_050604_1_CHir_Q_r.csv	Chir		2005-06-04				
2005-06-04	14:00	887.27	987.27	KLX05_0887.27_200506041400.ht2	KLX05_887.27-987.27_050604_1_CHir_Q_r.csv	Chir		2005-06-04				
2005-06-09	19:46	111.30	131.30	KLX05_0111.30_200506091946.ht2	KLX05_111.30-131.30_050609_1_CHir_Q_r.csv	Chir		2005-06-10				
2005-06-10	13:12	111.30	131.30	KLX05_0111.30_200506101312.ht2	KLX05_111.30-131.30_050610_2_CHir_Q_r.csv	Chir		2005-06-10				
2005-06-10	15:35	126.02	146.02	KLX05_0126.02_200506101535.ht2	KLX05_126.02-146.02_050610_1_CHir_Q_r.csv	Chir		2005-06-10				
2005-06-10	17:47	146.10	166.10	KLX05_0146.10_200506101747.ht2	KLX05_146.10-166.10_050610_1_CHir_Q_r.csv	Chir		2005-06-11				
2005-06-11	08:54	166.12	186.12	KLX05_0166.12_200506110854.ht2	KLX05_166.12-186.12_050611_1_CHir_Q_r.csv	Chir		2005-06-11				
2005-06-11	11:14	181.13	201.13	KLX05_0181.13_200506111114.ht2	KLX05_181.13-201.13_050611_1_CHir_Q_r.csv	Chir		2005-06-11				
2005-06-11	13:38	191.14	211.14	KLX05 0191.14 200506111338.ht2	KLX05 191.14-211.14 050611 1 CHir Q r.csv	Chir		2005-06-11				

Borehole: KLX05	Page 1/2	

HYDROTESTING WITH PSS				PSS	DRILLHOLE IDENTIFICATION NO.: KLX05							
TEST- A	AND	FILEP	ROTO	OCOL	Testorder dated: 2005-05-31							
Teststart		Interval boundari	es	Name	of Datafiles	Testtype	Copied to	Plotted	Sign.			
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)				
2005-06-11	15:55	211.14	231.14	KLX05_0211.14_200506111555.ht2	KLX05_211.14-231.14_050611_1_CHir_Q_r.csv	Chir		2005-06-11				
2005-06-11	18:10	226.14	246.14	KLX05_0226.14_200506111810.ht2	KLX05_226.14-246.14_050611_1_CHir_Q_r.csv	Chir		2005-06-12				
2005-06-12	08:10	246.15	266.15	KLX05_0246.15_200506120810.ht2	KLX05_246.15-266.15_050612_1_CHir_Q_r.csv	Chir		2005-06-12				
2005-06-12	10:21	266.21	286.21	KLX05_0266.21_200506121021.ht2	KLX05_266.21-286.21_050612_1_Pi_Q_r.csv	Pi		2005-06-12				
2005-06-12	12:29	286.28	306.28	KLX05_0286.28_200506121229.ht2	KLX05_286.28-306.28_050612_1_CHir_Q_r.csv	Chir		2005-06-12				
2005-06-12	14:39	306.37	326.37	KLX05_0306.37_200506121439.ht2	KLX05_306.37-326.37_050612_1_CHir_Q_r.csv	Chir		2005-06-12				
2005-06-12	17:03	326.38	346.38	KLX05_0326.38_200506121703.ht2	KLX05_326.38-346.38_050612_1_Pi_Q_r.csv	Pi		2005-06-12				
2005-06-12	18:38	341.40	361.40	KLX05_0341.40_200506121838.ht2	KLX05_341.40-361.40_050612_1_CHir_Q_r.csv	Chir		2005-06-13				
2005-06-13	07:26	356.42	376.42	KLX05_0356.42_200506130726.ht2	KLX05_356.42-376.42_050613_1_CHir_Q_r.csv	Chir		2005-06-13				
2005-06-13	09:17	376.47	396.47	KLX05_0376.47_200506130917.ht2	KLX05_376.47-396.47_050613_1_CHir_Q_r.csv	Chir		2005-06-13				
2005-06-13	11:00	386.50	406.50	KLX05_0386.50_200506131100.ht2	KLX05_386.50-406.50_050613_1_Pi_Q_r.csv	Pi		2005-06-13				
2005-06-13	13:04	406.54	426.54	KLX05_0406.54_200506131304.ht2	KLX05_406.54-426.54_050613_1_CHir_Q_r.csv	Chir		2005-06-13				
2005-06-13	15:32	426.55	446.55	KLX05_0426.55_200506131532.ht2	KLX05_426.55-446.55_050613_1_Pi_Q_r.csv	Pi		2005-06-13				
2005-06-13	17:33	446.57	466.57	KLX05_0446.57_200506131733.ht2	KLX05_446.57-466.57_050613_1_CHir_Q_r.csv	Chir		2005-06-13				
2005-06-13	19:13	466.58	486.58	KLX05 0466.58 200506131913.ht2	KLX05 466.58-486.58 050613 1 Pi Q r.csv	Pi		2005-06-14				
2005-06-14	07:40	486.59	506.59	KLX05 0486.59 200506140740.ht2	KLX05 486.59-506.59 050614 1 CHir Q r.csv	Chir		2005-06-14				

Borehole: KLX05	Page 1/3	

HYDROTESTING WITH PSS				PSS	DRILLHOLE IDENTIFICATION	NO.: F	KLX05							
TEST- AND FILEPROTOCOL				OCOL	Testorder dated: 2005-05-31									
Teststart		Interval boundari	es	Name	of Datafiles	Testtype	Copied to	Plotted	Sign.					
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)						
2005-06-14	11:09	606.82	626.82	KLX05_0606.82_200506141109.ht2	KLX05_606.82-626.82_050614_1_Pi_Q_r.csv	Pi		2005-06-14						
2005-06-14	13:16	626.85	646.85	KLX05_0626.85_200506141316.ht2	KLX05_626.85-646.85_050614_1_CHir_Q_r.csv	Chir		2005-06-14						
2005-06-14	16:07	646.85	666.85	KLX05_0646.85_200506141607.ht2	KLX05_646.85-666.85_050614_1_CHir_Q_r.csv	Chir		2005-06-14						
2005-06-14	17:56	666.85	686.85	KLX05_0666.85_200506141756.ht2	KLX05_666.85-686.85_050614_1_CHir_Q_r.csv	Chir		2005-06-14						
2005-06-14	19:48	686.83	706.83	KLX05_0686.83_200506141948.ht2	KLX05_686.83-706.83_050614_1_CHir_Q_r.csv	Chir		2005-06-15						
2005-06-15	08:02	706.83	726.83	KLX05_0706.83_200506150802.ht2	KLX05_706.83-726.83_050615_1_CHir_Q_r.csv	Chir		2005-06-15						
2005-06-15	10:40	726.91	746.91	KLX05_0726.91_200506151040.ht2	KLX05_726.91-746.91_050615_1_Pi_Q_r.csv	Pi		2005-06-15						
2005-06-15	12:45	747.00	767.00	KLX05_0747.00_200506151245.ht2	KLX05_747.00-767.00_050615_1_Pi_Q_r.csv	Pi		2005-06-15						
2005-06-15	17:07	787.07	807.07	KLX05_0787.07_200506151707.ht2	KLX05_787.07-807.07_050615_1_CHir_Q_r.csv	Chir		2005-06-16						
2005-06-16	08:05	807.11	827.11	KLX05_0807.11_200506160805.ht2	KLX05_807.11-827.11_050616_1_CHir_Q_r.csv	Chir		2005-06-16						
2005-06-16	09:52	827.15	847.15	KLX05_0827.15_200506160952.ht2	KLX05_827.15-847.15_050616_1_CHir_Q_r.csv	Chir		2005-06-16						
2005-06-16	13:09	847.20	867.20	KLX05_0847.20_200506161309.ht2	KLX05_847.20-867.20_050616_1_CHir_Q_r.csv	Chir		2005-06-16						
2005-06-16	15:39	867.24	887.24	KLX05_0867.24_200506161539.ht2	KLX05_867.24-887.24_050616_1_CHir_Q_r.csv	Chir		2005-06-16						
2005-06-16	18:07	887.27	907.27	KLX05_0887.27_200506161807.ht2	KLX05_887.27-907.27_050616_1_CHir_Q_r.csv	Chir		2005-06-17						
2005-06-17	07:33	907.30	927.30	KLX05_0907.30_200506170733.ht2	KLX05_907.30-927.30_050617_1_Pi_Q_r.csv	Pi		2005-06-17						

Borehole: KLX05	Page 1/4

HYDROTESTING WITH PSS				PSS	DRILLHOLE IDENTIFICATION NO.: KLX05					
TEST- AND FILEPROTOCOL				OCOL	Testorder dated: 2005-05-31					
Teststart		Interval boundari	ies	Name	e of Datafiles	Testtype	Copied to	Plotted	Sign.	
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)		
2005-06-17	09:13	927.34	947.34	KLX05_0927.34_200506170913.ht2	KLX05_927.34-947.34_050617_1_CHir_Q_r.csv	Chir		2005-06-17		

Borehole: KLX05

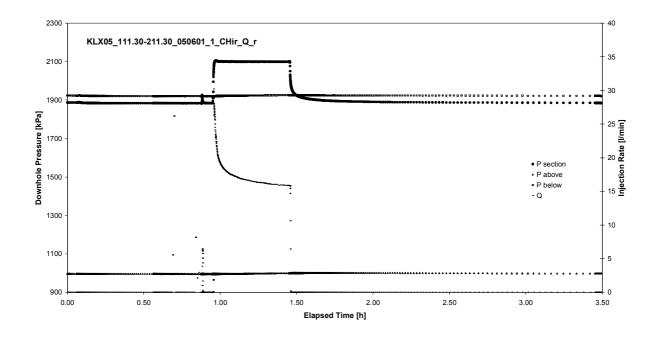
APPENDIX 2

Test: 111.30 – 211.30 m

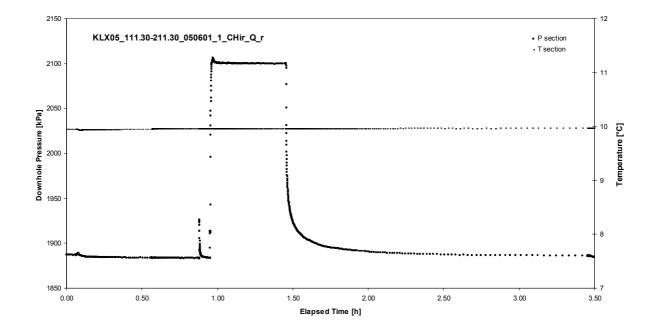
APPENDIX 2-1

Test 111.30 – 211.30 m

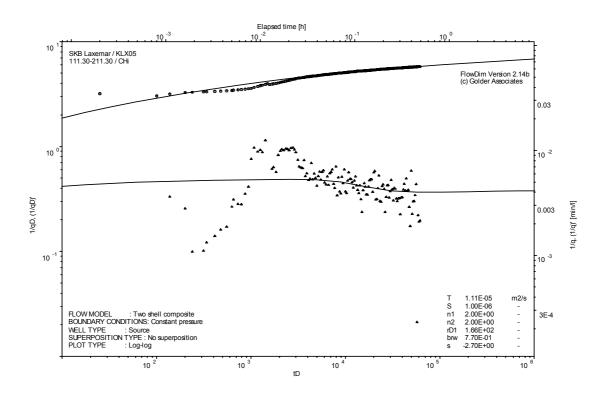
Test: 111.30 – 211.30 m



Pressure and flow rate vs. time; cartesian plot

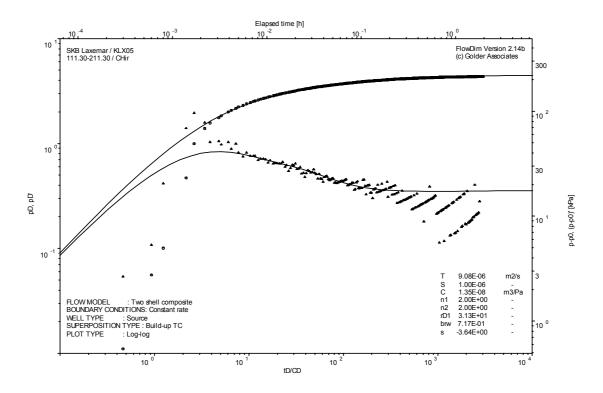


Test: 111.30 – 211.30 m

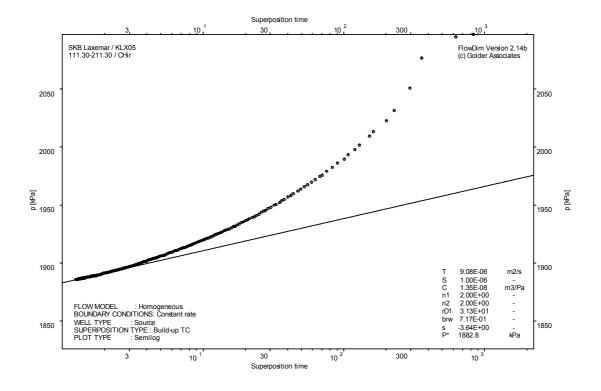


CHI phase; log-log match

Test: 111.30 – 211.30 m



CHIR phase; log-log match



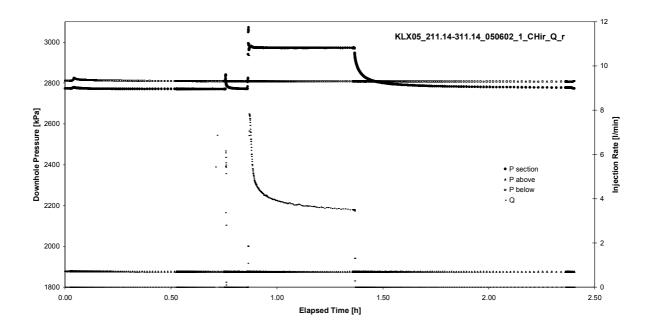
CHIR phase; HORNER match

Test: 211.14 – 311.14 m

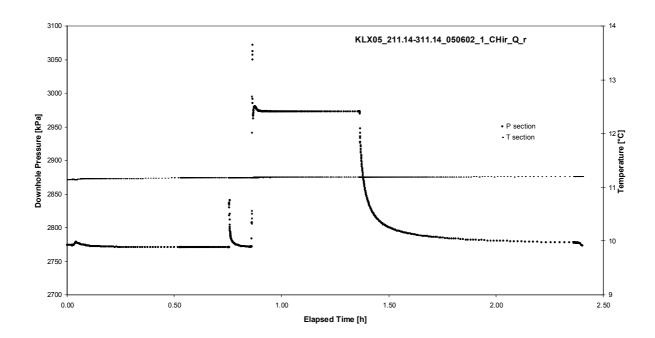
APPENDIX 2-2

Test 211.14 – 311.14 m

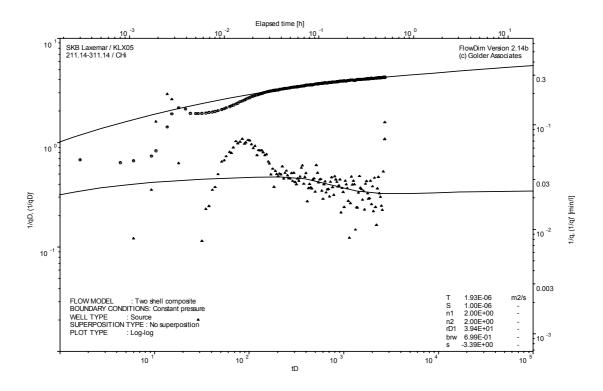
211.14 - 311.14 m Test:



Pressure and flow rate vs. time; cartesian plot

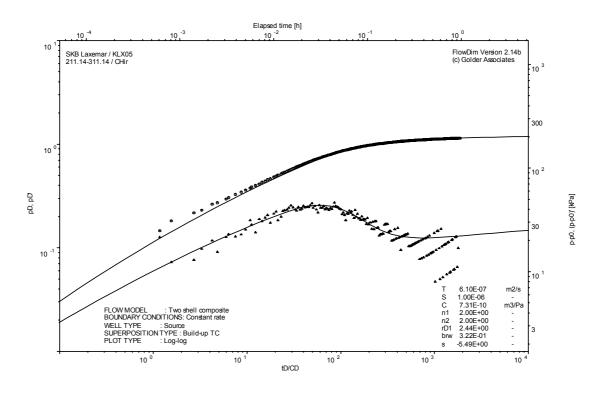


Test: 211.14 – 311.14 m

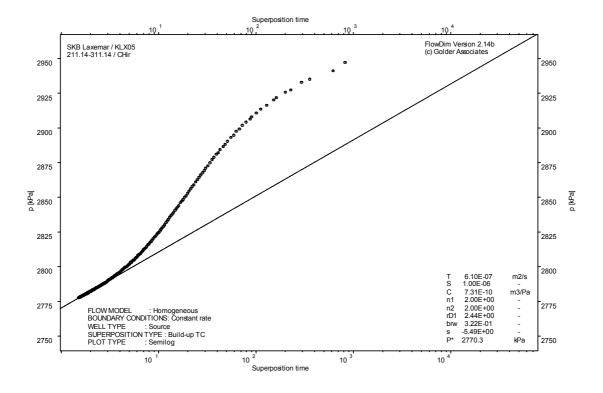


CHI phase; log-log match

Test: 211.14 – 311.14 m



CHIR phase; log-log match



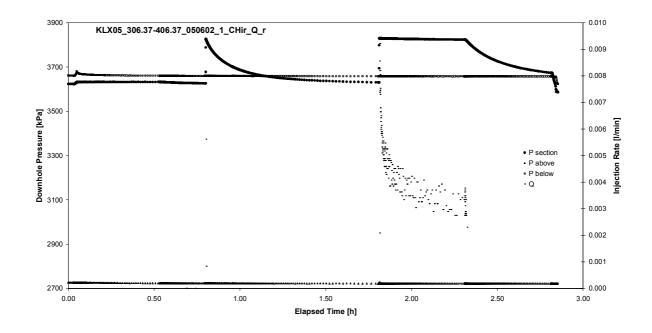
CHIR phase; HORNER match

Test: 306.37 – 406.37 m

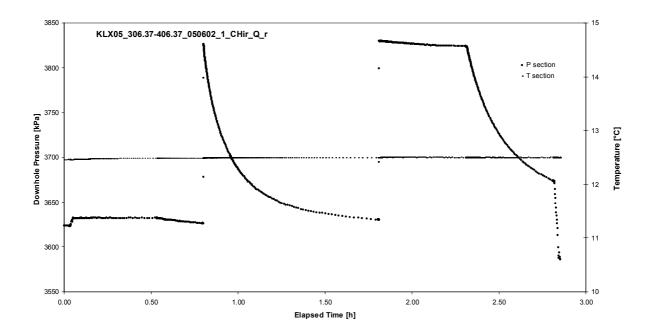
APPENDIX 2-3

Test 306.37 – 406.37 m

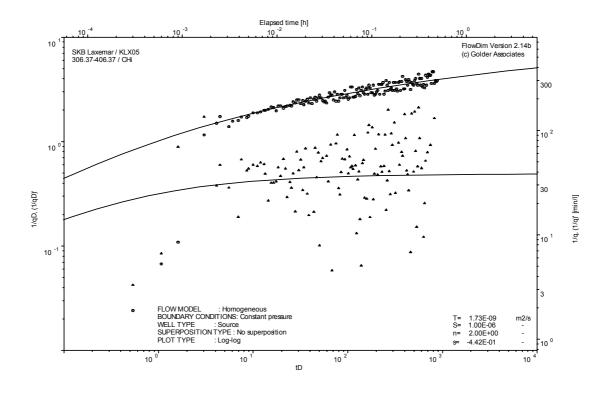
Test: 306.37 – 406.37 m



Pressure and flow rate vs. time; cartesian plot

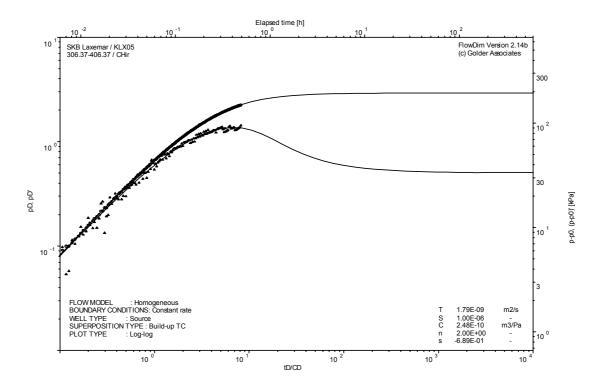


Test: 306.37 – 406.37 m

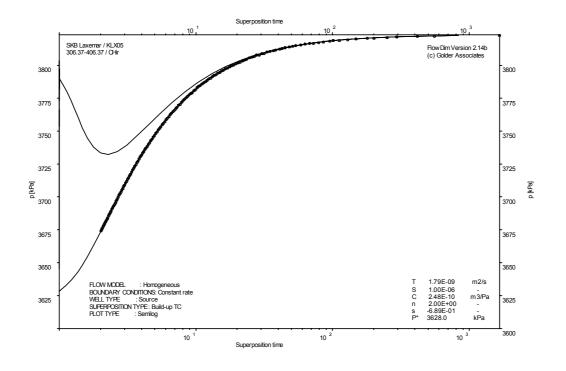


CHI phase; log-log match

Test: 306.37 – 406.37 m

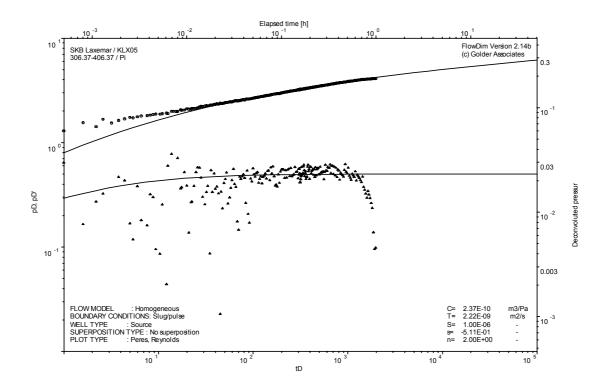


CHIR phase; log-log match



CHIR phase; HORNER match

Test: 306.37 – 406.37 m



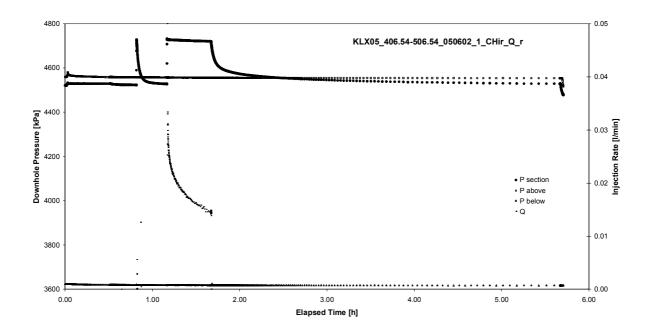
Pulse injection; deconvolution match

Test: 406.54 - 506.54 m

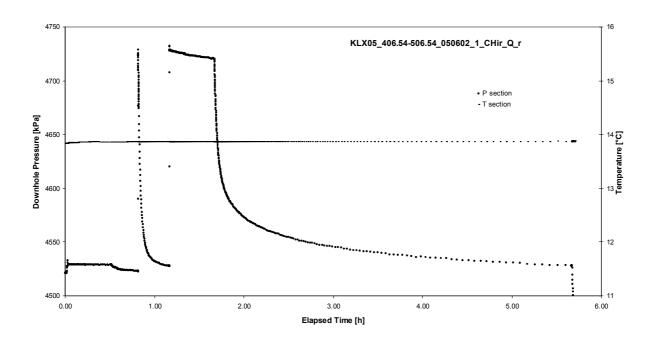
APPENDIX 2-4

Test 406.54 – 506.54 m

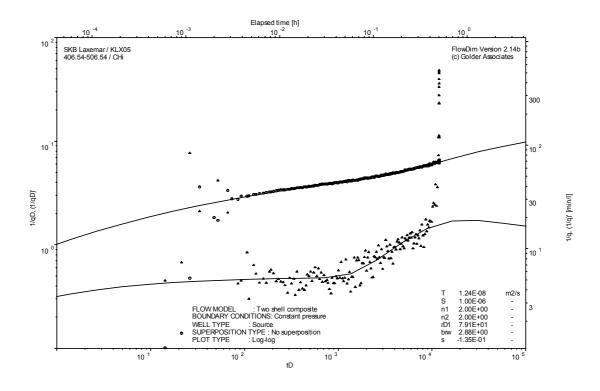
Test: 406.54 – 506.54 m



Pressure and flow rate vs. time; cartesian plot

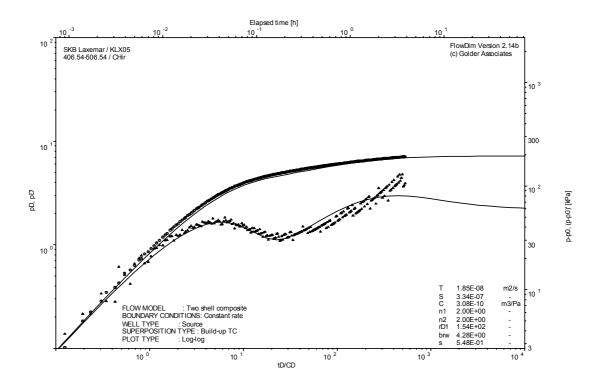


Test: 406.54 - 506.54 m

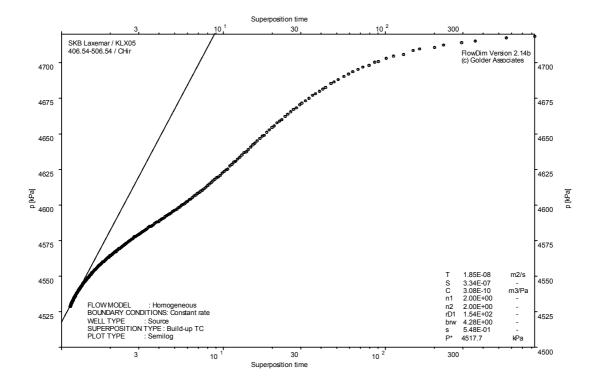


CHI phase; log-log match

Test: 406.54 – 506.54 m



CHIR phase; log-log match



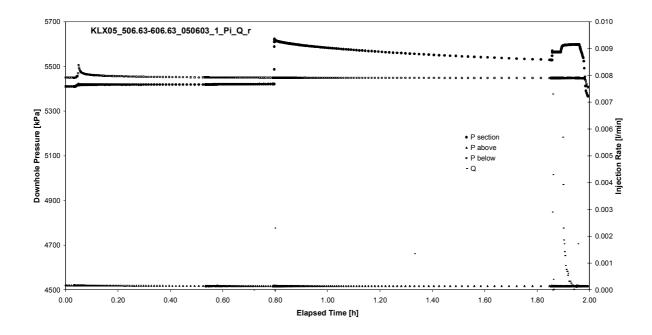
CHIR phase; HORNER match

Test: 506.63 – 606.63 m

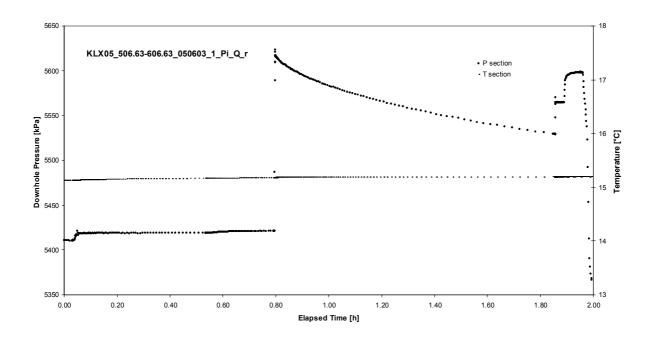
APPENDIX 2-5

Test 506.63 – 606.63 m

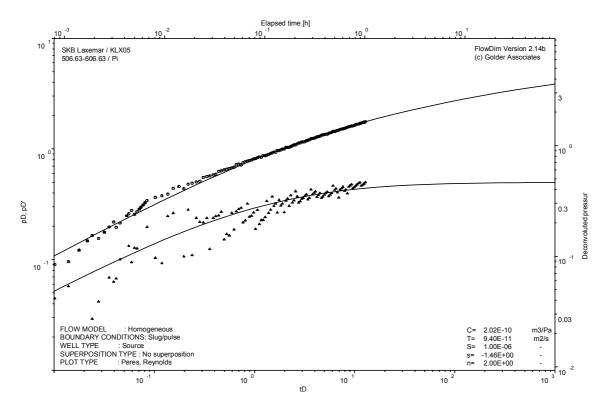
Test: 506.63 – 606.63 m



Pressure and flow rate vs. time; cartesian plot



Test: 506.63 – 606.63 m



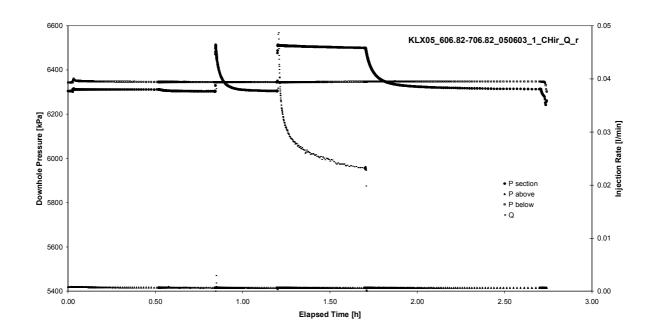
PI phase; log-log match

Test: 606.82 – 706.82 m

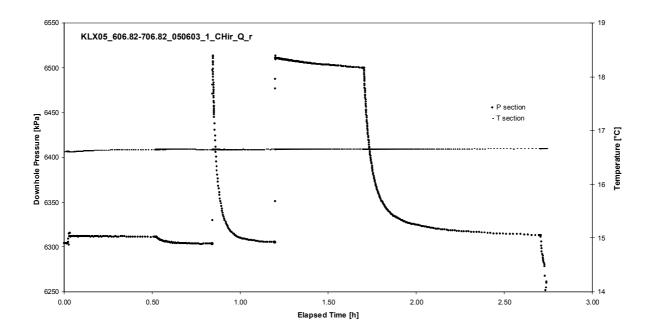
APPENDIX 2-6

Test 606.82 – 706.82 m

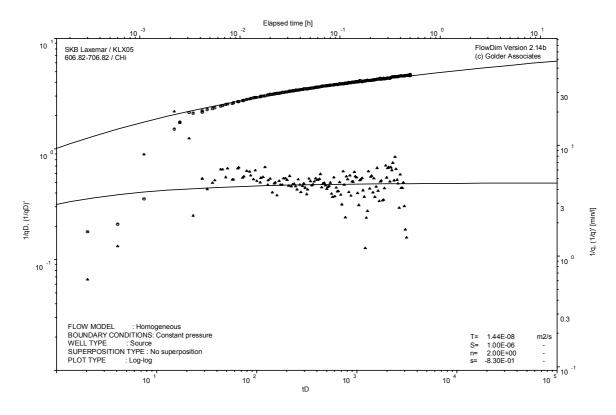
Test: 606.82 – 706.82 m



Pressure and flow rate vs. time; cartesian plot

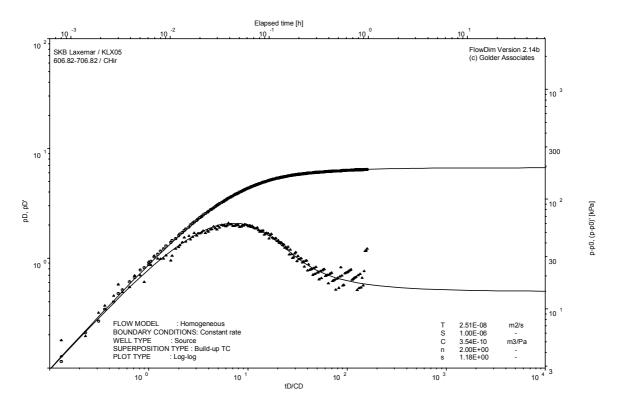


Test: 606.82 – 706.82 m

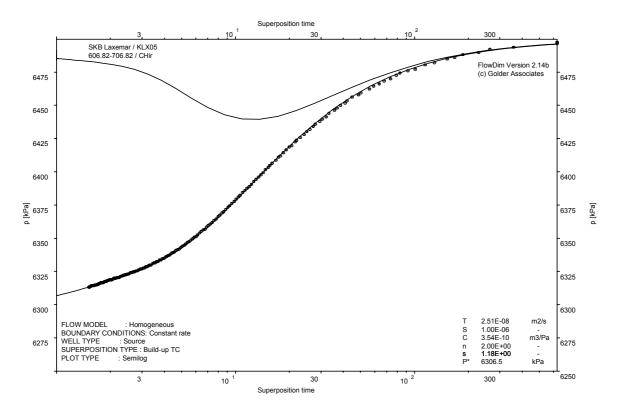


CHI phase; log-log match

Test: 606.82 – 706.82 m



CHIR phase; log-log match



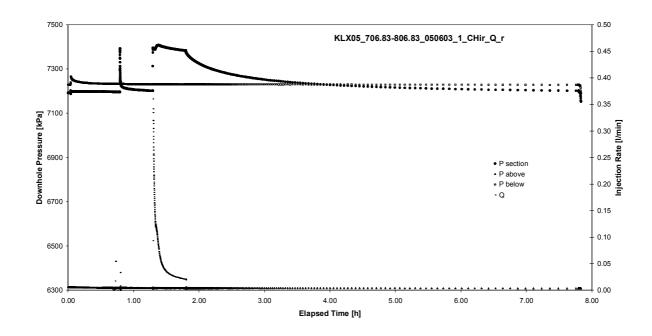
CHIR phase; HORNER match

Test: 706.83 – 806.83 m

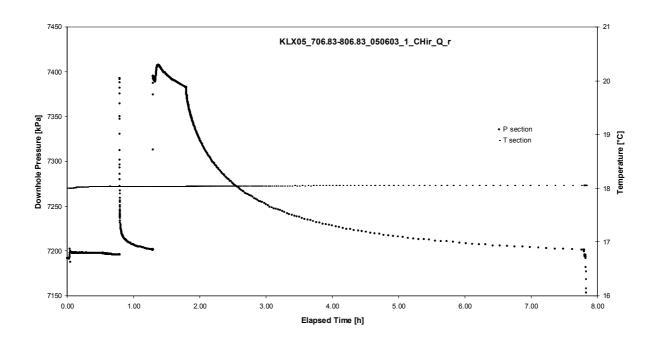
APPENDIX 2-7

Test 706.83 – 806.83 m

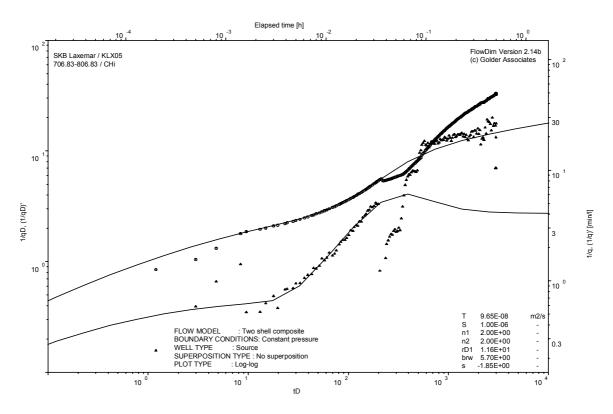
706.83 - 806.83 m Test:



Pressure and flow rate vs. time; cartesian plot

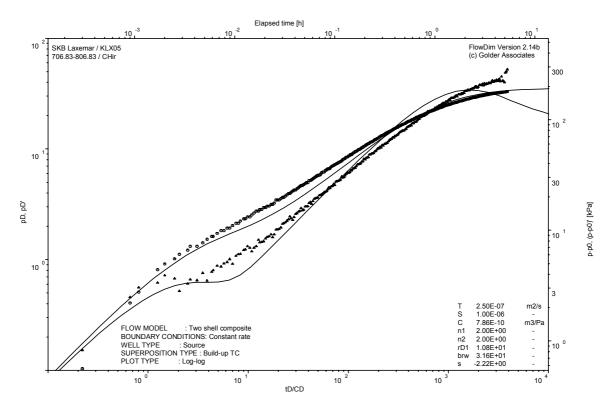


Test: 706.83 – 806.83 m

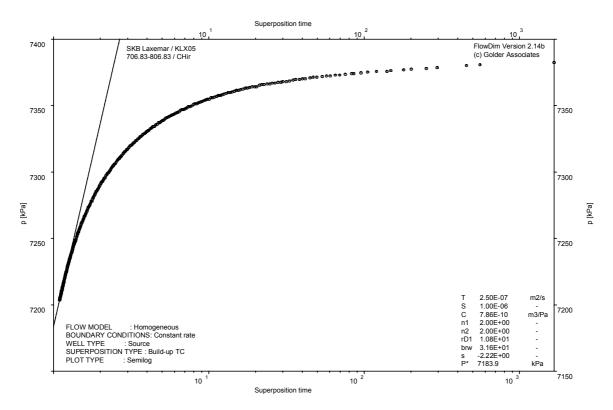


CHI phase; log-log match

Test: 706.83 – 806.83 m



CHIR phase; log-log match



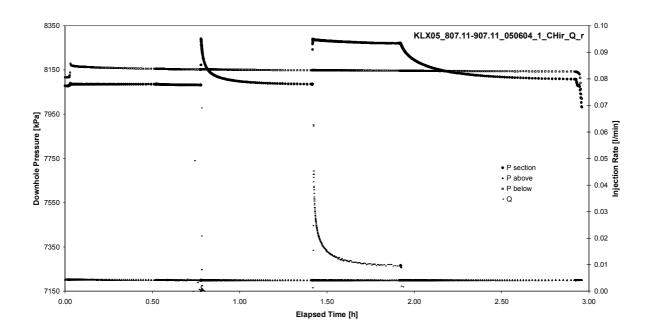
CHIR phase; HORNER match

Test: 807.11 – 907.11 m

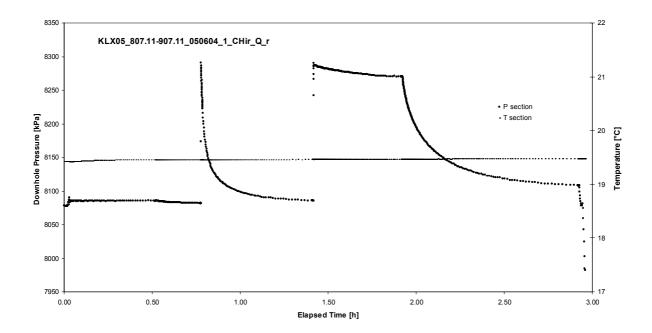
APPENDIX 2-8

Test 807.11 – 907.11 m

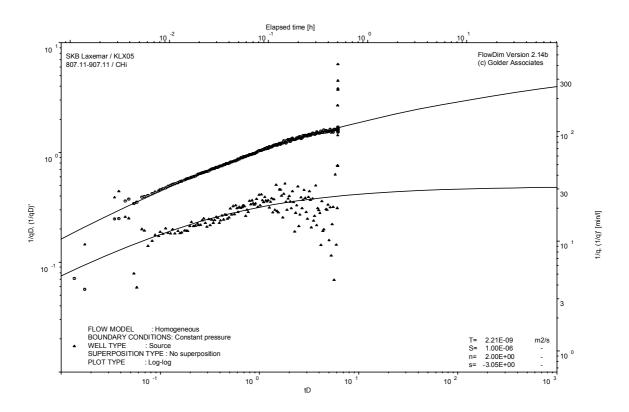
Test: 807.11 – 907.11 m



Pressure and flow rate vs. time; cartesian plot

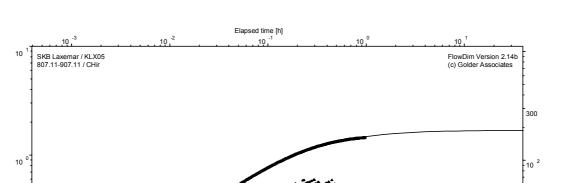


Test: 807.11 – 907.11 m



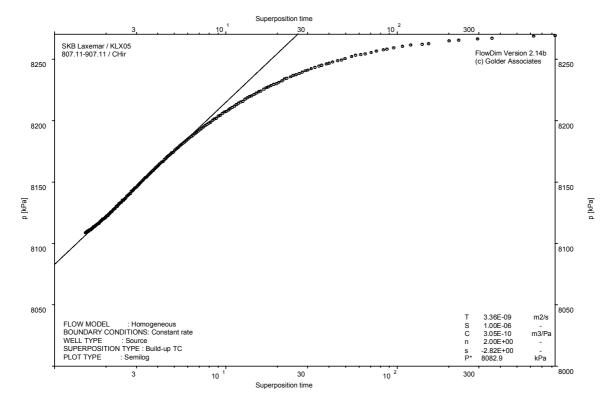
CHI phase; log-log match

Page 2-8/4 Borehole: KLX05 Test: 807.11 - 907.11 m



pD, pD' p-p0, (p-p0)' [kPa] 10 10 1 FLOW MODEL : Homogeneous BOUNDARY CONDITIONS: Constant rate WELL TYPE : Source SUPERPOSITION TYPE : Build-up TC PLOT TYPE : Log-log 3.36E-09 1.00E-06 3.05E-10 2.00E+00 -2.82E+00 m3/Pa 10 -1 10 0 10 10 2 10 tD/CD

