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Oskarshamn site investigation

Pumping tests and hydraulic injection tests in borehole KLX06, 2005

Subarea Laxemar

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June 2005

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

Abstract

Hydraulic injection tests have been performed in Borehole KLX06 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 pumping tests for water sampling and of the hydraulic injection tests in borehole KLX06 performed between 3rd of March and 20th of April 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 106.38–987.50 m below ToC. The results of the test interpretation are presented as transmissivity, hydraulic conductivity and hydraulic freshwater head. The main objective of the pumping tests was to take water samples in certain depths for chemical analyses.

Sammanfattning

Injektionstester har utförts i borrhål KLX06 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 från pumptesterna vid vattenprovtagningen och från de hydrauliska injektionstesterna i borrhål KLX06. Testerna utfördes mellan den 3 mars till den 20 april 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 106,38–987,50 m borrhålslängd. Resultaten av testutvärderingen presenteras som transmissivitet, hydraulisk konduktivitet och grundvattennivå uttryckt i ekvivalent sötvattenpelare (fresh-water head). Huvudsyftet med pumptesterna var vattenprovtagning vid specifika nivåer för kemiska laboratorieanalyser.

Borehole KLX06 – Summary of Results

Contents

Attached on CD

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/. Water sampling and hydraulic pump tests have been performed in KLX06 in three different sections. The length of the water sampling sections was 5 m and the selection of those sections is based on preliminary results from the Difference flow logging lengths and was made by SKB. The duration of pumping depended on the time for reaching acceptable uranine concentrations. Uranine is a conservative tracer used to tag the flush water utilised during drilling. 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/. These injection tests has been carried out after water sampling was finished. The work was carried out in accordance with activity plan AP PS 400-04-118. In Table 1-1 controlling documents for performing this activity are listed. Both activity plan and method descriptions are SKB's internal controlling documents.

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

Activity plan	Number	Version
Test pumping and hydraulic injection tests in borehole KLX06	AP PS 400-04-118	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
Allmäna 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

Pumping tests and water sampling were carried out accordingly in borehole KLX06 during 3rd March to 24th March 2005 following the methodology described in SKB MD 323.001e and in the activity plan AP PS 400-04-118 (SKB internal controlling documents). Hydraulic injection tests were carried out between 31st March to 20th April 2005. Data and results were delivered to the SKB site characterization database SICADA.

The main objective of the pumping tests was to take water samples in certain depths for chemical analyses. 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. Additionally, the data of the pumping tests were analysed to characterize the rock with respect to its hydraulic properties. This report describes the results and primary data evaluation of the pumping and hydraulic injection tests in borehole KLX06. The data is subsequently delivered for the site descriptive modelling. The commission was conducted by Golder Associates AB and Golder Associates GmbH.

Borehole KLX06 is situated in the Laxemar area approximately 3 km north-west of the nuclear power plant of Simpevarp, Figure 1-1. The borehole was drilled from August 2004 to November 2004 at 994.90 m depth with an inner diameter of 76 mm and an inclination of –65.23°. The upper 11.88 m is cased with large diameter telescopic casing ranging from diameter (outer diameter) 208–323 mm.

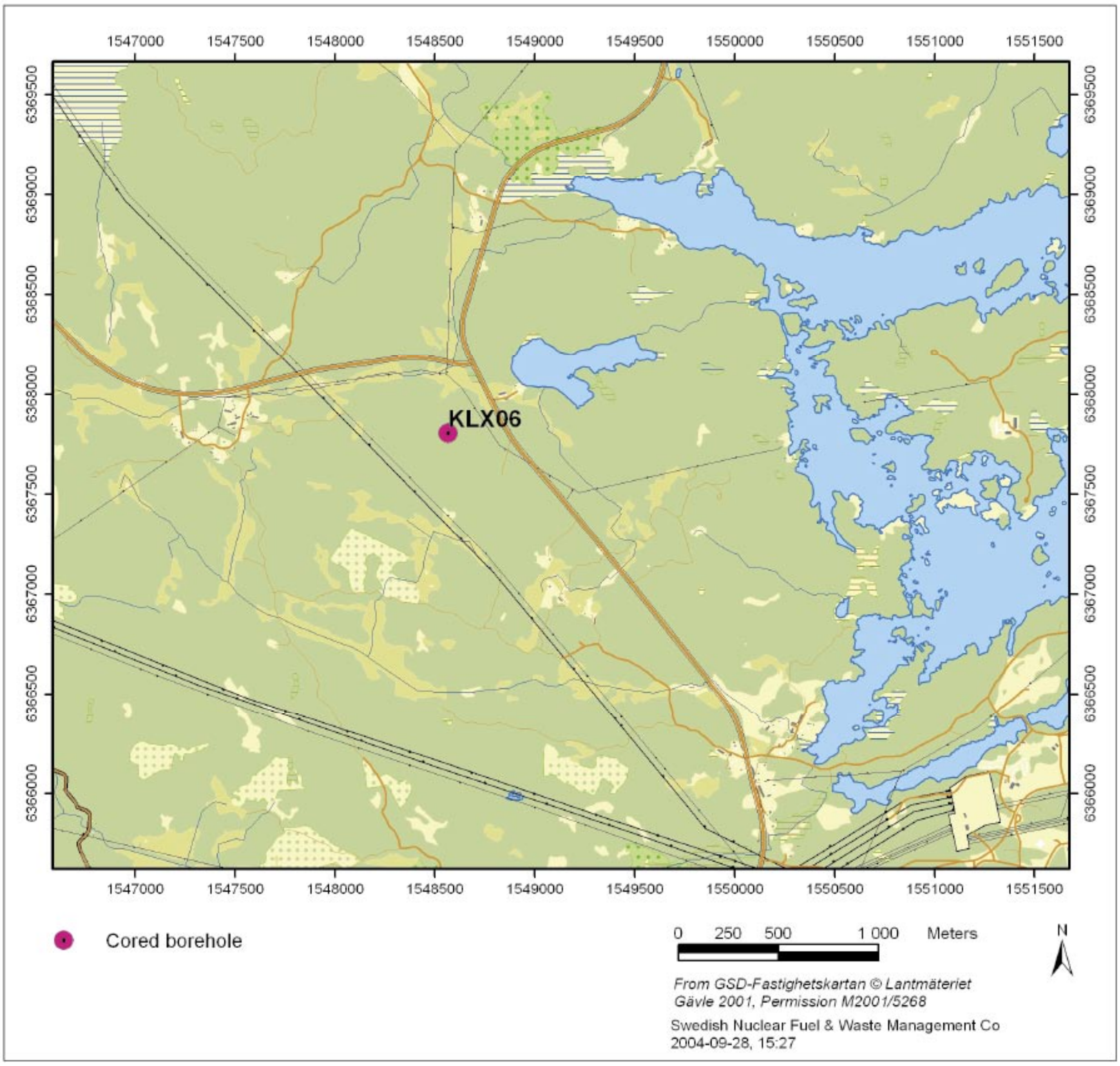

Figure 1-1. *The investigation area Laxemar, Oskarshamn with location of borehole KLX06.*

2 Objective

The objective of the injection tests 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.

The main objective of the pumping tests in KLX06 was the sampling of water in certain depths for chemical analyses. Additionally, the pumping was conducted and analysed as constant pressure pumping tests followed by a pressure recovery. The water sampling sections had a length of 5 m and are selected based on the preliminary results of the Difference flow logging. The samples taken from the upper section (260.00–265.00 m) were submitted for analysis according to SKB chemistry class 4. The other two samples (from 558.20–563.20 m and 776.20–781.20 m depth) were submitted for analysis according to SKB chemistry class 5.

3 Scope of work

The scope of work consisted of preparation of the testing equipment (PSS2 tool) which included cleaning of the down-hole tools, calibration and functional checks, pumping tests and water sampling in 5 m sections, 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.

From 3rd March to 24th March 2005 three pumping tests in different 5 m sections were performed. The main objective of these tests was to take water samples from the different sections. Additionally, the pumping phases and recovery phases were analysed quantitatively as well.

Hydraulic injection tests were performed between 31st March and 20th April 2005.

Table 3-1. Performed injection tests at borehole KLX06.

No of injection tests	Interval	Positions	Time/test	Total test time
9	100 m	106.38–987.48 m	125 min	18.8 hrs
45*	20 m	106.38–987.50 m	90 min	58.5 hrs
Total: 77.3 hrs				

*excluding additional overnight slug injection tests and repeated tests

3.1 Boreholes

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 KLX06 (from SICADA 2005-01-27 14:32:54).