CHIR phase; log-log match



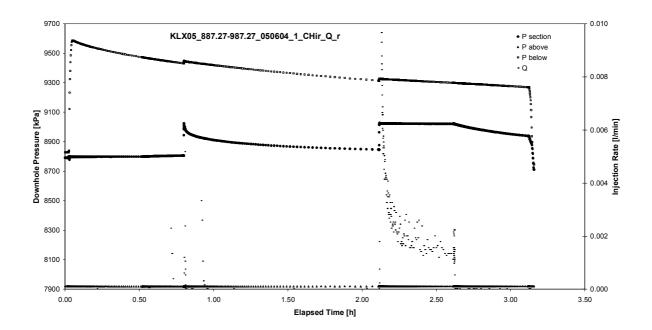
CHIR phase; HORNER match

Test: 887.27 – 987.27 m

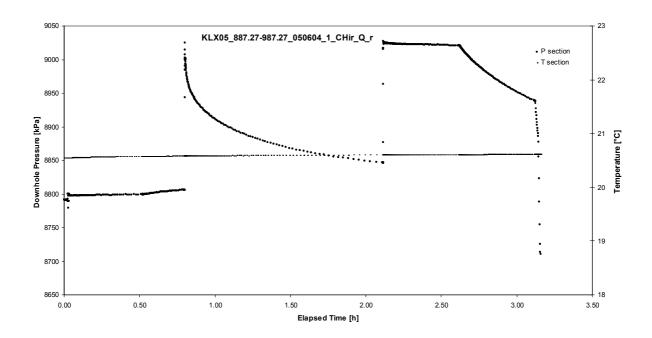
APPENDIX 2-9

Test 887.27 – 987.27 m

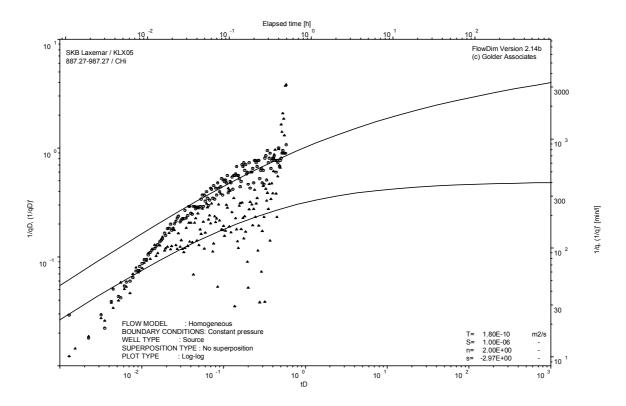
Test: 887.27 – 987.27 m



Pressure and flow rate vs. time; cartesian plot

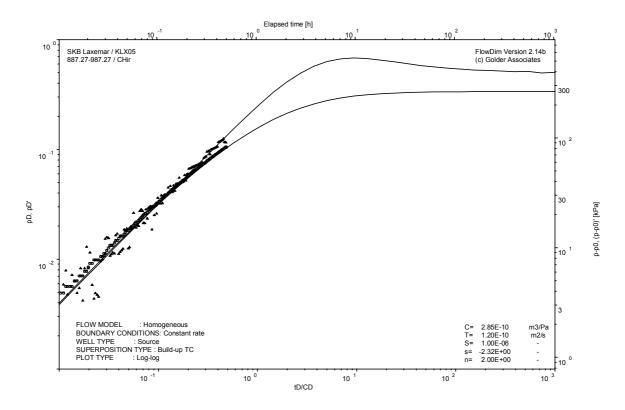


Test: 887.27 – 987.27 m



CHI phase; log-log match

Test: 887.27 – 987.27 m

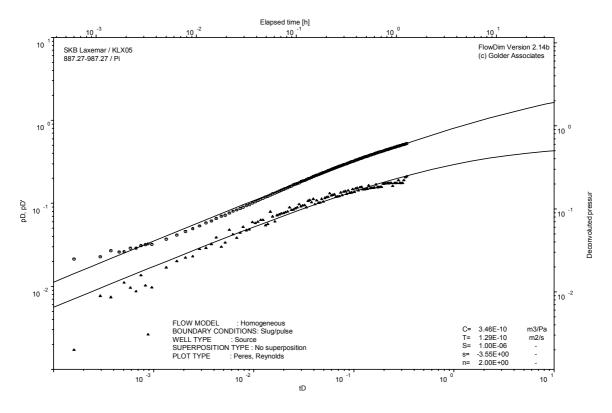


CHIR phase; log-log match

No calculation due to the tight section

CHIR phase; HORNER match

Test: 887.27 – 987.27 m



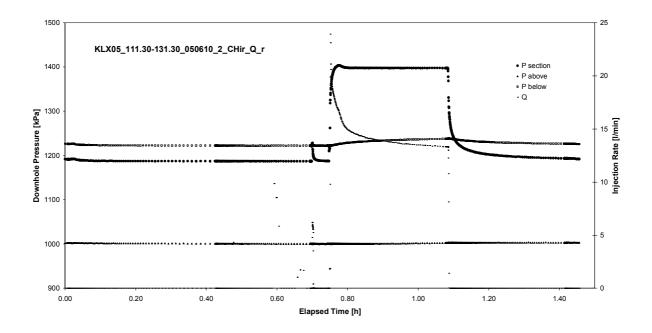
Pulse injection; deconvolution match

Test: 111.30 – 131.30 m

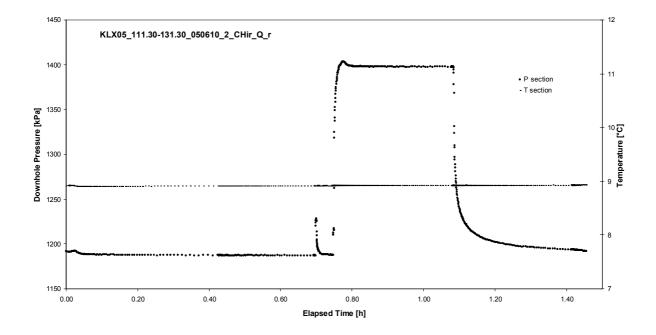
APPENDIX 2-10

Test 111.30 – 131.30 m

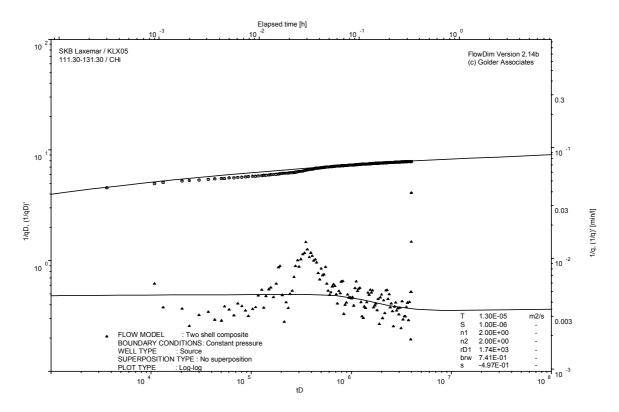
Test: 111.30 – 131.30 m



Pressure and flow rate vs. time; cartesian plot

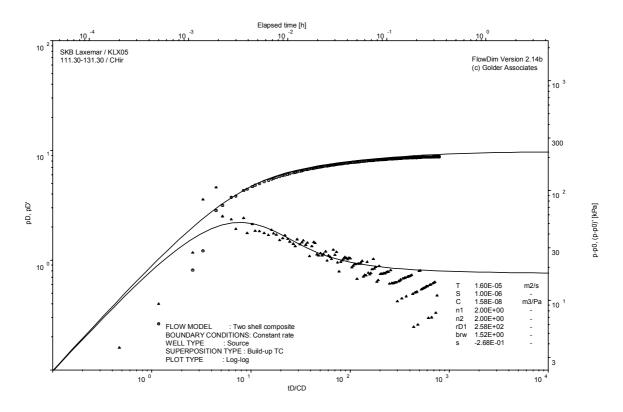


Test: 111.30 – 131.30 m

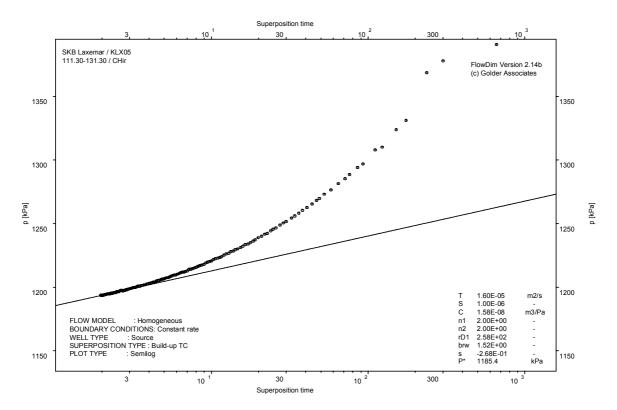


CHI phase; log-log match

Test: 111.30 – 131.30 m



CHIR phase; log-log match



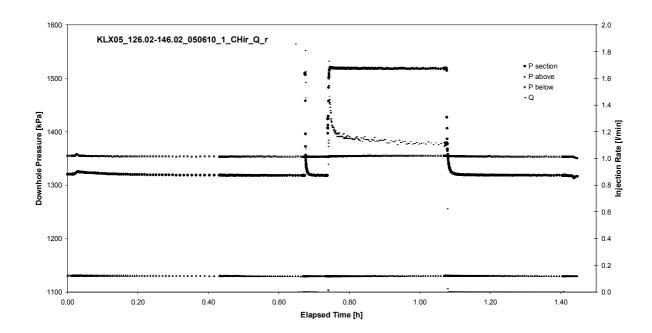
CHIR phase; HORNER match

Test: 126.02 – 146.02 m

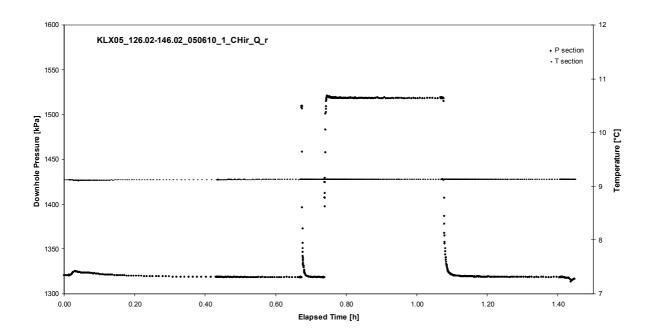
APPENDIX 2-11

Test 126.02 – 146.02 m

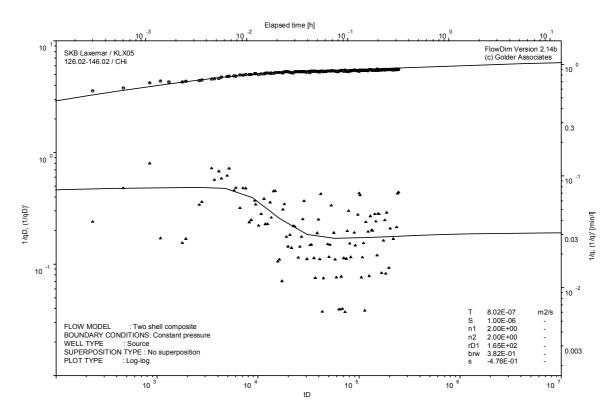
Test: 126.02 – 146.02 m



Pressure and flow rate vs. time; cartesian plot

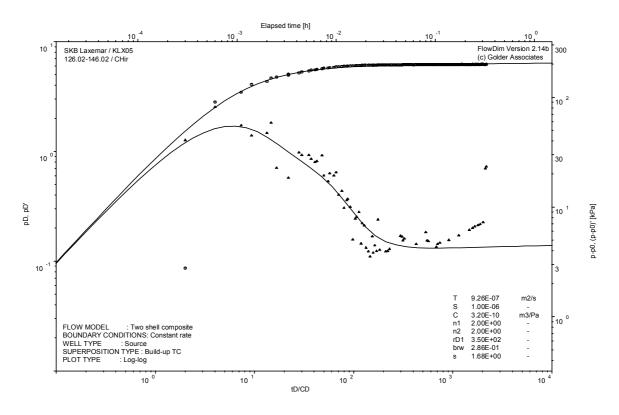


Test: 126.02 – 146.02 m

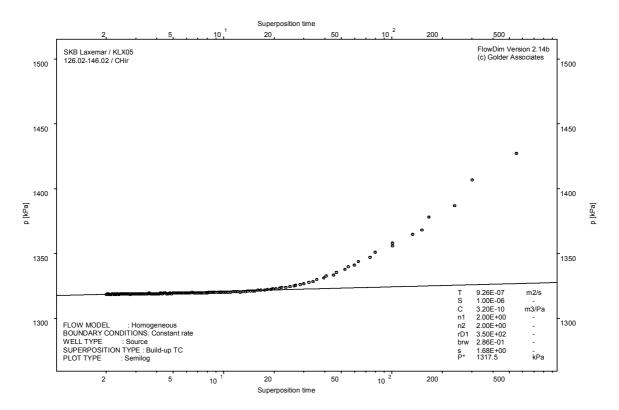


CHI phase; log-log match

Test: 126.02 – 146.02 m



CHIR phase; log-log match



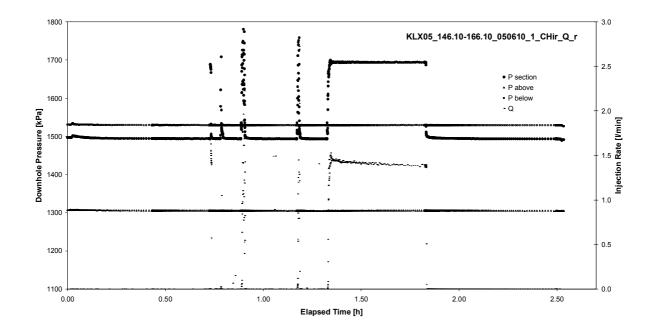
CHIR phase; HORNER match

Test: 146.10 – 166.10 m

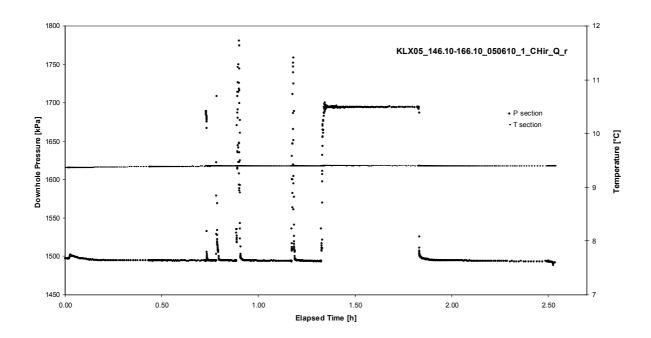
APPENDIX 2-12

Test 146.10 – 166.10 m

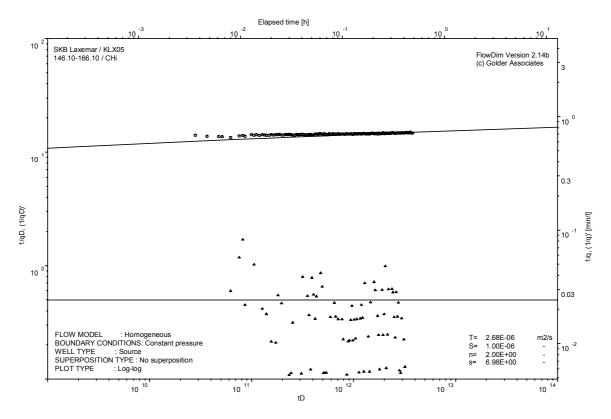
Test: 146.10 – 166.10 m



Pressure and flow rate vs. time; cartesian plot

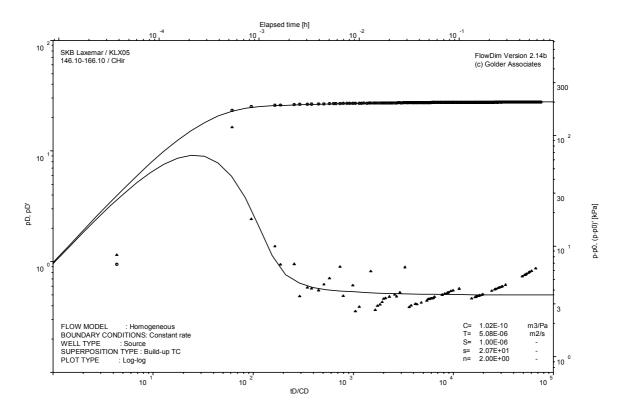


Test: 146.10 – 166.10 m

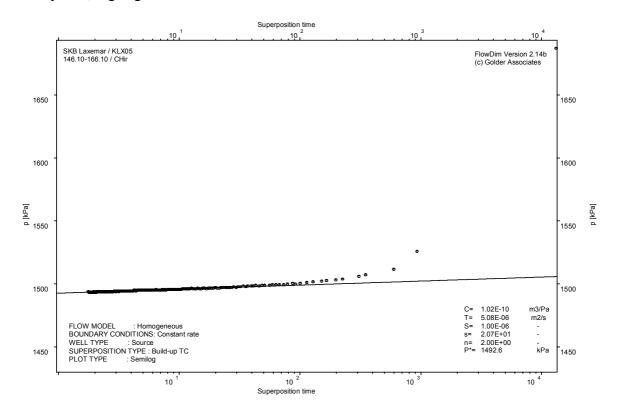


CHI phase; log-log match

Test: 146.10 – 166.10 m



CHIR phase; log-log match



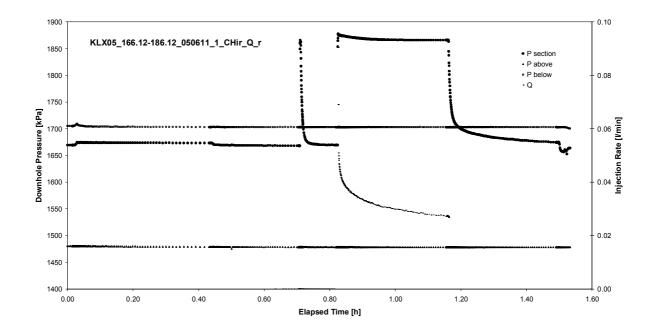
CHIR phase; HORNER match

Test: 166.12 – 186.12 m

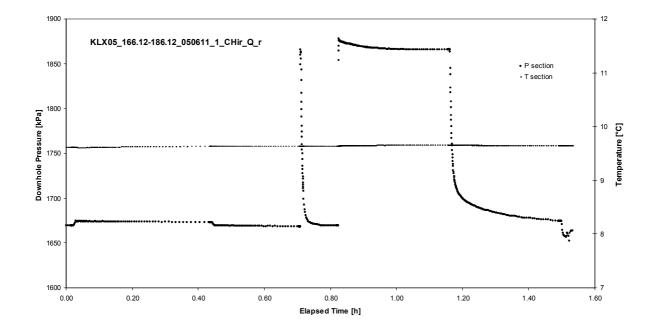
APPENDIX 2-13

Test 166.12 – 186.12 m

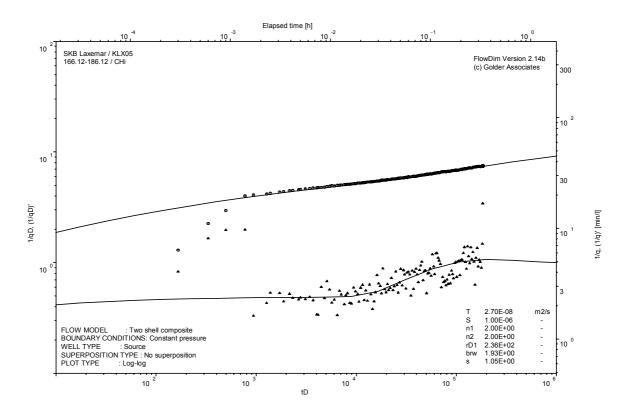
Test: 166.12 – 186.12 m



Pressure and flow rate vs. time; cartesian plot

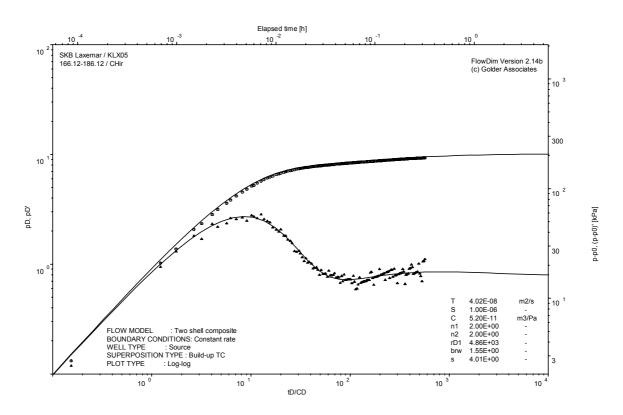


Test: 166.12 – 186.12 m

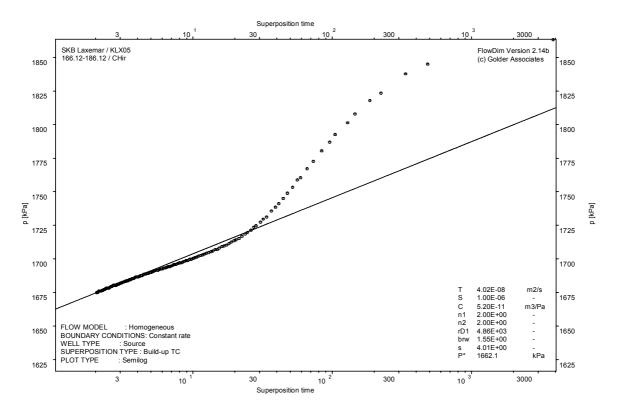


CHI phase; log-log match

Test: 166.12 – 186.12 m



CHIR phase; log-log match



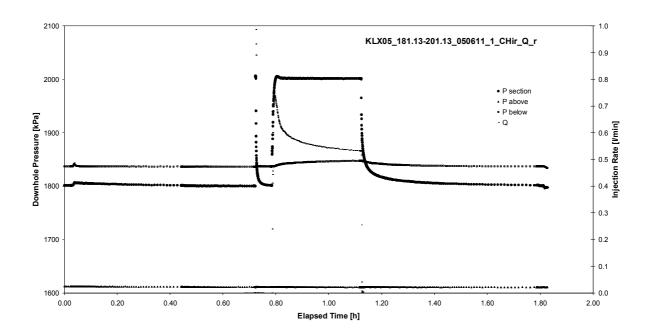
CHIR phase; HORNER match

Test: 181.13 – 201.13 m

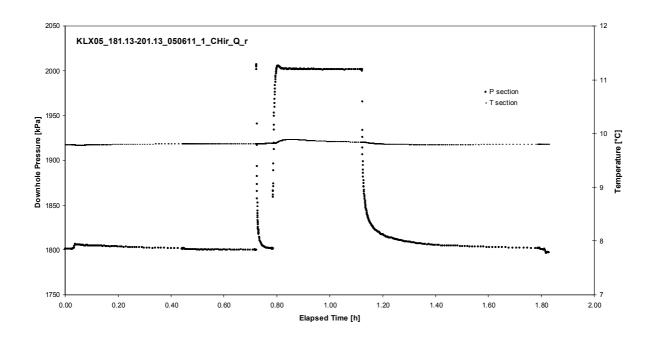
APPENDIX 2-14

Test 181.13 – 201.13 m

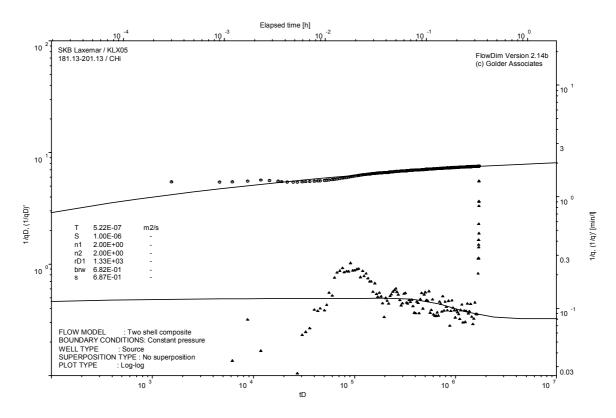
Test: 181.13 – 201.13 m



Pressure and flow rate vs. time; cartesian plot

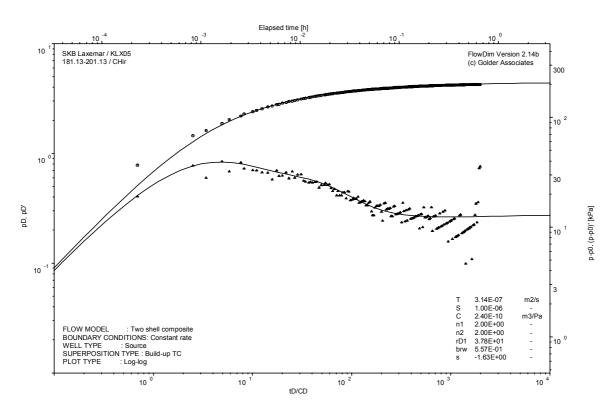


Test: 181.13 – 201.13 m

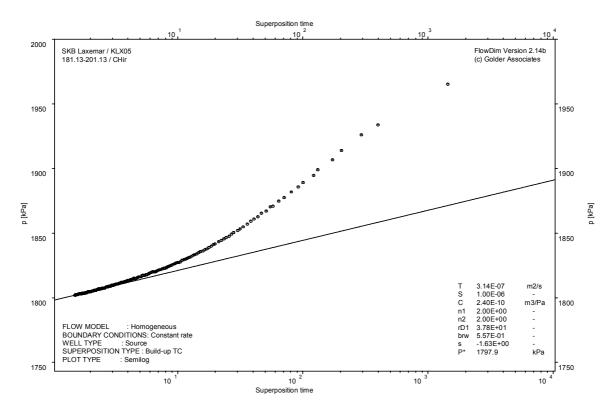


CHI phase; log-log match

Test: 181.13 – 201.13 m



CHIR phase; log-log match



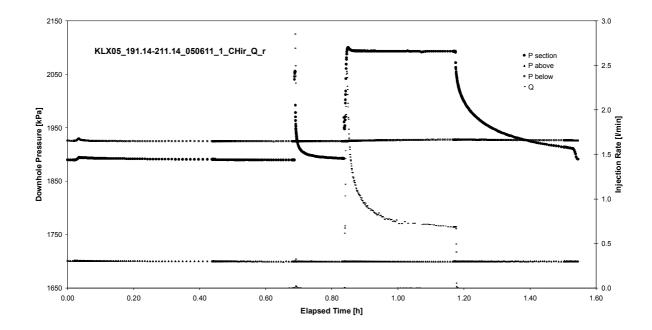
CHIR phase; HORNER match

Test: 191.14 – 211.14 m

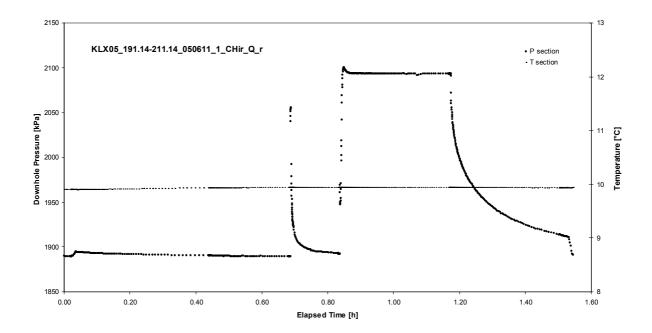
APPENDIX 2-15

Test 191.14 – 211.14 m

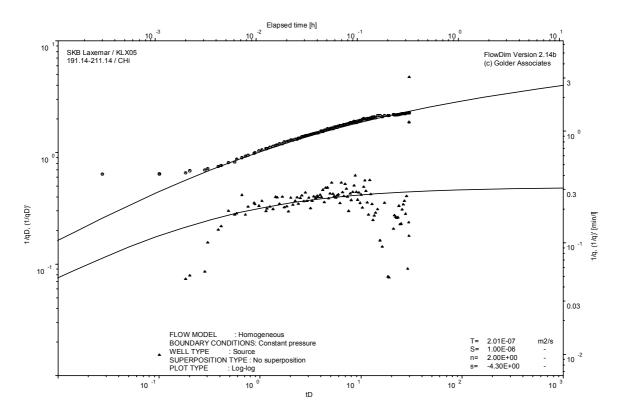
Test: 191.14 – 211.14 m



Pressure and flow rate vs. time; cartesian plot

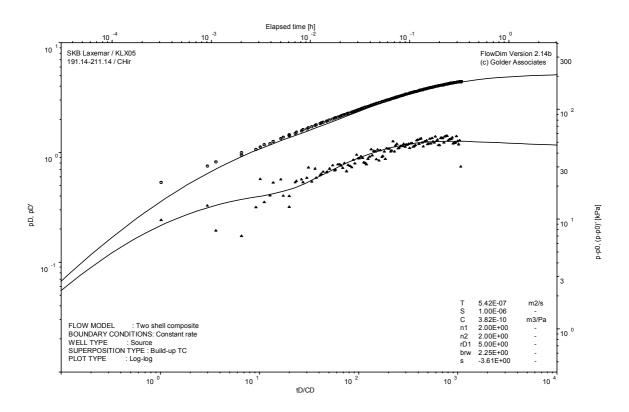


Test: 191.14 – 211.14 m

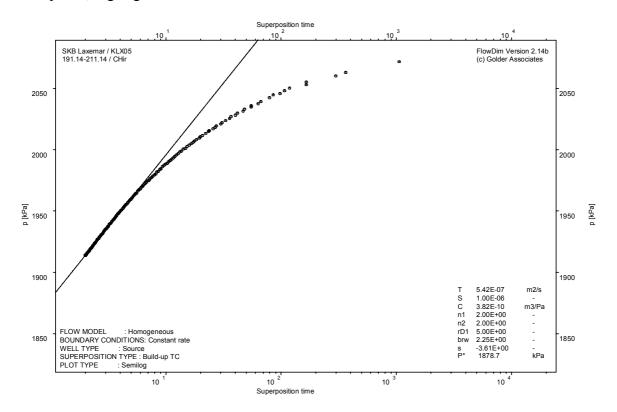


CHI phase; log-log match

Test: 191.14 – 211.14 m



CHIR phase; log-log match



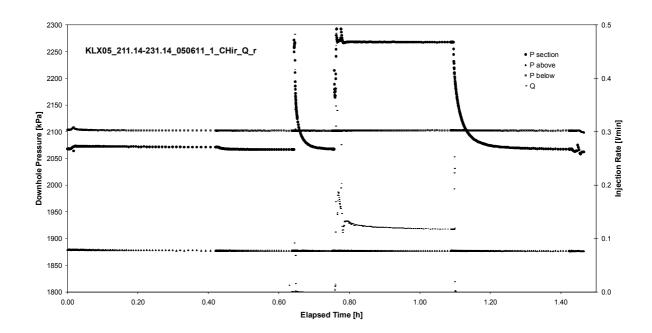
CHIR phase; HORNER match

Test: 211.14 – 231.14 m

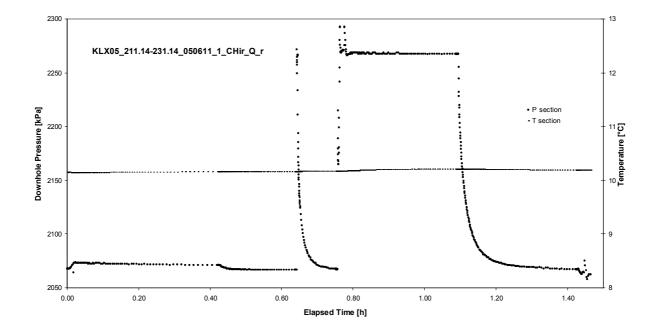
APPENDIX 2-16

Test 211.14 – 231.14 m

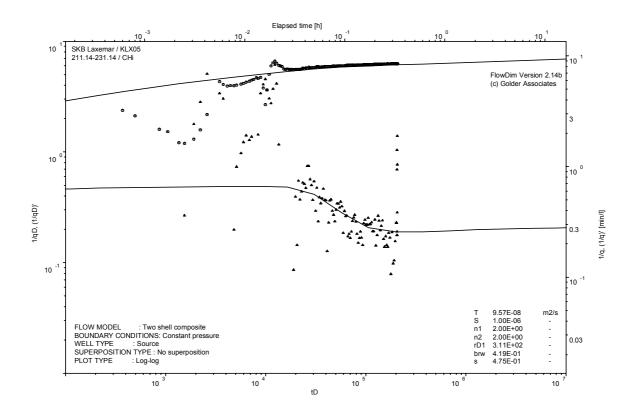
Test: 211.14 – 231.14 m



Pressure and flow rate vs. time; cartesian plot

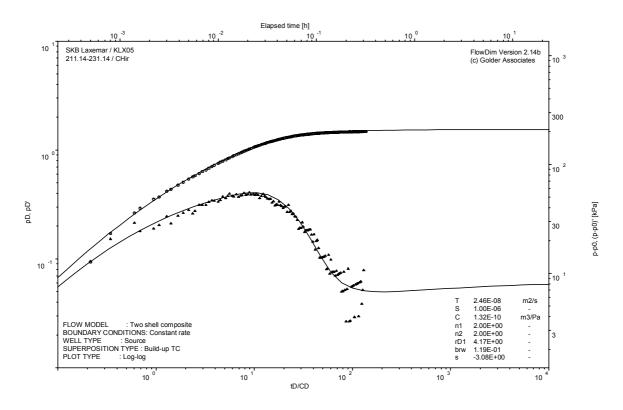


Borehole: KLX05 Page 2-16/3 Test: 211.14 – 231.14 m

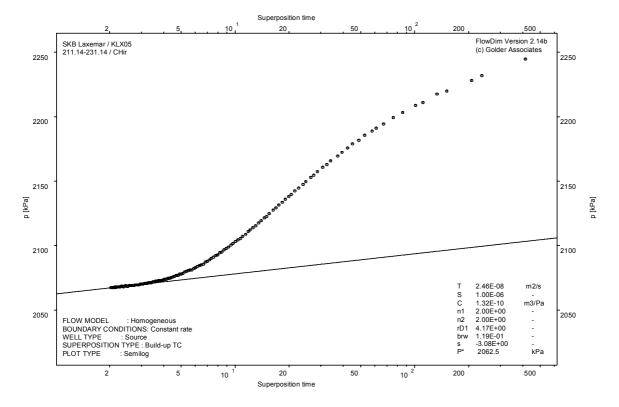


CHI phase; log-log match

Test: 211.14 – 231.14 m



CHIR phase; log-log match



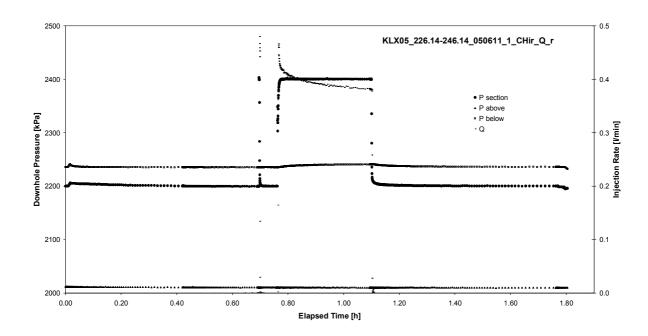
CHIR phase; HORNER match

Test: 226.14 – 246.14 m

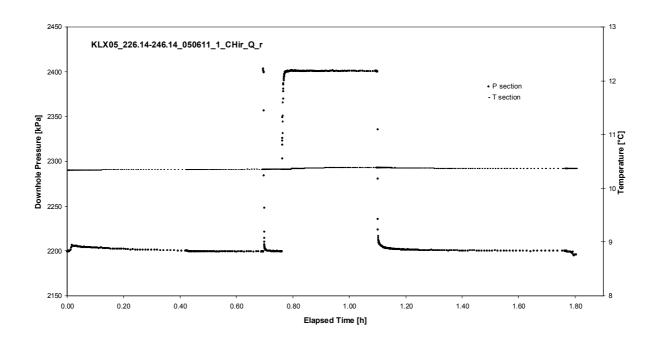
APPENDIX 2-17

Test 226.14 – 246.14 m

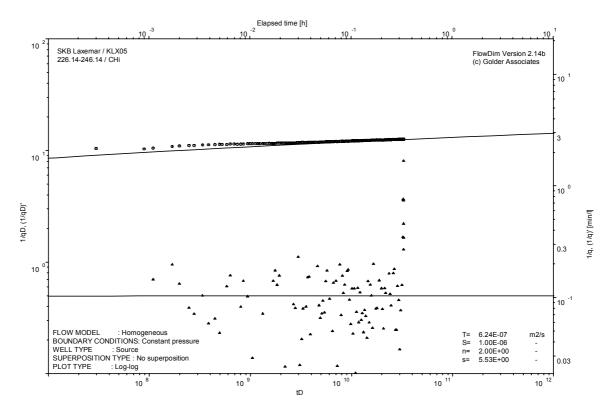
Test: 226.14 – 246.14 m



Pressure and flow rate vs. time; cartesian plot

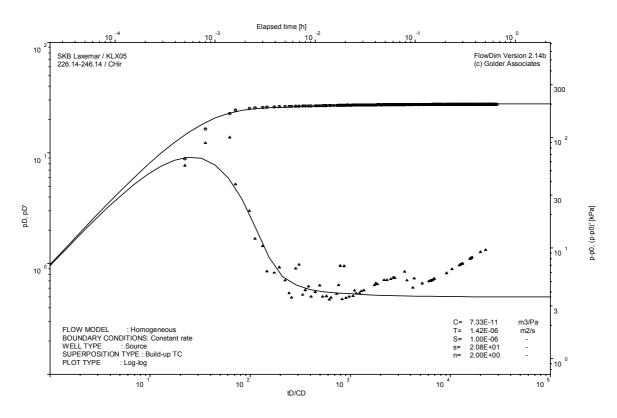


Test: 226.14 – 246.14 m

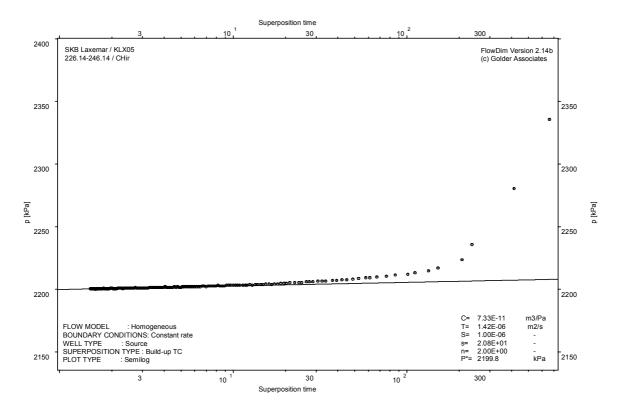


CHI phase; log-log match

Test: 226.14 – 246.14 m



CHIR phase; log-log match



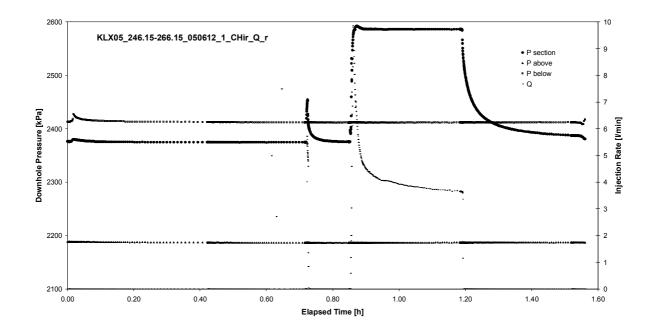
CHIR phase; HORNER match

Test: 246.15 – 266.15 m

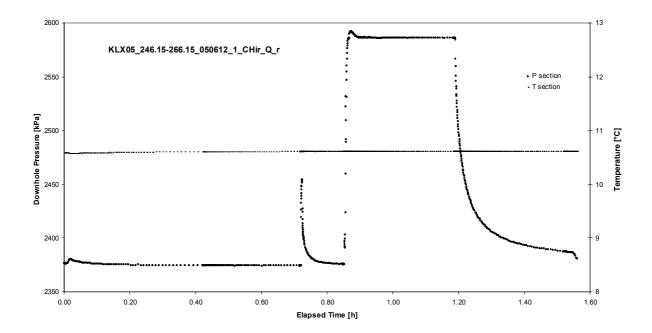
APPENDIX 2-18

Test 246.15 – 266.15 m

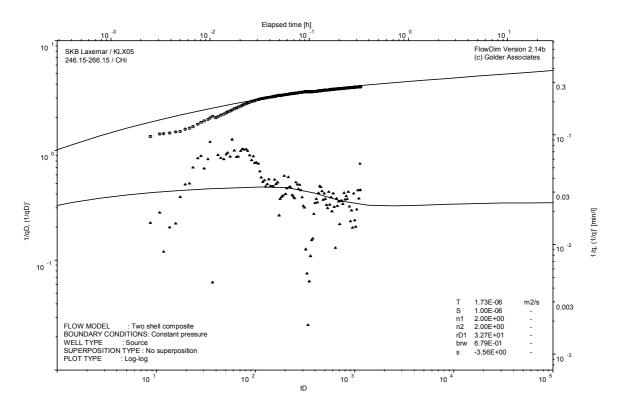
Test: 246.15 – 266.15 m



Pressure and flow rate vs. time; cartesian plot

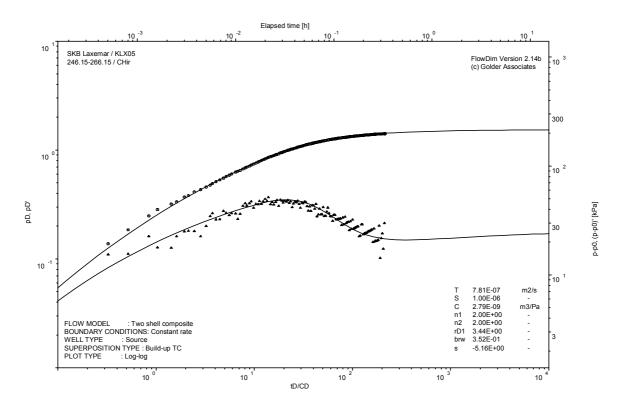


Test: 246.15 – 266.15 m

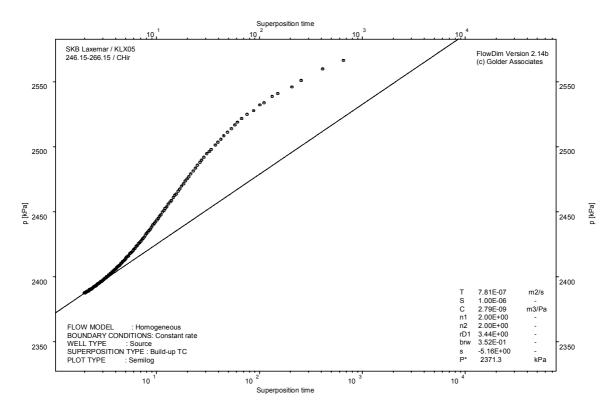


CHI phase; log-log match

Test: 246.15 – 266.15 m



CHIR phase; log-log match



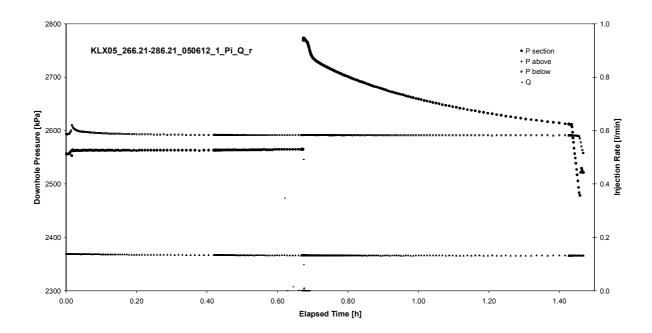
CHIR phase; HORNER match

Test: 266.21 – 286.21 m

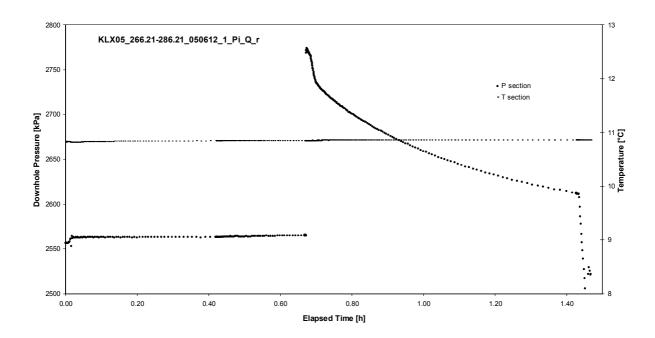
APPENDIX 2-19

Test 266.21 – 286.21 m

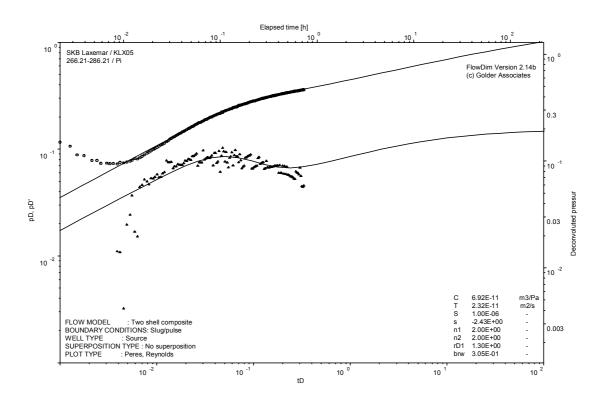
Test: 266.21 – 286.21 m



Pressure and flow rate vs. time; cartesian plot



Test: 266.21 – 286.21 m



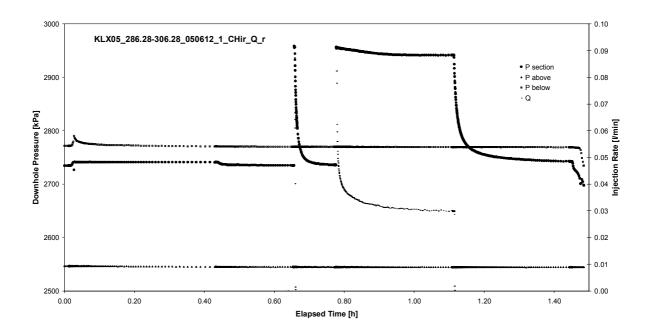
PI phase; deconvolution match

Test: 286.28 – 306.28 m

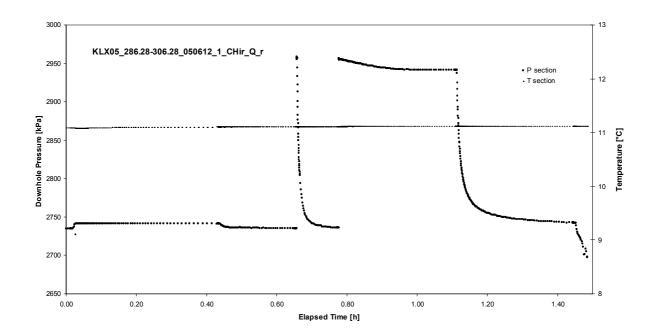
APPENDIX 2-20

Test 286.28 – 306.28 m

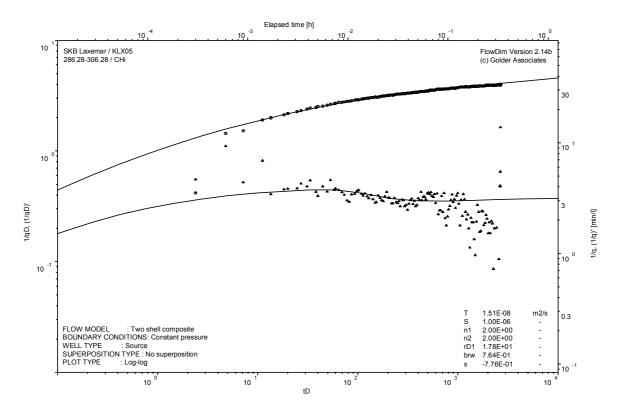
Test: 286.28 – 306.28 m



Pressure and flow rate vs. time; cartesian plot

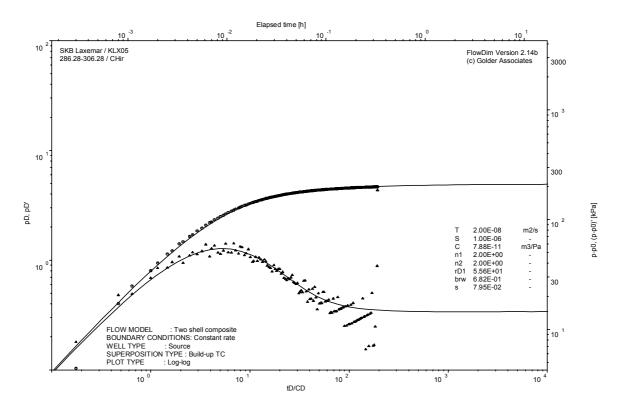


Test: 286.28 – 306.28 m

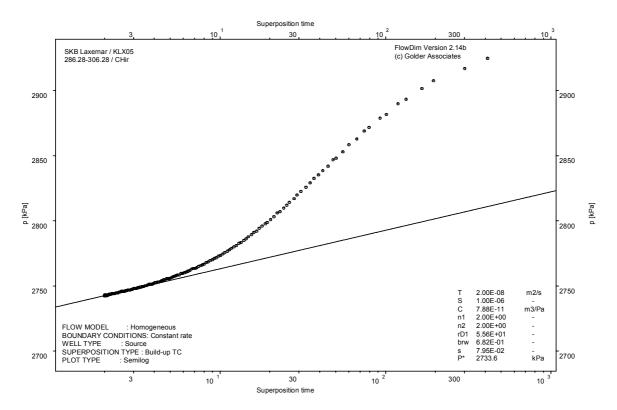


CHI phase; log-log match

Test: 286.28 – 306.28 m



CHIR phase; log-log match



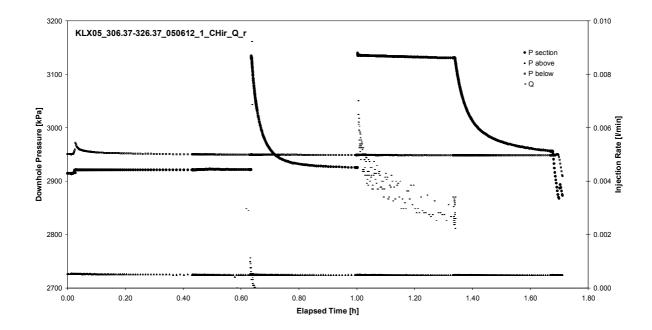
CHIR phase; HORNER match

Test: 306.37 – 326.37 m

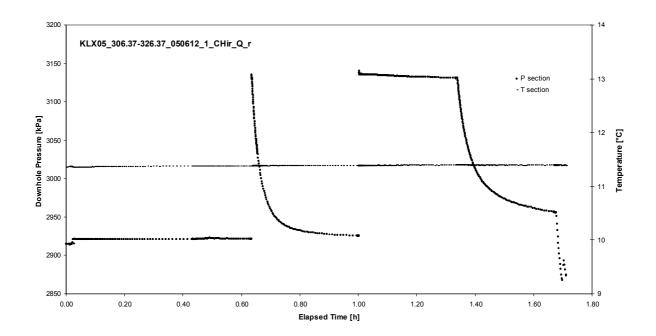
APPENDIX 2-21

Test 306.37 – 326.37 m

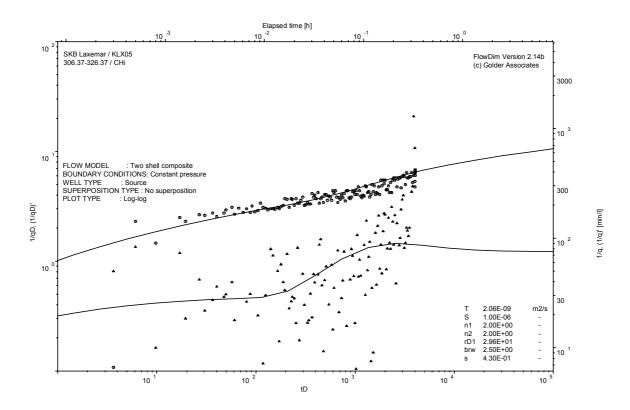
Test: 306.37 – 326.37 m



Pressure and flow rate vs. time; cartesian plot

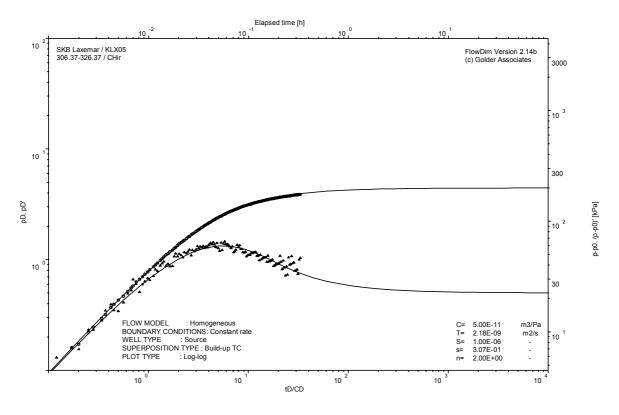


Test: 306.37 – 326.37 m

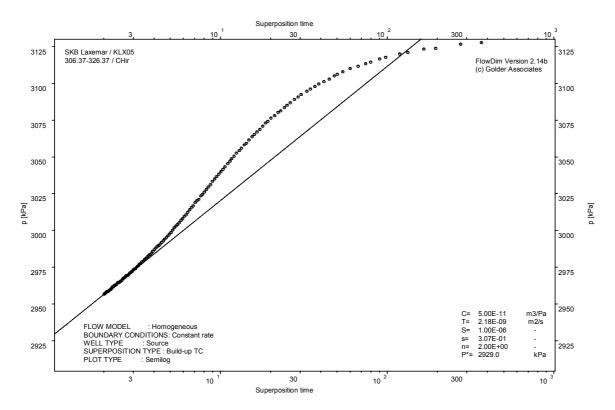


CHI phase; log-log match

Test: 306.37 – 326.37 m



CHIR phase; log-log match



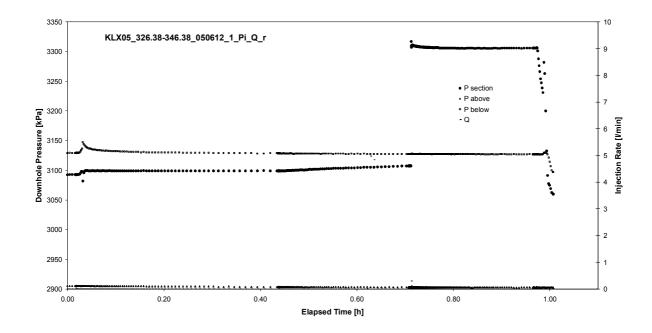
CHIR phase; HORNER match

Test: 326.38 – 346.38 m

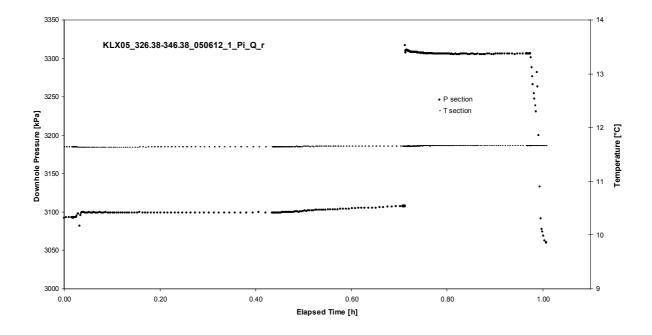
APPENDIX 2-22

Test 326.38 – 346.38 m

Test: 326.38 – 346.38 m



Pressure and flow rate vs. time; cartesian plot



Test: 326.38 - 346.38 m

Not Analysed

CHI phase; log-log match



Not Analysed

CHIR phase; log-log match

Not Analysed

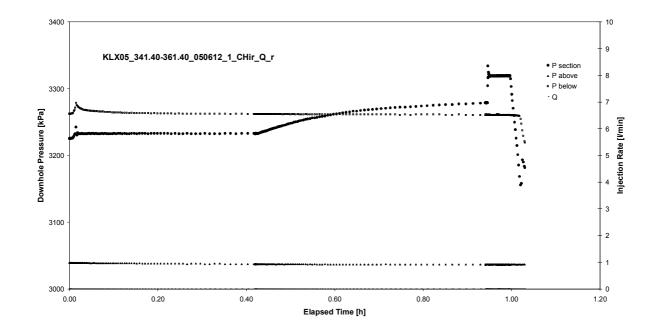
CHIR phase; HORNER match

Test: 341.40 – 361.40 m

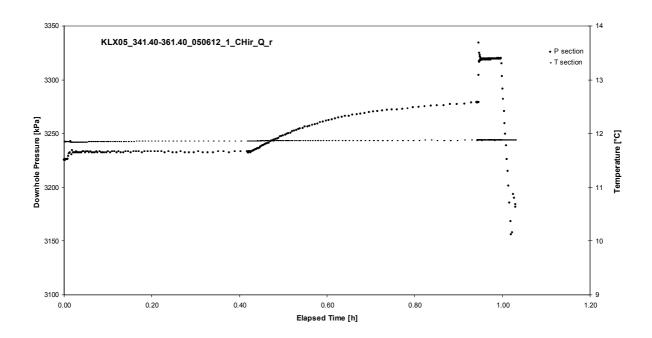
APPENDIX 2-23

Test 341.40 – 361.40 m

Test: 341.40 – 361.40 m



Pressure and flow rate vs. time; cartesian plot



Test: 341.40 - 361.40 m

Not Analysed

CHI phase; log-log match



Not Analysed

CHIR phase; log-log match

Not Analysed

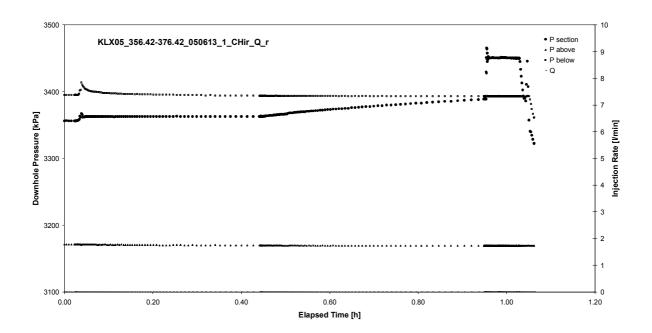
CHIR phase; HORNER match

Test: 356.42 - 376.42 m

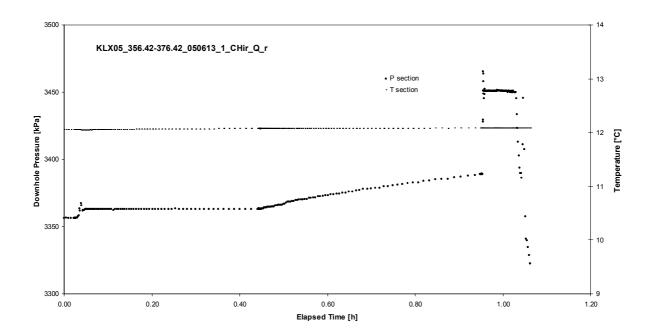
APPENDIX 2-24

Test 356.42 – 376.42 m

Test: 356.42 – 376.42 m



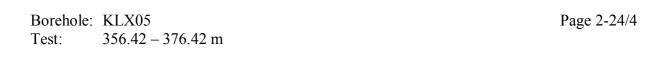
Pressure and flow rate vs. time; cartesian plot



Test: 356.42 - 376.42 m

Not Analysed

CHI phase; log-log match



Not Analysed

CHIR phase; log-log match

Not Analysed

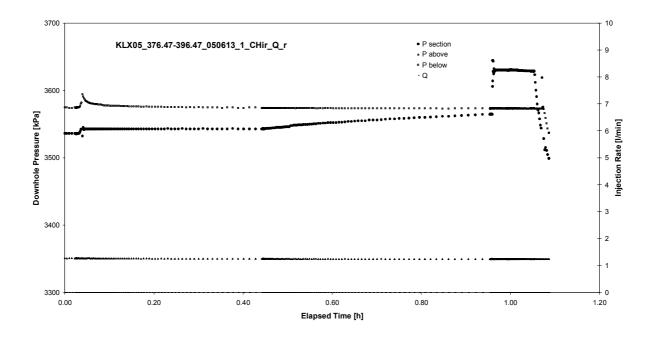
CHIR phase; HORNER match

Test: 376.47 – 396.47 m

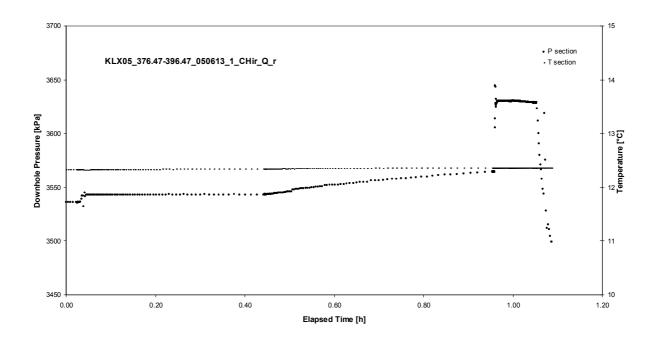
APPENDIX 2-25

Test 376.47 – 396.47 m

Test: 376.47 – 396.47 m



Pressure and flow rate vs. time; cartesian plot



Test: 376.47 - 396.47 m

Not Analysed

CHI phase; log-log match



Not Analysed

CHIR phase; log-log match

Not Analysed

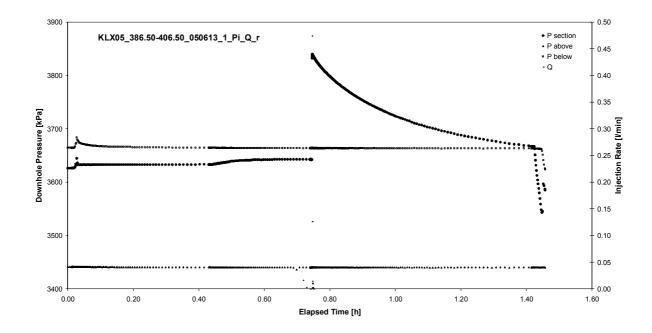
CHIR phase; HORNER match

Test: 386.50 – 406.50 m

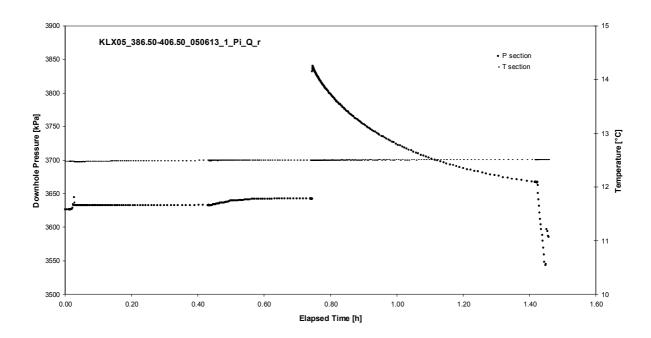
APPENDIX 2-26

Test 386.50 – 406.50 m

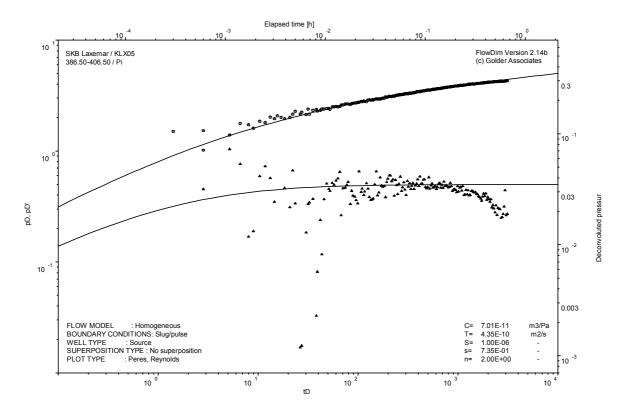
Test: 386.50 – 406.50 m



Pressure and flow rate vs. time; cartesian plot



Test: 386.50 – 406.50 m



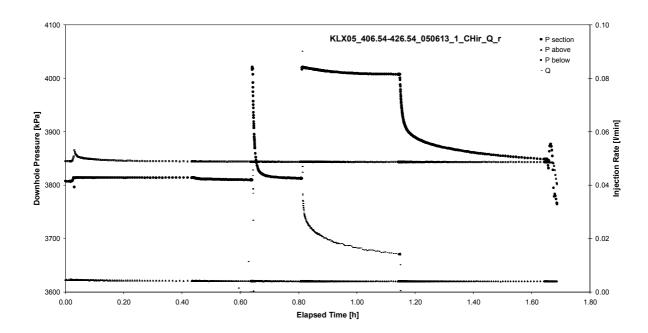
PI phase; deconvolution match

Test: 406.54 – 426.54 m

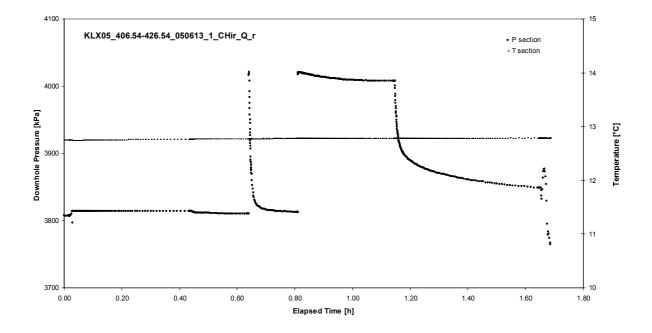
APPENDIX 2-27

Test 406.54 – 426.54 m

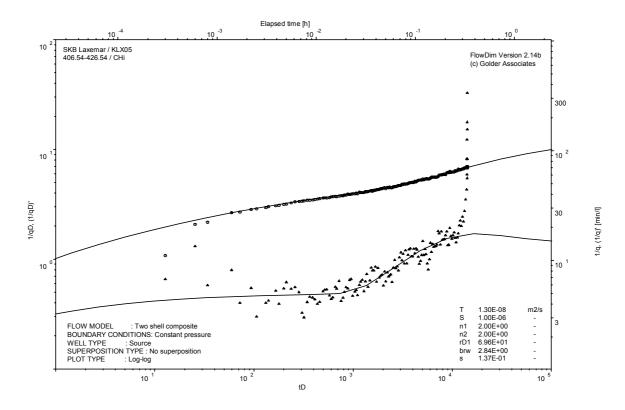
Test: 406.54 – 426.54 m



Pressure and flow rate vs. time; cartesian plot

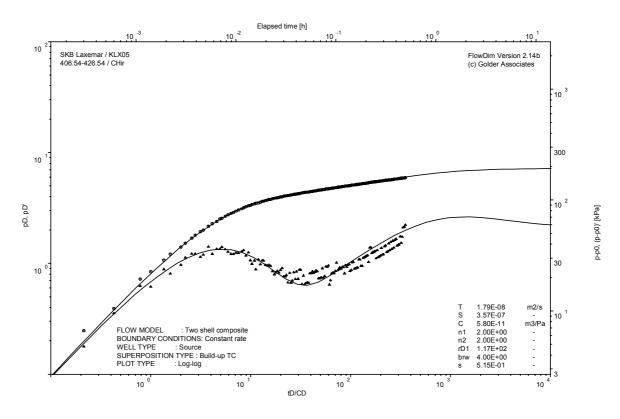


Test: 406.54 – 426.54 m

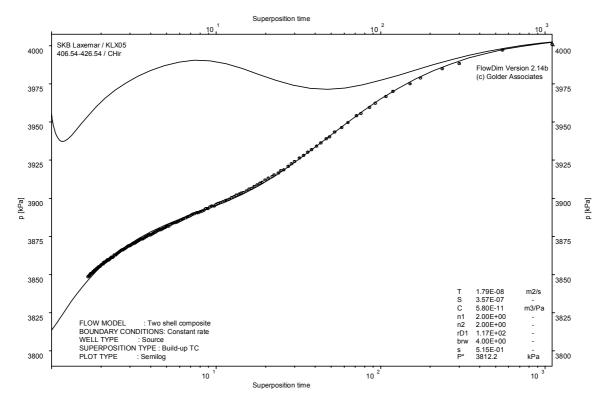


CHI phase; log-log match

Test: 406.54 – 426.54 m



CHIR phase; log-log match



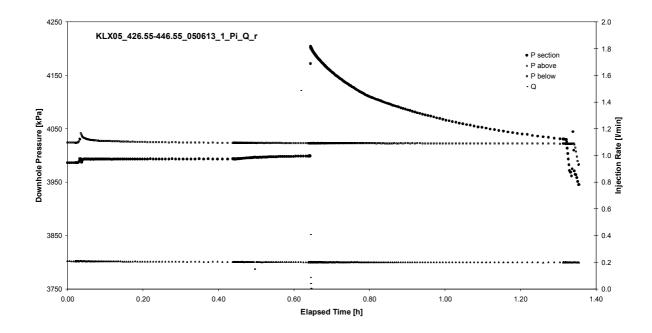
CHIR phase; HORNER match

Test: 426.55 – 446.55 m

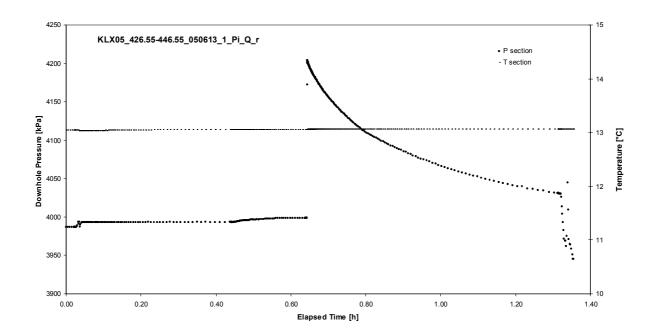
APPENDIX 2-28

Test 426.55 – 446.55 m

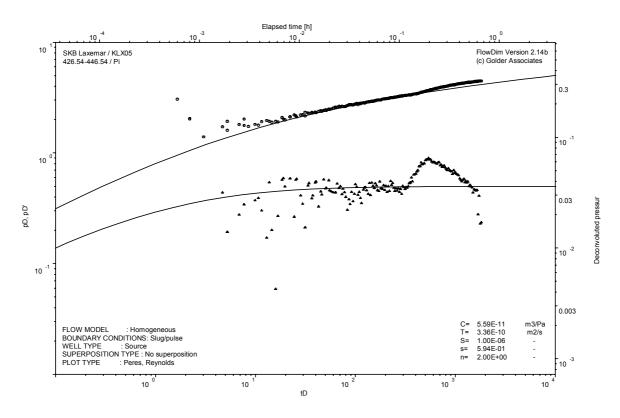
Test: 426.55 – 446.55 m



Pressure and flow rate vs. time; cartesian plot



Test: 426.55 – 446.55 m



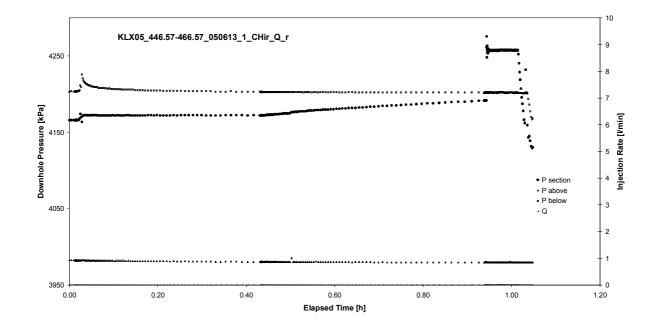
PI phase; deconvolution match

Test: 446.57 – 466.57 m

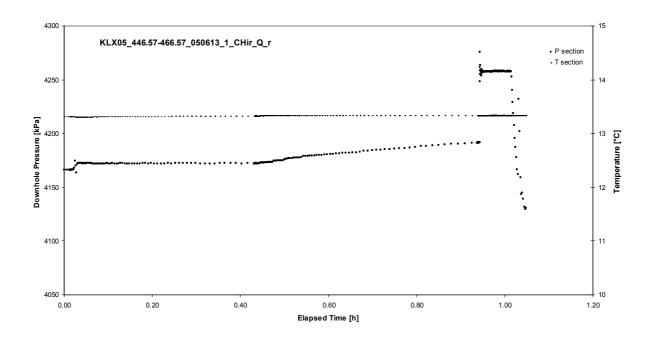
APPENDIX 2-29

Test 446.57 – 466.57 m

Test: 446.57 – 466.57 m



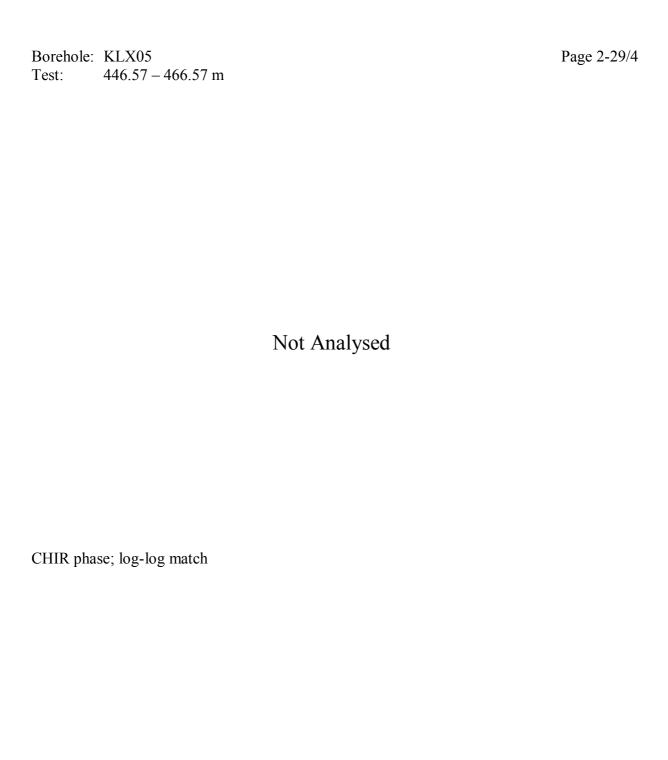
Pressure and flow rate vs. time; cartesian plot



Test: 446.57 – 466.57 m

Not Analysed

CHI phase; log-log match



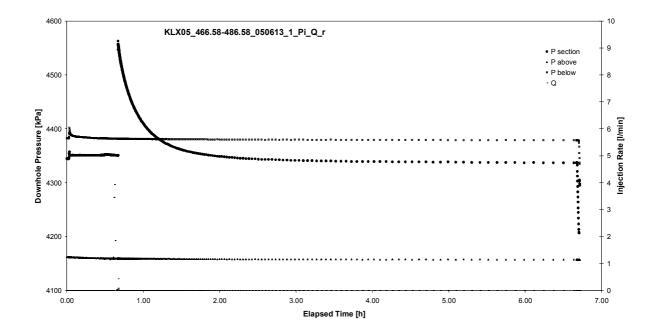
CHIR phase; HORNER match

Test: 466.58 – 486.58 m

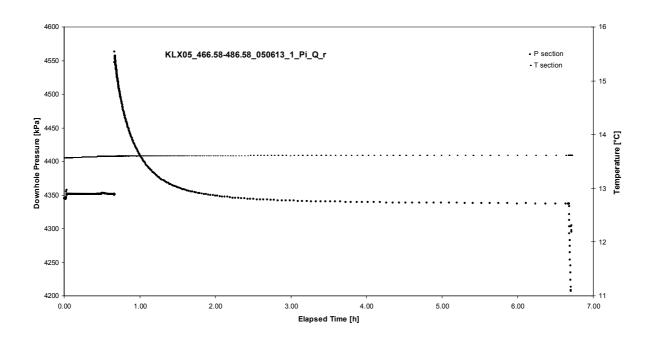
APPENDIX 2-30

Test 466.58 – 486.58 m

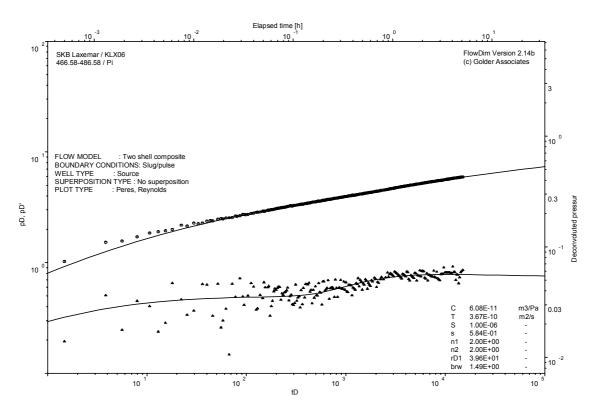
Test: 466.58 – 486.58 m



Pressure and flow rate vs. time; cartesian plot



Test: 466.58 – 486.58 m



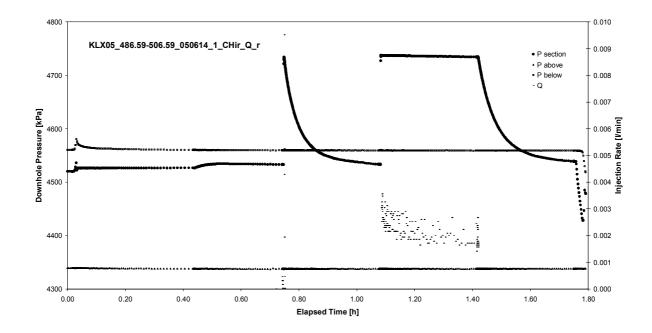
PI phase; deconvolution match

Test: 486.59 – 506.59 m

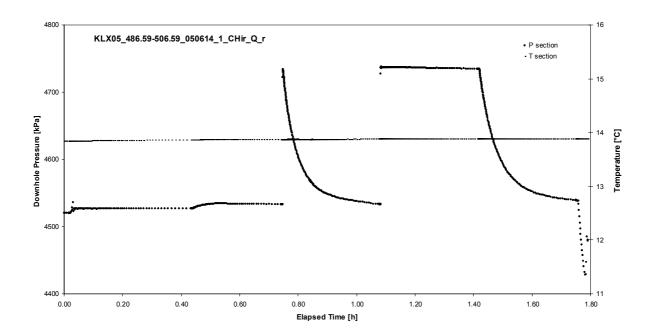
APPENDIX 2-31

Test 486.59 – 506.59 m

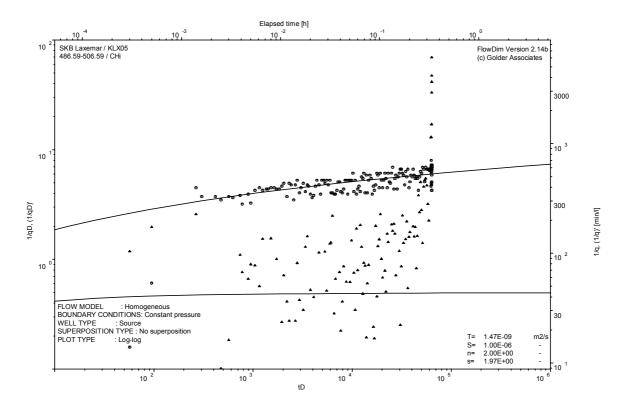
Test: 486.59 – 506.59 m



Pressure and flow rate vs. time; cartesian plot

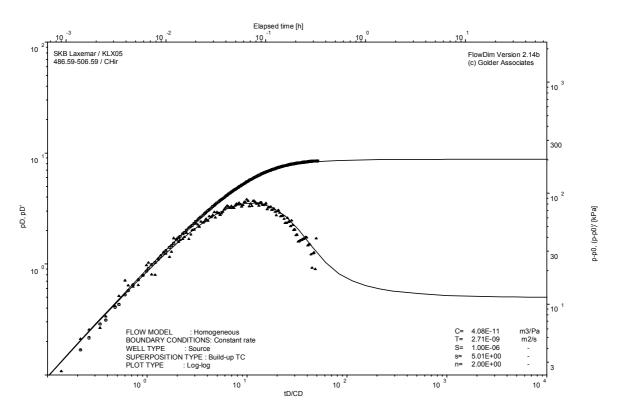


Test: 486.59 – 506.59 m

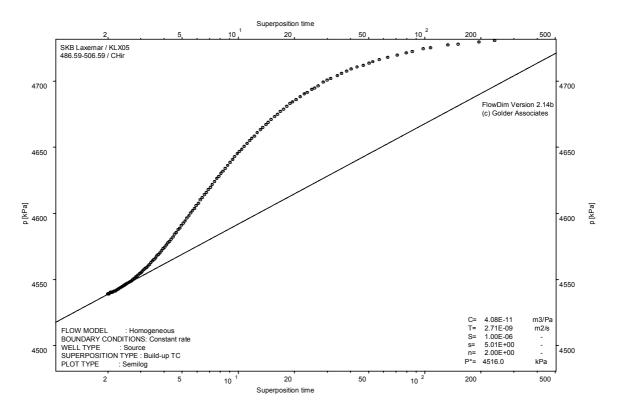


CHI phase; log-log match

Test: 486.59 – 506.59 m



CHIR phase; log-log match



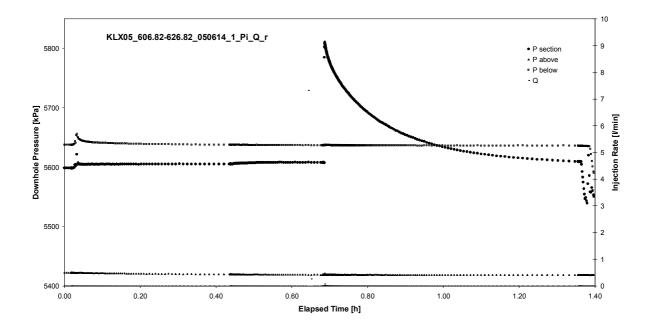
CHIR phase; HORNER match

Test: 606.82 - 626.82 m

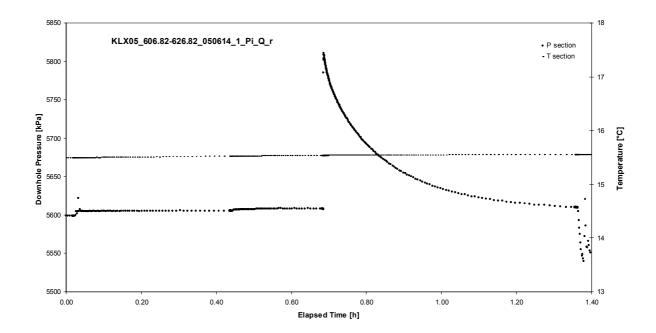
APPENDIX 2-32

Test 606.82 – 626.82 m

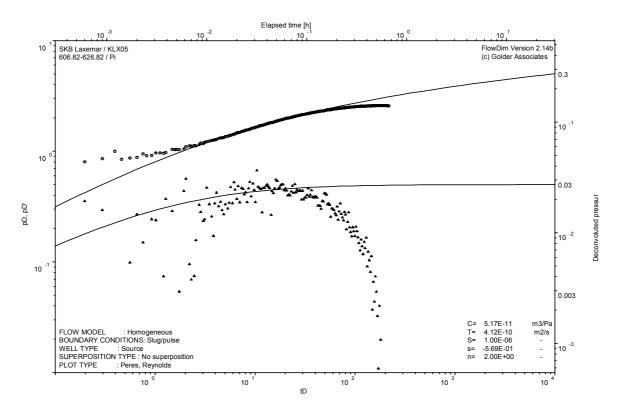
Test: 606.82 – 626.82 m



Pressure and flow rate vs. time; cartesian plot



Test: 606.82 - 626.82 m



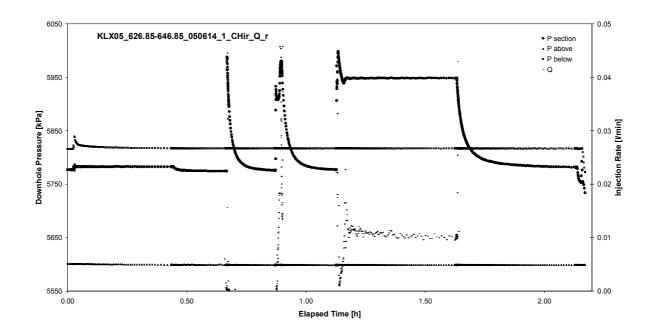
PI phase; deconvolution match

Test: 626.85 – 646.85 m

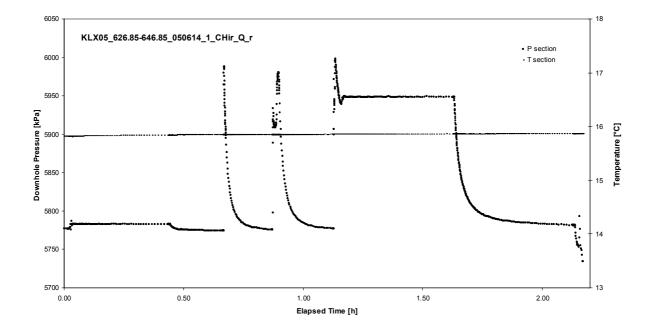
APPENDIX 2-33

Test 626.85 – 646.85 m

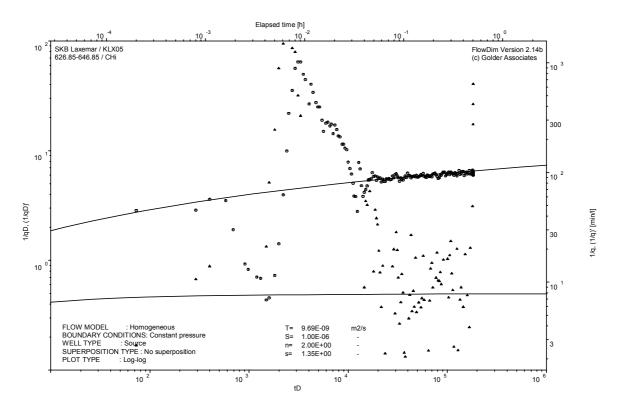
Test: 626.85 – 646.85 m



Pressure and flow rate vs. time; cartesian plot

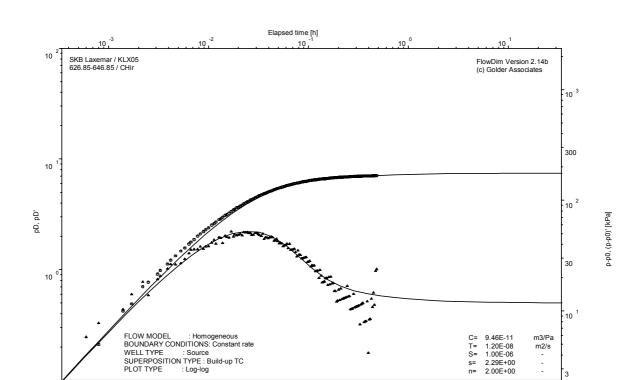


Test: 626.85 – 646.85 m



CHI phase; log-log match

Borehole: KLX05 Page 2-33/4
Test: 626.85 – 646.85 m

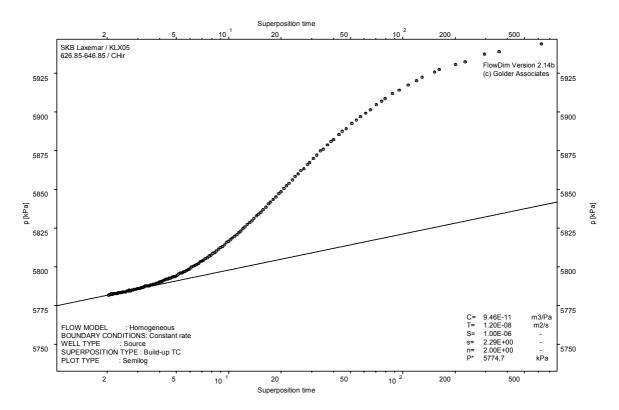


tD/CD

10

10

CHIR phase; log-log match



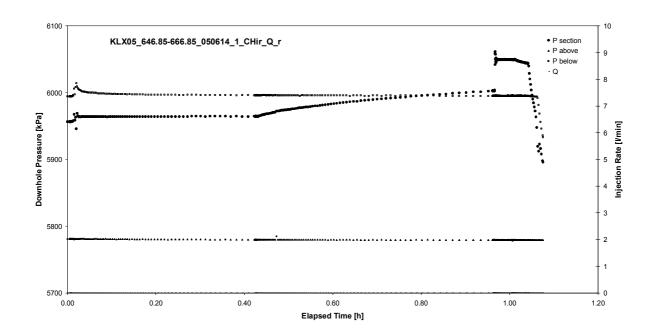
CHIR phase; HORNER match

Test: 646.85 – 666.85 m

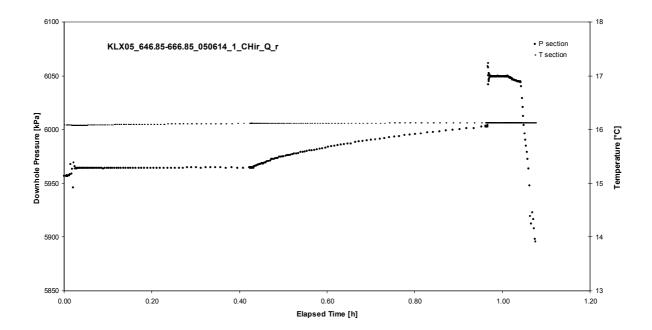
APPENDIX 2-34

Test 646.85 – 666.85 m

Test: 646.85 – 666.85 m



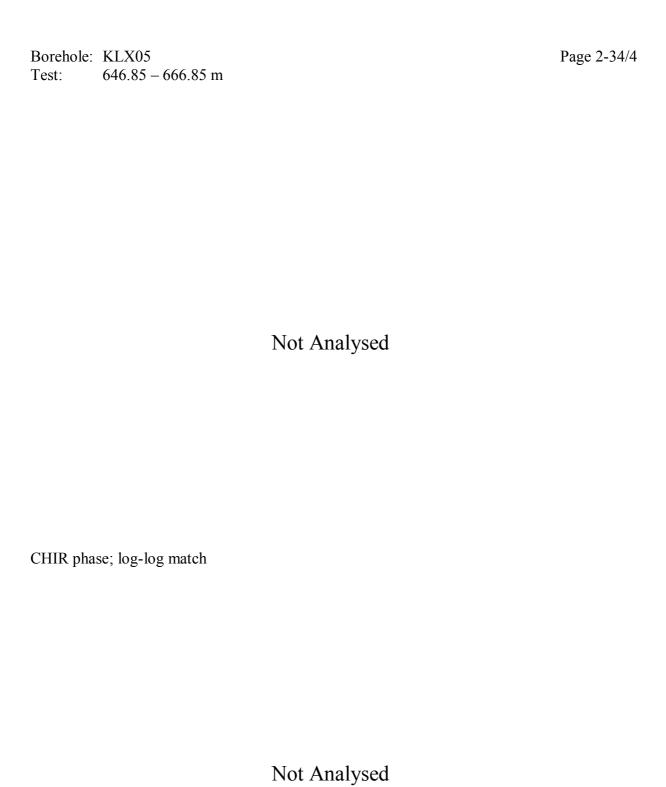
Pressure and flow rate vs. time; cartesian plot



Test: 646.85 – 666.85 m

Not Analysed

CHI phase; log-log match

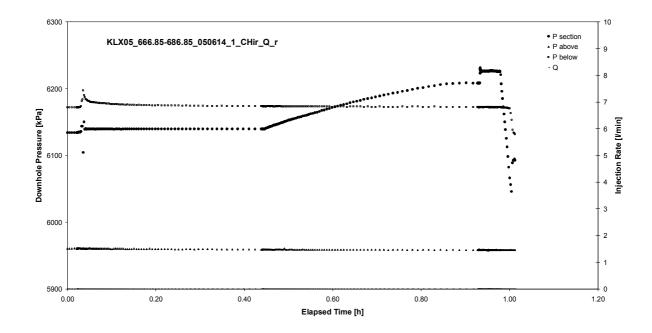


Test: 686.85 – 686.85 m

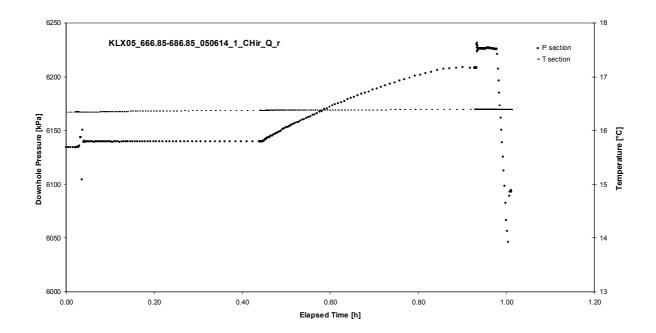
APPENDIX 2-35

Test 666.85 – 686.85 m

Test: 686.85 – 686.85 m



Pressure and flow rate vs. time; cartesian plot



Test: 686.85 - 686.85 m

Not Analysed

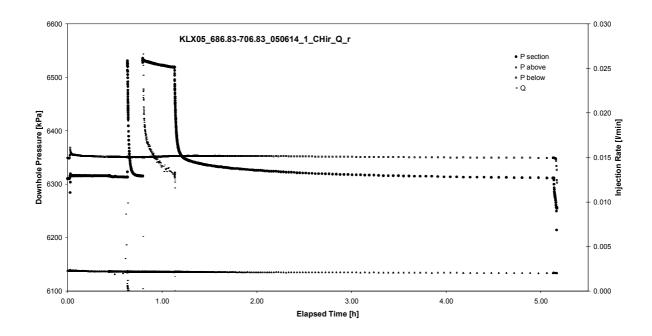
CHI phase; log-log match

Test: 686.83 – 706.83 m

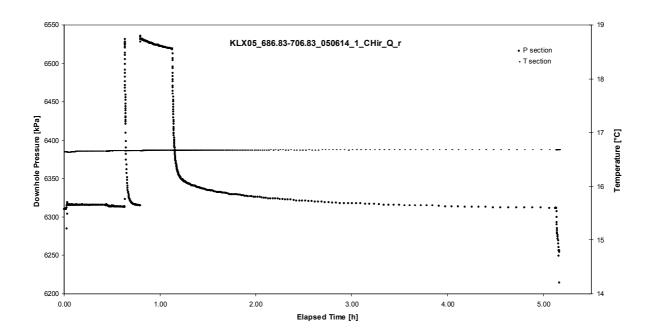
APPENDIX 2-36

Test 686.83 – 706.83 m

Test: 686.83 – 706.83 m

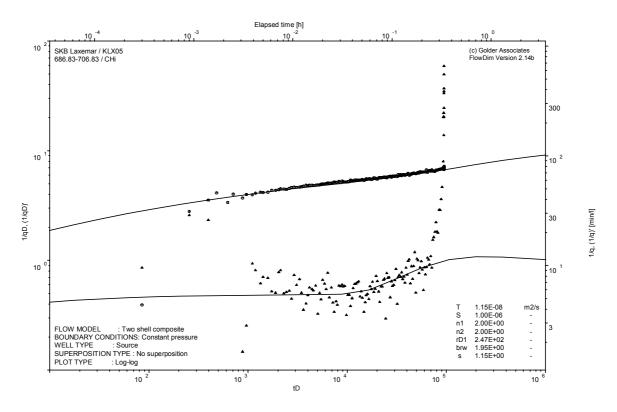


Pressure and flow rate vs. time; cartesian plot



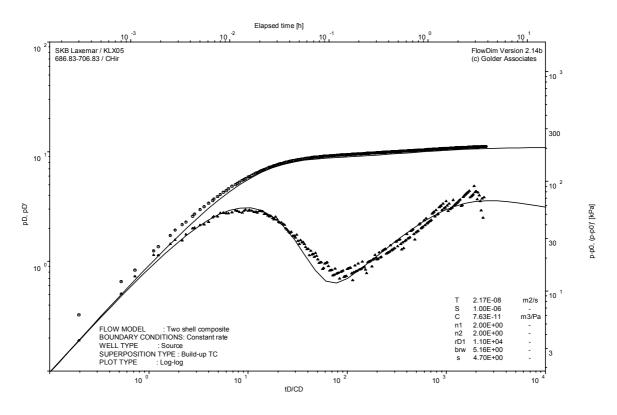
Interval pressure and temperature vs. time; cartesian plot

Test: 686.83 – 706.83 m

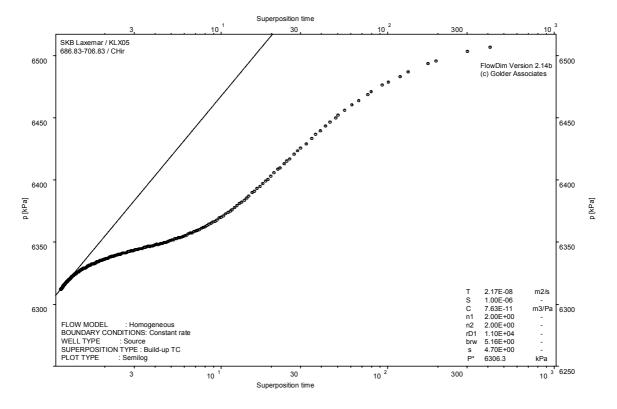


CHI phase; log-log match

Test: 686.83 – 706.83 m



CHIR phase; log-log match



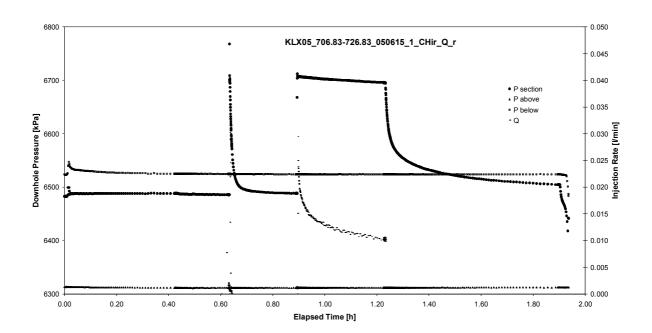
CHIR phase; HORNER match

Test: 706.83 – 726.83 m

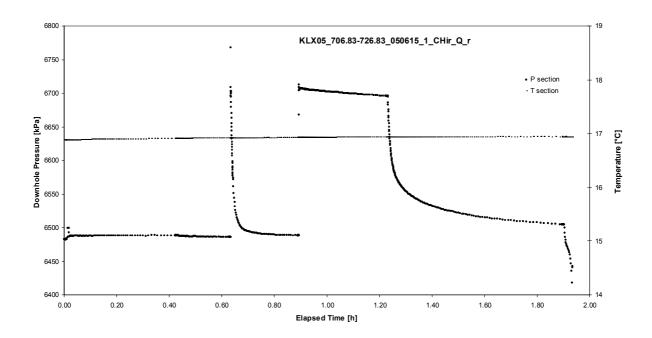
APPENDIX 2-37

Test 706.83 – 726.83 m

Test: 706.83 – 726.83 m

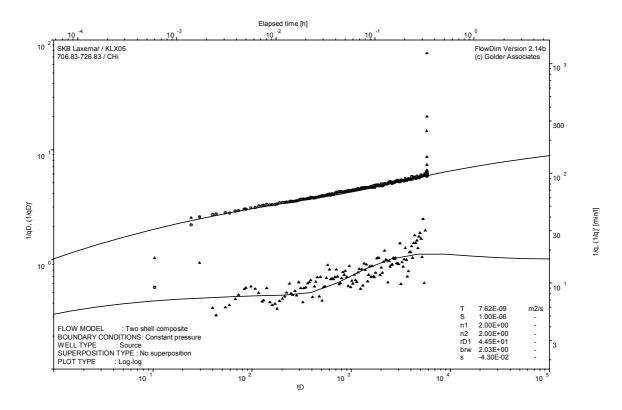


Pressure and flow rate vs. time; cartesian plot



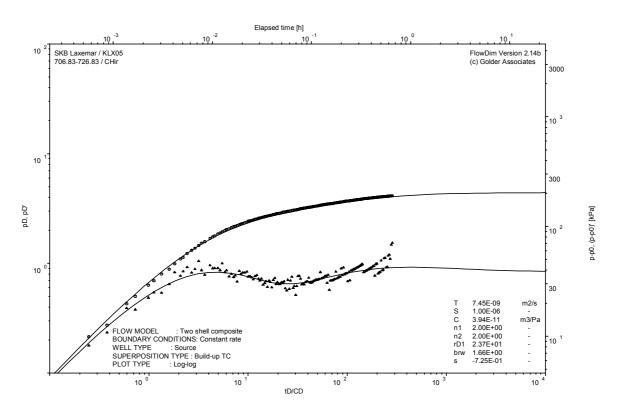
Interval pressure and temperature vs. time; cartesian plot

Test: 706.83 – 726.83 m

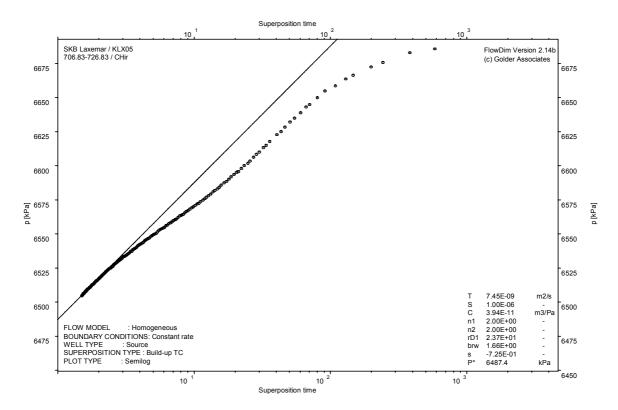


CHI phase; log-log match

Test: 706.83 – 726.83 m



CHIR phase; log-log match



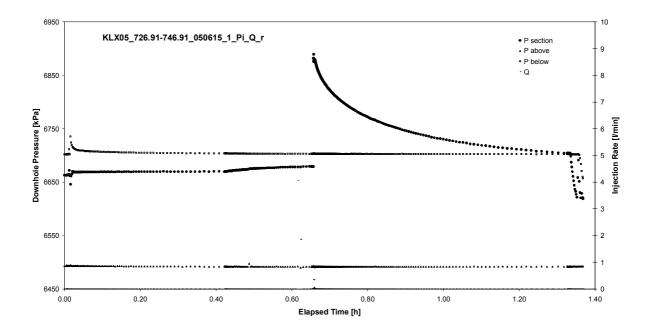
CHIR phase; HORNER match

Test: 726.91 – 746.91 m

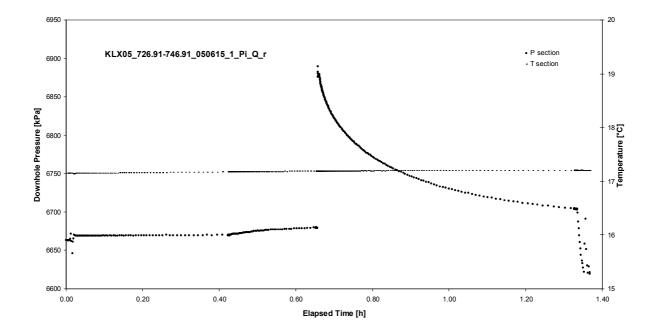
APPENDIX 2-38

Test 726.91 – 746.91 m

Test: 726.91 – 746.91 m

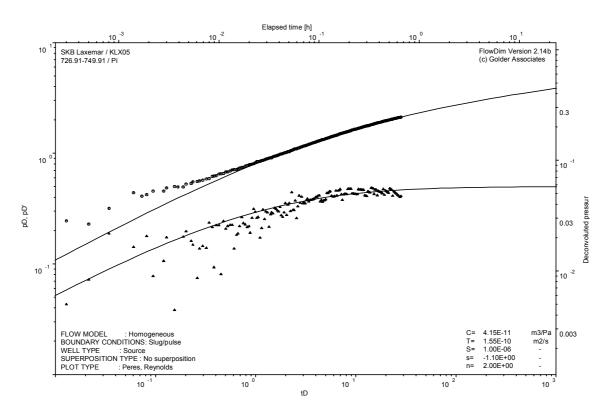


Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Test: 726.91 – 746.91 m



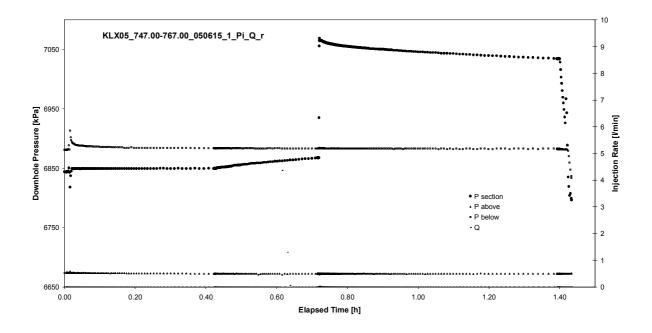
PI phase; deconvolution match

Test: 747.00 – 767.00 m

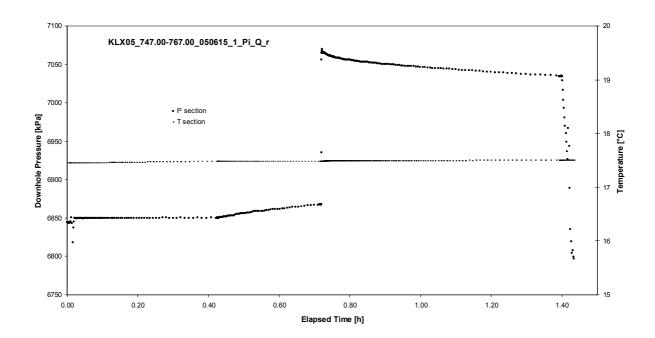
APPENDIX 2-39

Test 747.00 – 767.00 m

Test: 747.00 – 767.00 m

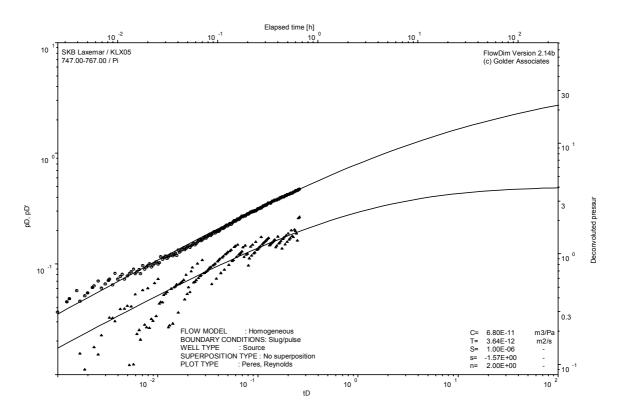


Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Test: 747.00 – 767.00 m



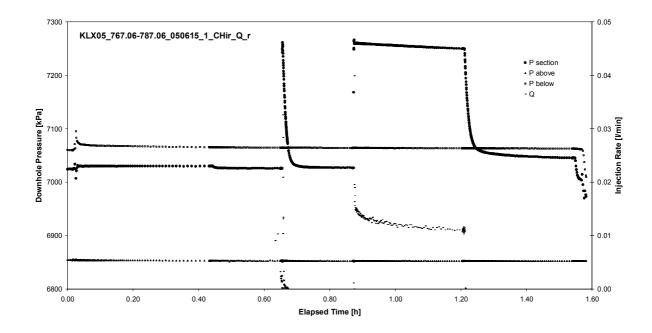
PI phase; deconvolution match

Test: 767.06 – 787.06 m

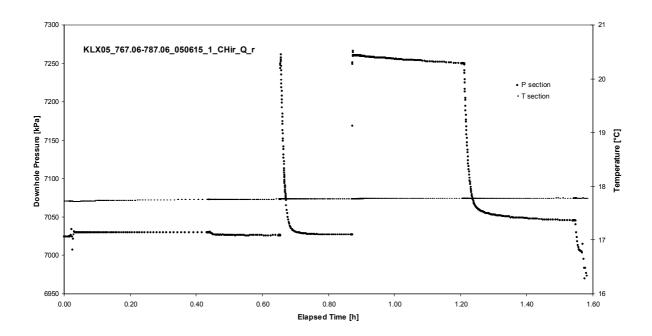
APPENDIX 2-40

Test 767.06 – 787.06 m

Test: 767.06 – 787.06 m

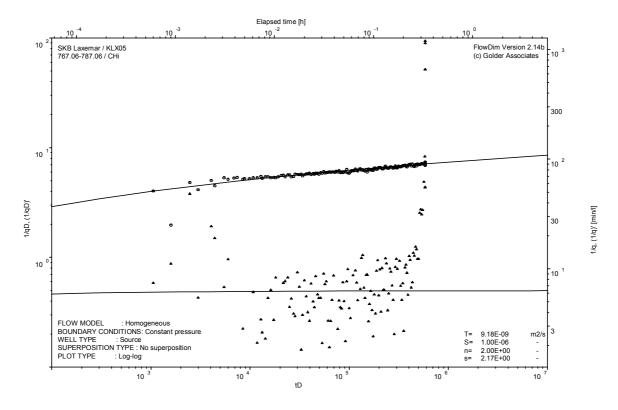


Pressure and flow rate vs. time; cartesian plot



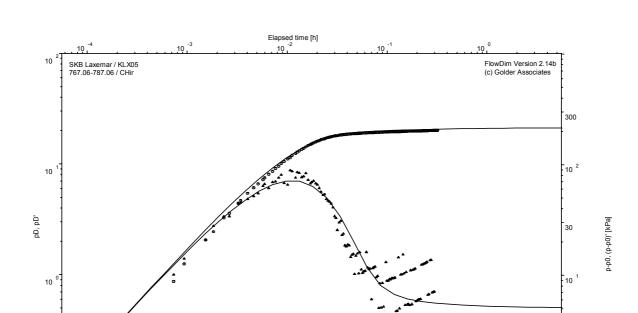
Interval pressure and temperature vs. time; cartesian plot

Test: 767.06 – 787.06 m



CHI phase; log-log match

Borehole: KLX05 Page 2-40/4 Test: 767.06 – 787.06 m



10 2

tD/CD

4.12E-11 3.21E-08 4.45E-20 1.54E+01 2.00E+00

C= T= S= s= n=

10

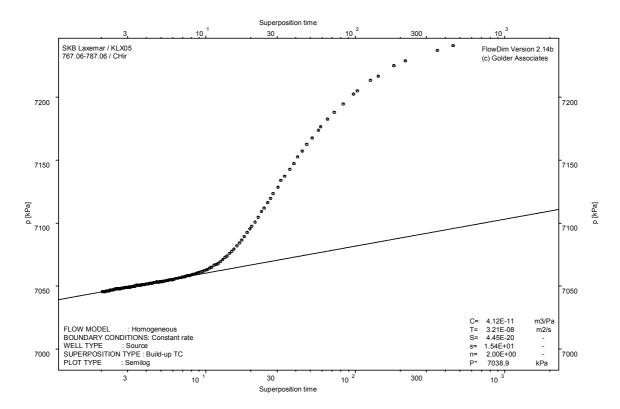
m3/Pa m2/s --

10 '

CHIR phase; log-log match

FLOW MODEL : Homogeneous BOUNDARY CONDITIONS: Constant rate WELL TYPE : Source SUPERPOSITION TYPE : Build-up TC PLOT TYPE : Log-log

10



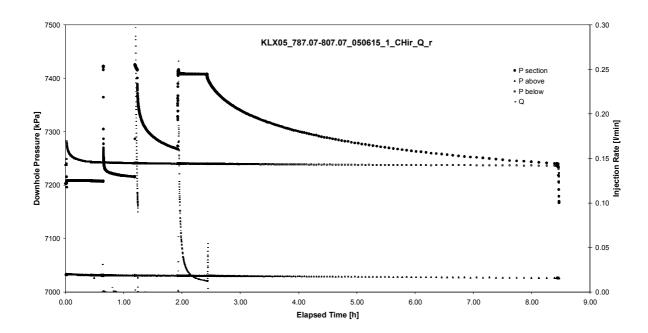
CHIR phase; HORNER match

Test: 787.07 – 807.07 m

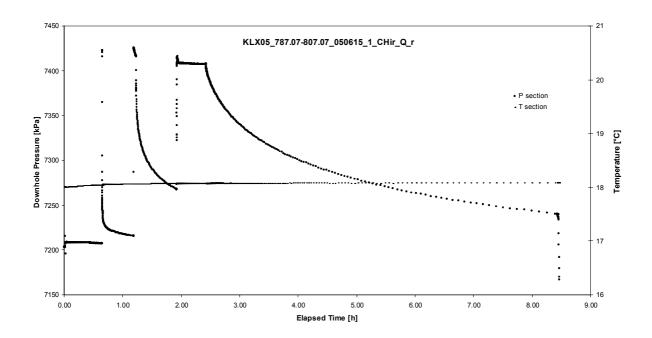
APPENDIX 2-41

Test 787.07 – 807.07 m

Test: 787.07 – 807.07 m

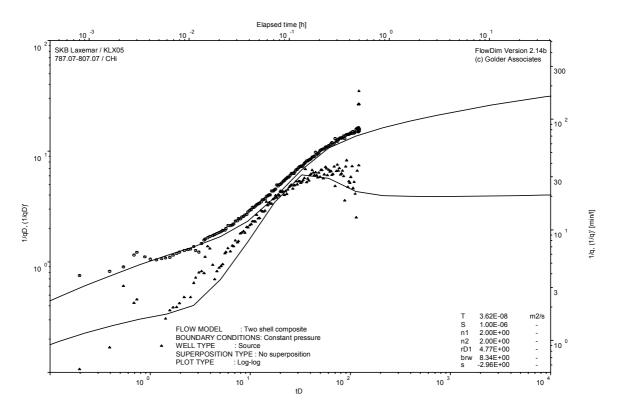


Pressure and flow rate vs. time; cartesian plot



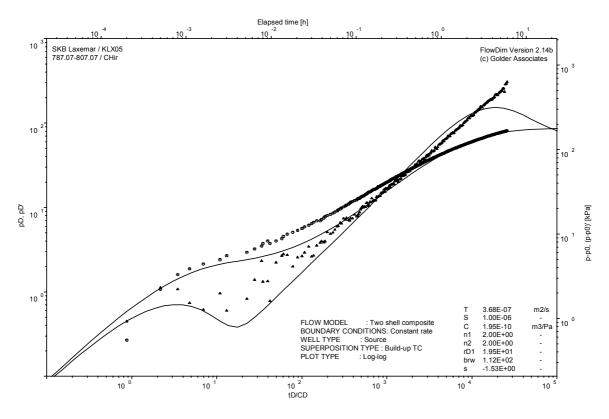
Interval pressure and temperature vs. time; cartesian plot

Test: 787.07 – 807.07 m

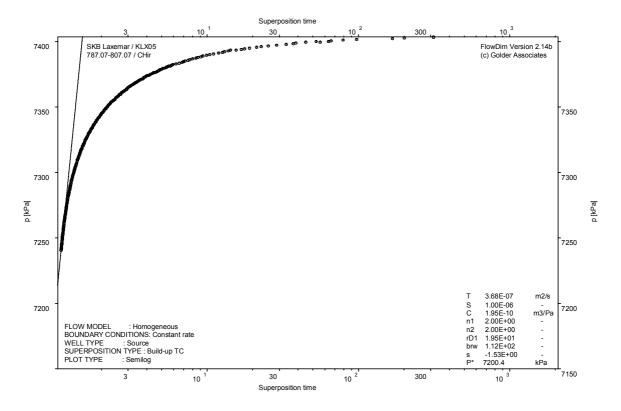


CHI phase; log-log match

Test: 787.07 – 807.07 m



CHIR phase; log-log match



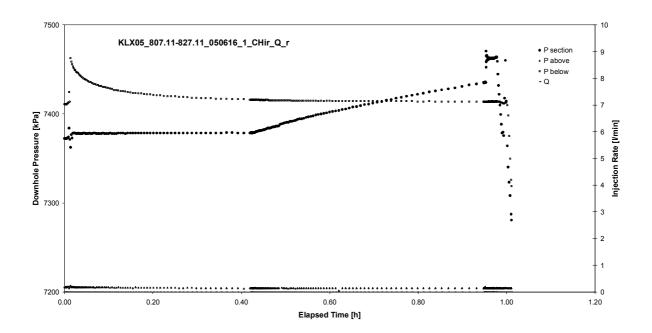
CHIR phase; HORNER match

Test: 807.11 – 827.11 m

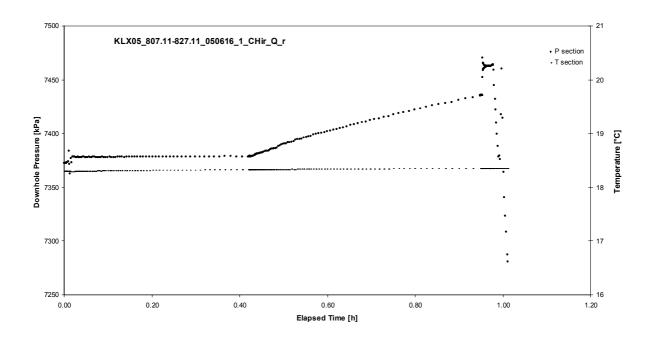
APPENDIX 2-42

Test 807.11 – 827.11 m

Test: 807.11 – 827.11 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Test: 807.11 – 827.11 m

Not Analysed

CHI phase; log-log match

Borehole:	KLX05	Page 2-42/4
Test:	807.11 – 827.11 m	_

Not Analysed

CHIR phase; log-log match

Not Analysed

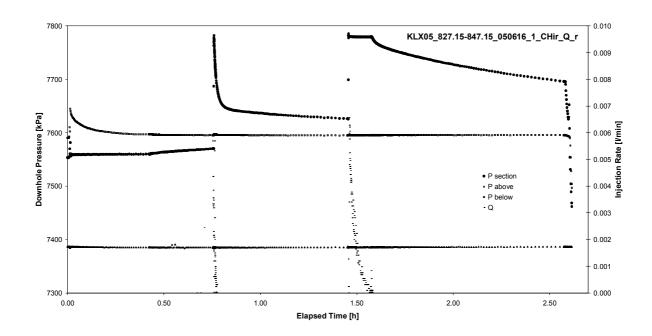
CHIR phase; HORNER match

Test: 827.15 – 847.15 m

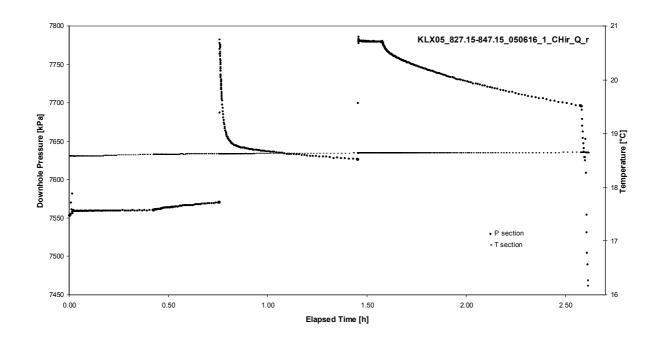
APPENDIX 2-43

Test 827.15 – 847.15 m

Test: 827.15 – 847.15 m

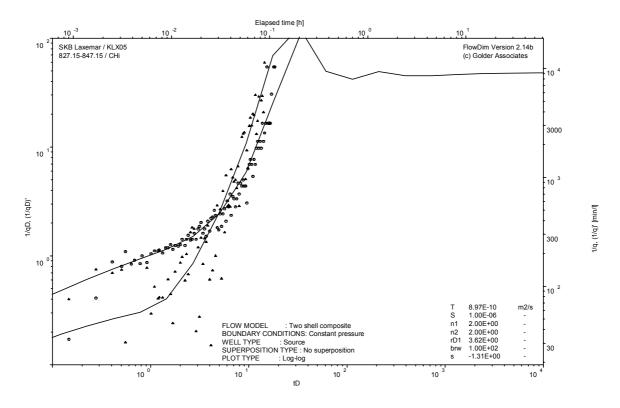


Pressure and flow rate vs. time; cartesian plot



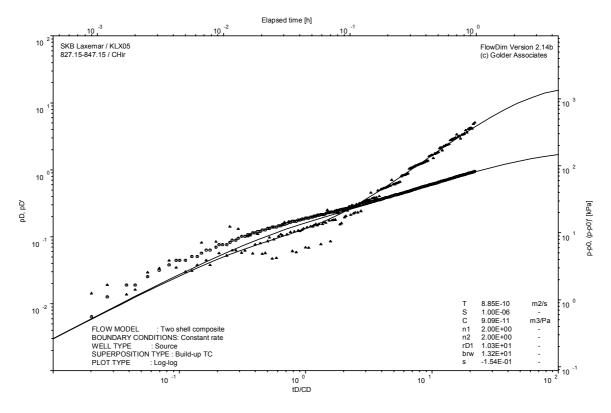
Interval pressure and temperature vs. time; cartesian plot

Test: 827.15 – 847.15 m



CHI phase; log-log match

Test: 827.15 – 847.15 m

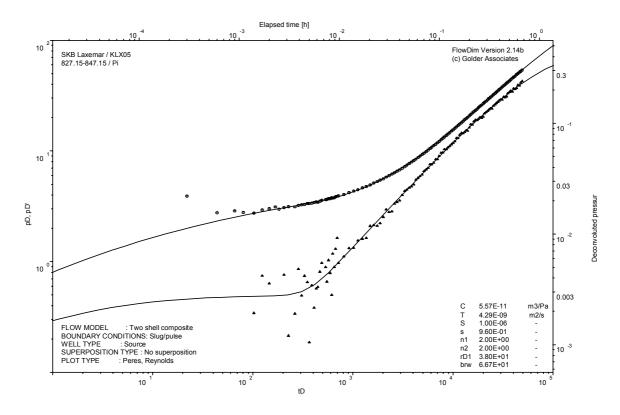


CHIR phase; log-log match

Not calculated due to the tight formation

CHIR phase; HORNER match

Test: 827.15 – 847.15 m



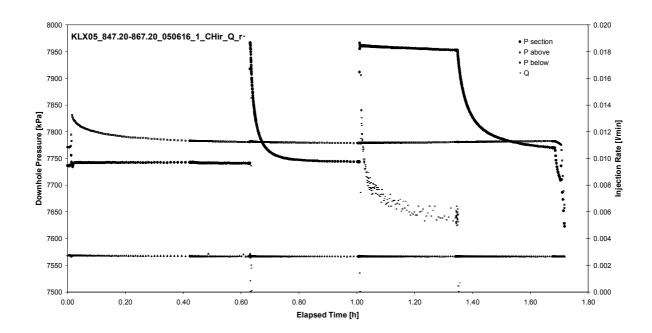
PI phase; deconvolution match

Test: 847.20 – 867.20 m

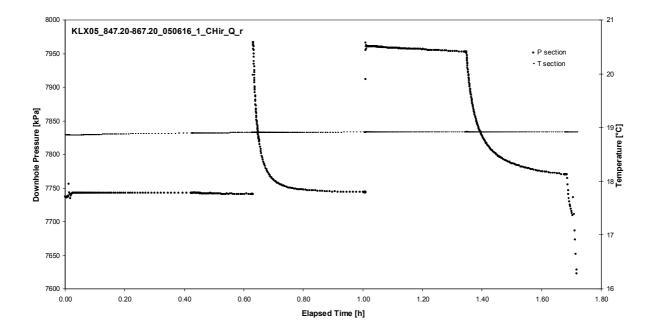
APPENDIX 2-44

Test 847.20 – 867.20 m

Test: 847.20 – 867.20 m

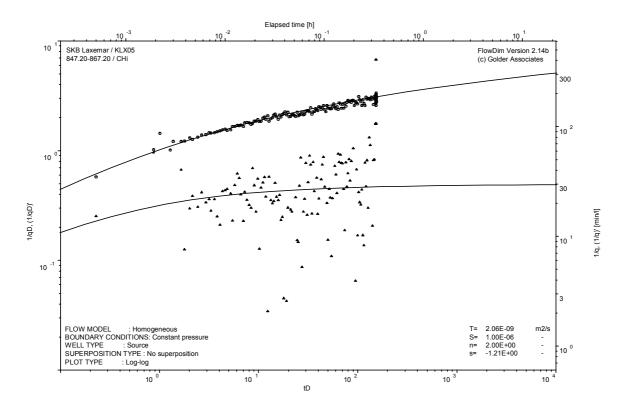


Pressure and flow rate vs. time; cartesian plot



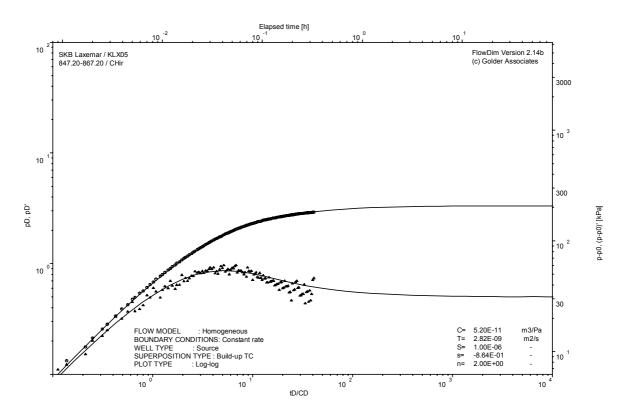
Interval pressure and temperature vs. time; cartesian plot