Title	Value				
Borehole length (m):	994.940				
Drilling Period(s):	**From Date**	**To Date**	**Secup (m)**	**Seclow (m)**	**Drilling Type**
	2004-08-03	2004-08-10	0.000	100.300	Percussion drilling
	2004-08-25	2004-11-25	0.000	994.940	Core drilling
Starting point coordinate:	**Length (m)**	**Northing (m)**	**Easting (m)**	**Elevation (masl)**	**Coord Sys**
(centerpoint of TOC)	0.000	6367806.640	1548566.880	17.680	RT90-RHB70
Angles:	**Length (m)**	**Bearing**	**Inclination (– = down)**		
	0.000	328.810	–65.230		
Borehole diameter:	**Secup (m)**	**Seclow (m)**	**Hole Diam (m)**		
	0.000	9.100	0.341		
	9.100	11.880	0.253		
	11.880	100.300	0.195		
	100.290	101.880	0.086		
	101.880	994.940	0.076		
Core diameter:	**Secup (m)**	**Seclow (m)**	**Core Diam (m)**		
	100.290	101.690	0.072		
	101.690	994.940	0.050		
Casing diameter:	**Secup (m)**	**Seclow (m)**	**Case In (m)**	**Case Out (m)**	
	0.000	11.880	0.200	0.208	
	0.000	9.100	0.310	0.323	
Grove milling:	**Length (m)**	**Trace detectable**			
	103.000	YES			
	151.000	YES			
	200.000	YES			
	250.000	YES			
	300.000	YES			
	350.000	YES			
	400.000	YES			
	450.000	YES			
	500.000	YES			
	550.000	YES			
	600.000	YES			
	650.000	YES			
	700.000	YES			
	750.000	YES			
	800.000	YES			
	850.000	YES			
	900.000	YES			
	950.000	YES			
	980.000	YES			

3.2 Tests and water sampling

Pumping tests and water sampling were conducted according to the Activity Plan AP PS 400-04-118. The intention was to conduct constant rate tests. The main goal of these pumping tests was to reach an acceptable uranine concentration as fast as possible to take water samples from the borehole. Acceptable in this case means a target of an uranine concentration of less than 5% of the concentration from the water used during the drilling campaign (231 µg/l).

After start of pumping, one water sampling was performed each day. These water samples were delivered to the Äspo chemistry laboratory. Simultaneous, the uranine content was measured in the field a few times a day. The intention was to pump until the ratio was at about 5%. However, in none of the three sections this ratio was reached (see Figure 6-1 to 6-3). The decision, when to abort pumping and take the final water chemistry sample, was made by SKB.

Injection tests were conducted according to the Activity Plan AP PS 400-04-118 and the method description for hydraulic injection tests, SKB MD 323.001 (SKB internal documents). Tests were done in 100 m test sections between 106.38–987.48 m below ToC and in 20 m test sections between 106.38–987.50 m below ToC. 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 tests covering the smaller sections (see Figure 3-1). The measurements were performed with SKBs custom made equipment for hydraulic testing called PSS2.

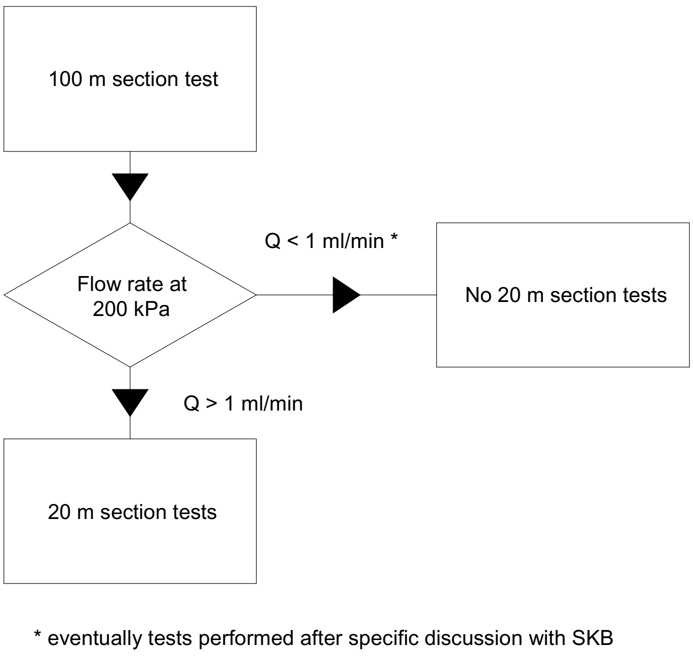

Figure 3-1. *Flow chart for test sections.*

Table 3-3. Tests performed.

Bh ID	Test section (m bToC)	Test type[1]	Test no	Test start Date, Time	Test stop Date, Time
KLX06	106.38–206.38	3	2	02.04.2005 17:03	02.04.2005 19:34
KLX06	206.52–306.52	3	1	03.04.2005 10:16	03.04.2005 12:37
KLX06	306.68–406.68	3	1	03.04.2005 14:20	03.04.2005 16:03
KLX06	406.83–506.83	3	1	03.04.2005 17:33	03.04.2005 23:08
KLX06	506.92–606.92	3	1	04.04.2005 09:33	04.04.2005 12:08
KLX06	607.06–707.06	3	1	04.04.2005 13:36	04.04.2005 15:37
KLX06	707.15–807.15	3	1	04.04.2005 17:04	05.04.2005 01:08
KLX06	807.31–907.31	3	1	05.04.2005 09:30	05.04.2005 13:01
KLX06	887.48–987.48	3	1	05.04.2005 14:30	05.04.2005 16:36
KLX06	106.38–126.38	3	1	07.04.2005 09:07	07.04.2005 10:43
KLX06	126.42–146.42	3	1 and 2	07.04.2005 11:26	07.04.2005 14:17
KLX06	146.44–166.44	3	1	07.04.2005 14:56	07.04.2005 16:28
KLX06	166.47–186.47	3	1	07.04.2005 17:08	07.04.2005 18:34
KLX06	186.49–206.49	3	1	08.04.2005 08:44	08.04.2005 10:05
KLX06	206.52–226.52	3	1	08.04.2005 11:19	08.04.2005 12:58
KLX06	226.56–246.56	3	1	08.04.2005 13:53	08.04.2005 15:36
KLX06	246.62–266.62	3	1	08.04.2005 16:26	08.04.2005 17:53
KLX06	266.64–286.64	3	2	09.04.2005 10:01	09.04.2005 11:22
KLX06	286.68–306.68	3	1	09.04.2005 12:09	09.04.2005 13:32
KLX06	306.68–326.68	3	1	09.04.2005 14:16	09.04.2005 15:35
KLX06	326.69–346.69	3	1	09.04.2005 16:16	09.04.2005 17:36
KLX06	346.74–366.74	3	1	09.04.2005 18:11	09.04.2005 19:37
KLX06	356.77–376.77	3	1	10.04.2005 08:40	10.04.2005 09:52
KLX06	376.80–396.80	3	2 and 3	10.04.2005 13:14	10.04.2005 14:50
KLX06	391.80–411.80	3	1	10.04.2005 15:31	10.04.2005 17:58
KLX06	406.83–426.83	3	1	11.04.2005 08:32	11.04.2005 10:02