Test: 847.20 – 867.20 m

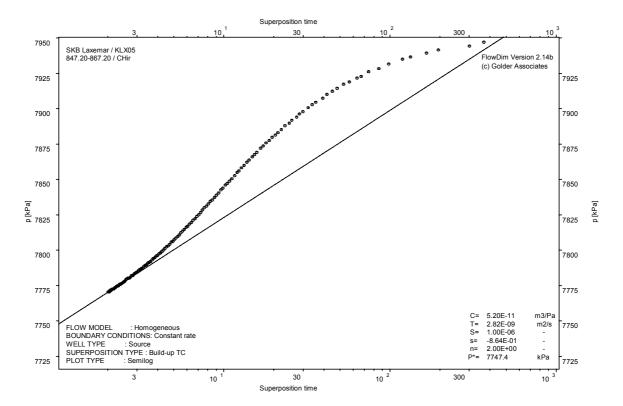


CHI phase; log-log match

Test: 847.20 – 867.20 m



CHIR phase; log-log match



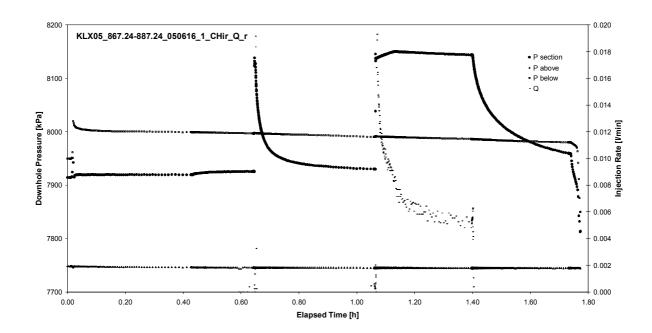
CHIR phase; HORNER match

Test: 867.24 – 887.24 m

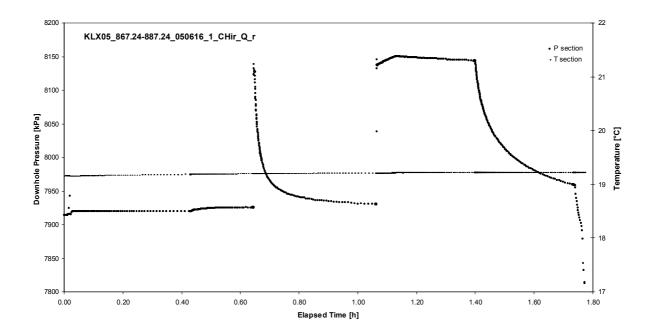
APPENDIX 2-45

Test 867.24 – 887.24 m

Test: 867.24 – 887.24 m

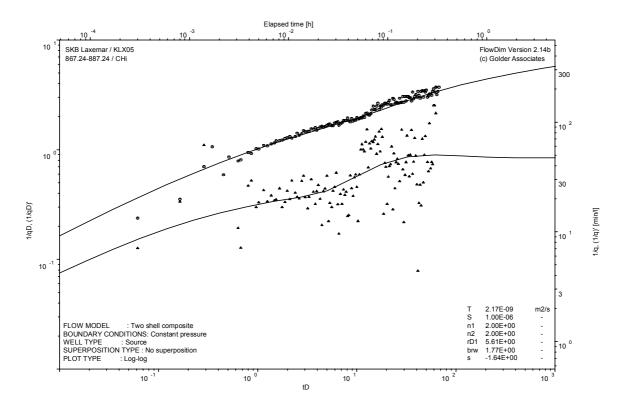


Pressure and flow rate vs. time; cartesian plot



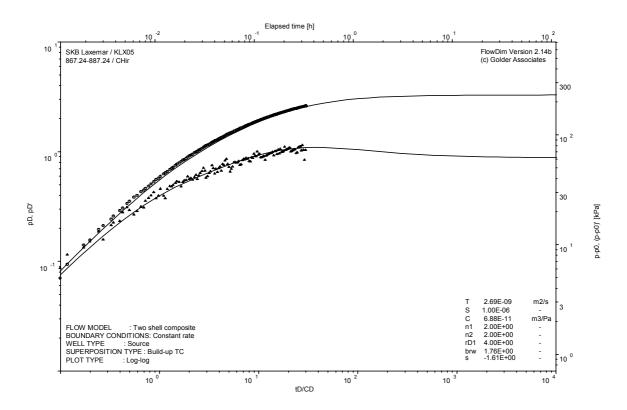
Interval pressure and temperature vs. time; cartesian plot

Test: 867.24 – 887.24 m

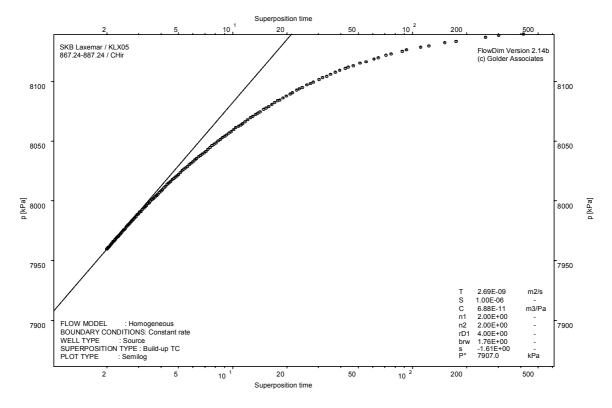


CHI phase; log-log match

Test: 867.24 – 887.24 m



CHIR phase; log-log match



CHIR phase; HORNER match

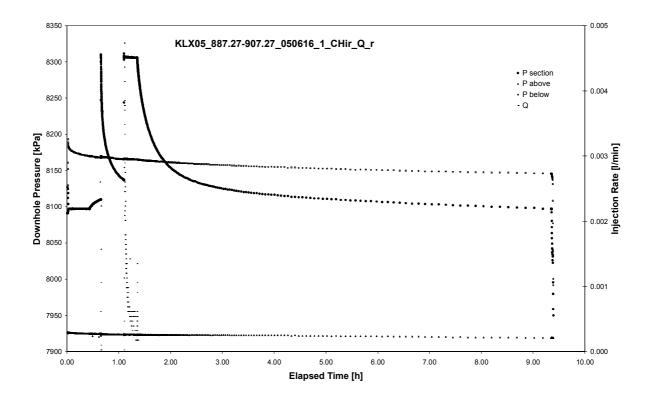
Test: 887.27 – 907.27 m

APPENDIX 2-46

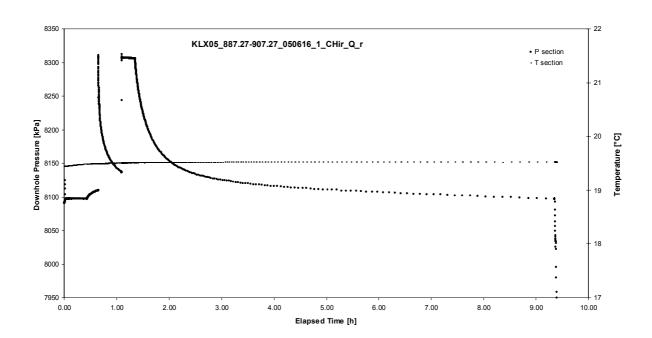
Test 887.27 – 907.27 m

Analysis diagrams

Test: 887.27 – 907.27 m

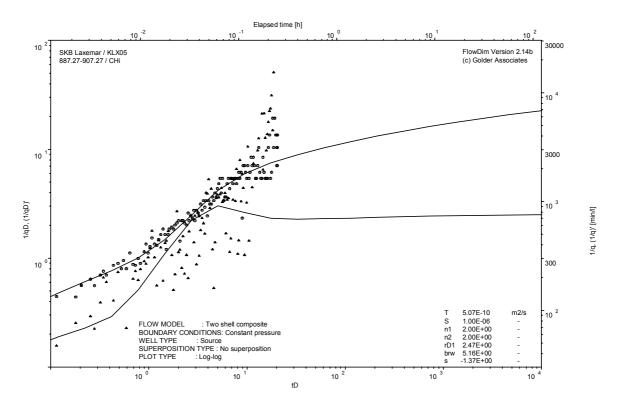


Pressure and flow rate vs. time; cartesian plot



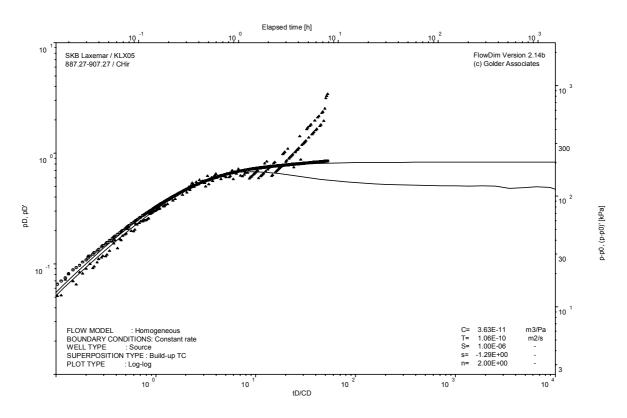
Interval pressure and temperature vs. time; cartesian plot

Test: 887.27 – 907.27 m

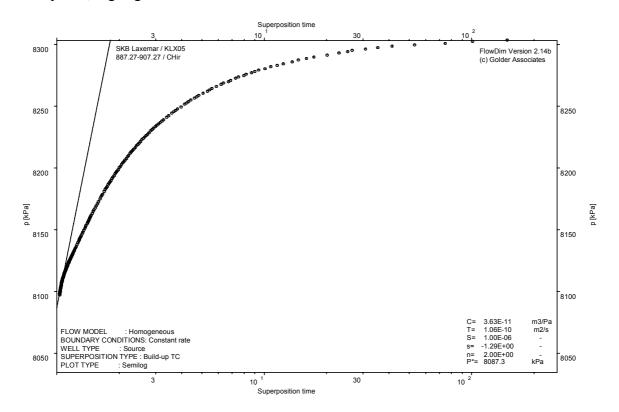


CHI phase; log-log match

Test: 887.27 – 907.27 m



CHIR phase; log-log match



CHIR phase; HORNER match

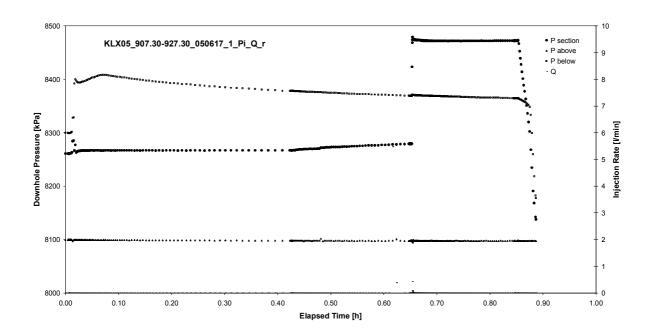
Test: 907.30 – 927.30 m

APPENDIX 2-47

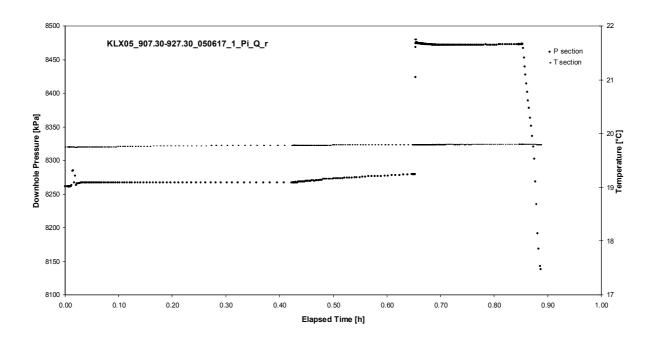
Test 907.30 – 927.30 m

Analysis diagrams

Test: 907.30 – 927.30 m



Pressure and flow rate vs. time; cartesian plot

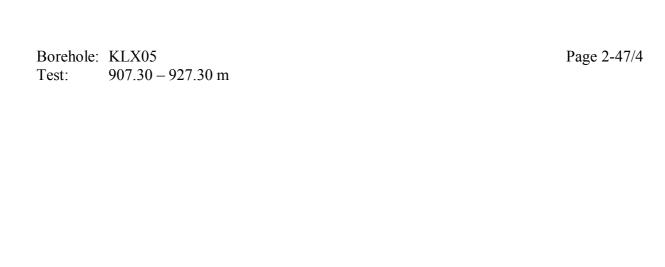


Interval pressure and temperature vs. time; cartesian plot

Test: 907.30 – 927.30 m

Not Analysed

CHI phase; log-log match



Not Analysed

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

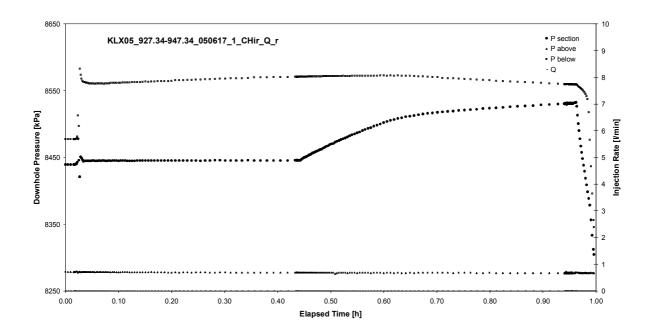
Test: 927.34 – 947.34 m

APPENDIX 2-48

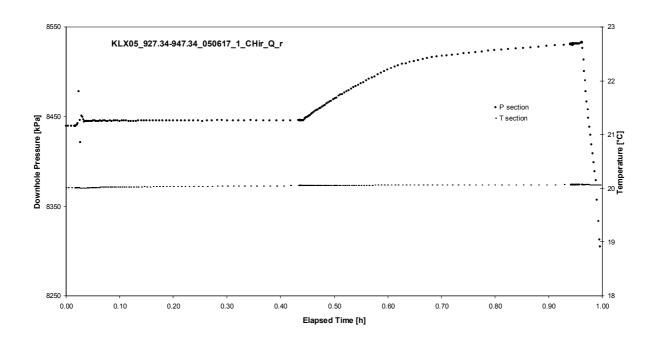
Test 927.34 – 947.34 m

Analysis diagrams

Test: 927.34 – 947.34 m



Pressure and flow rate vs. time; cartesian plot

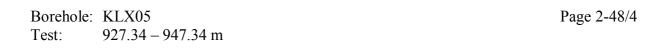


Interval pressure and temperature vs. time; cartesian plot

Test: 927.34 – 947.34 m

Not Analysed

CHI phase; log-log match



Not Analysed

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Borehole: KLX05

APPENDIX 3

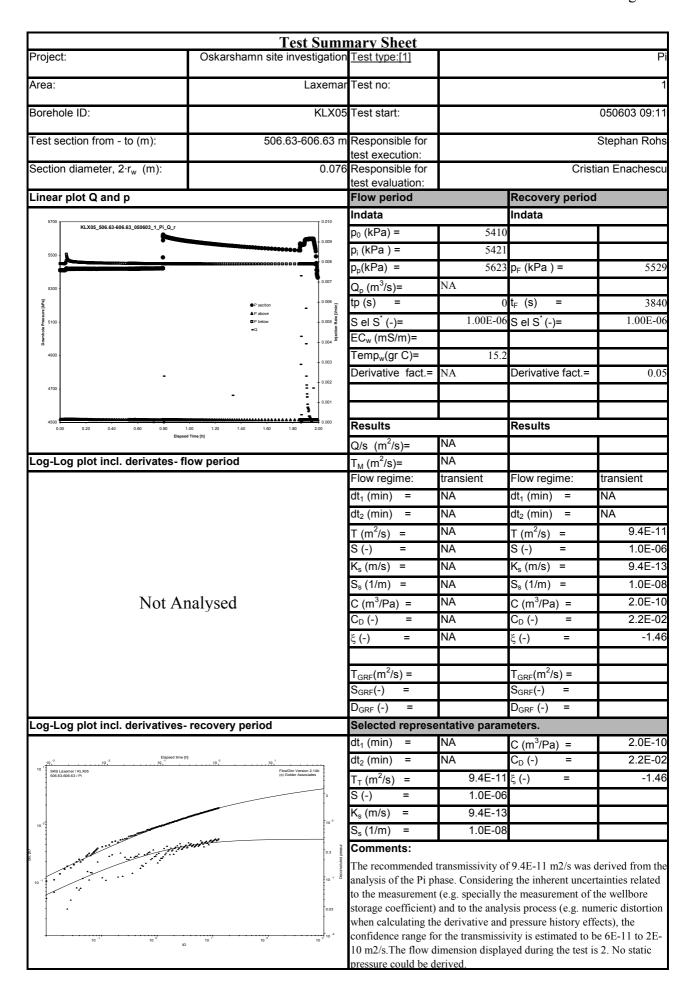
Test Summary Sheets

	Test S	umr	nary Sheet				
Project:	Oskarshamn site investiç	gation	Test type:[1]			CHi	
Area:	Lax	kemar	Test no:			1	
Borehole ID:	K	LX05	Test start:		050601 17:3		
Test section from - to (m):	111 20 2	11 20	Responsible for			Stephan Rohs	
rest section from - to (m).	111.30-2	11.30	test execution:			Stephan Rons	
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachescı	
Linear plot Q and p			test evaluation: Flow period		Recovery period		
pict & and p			Indata		Indata		
KLX05_111.30-211.30_050601_1_CHir_Q_r		T 40	p ₀ (kPa) =	1887			
2100 -		35	p _i (kPa) =	1884			
		- 30	$p_p(kPa) =$		p _F (kPa) =	188:	
1900	000000000000000000000000000000000000000	7	$Q_{p} (m^{3}/s) =$	2.63E-04		100.	
₹ 6 1700		- 25 Til	$Q_{p} (M/S) = $ $tp (s) =$		t _F (s) =	720	
R 전 1700 -	●P section	n Rate [l/min]			1 1	1.00E-0	
1500 -	▲ P above □ P below	lujection	S el S* (-)=	1.00E-06	S el S [*] (-)=	1.00E-0	
1300 -	•q		$EC_w (mS/m) =$	10			
-		10	Temp _w (gr C)=	10			
1100 -		- 5	Derivative fact.=	0.02	Derivative fact.=	0.0	
900	2.00 2.50 3.00]. 3.50					
	2.00 2.50 3.00 I Time [h]	3.50	Results		Results		
			$Q/s (m^2/s)=$	1.2E-05			
Log-Log plot incl. derivates- flo	ow period		$T_{\rm M} (m^2/s) =$	1.6E-05			
Log Log plot mon derivates in	on ponou		Flow regime:	transient	Flow regime:	transient	
			dt ₁ (min) =		dt ₁ (min) =	0.30	
Elapsed time (h) 10 -2 1		ŧ	dt_1 (min) =		dt_1 (min) =	0.60	
10 SKB Laxemar / KLX05 111.30-211.30 / CH	FlowDim Version 2.14b (c) Golder Associates				, ,	9.1E-0	
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.03	$T (m^2/s) = S (-) = $	1.0E-05	$T (m^2/s) = S (-) =$	1.0E-0	
			• ()		, ,		
10 0		10 -2	$K_s (m/s) =$		$K_s (m/s) =$	9.1E-0	
·		0.003	$S_s(1/m) =$		$S_s(1/m) =$	1.0E-0	
	.*		$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	1.4E-0	
10 -1		10 -3	$C_D(-) =$	NA	$C_D(-) =$	1.5E+00	
		3E4	ξ (-) =	-2.70	ξ(-) =	-3.6	
	•		- , 2, ,		- , 2, ,		
10 ² 10 ³	10 ⁴ 10 ⁵ 10 ⁶	ļ	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
			$S_{GRF}(-) = D_{GRF}(-) =$		$S_{GRF}(-) =$		
Log Log plot incl. desiretives	receivem, period		= GRF ()	ntativa navam	D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period		Selected represe dt ₁ (min) =	0.30		1.4E-08	
					$C (m^3/Pa) = C_D (-) =$	1.4E-0	
10 ⁻⁴ 10 ⁻³ Elapsed time [h] 10 ⁻²	10 ⁻¹ 10 ⁰	1	u ()				
10 SKB Laxemar / KLX05 111.30-211.30 / CHr	FlowDim Version 2.14b (c) Golder Associates	300	$T_T (m^2/s) =$	9.1E-06		-3.64	
		,	S (-) =	1.0E-06			
·/		, o	$K_s (m/s) =$	9.1E-08			
10 °	Manage as a	30	$S_s(1/m) =$	1.0E-08			
		[69]	Comments:				
		10 000,000			f 9.1E-6 m2/s was d		
10-1	•	Ĭ			one), which shows the		
		3			ange for the interval m2/s. The flow dime		
				. UL-U IU 4.UL-J .		-1101U11	
		10 °			tatic pressure measu	red at	
10° 10'	10 ² 10 ³ 10 ⁴	10 °	displayed during the	e test is 2. The s	tatic pressure measu the CHir phase usin		

	Test S	Sumi	nary Sheet				
Project:	Oskarshamn site invest	tigation	Test type:[1]			CHi	
Area:	La	axemar	Test no:				
, ii oa.							
Borehole ID:		KLX05	Test start:			050602 09:2	
Test section from - to (m):	211.14-31	1.14 m	Responsible for			Stephan Roh	
Section diameter, 2·r _w (m):	_	0.076	test execution: Responsible for		Crist	ian Enachesci	
		0.0.0	test evaluation:		0	=	
Linear plot Q and p			Flow period		Recovery period		
		12	Indata		Indata		
3000	KLX05_211.14-311.14_050602_1_CHir_Q_r		p ₀ (kPa) =	2774			
•		10	p _i (kPa) =	2772			
2800		\$	$p_p(kPa) =$	2972	p _F (kPa) =	277	
		*	$Q_p (m^3/s) =$	5.80E-05			
R 2000		in in	tp (s) =	1800	t_F (s) =	360	
Fe dia		o njection Rate [Wmin]	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0	
90 2400	●P section ▲P above	Injectio	EC _w (mS/m)=		. ,		
2200	■P below ■Q	4	Temp _w (gr C)=	11.2			
			Derivative fact.=	0.04	Derivative fact.=	0.0	
2000 -	_	- 2					
1800			Results		Results		
0.00 0.50 1.00 Elaps	1.90 2.00 sed Time [h]	2.50				suits	
			Q/s $(m^2/s)=$				
Log-Log plot incl. derivates- f	ow period		$T_{\rm M} ({\rm m}^2/{\rm s}) =$	3.7E-06			
			Flow regime:	transient	Flow regime:	transient	
10 -3 Elapsed time (h] 10.1 10.0 10.1		$dt_1 (min) =$		$dt_1 (min) =$	14.6	
10 1 SKB Laxemar / KLX05 211.14-311.14 / CH	FlowDim Version 2.14 (c) Golder Associates	4b	$dt_2 (min) =$		$dt_2 (min) =$	44.1	
		0.3	$T (m^2/s) =$		$T (m^2/s) =$	1.9E-0	
, 0 % 0 motores		10 -1	S (-) =	1.0E-06	` '	1.0E-0	
10 °			$K_s (m/s) =$		$K_s (m/s) =$	1.9E-0	
		0.03	$S_s (1/m) =$	1.0E-08	$S_s (1/m) =$	1.0E-0	
or o		1/q/ (min/	C (m³/Pa) =	NA	$C (m^3/Pa) =$	7.3E-1	
10 -1	•	10 \$	$C_D(-) =$	NA	$C_D(-) =$	8.0E-0	
		0.003	ξ (-) =	-3.39	ξ (-) =	-5.4	
10 ¹ 10 ²	10 3 10 4 1	10 ⁻³	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
tu			$S_{GRF}(-) =$		$S_{GRF}(-) =$		
			D_{GRF} (-) =		D_{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period		Selected represe	-			
		-	$dt_1 (min) =$	1.87	C (m³/Pa) =	7.3E-1	
Elapsed time (t	1] 10 ⁻¹		dt_2 (min) =		$C_D(-) =$	8.0E-0	
10 1 SKB Laxemar / KLX05 211.14-311.14 / OHir	FlowDim Version 2.14b (c) Golder Associates	103	$T_T (m^2/s) =$	1.9E-06	ξ (-) =	-3.3	
211.14-311.147 OHI			S (-) =	1.0E-06			
211.14911.147001		1	$K_s (m/s) =$	1.9E-08			
211.0031.007.00		300					
10.8		300	$S_s (1/m) =$	1.0E-08			
10.5		300	S _s (1/m) = Comments:	1.0E-08			
10.5	and the state of t	300 10 ² (Feat Jones 1)	Comments:			erived from the	
10.5	Maria Ministra	10 ² [e _{gl}] (20 d) 70 d	Comments: The recommended analysis of the CHi	transmissivity of phase (inner zoo	f 1.9E-6 m2/s was done), which shows the	e best data and	
10°		300 10 ² (e ₂) (10 ⁴) odd	Comments: The recommended analysis of the CHi derivative quality.	transmissivity of phase (inner zoo The confidence r	f 1.9E-6 m2/s was do ne), which shows the range for the interva	e best data and l transmissivity	
10°		300 Red (504) 704	Comments: The recommended analysis of the CHi derivative quality. This estimated to be 9	transmissivity of phase (inner zoo The confidence r 0E-7 to 4.0E-6	f 1.9E-6 m2/s was done), which shows the range for the interva m2/s. The flow dime	e best data and I transmissivity ension	
10°	03 ² 03 ² 03	10 ²	Comments: The recommended analysis of the CHi derivative quality. This estimated to be 9 displayed during the	transmissivity of phase (inner zoo The confidence r .0E-7 to 4.0E-6 e test is 2. The s	f 1.9E-6 m2/s was do ne), which shows the range for the interva	e best data and I transmissivity ension ared at	

	Test	Sumr	nary Sheet			
Project:	Oskarshamn site inves	stigation	Test type:[1]			CHir
Area:	L	axemar	Test no:			1
Borehole ID:		KLX05	Test start:			050602 13:30
Test section from - to (m):	306.37-4	06.37 m	Responsible for test execution:			Stephan Rohs
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachescu
			test evaluation:			
Linear plot Q and p			Flow period		Recovery period	
KLX05_306.37-406.37_050602_1_CHir_Q_r		0.010	Indata	•	Indata	•
		0.009	p ₀ (kPa) =	3623		
3700 -		0.008	p _i (kPa) =	3630		
	- , t	0.007	$p_p(kPa) =$		p _F (kPa) =	367
3500 -	•	20007	$Q_p (m^3/s) =$	5.00E-08		
enre [MP a]	[L/min]	tp (s) =		t_F (s) =	180
Pawinob P 4 2000 -	●P section ▲P above	oos Sano	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
Downik	Q P below	. 0.004 E	EC _w (mS/m)=			
3100 -		. 0.003	Temp _w (gr C)=	12.5		
	- -	0.002	Derivative fact.=	0.14	Derivative fact.=	0.02
2909 -		0.001				
2700	······	0.001			_	
0,000 0,500 1,000 1,500 2,500 2,500 3,000 Elapsed Time [h]			Results		Results	
			Q/s $(m^2/s)=$	2.5E-09		
Log-Log plot incl. derivates- flo	w period		$T_M (m^2/s) =$	3.3E-09		
			Flow regime:	transient	Flow regime:	transient
10 ⁻⁴ 10 ⁻³ Elapsed time [h]	10, ⁻¹ 10, ⁰		dt_1 (min) =		dt_1 (min) =	16.94
10 ¹ SKB Laxemar / KLX05 306:37-406:37 / CH	FlowDim Version 2 (c) Golder Associate	:14b es	dt_2 (min) =		dt_2 (min) =	29.48
.modele	Marie Millian Stranger	300	$T (m^2/s) =$		$T (m^2/s) =$	1.8E-09
· · · · · · · · · · · · · · · · · · ·		10 2	S (-) =	1.0E-06	, ,	1.0E-06
10 0		10-	$K_s (m/s) =$	1.7E-11	K_s (m/s) =	1.8E-1
		30	$S_s (1/m) =$	1.0E-08	$S_s (1/m) =$	1.0E-08
		(1/q)' (min/	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	2.5E-10
10-1	•	10 ¹ g	$C_D(-) =$	NA	$C_D(-) =$	2.8E-02
	. •	,	ξ(-) =	-0.44	ξ (-) =	-0.69
•		ľ				
10 0 10 1	10 2 10 3	10 0	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
tD tD	10 10	10	S _{GRF} (-) =		S _{GRF} (-) =	Ì
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives- r	ecovery period		Selected represe	entative paran	neters.	
			dt_1 (min) =	16.94	C (m ³ /Pa) =	2.5E-10
10. ⁻² Elapsed time [h]	10,1		dt_2 (min) =		C _D (-) =	2.8E-02
10 SKB Laxemar / KLX05 306.37-406.37 / CHir	FlowDim Version 2 (c) Golder Associat	2.14b les	$T_T (m^2/s) =$	1.8E-09		-0.69
		300	S (-) =	1.0E-06		
-		10 ²	K_s (m/s) =	1.8E-11		
10°	_		S _s (1/m) =	1.0E-08		
		30	Comments:			<u> </u>
i je		10 10 10 10 10 10 10 10 10 10 10 10 10		1 transmissivity	of 1.8E-9 m2/s was	derived from
10 1 35 Market .		10 1 00			ch shows the best da	
		3	derivative quality.	The confidence r	ange for the interva	l transmissivity
					m2/s. The flow din	
		10 °			tatic pressure measu	
10 ° 10 ¹ tD/CD	10 ² 10 ³	10 4			the CHir phase using value of 3613.2 kP	
			Catapolation in the	morner plot to a		u .

	Test S	Sumr	nary Sheet				
Project:	Oskarshamn site investi	gation	Test type:[1]			CHi	
Area:	Lax	xemar	Test no:			1	
Borehole ID:	, , , , , , , , , , , , , , , , , , ,	(I X05	Test start:		050602 17:49		
Test section from - to (m):	406.54-5	506.54	Responsible for test execution:			Stephan Rohs	
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachescı	
1: 1:0			test evaluation:				
Linear plot Q and p			Flow period		Recovery period		
4800		70.06	Indata	4521	Indata	1	
	KLX05_406.54-506.54_050602_1_CHir_Q_r		p ₀ (kPa) =	4521		<u> </u>	
4000 .		0.04	p _i (kPa) =	4528	n (IdDa) -	450	
			$p_p(kPa) =$		p _F (kPa) =	452	
4400			$Q_p (m^3/s) =$	2.33E-07			
RPI		. (Wmin)	tp (s) =		t _F (s) =	1440	
G. d. 93 18 2200		ction Rate	S el S* (-)=	1.00E-06	S el S [*] (-)=	1.00E-0	
Downh	●P section ▲P above	0.02 ig	EC _w (mS/m)=				
4000	■P below •Q		Temp _w (gr C)=	13.9			
3800 -		0.01	Derivative fact.=	0.07	Derivative fact.=	0.04	
:							
	3.00 4.00 5.00 ad Time [h]	6.00	Results		Results		
			$Q/s (m^2/s) =$	1.2E-08			
Log-Log plot incl. derivates- fl	ow period		$T_{\rm M} (m^2/s) =$	1.6E-08			
			Flow regime:	transient	Flow regime:	transient	
Elapsed time (h)			dt_1 (min) =	0.40	dt_1 (min) =	1.78	
10, ⁻⁴ 10, ⁻³ 10, ⁻² SKB Laxemar / KLX05 406.64-506.64 / CH	10 ⁻¹ 10 ⁰ FlowDim Version 2.14b (c) Golder Associates		dt_2 (min) =	2.63	dt_2 (min) =	4.18	
400.04-000.04 / Cri	(c) Contain Passonines		$T (m^2/s) =$	1.2E-08	$T (m^2/s) =$	1.9E-08	
1	:	300	S (-) =	1.0E-06	` '	1.0E-0	
10 '	A	10 2	K_s (m/s) =	1.2E-10	$K_s (m/s) =$	1.9E-1	
			S _s (1/m) =		S _s (1/m) =	1.0E-0	
	, ,	30 [Nu	$C (m^3/Pa) =$	NA	C (m ³ /Pa) =	3.1E-1	
•	in Stranger	14, (14)	$C_D(-) =$	NA	$C_D(-) =$	3.4E-0	
10°	والمستنبذ والمستنبذ والمستنبذ والمستنبذ والمستنبذ والمستنبذ	10 1	ξ(-) =	-0.14		0.5	
	** ***********************************	3	5()	•	5()	0.0	
			$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
10 ¹ 10 ²	10 3 10 4 10 5		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
			$D_{GRF}(-) =$		D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period		Selected represe	ntative naram			
Log Log plot men derivatives	Todovery period		$dt_1 \text{ (min)} =$		C (m ³ /Pa) =	3.1E-10	
Elapsed time (h)			$dt_1 (min) =$ $dt_2 (min) =$		$C_D(-) =$	3.4E-02	
10 -3 10 -2 10 -1 10 2 SKB Laxemar / KLX05 406.54-506.54 / CHr	10,0 FlowDim Version 2.14b (c) Golder Associates]		1.9E-08		0.5	
1		710 ³	$T_T (m^2/s) =$ $S (-) =$			0.5	
			- ()	1.0E-06			
10 1		300	$K_s (m/s) =$	1.9E-10			
			$S_s (1/m) =$	1.0E-08			
		10 [e _c h] j ₀ d	Comments:				
Maria de la companya	Mil .	30 69 60 69			f 1.9E-8 m2/s was de		
10 °					one), which shows the		
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Ì	uerivative quality.		ange for the interval		
		10 1	is estimated to be 9	0F-9 to 4 0F 9	m2/s. The flow dime	ncion -	
		10 1	is estimated to be 8 displayed during the				
, , , , , , , , , , , , , , , , , , ,	10 ² 10 ² 10 ⁴	10 ¹	displayed during the	e test is 2. The s	m2/s. The flow dime tatic pressure measu the CHir phase usin	red at	



	Test S	Sumn	nary Sheet				
Project:	Oskarshamn site invest	igation	Test type:[1]			CHi	
Area:	La	xemar	Test no:			1	
Borehole ID:		KI X05	Test start:		050603 12:4		
Test section from - to (m):	606.82-706	6.82 m	Responsible for test execution:			Stephan Rohs	
Section diameter, 2·r _w (m):		0.076	Responsible for		Cri	stian Enachescu	
Linear plot Q and p			test evaluation: Flow period		Recovery perio	nd .	
Lillear plot & allu p			Indata		Indata	Ju	
6000	KLX05_606.82-706.82_050603_1_CHir_Q_r	0.05	p ₀ (kPa) =	6304	maata		
	7		p _i (kPa) =	6305			
6400		0.04	$p_p(kPa) =$		p _F (kPa) =	631	
6000	7		$Q_p (m^3/s) =$	3.83E-07	FF ()		
<u>a</u>		- 0.03 ⊆	tp(s) =		t _F (s) =	3600	
Gd. 91 82 8000-	_	Rate [Vmin]	S el S [*] (-)=		S el S [*] (-)=	1.00E-0	
wmhole P	●P section	Injection	EC _w (mS/m)=	1	0 0 0 (-)-		
ă ₅eso -	▲P above □ P below		Temp _w (gr C)=	16.6		+	
	- Q		Derivative fact.=	= 0.05	Derivative fact.=	= 0.0	
5600 -		0.01					
<u> </u>							
0.00 0.50 1.00 1. Elapsed	50 2.00 2.50 Time [h]	3.00	Results		Results		
			$Q/s (m^2/s) =$	1.9E-08			
Log-Log plot incl. derivates- flo	ow period		$T_M (m^2/s) =$	2.5E-08			
			Flow regime:	transient	Flow regime:	transient	
Elapsed time [h]	10,-1		dt_1 (min) =		dt_1 (min) =	1.8	
10 SKB Laxemar / KLX05 606.82-708.82 / CHI	FlowDim Version 2.14b (c) Golder Associates	-	dt_2 (min) =		dt_2 (min) =	4.0	
\$ 51 W ST		30	$T (m^2/s) =$		$T (m^2/s) =$	2.5E-0	
··.		10 '	S (-) =	1.0E-06	, ,	1.0E-0	
			$K_s (m/s) =$		$K_s (m/s) =$	2.5E-1	
		3 (4	$S_s (1/m) =$		$S_s (1/m) =$	1.0E-0	
• •	:	A. (14) [p	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	3.5E-10	
10 -1		10 0	$C_D(-) =$	NA	$C_D(-) =$	3.9E-0	
		0.3	ξ (-) =	-0.38	ξ (-) =	1.18	
		10 -1	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
10 ¹ 10 ²	10 ³ 10 ⁴ 1	10	$S_{GRF}(III / S) =$	+	$S_{GRF}(III/S) =$	+	
			$D_{GRF}(\cdot) =$	+	D _{GRF} (-) =	+	
Log-Log plot incl. derivatives-	recovery period		Selected repres	entative naran			
	ecovery period		dt_1 (min) =	1.83		3.5E-10	
Elapsed time [h]			$dt_2 (min) =$		$C_D(-) =$	3.9E-02	
10, 3 10, 1	10, 0 FlowDim Version 2.14b (c) Golder Associates	1	$T_T (m^2/s) =$	2.5E-08		1.18	
606.82-706.82 / CHIP	(4/	-10.3	S (-) =	1.0E-06		1.10	
		1"	$K_s (m/s) =$	2.5E-10		+	
10 1		300	$S_s(1/m) =$	1.0E-08		+	
		1	Comments:	1.02 00			
		10 ° [e.ge] jo		1 transmissivity of	F2 5E 8 m2/a maa	darized from the	
		P 90.	The recommended analysis of the CH				
10°	A. C.	1	quality. The confi				
		10 1	estimated to be 9.0	0E-9 to 4.0E-8 m ²	2/s. The flow dime	ension displayed	
·/			during the test is 2				
10 ° 10 ¹	10 2 10 3 10 4	. †₃	was derived from			xtrapolation in the	
			Horner plot to a v	aiue oi 0300.3 KP	a.		

	Test	t Sumr	nary Sheet				
Project:	Oskarshamn site inve	estigation	Test type:[1]			CHi	
Area:		Lavemar	Test no:				
Al Ca.		Laxemai	restrio.				
Borehole ID:		KLX05	Test start:		050603 16:50		
Test section from - to (m):	706.83-8	306.83 m	Responsible for		Stephan Roh		
Section diameter, 2·r _w (m):		0.076	test execution: Responsible for		Crist	ian Enachescı	
occurr diamotor, 2 Tw (m).		0.070	test evaluation:				
Linear plot Q and p			Flow period		Recovery period		
7500		0.50	Indata		Indata		
к	X05_706.83-806.83_050603_1_CHir_Q_r	0.45	p ₀ (kPa) =	7191			
7300 -			p _i (kPa) =	7201			
			$p_p(kPa) =$	7382	p _F (kPa) =	719	
7100 -		0.35	$Q_{p} (m^{3}/s) =$	3.33E-07			
- kPa		- 0.30 [Main]	tp (s) =	1800	t _F (s) =	2160	
CC di ann se es de coco .	●P section	0.25	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0	
and through the state of the st	▲P above ■P below	uo go	EC _w (mS/m)=		()		
e700 -	•Q		Temp _w (gr C)=	18			
		0.15	Derivative fact.=	0.02	Derivative fact.=	0.1	
esso -		0.10					
: (0.05					
6300	00 500 600 7.00	0.00	Results		Results		
Elapsed	Time [h]		$Q/s (m^2/s)=$	1.8E-08			
Log-Log plot incl. derivates- flo	w neriod		$T_{\rm M} (m^2/s) =$	2.4E-08			
Log Log plot mon derivates me	, periou		Flow regime:	transient	Flow regime:	transient	
			dt ₁ (min) =	NA	dt₁ (min) =	NA	
10 ² Elapsed time [h]	10, 2 10, 1 1 FlowDim Version	0 ° n 2.14b	$dt_1 (min) =$ $dt_2 (min) =$	NA		NA	
SKB Laxemar / KLX05 706.83-806.83 / CHi	(c) Golder Associ	iates 10 ²			- 、	7.9E-0	
	/.	<u> </u>	$T (m^2/s) =$		$T (m^2/s) =$		
	of the same of the	30	S (-) =	1.0E-06	, ,	1.0E-0	
10	<i>.</i>	10 1	$K_s (m/s) =$		$K_s (m/s) =$	7.9E-1	
			$S_s (1/m) =$		$S_s (1/m) =$	1.0E-0	
·	, para pa	a 4(1/d) [h	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	7.9E-1	
10	<i>.</i> :	F10 °	$C_D(-) =$	NA	$C_D(-) =$	8.7E-0	
		100	ξ (-) =	-1.85	ξ (-) =	-2.2	
		0.3					
10 6 10 1	10 ² 10 ³	10 4	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
tD			$S_{GRF}(-)$ =		$S_{GRF}(-) =$		
			D_{GRF} (-) =		D_{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period		Selected represe	-	neters.		
			dt_1 (min) =	NA	$C (m^3/Pa) =$	7.9E-10	
Elapsed time (h)	. 10,1	10.1	dt_2 (min) =	NA	$C_D(-) =$	8.7E-0	
10 2 SKB Laxemar / KLX05 706.83-806.83 / CHir	FlowDim Version (c) Golder Associ	2.14b lates	$T_T (m^2/s) =$	7.9E-09	ξ(-) =	-2.2	
		\exists	S (-) =	1.0E-06			
†		10 2	$K_s (m/s) =$	7.9E-11			
10 1			S _s (1/m) =	1.0E-08			
		30 Te	Comments:				
i.i.m.novement		040, (p-p0) (96		transmissivity of	f 7.9E-9 m2/s was d	erived from the	
10°		g.			one), which shows the		
		3	derivative quality.	The confidence r	ange for the interva	l transmissivity	
					m2/s. The flow dime		
/		10 °			tatic pressure measu		
	10 ² 10 ³	40.4	uransqueer depth, w	as aerived from	the CHir phase usin	ig straight line	
10 ° 10 ¹ tD/CD	10	10			value of 7183.9 kP	la la	

	Test Si	umn	nary Sheet			
Project:	Oskarshamn site investig	ation	Test type:[1]			CHir
Area:	Laxe	emar	Test no:			1
Borehole ID:	KI	LX05	Test start:			050604 09:20
Test section from - to (m):	807.11-907.		Responsible for test execution:			Stephan Rohs
Section diameter, 2·r _w (m):	C	0.076	Responsible for		Cris	stian Enachescu
Linear plot Q and p			test evaluation: Flow period		Recovery perio	od.
Lillear plot & allu p			Indata		Indata	iu .
8350	KLX05_807.11-907.11_050604_1_CHir_Q_r	0.10	p ₀ (kPa) =	8078		
		0.09	p _i (kPa) =	8086		
8150			$p_p(kPa) =$		p _F (kPa) =	8108
-	1	0.07	$Q_p (m^3/s) =$	1.67E-07	p _F (iii a)	0100
		· 0.06 E	tp (s) =		t _F (s) =	3600
region on see of 1750 .		≥	S el S [*] (-)=		S el S [*] (-)=	1.00E-0
P alonhwith	●P section ▲P above	5	EC _w (mS/m)=	1.00L-00	S el S (-)=	1.00E-0
7950	■P below ■Q	0.04 =	Temp _w (gr C)=	19.5		
1		0.03	Derivative fact.=		Derivative fact.=	: 0.02
7350		0.02	Derivative lact.	0.07	Derivative fact.	0.0.
		0.01				+
7150	200 250 50	0.00	Results		Results	
Elapsed Ti	me [h]		Q/s $(m^2/s)=$	8.9E-09		
Log-Log plot incl. derivates- flo	w period		$T_{\rm M} (m^2/s) =$	1.2E-08		
log log plot men denvated ne	politica		Flow regime:	transient	Flow regime:	transient
			dt ₁ (min) =		dt ₁ (min) =	11.17
Elapsed time (h)	10 ° 10 ° FlowDim Version 2.14b (c) Golder Associates		dt_1 (min) =		$dt_1 \text{ (min)} =$	34.05
SKB Laxemar / KLX05 807.11-907.11 / CHi	(c) Golder Associates	300	$T (m^2/s) =$		2	3.4E-09
	·		S (-) =	1.0E-06	, ,	1.0E-06
19.5	•••	10	$K_s(m/s) =$		$K_s (m/s) =$	3.4E-1
	•		$S_s(1/m) =$		$S_s (1/m) =$	1.0E-08
	•	=	C (m ³ /Pa) =	NA	$C_s(1/111) = C_s(m^3/Pa) = 0$	3.1E-10
		10	, ,	NA	, ,	3.4E-02
10 1	•		-5()		9 D ()	-2.82
	[3	3	ξ (-) =	-3.05	ς (-) –	-2.02
1.		10 °	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 -1 10 ° (ID	10 ¹ 10 ² 10 ³		$S_{GRF}(III/S) =$		$S_{GRF}(III/S) =$	+
			$D_{GRF}(-)$ =		$D_{GRF}(-) =$	+
Log-Log plot incl. derivatives- r	acovery period		Selected represe	entative naram		
Log-Log plot mei. derivatives- i	ecovery period		$dt_1 \text{ (min)} =$	11.17	C (m ³ /Pa) =	3.1E-10
Transfer N			$dt_1 (min) =$		$C_D(-) =$	3.4E-02
10 1 SKB Laxemar / KLX05 807.11/0.CHir	10,0 10,1 FlowDim Version 2.14b (c) Golder Associates			3.4E-09		-2.82
300.000	(b) contain manufacture		$T_{T} (m^{2}/s) =$ $S (-) =$	1.0E-06		-2.02
	300	0	$K_s (m/s) =$	3.4E-11		
10 °	-10	2		1.0E-08		
مبنسر: /	een,		$S_s (1/m) =$ Comments:	1.0⊑-00		
	30	of kPaj		4	C2 4E 0 2/-	4 4.C d
and the same of th		p-50; (b-5	The recommended analysis of the CHi			
33,4	10		quality. The confid			
<i>f</i> .	3		estimated to be 1.0	E-9 to 7.0E-9 m ²	2/s. The flow dime	nsion displayed
<i>j</i> /			during the test is 2.			
10 -1 10 0 tDICD	10 ¹ 10 ² 10 ³		was derived from t			trapolation in the
			Horner plot to a va	iue oi 8082.9 KP	a.	

	Test	Sumr	nary Sheet				
Project:	Oskarshamn site inves	tigation	Test type:[1]			CHi	
Area:	La	axemar	Test no:				
Borehole ID:		KLX05	Test start:		050604 14:00		
Test section from - to (m):	887.27-98	7.27 m	Responsible for test execution:			Stephan Roh	
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachescı	
			test evaluation:		-		
Linear plot Q and p			Flow period		Recovery period		
KLX05_887.27-987.27_050604_1_CHir_Q	r • • • • • • • • • • • • • • • • • • •	0.010	Indata	0501	Indata		
9900	▲ P above		p ₀ (kPa) =	8791			
0	-Q	0.008	p _i (kPa) =	8847	n (kDa) =	902	
9			$p_p(kPa) =$		p _F (kPa) =	893	
9100.		0.006 —	$Q_{p} (m^{3}/s) =$ to (s) =	1.67E-08	t _r (s) =	100	
5 soo.		ate [Vmin]	(P (O)		4 (0)	1.005.0	
of acco.	1	njection Rate [Wmin]	S el S* (-)=	1.00E-06	S el S [*] (-)=	1.00E-0	
0	•	0.004 至	EC _w (mS/m)= Temp _w (gr C)=	20.6			
-			Derivative fact.=		Derivative fact.=	0.0	
8500		0.002	Derivative lact	0.19	Derivative fact	0.0	
8100	र न						
7900	2.00 2.50 3.00	0.000	Results		Results		
Elapsed T	ime [h]		$Q/s (m^2/s)=$	9.3E-10			
Log-Log plot incl. derivates- flo	w period		$T_{\rm M} (m^2/s) =$	1.2E-09			
3 37 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			Flow regime:	transient	Flow regime:	transient	
Thousand the District Control of the			$dt_1 \text{ (min)} =$	NA	$dt_1 \text{ (min)} =$	NA	
10 1 10 2 10 1 10 1 10 1 10 1 10 1 10 1	10, 10, 2 FlowDim Version 2.14b (c) Golder Associates	7	dt_2 (min) =	NA	$dt_2 (min) =$	NA	
887.27-967.27 / CHI	(c) Sonoti Paatoliinia	2000	$T (m^2/s) =$	1.8E-10	$T (m^2/s) =$	1.2E-1	
3		5555	S (-) =	1.0E-06	` '	1.0E-0	
10 °		10 3	K_s (m/s) =	1.8E-12	$K_s (m/s) =$	1.2E-1	
		300	S _s (1/m) =	1.0E-08	S _s (1/m) =	1.0E-0	
A Section 1		(mim) to	C (m ³ /Pa) =	NA	C (m³/Pa) =	2.9E-1	
10.1		10 ²	C _D (-) =	NA	C _D (-) =	3.2E-0	
			ξ (-) =	-2.97	ξ(-) =	-2.3	
• • • • • • • • • • • • • • • • • • • •		30					
10 2 10 -1 10 0 ID	10 ¹ 10 ² 10	10 1	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
ъ			$S_{GRF}(-)$ =		$S_{GRF}(-)$ =		
			D_{GRF} (-) =		D_{GRF} (-) =		
Log-Log plot incl. derivatives- r	ecovery period		Selected represe	· ·			
			dt_1 (min) =	NA	$C (m^3/Pa) =$	2.9E-1	
Elapsed time (h) 10 ° SKB Laxemar / KLX05	10 ¹ 10 ²	10 ³	$dt_2 (min) =$	NA	$C_D(-) =$	3.2E-0	
10 SKB Laxemar / KLX05 887.27-987.27 / CHir	FlowDim Version 2.14 (c) Golder Associates	-	$T_T (m^2/s) =$	1.2E-10		-2.3	
		300	S (-) =	1.0E-06			
10-1		10 2	$K_s (m/s) =$	1.2E-12			
			$S_s(1/m) =$	1.0E-08			
		30 [84]	Comments:				
		10 1 00			f 1.2E-10 m2/s was		
		1			hows the best data a ne interval transmiss		
		3			m2/s. The flow dim		
					tatic pressure measu		
İ		10 °					
10 -1 10 ° sD/CD	10 1 10 2	10 3	transducer depth w	as not calculated	due to the tight for	nation.	

	Test Sun	nmary Sheet				
Project:	Oskarshamn site investigati	on Test type:[1]			CHi	
Area:	Laxem	nar Test no:			2	
Borehole ID:	KLX	05 Test start:			050610 13:12	
Test section from to (m):	111 20 121 20	m Responsible for			Stanban Dah	
Test section from - to (m):	111.30-131.30	test execution:			Stephan Rohs	
Section diameter, 2·r _w (m):	0.0	76 Responsible for		Crist	ian Enachescı	
Linear plot Q and p		test evaluation: Flow period		Recovery period		
Emour prot & una p		Indata		Indata		
KLX05_111.30-131.30_050610_2_CHir_Q_r	- 25	p ₀ (kPa) =	1191			
	P section	p _i (kPa) =	1188			
1400	▲ P above	$p_p(kPa) =$		p _F (kPa) =	119	
	• •	$Q_p (m^3/s) =$	2.22E-04		117	
1500 -	15 5	4 (-)		t _F (s) =	120	
Regard 1200		φ(s) –			1.00E-0	
2 1200 8 90 100	1 Department of the Control of the C	S el S [*] (-)= EC _w (mS/m)=	1.00E-00	S el S [*] (-)=	1.00E-0	
- Down	10 2	= - w ()	9.0			
1100	•	Temp _w (gr C)=	8.9	D : " ()	0.0	
1000	.5	Derivative fact.=	0.02	Derivative fact.=	0.0	
000 020 0.40 0.80 1.00 1.20 1.40 Elapsed Time [h]		Results	<u> </u>	Results		
		$Q/s (m^2/s) =$	1.0E-05			
Log-Log plot incl. derivates- flo	ow period	$T_{\rm M} (m^2/s) =$	1.1E-05			
		Flow regime:	transient	Flow regime:	transient	
Elapsed time [h]	40 ⁻¹	dt_1 (min) =	0.59	dt_1 (min) =	2.7	
10 2 10, 10, 10, 10, 10, 10, 10, 10, 10, 10,	10, 10, FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	1.22	dt ₂ (min) =	5.0	
1	0.3	$T (m^2/s) =$	1.3E-05	$T (m^2/s) =$	1.6E-0	
+	0.3	S (-) =	1.0E-06	` '	1.0E-0	
10 1	10 -1	K_s (m/s) =		$K_s (m/s) =$	5.5E-0	
8 8 8 8 9 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0		S _s (1/m) =		$S_s(1/m) =$	5.0E-0	
	0.03	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	1.6E-0	
	10-2	$C_D(-) =$	NA	$C_D(-) =$	1.8E+0	
10 "	********	ξ(-) =	-0.50		-0.2	
	0.003	ç (-) –	0.00	Ç (-) —	0.2	
	10 6 10 7 10 8 10 3	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
10 ⁴ 10 ⁵ tD	10 ⁶ 10 ⁷ 10 ⁸ ¹⁰	$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		D _{GRF} (-) =		D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran			
<u> </u>		$dt_1 (min) =$	2.75		1.6E-08	
Elapsed time (h)		$dt_2 (min) =$		$C_D(-) =$	1.8E+0	
10 ² SKB Laxemar / KLX05 111.30-131.30 / CHir	10 ⁻¹ 10 ⁻¹ FlowDim Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	1.6E-05		-0.2	
	(c) Golder Associates	S (-) =	1.0E-06		0.2	
]		$K_s (m/s) =$	5.5E-07			
10 d	300	$S_s (1/m) =$	5.0E-08			
	10 2	Comments:	3.0L-00			
	10	<u></u>		C1 (F 5 2/ 1	1 6 1	
The state of the s	30			f 1.6E-5 m2/s was done), which shows the		
10°				range for the interval		
	10 1			5 m2/s. The flow din		
/ ·		is estimated to be o				
:				tatic pressure measu	red at	
: 10° 10' EDGD	10 3 10 6	displayed during th transducer depth, w	e test is 2. The s ras derived from		g straight line	

			nary Sheet				
Project:	Oskarshamn site investi	igation	Test type:[1]			CHi	
Area:	La	xemar	Test no:				
Borehole ID:	ļ	KLX05	Test start:		050610 15:3:		
Took cooking from to (m):	120 02 14	0.00	Deer engible for			Ctanhan Dah	
Test section from - to (m):	120.02-140	0.02 111	Responsible for test execution:			Stephan Roh	
Section diameter, 2·r _w (m):		0.076	Responsible for test evaluation:		Cris	stian Enachesc	
Linear plot Q and p			Flow period		Recovery perio	d	
1600		- 20	Indata		Indata		
KLX05_126.02-146.02_050610_1_CHir_Q_r			p ₀ (kPa) =	1320			
	• P section	1.8	p _i (kPa) =	1318			
1500	▲P above □ P below	1.6	$p_p(kPa) =$	1518	p _F (kPa) =	131	
	1	- 1.4	$Q_p (m^3/s) =$	1.87E-05			
G 1400		1.2 =	tp (s) =	1200	t _F (s) =	120	
onessand opinion of the control of the control opinion opinion of the control opinion opinio		n Rate [l/min]	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0	
0 1300 -		njectio	EC _w (mS/m)=				
-	-	0.6	Temp _w (gr C)=	9.1			
			Derivative fact.=	0.1	Derivative fact.=	0.0	
1.000							
1100	•		Decelle		DIt-		
000 020 0.40 0.60 0.80 1.00 1.20 1.40 Elapsed Time [h]			Results	9.2E-07	Results	1	
and an wlatinal darivates flu	ann mariad		Q/s $(m^2/s)=$	9.2E-07 9.6E-07		+	
og-Log plot incl. derivates- flo	ow period		$T_M (m^2/s) =$		Flow regime:	transiant	
			Flow regime: dt ₁ (min) =	transient	Flow regime: dt ₁ (min) =	transient NA	
10 1 10 2 Elapsed time (h	h) 10, 1 10 FlowDim Version 2 (c) Golder Association	10,1	$dt_1 (min) = $ $dt_2 (min) = $		$dt_1 (min) = $ $dt_2 (min) = $	NA NA	
10 SKB Laxemar / KLX05 126.02-146.02 / CHi	(c) Golder Associat	10 °				9.3E-0	
			$T (m^2/s) = S (-) = $	1.0E-06	$T (m^2/s) = S (-1) = -1$	9.3E-0	
		0.3	0 ()			4.7E-0	
10 0		10 -1	$K_s (m/s) =$		$K_s(m/s) =$		
	*	[hu	$S_s(1/m) =$	5.0E-08 NA	$S_s(1/m) =$	5.0E-0 3.2E-1	
	A A A A	0.03 (3)	$C (m^3/Pa) = C_D (-) =$	NA	$C (m^3/Pa) = C_D (-) =$	3.5E-0	
10 -1	4.4 .4 .4 .4 .4	10 -2	-0()		-0()		
		10	ξ (-) =	-0.48	ξ (-) =	1.6	
		0.003	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
10 ³ 10 ⁴	10 5 10 6	10 7	$S_{GRF}(-) =$		$S_{GRF}(11/3) =$		
			$D_{GRF}(-) =$		D _{GRF} (-) =		
			Selected represe	entative param			
og-Log plot incl. derivatives-	recovery period					3.2E-1	
og-Log plot incl. derivatives-	recovery period		-	-	$C (m^3/Pa) =$	3.ZE-1	
Log-Log plot incl. derivatives-	recovery period		dt ₁ (min) =	NA NA	$C (m^3/Pa) = C_D (-) =$		
Log-Log plot incl. derivatives-	recovery period	4b 300	$dt_1 \text{ (min)} = $ $dt_2 \text{ (min)} = $	NA NA	C _D (-) =	3.5E-0	
	10, ² 10, ¹ 10°	4b 300 s	$dt_1 (min) = dt_2 (min) = T_T (m^2/s) = $	NA NA 9.3E-07	$C_{D}(-) = \xi(-) =$	3.5E-0	
	10, ² 10, ¹ 10°	4b 300 s	$dt_1 \text{ (min)} = \\ dt_2 \text{ (min)} = \\ T_T \text{ (m}^2/\text{s)} = \\ S \text{ (-)} = \\$	NA NA 9.3E-07 1.0E-06	C _D (-) = ξ (-) =	3.5E-0	
	10, ² 10, ¹ 10°	4b 300 s	$dt_1 \text{ (min)} = dt_2 \text{ (min)} = T_T \text{ (m}^2/\text{s)} = S \text{ (-)} = K_s \text{ (m/s)} =$	NA 9.3E-07 1.0E-06 4.7E-08	C _D (-) = ξ (-) =	3.5E-0	
10 SSB Lasemer / NLXISS 100 A	10, ² 10, ¹ 10°	4b 300 s	$dt_1 \text{ (min)} = \\ dt_2 \text{ (min)} = \\ T_T \text{ (m}^2/\text{s)} = \\ S \text{ (-)} = \\ K_s \text{ (m/s)} = \\ S_s \text{ (1/m)} = \\$	NA NA 9.3E-07 1.0E-06	C _D (-) = ξ (-) =	3.5E-0	
10 SSR Lawrenz FALVS 10 3 Elapsed time (N) 10 3 SSR Lawrenz FALVS 10 CG - 46 GZ / GHz	10, ² 10, ¹ 10°	4b 300 2	$dt_1 \text{ (min)} = \\ dt_2 \text{ (min)} = \\ T_T \text{ (m}^2/\text{s)} = \\ S \text{ (-)} = \\ K_s \text{ (m/s)} = \\ S_s \text{ (1/m)} = \\ \textbf{Comments:}$	NA 9.3E-07 1.0E-06 4.7E-08	C _D (-) = ξ (-) =	3.5E-C 1.6	
10 SSR Lawrenz FALVS 10 3 Elapsed time (N) 10 3 SSR Lawrenz FALVS 10 CG - 46 GZ / GHz	10, ² 10, ¹ 10°	4b) 3000 s	$dt_1 \text{ (min)} = \\ dt_2 \text{ (min)} = \\ T_T \text{ (m}^2/\text{s)} = \\ S \text{ (-)} = \\ K_s \text{ (m/s)} = \\ S_s \text{ (1/m)} = \\$	NA 9.3E-07 1.0E-06 4.7E-08 5.0E-08	$C_D(-) = \xi(-) = $ $\xi(-) = $	3.5E-C 1.6	
10 SSR Lawrenz FALVS 10 3 Elapsed time (N) 10 3 SSR Lawrenz FALVS 10 CG - 46 GZ / GHz	10, ² 10, ¹ 10°	4b) 300 b) 10 2 10 1 10 2 10 10 10 10 10 10 10 10 10 10 10 10 10	$dt_1 \text{ (min)} = dt_2 \text{ (min)} = T_T \text{ (m}^2/\text{s)} = S \text{ (-)} = K_s \text{ (m/s)} = S_s \text{ (1/m)} = Comments:$ The recommended analysis of the CHi derivative quality.	NA 9.3E-07 1.0E-06 4.7E-08 5.0E-08 transmissivity of r phase (inner zo The confidence r	$C_D(-) = \xi(-) = \xi(-)$ $\xi(-) $	3.5E-0 1.6 derived from the the best data and al transmissivity	
	10, ² 10, ¹ 10°	46 300 s	$dt_1 \text{ (min)} = dt_2 \text{ (min)} = T_T \text{ (m}^2/\text{s)} = S \text{ (-)} = K_s \text{ (m/s)} = S_s \text{ (1/m)} = Comments:$ The recommended analysis of the CHi derivative quality. It is estimated to be 7	NA 9.3E-07 1.0E-06 4.7E-08 5.0E-08 transmissivity of r phase (inner zo The confidence r .0E-7 to 3.0E-6.0	$C_D(-) = \xi(-) = \xi(-)$ $\xi(-) $	3.5E-0 1.6 derived from the the best data and al transmissivity thension displaye	
10 19 4 19 3 Etapaed time (9) 10 3 000 Laserma' PAUSOS 100 00 COV COV	10, ² 10, ¹ 10°	110 ° (MM/0/45) (2) 4 4	$dt_1 \text{ (min)} = dt_2 \text{ (min)} = T_T \text{ (m}^2/\text{s)} = S \text{ (-)} = K_s \text{ (m/s)} = S_s \text{ (1/m)} = Comments:$ The recommended analysis of the CHi derivative quality.	NA 9.3E-07 1.0E-06 4.7E-08 5.0E-08 transmissivity of r phase (inner zo The confidence r .0E-7 to 3.0E-6 of The static pressor	$C_D(-) = \xi(-) = \xi(-) = \xi(-)$ $\xi(-) = \xi(-) = \xi(-)$ $\xi(-) $	3.5E-0 1.6 derived from the the best data and al transmissivity tension displaye insducer depth,	

	Test S	umr	nary Sheet					
Project:	Oskarshamn site investig	ation	Test type:[1]			CHi		
Area:	l ax	emar	Test no:			1		
Borehole ID:	K	LX05	Test start:			050610 17:47		
Test section from - to (m):	146.10-16	36.10	Responsible for			Stephan Rohs		
Section diameter, 2·r _w (m):	(076	test execution: Responsible for	1	Cris	stian Enachescu		
oconon diameter, 2 T _W (m).	•	3.070	test evaluation:					
Linear plot Q and p			Flow period		Recovery perio	d		
1800		T 3.0	Indata		Indata			
• •	KLX05_146.10-166.10_050610_1_CHir_Q_r		p ₀ (kPa) =	1497				
1700	P section	25	p _i (kPa) =	1494				
1600	▲P above		$p_p(kPa) =$		p _F (kPa) =	149		
	•Q	20	$Q_p (m^3/s) =$	2.28E-05				
(g) 1500		Rate [l/min]	tp (s) =	1800	t_F (s) =	2400		
Ted toos		15 Rate	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0		
Down tho		Injection	EC_w (mS/m)=					
- !		1.0	Temp _w (gr C)=	9.4				
1300			Derivative fact.=	0.07	Derivative fact.=	0.03		
1200	-	0.5						
. :	•							
1100 0.50 1.00 1.50 2.00 2.50 Elapsed Time (h)		100	Results	-	Results			
Сарыс	······································		Q/s $(m^2/s)=$	1.1E-06				
Log-Log plot incl. derivates- flo	ow period		$T_{\rm M} ({\rm m}^2/{\rm s}) =$	1.2E-06				
			Flow regime:	transient	Flow regime:	transient		
Elapsed time [h]	40 4		dt_1 (min) =	1.52	dt_1 (min) =	0.23		
10 ² SKB Laxemar / KLX05 146.10-166.10 / CHi	FlowDim Version 2.14b (c) Golder Associates	7.	dt_2 (min) =	21.23	dt_2 (min) =	9.58		
		ľ	$T (m^2/s) =$	2.9E-06	$T (m^2/s) =$	5.1E-06		
		10 °	S (-) =	1.0E-06	' '	1.0E-06		
10 1			$K_s (m/s) =$		$K_s (m/s) =$	2.6E-07		
		0.3	$S_s(1/m) =$		$S_s(1/m) =$	5.0E-08		
in the control of the		[win]	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	1.0E-10		
<u> </u>		144, (149	$C_D(-) =$	NA	$C_D(-) =$	1.1E-02		
10 °.		0.03		6.98		20.67		
			ξ (-) =	0.90	ς (-) –	20.07		
		10 -2	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$			
10 ¹⁰ 10 ¹¹	10 12 10 13 10	ia'	$S_{GRF}(-) =$		$S_{GRF}(-) =$			
			D _{GRF} (-) =	1	D _{GRF} (-) =	+		
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative param				
3 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	7,1		$dt_1 \text{ (min)} =$	0.23		1.0E-10		
Elapsed time [h]	10 -2 10 -1		$dt_2 \text{ (min)} =$		$C_D(-) =$	1.1E-02		
10 ² SKB Laxemar / KLX05 146.10-166.10 / CHir	FlowDim Version 2.14b (c) Golder Associates		$T_T (m^2/s) =$	5.1E-06		20.67		
		300	S (-) =	1.0E-06		20.07		
			$K_s (m/s) =$	2.6E-07				
10 1		10 *	$S_s(11/s) = S_s(1/m) = S_s(1/m)$	5.0E-08				
		30		5.UE-06				
		-p07 [kPa]	Comments:		25 1E 6 - 24	4		
: \:		10 1 8	The recommended analysis of the CHi					
10	· · · · · · · · · · · · · · · · · · ·		quality. The confid					
	المستعمر مراد	3	estimated to be 1.0					
		10 °	during the test is 2.					
 	,				ing straight line ex			
10 ¹ 10 ²	10 ³ 10 ⁴ 10 ⁵		Horner plot to a va			inapolation in the		

		mmary Sheet				
Project:	Oskarshamn site investigat	tion Test type:[1]			CHi	
Area:	Laxer	nar Test no:				
Borehole ID:	KL>	K05 Test start:		050611 08:54		
Test section from - to (m):	166.12-186.12	2 m Responsible for	1		Stephan Roh	
, ,		test execution:			·	
Section diameter, 2·r _w (m):	0.0	076 Responsible for test evaluation:		Cri	stian Enachesc	
Linear plot Q and p		Flow period		Recovery perio	od	
1900	0.10	Indata		Indata		
KLX05_166.12-186.12_050611_1_CHir_Q_r		$p_0 (kPa) =$	1669			
	●P section ▲P above	p _i (kPa) =	1669			
1800	•Q	$p_p(kPa) =$	1866	p _F (kPa) =	167	
1750 -		$Q_p (m^3/s) =$	4.50E-07			
7700 P. 1700	- 0.06	tp (s) =		t_F (s) =	120	
S 1650 .	*	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0	
1600 .	0.04	$EC_w (mS/m) =$				
1550 -		Temp _w (gr C)=	9.6			
1500	- 0.02	Derivative fact.=	0.04	Derivative fact.=	= 0.0	
1450						
1400	1.00 1.20 1.40 1.80	Results		Results		
Elapsed 1	ime [h]	Q/s $(m^2/s)=$	2.2E-08		1	
og-Log plot incl. derivates- flo	w period	$T_{\rm M} ({\rm m}^2/{\rm s}) =$	2.3E-08			
	-	Flow regime:	transient	Flow regime:	transient	
Elapsed time [h]	2 4 0	dt_1 (min) =	0.15	dt_1 (min) =	7.2	
10 10 10 10 10 10 10 10 10 10 10 10 10 1	FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	1.12	dt_2 (min) =	16.9	
	(-)	$T (m^2/s) =$	2.7E-08	$T (m^2/s) =$	2.6E-0	
	10 ²	_ ` _ ′	1.0E-06	S (-) =	1.0E-0	
10 1		$K_s (m/s) =$	1.4E-09	$K_s (m/s) =$	1.3E-0	
3 0 40 40 40 40 40	30	$S_s (1/m) =$	5.0E-08	$S_s(1/m) =$	5.0E-0	
:	10 1	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	5.2E-1	
10 0	· · · · · · · · · · · · · · · · · · ·	C _D (-) =	NA	$C_D(-) =$	5.7E-0	
	3	ξ (-) =	1.05	ξ (-) =	4.0	
	10°					
10 ² 10 ³	10 4 10 5 10 6	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
tD		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		D_{GRF} (-) =		D_{GRF} (-) =		
Log-Log plot incl. derivatives- r	ecovery period	Selected repres	· · · · · ·			
		$dt_1 (min) =$		$C (m^3/Pa) =$	5.2E-1	
10 -4 10 -3 10 -2 Elapsed time [h] 10 -2 SKB Laxemar / KLX05 166.12 / CHir	10 ⁻¹ 10 ⁰	$dt_2 (min) =$		$C_D(-) =$	5.7E-0	
100.12-100.12 / G/III	FlowDim Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	2.7E-08		1.0	
		S (-) =	1.0E-06			
10 1	300	K_s (m/s) =	1.4E-09			
To the second	- 10 ²	$S_s(1/m) =$	5.0E-08			
A Commission of the Commission		Comments:				
	30	The recommended				
10 *	10 1	analysis of the CH stabilization. The				
	10 1	estimated to be 1.0				
1/2	3	during the test is 2	. The static press	ure measured at tr	ansducer depth,	
10 ° 10 ° BD/CD	10 2 10 5 10 4	was derived from			xtrapolation in th	
tuicu		Horner plot to a va	.1	_		

	Test S	Sumn	nary Sheet			
Project:	Oskarshamn site investi	gation	Test type:[1]			CHi
Area:	Lax	xemar	Test no:			1
Borehole ID:	<u> </u>	KLX05	Test start:	1		050611 11:14
Test section from - to (m):	181.13-201	I.13 m	Responsible for			Stephan Rohs
			test execution:			•
Section diameter, 2·r _w (m):		0.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p			Flow period		Recovery period	
			Indata		Indata	
2100	KLX05_181.13-201.13_050611_1_CHir_Q_r	1.0	p ₀ (kPa) =	1801		
-		- 0.9	p _i (kPa) =	1801		
2000	●P section	0.8	$p_p(kPa) =$	2001	p _F (kPa) =	180
	▲ P above ■ P below	0.7	$Q_p (m^3/s) =$	8.83E-06		
₹ 1900.	•q	0.8 =	tp (s) =		t _F (s) =	240
Cd 1000.		Rate [l/min]	S el S [*] (-)=		S el S [*] (-)=	1.00E-0
ahode P		jection	EC _w (mS/m)=	1.00L-00	S el S (-)-	1.00L-0
S 1800		0.4 5	Temp _w (gr C)=	9.8		
	_	0.3	Derivative fact.=		Derivative fact.=	0.0
1760 .		0.2	Derivative lact	0.04	Derivative fact.=	0.0
	_	0.1				
1600 0.00 0.20 0.40 0.60 0.60 Figure	1.50 1.20 1.40 1.80 1.80 seed Time [h]	2.00	Results		Results	
Loop	and time by		Q/s $(m^2/s)=$	4.3E-07		
Log-Log plot incl. derivates- f	low period		$T_{\rm M} (m^2/s) =$	4.5E-07		
			Flow regime:	transient	Flow regime:	transient
Elapsed time (h	n]		dt_1 (min) =	2.14	dt ₁ (min) =	0.4
10 2 SKB Laxemar / KLX05 181.13.201.13 / CHI	10, 2 10, 1	7	$dt_2 (min) =$	4.28	dt_2 (min) =	1.0
	(c) Golder Associates	10 1	$T (m^2/s) =$	I .	$T (m^2/s) =$	3.1E-0
			S (-) =	1.0E-06	` '	1.0E-0
10 17		3	$K_s (m/s) =$		K_s (m/s) =	1.6E-0
0 0 0 0 0 0 000000	14 to 20 to 100	7	S _s (1/m) =		$S_s(1/m) =$	5.0E-0
(1)	:	10 "	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	2.4E-1
Tribu	•	14, (14)	<u> </u>	NA	- ' '	2.6E-0
10 °.	a a sa a	0.3	C _D (-) =		C _D (-) =	-1.6
		10 -1	ξ (-) =	0.69	ξ(-) =	-1.0
		0.03	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ³ 10 ⁴ tD	10 5 10 6 10	. 7 ⁷	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative param		
5 5,	• r · · · ·		dt ₁ (min) =	0.46		2.4E-10
Elapsed time (pj		dt_2 (min) =		$C_D(-) =$	2.6E-0
10, 4 10, 3	10, 1 10, 0 FlowDim Version 2.14b (c) Golder Associates	1	- ' '	3.1E-07		-1.63
_		300	$T_T (m^2/s) =$ $S (-) =$	1.0E-06		-1.0
1,000 Marketine		10 2	$K_s (m/s) =$	1.6E-08		
10 °			$S_s(1/m) =$	5.0E-08		
	and the same of th	30		5.UE-U6		
	- Walter Commence	[edy]	Comments:			
g.		10, 84			f 3.1E-7 m2/s was de	
		ž]			mai which chawc th	e nest data and
10-4		3	analysis of the CHi			
10-1		3	derivative quality.	The confidence r	ange for the interval	l transmissivity
10.1	· .	3 3	derivative quality. 'is estimated to be 9	The confidence r .0E-8 to 6.0E-7	range for the interval m2/s. The flow dime	l transmissivity ension
10 4	•• ••	3	derivative quality. is estimated to be 9 displayed during the	The confidence r .0E-8 to 6.0E-7 e test is 2. The s	ange for the interval	l transmissivity ension red at

Columbia		Test Sum	mary Sheet			
Borehole D:	Project:					CHi
Test section from - to (m): 191.14-211.14 n Responsible for test execution: 0.078 Responsible for test evaluation: Linear plot Q and p Recovery period Recovery period	Area:	Laxema	r Test no:			1
Test section from - to (m): 191.14-211.14 n Responsible for test execution: 0.078 Responsible for test evaluation: Linear plot Q and p Recovery period Recovery period	Doroholo ID:	VI VOI	Took otomb			050644 42:20
test execution: Cristian Enaches Cristian Ena	Borenoie ID:	KLXU	o rest start:			050611 13:38
Cristian Enaches Cristian En	Test section from - to (m):	191.14-211.14 m	· ·			Stephan Rohs
Flow period	Section diameter, 2·r _w (m):	0.076	Responsible for		Cris	tian Enachescu
India						
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Linear plot Q and p		•			d
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2150	KLX05 191.14-211.14 050611 1 CHir Q r		1900	indata	1
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	-					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	2050 .	●P section			n (kPa) =	101
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					ρ _F (KFa) =	1914
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Ē 1980.				t (s) -	120
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Z	te pinnin;				
Temp _w (gr C)= 0.99 Derivative fact.= 0.07	P e e Pe	D T S S S S S S S S S S S S S S S S S S		1.00E-00	S el S (-)=	1.00E-0
Derivative fact.= 0.07 Derivative fact.= 0	8 1890 ·	. \		0.0		
Results Objectively a service of the period of the perio					Derivative fact =	0.0
$ \begin{array}{c} \text{Cog-Log plot incl. derivates-flow period} \\ \text{Cog-Log plot incl. derivates-flow period} \\ \text{Tog}_{\text{Minimary}}(n^2/s) = 5.9E-07 \\ \text{Flow regime: transient} \\ \text{Flow regime: transient} \\ \text{Flow regime: transient} \\ \text{Hinimary}(n) = 2.15 \text{ dut}_{1}(\text{min}) = 6. \\ \text{Minimary}(n) = 7.32 \text{ dut}_{2}(\text{min}) = 18. \\ \text{Tog}_{\text{Color}}(n) = 2.0E-07 \text{ Tog}_{\text{Color}}(n^2/s) = 2.4E-0 \\ \text{S}_{\text{C}}(-) = 1.0E-08 \text{ S}_{\text{C}}(-) = 1.0E-08 \\ \text{S}_{\text{C}}(1/m) = 5.0E-08 \\ \text{S}_{\text{S}}(1/m) = 5.0E-08 \\ \text{S}_{\text{S}}(1/m) = 5.0E-08 \\ \text{S}_{\text{C}}(-) = 1.0E-08 \\ \text{Co}_{\text{C}}(-) = 1.0E-08 \\ \text{C}_{\text{C}}(-) = 1.0E-08$	1750 -	0.5	Derivative fact.	0.07	Derivative fact	0.0
$ \begin{array}{c} \text{Cog-Log plot incl. derivates-flow period} \\ \text{Cog-Log plot incl. derivates-flow period} \\ \text{Tog}_{\text{Minimary}}(n^2/s) = 5.9E-07 \\ \text{Flow regime: transient} \\ \text{Flow regime: transient} \\ \text{Flow regime: transient} \\ \text{Hinimary}(n) = 2.15 \text{ dut}_{1}(\text{min}) = 6. \\ \text{Minimary}(n) = 7.32 \text{ dut}_{2}(\text{min}) = 18. \\ \text{Tog}_{\text{Color}}(n) = 2.0E-07 \text{ Tog}_{\text{Color}}(n^2/s) = 2.4E-0 \\ \text{S}_{\text{C}}(-) = 1.0E-08 \text{ S}_{\text{C}}(-) = 1.0E-08 \\ \text{S}_{\text{C}}(1/m) = 5.0E-08 \\ \text{S}_{\text{S}}(1/m) = 5.0E-08 \\ \text{S}_{\text{S}}(1/m) = 5.0E-08 \\ \text{S}_{\text{C}}(-) = 1.0E-08 \\ \text{Co}_{\text{C}}(-) = 1.0E-08 \\ \text{C}_{\text{C}}(-) = 1.0E-08$		•				
T _M (m²/s)= 5.9E-07 Flow regime: transient that (min) = 2.15 dt, (min) = 6.0 dt_2 (min) = 7.32 dt_2 (min) = 18. T (m²/s) = 1.0E-08 S (·) = 1					Results	
Flow regime: transient flow regime: transient dt, (min) = 2.15 dt, (min) = 6. dt_2 (min) = 7.32 dt_2 (min) = 18. T (m²/s) = 2.0E-07 T (m²/s) = 2.4E-05 (m³/pa) = 1.2E-05 (m³/pa) = 1.2E-05 (m³/pa) = 3.8E-05 (m³/						
$\frac{dt_1 (\text{min})}{dt_2 (\text{min})} = \frac{2.15}{3.2} \frac{dt_1 (\text{min})}{dt_2 (\text{min})} = \frac{18.1}{10.0000} \frac{dt_2 (\text{min})}{dt_2 (\text{min})} = \frac{18.1}{10.0000} \frac{dt_2 (\text{min})}{dt_2 (\text{min})} = \frac{18.1}{10.00000} \frac{dt_2 (\text{min})}{dt_2 (\text{min})} = \frac{18.1}{10.000000000000000000000000000000000$	Log-Log plot incl. derivates- flo	w period		5.9E-07		
$\frac{1}{100} = \frac{1}{100} = \frac{1}$			_		_	
	10, 3 10, 2 Elapsed time (h)	10, ⁻¹ 10, ⁰ 10, ¹				6.3
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	10 SKB Laxemar / KLX05 191.14-211.14 / CHi	FlowDim Version 2.14b (c) Golder Associates			- ' '	18.2
$K_{S} (m/S) = 1.0E-08 K_{S} (m/S) = 1.2E-08 K_{S} (m/S) = 1.2E-0$		3	` '		` '	
$S_{s}\left(1/m\right) = 5.0E-08 \ S_{s}\left(1/m\right) = 5.0E$		10 °				
	10°					1.2E-0
		0.3			• ,	5.0E-0
$\xi\left(\cdot\right) = \frac{-4.30}{5} \left\{\frac{1}{5} \left(-\right) = \frac{-3.1}{5}	·	10-1				
T _{GRF} (m ² /s) = $\frac{1}{S_{GRF}(-)} = \frac{1}{S_{GRF}(-)} = \frac{1}{S_{GRF}($	10-1					
		0.03	ξ (-) =	-4.30	ξ (-) =	-3.6
SGRF(-) = $D_{GRF}(-)$ = $D_{GRF}(-$		10 -2	$T_{}(m^2/s) =$		$T_{}(m^2/s) =$	+
Log-Log plot incl. derivatives- recovery period Selected representative parameters. $ \frac{dt_1 \text{ (min)}}{dt_2 \text{ (min)}} = \frac{6.35}{18.27} \frac{\text{C}_{\text{CD}}(-)}{\text{C}_{\text{D}}(-)} = \frac{3.8\text{E-}}{4.2\text{E-}} \frac{1}{10.2\text{E-}} \frac{1}{10$	10 -1 10 ° HD	10 1 10 2 10 3				
Selected representative parameters. $dt_1 \text{ (min)} = 6.35 \text{ C (m}^3/\text{Pa)} = 3.8\text{E-}$ $dt_2 \text{ (min)} = 18.27 \text{ Cp (-)} = 4.2\text{E-}$ $T_T \text{ (m}^2/\text{s)} = 2.4\text{E-}07 \xi \text{ (-)} = -3.1$ $S_s \text{ (1/m)} = 5.0\text{E-}08$ $S_s \text{ (1/m)} = 5.0\text{E-}$						
$dt_1 \text{ (min)} = 6.35 \text{ C (m}^3/\text{Pa)} = 3.8\text{E-}$ $dt_2 \text{ (min)} = 18.27 \text{ C}_D \text{ (-)} = 4.2\text{E-}$ $T_T \text{ (m}^2/\text{s)} = 2.4\text{E-}07 \text{ § (-)} = -3.1$ $S_S \text{ (1/m)} = 5.0\text{E-}08$ $S_S \text{ (1/m)} = 5.0\text{E-}08$ $Comments:$ The recommended transmissivity of 2.4E-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows a clear derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the confidence range from the CHir phase using straight line extrapolation in the confidence range from the CHir phase using straight line extrapolation in the confidence range from the CHir phase using straight line extrapolation in the confidence range from the CHir phase using straight line extrapolation in the confidence range from the CHir phase using straight line extrapolation in the confidence range from the CHir phase using straight line extrapolation in the chiral phase using straight line extrapolation line phase using	Log-Log plot incl. derivatives- r	ecovery period		entative param		<u> </u>
$\frac{10}{10} = \frac{18.27}{10} \frac{\text{CD}}{\text{CD}} = \frac{1.2\text{E-O}}{\text{CD}} =$	3 37 3 3 3 3		-	-		3.8E-10
T _T (m²/s) = $2.4\text{E}-07$ ξ (-) = -3.1 ξ (-) = $-$	Elapsed time [b]	10.4			, ,	4.2E-02
S(-) = 1.0E-06 K_s (m/s) = 1.2E-08 S_s (1/m) = 5.0E-08 Comments: The recommended transmissivity of 2.4E-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows a clear derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in t	10 SKB Laxemer / KLX05 191.14-211.14 / CHir	FlowDim Version 2.14b (c) Golder Associates 300	- ' '			-3.6
K_s (m/s) = 1.2E-08 S_s (1/m) = 5.0E-08 Comments: The recommended transmissivity of 2.4E-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows a clear derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in t						
S_s (1/m) = 5.0E-08 Comments: The recommended transmissivity of 2.4E-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows a clear derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in t	aseses	10 ²				
Comments: The recommended transmissivity of 2.4E-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows a clear derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in t	10°	The state of the s				
The recommended transmissivity of 2.4E-7 m2/s was derived from th analysis of the CHir phase (outer zone), which shows a clear derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in t		-		J.UL 00		1
analysis of the CHir phase (outer zone), which shows a clear derivative stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in t		10 1	3	tranemiecivity of	62 1E 7 m2/c was d	arived from the
stabilization. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in t	10-1	90				
during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in t		3	stabilization. The co	onfidence range	for the interval tran	smissivity is
during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in t		-10 °	estimated to be 9.01	E-8 to 4.0E-7 m ²	2/s. The flow dimen	sion displayed
nomer plot to a value of 1070.7 kg a.	10 ⁰ 10 ¹	10 ² 10 ³ 10 ⁴				napoiation in the
			romer plot to a val	01 10/0./ KI		

	Test Sum	mary Sheet			
Project:	Oskarshamn site investigation	on Test type:[1]			CHir
Area:	Laxem	ar Test no:			1
Borehole ID:	KLX(05 Test start:			050611 15:55
-	0444400444	D 111.6			01 1 5 1
Test section from - to (m):	211.14-231.14	m Responsible for test execution:			Stephan Rohs
Section diameter, 2·r _w (m):	0.07	76 Responsible for		Cris	stian Enachescu
Linear plot Q and p		test evaluation: Flow period		Recovery perio	nd
Emour prot & una p		Indata		Indata	
KLX05_211.14-231.14_050611_1_CHir_Q_r	L	p ₀ (kPa) =	2068		1
2250 -		p _i (kPa) =	2067		
2200 .	●P section ▲P above	$p_p(kPa) =$	2268	p _F (kPa) =	206
2150	-Q	$Q_{p} (m^{3}/s) =$	2.00E-06		
g 2100	- · · · · · · · · · · · · · · · · · · ·	$\frac{Q_p (11175)^2}{tp (s)} =$		t _F (s) =	120
G 2100	. Rate @/win	S el S [*] (-)=		S el S [*] (-)=	1.00E-0
A and	- jection F	EC _w (mS/m)=	1.00L-00	S el S (-)=	1.00L-0
300 2000 .	102 E	Temp _w (gr C)=	10.2		
1950 .	1	Derivative fact.=		Derivative fact.=	0.0
1900 -	-0.1	Delivative fact.=	0.09	Derivative fact	0.0
1850 -	_				+
000 020 0.40 0.60 Elapsed	0.80 1.00 1.20 1.40 Time (h)	Results		Results	
Etapseu	Tame (ii)	Q/s $(m^2/s)=$	9.8E-08		
Log-Log plot incl. derivates- flo	w period	$T_{\rm M} (m^2/s) =$	1.0E-07		
		Flow regime:	transient	Flow regime:	transient
.3 2 Elapsed time (h)	-1 0 1	dt_1 (min) =	11.66	dt_1 (min) =	0.67
10 10 10 10 10 10 10 10 10 10 10 10 10 1	10," 10,"	dt_2 (min) =	19.91	dt_2 (min) =	1.78
O code supported A	FlowDim Version 2.14b (c) Golder Associates	$T (m^2/s) =$	2.3E-07	$T (m^2/s) =$	2.5E-08
	3	S (-) =	1.0E-06	` '	1.0E-06
10 0	:	$K_s (m/s) =$		$K_s (m/s) =$	1.3E-09
	10°	$S_s(1/m) =$		$S_s(1/m) =$	5.0E-08
(chap)		$C_s(1/11)$ $C(m^3/Pa) =$	NA	$C_s(1/111)$ $C(m^3/Pa) =$	1.3E-1
<u>.</u>	. ** : 4	9	NA	, ,	1.4E-02
10 -1	10 -1	-5()		90()	-3.08
	0.03	ξ (-) =	0.40	ξ(-) =	-3.00
	0.03	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ³ 10 ⁴ 10	10 ⁵ 10 ⁶ 10 ⁷	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		D_{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives- i	recovery period	Selected represe	entative naran		
Log Log plot mon derivatives	ecovery period	$dt_1 (min) =$	· ·	C (m ³ /Pa) =	1.3E-10
		$dt_2 \text{ (min)} =$		$C_D(-) =$	1.4E-02
10, 3 10, 2 Elapsed time (h) 10 1 10 1 SKB Laxemar / KLX05	10 0 10 1 FlowDim Version 2.14b				
211.14-231.14 / CHir	(c) Golder Associates 10 ³	$T_T (m^2/s) =$	2.5E-08		-3.08
	300	S (-) =	1.0E-06		
		$K_s (m/s) =$	1.3E-09		
10 °	10 ²	$S_s (1/m) =$	5.0E-08		
10.	30 To 1	The recommended analysis of the CHi derivative. The con estimated to be 9.0 during the test is 2. was derived from the control of the control	r phase (inner zo affidence range fo E-9 to 5.0E-8 m. The static press	one), which shows or the interval trans 2/s. The flow dime ure measured at tra	the best data and missivity is nsion displayed ansducer depth,
. 19 ° 19 ° 10CD	10 ³ 10 ³ 10 ⁴	Horner plot to a va			aupoianon in th

	Test	Sumi	nary Sheet			
Project:	Oskarshamn site inves	tigation	Test type:[1]			CHi
Area:	Li	axemaı	Test no:			1
Borehole ID:	KLX05		Test start:			050611 18:10
Test section from to (m):	226 14 24	IG 14 m	Deepensible for			Ctanhan Daha
Test section from - to (m):	220.14-24	10.14 11	Responsible for test execution:			Stephan Rohs
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p			test evaluation:	Recovery period		
inear plot & and p			Flow period Indata		Indata	
2500	KLX05_226.14-246.14_050611_1_CHir_Q_r	0.5	p ₀ (kPa) =	2200		1
			p _i (kPa) =	2200		
2400	=	- 0.4	$p_p(kPa) =$		p _F (kPa) =	220
• •	●P section ▲P above		$\frac{Q_{p}(M'''a)}{Q_{p}(m^{3}/s)}=$	6.33E-06		220
₹ 200 .	■P below ■Q	103 =	$\frac{Q_p (\Pi / s) -}{tp (s)} =$		t _F (s) =	240
(d. 2000) de onn sea e d. d. de outer (d. 2000)	•	Rate [Vmin]	S el S [*] (-)=		S el S [*] (-)=	1.00E-0
withole P.		njection F	EC _w (mS/m)=	1.00L-00	3 el 3 (-)=	1.00L-0
8 2000		02 =	Temp _w (gr C)=	10.4		
-			Derivative fact.=		Derivative fact.=	0.0
2100 -		0.1	Benvalive lact.	0.02	Berryadive radi.	0.0
<u>-</u>	-					
0.00 0.20 0.40 0.60 0.60 Elaps	1.00 1.20 1.40 1.60 1.8 sed Time [h]	0.0	Results		Results	
***			$Q/s (m^2/s) =$	3.1E-07		
Log-Log plot incl. derivates- f	low period		$T_{\rm M} ({\rm m}^2/{\rm s}) =$	3.2E-07		
			Flow regime:	transient	Flow regime:	transient
Elapsed time (h	J 40 °	40.1	dt_1 (min) =	0.20	dt_1 (min) =	0.60
10 2 SKB Laxemar / KLX05 226.14-246.14 / CHi	FlowDim Version 2. (c) Golder Associate	14b	dt_2 (min) =	14.62	dt_2 (min) =	1.6
		10 1	$T (m^2/s) =$	6.2E-07	$T (m^2/s) =$	1.4E-0
+			S (-) =	1.0E-06	S (-) =	1.0E-0
10 1		3	$K_s (m/s) =$	3.1E-08	$K_s (m/s) =$	7.0E-0
	•	10 °	S _s (1/m) =	5.0E-08	$S_s (1/m) =$	5.0E-0
	<u>*</u>	qf (mint)	$C (m^3/Pa) =$	NA	C (m³/Pa) =	7.3E-1
10 °		0.3	C _D (-) =	NA	C _D (-) =	8.0E-0
*		10 -1	ξ (-) =	5.53	ξ (-) =	20.84
			- , ,			
		0.03	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ⁸ 10 ⁹ tD	10 10 10 11	10 12	S _{GRF} (-) =		S _{GRF} (-) =	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative paran	neters.	
			dt_1 (min) =	0.20	$C (m^3/Pa) =$	7.3E-1
Elapsed time (h] 10, ⁻²	_	dt_2 (min) =	14.62	$C_D(-) =$	8.0E-0
SKB Laxemar / KLX05 226.14-246.14 / CHir	FlowDim Version 2. (c) Golder Associate	es	$T_T (m^2/s) =$	6.2E-07	ξ (-) =	5.5
		300	S (-) =	1.0E-06		
		1	$K_s (m/s) =$	3.1E-08		
<u></u>		10 2	3 (- /			-
10		10 2	$S_s(1/m) =$	5.0E-08		
10		10 ²		5.0E-08		
10	ı.	30 (Real)	S _s (1/m) = Comments:		f 6.2E-7 m2/s was do	erived from the
	a a di sa a sa a sa a sa a sa a sa a sa		S _s (1/m) = Comments: The recommended analysis of the CHi	transmissivity of phase, which sh	f 6.2E-7 m2/s was do	d derivative
10	the state of the s	30 (Real)	S _s (1/m) = Comments: The recommended analysis of the CHi quality. The confidence of the confidence	transmissivity of phase, which sh ence range for th	f 6.2E-7 m2/s was do ows the best data and the interval transmiss	d derivative ivity is
10 0	And the second of the second o	30 (Real)	S _s (1/m) = Comments: The recommended analysis of the CHi quality. The confidestimated to be 1.01	transmissivity of phase, which shence range for the E-7 to 1.0E-6 m ²	f 6.2E-7 m2/s was do ows the best data and the interval transmiss 2/s. The flow dimensi	nd derivative ivity is sion displayed
10 10 10 10 10 10 10 10 10 10 10 10 10 1	10 ² 10 ³	30 (Real)	S _s (1/m) = Comments: The recommended analysis of the CHi quality. The confide estimated to be 1.01 during the test is 2.	transmissivity of phase, which sh ence range for the E-7 to 1.0E-6 m ² . The static press	f 6.2E-7 m2/s was do ows the best data and the interval transmiss	d derivative ivity is sion displayed sducer depth,

	Test 9	Sumi	nary Sheet			
Project:	Oskarshamn site invest					CHi
Area:	Laxemar		Test no:			
Borehole ID:		KLX05	Test start:			050612 08:10
Test section from - to (m):	246.15-26	6.15 m	Responsible for			Stephan Roh
O		0.070	test execution:		Onto	
Section diameter, 2·r _w (m):		0.076	Responsible for test evaluation:		Cris	tian Enachesci
Linear plot Q and p			Flow period		Recovery period	t
2000		10	Indata		Indata	
KLX05_246.15-266.15_050612_1_CHir_Q_r			$p_0 (kPa) =$	2377		
	●P section ▲P above	ľ	p _i (kPa) =	2376		
2500 -	□P below -Q	*	$p_p(kPa) =$	2586	p _F (kPa) =	238
. 1	3	7	$Q_p (m^3/s) =$	6.08E-05		
E 240		e Fe	tp (s) =	1200	t_F (s) =	120
Teg ann mand appu		Rate [Vmln]	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
904F 2200 -	. (Injection	EC _w (mS/m)=		()	
á			Temp _w (gr C)=	10.6		
-	•	3	Derivative fact.=	0.02	Derivative fact.=	0.0
2200 -		2				
2100	-		Deculto		Deculto	
0.00 0.20 0.40 0.00 Elaps -	0.80 1.00 1.20 1.40 sed Time [h]	1.60	Results	2.05.00	Results	1
lan lan olakkoal alaskaataa fi			Q/s (m ² /s)=	2.8E-06		
Log-Log plot incl. derivates- flo	ow period		$T_{\rm M} ({\rm m}^2/{\rm s}) =$	3.0E-06		
			Flow regime:	transient	Flow regime:	transient
Elapsed time (h)	10,0 10,1	_	dt ₁ (min) =		$dt_1 (min) =$	8.6
10 SKB Laxemar / KLX05 246.15-266.15 / CHi	FlowDim Version 2.14b (c) Golder Associates	b	dt_2 (min) =	1	$dt_2 (min) =$	18.2
		0.3	$T (m^2/s) =$		$T (m^2/s) =$	2.2E-0
		10 -1	S (-) =	1.0E-06		1.0E-0
10 0	•		K_s (m/s) =		$K_s (m/s) =$	1.1E-0
-		0.03	S _s (1/m) =		$S_s(1/m) =$	5.0E-0
	. 12	2 chqf (mir	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	2.8E-0
10-1	•	10 \$	C _D (-) =	NA	$C_D(-) =$	3.1E-0
		0.003	ξ (-) =	-3.56	ξ(-) =	-5.1
		10 -3	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	+
10 ¹ 10 ²	10 3 10 4 11	-	$S_{GRF}(III/S) =$		$S_{GRF}(III/S) =$	+
			$D_{GRF}(\cdot)$ =		$D_{GRF}(\cdot) =$	
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative naram		
-og -og plot mon domtatitos	Tooling police		$dt_1 \text{ (min)} =$	8.65		2.8E-0
Elaps of time Act			$dt_2 \text{ (min)} =$		$C_D(-) =$	3.1E-0
10 1 SKB Laxemar / KLX05 246.15-266.15 / Chir	10, ⁻¹ 10, ⁰ 10, ¹ FlowDim Version 2.14b	10.3	$T_T (m^2/s) =$	2.2E-06		-5.1
1	(c) Golder Associates	10	S (-) =	1.0E-06		-0.1
		300	$K_s (m/s) =$	1.1E-07		+
		1				+
10 5		. ,	$S_{a}(1/m) =$	5 (IF-UX	1	
10.5		10 ²	G s (,, , , ,	5.0E-08		
10°	independent of the second	10 ² [e _{chl}] (od-	Comments:			arived from the
	The state of the s	10 ² [e _d] Jodd) odd	Comments: The recommended	transmissivity of	f 2.2E-6 m2/s was d	
10 *	i iii alli j	10 ² [e ₆ 8] Jod d) od d	Comments: The recommended analysis of the CHi derivative. The con	transmissivity of r phase (outer zo fidence range fo	f 2.2E-6 m2/s was d one), which shows the other the interval transn	he best data and nissivity is
10 *	in the state of th	10 ° (e.gel Jodd) 70d d	Comments: The recommended analysis of the CHi derivative. The conestimated to be 9.01	transmissivity of r phase (outer zo fidence range fo E-7 to 4.0E-6 m ²	f 2.2E-6 m2/s was d one), which shows the r the interval transn 2/s. The flow dimen	he best data and hissivity is sion displayed
		(log) (state) (log) (state) (log) (state) (log) (state) (log) (state) (log) (l	Comments: The recommended analysis of the CHi derivative. The con estimated to be 9.01 during the test is 2.	transmissivity of r phase (outer zo fidence range fo E-7 to 4.0E-6 m ² The static pressi	f 2.2E-6 m2/s was d one), which shows the other the interval transn	he best data and hissivity is sion displayed asducer depth,

	Test Sumi	mary Sheet				
Project:	Oskarshamn site investigation	Test type:[1]			Pi	
Area:	Laxema	Test no:			1	
, wea.	Laxoma	T COL TIO.			'	
Borehole ID:	KLX05	Test start:			050612 10:21	
Test section from - to (m):	266.21-286.21 m	Responsible for			Stephan Rohs	
		test execution:			-	
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Q and p		test evaluation: Flow period		Recovery period		
-mour prot & and p		Indata		Indata		
KLX05_266.21-286.21_050612_1_Pi_Q_r	1.0	p ₀ (kPa) =	2557		1	
	● P section ▲ P above	p _i (kPa) =	2565			
2700 -	■P below •Q	$p_p(kPa) =$		p _F (kPa) =	2613	
		$Q_p (m^3/s) =$	NA	PF (5.)		
2 2000 L	-08 <u>E</u>	tp (s) =		t _F (s) =	2700	
[d-] 2000 J	pecton Rate (im.)	S el S [*] (-)=		S el S [*] (-)=	1.00E-06	
	. Injection	EC _w (mS/m)=	1.002 00	3 61 3 (-)-	1.002 0	
80 asoo . ■	8 104 -	Temp _w (gr C)=	10.9			
		Derivative fact.=		Derivative fact.=	0.02	
2400 -	0.2	Derivative last.	1471	Benvative ract.	0.02	
-						
2900 0.00 0.20 0.40 0.60	0.80 1.00 1.20 1.40	Results		Results	<u> </u>	
Elapse	d Time [h]	Q/s $(m^2/s)=$	NA			
Log-Log plot incl. derivates- fl	ow period	$T_{\rm M} (m^2/s) =$	NA			
<u> </u>	· ·	Flow regime:	transient	Flow regime:	transient	
		$dt_1 \text{ (min)} =$	NA	$dt_1 \text{ (min)} =$	18.90	
		$dt_2 \text{ (min)} =$	NA	$dt_2 \text{ (min)} =$	36.60	
		$T (m^2/s) =$	NA	$T (m^2/s) =$	7.6E-11	
		S (-) =	NA	S (-) =	1.0E-06	
		K_s (m/s) =	NA	$K_s (m/s) =$	3.8E-12	
Not At	nalysed	$S_s(1/m) =$	NA	$S_s(1/m) =$	5.0E-08	
1101711	larysea	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	6.9E-1	
		$C_D(-) =$	NA	$C_D(-) =$	7.6E-03	
		ξ(-) =	NA	ξ(-) =	-2.43	
		5()		5()		
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		D _{GRF} (-) =		D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param			
5 - 5 p	- , p	$dt_1 \text{ (min)} =$	18.90		6.9E-11	
Elapsed time (t) 	$dt_2 \text{ (min)} =$		$C_D(-) =$	7.6E-03	
10 ° 10 10 10 10 10 10 10 10 10 10 10 10 10	10, 10, 10, 2	$T_T (m^2/s) =$	7.6E-11		-2.43	
	FlowDim Version 2.14b (c) Golder Associates	S (-) =	1.0E-06			
	0.3	$K_s (m/s) =$	3.8E-12		1	
10.1	r4	S _s (1/m) =	5.0E-08		 	
, altered to the second	10	Comments:	1 30	1	1	
:	0.03		transmissivity of	f 7.6E-11 m2/s was	derived from the	
10 2	Decord			g the inherent uncer		
	10 -2	to the measuremen	t (e.g. specially t	he measurement of	the wellbore	
				vsis process, the cor		
	0.003			be 2E-11 to 2E-10 is 2. No static press		
10 -2 10 -1 tD	10 0 10 1 10 2	derived.	a uning the test	15 2. INO STATIC PRESS	oure could be	

	Test Sumn	nary Sheet	1			
Project:	Oskarshamn site investigation	Test type:[1]			CHii	
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX05	Test start:			050612 12:29	
Test section from - to (m):	286.28-306.28 m				Stephan Rohs	
Section diameter, 2·r _w (m):	0.076	test execution: Responsible for		Criet	ian Enachescı	
dection diameter, 2 1 _w (m).	0.070	test evaluation:		Onst	Trodair Eriadirood	
Linear plot Q and p		Flow period		Recovery period		
3000 1	0.10	Indata		Indata		
KLX05_286.28-306.28_050612_1_CHir_Q_r		p ₀ (kPa) =	2735			
	●P section	p _i (kPa) =	2736			
2000 -	▲P above - o.se	$p_p(kPa) =$	2941	p _F (kPa) =	274	
i i	- Q -0.07	$Q_{p} (m^{3}/s) =$	5.00E-07			
<u>E</u> 2800 -	10.06 E	tp (s) =	1200	t _F (s) =	120	
d d ano	Rate [Vn	S el S* (-)=	1.00E-06	S el S [*] (-)=	1.00E-0	
elontum anno		$EC_w (mS/m) =$		0 0. 0 ()		
ă - · · · ·	204 =	Temp _w (gr C)=	11.1		1	
	0.03	Derivative fact.=		Derivative fact.=	0.0	
2600 -	0.62	20	0.00	201114411014041	0.0	
240	0.01					
0.00 0.20 0.40 0.60 Elapsed Tin	3.80 1.00 1.20 1.40 1.6 [h]	Results		Results		
		Q/s $(m^2/s)=$	2.4E-08			
Log-Log plot incl. derivates- flov	<i>i</i> period	$T_M (m^2/s) =$	2.5E-08			
		Flow regime:	transient	Flow regime:	transient	
Elapsed time (h)	10,2 10,1	dt_1 (min) =		dt_1 (min) =	8.9	
SKB Laxemar / KLX05 286.28-306.28 / CHi	FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	8.75	dt_2 (min) =	17.0	
	30	$T (m^2/s) =$	2.0E-08	$T (m^2/s) =$	2.9E-0	
· · · · · · · · · · · · · · · · · · ·		S (-) =	1.0E-06	S (-) =	1.0E-0	
10 °	10 '	$K_s (m/s) =$	1.0E-09	$K_s (m/s) =$	1.5E-0	
	3	$S_s (1/m) =$	5.0E-08	$S_s (1/m) =$	5.0E-0	
	Total forms	$C (m^3/Pa) =$	NA	C (m³/Pa) =	7.9E-1	
10 -1 .	10 0 2	C _D (-) =	NA	C _D (-) =	8.7E-0	
		ξ (-) =	-0.78	ξ(-) =	0.0	
	0.3					
	10 ² 10 ³ 10 ⁴	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
10 ° 10 ¹ tD	10 ² 10 ³ 10 ⁴	$S_{GRF}(-) =$		S _{GRF} (-) =		
		D _{GRF} (-) =		D _{GRF} (-) =		
Log-Log plot incl. derivatives- re	covery period	Selected represe	ntative param	neters.		
		$dt_1 (min) =$	-	C (m ³ /Pa) =	7.9E-1	
Elapsed time (h)	1 40 0 1	$dt_2 (min) =$		$C_D(-) =$	8.7E-0	
10 2 SKB Laxemar / KLX05 286 28-306 28 / CHir	FlowDim Version 2.14b (c) Golder Associates 3000	$T_T (m^2/s) =$	2.0E-08		-0.78	
	†	S (-) =	1.0E-06			
+	10 3	K_s (m/s) =	1.0E-09			
10 1		S _s (1/m) =	5.0E-08			
	300	Comments:	0.02 00			
10 8	10 / India cold	The recommended to analysis of the CHi derivative stabilizat transmissivity is est	phase (outer zonion. The confide imated to be 9.0	ence range for the in	e clearest terval The flow	
10 ³ 10 ³ soco	10 2 10 3 10	at transducer depth,	was derived fro	om the CHir phase us value of 2733.6 kP	sing straight lin	