Bh ID	Test section (m bToC)	Test type[1]	Test no	Test start Date, Time	Test stop Date, Time
KLX06	426.86–446.86	3	1	11.04.2005 10:48	11.04.2005 12:18
KLX06	446.88–466.88	4	1	11.04.2005 13:03	11.04.2005 14:40
KLX06	466.89–486.89	3	1 and 2	11.04.2005 15:15	11.04.2005 16:55
KLX06	486.90–506.90	3	1	12.04.2005 08:44	12.04.2005 12:02
KLX06	506.92–526.92	3	3	13.04.2005 15:39	13.04.2005 17:22
KLX06	526.94–546.94	3	1	13.04.2005 18:08	13.04.2005 20:21
KLX06	546.97–566.97	3	1	14.04.2005 08:24	14.04.2005 10:03
KLX06	566.98–586.98	3	1	14.04.2005 10:42	14.04.2005 12:44
KLX06	587.02–607.02	–	1	14.04.2005 13:25	14.04.2005 14:30
KLX06	607.06–627.06	4	1	14.04.2005 15:07	14.04.2005 16:17
KLX06	627.10–647.10	3	1	14.04.2005 17:04	14.04.2005 19:31
KLX06	647.11–667.11	3	1	15.04.2005 08:32	15.04.2005 10:07
KLX06	667.09–687.09	4	1	15.04.2005 10:40	15.04.2005 11:57
KLX06	687.12–707.12	3	2	15.04.2005 13:52	15.04.2005 14:50
KLX06	707.15–727.15	3	1	15.04.2005 15:22	15.04.2005 17:07
KLX06	727.19–747.19	3	1 and 2	15.04.2005 17:48	15.04.2005 21:00
KLX06	747.22–767.22	4	1	16.04.2005 08:51	16.04.2005 10:17
KLX06	767.25–787.25	3	1	16.04.2005 10:54	16.04.2005 13:38
KLX06	787.28–807.28	–	1	16.04.2005 14:19	16.04.2005 15:21
KLX06	807.31–827.31	3	2	16.04.2005 17:33	17.04.2005 00:32
KLX06	827.33–847.33	3	1	17.04.2005 08:42	17.04.2005 09:59
KLX06	847.39–867.39	3	1	17.04.2005 10:29	17.04.2005 12:05
KLX06	867.46–887.46	–	1	17.04.2005 12:42	17.04.2005 13:42
KLX06	887.48–907.48	–	1	17.04.2005 14:29	17.04.2005 15:33
KLX06	907.49–927.49	3	1	17.04.2005 16:15	17.04.2005 17:58
KLX06	927.50–947.50	3	1	18.04.2005 08:42	18.04.2005 10:12
KLX06	947.50–967.50	–	1	18.04.2005 11:01	18.04.2005 12:09

Bh ID	Test section (m bToC)	Test type[1]	Test no	Test start Date, Time	Test stop Date, Time
KLX06	967.50–987.50	–	1	18.04.2005 13:29	18.04.2005 14:37
KLX06	260.00–265.00	1	1	07.03.2005 08:59	10.03.2005 08:15
KLX06	558.20–563.20	1	1	10.03.2005 18:56	17.03.2005 08:19
KLX06	776.20–781.20	1	1	17.03.2005 16:07	23.03.2005 07:08

1: 1: Pumping test; 3: Injection test; 4: Pulse injection test ; 5: Slug injection test

No other additional measurements except the actual hydraulic tests and related measurements of packer position and water level in annulus of borehole KLX06 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 "Mätssystem-beskrivning".

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.

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 1–8.

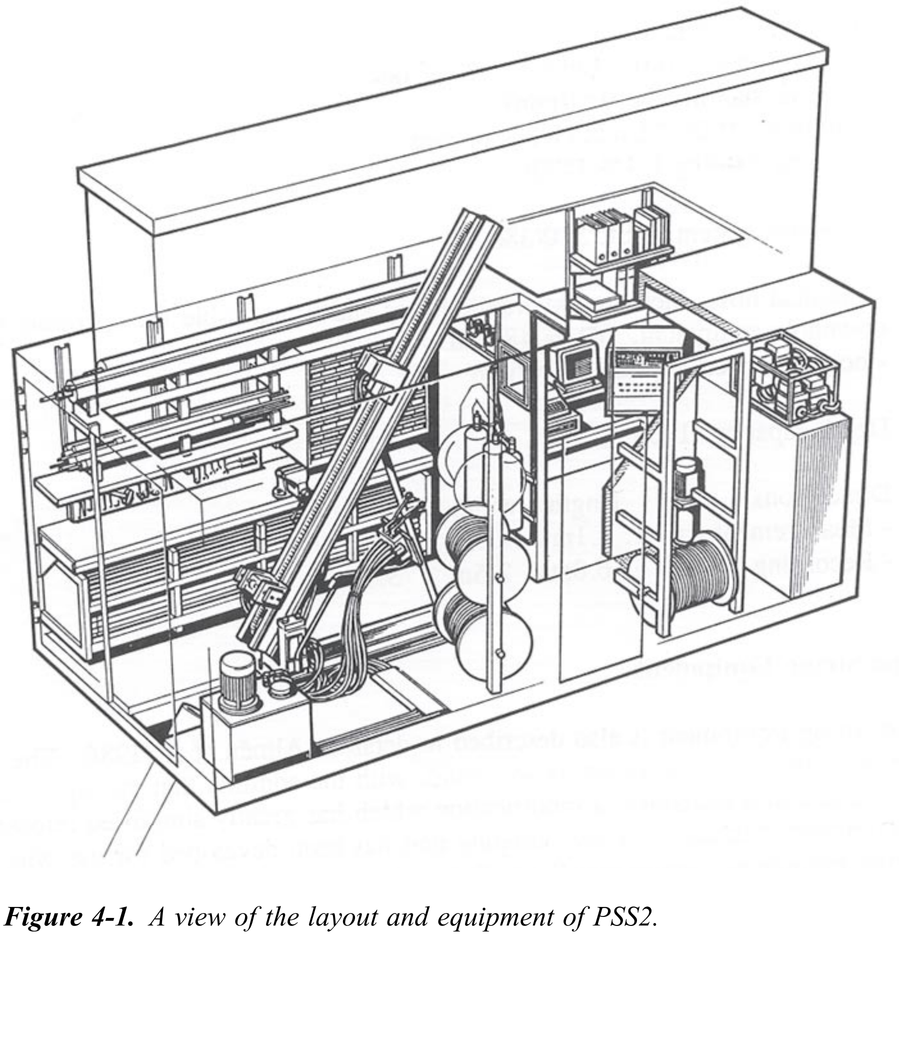

Figure 4-1. *A view of the layout and equipment of PSS2.*

Photo 1: **Hydraulic rig.**

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

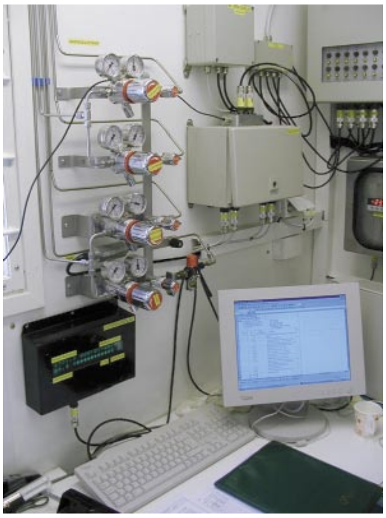

Photo 3: **Computer room, displays and gas regulators.**

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.**

Photo 7: **Top of test string with shunt valve and nylon line down to the pump basket**

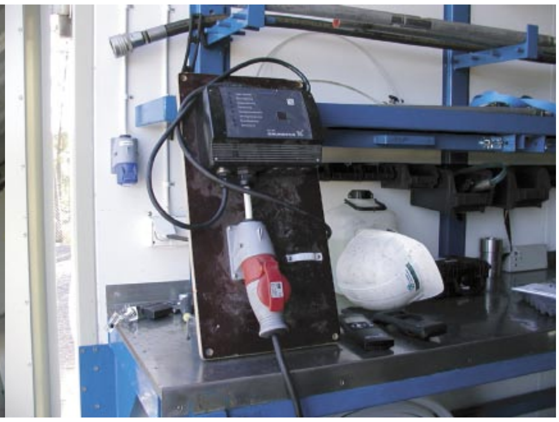

Photo 8: **Control board of the pump with remote control**

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 3kPa/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 3kPa/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 (± 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–50L/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 3"-pump is placed in a pump basket and connected to the test string at about 50 to 60 m below ToC. The pumping frequency of the pump is set with a remote control on surface. The flow can be regulated with a shunt-valve on top of the test string, a nylon line connects the valve with the pump basket, so the water can circulate and the pump cannot run out of water (photo 7).

The tool scheme is presented in Figure 4-2.