	Test S	Sumn	nary Sheet			
Project:	Oskarshamn site investi	igation	Test type:[1]			CHi
Area:	La	xemar	Test no:			
Borehole ID:	ĺ	KLX05	Test start:			050612 14:39
Test section from - to (m):	306.37-320	6.37 m	Responsible for			Stephan Roh
			test execution:			
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachesc
Linear plot Q and p			test evaluation: Flow period		Recovery period	
			Indata		Indata	
KLX05_306.37-326.37_050612_1_CHir_Q_r		0.010	p ₀ (kPa) =	2915		
	● P section		p _i (kPa) =	2926		
3100 -	■P below ■Q	0.008	$p_p(kPa) =$	3131	p _F (kPa) =	295
			$Q_p (m^3/s) =$	5.00E-08	FF (- /	
₹ 300 ·		-0.006 E	tp (s) =		t _F (s) =	120
on search		Rate [Vmin]	S el S [*] (-)=		S el S* (-)=	1.00E-0
Fe 2000	-5.	Injection	EC _w (mS/m)=		0 0 0 ()	
ă	23.		Temp _w (gr C)=	11.4		
•	أننو		Derivative fact.=	0.14	Derivative fact.=	0.0
2800 -		0.002				
2700		0.000	Results		Results	
0.00 0.20 0.40 0.80 0.80 Elapsed	1.00 1.20 1.40 1.60 d Time [h]	1.80		2.4E-09	Results	
og-Log plot incl. derivates- flo	ow poriod		Q/s $(m^2/s)=$	2.4E-09 2.5E-09		
Log-Log plot filet. derivates- file	Jw periou		T _M (m ² /s)= Flow regime:	transient	Flow regime:	transient
			dt ₁ (min) =		dt ₁ (min) =	NA
Elapsed time (h)	10,-1	ì	$dt_1 (min) =$ $dt_2 (min) =$		$dt_1 (min) =$ $dt_2 (min) =$	NA
10 SKB Laxemar / KLX05 306.37-326.37 / CHI	FlowDim Version 2.14b (c) Golder Associates	3000	3		3	2.2E-0
	<u>.</u>		$T (m^2/s) = $ $S (-) = $	1.0E-06	` '	1.0E-0
, (i		10 3	$K_s (m/s) =$		$K_s (m/s) =$	1.1E-1
	A STATE OF THE STA	300	$S_s(1/m) =$		$S_s (1/m) =$	5.0E-0
و المالية الما		(mint)	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	5.0E-0
		10° (1/d),	$C_D(-) =$	NA	$C_D(-) =$	5.5E-0
10 "	,		ξ(-) =	0.43		0.3
	· . · ·	30	ζ(-) –	0.40	ζ(-) –	0.0
	·	10 1	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ¹ 10 ²	10 ³ 10 ⁴ 10 ⁵	7	$S_{GRF}(m/s) = S_{GRF}(-) =$		$S_{GRF}(m/s) =$ $S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		Selected represe	I entative naram		
-og 10g plot mon domainte	Toda Tariy pariou		$dt_1 (min) =$	NA	C (m ³ /Pa) =	5.0E-1
			dt_1 (min) =	NA	$C_D(-) =$	5.5E-0
10 2 SKB Laxemar / KLX05 306.37-326.37 / CHir	10 1 FlowDim Version 2.14b	}	$T_T (m^2/s) =$	2.2E-09		0.3
306.37-326.37 / CHIr	(c) Golder Associates	3000	S (-) =	1.0E-06		0.0
		10 3	$K_s (m/s) =$	1.1E-10		
			S _s (1/m) =	5.0E-08		
10]		300	Comments:	0.02 00		
10			Comments.			
10		10°2 (kg	The recommended	ranemiceivity	2) 2E_0 m2/a maa 4	arived from the
		01 pp0, (pp0) [IPa]			2.2E-9 m2/s was denows the best data a	
10 September 19 Se		(Real) (Jodd) rodd	analysis of the CHir quality. The confide	phase, which sl ence range for th	nows the best data as	nd derivative ivity is
10°		(R _c Ar) (yold (R _c Ar)	analysis of the CHinquality. The confidence estimated to be 9.01	r phase, which shence range for the E-10 to 4.0E-9 m	nows the best data and e interval transmission 12/s. The flow dimensional transmission 12/s.	nd derivative ivity is nsion displayed
10 The state of th		(e ₂)) (pdd) rodd 10 ² 30	analysis of the CHin quality. The confide estimated to be 9.0I during the test is 2.	r phase, which slence range for the E-10 to 4.0E-9 m The static pressu	nows the best data as	nd derivative ivity is nsion displayed sducer depth,

	Test S	Sumr	nary Sheet			
Project:	Oskarshamn site investi					Р
Area:	La	vemar	Test no:			
Alca.	La	ixemai	restrio.			
Borehole ID:	ŀ	KLX05	Test start:			050612 17:00
Test section from - to (m):	326.38-346	6.38 m	Responsible for test execution:			Stephan Roh
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	tian Enachesci
Linear plot Q and p			test evaluation: Flow period		Recovery period	1
Lillear plot & allu p			Indata		Indata	<i>A</i>
KLX05_326.38-346.38_050612_1_Pi_Q_r		10	p ₀ (kPa) =	3092		1
3300 -			p _i (kPa) =	NA		
3250 -	AD conting	*	$p_p(kPa) =$	NA	p _F (kPa) =	NA
3200 -	▲P above	7	$Q_p (m^3/s) =$	NA	PF (&)	1111
G 3150 - Q	- q	* E	tp(s) =		t _F (s) =	
g 3150 .		Rate [Vm]	S el S [*] (-)=		S el S* (-)=	1.00E-0
9 3100		Injection Rate [Vmln]	EC _w (mS/m)=	2.302 00	5 5, 5 (-)-	1.002 0
3090 -	•	[-	Temp _w (gr C)=	11.7	7	†
		3	Derivative fact.=	NA	Derivative fact.=	NA
3000 -		2				
2060 -		1				
2000 0.20 0.40	0.60 0.80 1.00		Results		Results	
Elapsed Time (h)			$Q/s (m^2/s)=$	NA		
Log-Log plot incl. derivates- flo	ow period		$T_M (m^2/s) =$	NA		
3 37 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			Flow regime:	transient	Flow regime:	transient
			$dt_1 \text{ (min)} =$	NA	$dt_1 \text{ (min)} =$	NA
			$dt_2 \text{ (min)} =$	NA	dt_2 (min) =	NA
			$T (m^2/s) =$	NA	$T (m^2/s) =$	NA
			S (-) =	NA	S (-) =	NA
			K_s (m/s) =	NA	K_s (m/s) =	NA
Not At	nalysed		$S_s (1/m) =$	NA	$S_s (1/m) =$	NA
1,0011	141 / 50 4		$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	NA
			$C_D(-) =$	NA	$C_D(-)$ =	NA
			ξ (-) =	NA	ξ (-) =	NA
			-			
			$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
			$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative paran	neters.	
			dt_1 (min) =	NA	$C (m^3/Pa) =$	NA
			dt_2 (min) =	NA	C _D (-) =	NA
			$T_T (m^2/s) =$	NA	ξ (-) =	NA
			S (-) =	NA		
			$K_s (m/s) =$	NA		
Not Ar	nalysed		$S_s (1/m) =$	NA		
			Comments:			
			Based on the test re 11 m2/s.	esponse the inter	val transmissivity is	lower than 1E-

	Test S	umn	nary Sheet				
Project:	Oskarshamn site investi					CHi	
Area:	Lay	vemar	Test no:				
Alea.	La	ACIII ai	restrio.				
Borehole ID:	k	KLX05	Test start:		050612 18:		
Test section from - to (m):	341 40-361	40 m	Responsible for			Stephan Roh	
rest section from - to (iii).	041.40-001	.40 111	test execution:			Otephan Ron	
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachesc	
Linear plot Q and p			test evaluation: Flow period		Recovery period		
Emedi piot & and p			Indata		Indata		
KLX05_341.40-361.40_050612_1_CHir_Q_r		10	p ₀ (kPa) =	3226			
	● P section ▲ P above ■ P below	9	p _i (kPa) =	NA			
3300 -	-Q	*	$p_p(kPa) =$	NA	p _F (kPa) =	NA	
		7	$Q_p (m^3/s) =$	NA			
MPaj		. 5	tp (s) =		t _F (s) =		
Cryst ourses so	••••••••••••••••••••••••••••••••••••••	injection Rate [l/min]	S el S [*] (-)=		S el S* (-)=	1.00E-0	
Downhole F		Injection	EC _w (mS/m)=		- 0. 0 ()		
ă	•		Temp _w (gr C)=	11.9			
3100 .		3	Derivative fact.=		Derivative fact.=	NA	
		2					
		1					
	.80 0.80 1.00	1 20	Results		Results		
Elapsed	Time [h]		$Q/s (m^2/s)=$	NA			
Log-Log plot incl. derivates- flo	w period		$T_M (m^2/s) =$	NA			
			Flow regime:	transient	Flow regime:	transient	
			$dt_1 (min) =$	NA	$dt_1 \text{ (min)} =$	NA	
			dt_2 (min) =	NA	dt_2 (min) =	NA	
			$T (m^2/s) =$	NA	$T (m^2/s) =$	NA	
			S (-) =	NA	S (-) =	NA	
			$K_s (m/s) =$	NA	$K_s (m/s) =$	NA	
Not An	alvsed		$S_s (1/m) =$	NA	$S_s (1/m) =$	NA	
	,		C (m³/Pa) =	NA	$C (m^3/Pa) =$	NA	
			$C_D(-) =$	NA	$C_D(-) =$	NA	
			ξ (-) =	NA	ξ (-) =	NA	
			$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
			$S_{GRF}(-) =$		$S_{GRF}(-) =$		
			D_{GRF} (-) =		D_{GRF} (-) =		
Log-Log plot incl. derivatives- r	ecovery period		Selected represe	<u> </u>			
			dt_1 (min) =	NA	$C (m^3/Pa) =$	NA	
			dt_2 (min) =	NA	$C_D(-) =$	NA	
			$T_T (m^2/s) =$	NA	ξ (-) =	NA	
			S (-) =	NA			
			K_s (m/s) =	NA			
Not An	alysed		$S_s (1/m) =$	NA			
			Comments:				
			Based on the test re transmissivity is lo		ed packer compliand m2/s.	ce) uie interval	

	Test S	umn	nary Sheet			
Project:	Oskarshamn site investi	gation	Test type:[1]			CHi
Area:	Lax	kemar	Test no:			
Borehole ID:	k	KLX05	Test start:			050613 07:20
Test section from - to (m):	356.42-376	.42 m	Responsible for			Stephan Roh
			test execution:			-
Section diameter, 2·r _w (m):		0.076	Responsible for test evaluation:		Crist	ian Enachesc
Linear plot Q and p			Flow period		Recovery period	
3900		10	Indata		Indata	
KLX05_356.42-376.42_050613_1_CHir_Q_r	•		p ₀ (kPa) =	3356		
	نسز	ľ	p _i (kPa) =	NA		
3400		*	$p_p(kPa) =$	NA	p _F (kPa) =	NA
		7	$Q_p (m^3/s) =$	NA		
sure [kP a]	1)/min]	tp (s) =		t_F (s) =	
2000 -	●P section ▲P above	Injection Rate [[/min]	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
Downhol	■P below •Q	Defu	EC _w (mS/m)=			
		3	Temp _w (gr C)=	12.1		
3200 -		2	Derivative fact.=	NA	Derivative fact.=	NA
*************],				
		[
	1.80 0.80 1.00 I Time [h]	120	Results		Results	
			$Q/s (m^2/s) =$	NA		
Log-Log plot incl. derivates- flo	ow period		$T_M (m^2/s) =$	NA		
			Flow regime:	transient	Flow regime:	transient
			$dt_1 (min) =$	NA	$dt_1 (min) =$	NA
			$dt_2 (min) =$	NA	$dt_2 (min) =$	NA
			$T (m^2/s) =$	NA	$T (m^2/s) =$	NA
			S (-) =	NA	S (-) =	NA
			$K_s (m/s) =$	NA	$K_s (m/s) =$	NA
Not An	alysed		$S_s (1/m) =$	NA	$S_s (1/m) =$	NA
			$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	NA
			$C_D(-) =$	NA	$C_D(-) =$	NA
			ξ (-) =	NA	ξ (-) =	NA
					2	
			$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
			$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		Selected represe		_	INIA
			$dt_1 (min) =$	NA NA	$C (m^3/Pa) = C_D (-) =$	NA
			$dt_2 (min) =$		9 D ()	NA
			$T_T (m^2/s) =$	NA NA	ξ (-) =	NA
			S (-) =	NA NA		
NIat A.	alward		$K_s (m/s) = S_s (1/m) =$	NA NA		
Not An	aiyseu		S _s (1/m) = Comments:	IVA		
					ed packer complian n2/s.	ce) the interval

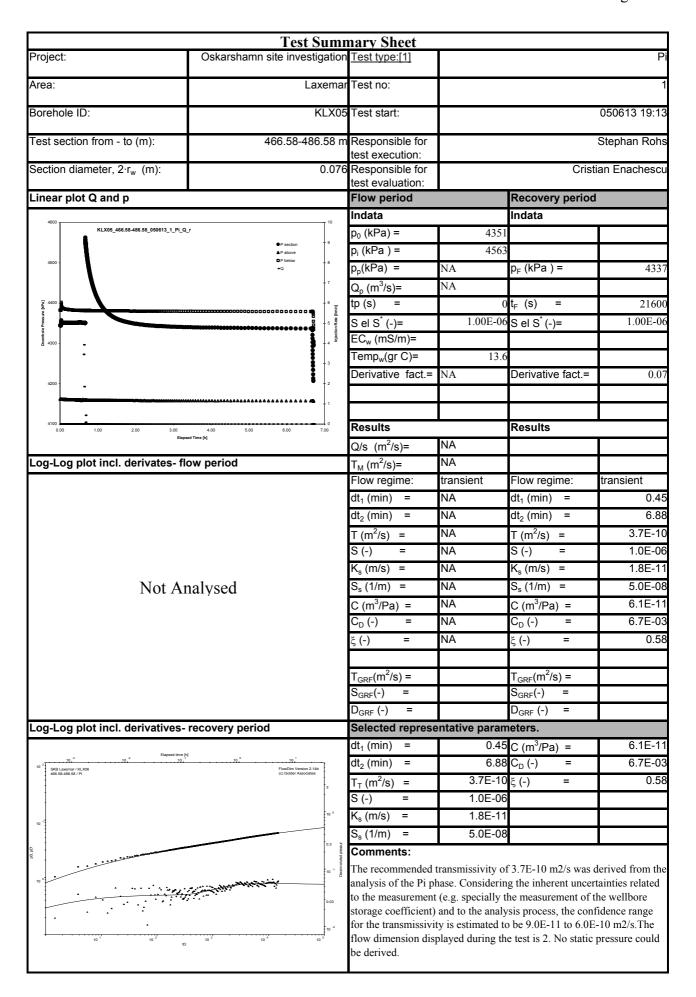
	Test Sumi	mary Sheet			
Project:	Oskarshamn site investigation				CHir
Area:	Lavoma	r Test no:			1
Alea.	Laxema	restrio.			'
Borehole ID:	KLX05	Test start:			050613 09:17
Test section from - to (m):	376.47-396.47 m	Responsible for			Stephan Rohs
		test execution:			
Section diameter, 2·r _w (m):	0.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	i
		Indata		Indata	
3700 KLX05_376.47-396.47_050613_1_CHir_Q_r	●P section	p ₀ (kPa) =	3536		
	▲P above ■ P below	p _i (kPa) =	NA		
3600	-0 -8	$p_p(kPa) =$	NA	p _F (kPa) =	NA
	7	$Q_p (m^3/s) =$	NA		
[egy]		tp (s) =	0	t _F (s) =	C
(r.g.) 2 ms es es es 3500 -	Percion Rate (Umin)	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
Downhole	hijectio	EC _w (mS/m)=		. ,	
		Temp _w (gr C)=	12.3		
3400 -		Derivative fact.=	NA	Derivative fact.=	NA
	2				
	+1				
	0 0.80 1.00 1.20	Results		Results	
Elapsec	l Time [h]	Q/s $(m^2/s)=$	NA		
Log-Log plot incl. derivates- flo	ow period	$T_M (m^2/s) =$	NA		
		Flow regime:	transient	Flow regime:	transient
		dt_1 (min) =	NA	$dt_1 (min) =$	NA
		dt_2 (min) =	NA	dt_2 (min) =	NA
		$T (m^2/s) =$	NA	$T (m^2/s) =$	NA
		S (-) =	NA	S (-) =	NA
		$K_s (m/s) =$	NA	$K_s (m/s) =$	NA
Not An	alysed	$S_s (1/m) =$	NA	$S_s (1/m) =$	NA
		$C (m^3/Pa) =$	NA	C (m³/Pa) =	NA
		$C_D(-) =$	NA	$C_D(-) =$	NA
		ξ (-) =	NA	ξ (-) =	NA
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
		$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		D_{GRF} (-) =		D_{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected represe	-		T
		dt ₁ (min) =	NA	$C (m^3/Pa) =$	NA
		$dt_2 (min) =$	NA	C_D (-) =	NA
		$T_T (m^2/s) =$	NA	ξ (-) =	NA
		S (-) =	NA		
	1 1	$K_s (m/s) =$	NA		
Not An	alysed	$S_s (1/m) =$	NA		
		Comments:			
		Based on the test re transmissivity is lov			ce) the interval

	Test Su	mmary Sheet			
Project:	Oskarshamn site investigat				Р
Area:	l aver	mar Test no:			
Alca.	Laxei	nai restrio.			'
Borehole ID:	KLX	K05 Test start:			050613 11:00
Test section from - to (m):	386.50-406.50	0 m Responsible for test execution:			Stephan Rohs
Section diameter, 2·r _w (m):	0.0	076 Responsible for		Crist	ian Enachescu
		test evaluation:		ln :	
Linear plot Q and p		Flow period		Recovery period	
KLX05_386.50-406.50_050613_1_Pi_Q_r	0.50	Indata	2626	Indata	Ī
	▲P above -0.45	$p_0 (kPa) =$	3626		
5900	•Q	p _i (kPa) =	3642		
	0.25	$p_p(kPa) =$		p _F (kPa) =	366
_		$Q_p (m^3/s) =$	NA		
P (2 100 100 100 100 100 100 100 100 100 10	0.30	$\frac{\text{tp (s)}}{\text{S el S}^* (-)=}$		t_F (s) =	240
8	0.25	S el S* (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
2000 -	0.20				
	0.15	Temp _w (gr C)=	12.5		
3900 -	0.10	Derivative fact.=	NA	Derivative fact.=	0.0
340	0.00				
0.00 0.20 0.40 0.80 0.80 Elapsed Tir	1.00 1.20 1.40 1.60 ne [h]	Results	INIA	Results	T
		Q/s $(m^2/s)=$	NA		
Log-Log plot incl. derivates- flov	v period	$T_M (m^2/s) =$	NA		
		Flow regime:	transient	Flow regime:	transient
		$dt_1 (min) =$	NA	dt_1 (min) =	0.62
		dt_2 (min) =	NA	$dt_2 (min) =$	10.9
		$T (m^2/s) =$	NA	$T (m^2/s) =$	4.4E-1
		S (-) =	NA	S (-) =	1.0E-0
		$K_s (m/s) =$	NA	$K_s (m/s) =$	2.2E-1
Not Ana	alysed	$S_s (1/m) =$	NA	$S_s (1/m) =$	5.0E-0
	•	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	7.0E-1
		$C_D(-) =$	NA	$C_D(-) =$	7.7E-0
		ξ (-) =	NA	ξ (-) =	0.74
		-			
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
		$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives- re	covery period	Selected repres	entative param		
		$dt_1 (min) =$	0.62		7.0E-1
Elapsed time (h)	10 ⁻¹ 4n ⁰	$dt_2 \text{ (min)} =$		$C_D(-) =$	7.7E-0
10 1 SKB Laxemar / KLX05 386.50-406.50 / Pi	FlowDim Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	4.4E-10		0.74
	0.3	S (-) =	1.0E-06		
ن ن من		$K_s (m/s) =$	2.2E-11		
10 °	10	$S_s (1/m) =$	5.0E-08		
	0.03	Comments:	1 2.02 30	1	
		b T1	transmissivity of	f 4.4E-10 m2/s was	derived from the
10-1	10 -2			g the inherent uncer	
		to the measuremen	t (e.g. specially t	he measurement of t	he wellbore
•	0.003	storage coefficient) and to the analy	rsis process, the con-	fidence range
•	10 -5			be 1E-10 to 7E-10	
10 ° 10 ' 10	10 2 10 3 10 4	dimension displayederived.	ed during the test	is 2. No static press	sure could be
		acrivou.			

	Test S	umn	nary Sheet				
Project:	Oskarshamn site investig					CHi	
Area:	Lax	cemar	Test no:				
Borehole ID:	K	LX05	Test start:		050613 13:		
Test section from - to (m):	406.54-426.		Responsible for test execution:			Stephan Roh	
Section diameter, 2·r _w (m):	(0.076	Responsible for		Cris	stian Enachesc	
Linear plot Q and p			test evaluation: Flow period		Recovery perio	nd	
Ellicai piot & alia p			Indata		Indata	, u	
4100	KLX05_406.54-426.54_050613_1_CHir_Q_r	T 0.10	p ₀ (kPa) =	3807		1	
			p _i (kPa) =	3812		1	
4000 -	● P section ▲ P above		$p_{p}(kPa) =$	4008	p _F (kPa) =	384	
	■ P Delow		$Q_{p} (m^{3}/s) =$	2.33E-07	,		
2 3000 -		-0.06 =	tp (s) =	1200	t _F (s) =	180	
Press		Rate [Vmln	S el S [*] (-)=		S el S* (-)=	1.00E-0	
own those		9	$EC_w (mS/m) =$		0 0. 0 ()		
	į		Temp _w (gr C)=	12.8			
• (Derivative fact.=	0.08	Derivative fact.=	0.0	
3700 -		- 0.02					
-	-						
0.00 0.20 0.40 0.60 0.80 Elapsed	1.00 1.20 1.40 1.60 1. Fime [h]	1.80	Results		Results		
			Q/s (m^2/s)=	1.2E-08			
og-Log plot incl. derivates- flo	w period		$T_{\rm M} ({\rm m}^2/{\rm s}) =$	1.2E-08			
			Flow regime:	transient	Flow regime:	transient	
10 ⁴ 10 ⁵ Elapsed time [h] 10 ² SKB Laxemar / KLX05			dt ₁ (min) =		dt ₁ (min) =	1.9	
406.54-426.54 / CHI	FlowDim Version 2.14b (c) Golder Associates		$dt_2 (min) =$		$dt_2 (min) =$	4.5	
	- 30	00	$T (m^2/s) =$ $S (-) =$		$T (m^2/s) =$	1.8E-0	
1	:	_ 2	$S(-) = K_s(m/s) =$	1.0E-06		1.0E-0	
10 1		0	_		$K_s (m/s) = S_s (1/m) =$	9.0E-1	
- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	30	o (fu	$S_s(1/m) =$	5.0E-06 NA	o (5.0E-0 5.8E-1	
		1/4 (1/4).[$C (m^3/Pa) = C_D (-) =$	NA	$C (m^3/Pa) = C_D (-) =$	6.4E-0	
10 °	المراجعة الم	0 1	-0()			0.4E-0	
	3		ξ (-) =	0.14	ζ(-) –	0.2	
			$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
10 ¹ 10 ²	10 3 10 4 10 5		$S_{GRF}(-) =$	+	$S_{GRF}(-) =$	+	
			D _{GRF} (-) =	†	D _{GRF} (-) =	+	
_og-Log plot incl. derivatives- r	ecovery period		Selected repres	entative param			
			$dt_1 (min) =$	1.99		5.8E-1	
Elapsed time (b)	10 ⁻¹ 40 ⁰ c-1		$dt_2 \text{ (min)} =$	4.50	$C_D(-) =$	6.4E-0	
10 ² SKB Laxemar / KLX05 406.54-426.54 / CHir	FlowDim Version 2.14b (c) Golder Associates		$T_T (m^2/s) =$	1.8E-08		0.5	
	1	10 3	S (-) =	1.0E-06			
			K_s (m/s) =	9.0E-10		1	
10 1	3	300	S _s (1/m) =	5.0E-08			
10 10 10 1000		10 10 10 10 10 10 10 10 10 10 10 10 10 1	Comments: The recommended analysis of the CH derivative quality. is estimated to be 9 during the test is 2 was derived from to	ir phase (inner zo The confidence r 0.0E-9 to 3.0E-8 to The static pressu	ne), which shows ange for the interv m2/s. The flow dir are measured at tra- ting straight line ex-	the best data and ral transmissivity mension displaye ansducer depth,	

	Test S	Sumn	nary Sheet			
Project:	Oskarshamn site investi	gation	Test type:[1]			Pi
Area:	La	xemar	Test no:			1
Borehole ID:		(I X05	Test start:	050613 15:3:		
Test section from - to (m):	426.55-446	6.55 m	Responsible for test execution:			Stephan Rohs
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachescu
, ,			test evaluation:			
Linear plot Q and p			Flow period		Recovery period	
4250		20	Indata		Indata	
KLX05_426.55-446.55_050613_1_Pi_Q_r	●P section	- 1.8	p ₀ (kPa) =	3986		
4150	▲P above	1.6	p _i (kPa) =	3999		
•	•9		$p_p(kPa) =$		p _F (kPa) =	4030
		1.4	$Q_p (m^3/s) =$	NA		
E 4000		1.2 [u w/d]	tp (s) =		t _F (s) =	2400
Fed 2000	50	injection Rate [l/min]	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
Down also -	•	njedi	EC _w (mS/m)=			
		0.6	Temp _w (gr C)=	13.1		
3850 -		.04	Derivative fact.=	NA	Derivative fact.=	0.
<u> </u>		. +02				
3190 40 0.00 1.00 1.00 1.20 1.40 Elapsed Time [h]			Results		Results	
			Q/s $(m^2/s)=$	NA		
Log-Log plot incl. derivates- fl	ow period		$T_M (m^2/s) =$	NA		
			Flow regime:	transient	Flow regime:	transient
			dt_1 (min) =	NA	dt_1 (min) =	1.12
			dt_2 (min) =	NA	dt_2 (min) =	7.35
			$T (m^2/s) =$	NA	$T (m^2/s) =$	3.4E-1
			S (-) =	NA	S (-) =	1.0E-06
			$K_s (m/s) =$	NA	$K_s (m/s) =$	1.7E-12
Not A	nalysed		$S_s (1/m) =$	NA	$S_s (1/m) =$	5.0E-08
	•		C (m³/Pa) =	NA	C (m³/Pa) =	5.6E-1
			$C_D(-) =$	NA	$C_D(-) =$	6.2E-03
			ξ (-) =	NA	ξ (-) =	0.59
			$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
			$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative param	eters.	
			dt ₁ (min) =	1.12	C (m³/Pa) =	5.6E-1
Elapsed time [1 10 10 10 10 10 10 10 10 10 10 10 10 10	n] 10, ⁻¹ 10, ⁰	_	dt_2 (min) =	7.35	C _D (-) =	6.2E-03
10 SKB Laxemar / KLX05 426.54-446.54 / Pi	FlowDim Version 2.14b (c) Golder Associates		$T_T (m^2/s) =$	3.4E-11	ξ (-) =	0.59
		0.3	S (-) =	1.0E-06		
• • • • • • • • • • • • • • • • • • • •		10 -1	K_s (m/s) =	1.7E-12		1
10 °			$S_s (1/m) =$	5.0E-08		
		0.03	Comments:	_		
	;	ad pegrapa.			3.4E-11 m2/s was o	
10 -1		10 °2 mbog			g the inherent uncer	
•		0.003			he measurement of t	
1		}			sis process, the cont be 1E-11 to 6E-11	
+			TOT THE HARGINGGRAM			
10 0 10 1	10 ² 10 ³ 10	10 -3			is 2. No static press	

	Test Sum	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			CHi
Area:	Laxemai	Test no:			1
D 1 1 1D	1/1 //05	T			050040 47.00
Borehole ID:	KLX05	Test start:			050613 17:33
Test section from - to (m):	446.57-466.57 m				Stephan Rohs
Section diameter, 2·r _w (m):	0.076	test execution: Responsible for		Cris	tian Enachescu
		test evaluation:	luation:		
Linear plot Q and p		Flow period		Recovery period	t
	10	Indata		Indata	
KLX05_446.57-466.57_050613_1_CHir_Q_	, ,	p ₀ (kPa) =	4166		
4250		p _i (kPa) =	NA		
		$p_p(kPa) =$	NA	p _F (kPa) =	NA
		$Q_p (m^3/s) =$	NA		
4150 -	[unang a	tp (s) =		t _F (s) =	(
feel anssering program on	the section	S el S* (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
Downi	●P section AP above	EC _w (mS/m)=			
4000 -	■P below •Q	Temp _w (gr C)=	13.3		<u> </u>
	2	Derivative fact.=	NA NA	Derivative fact.=	NA
	1				
3600		Results		Results	
	0.80 1.00 1.20 ed Time [h]		NA	Results	1
Log-Log plot incl. derivates- flo	ow pariod	Q/s $(m^2/s)=$	NA		
Log-Log plot mci. derivates- m	ow period	T _M (m ² /s)= Flow regime:	transient	Flow regime:	transient
		dt ₁ (min) =	NA	$dt_1 \text{ (min)} =$	NA
		$dt_1 (min) = $ $dt_2 (min) = $	NA	$dt_1 \text{ (min)} =$ $dt_2 \text{ (min)} =$	NA
		$T (m^2/s) =$	NA	$T (m^2/s) =$	NA
		S (-) =	NA	S (-) =	NA
		$K_s (m/s) =$	NA	$K_s(m/s) =$	NA
Not Ar	nalwand	$S_s (1/m) =$	NA	$S_s (1/m) =$	NA
NOT AI	iaryscu	$C_s(m^3/Pa) =$	NA	$C_s(m^3/Pa) =$	NA
		$C_D(-) =$	NA	$C_D(-) =$	NA
		ξ(-) =	NA	ξ(-) =	NA
		5 ()		5 ()	1
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	1
		$S_{GRF}(-) =$		$S_{GRF}(-) =$	†
		D_{GRF} (-) =		D_{GRF} (-) =	1
Log-Log plot incl. derivatives-	recovery period	Selected repres	entative paran		
		$dt_1 \text{ (min)} =$	NA	$C (m^3/Pa) =$	NA
		$dt_2 \text{ (min)} =$	NA	$C_D(-) =$	NA
		$T_T (m^2/s) =$	NA	ξ (-) =	NA
		S (-) =	NA		
		K_s (m/s) =	NA		
Not Ar	nalysed	$S_s (1/m) =$	NA		
	-	Comments:			
		Based on the test r transmissivity is lo		ed packer complian n2/s.	ce) the interval



	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation				CHi
Area:	Laxemar	Test no:			
Borehole ID:	KLX05	Test start:			050614 07:40
Test section from - to (m):	486.59-506.59 m	Responsible for test execution:			Stephan Roh
Section diameter, 2·r _w (m):	0.076	Responsible for		Cris	tian Enachescı
Linear plot Q and p		test evaluation: Flow period		Recovery period	4
Emicur piot & una p		Indata		Indata	4
KLX05_486.59-506.59_050614_1_CHir_Q_r ■	0.010	p ₀ (kPa) =	4520		
•	●P section ▲P above	p _i (kPa) =	4533		
4700 -	□ P below - 0.008 - Q	$p_p(kPa) =$	4735	p _F (kPa) =	453
	. 0.007	$Q_{p} (m^{3}/s) =$	3.33E-08		
G 4600 -	10.000 =	tp (s) =	1200	t _F (s) =	120
(ed acco	Rate (Tr	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
Southwo 4500	10001	EC _w (mS/m)=		()	
۵	.	Temp _w (gr C)=	13.9		
		Derivative fact.=	0.2	Derivative fact.=	0.0
4400	0.002				
-	. 0.001				
4300 0.00 0.20 0.40 0.80 0.80 Flansed	1.00 1.20 1.40 1.60 1.80 Time [h]	Results		Results	
		Q/s $(m^2/s)=$	1.6E-09		
Log-Log plot incl. derivates- flo	ow period	$T_M (m^2/s) =$	1.7E-09		
		Flow regime:	transient	Flow regime:	transient
Elapsed time [h]	10	dt_1 (min) =	1.20	dt_1 (min) =	NA
10 10 10 10 10 10 10 10 10 10 10 10 10 1	FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =		dt_2 (min) =	NA
	3000	$T (m^2/s) =$		$T (m^2/s) =$	2.7E-0
	:	S (-) =	1.0E-06	` '	1.0E-0
10 1	10 3	$K_s (m/s) =$		$K_s (m/s) =$	1.4E-1
***************************************	300	$S_s (1/m) =$		$S_s (1/m) =$	5.0E-0
	1 Clod Diese	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	4.8E-1
10 0	10 2 5	$C_D(-) =$	NA	C _D (-) =	5.3E-0
	30	ξ (-) =	1.97	ξ (-) =	5.0
	• • • •	2		2	
10 ² 10 ³	10 4 10 5 10 6	$T_{GRF}(m^2/s) = S_{GRF}(-) =$		$T_{GRF}(m^2/s) = S_{GRF}(-) =$	
		$S_{GRF}(-) = D_{GRF}(-) =$		$S_{GRF}(-) = D_{GRF}(-) =$	
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative naram		
Log Log plot mon derivatives	ledevery period	$dt_1 \text{ (min)} =$	NA	C (m ³ /Pa) =	4.8E-1
Elaosed time (h)		dt_2 (min) =	NA	$C_D(-) =$	5.3E-0
10 ⁻³ 10 ⁻² 10 ⁻¹ SKB Laxemar / KLX05 486.59-506.59 / CHir	10 ⁰ FlowDim Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	2.7E-09		5.0
	10 3	S (-) =	1.0E-06		
+		K_s (m/s) =	1.4E-10		
10 1	300	S _s (1/m) =	5.0E-08		
Mark Street	10 2	Comments:			
	• vend 1001	The recommended	transmissivity of	£ 2.7E-9 m2/s was d	lerived from the
10°	30 8	analysis of the CHi	r phase, which s	hows the best data a	and derivative
	10 1	quality. The confidence			
, Ar	·	estimated to be 9.01 during the test is 2.			
1 /-	Ī	-	_		-
10 0 10 1	102 103 104	was derived from the	ne CHir phase us	sing straight line ex	trapolation in the

	Test Sumn	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Р
Area:	Laxemar	Test no:			1
Borehole ID:	KLX05	Test start:			050614 11:09
Test section from - to (m):	606.82-626.82 m	Responsible for			Stephan Rohs
		test execution:			
Section diameter, 2·r _w (m):	0.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
· ·	40	Indata		Indata	
KLX05_606.82-626.82_050614_1_Pi_Q_r		p ₀ (kPa) =	5599		
5800 -	,	p _i (kPa) =	5608		
	●P section 8 ▲P above	$p_p(kPa) =$	5811	p _F (kPa) =	561
5700 -	-Q 7	$Q_{p} (m^{3}/s) =$	1.67E-04		
e RPa]	e min)	tp (s) =	0	t _F (s) =	2400
Ted ansaud mourage		S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
5600	tujeciic	EC _w (mS/m)=			
	1 ,	Temp _w (gr C)=	15.5		
5500 -	2	Derivative fact.=	NA	Derivative fact.=	0.0
0.00 0.20 0.40 0.60 Elapse	0.80 1.00 1.20 1.40 d Time [h]	Results		Results	
		Q/s $(m^2/s)=$	NA		
Log-Log plot incl. derivates- fl	ow period	$T_M (m^2/s)=$	NA		
		Flow regime:	transient	Flow regime:	transient
		$dt_1 (min) =$	NA	dt_1 (min) =	1.4
		$dt_2 (min) =$	NA	$dt_2 (min) =$	5.4
		$T (m^2/s) =$	NA	$T (m^2/s) =$	4.1E-1
		S (-) =	NA	S (-) =	1.0E-0
NT	1 1	$K_s (m/s) =$	NA	$K_s (m/s) =$	2.1E-1
Not Ar	nalysed	S _s (1/m) =	NA	$S_s (1/m) =$	5.0E-0
		$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	5.2E-1
		$C_D(-) =$	NA	$C_D(-) =$	5.7E-0
		ξ (-) =	NA	ξ (-) =	-0.5
		$T (m^2/a) =$		$T (m^2/s) =$	
		$T_{GRF}(m^2/s) = S_{GRF}(-) =$		$T_{GRF}(m^2/s) = S_{GRF}(-) =$	
		$D_{GRF}(-)$ =		$D_{GRF}(-) =$	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative naram		
-03 -03 Piot illoi. delivatives-		dt ₁ (min) =	1.42	C (m ³ /Pa) =	5.2E-1
		dt_1 (min) =		$C_D(-) =$	5.7E-0
Elapsed time [h] 10 1 10 1 10 1 10 1 10 1 10 1 10 1 10	10, 10 1 10 1 FlowDlm Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	4.1E-10		-0.5
ti06.82-626.82 / Pi	(c) Golder Associates 0.3	S (-) =	1.0E-06	• ()	0.0
<u> </u>		$K_s (m/s) =$	2.1E-11		
10°	10	$S_s(1/m) =$	5.0E-08		
· · · · · · · · · · · · · · · · · · ·	0.03	Comments:			<u> </u>
	The board and		transmissivity of	f 4.1E-10 m2/s was o	derived from th
	10 2 88000000	analysis of the Pi pl	hase. Considerin	g the inherent uncer	tainties related
10-1	0.003			he measurement of t	
	*			vsis process (e.g. nur pressure history eff	
	10 -3			vity is estimated to b	
10 ° 10 ° tD	10 2 10 3 10 4			yed during the test is	
		pressure could be d			

	Test Su	ımma	ary Sheet			
Project:	Oskarshamn site investiga	ation <u>T</u>	est type:[1]			CHi
Area:	Laxe	emar T	est no:			1
Borehole ID:	KL	_X05 T	est start:			050614 13:16
Test section from - to (m):	626.85-64	6.85 R	Responsible for			Stephan Rohs
		te	est execution:			
Section diameter, 2·r _w (m):	0.		Responsible for est evaluation:		Cristi	an Enachescı
Linear plot Q and p			low period		Recovery period	
			ndata		Indata	
KLX05_626.85-646.85_050614_1_CHir_Q_r	●P section	p ₀	₀ (kPa) =	5777		
1 1	▲P above ■ P below		i (kPa) =	5777		
5950 -	••		_p (kPa) =	5947	p _F (kPa) =	578
			$Q_p (m^3/s) =$	1.67E-07	PF (*** **)	0,0
<u>.</u> 5850 -	-0.		$\frac{x_p(111/s)-}{x_p(s)} =$		t _F (s) =	180
Possure Person (Pd.)		2	s el S* (-)=		S el S [*] (-)=	1.00E-0
Ē -	-	٥	C _w (mS/m)=	1.00E-00	୦ ୯ ୦ (-)=	1.0012-0
N 5750 -			emp _w (gr C)=	15.9		
					Danis ather fact	0.0
9650 -		•••	Perivative fact.=	0.11	Derivative fact.=	0.04
1 1						
0.00 0.50 1.00 Elaps	1.50 2.00 sed Time [h]		Results		Results	
		Q)/s (m²/s)=	9.6E-09		
Log-Log plot incl. derivates- fl	low period	T	$_{\rm M} ({\rm m}^2/{\rm s}) =$	1.0E-08		
		F	low regime:	transient	Flow regime:	transient
Elapsed time [h	1	di	t ₁ (min) =	5.92	dt_1 (min) =	12.68
10 ⁴ 10 ³ 10 10 10 10 10 10 10 10 10 10 10 10 10	2 10 1 10 0 FlowDim Version 2.14b (c) Golder Associates	dt	t ₂ (min) =	26.28	dt ₂ (min) =	25.63
	10 "	T	$(m^2/s) =$	9.7E-09	$T (m^2/s) =$	1.2E-08
	300		S (-) =	1.0E-06	` '	1.0E-06
10 1		K	(m/s) =	4.8E-10	$K_s (m/s) =$	6.0E-1
	10 2	2	S _s (1/m) =		$S_s (1/m) =$	5.0E-08
	• • • • • • • • • • • • • • • • • • • •	_	(m ³ /Pa) =	NA	C (m ³ /Pa) =	9.5E-1
	30	5	$\mathcal{C}_{D}(-) =$	NA	$C_D(-) =$	1.0E-02
10	10 1		(-) =		ξ(-) =	2.29
		٦	()	1.00	Ş ()	2.2
	• • • • •	T,	$G_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 10 tD	10 10 10		G _{GRF} (-) =		$S_{GRF}(-) =$	
) _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		selected represe	entative param		
			t ₁ (min) =	-	C (m ³ /Pa) =	9.5E-1
Elapsed time [h]	ı		t ₂ (min) =		$C_D(-) =$	1.0E-02
10, 3 10, 2 10, 1 10, 2 10, 1 10, 2 10, 1 10, 2 10, 1 10, 2 10, 1 10, 2	10 0 10 1 FlowDim Version 2.14b (c) Golder Associates		$T_{\rm T} (m^2/s) =$	1.2E-08		2.29
	(c) Golder Associates		G (-) =	1.0E-06	_ /) د	
			X_{s} (m/s) =	6.0E-10		
10 17	300		$G_s(11/3) = G_s(1/m) = G_s(1/m)$	5.0E-08		
			comments:	5.0E-06		
"	10 *	· [E1 2E 9 2/2 2 de	
	ļ		ne recommended	rranemiceivity of	- 1.2E-8 m2/s was de	rived from the
						nd derivativa
10.5	30	^g ar	nalysis of the CHi	r phase, which sl	nows the best data ar	
	30	ar qı	nalysis of the CHi uality. The confide	r phase, which sl ence range for th	nows the best data and e interval transmissi	vity is
	30 to 1	ar qı es dı	nalysis of the CHi uality. The confide stimated to be 9.01 uring the test is 2.	r phase, which slence range for the E-9 to 6.0E-8 m ² . The static pressure.	nows the best data and e interval transmission. The flow dimensure measured at transmission.	vity is ion displayed sducer depth,
	3 3 3 4 4 4 5 4 5 4 5 5 6 5 6 5 6 5 6 5 6 5 6	ar qu es du w	nalysis of the CHi uality. The confide stimated to be 9.01 uring the test is 2.	r phase, which shence range for the E-9 to 6.0E-8 m ² . The static pressure CHir phase us	nows the best data and e interval transmissinglys. The flow dimensure measured at transing straight line extra	vity is ion displayed sducer depth,

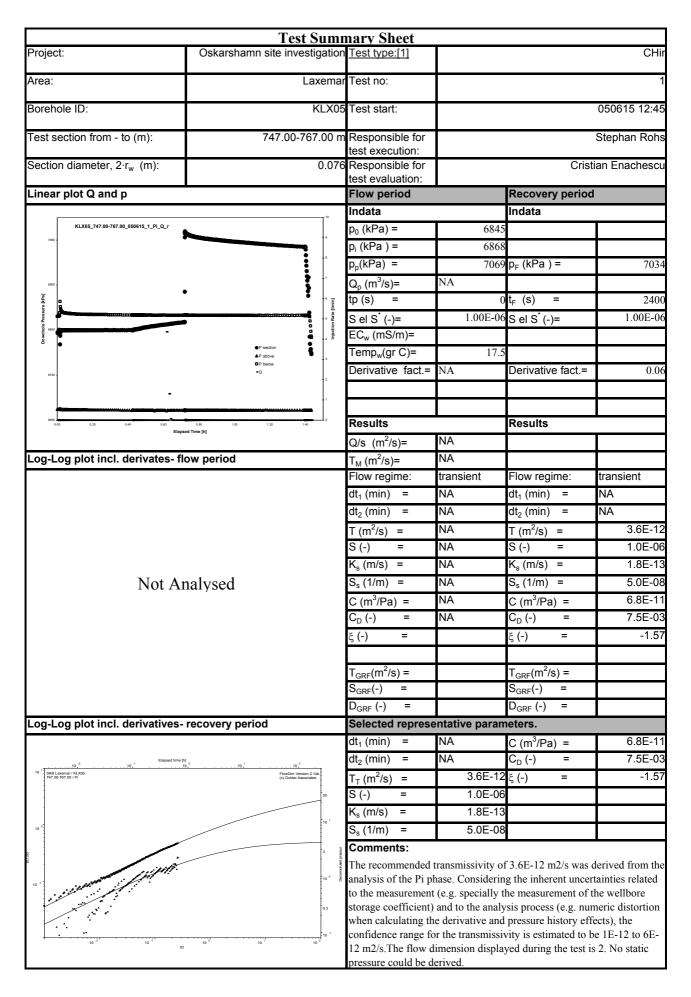
	Test Sur	nmary Sheet			
Project:	Oskarshamn site investigat				CHi
Area:	Lavon	nar Test no:			
Alea.	Laxen	iai rest iio.			
Borehole ID:	KLX	05 Test start:			050614 16:07
Test section from - to (m):	646.85-666.85	m Responsible for test execution:			Stephan Rohs
Section diameter, 2·r _w (m):	0.0	76 Responsible for		Cris	tian Enachescu
l :		test evaluation:		In	.1
Linear plot Q and p		Flow period		Recovery period	i e
KLX05_646.85-666.85_050614_1_CHir_Q_r	10	Indata	5950		1
KEX03_040.03-000.03_030014_1_01111_q_1	-	$p_0 (kPa) = p_i (kPa) =$	NA	0	
		$p_i(kPa) = p_p(kPa) =$	NA NA	p _F (kPa) =	NA
8000	7	·	NA NA	ρ _F (κ - α) -	NA
ş	•	$Q_p (m^3/s) =$ $tp (s) =$		0 4 (a) -	
Seure R	€	tp (s) =		$0 t_{F} (s) =$	1.005.0
Egyl annessou propunoci	P section AP above	S el S* (-)=	1.00E-00	⁶ S el S [*] (-)=	1.00E-0
DOW	■P below		16	1	
	-3	Temp _w (gr C)=	16.	.	27.4
5600	2	Derivative fact.=	• NA	Derivative fact.=	NA
	1				
5700		D Ita		Danilla	
0.00 0.20 0.40 0. Elapsed		Results	INIA	Results	1
		Q/s (m ² /s)=	NA		
Log-Log plot incl. derivates- flo	w perioa	$T_{\rm M} ({\rm m}^2/{\rm s}) =$	NA		
		Flow regime:	transient	Flow regime:	transient
		$dt_1 (min) =$	NA	$dt_1 (min) =$	NA
		$dt_2 (min) =$	NA	$dt_2 (min) =$	NA
		$T (m^2/s) =$	NA	$T (m^2/s) =$	NA
		S (-) =	NA	S (-) =	NA
		$K_s (m/s) =$	NA	$K_s (m/s) =$	NA
Not An	alysed	$S_s (1/m) =$	NA	$S_s (1/m) =$	NA
		$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	NA
		$C_D(-) =$	NA	$C_D(-) =$	NA
		ξ (-) =	NA	ξ (-) =	NA
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
		$S_{GRF}(-) =$		S _{GRF} (-) =	
		D _{GRF} (-) =		D_{GRF} (-) =	
Log-Log plot incl. derivatives- r	ecovery period	Selected repres	-		1
		$dt_1 (min) =$	NA	$C (m^3/Pa) =$	NA
		$dt_2 (min) =$	NA	$C_D(-) =$	NA
		$T_T (m^2/s) =$	NA	ξ (-) =	NA
		S (-) =	NA		
		K_s (m/s) =	NA		
Not An	alysed	$S_s (1/m) =$	NA		
		Comments:			
		Based on the test r transmissivity is lo		ged packer complian m2/s.	ice) the interval

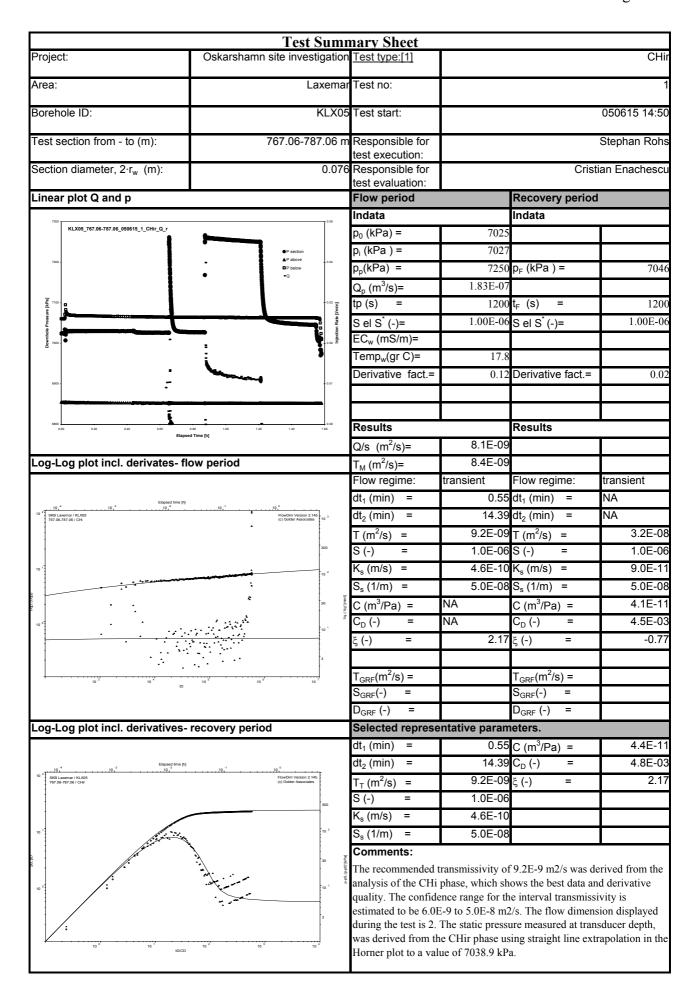
	Test Sum	mary Sheet			
Project:	Oskarshamn site investigatio	n Test type:[1]			CHi
Area:	Laxema	nr Test no:			
Borehole ID:	KI X0	5 Test start:		050614 ²	
Test section from - to (m):	666.85-686.85 r	n Responsible for test execution:			Stephan Roh
Section diameter, 2·r _w (m):	0.07	6 Responsible for		Crist	ian Enachesc
l !		test evaluation:		D	•
Linear plot Q and p		Flow period		Recovery period	
6900	10 P section	Indata p ₀ (kPa) =	(125	Indata	Ī
KLX05_666.85-686.85_050614_1_CHir_Q_r	△P above 9 □P below	$p_0 (kPa) = p_i (kPa) =$	6135 NA		
	•••	$p_i(kPa) = p_p(kPa)$	NA NA	p _F (kPa) =	NA
6200	7		NA NA	ρ _F (KPa) -	NA
2	90	$Q_{p} (m^{3}/s) =$ $tp (s) =$		t _r (s) =	
P Pessure (PP)	d + + + + + + + + + + + + + + + + + + +	4 (-)		t _F (0)	1.00E-0
whole	the part of the pa	S el S * (-)= EC $_w$ (mS/m)=	1.00E-06	S el S [*] (-)=	1.00E-0
Dow		Temp _w (gr C)=	16.4		
6000	73	Derivative fact.=		Derivative fact.=	NA
	2	Delivative lact	11/1	Delivative lact.	11/1
	- 1		<u> </u>		
5000 0.00 0.20 0.40	0.80 0.80 1.00 1.20	Results		Results	
Elapse	d Time [h]	$Q/s (m^2/s) =$	NA		
Log-Log plot incl. derivates- fl	ow period	$T_{\rm M} (m^2/s) =$	NA		
	оп ролош	Flow regime:	transient	Flow regime:	transient
		$dt_1 \text{ (min)} =$	NA	dt ₁ (min) =	NA
		$dt_2 \text{ (min)} =$	NA	$dt_2 \text{ (min)} =$	NA
		$T (m^2/s) =$	NA	$T (m^2/s) =$	NA
		S (-) =	NA	S (-) =	NA
		$K_s (m/s) =$	NA	$K_s (m/s) =$	NA
Not Ar	nalvsed	S _s (1/m) =	NA	$S_s(1/m) =$	NA
1101711	larysoa	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	NA
		$C_D(-) =$	NA	$C_D(-) =$	NA
		ξ (-) =	NA	ξ(-) =	NA
		3 ()		3 ()	
		$T_{GRF}(m^2/s) =$	1	$T_{GRF}(m^2/s) =$	
		S _{GRF} (-) =		$S_{GRF}(-) =$	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	neters.	
		dt_1 (min) =	NA	$C (m^3/Pa) =$	NA
		dt_2 (min) =	NA	$C_D(-) =$	NA
		$T_T (m^2/s) =$	NA	ξ (-) =	NA
		S (-) =	NA		
		$K_s (m/s) =$	NA		
Not Ar	nalysed	$S_s (1/m) =$	NA		
		Comments:			
		Based on the test re transmissivity is lo		ged packer complian n2/s.	ce) the interval

	Test Sun	nmary Sheet			
Project:	Oskarshamn site investigati	on Test type:[1]			CHi
Area:	Laxem	nar Test no:			
Borehole ID:	KLX	05 Test start:			050614 19:48
Test section from - to (m):	686.83-706.83	m Responsible for test execution:			Stephan Roh
Section diameter, 2·r _w (m):	0.0	76 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation: Flow period		Recovery period	
Linear plot & and p		Indata		Indata	
KLX05_686.83-706.83_050614_1_CHir	0 030	p ₀ (kPa) =	6312		I
	●P section	$p_i(kPa) =$	6315		<u> </u>
6500 -	▲P above a coss	$p_p(kPa) =$		p _F (kPa) =	631
	- q		2.17E-07		031
	0.020	$Q_{p} (m^{3}/s) =$ $tp (s) =$			1440
o in second	- 4015 6	(°)		$t_F(s) =$	1440
Committed of Personal	4 0.05 0	()	1.00E-06	S el S [*] (-)=	1.00E-0
6300		,	165		
:	0.010	Temp _w (gr C)=	16.7		0.0
6200 -	0.009	Derivative fact.=	0.11	Derivative fact.=	0.0
•	************************				
6100	3.00 4.00 5.00 inte [h]	Results	•	Results	
		Q/s $(m^2/s)=$	1.0E-08		
Log-Log plot incl. derivates- flo	w period	$T_M (m^2/s)=$	1.1E-08		
		Flow regime:	transient	Flow regime:	transient
Elapsed time [h]	4	dt_1 (min) =	0.40	dt_1 (min) =	NA
10 ² SKB Laxemar / KLX05 688.83-708.83 / CHI	(c) Golder Associates FlowDim Version 2-14b	dt_2 (min) =	2.93	dt_2 (min) =	NA
1	i	$T (m^2/s) =$	1.2E-08	$T (m^2/s) =$	2.2E-0
+	300	S (-) =	1.0E-06	S (-) =	1.0E-0
10 1	10 2	K_s (m/s) =	6.0E-10	$K_s (m/s) =$	1.1E-0
	:	$S_s (1/m) =$	5.0E-08	$S_s (1/m) =$	5.0E-0
	30	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	7.6E-1
10 °	10	C _D (-) =	NA	C _D (-) =	8.4E-0
· · · · · · · · · · · · · · · · · · ·		ξ (-) =	1.15	ξ(-) =	4.7
	3	5 ()		5 ()	
10 2 10 3	10 4 10 5 10 6	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
.0 sD		$S_{GRF}(-) =$		S _{GRF} (-) =	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives- re	ecovery period	Selected represe	entative paran	neters.	
		$dt_1 (min) =$	0.40		7.6E-1
Elapsed time Ihi		$dt_2 \text{ (min)} =$	2.93	$C_D(-) =$	8.4E-0
10 ² SKB Laxemar / KLX05 696.83.706.83 / CHir	0 -1 10 0 10 1 FlowDim Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	1.2E-08		1.1
	10 3	S (-) =	1.0E-06		
		K_s (m/s) =	6.0E-10		
10 1	300	S _s (1/m) =	5.0E-08		
	10 ²	Comments:	5.52 50		
:://		₫	transmissivity o	f 1.2E-8 m2/s was d	erived from the
	30			ne), which shows the	
10 " . ;/	**************************************			ence range for the in	
• /	10	transmissivity is est	timated to be 9.0	E-9 to 3.0E-8 m2/s.	The flow
	3			is 2. The static pres	
∀		at transducer depth	, was derived fro	m the CHir phase u	
10 ⁰ 10 ¹	10 ² 10 ³ 10 ⁴	extrapolation in the	TT 1	.1 . 0/20/21	· -