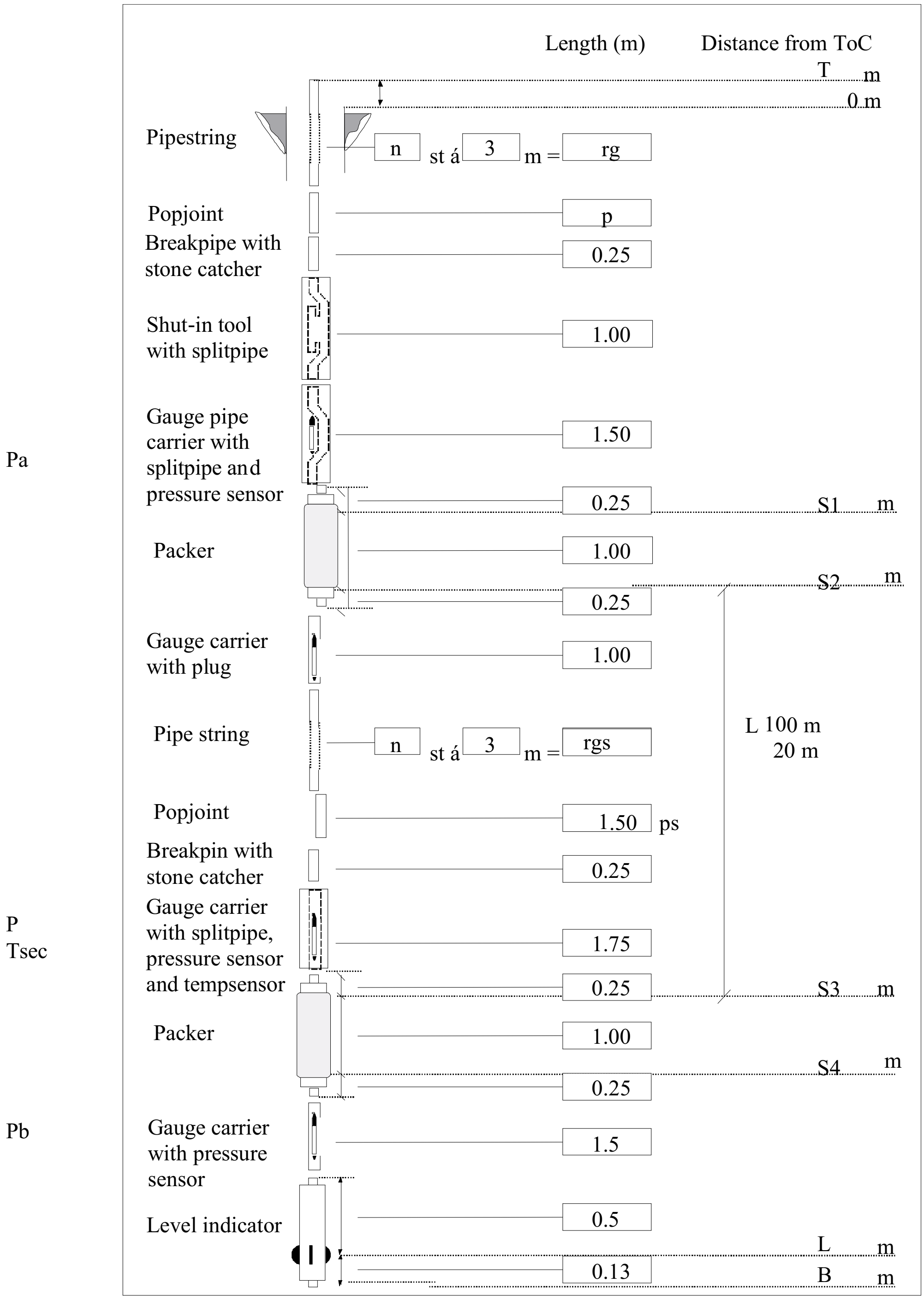

Figure 4-2. *Schematic drawing of the down-hole equipment in the PSS2 system.*

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 Resolution Accuracy	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_{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	
$p_{in,out}$	Pressure	Druck PTX 1400	9–28 4–20 0–2.5	VDC mA MPa	
L	Level Indicator				Length correction

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

Borehole information			Sensors		Equipment affecting WBS coefficient		
ID	Test section (m)	Test no	Type	Position (m fr ToC)	Position	Function	Outer diameter (mm)
KLX06	106.38–206.38	1	p_a p T p_b L	104.38 205.53 205.28 208.38 209.63	Test section	Signal cable Pump string Packer line	9.1 33 6
KLX06	106.38–126.38	1	p_a p T p_b L	104.38 125.53 125.28 128.38 129.63	Test section	Signal cable Pump string Packer line	9.1 33 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.

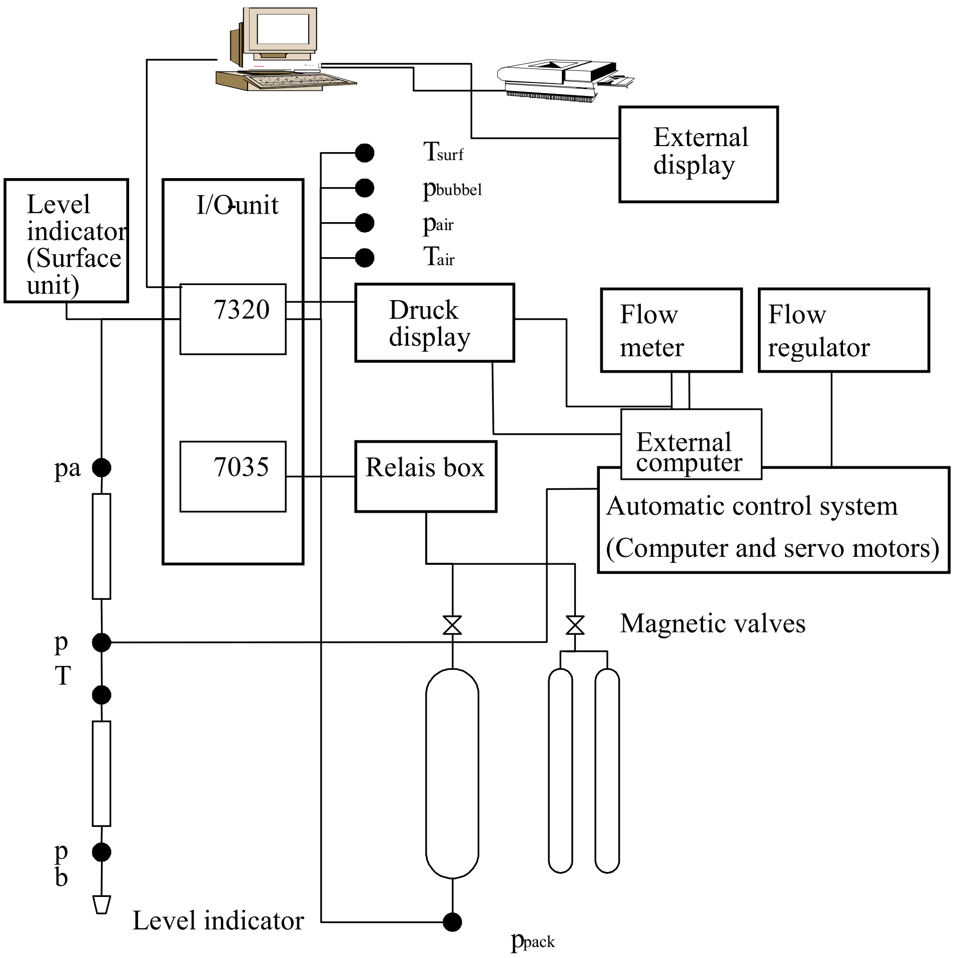

Figure 4-3. *Schematic drawing of the data acquisition system and the flow regulation control system in PSS2.*

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 KLX06.
- Filling buffer tank with water and tracer it with Uranin; take water sample.
- Filing 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 is used to adjust the location of the packers for the testsections to avoid wrong placements and minimize elongation effects of the test string.

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.

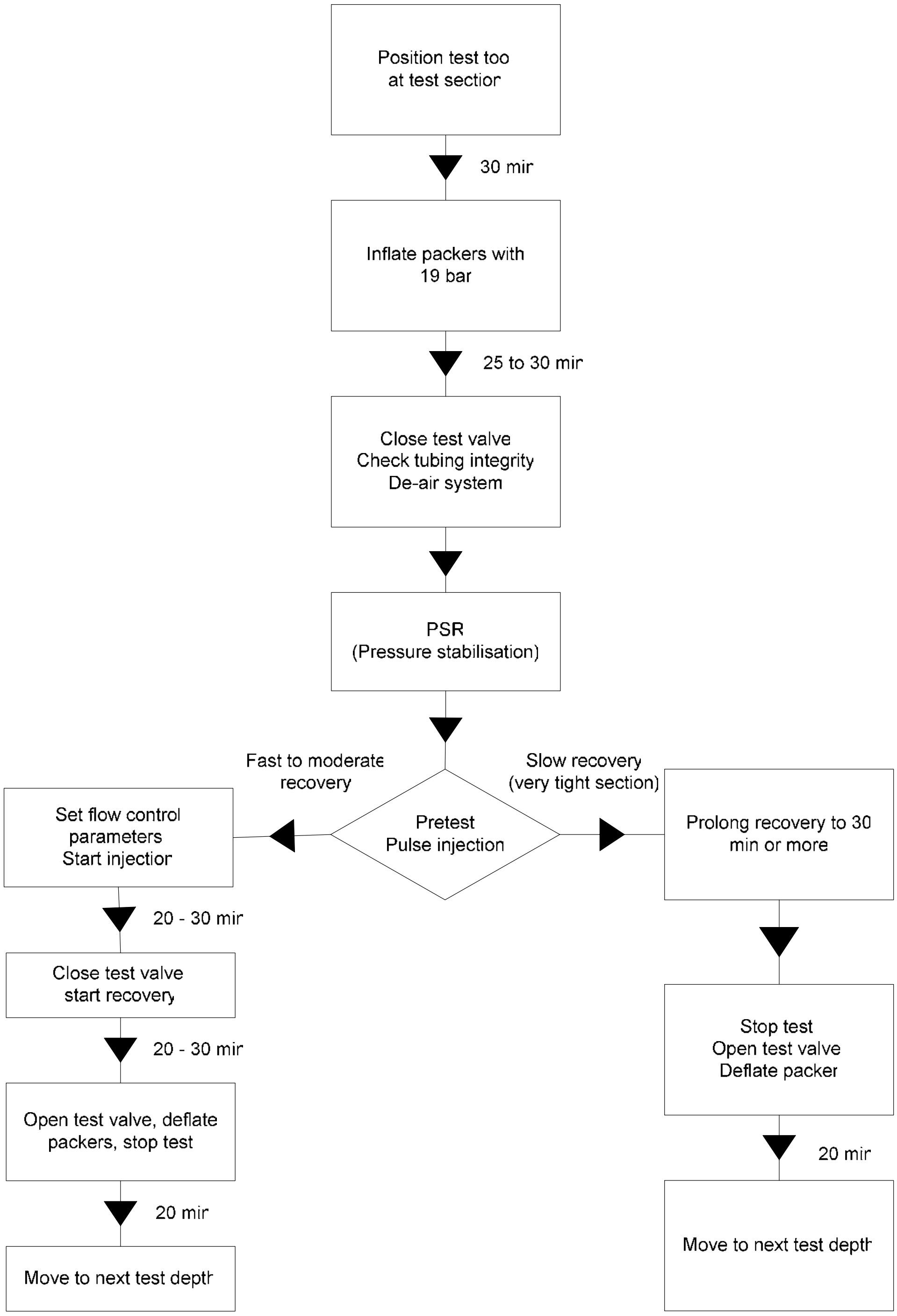

Figure 5-1. *Flow chart for test performance.*

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 KLX06 has been carried out by applying a constant injection pressure of ca 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 KLX06.

• Position test tool to new test section (correct position using the borehole markers).	Approx 30 min.
• Inflate packers with appr. 1,900 kPa.	25 min.
• Close test valve.	10 min.
• Check tubing integrity with appr. 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 both 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. The pressure recovery is analysed as a pulse injection phase (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

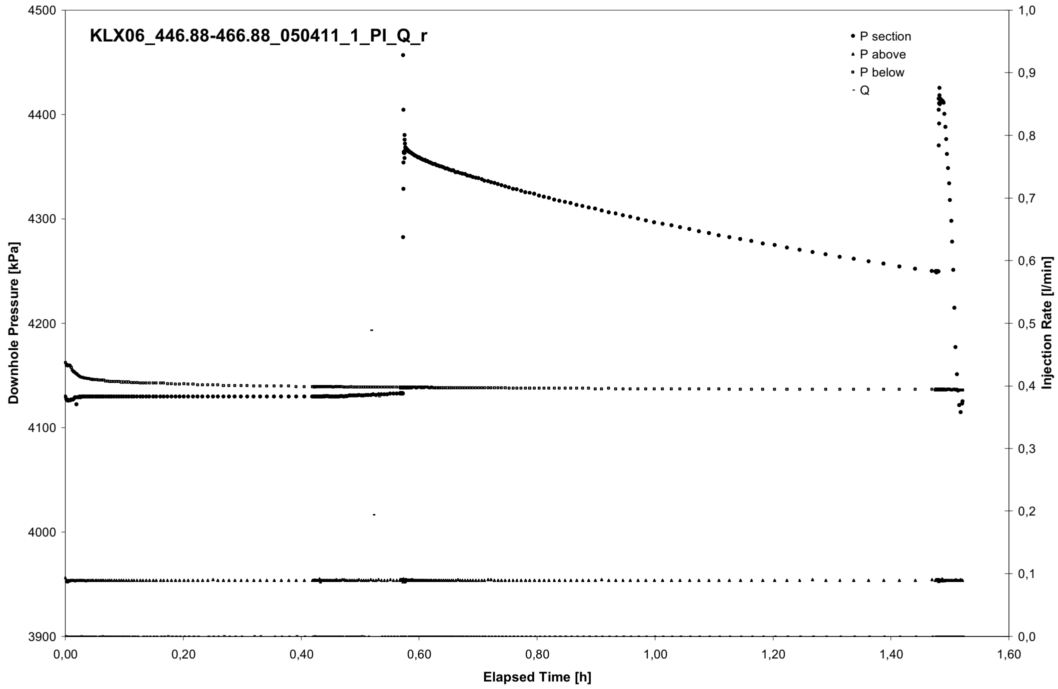

Figure 5-2. Typical pressure versus time plot of a Pulse injection test.

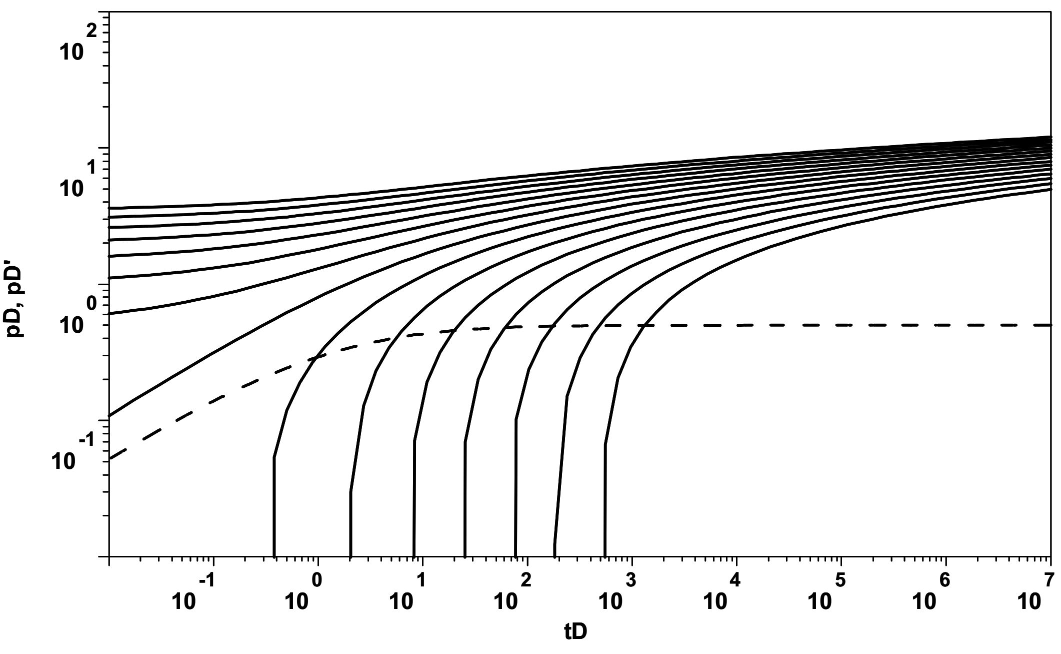

Figure 5-3. Deconvolution type curve set for pulse test analysis.

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 pressure 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.