	Test Sum	mary Sheet			
Project:	Oskarshamn site investigation				CHi
Area:	Laxem	ar Test no:			
Borehole ID:	ZI V	05 Test start:			050615 08:02
Soferiole ID.	KLAU	os rest start.			050015 06.02
Test section from - to (m):	706.83-726.83	m Responsible for test execution:			Stephan Roh
Section diameter, 2·r _w (m):	0.07	6 Responsible for		Crist	ian Enachesc
		test evaluation:		In ·	
Linear plot Q and p		Flow period		Recovery period	
6800 KI Y	05_706.83-726.83_050615_1_CHir_Q_r	Indata	6483	Indata	1
• ***	00_700.00720.00_00010_1_01III_Q_1	$p_0 (kPa) =$ $p_i (kPa) =$	6488		
6700 .	0.040	$p_{p}(kPa) =$		p _F (kPa) =	650
•	AP above □ P below □ a.o.ss	P.	1.67E-07		030
₹ eco .	•Q	$\frac{Q_p (m^3/s)=}{tp (s)} =$		t _F (s) =	240
fed cons.	2000 - Ran (2000 - 1)			S el S [*] (-)=	1.00E-0
P. Harding Pro		S el S [*] (-)= EC _w (mS/m)=	1.00E-00	S el S (-)=	1.00E-0
8 8500	0.020 至	Temp _w (gr C)=	16.9		
	0.015	Derivative fact.=		Derivative fact.=	0.0
6400 -	0.010	Delivative lact.	0.11	Derivative lact.	0.0
<u> </u>	0.005				
0.00 0.20 0.40 0.60 0.80 Elapse	0.000 1.00 1.20 1.40 1.80 1.80 2.00 d Time [h]	Results		Results	
		Q/s $(m^2/s)=$	7.9E-09		
Log-Log plot incl. derivates- flo	ow period	$T_{\rm M} (m^2/s) =$	8.2E-09		
		Flow regime:	transient	Flow regime:	transient
Elapsed time (h)	4	dt_1 (min) =	0.25	dt_1 (min) =	13.2
10 10 10 10 10 10 10 10 10 10 10 10 10 1	FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	1.47	dt_2 (min) =	34.8
1		$T (m^2/s) =$	7.6E-09	$T (m^2/s) =$	4.5E-0
•	300	S (-) =	1.0E-06	S (-) =	1.0E-0
10 1		$K_s (m/s) =$	3.8E-10	$K_s (m/s) =$	2.3E-1
	10 ²	$S_s(1/m) =$	5.0E-08	$S_s (1/m) =$	5.0E-0
9		$C (m^3/Pa) =$	NA	C (m³/Pa) =	3.9E-1
10 0	من م	$C_D(-) =$	NA	$C_D(-) =$	4.3E-0
	10 '	ξ (-) =	-0.04	ξ (-) =	-0.7
10 1 10 2	10 3 10 4 10 5	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ¹ 10 ² tD	10 ³ 10 ⁴ 10 ⁵	$S_{GRF}(-) =$		$S_{GRF}(-)$ =	
		D_{GRF} (-) =		D_{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	neters.	
		dt ₁ (min) =	13.24	C (m³/Pa) =	3.9E-1
Elapsed time [h]		dt_2 (min) =	34.82	C _D (-) =	4.3E-0
10 2 10 2 10 2 10 10 10 10 10 10 10 10 10 10 10 10 10	-1 10 0 FlowDim Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	4.5E-09		-0.7
	3000	S (-) =	1.0E-06		
	10 3	$K_s (m/s) =$	2.3E-10		
10 1		$S_s (1/m) =$	5.0E-08		
	300	Comments:	<u> </u>		•
	10 ²	7	transmissivity of	f 4.5E-9 m2/s was de	erived from the
				one), which shows th	ne best data and
10.5	10 July 10 Jul	derivative quality.		range for the interval	
10°	20 Est	derivative quality. It is estimated to be 1.	.0E-9 to 7.0E-9	m2/s. The flow dime	ension displaye
10°	30 To '	derivative quality. It is estimated to be 1 during the test is 2.	.0E-9 to 7.0E-9 to The static press		ension displayed sducer depth,

	Test Sur	mmary Sheet			
Project:	Oskarshamn site investigat	ion Test type:[1]			Р
Area:	Laxer	nar Test no:	1		1
Borehole ID:	KL>	(05 Test start:	 		050615 10:40
Test section from - to (m):	726 01 746 0	1 m Responsible for			Stephan Rohs
rest section from - to (m).	720.91-740.9	test execution:			Stephan Rons
Section diameter, 2·r _w (m):	0.0	76 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation: Flow period		Recovery period	
Emour plot & una p		Indata		Indata	
KLX05_726.91-746.91_050615_1_Pi_Q_r	10	p ₀ (kPa) =	6664		1
	●P section	p _i (kPa) =	6679		
6850 .	▲P above ☐ P below	$p_p(kPa) =$		p _F (kPa) =	670:
	-0	$Q_p (m^3/s) =$	NA	FF (5.)	0,0
€ 6750 -		t (-)		t _F (s) =	2400
Sesure B		S el S* (-)=		S el S [*] (-)=	1.00E-0
Fed and		$S \text{ el } S^* (-) =$ $EC_w \text{ (mS/m)} =$	1.001	o ei o (-)−	1.00L-00
8 0000	T †	Temp _w (gr C)=	17.2		
	,	Derivative fact.=		Derivative fact.=	0.00
6500	2	Derivative lact.	NA	Derivative lact.	0.0.
	1		†		
0450 0.00 0.40 0.60 Flanse	0.80 1.00 1.20 1.40 and Time [h]	Results		Results	
Спри	in the light	Q/s $(m^2/s)=$	NA		
Log-Log plot incl. derivates- flo	ow period	$T_{\rm M} (m^2/s) =$	NA		
		Flow regime:	transient	Flow regime:	transient
		$dt_1 (min) =$	NA	dt_1 (min) =	7.38
		dt_2 (min) =	NA	dt_2 (min) =	35.03
		$T (m^2/s) =$	NA	$T (m^2/s) =$	1.6E-10
		S (-) =	NA	S (-) =	1.0E-06
		K_s (m/s) =	NA	$K_s (m/s) =$	8.0E-12
Not Ar	nalysed	$S_s (1/m) =$	NA	$S_s (1/m) =$	5.0E-08
1101711	iai y sea	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	4.2E-1
		$C_D(-) =$	NA	$C_D(-) =$	4.6E-03
		ξ (-) =	NA	ξ(-) =	-1.10
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
		$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		D_{GRF} (-) =		D_{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected repres	entative paran	neters.	
		$dt_1 (min) =$	7.38	C (m ³ /Pa) =	4.2E-1
Elapsed time [t	1	$dt_2 (min) =$	35.03	$C_D(-) =$	4.6E-0
10 SKB Laxemar / KLX05 725.91.749.91 / Pi	10 ⁻¹ 10 ⁰ 10 ¹ FlowDim Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	1.6E-10		-1.10
		S (-) =	1.0E-06		1
+	0.4		8.0E-12		
10 °.	-10	C (1/m) -	5.0E-08		
· · · · · · · · · · · · · · · · · ·	A STATE OF THE STA	Comments:			<u> </u>
· · ·	0.5	98	transmissivity of	f 1.6E-10 m2/s was o	derived from the
10-1		analysis of the Pi p	hase. Considerin	g the inherent uncer	tainties related
	10	to the measuremen		he measurement of t	
•	ng			vsis process (e.g. nur	
	0.3			pressure history effortivity is estimated to b	
10 -1 10 ° sD	10 ¹ 10 ² 10 ³			yed during the test is	
		pressure could be		-	





Tes	<u>t Sumn</u>	nary Sheet			
Oskarshamn site inve	estigation	Test type:[1]			CHi
	Laxemar	Test no:			
	KLX05	Test start:			050615 17:0
					Stephan Roh
	0.076			Criet	ian Enachesc
	0.076	test evaluation:		Clist	ian Enachesc
,		Flow period		Recovery period	
	- 0.30	Indata		Indata	
37.07-807.07_050615_1_CHir_Q_r		p ₀ (kPa) =	7203		
	0.25	p _i (kPa) =	7267		
● P section ▲ P above		$p_p(kPa) =$	7407	p _F (kPa) =	723
■ P below • Q	0.20	$Q_{p} (m^{3}/s) =$	2.00E-07		
	min.]	tp (s) =	1200	t _F (s) =	2160
	n Rate []/	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
	Injectio	EC _w (mS/m)=		. ,	
	0.10	Temp _w (gr C)=	18.1		
		Derivative fact.=	0.09	Derivative fact.=	0.0
	- 0.06				
5.00 e.00 7.00 e.00	0.00	Results		Results	
d Time [h]		$Q/s (m^2/s) =$	1.4E-08		
ow period			1.5E-08		
			transient	Flow regime:	transient
		•	NA		NA
10 ⁰ 10 ¹ FlowDim Versk	on 2.14b		NA	,	NA
(c) Golder Asso	300		4.3E-09	- ' '	3.3E-0
•	10 2	, ,			1.0E-0
A CONTRACTOR OF THE PARTY OF TH				. ,	1.7E-1
	30	-		0 ,	5.0E-0
	(min))				2.0E-1
	10 (01)	, ,	NA	, ,	2.2E-0
	3				-1.5
	İ	7()		7()	
	10 °	$T_{a}(m^2/s) =$		$T_{a=-}(m^2/s) =$	
10 ² 10 ³	10 4				
recovery period			ntative param		
		-	NA		2.0E-1
ı .			NA		2.2E-0
10, " 10 " 1 FlowDim Ver (c) Golder A:	rsion 2.14b ssociates				-2.9
.A.	10 3	. , ,			
	10 2				
			5.52		
and the same of th	0 pp0. (p-p0/ [4Pa]	The recommended t	ransmissivity of	f 4 3E-9 m2/s was de	erived from the
(m)	10 ' 9			one), which shows th	
- /	2	anarysis of the Ciff			
·/	*	derivative quality.	he confidence r	ange for the interval	
-/	10 °	derivative quality. This estimated to be 1.	The confidence r 0E-9 to 7.0E-9 to	ange for the interval m2/s. The flow dime	ension displaye
-/	10 °	derivative quality. It is estimated to be 1. during the test is 2.	The confidence r 0E-9 to 7.0E-9 r The static pressu	ange for the interval m2/s. The flow dime	ension displaye sducer depth,
	Oskarshamn site inventors of the inventor of t	Oskarshamn site investigation Laxemar KLX05 787.07-807.07 m 0.076 97 ection 10 period 10 per	Flow period Indata p ₀ (kPa) = p ₁ (kPa) = Q _p (m³/s)= tp (s) = Sels (-)= EC _w (mS/m)= Temp _w (gr C)= Derivative fact.= Results Q/s (m²/s)= T _M (m²/s)= T _M (m²/s) = S (-) = K _s (m/s) = S (-) = K _s (m/s) = S (-) = K _s (m/s) = S (-) = S (-) = K _s (m/s) = S (-) = S (Oskarshamn site investigation $\frac{\text{Test type:}[1]}{\text{Test no:}}$ Laxemar Test no: KLX05 Test start: 787.07-807.07 m Responsible for test execution: 0.076 Responsible for test execution: Flow period Indata P_0 (kPa) = 7203 P_0 (kPa) = 7267 P_0 (kPa) = 7267 P_0 (kPa) = 7207 P_0 (kPa) = 7207 P_0 (kPa) = 7207 P_0 (kPa) = 7207 P_0 (kPa) = 1.00E-06 P_0 (kPa) =	Coskarshamn site investigation Test type:[1]

Oskarshamn site investiga				CHi
Laxe				
Laxe				
	mai rest no.			
KL	X05 Test start:			050616 08:0
807.11-827.1	1 m Responsible for test execution:			Stephan Roh
0.			Cris	tian Enachesc
	test evaluation:			
	•			
, ,		7270		
š e.			2	
			n (kDa) =	NA
7			ρ _F (KFa) =	NA
•)t_ (s) =	
•	C O C ()—			1.00E-0
●P section	FC (mS/m)=	1.002 00	7 3 El 3 (-)=	1.00L 0
▲ P above □ P below	" (/	18 3	3	
*				NA
-2				
-1		+		
	Results		Results	<u> </u>
d Time [h]	$Q/s (m^2/s) =$	NA		
ow period		NA		
	Flow regime:	transient	Flow regime:	transient
	dt_1 (min) =	NA	dt_1 (min) =	NA
	dt_2 (min) =	NA	dt_2 (min) =	NA
	$T (m^2/s) =$	NA	$T (m^2/s) =$	NA
	S (-) =	NA	S (-) =	NA
	$K_s (m/s) =$	NA	$K_s (m/s) =$	NA
alysed	$S_s(1/m) =$	NA	$S_s(1/m) =$	NA
	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	NA
		NA		NA
	ξ (-) =	NA	ξ (-) =	NA
				↓
		l entetices		
recovery period		-		NA
				NA NA
				NA NA
			~ (-) =	17/7
			1	
alvsed				1
iui y sou		1	<u> </u>	<u> </u>
		response (prolong	ged packer complian	ce) the interval
				, . ,
	P section A P above P below	0.076 Responsible for test evaluation: Flow period Indata p_0 (kPa) = p_1 (kPa) = p_1 (kPa) = p_1 (kPa) = p_1 (kPa) = p_2 (kPa) = p_1 (kPa) = p_2 (kPa) = p_2 (kPa) = p_1 (kPa) = p_2 (kPa) = p_2 (kPa) = p_2 (kPa) = p_3 (kPa) = p_4 (kPa) = p_1 (kPa) = p_2 (kPa) = p_2 (kPa) = p_3 (kPa) = p_4 (kPa) = p_4 (kPa) = p_1 (kPa) = p_4 (kPa) = p_4 (kPa) = p_5 (kPa) = p_6 (kPa) = p_7	0.076 Responsible for test evaluation: Flow period Indata $p_{0} (kPa) = 7377$ $p_{1} (kPa) = NA$ $p_{p}(kPa) = NA$ $Q_{p} (m^{3}/s) = NA$ $Q_{p} (m^{3}/s) = NA$ $Q_{p} (m^{3}/s) = NA$ $Q_{p} (m^{3}/s) = NA$ $Q_{p} (m^{2}/s) $	0.076 Responsible for test evaluation: Flow period Indata I

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chi
Area:	Laxemar	Test no:			•
Borehole ID:	KLX05	Test start:			050616 09:52
T1	007.45.047.45	Danasa ikla fan			Otamban Daha
Test section from - to (m):	827.15-847.15 m	Responsible for test execution:			Stephan Rohs
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescı
1: 1:0		test evaluation:		ln :	
Linear plot Q and p		Flow period		Recovery period	
7900	KLX05_827.15-847.15_050616_1_CHir_Q_r	Indata	7550	Indata	ī
	0.009	p ₀ (kPa) =	7556		
7700 -	0.008	$p_i (kPa) = p_p(kPa) =$	7625	p _F (kPa) =	769
	0.007		1.67E-08		709
[e 7000	0,000	$Q_{p} (m^{3}/s) = $ tp (s) =		t _F (s) =	360
C 0 7000 D	R 5000			* *	1.00E-0
Pre	P section	S el S [*] (-)= EC _w (mS/m)=	1.00E-00	S el S [*] (-)=	1.00E-0
7500 . •	A P shove	Temp _w (gr C)=	18.6		
	0.003	Derivative fact.=		Derivative fact.=	0.0
7400 -	-0.002	Delivative lact	0.00	Derivative fact.	0.0
	0.001				
7000 0.00 0.50 1.00	1.50 2.00 2.50 ed Time [h]	Results		Results	<u> </u>
Енара	ea i ime [n]	Q/s $(m^2/s)=$	1.1E-09		
Log-Log plot incl. derivates- f	low period	$T_{\rm M} ({\rm m}^2/{\rm s}) =$	1.1E-09		
		Flow regime:	transient	Flow regime:	transient
Elapsed time (h)		dt_1 (min) =	NA	dt_1 (min) =	NA
10 ² SKB Laxemar / KLX05 827.15-847.15 / CHi	10 0 10 FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	NA	dt_2 (min) =	NA
<i>j.</i> /	10 4	$T (m^2/s) =$	9.0E-10	$T (m^2/s) =$	4.3E-0
<i>f.</i> -⁄	3000	S (-) =	1.0E-06	S (-) =	1.0E-0
10 1		$K_s (m/s) =$	4.5E-11	$K_s (m/s) =$	2.2E-1
	to ³	$S_s (1/m) =$	5.0E-08	$S_s (1/m) =$	5.0E-0
	Aut (usual Jan	C (m³/Pa) =	NA	C (m³/Pa) =	5.6E-1
10 0	300 5	C _D (-) =	NA	C _D (-) =	6.1E-0
	10 2	ξ (-) =	-1.31	ξ (-) =	0.9
:					
400 401	10 ² 10 ³ 10 ⁴	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 tD	10	S _{GRF} (-) =		S _{GRF} (-) =	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. pulse recov	ery period	Selected represe	entative paran	neters.	
		dt_1 (min) =	NA	$C (m^3/Pa) =$	5.6E-1
Elapsed time	h) 10, ⁻² 10, ⁻¹ 10, ⁰	dt_2 (min) =	NA	$C_D(-) =$	6.1E-0
10 ² SKB Laxemar / KLX05 827.15-847.15 / Pi	FlowDim Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	4.3E-09	ξ (-) =	0.9
1	Japan 1	S (-) =	1.0E-06		
	10-1	$K_s (m/s) =$	2.2E-10		
10 1		$S_s (1/m) =$	5.0E-08		
		Comments:			-
••••••	• par = 10 ° 2	The recommended	transmissivity of	f 4.3E-9 m2/s was d	erived from the
10 °	. :://	analysis of the Pi pl	nase (inner zone), which shows the b	est data and
· ·	·/·	Iderivative quality.	The confidence i	ange for the interva	
···	0.003		OE 104: 7 OF 6) 2 /n (1: : -1: : -1	laa 41aa1 -
• • • • • • • • • • • • • • • • • • • •	•	is estimated to be 8.			
10 1 10 2	0.003	is estimated to be 8. derived from inner	zones of the CH		The flow

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation				CHi
Area:	Laxemar	Test no:			1
Borehole ID:	KLX05	Test start:			050616 13:09
T (C ()	0.47.00.007.00				01 1 5 1
Test section from - to (m):	847.20-867.20 m	Responsible for test execution:			Stephan Rohs
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation: Flow period		Recovery period	1
Linear plot & and p		Indata		Indata	
KLX05_847.20-867.20_050616_1_CHir_Q_r	0.020	p ₀ (kPa) =	7737	maata	
7960 -	● P section	$p_0 (RPa) =$	7744		
7900 -	▲ P above ■ P below - a.oss	ρ _i (kPa) = p _p (kPa) =		p _F (kPa) =	777
7850 -	•Q	ŀ	1.00E-07	ρ _F (KFa) =	///
- L		$Q_p (m^3/s) =$		4 (-)	120
A 7800 D	R 0 010 0 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	tp (s) =		t _F (s) =	120
7750	- 0.010 <u>F</u>	S el S* (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
7700 -	0.000	EC _w (mS/m)=			
7650 -	0.006	Temp _w (gr C)=	18.9		
7600 -	0.004	Derivative fact.=	0.09	Derivative fact.=	0.0
7550	0.002				
7500 0.00 0.20 0.40 0.60 0.80 Fiance	1.00 1.20 1.40 1.60 1.80 d Time [h]	Results		Results	
Спрос	- 1 (rg	Q/s $(m^2/s)=$	4.7E-09		
Log-Log plot incl. derivates- fl	ow period	$T_M (m^2/s) =$	4.9E-09		
		Flow regime:	transient	Flow regime:	transient
Elassed time th	1	dt_1 (min) =	3.38	dt_1 (min) =	9.7
10 SKB Laxemar / KLX05 847.20-867.20 / CHi	10 1 10 5 10 1 10 1 Flowtom Version 2.14b (c) Glober Associates	dt_2 (min) =	15.85	dt_2 (min) =	17.7
	300	$T (m^2/s) =$	2.1E-09	$T (m^2/s) =$	2.8E-0
and the state of t		S (-) =	1.0E-06	` '	1.0E-0
10 °	·	$K_s (m/s) =$		K_s (m/s) =	1.4E-1
	30	$S_s(1/m) =$		$S_s(1/m) =$	5.0E-0
	[bus]	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	5.2E-1
	10 1 (0.1)		NA	$C_D(-) =$	5.7E-0
10 -1			-1.21		-0.8
• •		ξ (-) =	1.21	Ç (-) –	0.0
	10 °	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ° 10 ° 10	10 2 10 3 10 4	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	rocovery period	Selected represe	ntativo param		
-og-Log plot illol. delivatives-	1000 vory periou	dt ₁ (min) =	-		5.2E-1
		$dt_1 (min) =$ $dt_2 (min) =$		$C (m^3/Pa) = C_D (-) =$	5.7E-0
Elapsed time [h] 10 -2 10 -1 10 -2 SKB Laxemar / KLX05	10 ⁰ 10 ¹ FlowDim Version 2.14b			-0()	-0.8
847.20-867.20 / CHir	(c) Golder Associates	$T_{T} (m^2/s) =$ $S(-) =$	2.8E-09		-0.8
		0 ()	1.0E-06		
	10 3	$K_s (m/s) =$	1.4E-10		
10 1	300	$S_s (1/m) =$	5.0E-08		
	300	Comments:			
	(c) 49 (24 - 24 - 24 - 24 - 24 - 24 - 24 - 24			£ 2.8E-9 m2/s was de	
10 0	<u>*</u>			hows the best data a le interval transmiss	
The state of the s					
	30	estimated to be 0 01	-10) to 5 0E-9 ∞	1//C I DE TIOUZ AIMAI	
	30	estimated to be 9.01 during the test is 2.			
10 10 10	10 10 10 10 10 10 10 10 10 10 10 10 10 1	during the test is 2.	The static pressi	ure measured at tran sing straight line ext	sducer depth,

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation				CHi
Area:	Laxemar	Test no:			
Borehole ID:	KLX05	Test start:			050616 15:39
Test section from - to (m):	867.24-887.24 m	Dognonaible for			Stephan Rohs
` ,		test execution:			·
Section diameter, 2·r _w (m):	0.076	Responsible for test evaluation:		Crist	ian Enachesc
Linear plot Q and p		Flow period		Recovery period	
	A 440	Indata		Indata	
KLX05_867.24-887.24_050616_1_CHir_Q_r	:	p ₀ (kPa) =	7914		
	P section AP above	p _i (kPa) =	7930		
8100	■ P below 0.016 ■ Q	$p_p(kPa) =$	8144	p _F (kPa) =	796
	0.014	$Q_p (m^3/s) =$	8.33E-08		
₹ 800 -	0.012 E	tp (s) =		t _F (s) =	120
D D D D D D D D D D D D D D D D D D D	Sate (I/m)	S el S [*] (-)=		S el S [*] (-)=	1.00E-0
Company of the compan	ejection F	EC _w (mS/m)=	1.002 00	3 61 3 (-)=	1.002 0
D 7900 -	0.000. =	Temp _w (gr C)=	19.2		
	0.000	Derivative fact.=		Derivative fact.=	0.0
7800 -	0.004	Derivative lact	0.1	Derivative lact.	0.0
	0.002				
7700		Results	•	Results	•
		Q/s $(m^2/s)=$	3.8E-09		
og-Log plot incl. derivates- flow	period	$T_M (m^2/s) =$	4.0E-09		
		Flow regime:	transient	Flow regime:	transient
Elapsed time [h]		dt_1 (min) =	7.50	dt_1 (min) =	8.5
10 ⁴ 10, ³ 10, ² 10 ¹ SKB Laxemar / KLX05 867.44.87.24 / CHI	10 ⁻¹ 10 ⁰ FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	14.05	dt_2 (min) =	19.7
	300	$T (m^2/s) =$	1.2E-09	$T (m^2/s) =$	1.5E-0
	To 2	S (-) =	1.0E-06	, ,	1.0E-0
10 °		K_s (m/s) =	6.0E-11	$K_s (m/s) =$	7.5E-1
٠٠٠٠٠٠ بعضوية	30	$S_s(1/m) =$		$S_s(1/m) =$	5.0E-0
	[[Mana]]	$C (m^3/Pa) =$	NA	C (m ³ /Pa) =	6.9E-1
	10 1 87)	$C_D(-) =$	NA	$C_D(-) =$	7.6E-0
10 4			-1.64		-1.6
		ξ (-) =	1.04	Ç (-) –	1.0
	10 °	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ⁻³ 10 ⁹ 5D	10 1 10 2 10 3	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives- red	covery period	Selected represe	ntativo param		
Log-Log plot ilici. derivatives- ret	covery period	dt ₁ (min) =	-		6 0E 1
				$C (m^3/Pa) =$	6.9E-1 7.6E-0
Elapsed time [h] 10 10 10 10 10 10 10 1	10, 10, 10, FlowDim Version 2.14b	$dt_2 (min) =$		$C_D(-) =$	
867.24-887.24 / CHir	(c) Golder Associates	$T_T (m^2/s) =$	1.5E-09		-1.6
		S (-) =	1.0E-06		
10 °	10 ²	K_s (m/s) =	7.5E-11		
and in the second		$S_s (1/m) =$	5.0E-08		
10.7	Registration of the state of th	analysis of the CHirderivative quality. It is estimated to be 8	r phase (outer zo The confidence r 0E-10 to 4.0E-9	f 1.5E-9 m2/s was do one), which shows the ange for the interval o m2/s. The flow din tatic pressure measu	e best data and transmissivity nension
to ^d to ' toco	10 2 10 3 10 4	transducer depth, w	as derived from	the CHir phase using value of 7907.0 kP	g straight line

	Tes	t Sumn	nary Sheet			
Project:	Oskarshamn site inve	estigation	Test type:[1]			CHi
Area:		Laxemar	Test no:			1
Borehole ID:		KLX05	Test start:			050616 18:07
Test section from - to (m):	007 27	007 27 m	Responsible for			Stephan Rohs
rest section from - to (iii).	007.27-	907.27 111	test execution:			Stephan Rons
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachescı
Linear plot Q and p			test evaluation: Flow period		Recovery period	
Linear prot & and p			Indata		Indata	
* KLX05_887.27-907.27_050	0616 1 CHir O r	0.005	p ₀ (kPa) =	8094		1
8300		0.006	p _i (kPa) =	8137		
8250	●P section	0.004	$p_p(kPa) =$		p _F (kPa) =	809
	▲ P above ■ P below	0.004	$Q_{p} (m^{3}/s) =$	1.67E-08	ρ _F (κι α)	807
200 L	- Q	10.000 =	tp (s) =		t _F (s) =	2880
S S S S S S S S S S S S S S S S S S S		Rate [[min]]	S el S [*] (-)=		S el S [*] (-)=	1.00E-0
G 9100	*****************************	Injection R	S el S (-)= EC _w (mS/m)=	1.00L-00	3 el 3 (-)=	1.001
8050		5 10.002 E	Temp _w (gr C)=	19.5		
· •		0.002	Derivative fact.=		Derivative fact.=	0.0
8000 -		- c.oo:	Derivative last.	0.1	Denvative last.	0.0
7960		8				
7900	5.00 8.00 7.00 8.00 9.00	0.000	Results		Results	
Elapsed	d Time [h]		Q/s $(m^2/s)=$	9.7E-10		
Log-Log plot incl. derivates- flo	ow period		$T_{\rm M}$ (m ² /s)=	1.0E-09		
	- I		Flow regime:	transient	Flow regime:	transient
			$dt_1 (min) =$	NA	$dt_1 (min) =$	37.3
Elapsed time (h) 10 10 10 10 10 10 10 1	10,10 FlowDim Version 2	10 ² 2.14b 30000	$dt_2 (min) =$	NA	$dt_2 \text{ (min)} =$	112.3
887.27-907.27 / CHI	(c) Golder Associa	tes	$T (m^2/s) =$		$T (m^2/s) =$	1.1E-1
		10 4	S (-) =	1.0E-06	, ,	1.0E-0
10 1		3000	K_s (m/s) =		K_s (m/s) =	5.5E-1
00000000000000000000000000000000000000			S _s (1/m) =		S _s (1/m) =	5.0E-0
		10 3 (viu)	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	3.6E-1
		1/4.(14)	$C_D(-) =$	NA	$C_D(-) =$	4.0E-0
			ξ(-) =		ξ(-) =	-1.2
<i></i>		10 2	÷ ()		5 ()	
			$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ° 10 '	10 2 10 3	10 *	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative param		
			$dt_1 (min) =$	-	C (m³/Pa) =	3.6E-1
			$dt_2 (min) =$	112.37		4.0E-03
Plane 11 and	. 10,1	10.3 1 2.14b	$T_T (m^2/s) =$	1.1E-10		-1.29
Elapsed time (h)	FlowDim Version	nentS I		1.0E-06		
10,10,10,10	FlowDim Version (c) Golder Assoc	10 3	S (-) =			_
10 ¹ SKB Laxemar / KLX05	FlowDim Version (c) Golder Assoc	10 3	$S(-) = K_s(m/s) =$	5.5E-12		
10 ¹ SKB Laxemar / KLX05	Flow Dim Version (c) Globber Associ	10 3	K _s (m/s) =			
10 10 10 10 10 10 10 10 10 10 10 10 10 1	Foodmin Versors	300		5.5E-12		
10 10 10 10 10 10 10 10 10 10 10 10 10 1	Flooding Version (c) Global Associ	10 3	K _s (m/s) = S _s (1/m) = Comments:	5.5E-12 5.0E-08		derived from the
10 10 10 10 10 10 10 10 10 10 10 10 10 1	Flood Grander Version (c) Grander Andrew	300	K_s (m/s) = S_s (1/m) = $Comments$: The recommended analysis of the CHiral	5.5E-12 5.0E-08 transmissivity of r phase, which sl	f 1.1E-10 m2/s was on the best data at	nd derivative
10 10 10 10 10 10 10 10 10 10 10 10 10 1	Foxoffin Versor (c) Goder Adoor	10 ³	K _s (m/s) = S _s (1/m) = Comments: The recommended analysis of the CHii quality. The confide	5.5E-12 5.0E-08 transmissivity of r phase, which slence range for the	1.1E-10 m2/s was on the best data are interval transmissi	nd derivative vity is
10 10 10 10 10 10 10 10 10 10 10 10 10 1	Foodbra Vessor (c) Goder Assor	300	K _s (m/s) = S _s (1/m) = Comments: The recommended analysis of the CHirquality. The confideration and the confideration are to be 6.01	5.5E-12 5.0E-08 transmissivity of r phase, which slence range for the E-11 to 4.0E-10	f 1.1E-10 m2/s was on the best data and the interval transmission m2/s. The flow dimes	nd derivative vity is ension displayed
10 10 10 10 10 10 10 10 10 10 10 10 10 1	Floodform Version (c) Globel Asland	10 ³	K _s (m/s) = S _s (1/m) = Comments: The recommended analysis of the CHi quality. The confide estimated to be 6.01 during the test is 2.	5.5E-12 5.0E-08 transmissivity of r phase, which slence range for the E-11 to 4.0E-10 The static pressu	1.1E-10 m2/s was on the best data are interval transmissi	nd derivative ivity is ension displayed sducer depth,

	Test S	umr	nary Sheet			
Project:	Oskarshamn site investig					Р
Area:	Lov	(omor	Test no:			
Alea.	Laxemai		rest no.			
Borehole ID:	К	LX05	Test start:			050617 07:33
Test section from - to (m):	907.30-927.30 m		Responsible for test execution:			Stephan Roh
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	tian Enachesci
Linear plat O and p			test evaluation: Flow period		Deceyory period	
Linear plot Q and p			Indata		Recovery period Indata	1
8500	● P section	10	p ₀ (kPa) =	8261		
KLX05_907.30-927.30_050617_1_Pi_Q_r	▲ P above		$p_0 (kPa) =$	NA		
8400 -	- q	8	$p_p(kPa) =$	NA	p _F (kPa) =	NA
		7	$\frac{\rho_{p}(M'''a')}{Q_{p}(m^{3}/s)}=$	NA	ρ _F (κι α) –	IVA
₫ 800 m			$\frac{Q_p (\Pi / S) -}{tp (s)} =$		t _F (s) =	
A)	8	ate [Vmir			S el S [*] (-)=	1.00E-0
Fe ye answard moonupoop Company	• •	injection Rate [Vmin]	S el S * (-)= EC $_w$ (mS/m)=	1.001-00	/୦୯ା୦ (-)=	1.0015-0
Š 8200 ·	•	1. E	Temp _w (gr C)=	19.8		1
	•	3	Derivative fact.=	NA	Derivative fact.=	NA
8100		2	Derivative lact.=	INA	Derivative lact	IVA
		,				+
0.00 0.10 0.20 0.30 0.40	0.50 0.80 0.70 0.80 0.90	1.	Results		Results	
	ed Time [h]	1.00	Q/s $(m^2/s)=$	NA	Results	1
Log-Log plot incl. derivates- fl	ow period		$T_{M} (m^{2}/s) =$	NA		+
Log-Log plot mei. denvates- n	ow period		Flow regime:	transient	Flow regime:	transient
			dt ₁ (min) =	NA	dt ₁ (min) =	NA
			$dt_2 \text{ (min)} =$	NA	$dt_1 \text{ (min)} =$	NA
			$T (m^2/s) =$	NA	$T (m^2/s) =$	NA
			S (-) =	NA	S (-) =	NA
			$K_s(m/s) =$	NA	$K_s(m/s) =$	NA
Not A	anlarged		$S_s (1/m) =$	NA	$S_s(11/3) = S_s(11/m) = S_s(11/m)$	NA
Not Al	nalysed		$C (m^3/Pa) =$	NA	$C_s(1/111) = C_s(1/111) = C_s$	NA
			$C_D(-) =$	NA	$C_D(-) =$	NA
				NA		NA
			ξ (-) =	INA	ξ (-) =	INA
			$T = (m^2/a) =$	1	$T_{GRF}(m^2/s) =$	+
			$T_{GRF}(m^2/s) = S_{GRF}(-) =$		$S_{GRF}(m/s) = S_{GRF}(-) =$	+
			$D_{GRF}(-) =$		$D_{GRF}(-) =$	+
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative paran		
99 P.or mon donitari409-	polica		dt ₁ (min) =	NA	C (m ³ /Pa) =	NA
			$dt_2 \text{ (min)} =$	NA	$C_D(-) =$	NA
			$T_T (m^2/s) =$	NA	ξ(-) =	NA
			S (-) =	NA	7 \ /	
			$K_s (m/s) =$	NA		1
Not As	Not Analysed		$S_s(1/m) =$	NA		1
ΠΟΙΑΙ	imiyood		Comments:		<u> </u>	1
			Based on the test re 11 m2/s.	esponse the inter	val transmissivity is	lower than 1E-

	Test Sumn	nary Sheet			
Project:	Oskarshamn site investigation				CHi
Area:	Laxemar	Test no:			
Borehole ID:	KLX05	Test start:			050617 09:13
Test section from - to (m):	927.34-947.34 m				Stephan Rohs
Section diameter, 2·r _w (m):	0.076	test execution: Responsible for		Criet	ian Enachescu
Section diameter, 21 _W (III).	0.070	test evaluation:		Crist	iaii Liiaciiesci
Linear plot Q and p		Flow period		Recovery period	
8650	10	Indata		Indata	
KLX05_927.34-947.34_050617_1_CHir_Q_r	●P section ▲P above	p_0 (kPa) =	8439		
9	■P below ■Q	p _i (kPa) =	NA		
8500 .	***************************************	$p_p(kPa) =$	NA	p _F (kPa) =	NA
		$Q_p (m^3/s) =$	NA		
ure [kPa]	[vimin]	tp (s) =		t _F (s) =	(
8 8450 -	D + T	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0
Downh	₽9(u	EC _w (mS/m)=			
	3	Temp _w (gr C)=	20		
8350 .	2	Derivative fact.=	NA	Derivative fact.=	NA
	\$,				
8720					
0.00 0.10 0.20 0.50 0.40 0 Elapsed	0.50 0.60 0.79 0.80 0.90 1.00 I Time [h]	Results	NI A	Results	
		Q/s (m^2/s)=	NA		
Log-Log plot incl. derivates- flo	ow period	$T_M (m^2/s) =$	NA	<u> </u>	t
		Flow regime: dt ₁ (min) =	transient NA	Flow regime:	transient NA
			NA NA	$dt_1 (min) = dt_2 (min) =$	NA NA
			NA		NA
		$T (m^2/s) = S (-) =$	NA	$T (m^2/s) = S (-) =$	NA NA
		$K_s (m/s) =$	NA	$K_s (m/s) =$	NA
Not Am	alera ad	$S_s (1/m) =$		$S_s(1/m) =$	NA
Not An	larysed	$C (m^3/Pa) =$	NA	C (m ³ /Pa) =	NA
		$C_D(-) =$		$C_D(-) =$	NA
		ξ(-) =	NA	ξ(-) =	NA
		ς (-) –	147 (ς (-) –	1.0.
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
		$S_{GRF}(1175) =$		$S_{GRF}(1175) =$	
		$D_{GRF}(-) =$		$D_{GRF}(-) =$	
Log-Log plot incl. derivatives- i	recovery period	Selected represe	entative param		
<u> </u>		$dt_1 (min) =$	NA	$C (m^3/Pa) =$	NA
		$dt_2 \text{ (min)} =$	NA	$C_D(-) =$	NA
		$T_T (m^2/s) =$	NA	ξ (-) =	NA
		S (-) =	NA		
		K _s (m/s) =	NA		
Not An	alysed	$S_s (1/m) =$	NA		
	=	Comments:	=	-	-
		Based on the test re transmissivity is lov		ed packer compliand n2/s.	ce) the interval

Borehole: KLX05

APPENDIX 4

Nomenclature

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Character Variables,	SICADA designation	Explanation	Dimension	Unit
A _w	Unstants	Horizontal area of water surface in open borehole, not	[L ²]	m ²
A_{w}		including area of signal cables, etc.	[[-]	'''
b		Aquifer thickness (Thickness of 2D formation)	[L]	m
В		Width of channel	[L]	m
L		Corrected borehole length	[L]	m
L ₀		Uncorrected borehole length	[L]	m
L _p		Point of application for a measuring section based on its	[L]	m
∟ p		centre point or centre of gravity for distribution of transmissivity in the measuring section.	[-]	
L _w		Test section length.	[L]	m
dL		Step length, Positive Flow Log - overlapping flow logging. (step length, PFL)	[L]	m
r		Radius	[L]	m
r _w		Borehole, well or soil pipe radius in test section.	[L]	m
r _{we}		Effective borehole, well or soil pipe radius in test section. (Consideration taken to skin factor)	[L]	m
r _s		Distance from test section to observation section, the shortest distance.	[L]	m
r _t		Distance from test section to observation section, the interpreted shortest distance via conductive structures.	[L]	m
r_D		Dimensionless radius, r _D =r/r _w	-	-
Z		Level above reference point	[L]	m
Z _r		Level for reference point on borehole	[L]	m
Z _{wu}		Level for test section (section that is being flowed), upper limitation	[L]	m
Z _{Wl}		Level for test section (section that is being flowed), lower limitation	[L]	m
Z _{ws}		Level for sensor that measures response in test section (section that is flowed)	[L]	m
Z _{ou}		Level for observation section, upper limitation	[L]	m
Z _{ol}		Level for observation section, lower limitation	[L]	m
Z _{os}		Level for sensor that measures response in observation section	[L]	m
E		Evaporation:	[L ³ /(T L ²)]	mm/y, mm/d,
		hydrological budget:	[L ³ /T]	m ³ /s
ET		Evapotranspiration	[L ³ /T]	mm/y, mm/d,
		hydrological budget:	[L ³ /T]	m ³ /s
Р		Precipitation	[L ³ /T]	mm/y, mm/d,
		hydrological budget:	[L ³ /T]	m ³ /s
R		Groundwater recharge	[L ³ /T]	mm/y, mm/d,
		hydrological budget:	[L ³ /T]	m ³ /s
D		Groundwater discharge	[L ³ /(T L ²)]	mm/y, mm/d,
		hydrological budget:	[L ³ /T]	m ³ /s
Q_R		Run-off rate	[L ³ /T]	m³/s
Qp		Pumping rate	[L³/T]	m³/s
Qı		Infiltration rate	[L ³ /T]	m³/s
Q		Volumetric flow. Corrected flow in flow logging $(Q_1 - Q_0)$ (Flow rate)	[L ³ /T]	m³/s
Q_0		Flow in test section during undisturbed conditions (flow logging).	[L ³ /T]	m³/s

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Q_p		Flow in test section immediately before stop of flow.	[L ³ /T]	m³/s
		Stabilised pump flow in flow logging.	r. 3	3,
Q _m		Arithmetical mean flow during perturbation phase.	[L ³ /T]	m³/s
Q ₁		Flow in test section during pumping with pump flow Q_{p1} , (flow logging).	[L ³ /T]	m³/s
Q ₂		Flow in test section during pumping with pump flow Q_{p1} , (flow logging).	[L ³ /T]	m³/s
ΣQ	SumQ	Cumulative volumetric flow along borehole	[L ³ /T]	m³/s
ΣQ_0	SumQ0	Cumulative volumetric flow along borehole, undisturbed conditions (ie, not pumped)	[L ³ /T]	m³/s
ΣQ_1	SumQ1	Cumulative volumetric flow along borehole, with pump flow Q_{p1}	[L ³ /T]	m³/s
ΣQ_2	SumQ2	Cumulative volumetric flow along borehole, with pump flow Q_{p2}	[L ³ /T]	m³/s
ΣQ_{C1}	SumQC1	Corrected cumulative volumetric flow along borehole,	[L ³ /T]	m³/s
ΣQ_{C2}	SumQC2	$\Sigma Q_1 - \Sigma Q_0$ Corrected cumulative volumetric flow along borehole,	[L ³ /T]	m³/s
q		ΣQ_2 - ΣQ_0 Volumetric flow per flow passage area (Specific displaces (Darry volocity, Darry flow, Filtration volocity)	([L ³ /T*L ²]	m/s
V		discharge (Darcy velocity, Darcy flux, Filtration velocity)). Volume	[L ³]	m ³
$V_{\rm w}$		Water volume in test section.	[L] [L ³]	m ³
V _w		Total water volume injected/pumped during perturbation		m ³
<u> </u>		phase.		
V		Velocity	$([L^3/T*L^2]$	m/s
Va		Mean transport velocity (Average linear velocity (Average linear groundwater velocity, Mean microscopic velocity)); v_a =q/n _e	([L ³ /T*L ²]	m/s
t		Time	[T]	hour,mi
t ₀		Duration of rest phase before perturbation phase.	[T]	S
t _p		Duration of perturbation phase. (from flow start as far as p_0).	[T]	s
t _F		Duration of recovery phase (from p_p to p_F).	[T]	S
t ₁ , t ₂ etc		Times for various phases during a hydro test.	[T]	hour,mi n,s
dt		Running time from start of flow phase and recovery phase respectively.	[T]	S
dt _e		$dt_e = (dt \cdot tp) / (dt + tp)$ Agarwal equivalent time with dt as running time for recovery phase.	[T]	S
t_D		$t_D = T \cdot t / (S \cdot r_w^2)$. Dimensionless time	-	-
р		Static pressure; including non-dynamic pressure which depends on water velocity. Dynamic pressure is normally ignored in estimating the potential in groundwater flow relations.	[M/(LT) ²]	kPa
p _a		Atmospheric pressure	[M/(LT) ²]	kPa
p _t		Absolute pressure; p _t =p _a +p _g	[M/(LT) ²]	kPa
p _g		Gauge pressure; Difference between absolute pressure and atmospheric pressure.	[M/(LT) ²]	kPa
p ₀		Initial pressure before test begins, prior to packer expansion.	[M/(LT) ²]	kPa
p _i		Pressure in measuring section before start of flow.	[M/(LT) ²]	kPa
p _f		Pressure during perturbation phase.	[M/(LT) ²]	kPa
p _s		Pressure during recovery.	[M/(LT) ²]	kPa
p _p		Pressure in measuring section before flow stop.	[M/(LT) ²]	kPa
p_F		Pressure in measuring section at end of recovery.	[M/(LT) ²]	kPa

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dp	Pressure difference, drawdown of pressure surface between two points of time.	[M/(LT) ²]	kPa
dp _f	$dp_f = p_i - p_f$ or $= p_f - p_i$, drawdown/pressure increase of pressure surface between two points of time during perturbation phase. dp_f usually expressed positive.	[M/(LT) ²]	kPa
dps	$dp_s = p_s - p_p$ or $= p_p - p_s$, pressure increase/drawdown of pressure surface between two points of time during recovery phase. dp_s usually expressed positive.	[M/(LT) ²]	kPa
dpp	$dp_p = p_i - p_p$ or $= p_p - p_i$, maximal pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dp_p expressed positive.	[M/(LT) ²]	kPa
dp₅	$dp_F = p_p - p_F$ or $= p_F - p_p$, maximal pressure increase/drawdown of pressure surface between two points of time during recovery phase. dp_F expressed positive.	[M/(LT) ²]	kPa
Н	Total head; (potential relative a reference level) (indication of h for phase as for p). H=h _e +h _p +h _v	[L]	m
h	Groundwater pressure level (hydraulic head (piezometric head; possible to use for level observations in boreholes, static head)); (indication of h for phase as for p). h=h _e +h _p	[L]	m
h _e	Height of measuring point (Elevation head); Level above reference level for measuring point.	[L]	m
h _p	Pressure head; Level above reference level for height of measuring point of stationary column of water giving corresponding static pressure at measuring point	[L]	m
h _v	Velocity head; height corresponding to the lifting for which the kinetic energy is capable (usually neglected in hydrogeology)	[L]	m
S	Drawdown; Drawdown from undisturbed level (same as dh _p , positive)	[L]	m
Sp	Drawdown in measuring section before flow stop.	[L]	m
h ₀	Initial above reference level before test begins, prior to packer expansion.		m
h _i	Level above reference level in measuring section before start of flow.	[L]	m
h _f	Level above reference level during perturbation phase.	[L]	m
h _s	Level above reference level during recovery phase.	[L]	m
h _p	Level above reference level in measuring section before flow stop.	[L]	m
h _F	Level above reference level in measuring section at end of recovery.	[L]	m
dh	Level difference, drawdown of water level between two points of time.	[L]	m
dh _f	$dh_f = h_i - h_f$ or $= h_f - h_i$, drawdown/pressure increase of pressure surface between two points of time during perturbation phase. dh_f usually expressed positive.	[L]	m
dh _s	$dh_s = h_s - h_p \text{ or } = h_p - h_s, \text{ pressure increase/drawdown of pressure surface between two points of time during recovery phase. } dh_s usually expressed positive.}$	[L]	m
dh _p	$dh_p = h_i - h_p$ or $= h_p - h_i$, maximal pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dh_p expressed positive.	[L]	m
dh _F	$dh_F = h_p - h_F$ or $= h_F - h_p$, maximal pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dh_F expressed positive.	[L]	m
Te _w	Temperature in the test section (taken from temperature		°C

		logging). Temperature		
Te _{w0}		Temperature in the test section during undisturbed		°C
WO		conditions (taken from temperature logging).		
		Temperature		
Te _o		Temperature in the observation section (taken from		°C
0		temperature logging). Temperature		
EC _w		Electrical conductivity of water in test section.		mS/m
EC _{w0}		Electrical conductivity of water in test section during		mS/m
WO		undisturbed conditions.		
EC _o		Electrical conductivity of water in observation section		mS/m
TDS _w		Total salinity of water in the test section.	[M/L ³]	mg/L
TDS _{w0}		Total salinity of water in the test section during	[M/L ³]	mg/L
****		undisturbed conditions.	'	
TDS₀		Total salinity of water in the observation section.	[M/L ³]	mg/L
<u> </u>				
g		Constant of gravitation (9.81 m*s ⁻²) (Acceleration due to	[L/T ²]	m/s ²
•		gravity)	-	
π	pi	Constant (approx 3.1416).	[-]	
			T	
r		Residual. r= p _c -p _m , r= h _c -h _m , etc. Difference between		
		measured data (p _m , h _m , etc) and estimated data (p _c , h _c ,		
		etc)		
ME		1 ,		
		Mean error in residuals. $ME = \frac{1}{n} \sum_{i=1}^{n} r_i$		
		r-1		
NME		Normalized ME. NME=ME/(x _{MAX} -x _{MIN}), x: measured		
		variable considered.		
MAE		Mean absolute error. $MAE = \frac{1}{n} \sum_{i=1}^{n} r_i $		
		Mean absolute error. $MAE = -\sum_{i} r_i $		
N 1 N 4 A F		• •		
NMAE		Normalized MAE. NMAE=MAE/(x _{MAX} -x _{MIN}), x: measured		
RMS		variable considered.	+	
KIVIO		Root mean squared error. $RMS = \left(\frac{1}{n}\sum_{i=1}^{n}r_{i}^{2}\right)^{0.5}$		
		Root mean squared error. $RMS = \left[-\sum_{n} r_{i}^{-}\right]$		
NIDNAO		(n i=1)		
NRMS		Normalized RMR. NRMR=RMR/(x _{MAX} -x _{MIN}), x: measured		
000		variable considered.		
SDR		Standard deviation of residual.		
		$SDR = \left(\frac{1}{n-1}\sum_{i=1}^{n} (r_i - ME)^2\right)^{0.5}$		
		$SDR = \left[\frac{1}{n-1} \sum_{i=1}^{n} (r_i - ME)^{-1} \right]$		
SEMR		Standard error of mean residual.		
		$\left(\begin{array}{ccc} 1 & \sum_{i=1}^{n} \left(& & \\ & & \end{array} \right)^{0.5}$		
		$SEMR = \left(\frac{1}{n(n-1)}\sum_{i=1}^{n}(r_i - ME)^2\right)^{0.3}$		
		$(n(n-1))_{i=1}$		
Danier 1				
Paramete	ers	Charific consolity and an area of the form the second of the	rı 2/ 1	21-
Q/s		Specific capacity s=dp _p or s=s _p =h ₀ -h _p (open borehole)	[L ² /T]	m²/s
ח		Interpreted flow dimension asserting to Parker 1000	r 1	
D		Interpreted flow dimension according to Barker, 1988.	[-]	-
dt ₁		Time of starting for semi-log or log-log evaluated	[T]	s
uι ₁		characteristic counted from start of flow phase and	נייו	3
		recovery phase respectively.		
		Todovory pridoc respectively.		
dt ₂		End of time for semi-log or log-log evaluated	[T]	s
 2		characteristic counted from start of flow phase and	1	Ĭ
		recovery phase respectively.		
-	1	1.200.0.) p	1	

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dt _L	Response time to obtain 0.1 m (or 1 kPa) drawdown in observation section counted from start of recovery phase.	[T]	S
ТВ	Flow capacity in a one-dimensional structure of width B and transmissivity T. Transient evaluation of one-dimensional structure	[L ³ /T]	m³/s
Т	Transmissivity	[L ² /T]	m²/s
T _M	Transmissivity according to Moye (1967)	[L ² /T]	m²/s
TQ	Evaluation based on Q/s and regression curve between	[L ² /T]	m²/s
	Q/s and T, as example see Rhén et al (1997) p. 190.	7	2.
T _S	Transmissivity evaluated from slug test	[L ² /T]	m²/s
T _D	Transmissivity evaluated from PFL-Difference Flow Meter	[L ² /T]	m²/s
T _I	Transmissivity evaluated from Impeller flow log	$[L^2/T]$	m²/s
T_{Sf} , T_{Lf}	Transient evaluation based on semi-log or log-log diagram for perturbation phase in injection or pumping.	[L ² /T]	m²/s
T_{Ss}, T_{Ls}	Transient evaluation based on semi-log or log-log diagram for recovery phase in injection or pumping.	[L ² /T]	m²/s
T _T	Transient evaluation (log-log or lin-log). Judged best evaluation of T_{Sf} , T_{Lf} , T_{SS} , T_{Ls}	[L ² /T]	m²/s
T _{NLR}	Evaluation based on non-linear regression.	[L ² /T]	m²/s
T _{Tot}	Judged most representative transmissivity for particular	[L ² /T]	m²/s
	test section and (in certain cases) evaluation time with respect to available data (made by SKB at a later stage).		
		r. (,
K	Hydraulic conductivity	[L/T]	m/s
K _s	Hydraulic conductivity based on spherical flow model	[L/T]	m/s
K _m	Hydraulic conductivity matrix, intact rock Intrinsic permeability	[L/T] [L ²]	m/s m²
kb	Permeability-thickness product: kb=k·b	[L ³]	m ³
ND .	T erricability-trickriess product. Rb-R b	[L]	1111
SB	Storage capacity in a one-dimensional structure of width B and storage coefficient S. Transient evaluation of one-dimensional structure	[L]	m
SB*	Assumed storage capacity in a one-dimensional structure of width B and storage coefficient S. Transient evaluation of one-dimensional structure	[L]	m
S S*	Storage coefficient, (Storativity)	[-]	-
S _y	Assumed storage coefficient Theoretical specific yield of water (Specific yield;	[-] [-]	-
O _y	unconfined storage. Defined as total porosity (n) minus retention capacity (S _r)	[-]	
S _{ya}	Specific yield of water (Apparent specific yield); unconfined storage, field measuring. Corresponds to volume of water achieved on draining saturated soil or	[-]	-
	rock in free draining of a volumetric unit. S_{ya} = S_{y} (often called S_{y} in literature)		
S _r	Specific retention capacity, (specific retention of water, field capacity) (Specific retention); unconfined storage.	[-]	-
	Corresponds to water volume that the soil or rock has left after free draining of saturated soil or rock.		
S _f	Fracture storage coefficient	[-]	
S _f	Matrix storage coefficient	[-]	-
S _{NLR}	Storage coefficient, evaluation based on non-linear	[-]	-
S _{Tot}	regression Judged most representative storage coefficient for	[-]	
∪ Fot	particular test section and (in certain cases) evaluation	[-]	-