The equivalent freshwater head (expressed in meters above sea level) was calculated from the static formation pressure, 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/m^3 (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 meters above sea level is calculated as following:

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

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_{iwf} is:

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

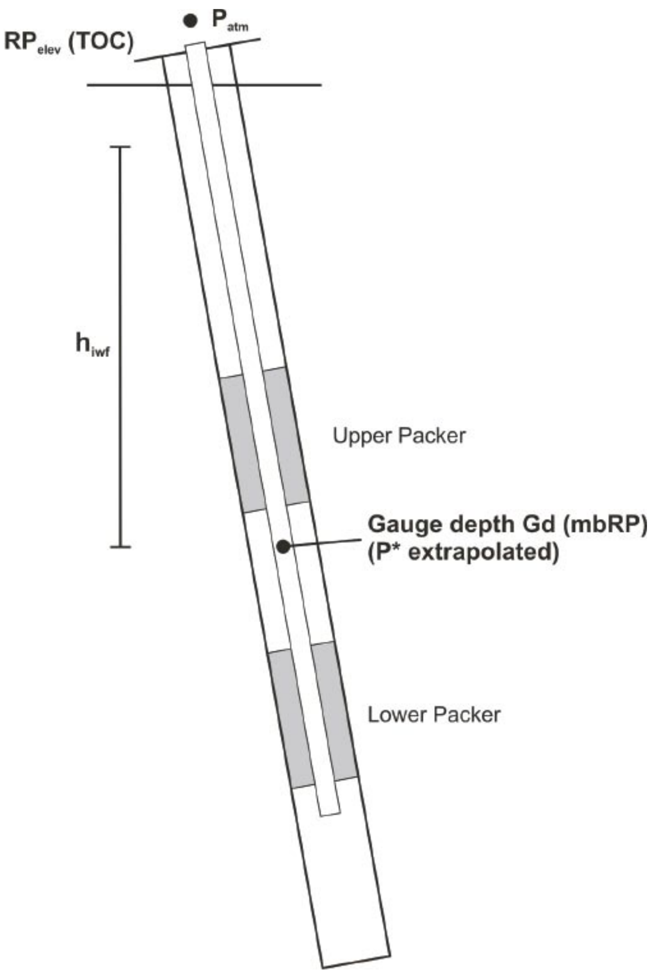

Figure 5-4. *Schematic methodologies for calculation of the freshwater head.*

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 changing transmassivity with distance from the borehole (composite model) was diagnosted, the inner zone transmassivity (in borehole vicinity) was recommended. This is consistence with SKB's standards.

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 100m tests and 6.2 the 20m tests. The results are given as general comments to test pereformance, the identified flow regimes and calculated parameters and finally the parameters which are considered as most representative are chosen and justification is given. All results are also summarised in Table 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 KLX06 are presented and analysed.

6.1.1 Section 106.38–206.38 m, test no 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the bottom packer bursting during inflation. The second test was conducted without problems. The Cartesian plots of both tests are shown in the Appendix 2-1. 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 fast 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 15 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 32.9 L/min at start of the CHi phase to 19.3 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 CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase shows a flat derivative at middle times. An infinite acting homogeneous radial 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 2.1E–4 m^2/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–4 to 4.0E–4 m^2/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 1,874.0 kPa.

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

6.1.2 Section 206.52–306.52 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 relatively fast 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 59 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 23.6 L/min at start of the CHi phase to 20.6 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 CHi phase shows a flat derivative, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative is flat at late times, too. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi and CHir phase. The analysis is presented in Appendix 2-2.

Selected representative parameters

The recommended transmissivity of 1.3E–4 m^2/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–5 to 3.0E–4 m^2/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 2,767.0 kPa.

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

6.1.3 Section 306.68–406.68 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 relatively fast 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 118 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 28.0 L/min at start of the CHi phase to 15.0 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 CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-3.

Selected representative parameters

The recommended transmissivity of 2.9E–5 m^2/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–5 to 8.0E–5 m^2/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 3,626.6 kPa.

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

6.1.4 Section 406.83–506.83 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 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 216 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.39 L/min at start of the CHi phase to 0.11 L/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 CHi phase shows a noisy but flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows a downward trend at late times indicating whether an increase of transmissivity at some distance from the borehole or a change in flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a two shell radial composite flow model was chosen. The analysis is presented in Appendix 2-4.

Selected representative parameters

The recommended transmissivity of 9.0E–8 m^2/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–8 to 2.0E–7 m^2/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 4,437.7 kPa.

The analysis of the CHi and CHir phases show some inconsistencies regarding the chosen flow model. However, regarding the derived transmissivities, both phases show good concistency. No further analysis is recommended.

6.1.5 Section 506.92–606.92 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 relatively fast 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 201 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 23.8 L/min at start of the CHi phase to 12.3 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 CHi phase shows a relatively flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows an upward trend at late times indicating a decrease of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-5.

Selected representative parameters

The recommended transmissivity of 1.1E–5 m^2/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 8.0E–6 to 2.0E–5 m^2/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 5,233.5 kPa.

The analysis of the CHi and CHir phases show some inconsistencies regarding the chosen flow model. However, regarding the derived transmissivities, both phases show good concistency. No further analysis is recommended.

6.1.6 Section 607.06–707.06, 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 relatively fast 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 201 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.69 L/min at start of the CHi phase to 0.37 L/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 CHi phase and the CHir phase show a flat derivative at late times, indicating a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-6.

Selected representative parameters

The recommended transmissivity of 4.5E–7 m^2/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 3.0E–7 to 7.0E–7 m^2/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 6,010.1 kPa.

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

6.1.7 Section 707.15–807.15 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 relatively fast 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 220 kPa. No hydraulic connection between 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 11.8 L/min at start of the CHi phase to 2.4 L/min at the end, indicating a high 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 and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-7.

Selected representative parameters

The recommended transmissivity of 6.5E–7 m^2/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 5.0E–7 to 1.0E–6 m^2/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 6,714.3 kPa.

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

6.1.8 Section 807.31–907.31 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. No hydraulic connection between test interval and the adjacent zones was observed. Due to the injecting regulation unit that was switching between the automatic pump and the pressure vessel at the beginning, the data of the first part of the CHi phase is very noisy. However, the second part of the CHi phase can be analysed quantitively. The injection rate decreased from

1.47 L/min at start of the CHi phase to 0.11 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 CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase and CHir phase. The analysis is presented in Appendix 2-8.

Selected representative parameters

The recommended transmissivity of 9.1E–8 m^2/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 5.0E–8 to 2.0E–7 m^2/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 7,372.2 kPa.

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

6.1.9 Section 887.48–987.48 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 192 kPa. No hydraulic connection between test interval and the adjacent zones was observed. Due to the injecting regulation unit that was switching between the automatic pump and the pressure vessel at the beginning, the data of the first part of the CHi phase is noisy. However, the second part of the CHi phase can be analysed quantitively. The injection rate decreased from 0.48 L/min at start of the CHi phase to 0.07 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The recovery phase (CHir) shows no 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 CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-9.

Selected representative parameters

The recommended transmissivity of 5.7E–8 m^2/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 4.0E–8 to 8.0E–8 m^2/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 7,874.9 kPa.

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

6.2 20 m single-hole injection tests

In the following, the 20 m section tests conducted in borehole KLX06 are presented and analysed.

6.2.1 Section 106.38–126.38 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 fast 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 19 kPa. No hydraulic connection between test interval and the adjacent zones was observed. Due to a slow injection regulation and a change of the pressure difference at the beginning, the data of the CHi phase is noisy. However, the second part of the CHi pase can be analysed quantitatively. The injection rate decreased from 28.8 L/min at start of the CHi phase to 20.6 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Due to the low pressure difference, 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 and CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi and CHir phase. The analysis is presented in Appendix 2-10.

Selected representative parameters

The recommended transmissivity of 1.8E–4 m^2/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 8.0E–5 to 3.0E–4 m^2/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 1,178.8 kPa.

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

6.2.2 Section 126.42–146.42 m, test no 1 and 2, injection and slug 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 relatively fast 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 237 kPa. No hydraulic connection between test interval and the adjacent zones was observed. Both phases show no problems and can be analysed quantitatively. The injection rate decreased from 75 mL/min at start of the CHi phase to 23.3 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows a relatively fast recovery, but it is still amenable for quantitative analysis.

Additionally, a slug injection test was performed over night.

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 late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase does not allow for a specific determination of the flow dimension. However, the analysis was conducted using a homogeneous flow model with a flow dimension of two. The analysis is presented in Appendix 2-11.

Selected representative parameters

The recommended transmissivity of 2.2E–8 m^2/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 9.0E–9 to 4.0E–8 m^2/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 1,352.6 kPa.

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

The analysis of the slug injection test is consistent with the results of the injection test. The derived transmissivities are 1.4E–8 m^2/s from the SI-phase (open test valve) and 2.7E–8 m^2/s from the analysis of the SIS-phase (test valve closed).

6.2.3 Section 146.44–166.44 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 relatively fast recovery of the pulse test indicated a medium to 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 213 kPa. No hydraulic connection between test interval and the adjacent zones was observed. Due to the time needed by the regulation unit to get constant pressure, the data of the Chi phase are very noisy. However, the second part is of good quality and adequate for quantitative analysis. The injection rate decreased from 0.56 L/min at start of the CHi phase to 0.45 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows fast recovery, but it 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 flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. Mainly caused by the fast recovery and the resulting data quality, the derivative of the CHir phase does not allow for a specific determination of the flow dimension. The analysis was conducted using a homogeneous flow model with a flow dimension of two. The analysis is presented in Appendix 2-12.

Selected representative parameters

The recommended transmissivity of 5.9E–7 m^2/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 3.5E–7 to 8.0E–7 m^2/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 1,532.2 kPa.

The analysis of the CHi and CHir phases show some inconsistencies, mainly caused by the fast recovery. No further analysis is recommended.

6.2.4 Section 166.47–186.47 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 relatively fast 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 59 kPa. The pressure in the section below rose by 3 kPa indicating a small hydraulic connection to that zone. Due to the time needed by the regulation unit to get constant pressure, the data of the Chi phase are very noisy at the beginning. However, the second part is of good quality and adequate for quantitative analysis. The injection rate decreased from 24.1 L/min at start of the CHi phase to 18.9 L/min at the end, indicating a high interval transmissivity. 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 CHi phase shows a flat derivative at middle times followed by a downward slope, which is indicative of a change in transmissivity at some distance from the borehole or for a change in flow dimension. A two shell composite flow model with a flow dimension of two was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal line at late times, indicating radial flow. The analysis was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-13.

Selected representative parameters

The recommended transmissivity of 5.9E–5 m^2/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 3.0E–5 to 8.0E–5 m^2/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 1,708.9 kPa.

The analysis of the CHi and CHir phases show some minor inconsistencies, but anyway no further analysis is recommended.

6.2.5 Section 186.49–206.49 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 fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. Due to the time needed by the regulation unit to get constant pressure, the data of the Chi phase are very noisy at the beginning. However, the second part is of good quality and adequate for quantitative analysis. The injection rate decreased from 17.22 L/min at start of the CHi phase to 16.5 L/min at the end, indicating a relatively high interval transmissivity. 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 CHi phase shows a downward trend at late times indicating a change in transmissivity at some distance from the borehole or a change in flow dimension. A two shell composite flow model with a flow dimension of two was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal line at middle and late times, indicating radial flow. The analysis was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-14.

Selected representative parameters

The recommended transmissivity of 4.7E–5 m^2/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 3.0E–5 to 8.0E–5 m^2/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 1,884.4 kPa.

The analysis of the CHi and CHir phases show consistency in general, no further analysis is recommended.

6.2.6 Section 206.52–226.52 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 fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good. The data of the Chi phase are of good quality and as such adequate for quantitative analysis. The injection rate decreased from 6.68 L/min at start of the CHi phase to 5.68 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows fast recovery and so the results should be regarded as order of magnitude only.

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 middle times and a downward trend at late times, indicating the transition to a zone of higher transmissivity at some distance from the borehole. A radial two shell composite flow model was chosen for the analysis of the CHi phase. The quality of the data and derivative of the CHir phase is not good and it is not possible to determine clearly the flow dimension. The analysis was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-15.

Selected representative parameters

The recommended transmissivity of 6.8E–6 m^2/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 3.0E–6 to 1.0E–5 m^2/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 2,062.8 kPa.

The analysis of the CHi and CHir phases show some inconsistencies, mainly caused by the fast recovery of the CHir phase.

6.2.7 Section 226.56–246.56 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 fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was not very good at the beginning. However, the second part is of good quality and as such amenable for quantitative analysis. The injection rate decreased from 8.99 L/min at start of the CHi phase to 7.73 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows fast recovery and so the results should be regarded as order of magnitude only.

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 late times, indicating a flow dimension of two (radial flow). A homogeneous radial flow model was chosen for the analysis of the CHi phase. The quality of the data and derivative of the CHir phase is not good and it is not possible to determine clearly the flow dimension. The analysis was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-16.

Selected representative parameters

The recommended transmissivity of 1.3E–5 m^2/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 8.0E–6 to 4.0E–5 m^2/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 2,238.5 kPa.

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

6.2.8 Section 246.62–266.62 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 fast 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 135 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 25.4 L/min at start of the CHi phase to 20.5 L/min at the end, indicating a relatively high interval transmissivity. The CHir is of good quality and as such 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 downward trend at middle times and a flat part at late times, indicating a higher transmissivity at some distance from the borehole. A radial two shell composite flow model was chosen for the analysis. The derivative of the CHir phase shows a flat derivative at late times, which is indicative for a flow dimension of two (radial flow). The analysis was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-17.

Selected representative parameters

The recommended transmissivity of 6.4E–5 m^2/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 4.0E–5 to 1.0E–4 m^2/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 2,415.2 kPa.

The analysis of the CHi and CHir phases show consistency in general, no further analysis is recommended.

6.2.9 Section 266.64–286.64 m, test no 2, 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 fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 4.02 L/min at start of the CHi phase to 2.63 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows relatively fast recovery, but is of good quality and as such 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 and the CHir phase show a flat derivative at late times, indicating a flow dimension of two (radial flow). The analysis for both phases was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-18.

Selected representative parameters

The recommended transmissivity of 4.4E–6 m^2/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 2.0E–6 to 8.0E–6 m^2/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 2,590.1 kPa.

The analysis of the CHi and CHir phases show some minor inconsistencies, which are mainly caused by the fast recovery. No further analysis is recommended.

6.2.10 Section 286.68–306.68 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 relatively fast 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 to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is adequate for quantitative analysis. The injection rate decreased from 1.70 L/min at start of the CHi phase to 1.47 L/min at the end, indicating a moderate to high interval transmissivity. The CHir phase shows relatively fast recovery, but is of good quality and as such 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 and the CHir phase show a flat derivative at late times, indicating a flow dimension of two (radial flow). The analysis for both phases was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-19.

Selected representative parameters

The recommended transmissivity of 2.2E–6 m^2/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 9.0E–5 to 4.0E–6 m^2/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 2,765.8 kPa.

The analysis of the CHi and CHir phases show some minor inconsistencies, which are mainly caused by the fast recovery. No further analysis is recommended.

6.2.11 Section 306.68–326.68 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 fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is adequate for quantitative analysis. The injection rate decreased from 4.76 L/min at start of the CHi phase to 3.66 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows 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 and the CHir phase show a flat derivative at late times, indicating a flow dimension of two (radial flow). The analysis for both phases was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-20.

Selected representative parameters

The recommended transmissivity of 4.2E–6 m^2/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 1.5E–6 to 7.0E–6 m^2/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 2,937.8 kPa.

The analysis of the CHi and CHir phases show some minor inconsistencies, which are mainly caused by the fast recovery. No further analysis is recommended.

6.2.12 Section 326.69–346.69 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 fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is adequate for quantitative analysis. The injection rate decreased from 8.86 L/min at start of the CHi phase to 6.90 L/min at the end, indicating a high interval transmissivity. The CHir phase shows 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 flat derivative at late times, indicating a flow dimension of two (radial flow). The determination of the flow dimension using the CHir phase is difficult due to the fast recovery and the quality of the data. The analysis for both phases was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-21.

Selected representative parameters

The recommended transmissivity of 1.0E–5 m^2/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 7.0E–6 to 3.0E–5 m^2/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 3,109.7 kPa.

The analysis of the CHi and CHir phases show some minor inconsistencies, which are mainly caused by the fast recovery. No further analysis is recommended.

6.2.13 Section 346.74–366.74 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 fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is adequate for quantitative analysis. The injection rate decreased from 10.6 L/min at start of the CHi phase to 8.10 L/min at the end, indicating a high interval transmissivity. The CHir phase shows 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 and the CHir phase show a flat derivative at late times, indicating a flow dimension of two (radial flow). The analysis for both phases was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-22.

Selected representative parameters

The recommended transmissivity of 9.3E–6 m^2/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–6 to 3.0E–5 m^2/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 3,282.7 kPa.