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		time with respect to available data (made by SKB at a		
		later stage).		
0			5.40.7	4.1
S _s		Specific storage coefficient; confined storage.	[1/L]	1/m
S _s *		Assumed specific storage coefficient; confined storage.	[1/L]	1/m
C _f		Hydraulic resistance: The hydraulic resistance is an	[T]	s
O _I		aguitard with a flow vertical to a two-dimensional	[.,]	
		formation. The inverse of c is also called Leakage		
		coefficient. c _f =b'/K' where b' is thickness of the aquitard		
		and K' its hydraulic conductivity across the aquitard.		
L _f		Leakage factor: $L_f = (K \cdot b \cdot c_f)^{0.5}$ where K represents	[L]	m
		characteristics of the aquifer.		
ξ	Skin	Skin factor	[-]	-
ξ* C	Skin	Assumed skin factor	[-]	- 3
С		Wellbore storage coefficient	$[(LT^2)\cdot M^2]$	m³/Pa
C_D		$C_D = C \cdot \rho_w g / (2\pi \cdot S \cdot r_w^2)$, Dimensionless wellbore storage coefficient	[-]	-
ω	Stor-ratio	$\omega = S_f/(S_f + S_m)$, storage ratio (Storativity ratio); the ratio	[-]	-
		of storage coefficient between that of the fracture and		
		total storage.		
		2		
λ	Interflow-coeff	$\lambda = \alpha \cdot (K_m / K_f) \cdot r_w^2$ interporosity flow coefficient.	[-]	-
T _{GRF}		Transmissivity interpreted using the GRF method	[L ² /T]	m²/s
S _{GRF}		Storage coefficient interpreted using the GRF method	[1/L]	1/m
D _{GRF}		Flow dimension interpreted using the GRF method	[-]	-
			50 - 20 0 43	4.5
C _w		Water compressibility; corresponding to β in	[(LT ²)/M]	1/Pa
		hydrogeological literature.	F/L T ² \/N 41	1/Pa
Cr		Pore-volume compressibility, (rock compressibility); Corresponding to α/n in hydrogeological literature.	[(LT ²)/M]	I/Pa
		Corresponding to within hydrogeological interactive.		
Ct		$c_t = c_r + c_w$, total compressibility; compressibility per	[(LT ²)/M]	1/Pa
		volumetric unit of rock obtained through multiplying by		
		the total porosity, n. (Presence of gas or other fluids can		
		be included in ct if the degree of saturation (volume of		
		respective fluid divided by n) of the pore system of		
		respective fluid is also included)	2	
nc _t		Porosity-compressibility factor: nc _t = n·c _t	[(LT ²)/M]	1/Pa
nc _t b		Porosity-compressibility-thickness product: nc _t b= n·c _t .b	$[(L^2T^2)/M]$	m/Pa
n		Total porosity	-	-
n _e		Kinematic porosity, (Effective porosity)	-	-
е		Transport aperture. e = n _e ·b	[L]	m
ρ	Density	Density	[M/L ³]	kg/(m ³)
$\rho_{\rm w}$	Density-w	Fluid density in measurement section during	[M/L ³]	kg/(m ³)
₽w	_ = = = = = = = = = = = = = = = = = = =	pumping/injection		
ρο	Density-o	Fluid density in observation section	[M/L ³]	kg/(m³)
$\rho_{\sf sp}$	Density-sp	Fluid density in standpipes from measurement section	[M/L ³]	kg/(m ³)
μ μ	my	Dynamic viscosity	[M/LT]	Pas
μ _w	my	Dynamic viscosity (Fluid density in measurement section	[M/LT]	Pas
-		during pumping/injection)	-	
FC _T		Fluid coefficient for intrinsic permeability, transference of	[1/LT]	1/(ms)
		k to K; K=FC _T -k; FC _T = ρ_w ·g/ μ_w		
FC_S		Fluid coefficient for porosity-compressibility, transference	$[M/T^2L^2]$	Pa/m

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	of c_t to S_s ; $S_s = FC_S \cdot n \cdot c_t$; $FC_S = \rho_w \cdot g$	
Index on K, T and		
S	S: semi-log	
L	L: log-log	
f	Pump phase or injection phase, designation following S	
	or L (withdrawal)	
s	Recovery phase, designation following S or L (recovery)	
NLR	NLR: Non-linear regression. Performed on the entire test	
	sequence, perturbation and recovery	
М	Moye	
GRF	Generalised Radial Flow according to Barker (1988)	
m	Matrix	
f	Fracture	
measl	Measurement limit. Estimated measurement limit on parameter being measured (T or K)	
Т	Judged best evaluation based on transient evaluation.	
Tot	Judged most representative parameter for particular test section and (in certain cases) evaluation time with respect to available data (made by SKB at a later stage).	
b	Bloch property in a numerical groundwater flow model	
е	Effective property (constant) within a domain in a	
	numerical groundwater flow model.	
Index on p and Q	•	
0	Initial condition, undisturbed condition in open holes	
i	Natural, "undisturbed" condition of formation parameter	
f	Pump phase or injection phase (withdrawal, flowing	
	phase)	
S	Recovery, shut-in phase	
p	Pressure or flow in measuring section at end of	
	perturbation period	
F	Pressure in measuring section at end of recovery period.	
m	Arithmetical mean value	
С	Estimated value. The index is placed last if index for "where" and "what" are used. Simulated value	
m	Measured value. The index is placed last if index for	
	"where" and "what" are used. Measured value	
Some miscellaned	ous indexes on p and h	
W	Test section (final difference pressure during flow phase	
	in test section can be expressed dp _{wp} ; First index shows	
	"where" and second index shows "what")	
0	Observation section (final difference pressure during flow phase in observation section can be expressed dp _{op} ; First index shows "where" and second index shows "what")	
f	Fresh-water head. Water is normally pumped up from section to measuring hoses where pressure and level are observed. Density of the water is therefore approximately the same as that of the measuring section. Measured groundwater level is therefore normally represented by what is defined as point-water head. If pressure at the measuring level is recalculated to a level for a column of water with density of fresh water above the measuring point it is referred to as fresh-water head and h is indicated last by an f. Observation section (final level during flow phase in observation section can be expressed hopf; the first index shows "where" and the second index shows "what" and the last one "recalculation")	

Borehole: KLX05

APPENDIX 5

SICADA data tables



SICADA/Data Import Template

(Simplified version v1.4)

SKB & Ergodata AB 2004

File Identity	
Created By	Stephan Rohs
Created	2005-07-07

Activity Type	KLX05
	KLX05 - Injection test

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Project	AP PS 400-05-031

Activity Info	rmation				Additional Activity Data							
					C10	P20	P200	P220	R25			
ldcode	Start Date	Stop Date	Secup (m)	Seclow (m)	Section No	Company	Field crew manager	Field crew	evaluating data	Report		
KLX05	2005-06-01 17:37	2005-06-17 10:14	111.30	987.27		Golder	Stephan Rohs	Stephan Rohs, Mesgena Gebrezghi	Cristian Enachescu, Jörg Böhner, Stephan Rohs	Cristian Enachescu, Jörg Böhner, Stephan Rohs		

Table	plu_s_hole_test_d
	PLU Injection and pumping, General information

Column	Datatype	Unit	Column Description
site	CHAR		Investigation site name
activity_type	CHAR		Activity type code
start_date	DATE		Date (yymmdd hh:mm:ss)
stop_date	DATE		Date (yymmdd hh:mm:ss)
project	CHAR		project code
idcode	CHAR		Object or borehole identification code
secup	FLOAT	m	Upper section limit (m)
seclow	FLOAT	m	Lower section limit (m)
section_no	INTEGER	number	Section number
test_type	CHAR		Test type code (1-7), see table description
formation_type	CHAR		1: Rock, 2: Soil (superficial deposits)
start_flow_period	DATE	yyyymmdd	Date & time of pumping/injection start (YYYY-MM-DD hh:mm:ss)
stop_flow_period	DATE	yyyymmdd	Date & time of pumping/injection stop (YYYY-MM-DD hh:mm:ss)
flow_rate_end_qp	FLOAT	m**3/s	Flow rate at the end of the flowing period
value_type_qp	CHAR		0:true value,-1 <lower meas.limit1:="">upper meas.limit</lower>
mean_flow_rate_qm	FLOAT	m**3/s	Arithmetic mean flow rate during flow period
q_measll	FLOAT	m**3/s	Estimated lower measurement limit of flow rate
q_measlu	FLOAT	m**3/s	Estimated upper measurement limit of flow rate
tot_volume_vp	FLOAT	m**3	Total volume of pumped or injected water
dur_flow_phase_tp	FLOAT	S	Duration of the flowing period of the test
dur_rec_phase_tf	FLOAT	s	Duration of the recovery period of the test
initial_head_hi	FLOAT	m	Hydraulic head in test section at start of the flow period
head_at_flow_end_h	FLOAT	m	Hydraulic head in test section at stop of the flow period.
final_head_hf	FLOAT	m	Hydraulic head in test section at stop of recovery period.
initial_press_pi	FLOAT	kPa	Groundwater pressure in test section at start of flow period
press_at_flow_end_ _l	FLOAT	kPa	Groundwater pressure in test section at stop of flow period.
final_press_pf	FLOAT	kPa	Ground water pressure at the end of the recovery period.
fluid_temp_tew	FLOAT	оС	Measured section fluid temperature, see table description
fluid_elcond_ecw	FLOAT	mS/m	Measured section fluid el. conductivity, see table descr.
fluid_salinity_tdsw	FLOAT	mg/l	Total salinity of section fluid based on EC, see table descr.
fluid_salinity_tdswm	FLOAT	mg/l	Tot. section fluid salinity based on water sampling, see
reference	CHAR		SKB report No for reports describing data and evaluation
comments	VARCHAR		Short comment to data
error_flag	CHAR		If error_flag = "*" then an error occured and an error
in_use	CHAR		If in_use = "*" then the activity has been selected as
sign	CHAR		Signature for QA data accknowledge (QA - OK)
lp	FLOAT	m	Hydraulic point of application

							formation t			flow_rate_end_	value_type_	mean flow ra	l	_measl	tot_volume_v
idcode	start_date	stop_date	secup	seclow	section_no	test_type	ype	start_flow_period	stop_flow_period	qp	qp		q_measll		р
KLX05	050601 17:37	050601 21:07	111.30	211.30	_	3	1	2005-06-01 18:35:44	2005-06-01 19:05:54	2.63E-04	0	2.87E-04	1.67E-08	8.33E-04	5.16E-01
KLX05	050602 09:21	050602 11:45	211.14	311.14		3	1	2005-06-02 10:13:24	2005-06-02 10:43:34	5.80E-05	0	6.63E-05	1.67E-08	8.33E-04	1.19E-01
KLX05	050602 13:30	050602 16:22	306.37	406.37		3	1	2005-06-02 13:30:00	2005-06-02 16:22:00	5.00E-08	0	8.33E-08	1.67E-08	8.33E-04	1.50E-04
KLX05	050602 17:49	050602 23:32	406.54	506.54		3	1	2005-06-02 18:59:51	2005-06-02 19:30:01	2.33E-07	0	3.17E-07	1.67E-08	8.33E-04	5.70E-04
KLX05	050603 09:11	050603 11:11	506.63	606.63		4	1	2005-06-03 09:59:29	2005-06-03 09:59:30	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX05		050603 15:26	606.82	706.82		3	1	2005-06-03 13:54:22	2005-06-03 14:24:32		0		1.67E-08	8.33E-04	8.40E-04
KLX05	050603 16:56	050604 00:46	706.83	806.83		3	1	2005-06-03 18:14:16	2005-06-03 18:44:26	3.33E-07	0	8.33E-07	1.67E-08	8.33E-04	1.50E-03
KLX05	050604 09:20	050604 12:18	807.11	907.11		3	1	2005-06-04 10:46:20	2005-06-04 11:16:30	1.67E-07	C	1.67E-07	1.67E-08	8.33E-04	3.00E-04
KLX05	050604 14:00	050604 17:10	887.27	987.27		3	1	2005-06-04 16:08:15	2005-06-04 16:38:15	1.67E-08	0	6.67E-08	1.67E-08	8.33E-04	1.20E-04
KLX05	050610 13:12	050610 14:40	111.30	131.30		3	1	2005-06-10 13:57:50	2005-06-10 14:18:00	2.22E-04	0	2.37E-04	1.67E-08	8.33E-04	2.85E-01
KLX05	050610 15:35	050610 17:02	126.02	146.02		3	1	2005-06-10 16:20:30	2005-06-10 16:40:40	1.87E-05	0	1.90E-05	1.67E-08	8.33E-04	2.28E-02
KLX05	050610 17:47	050610 20:20	146.10	166.10		3	1	2005-06-10 19:08:02	2005-06-10 19:38:22	2.28E-05	C	2.35E-05	1.67E-08	8.33E-04	4.23E-02
KLX05	050611 08:54	050611 10:27	166.12	186.12		3	1	2005-06-11 09:44:53	2005-06-11 10:05:03	4.50E-07	0	5.33E-07	1.67E-08	8.33E-04	6.40E-04
KLX05	050611 11:14	050611 13:04	181.13	201.13		3	1	2005-06-11 12:02:34	2005-06-11 12:22:44	8.83E-06	0	9.33E-06	1.67E-08	8.33E-04	1.12E-02
KLX05	050611 13:38	050611 15:11	191.14	211.14		3	1	2005-06-11 14:29:04	2005-06-11 14:49:14	1.15E-05	0	1.40E-05	1.67E-08	8.33E-04	1.68E-02
KLX05	050611 15:55	050611 17:23	211.14	231.14		3	3 1	2005-06-11 16:41:20	2005-06-11 17:01:30	2.00E-06	0	2.17E-06	1.67E-08	8.33E-04	2.60E-03
KLX05	050611 18:10	050611 19:59	226.14	246.14		3	1	2005-06-11 18:57:09	2005-06-11 19:17:19	6.33E-06	0	6.50E-06	1.67E-08	8.33E-04	7.80E-03
KLX05	050612 08:10	050612 09:44	246.15	266.15		3	1	2005-06-12 09:01:51	2005-06-12 09:22:01	6.08E-05	0	7.00E-05	1.67E-08	8.33E-04	8.40E-02
KLX05	050612 10:21	050612 11:49	266.21	286.21		4	1	2005-06-12 11:02:01	2005-06-12 11:02:02	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX05	050612 12:29	050612 13:58	286.28	306.28		3	1	2005-06-12 13:16:13	2005-06-12 13:36:23	5.00E-07	0	5.00E-07	1.67E-08	8.33E-04	6.00E-04
KLX05	050612 14:39	050612 16:22	306.37	326.37		3	1	2005-06-12 15:40:08	2005-06-12 16:00:18	5.00E-08	0	6.67E-08	1.67E-08	8.33E-04	8.00E-05
KLX05	050612 17:03	050612 18:05	326.38	346.38		4	1	#NV	#NV	0.00E+00	-1	0.00E+00	1.67E-08	8.33E-04	0.00E+00
KLX05	050612 18:38	050612 19:40	341.40	361.40		3	1	#NV	#NV	0.00E+00	-1	0.00E+00	1.67E-08	8.33E-04	0.00E+00
KLX05	050613 07:26	050613 08:31	356.42	376.42		3	3 1	#NV	#NV	0.00E+00	-1	0.00E+00	1.67E-08	8.33E-04	0.00E+00
KLX05	050613 09:17	050613 10:23	376.47			3	1	#NV	#NV	0.00E+00	-1	0.00E+00	1.67E-08	8.33E-04	0.00E+00
KLX05	050613 11:00	050613:12:27	386.50	406.50		4	1	2005-06-13 11:45:32	2005-06-13 11:45:33	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX05	050613 13:04	050613 14:46	406.54	426.54		3	1	2005-06-13 13:54:05	2005-06-13 14:14:15	2.33E-07	0	3.00E-07	1.67E-08	8.33E-04	3.60E-04
KLX05	050613 15:32	050613 16:53	426.55	446.55		4	1		2005-06-13 16:11:49	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX05	050613 17:33	050613 18:38	446.57	466.57		3	1	#NV	#NV	0.00E+00	-1	0.00E+00	1.67E-08	8.33E-04	0.00E+00
KLX05	050613 19:13	050614 01:56	466.58	486.58		4	1	2005-06-13 19:54:23	2005-06-13 19:54:23	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX05	050614 07:40	050614 09:27	486.59	506.59		3	1	2005-06-14 08:45:37	2005-06-14 09:05:47	3.33E-08	0	3.33E-08	1.67E-08	8.33E-04	4.00E-05
KLX05	050614 11:09	050614 12:33	606.82	626.82		4	1	2005-06-14 11:51:03	2005-06-14 11:51:04	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX05		050614 15:26	626.85	646.85		3	1	2005-06-14 14:24:25		1.67E-07	0	1.67E-07	1.67E-08	8.33E-04	3.00E-04
KLX05	050614 16:07	050614 17:12	646.85	666.85		3	1	#NV	#NV	0.00E+00	-1	0.00E+00	1.67E-08	8.33E-04	0.00E+00
KLX05	050614 17:56	050614 18:57	666.85	686.85		3	1	#NV	#NV	0.00E+00	-1	0.00E+00	1.67E-08	8.33E-04	0.00E+00
KLX05	050614 19:48	050615 00:58	686.83	706.83		3	1	2005-06-14 20:36:20	2005-06-14 20:56:30	2.17E-07	0	2.50E-07	1.67E-08	8.33E-04	3.00E-04
KLX05	050615 08:02	050615 09:58	706.83	726.83		3	1	2005-06-15 08:56:18	2005-06-10 09:16:28	1.67E-07	0	2.17E-07	1.67E-08	8.33E-04	2.60E-04
KLX05	050615 10:40	050615 11:52	726.91	746.91		4	1	2005-06-15 11:20:36	2005-06-15 11:20:37	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX05		050615 14:11	747.00	767.00		4	1	2005-06-15 13:29:19	2005-06-15 13:29:20	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX05		050615 16:25	767.06	787.06		3	1	2005-06-15 15:43:10	2005-06-15 16:03:20	1.83E-07	-1	2.00E-07	1.67E-08	8.33E-04	2.40E-04
KLX05		050616 01:36	787.07	807.07		3	1	2005-06-15 19:04:04	2005-06-15 19:34:14	2.00E-07	0	4.83E-07	1.67E-08	8.33E-04	5.80E-04
KLX05	050616 08:05		807.11			3	1	#NV	#NV	0.00E+00	-1		1.67E-08	8.33E-04	0.00E+00
KLX05		050616 12:29	827.15			3	3 1	2005-06-16 11:20:13	2005-06-16 11:27:23	1.67E-08	0		1.67E-08	8.33E-04	2.10E-05
KLX05		050616 00:00	847.20			3	3 1	2005-06-16 14:10:58	2005-06-16 14:31:08	1.00E-07	0		1.67E-08	8.33E-04	1.40E-04
KLX05		050616 17:25	867.24	887.24		3	3 1	2005-06-16 16:43:46		8.33E-08	0	1.17E-07	1.67E-08	8.33E-04	1.40E-04
KLX05	050616 18:07		887.27			3	1	2005-06-16 19:13:43		1.67E-08	0		1.67E-08	8.33E-04	2.00E-05
KLX05		050617 08:27	907.30			4	1		#NV	0.00E+00	-1		1.67E-08	8.33E-04	0.00E+00
KLX05		050617 10:14	927.34			3	1	#NV	#NV	0.00E+00	-1	0.00E+00	1.67E-08	8.33E-04	0.00E+00

			dur flow n	dur roo n	initial boad	hood at flow a final hood	initial proce	proce at flow a	final proce	fluid town t	huid alaand	fluid_salinity_t	fluid salini			$\overline{}$
idaada						head_at_flow_e final_head_ nd_hp hf		press_at_flow_e		fluid_temp_t f			_			lm.
idcode	secup	seclow	hase_tp				pi		pf		ecw	dsw	ty_tdswm	reference	comments	lp
KLX05	111.30	211.30				10.49	1884									161.30
KLX05	211.14	311.14	1800			11.37	2772			11.2 12.5						261.14
KLX05	306.37	406.37	1800			12.90	3630		3673							356.37
KLX05	406.54	506.54	1800	14400 3840		13.04 #NV	4528	4720 5623		13.9 15.2						456.54 556.63
KLX05 KLX05	506.63 606.82	606.63 706.82	1800			15.34	5421 6305			16.6					-	656.82
			1800			15.42	7201	7382		18.0					-	756.83
KLX05 KLX05	706.83	806.83 907.11	1800			17.23	8086			19.5					-	857.11
KLX05	807.11 887.27	987.11	1800			#NV	8847			20.6					-	937.11
KLX05	111.30	131.30				10.86	1188		1192	8.9						121.30
KLX05	126.02	146.02	1200			11.19	1318			9.1						136.02
KLX05	146.10	166.10	1800			11.19	1494		1494	9.1						156.02
KLX05	166.12	186.12	1200			10.53	1669		1674	9.6						176.12
KLX05	181.13	201.13	1200			10.94	1801	2001	1802	9.8						191.13
KLX05	191.14	211.14				10.94	1892			9.9						201.14
KLX05	211.14	231.14				11.06	2067		2067	10.2						221.14
KLX05	226.14	246.14	1200			11.61	2200		2200	10.4						236.14
KLX05	246.15	266.15				11.15	2376		2387	10.4						256.15
KLX05	266.21	286.21	1200	2700		#NV	2565			10.9						276.21
KLX05	286.28	306.28	1200			12.01	2736		2743	11.1						296.28
KLX05	306.37	326.37	1200			13.82	2926		2956	11.4						316.37
KLX05	326.38	346.38	0			#NV	#NV		#NV	11.7						336.38
KLX05	341.40	361.40				#NV	#NV		#NV	11.9						351.40
KLX05	356.42	376.42	0			#NV	#NV	#NV	#NV	12.1						366.42
KLX05	376.47	396.47	0			#NV	#NV		#NV	12.3						386.42
KLX05	386.50	406.50	1	2400		#NV	3642		3668	12.5						396.50
KLX05	406.54	426.54				13.46	3812		3849	12.8						416.54
KLX05	426.55	446.55	1200			#NV	3999		4030	13.1						436.55
KLX05	446.57	466.57	0			#NV	#NV		#NV	13.3						456.57
KLX05	466.58	486.58		21600		#NV	4351	4563		13.6						476.58
KLX05	486.59	506.59				12.82	4533			13.9						496.59
KLX05	606.82	626.82	1200	2400		#NV	5608		5610	15.5						616.82
KLX05	626.85	646.85	1800			14.82	5777		5782	15.9						636.85
KLX05	646.85	666.85	0			#NV	#NV		#NV	16.1						656.85
KLX05	666.85	686.85	0			#NV	#NV		#NV	16.4						676.85
KLX05	686.83	706.83	1200			15.31	6315			16.7						696.83
KLX05	706.83	726.83	1200			15.92	6488			16.9					1	716.83
KLX05	726.91	746.91	1	2400		#NV	6679			17.2						736.91
KLX05	747.00	767.00	1	2400		#NV	6868			17.5					1	757.00
KLX05	767.06	787.06	1200			18.33	7027		7046	17.8					1	777.06
KLX05	787.07	807.07	1200			16.89	7267		7239	18.1					1	797.07
KLX05	807.11	827.11	0			#NV	#NV		#NV	18.3						817.11
KLX05	827.15	847.15				#NV	7625			18.6					1	837.15
KLX05	847.20	867.20	1200			18.75	7744			18.9						857.20
KLX05	867.24	887.24	1200			17.07	7930		7960	19.2					1	877.24
KLX05	887.27	907.27	1200			17.53	8137			19.5						897.27
KLX05	907.30	927.30	0			#NV	#NV	#NV	#NV	19.8					1	917.30
KLX05	927.34	947.34				#NV	#NV			20.0						937.34

Table		plu_s_hol	e_test_ed1
	PLU		ing/injection. Basic evaluation
Column site	Datatype CHAR	Unit	Column Description
site activity type	CHAR		Investigation site name Activity type code
start_date	DATE		Date (yymmdd hh:mm:ss)
stop_date	DATE		Date (yymmdd hh:mm:ss)
project	CHAR		project code
idcode	CHAR		Object or borehole identification code
secup	FLOAT	m	Upper section limit (m)
seclow	FLOAT	m	Lower section limit (m)
section_no	INTEGER	number	Section number
test_type formation_type	CHAR		Test type code (1-7), see table description! Formation type code. 1: Rock, 2: Soil (superficial deposits)
lp	FLOAT	m	Hydraulic point of application for test section, see descr.
seclen_class	FLOAT	m	Planned ordinary test interval during test campaign.
spec_capacity_q_s	FLOAT	m**2/s	Specific capacity (Q/s) of test section, see table descript.
value_type_q_s	CHAR		0:true value,-1:Q/s <lower meas.limit,1:q="" s="">upper meas.limit</lower>
transmissivity_tq	FLOAT	m**2/s	Tranmissivity based on Q/s, see table description
value_type_tq	CHAR		0:true value,-1:TQ <lower meas.limit,1:tq="">upper meas.limit.</lower>
bc_tq transmissivity_moye	FLOAT	m**2/s	Best choice code. 1 means TQ is best choice of T, else 0 Transmissivity,TM, based on Moye (1967)
bc_tm	CHAR	20	Best choice code. 1 means Tmoye is best choice of T, else 0
value_type_tm	CHAR		0:true value,-1:TM <lower meas.limit,1:tm="">upper meas.limit.</lower>
hydr_cond_moye	FLOAT	m/s	K_M: Hydraulic conductivity based on Moye (1967)
formation_width_b	FLOAT	m	b:Aquifer thickness repr. for T(generally b=Lw) ,see descr.
width_of_channel_b	FLOAT	m	B:Inferred width of formation for evaluated TB
I moasl th	FLOAT	m**3/s m**3/s	TB:Flow capacity in 1D formation of T & width B, see descr. Estimated lower meas. limit for evaluated TB,see description
I_measl_tb u measl tb	FLOAT	m**3/s	Estimated lower meas. limit for evaluated TB,see description Estimated upper meas. limit of evaluated TB,see description
sb	FLOAT	m	SB:S=storativity,B=width of formation,1D model,see descript.
assumed_sb	FLOAT	m	SB*: Assumed SB,S=storativity,B=width of formation,see
leakage_factor_lf	FLOAT	m	Lf:1D model for evaluation of Leakage factor
transmissivity_tt	FLOAT	m**2/s	TT:Transmissivity of formation, 2D radial flow model,see
value_type_tt	CHAR		0:true value,-1:TT <lower meas.limit,1:tt="">upper meas.limit,</lower>
bc_tt	CHAR		Best choice code. 1 means TT is best choice of T, else 0
l_measl_q_s u_measl_q_s	FLOAT	m**2/s m**2/s	Estimated lower meas. limit for evaluated TT,see table descr Estimated upper meas. limit for evaluated TT,see description
storativity_s	FLOAT	111 2/3	S:Storativity of formation based on 2D rad flow,see descr.
assumed_s	FLOAT		Assumed Storativity,2D model evaluation,see table descr.
bc_s	FLOAT		Best choice of S (Storativity) ,see descr.
ri	FLOAT	m	Radius of influence
ri_index	CHAR		ri index=index of radius of influence :-1,0 or 1, see descr.
leakage_coeff	FLOAT	1/s m/s	K'/b':2D rad flow model evaluation of leakage coeff,see desc
hydr_cond_ksf value_type_ksf	FLOAT	111/5	Ksf:3D model evaluation of hydraulic conductivity,see desc. 0:true value,-1:Ksf <lower meas.limit,1:ksf="">upper meas.limit,</lower>
I measl ksf	FLOAT	m/s	Estimated lower meas.limit for evaluated Ksf,see table desc.
u_measl_ksf	FLOAT	m/s	Estimated upper meas.limit for evaluated Ksf,see table descr
spec_storage_ssf	FLOAT	1/m	Ssf:Specific storage,3D model evaluation,see table descr.
assumed_ssf	FLOAT	1/m	Ssf*:Assumed Spec.storage,3D model evaluation,see table des.
C	FLOAT	m**3/pa	C: Wellbore storage coefficient; flow or recovery period
cd skin	FLOAT		CD: Dimensionless wellbore storage coefficient Skin factor;best estimate of flow/recovery period,see descr.
dt1	FLOAT	s	Estimated start time of evaluation, see table description
dt2	FLOAT	s	Estimated start time of evaluation, see table description Estimated stop time of evaluation, see table description
t1	FLOAT	s	Start time for evaluated parameter from start flow period
t2	FLOAT	s	Stop time for evaluated parameter from start of flow period
dte1	FLOAT	s	Start time for evaluated parameter from start of recovery
dte2	FLOAT	S	Stop time for evaluated parameter from start of recovery
p_horner transmissivity_t_nlr	FLOAT	kPa m**2/s	p*:Horner extrapolated pressure, see table description T NLR Transmissivity based on None Linear Regression
storativity s_nlr	FLOAT	111 2/3	S NLR=storativity based on None Linear Regression
value_type_t_nlr	CHAR		0:true value,-1:T_NLR <lower meas.limit,1:="">upper meas.limit</lower>
bc_t_nlr	CHAR		Best choice code. 1 means T_NLR is best choice of T, else 0
c_nlr	FLOAT	m**3/pa	Wellbore storage coefficient, based on NLR, see descr.
cd_nlr	FLOAT		Dimensionless wellbore storage constant, see table descrip.
skin_nlr	FLOAT		Skin factor based on Non Linear Regression,see desc.
transmissivity_t_grf	FLOAT CHAR	m**2/s	T_GRF:Transmissivity based on Genelized Radial Flow,see 0:true value,-1:T_GRF <lower meas.limit,1:="">upper meas.limit</lower>
value_type_t_grf	CHAR		U:true value,-1:1_GRF <lower meas.ilmit,1:="">upper meas.ilmit Best choice code. 1 means T_GRF is best choice of T, else 0</lower>
hc t arf	FLOAT		S GRF:Storativity based on Generalized Radial Flow, see des.
bc_t_grf storativity s grf	-		Inferred flow dimesion based on Generalized Rad. Flow model
bc_t_grf storativity_s_grf flow_dim_grf	FLOAT		
storativity_s_grf	FLOAT VARCHAR	no_unit	Short comment to the evaluated parameters
storativity_s_grf flow_dim_grf	VARCHAR CHAR	no_unit	If error_flag = "*" then an error occured and an error
storativity_s_grf flow_dim_grf comment error_flag in_use	VARCHAR CHAR CHAR	no_unit	If error_flag = "*" then an error occured and an error If in_use = "*" then the activity has been selected as
storativity_s_grf flow_dim_grf comment error_flag	VARCHAR CHAR	no_unit	If error_flag = "*" then an error occured and an error
storativity_s_grf flow_dim_grf comment error_flag in_use	VARCHAR CHAR CHAR	no_unit	If error_flag = "*" then an error occured and an error If in_use = "*" then the activity has been selected as

								formation t		seclen cl	spec_capacity_	value type	transmissivity_t	value_type		transmissivity_		value type t	hydr_cond_
KANDE 050902 0921 050902 1146 22 11.14 311.14 31 281.14 100 2.84E-08 0 3.70E-08 0 3.70E-08 0 3.70E-08 0 3.70E-08 0 3.70E-08 0	idcode	start_date	stop_date	secup	seclow	section_no	test_type	_	lp	_			-		bc_tq		bc_tm		
KANDS 056602 17-30 056602 18-22 306.37 406.37 3 1 366.37 100 2.54E-08 0 3.31E-09 0 0.33E-11 10.64E 0 1 1.96E-08 0 1.55E-08 0 0 1.55E-08 0 0 0 1.55E-08 0 0 0 1.55E-08	KLX05	050601 17:37	050601 21:07	111.30	211.30		1 3	3 1	161.30	100	1.20E-0	5 (0			1.56E-05	C	0	1.56E-07
KINDS 0.000002 17-49 0.000002 23-32 400 5-6 500 5-6 3 1 450-54 100 1 195-06 0 1 555-06 0 0 1 555-06 0 1 555-06	KLX05	050602 09:21	050602 11:45	211.14	311.14		3	3 1	261.14	100	2.84E-0	6 (0			3.70E-06	C	0	3.70E-08
KANSS 050903 09111 050903 19111 590.85 600.85 4 1 556.85 100 89V1 99V1 99V0 -1 89V. 0	KLX05	050602 13:30	050602 16:22	306.37	406.37		3	3 1	356.37	100	2.54E-0	9 (0			3.31E-09	C	0	3.31E-11
KLX06	KLX05	050602 17:49	050602 23:32	406.54	506.54		3	1	456.54	100	1.19E-0	8 (0			1.55E-08	C	0	1.55E-10
KLX05	KLX05	050603 09:11	050603 11:11	506.63	606.63		4	1	556.63	100	#N	V -1	1			#NV	C	-1	#NV
KIX05	KLX05	050603 12:41	050603 15:26	606.82	706.82		3	3 1	656.82	100	1.93E-0	8 (0			2.51E-08	C	0	2.51E-10
KLXDS 050004 14:00 050004 17:10 887.27 997.27 3 1 937.27 100 9.34E-10 0 1.22E-05 0 1.22E-05 0 1.22E-05 0 1.02E-05 0 1.	KLX05	050603 16:56	050604 00:46	706.83	806.83		3	3 1	756.83	100	1.81E-0	8 (0			2.35E-08	C	0	2.35E-10
KLX06 050910 1312 050910 1440 11130 13130 3 1 12130 20 1.0HE-05 0 0 5.8EE-07 0	KLX05	050604 09:20	050604 12:18	807.11	907.11		3	1	857.11	100	8.93E-0	9 (0			1.16E-08	C	0	1.16E-10
KLX05	KLX05	050604 14:00	050604 17:10	887.27	987.27		3	3 1	937.27	100	9.34E-1	0 (0			1.22E-09	C	0	1.22E-11
KLX05 05661 1054 05661 10	KLX05	050610 13:12	050610 14:40	111.30	131.30		3	1	121.30	20	1.04E-0	5 (0			1.08E-05	C	0	5.40E-07
KLX05 050611 1051 050611 1052 166.12 186.12 3 1 176.12 20 2.24E-06 0 2.24E-06 0 0 1.17E-09 KLX05 050611 13.04 181.13 201.14 3 1 201.14 20 2.64E-07 0 4.55E-07 0 2.24E-06 0	KLX05	050610 15:35	050610 17:02	126.02	146.02		3	3 1	136.02	20	9.16E-0	7 (0			9.58E-07	C	0	4.79E-08
KLX05 0566111314 0566111304 181.13 201.13 3 1 191.13 20 4.33E-07 0 4.58E-07 0 2.24E-08 KLX05 0566111355 0566111515 191.14 211.14 3 1 221.14 20 5.61E-07 0 5.57E-07 0 2.24E-08 KLX05 056611151515 0566111515	KLX05	050610 17:47	050610 20:20	146.10	166.10		3	1	156.10	20	1.12E-0	6 (0			1.17E-06	C	0	5.85E-08
KLX05 056611 15.51 05611 15.51 191.14 211.14 3 1 201.14 20 9.76-08 0 1.02E-07 0 0 5.19E-08 0 1.02E-07 0 0 5.19E-08 0 1.02E-08 0 1.02E-08 0 0 0.00E-07 0 0 0.00E-08 0.00E-07 0.00E-08 0.00E-07 0.00E-08 0.00E-07 0.00E-08 0.00E-07 0.00E-08 0.00E-07 0.00E-08 0	KLX05	050611 08:54	050611 10:27	166.12	186.12		3	1	176.12	20	2.24E-0	8 (0			2.34E-08	C	0	1.17E-09
KIXDS 0.05011 11.81-10 0.05011 11.91-01 0.0	KLX05	050611 11:14	050611 13:04	181.13	201.13		3	3 1	191.13	20	4.33E-0	7 (0			4.53E-07	C	0	2.27E-08
KLX09 0050611 R10 0050611 959 226.14 246.14 3 1 236.14 20 3.09E-07 0 2.32E-06 0 0 1.49E-07 KLX05 0050612 09.14 246.15 226.15 3 1 236.15 20 2.84E-06 0 2.29E-06 0 0 1.49E-07 KLX05 0050612 13.95 256.21 286.21 286.21 286.21 286.21 286.21 286.22 30.63.2 3 1.29E-08 0 2.50E-08 0 2.50E-08 0 0 1.25E-08 KLX05 0050612 13.95 286.22 306.37 326.37 3 1.316.37 20 2.39E-09 0 2.50E-08 0 0 1.25E-09 KLX05	050611 13:38	050611 15:11	191.14	211.14		3	1	201.14	20	5.61E-0	7 (0			5.87E-07	C	0	2.94E-08	
KIXDS 0050F12 0071 0050F12 0072 0050F12 0050F12 0072 0050F12 0072 0050F12 0072 0050F12 0072 0050F12 0072 0050F12 0072 0050F12 0072 0050F12 0072 0050F12 0050F12 0072 0050F12 00	KLX05	050611 15:55	050611 17:23	211.14	231.14		3	3 1	221.14	20	9.76E-0	8 (0			1.02E-07	C	0	5.10E-09
KLX05 050612 120 050612 1146 266 21 286 21 4 1 276 21 20 mVV 1 mVV 0 -1 mVV 0 1 256 -00 1.256 -0	KLX05	050611 18:10	050611 19:59	226.14	246.14		3	3 1	236.14	20	3.09E-0	7 (0			3.23E-07	C	0	1.62E-08
KLX05 050612 1239 050612 1338 286.28 306.28 3 1 296.28 20 2.39E-08 0 2.50E-09 0 1.25E-09 0 0 1.25E-09 0 1.25E-09 0 1.25E-09 0 0 1.2	KLX05	050612 08:10	050612 09:44	246.15	266.15		3	3 1	256.15	20	2.84E-0	6 (0			2.97E-06	C	0	1.49E-07
KLX05 05061214739 050612 18-02 306.37 326.37 3 1 316.37 20 2.39E-09 0 0 1.25E-10 0 1.25E-10 0 0 1.25E-10 0 1.25E	KLX05	050612 10:21	050612 11:49	266.21	286.21		4	1	276.21	20	#N	V -1	1			#NV	C	-1	#NV
KLX05 050612 18:05 050612 18:05 050612 18:05 050612 18:05 050612 18:05 050612 18:05 050612 18:05 050613 09:31 050612 18:05 050613 09:31 050612 18:05 050613 09:31 050612 18:05 050613 09:31 050612 18:05 050613 09:31 050612 18:05 050613 09:31 050612 18:05 050613 09:31 050612 18:05 050613 09:31 050612 18:05 050613 09:31 050613 19:32 050613 09:31 050613 19:32 050613 09:31 050613 19:32 050613 19:3	KLX05	050612 12:29	050612 13:58	286.28	306.28		3	3 1	296.28	20	2.39E-0	8 (0			2.50E-08	C	0	1.25E-09
ILX05 050612 18-38 050612 19-40 341.40 361.40 3 1 361.40 20 MNV -1	KLX05	050612 14:39	050612 16:22	306.37	326.37		3	3 1	316.37	20	2.39E-0	9 (0			2.50E-09	C	0	1.25E-10
KLX05 050613 07.26 050613 08.31 356.42 376.42 3 1 366.42 20 mVV -1	KLX05	050612 17:03	050612 18:05	326.38	346.38		4	1	336.38	20	#N	V -1	1			#NV	C	-1	#NV
KLX05 050613 07.26 050613 08.31 356.42 376.42 3 1 366.42 20 mVV -1	KLX05	050612 18:38	050612 19:40	341.40	361.40		3	3 1	351.40	20	#N	V -1	1			#NV	C) -1	#NV
RLX05 050613 10:23 376.47 396.47 3 1 386.42 20 #HV -1							3	3 1									C		
KLX05 050613 11:00 050613:12:27 386.50 406.50 4 1 396.50 20 #NV -1	KLX05		050613 10:23	376.47	396.47		3	3 1			#N	V -1	1			#NV	C) -1	#NV
KLX05 050613 13:04 050613 14:46 406.64 426.64 3 1 416.54 20 1.17E-08 0 1.22E-08 0 0 6.10E-10							4	1					1				C		
KLX05 050613 15:32 050613 16:33 426.55 446.55	KLX05	050613 13:04	050613 14:46	406.54	426.54		3	3 1	416.54	- 20	1.17E-0	8 (0			1.22E-08	C	0	
KLX05 050613 17:33 050613 18:38 446.57 466.57 3 1 456.57 20 #NV -1					446.55		4	1					1				C) -1	
KLX05	KLX05		050613 18:38	446.57	466.57		3	3 1	456.57	20	#N	V -1	1			#NV	C) -1	#NV
KLX05 050614 11:09 050614 12:33 606.82 626.82 4 1 616.82 20 #NV -1 #NV 0 -1 #NV KLX05 050614 15:26 626.85 646.85 3 1 636.85 20 9.62E-09 0 1.01E-08 0 0 5.05E-10 KLX05 050614 16:07 050614 17:12 646.85 666.85 3 1 656.85 20 #NV -1 #NV 0 -1 #NV KLX05 050614 17:56 050614 17:56 050614 17:57 050615 17:56 050614 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:56 050615 17:57 050616 07:56 050615 17:57 050616 07:56 050615 17:57 050616 07:56 050616 07							4	1					1			#NV	C	-1	#NV
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KLX05	111.30									_	9.10E-06	(7.00E-06					24.69	-1
KLX05	211.14	311.14									1.90E-06								42.45	-1
KLX05	306.37	406.37									1.79E-09) 1	8.00E-10					19.71	1
KLX05	406.54	506.54									1.85E-08) 1	8.00E-09					13.19	1
KLX05	506.63	606.63									9.40E-11	() 1	6.00E-11					13.78	C
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KLX05	706.83	806.83									7.91E-09	C) 1						99.02	1
KLX05	807.11	907.11									3.36E-09	C) 1						32.63	C
KLX05	887.27	987.27									1.20E-10	() 1						10.03	1
KLX05	111.30	131.30									1.60E-05	C) 1						78.49	-1
KLX05	126.02	146.02									9.26E-07	() 1	7.00E-07	3.00E-06	1.00E-06	1.00E-06	3	76.76	-1
KLX05	146.10	166.10									5.08E-06	C) 1	1.00E-06	8.00E-06			3	121.04	C
KLX05	166.12										2.70E-08	C	1	1.00E-08	4.00E-08				7.51	1
KLX05	181.13	201.13									3.14E-07	C	1	9.00E-08	6.00E-07	1.00E-06	1.00E-06	3	13.43	-1
KLX05	191.14	211.14									2.41E-07	C) 1	9.00E-08	4.00E-07	1.00E-06	1.00E-06	3	54.82	1
KLX05	211.14	231.14									2.46E-08	C	1	9.00E-09	5.00E-08	1.00E-06	1.00E-06	3	9.25	-1
KLX05	226.14	246.14									6.24E-07	C) 1	1.00E-07	1.00E-06	1.00E-06	1.00E-06	3	69.55	C
KLX05	246.15	266.15									2.22E-06	C	1	9.00E-07	4.00E-06	1.00E-06	1.00E-06	3	95.51	-1
KLX05	266.21	286.21									7.61E-11	C	1	2.00E-11	2.00E-10	1.00E-06	1.00E-06	3	10.96	-1
KLX05	286.28	306.28									1.98E-08	C) 1	9.00E-09	4.00E-08	1.00E-06			29.34	-1
KLX05	306.37	326.37									2.18E-09	C	1	9.00E-10	4.00E-09	1.00E-06	1.00E-06	3	16.91	-1
KLX05	326.38	346.38									1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06	1.00E-06	3	#NV	#NV
KLX05	341.40	361.40									1.00E-11	-1	1	1.00E-13					#NV	#NV
KLX05	356.42	376.42									1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06			#NV	#NV
KLX05	376.47	396.47									1.00E-11	-1	1	1.00E-13	1.00E-11			3	#NV	#NV
KLX05	386.50	406.50									4.35E-10	C) 1	1.00E-10					15.98	C
KLX05	406.54	426.54									1.79E-08	C) 1	9.00E-09	3.00E-08	1.00E-06	1.00E-06	3	13.58	1
KLX05	426.55	446.55									3.36E-11	C	1	1.00E-11	6.00E-11			3	8.43	C
KLX05	446.57	466.57									1.00E-11	-1	1	1.00E-13	1.00E-11				#NV	#NV
KLX05	466.58	486.58									3.67E-10	C) 1	9.00E-11	6.00E-10	1.00E-06	1.00E-06	3	6.35	1
KLX05	486.59	506.59									2.71E-09	C) 1	9.00E-10	5.00E-09	1.00E-06	1.00E-06	3	17.85	-1
KLX05	606.82	626.82									4.12E-10	C) 1	1.00E-10	8.00E-10	1.00E-06	1.00E-06	3	15.77	C
KLX05	626.85	646.85									1.20E-08	C) 1	9.00E-09	6.00E-08	1.00E-06	1.00E-06	3	31.72	-1
KLX05	646.85	666.85									1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06	1.00E-06	3	#NV	#NV
KLX05	666.85	686.85									1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06	1.00E-06	3	#NV	#NV
KLX05	686.83	706.83									1.15E-08	C) 1	9.00E-09	3.00E-08	1.00E-06	1.00E-06	3	9.81	1
KLX05	706.83	726.83									4.49E-09	C) 1	1.00E-09	7.00E-09	1.00E-06	1.00E-06	3	28.64	1
KLX05	726.91	746.91									1.55E-10	C	1	8.00E-11	4.00E-10	1.00E-06	1.00E-06	3	12.35	C
KLX05	747.00	767.00									3.64E-12	C) 1	1.00E-12	6.00E-12	1.00E-06	1.00E-06	3	4.83	1
KLX05	767.06	787.06									9.18E-09	C) 1	6.00E-09	5.00E-08	1.00E-06	1.00E-06	3	24.22	-1
KLX05	787.07	807.07									4.34E-09	C	1	1.00E-09	7.00E-09	1.00E-06	1.00E-06	3	11.82	1
KLX05	807.11	827.11									1.00E-11	-1	1						#NV	#NV
KLX05	827.15	847.15									4.29E-09	C) 1	8.00E-10	7.00E-09	1.00E-06	1.00E-06	3	#NV	1
KLX05	847.20	867.20									2.82E-09	C) 1						18.03	C
KLX05	867.24	887.24									1.53E-09	C) 1	8.00E-10					15.47	1
KLX05	887.27	907.27									1.06E-10	C) 1	6.00E-11					38.90	C
KLX05	907.30	927.30						1			1.00E-11			1.00E-13					#NV	#NV
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KLX05 726.91 746.91																															
KLX05 747.00 767.00 6.80E-11 7.49E-03 -1.57 #NV #NV #NV KLX05 767.06 787.06 4.12E-11 4.54E-03 2.17 33 863 7038.9 KLX05 787.07 807.07 1.95E-10 2.15E-02 -2.96 #NV #NV 7200.4 KLX05 807.11 827.11 #NV #NV #NV #NV #NV KLX05 827.15 847.15 5.57E-11 6.14E-03 0.96 #NV #NV #NV																				,											
KLX05 767.06 787.06 4.12E-11 4.54E-03 2.17 33 863 7038.9 KLX05 787.07 807.07 1.95E-10 2.15E-02 2.96 #NV #NV 720.4 1.95E-10 KLX05 807.11 827.11 #NV #NV #NV #NV #NV #NV KLX05 827.15 847.15 5.57E-11 6.14E-03 0.96 #NV #NV #NV #NV																				,											
KLX05 787.07 807.07 1.95E-10 2.15E-02 2.296 #NV #NV 7200.4 KLX05 807.11 827.11 #NV #NV #NV #NV #NV KLX05 827.15 847.15 5.57E-11 6.14E-03 0.96 #NV #NV #NV																															
KLX05 807.11 827.11 #NV #NV #NV #NV #NV #NV #NV #NV #NV #NV																															
KLX05 827.15 847.15 5.57E-11 6.14E-03 0.96 #NV #NV #NV																				1											
																							1				1				
KLX05 847.20 867.20	KLX05	847.20	867.20								5.20E-11					1067			7747.4				1				1				
KLX05 867.24 887.24 6.88E-11 7.58E-03 -1.61 514 1186 7907.0																															
KLX05 887.27 907.27 3.63E-11 4.00E-03 -129 2243 6742 8087.3	KLX05																		8087.3												
KLX05 907.30 927.30 #NV #NV #NV #NV #NV #NV	KLX05	907.30	927.30								#NV			ıv #i	NV	#NV			#NV	1											
	KLX05	927.34	947.34								#NV								#NV	1											

Tab	ole	. – –	ple_test_obs sections of single hole test
Column	Datatype	Unit	Column Description
site	CHAR	<u> </u>	Investigation site name
activity_type	CHAR		Activity type code
dcode	CHAR		Object or borehole identification code
start_date	DATE		Date (yymmdd hh:mm:ss)
secup	FLOAT	m	Upper section limit (m)
seclow	FLOAT	m	Lower section limit (m)
obs_secup	FLOAT	m	Upper limit of observation section
obs_seclow	FLOAT	m	Lower limit of observation section
oi_above	FLOAT	kPa	Groundwater pressure above test section, start of flow period
pp_above	FLOAT	kPa	Groundwater pressure above test section, at stop flow period
of_above	FLOAT	kPa	Groundwater pressure above test section at stop recovery per
oi_below	FLOAT	kPa	Groundwater pressure below test section at start flow period
pp_below	FLOAT	kPa	Groundwater pressure below test section at stop flow period
of_below	FLOAT	kPa	Groundwater pressure below test section at stop recovery per
comments	VARCHAR		Comment text row (unformatted text)

	<u> </u>	1	1	T	1	ı	ı	T	ı	1		ı	1	1
idcode	start_date	stop_date	secup	seclow	section_no	obs_secup	obs_seclow	pi_above	pp_above	pf_above	pi_below	pp_below	pf_below	comments
KLX05	050601 17:37	050601 21:07	111.30	211.30		212.30	1000.16	996	999	997	1920	1924	1922	
KLX05	050602 09:21	050602 11:45	211.14	311.14		312.14	1000.16	1876	1876	1876	2808	2807	2810	
KLX05	050602 13:30	050602 16:22	306.37	406.37		407.37	1000.16	2722	2722	2722	3658	3658	3655	
KLX05	050602 17:49	050602 23:32	406.54	506.54		507.54	1000.16	3618	3618	3618	4556	4556	4552	
KLX05	050603 09:11	050603 11:11	506.63	606.63		607.63	1000.16	4516	4516	4516	5448	5448	5443	
KLX05	050603 12:41	050603 15:26	606.82			707.82	1000.16	5415	5415	5415	6344	6347	6347	
KLX05	050603 16:56	050604 00:46	706.83	806.83		807.83	1000.16	6310	6310	6309	7231	7230	7228	
KLX05	050604 09:20	050604 12:18	807.11	907.11		908.11	1000.16	7200	7200	7201	8148	8147	8142	
KLX05	050604 14:00	050604 17:10	887.27	987.27		988.27					9313			
KLX05	050610 13:12	050610 14:40	111.30	131.30		132.30	1000.16	1000	1002	1003	1222	1237	1226	
KLX05	050610 15:35	050610 17:02	126.02			147.02		1129	1130	1129	1353			
KLX05	050610 17:47	050610 20:20	146.10	166.10		167.10	1000.16	1304	1306	1305	1529	1529	1529	
KLX05	050611 08:54	050611 10:27	166.12	186.12		187.12	1000.16	1478	1478	1478	1703	1703	1700	
KLX05	050611 11:14	050611 13:04	181.13	201.13		202.13	1000.16	1611	1611	1611	1836	1845	1336	
KLX05	050611 13:38	050611 15:11	191.14	211.14		212.14	1000.16	1699	1699	1699	1924	1927	1926	
KLX05	050611 15:55	050611 17:23	211.14	231.14		232.14	1000.16	1877	1877	1876	2101	2102	2101	
KLX05	050611 18:10	050611 19:59	226.14			247.14		2010	2010	2010	2235	2240	2236	
KLX05	050612 08:10	050612 09:44	246.15	266.15		267.15	1000.16	2186	2187	2187	2411	2411	2411	
KLX05	050612 10:21	050612 11:49	266.21	286.21		287.21	1000.16	2366	2366	2366	2591	2591	2589	
KLX05	050612 12:29	050612 13:58	286.28	306.28		307.28		2543	2544	2544	2770	2769	2768	
KLX05	050612 14:39	050612 16:22	306.37	326.37		327.37	1000.16	2724	2724	2724	2949	2948	2950	
KLX05	050612 17:03	050612 18:05	326.38	346.38		347.38	1000.16	#NV	#NV	#NV	#NV	#NV	/ #NV	
KLX05	050612 18:38	050612 19:40	341.40	361.40		362.40	1000.16	#NV	#NV	#NV	#NV	#NV	/ #NV	
KLX05	050613 07:26	050613 08:31	356.42	376.42		377.42	1000.16	#NV	#NV	#NV	#NV	#NV	/ #NV	
KLX05	050613 09:17	050613 10:23	376.47	396.47		397.42	1000.16	#NV	#NV	#NV	#NV	#NV	/ #NV	
KLX05	050613 11:00	050613:12:27	386.50	406.50		407.50	1000.16	3440	3440	3440	3663	3663	3662	
KLX05	050613 13:04	050613 14:46	406.54	426.54		427.54	1000.16	3620	3620	3620	3843	3842	3841	
KLX05	050613 15:32	050613 16:53	426.55	446.55		447.55	1000.16	3800	3800	3800	4023	4022	4020	
KLX05	050613 17:33	050613 18:38	446.57	466.57		467.57	1000.16	#NV	#NV	#NV	#NV	#NV	/ #NV	
KLX05	050613 19:13	050614 01:56	466.58	486.58		487.58	1000.16	4159	4159	4157	4381	4380	4379	
KLX05	050614 07:40	050614 09:27	486.59	506.59		507.59	1000.16	4338	4338	4338	4559	4559	4558	
KLX05	050614 11:09	050614 12:33	606.82	626.82		627.82	1000.16	5419	5418	5418	5637	5636	5636	
KLX05	050614 13:16	050614 15:26	626.85	646.85		647.85	1000.16	5599	5599	5599	5816	5816	5815	
KLX05	050614 16:07	050614 17:12	646.85	666.85		667.85	1000.16	#NV	#NV	#NV	#NV	#NV	/ #NV	
KLX05	050614 17:56	050614 18:57	666.85	686.85		687.85	1000.16	#NV	#NV	#NV	#NV	#NV	/ #NV	
KLX05	050614 19:48	050615 00:58	686.83	706.83		707.83	1000.16	6136	6135	6133	6350	6352	6347	
KLX05	050615 08:02	050615 09:58	706.83	726.83		727.83	1000.16	6311	6311	6312	6523	6523	6523	
KLX05	050615 10:40	050615 11:52	726.91	746.91		747.91			6491		6703			
KLX05	050615 12:45	050615 14:11	747.00			768.00	1000.16	6672			6883	6882	6881	
KLX05	050615 14:50	050615 16:25	767.06	787.06		788.06	1000.16	6852	6852		7063	7063	7062	
KLX05	050615 17:07	050616 01:36	787.07	807.07		808.07	1000.16	7030	7030	7025	7240	7236	7230	
KLX05	050616 08:05	050616 09:07	807.11	827.11		828.11			#NV	#NV	#NV	#NV	#NV	
KLX05	050616 09:52	050616 12:29	827.15			848.15	1000.16	7385	7385	7386	7594		7594	
KLX05	050616 13:09	050616 00:00	847.20	867.20		868.20			7567	7567	7779	7780	7782	
KLX05	050616 15:39	050616 17:25	867.24			888.24	1000.16	7745	7745	7745	7990	7985	7980	
KLX05	050616 18:07	050617 03:30	887.27	907.27		908.27	1000.16	7923	7923	7919	8165	8164	8141	
KLX05	050617 07:33	050617 08:27	907.30	927.30		928.30	1000.16	#NV	#NV	#NV	#NV	#NV	#NV	
KLX05	050617 09:13	050617 10:14	927.34			948.34	1000.16	#NV	#NV	#NV	#NV	#NV	#NV	