The analysis of the CHi and CHir phases show some inconsistencies, which are mainly caused by the fast recovery. No further analysis is recommended.

6.2.14 Section 356.77–376.77 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 fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is adequate for quantitative analysis. The injection rate decreased from 8.46 L/min at start of the CHi phase to 6.71 L/min at the end, indicating a high interval transmissivity. The CHir phase shows 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 and the CHir phase show a flat derivative at late times, indicating a flow dimension of two (radial flow). The analysis for both phases was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-23.

Selected representative parameters

The recommended transmissivity of 1.1E–5 m^2/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 7.0E–6 to 4.0E–5 m^2/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 3,366.2 kPa.

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

6.2.15 Section 376.80–396.80 m, test no 2 and 3, injection and slug 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 fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was bad and it took about 7 minutes to get stable pressure conditions. It was decided to let the injection phase for 30 minutes. Only the very last part of the Chi phase was analysable quantitatively. The injection rate decreased from about 0.32 L/min at start of the CHi phase to 0.28 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows no problems, but due to the fact that no radial flow was reached, the results should be regarded carefully.

Because of the problems with the injection test, an over night slug injection test was performed.

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, it is difficult to determine the flow dimension from one of the phases. A flow dimension of two was assumed. The analysis for both phases was conducted using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-24.

Selected representative parameters

The recommended transmissivity of 3.0E–7 m^2/s was derived from the analysis of the CHi phase, which shows at late times the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E–8 to 6.0E–7 m^2/s. The analysis was conducted using a flow dimension of 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 3,523.8 kPa.

The analysis of the CHi and CHir phases show some inconsistencies, due to the problems mentioned above. The analysis of the SI phase shows similar results, so that no further analysis is recommended.

6.2.16 Section 391.80–411.80 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection (Pi) test conducted with the goal of deriving a first estimate of the formation transmissivity. The relative slow recovery of the pulse test indicated a relative 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 230 kPa. No hydraulic connection to the adjacent zones was observed. Due to the time needed to get stable pressure conditions, the first part of the Chi phase is not analysable. However, the second part can be analysed quantitatively. The injection rate decreased from about 0.21 L/min at start of the CHi phase to 0.06 L/min at the end, indicating a relative low interval transmissivity. 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 CHi phase shows a flat derivative at late times, indicating radial flow (flow dimension of 2). For the CHir and Pi phase it is difficult to determine the flow dimension. In those cases a flow dimension of two was assumed. The analyses of the Chi and CHir phase were conducted using an infinite acting homogeneous radial flow model. The analysis of the Pulse injection test was conducted using a two shel composite flow model. The analysis is presented in Appendix 2-25.

Selected representative parameters

The recommended transmissivity of 4.2E–8 m^2/s was derived from the analysis of the CHi phase, which shows at late times the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E–8 to 8.0E–8 m^2/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 3,606.7 kPa.

The analysis of the CHi and CHir phases show inconsistencies, due to the problems mentioned above. The analysis of the Pi phase shows similar results, so that no further analysis is recommended.

6.2.17 Section 406.83–426.83 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 255 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is adequate for quantitative analysis. The injection rate decreased from 30.1 mL/min at start of the CHi phase to 16.7 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 flat derivative at late times, indicating a flow dimension of two (radial flow). The CHir phase does not reach radial flow, so that the flow dimension was assumed as two. For the analysis of both phases, a homogeneous radial flow model was chosen. The analysis is presented in Appendix 2-26.

Selected representative parameters

The recommended transmissivity of 1.1E–8 m^2/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 7.0E–9 to 3.0E–8 m^2/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 3,775.5 kPa.

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

6.2.18 Section 426.86–446.86 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 230 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is adequate for quantitative analysis. The injection rate decreased from 30.3 mL/min at start of the CHi phase to 15.3 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 flat derivative at late times, indicating a flow dimension of two (radial flow). The CHir phase does not reach radial flow, so that the flow dimension was assumed as two. For the analysis of both phases, a homogeneous radial flow model was chosen. The analysis is presented in Appendix 2-27.

Selected representative parameters

The recommended transmissivity of 1.3E–8 m^2/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 7.0E–9 to 3.0E–8 m^2/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 3,935.8 kPa.

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

6.2.19 Section 446.88–466.88 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 recovery of the pulse test was very slow, indicating 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 extended to about one hour.

During the brief injection phase a total volume of 19 mL was injected (derived from the replacement in the injection vessel). This injected volume produced a pressure increase of 236 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 8.1E–11 m^3/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 Pi phase shows a flat part at middle tmes, which is indicative for a flow dimension of 2 (radial flow). At late times it shows a downward trend, indicating a transition to a zone of higher transmissivity. The analysis is presented in Appendix 2-28.

Selected representative parameters

The recommended transmissivity of 7.8E–11 m^2/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 3E–11 to 3E–10 m^2/s (the outer zone transmissivity is considered as most representative).The flow dimension displayed during the test is 2. No static pressure could be derived.

6.2.20 Section 466.89–486.89 m, test no 1 and 2, injection and slug 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 217 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the CHi phase is of good quality and as such quantitatively analysable.

The injection rate decreased from about 57 mL/min at start of the CHi phase to 41 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is adequate for quantitatively analysis

Additionally, an over night slug injection (Si) test was performed.

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 and the CHir phase show a flat derivative at late times, indicating a flow dimension of 2. The analysis for both phases was conducted using an infinite acting homogeneous radial flow model. The derivative of the Si phase shows a flat derivative as well. The same model was used for the analysis of this part. The analysis is presented in Appendix 2-29.

Selected representative parameters

The recommended transmissivity of 6.7E–8 m^2/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 3.0E–8 to 9.0E–8 m^2/s. The flow dimension displayed during the test was 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 4,264.7 kPa. The derived transmissivity of the Si phase is 6.9E–8 m^2/s.

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

6.2.21 Section 486.90–506.90 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 210 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is adequate for quantitative analysis. The injection rate decreased from 61.9 mL/min at start of the CHi phase to 31.2 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 both phases show at middle times a flat derivative, indicating a flow dimension of two (radial flow). After that flat part, the derivative shows an upward trend followed by a second stabilisation, which is indicative for a transition to a zone of lower transmissivity. For the analysis of both phases, a two shell composite flow model was chosen. The analysis is presented in Appendix 2-30.

Selected representative parameters

The recommended transmissivity of 1.1E–8 m^2/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 7.0E–9 to 3.0E–8 m^2/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 4,415.2 kPa.

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

6.2.22 Section 506.92–526.92 m, test no 3, 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 220 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was not very good and it took about two minutes to get stale pressure conditions. It was decided to extend the injection phase to 30 minutes. However, the second part of the Chi phase is good and adequate for quantitative analysis. The injection rate decreased from 0.55 L/min at start of the CHi phase to 0.48 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 flat derivative at late times, indicating a flow dimension of two (radial flow). The CHir phase does not reach radial flow. A flow dimension of two was assumed. For the analysis of both phases, an infinite acting homogeneous radial flow model was chosen. The analysis is presented in Appendix 2-31.

Selected representative parameters

The recommended transmissivity of 3.4E–7 m^2/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 7.0E–7 m^2/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 4,586.5 kPa.

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

6.2.23 Section 526.94–546.94 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 to 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 225 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is good and adequate for quantitative analysis. The injection rate decreased from 0.13 L/min at start of the CHi phase to 0.04 L/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 flat derivative at middle and late times, indicating a flow dimension of two (radial flow). The CHir phase does not reach radial flow. A flow dimension of two was assumed. For the analysis of both phases, an infinite acting homogeneous radial flow model was chosen. The analysis is presented in Appendix 2-32.

Selected representative parameters

The recommended transmissivity of 3.0E–8 m^2/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–8 to 6.0E–8 m^2/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 4,756.6 kPa.

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

6.2.24 Section 546.97–566.97 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 fast 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 to the adjacent zones was observed. The injection rate control during the CHi phase was good and the Chi phase is adequate for quantitative analysis. The injection rate decreased from 15.3 L/min at start of the CHi phase to 12.1 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 flat derivative at late times, indicating a flow dimension of two (radial flow). An infinite acting homogeneous flow model was chosen for the analysis of the Chi phase. The CHir phase shows a flat derivative at middle times, at late times it shows an upward trend, which is indicative for decreasing transmissivity at some distance from the borehole. For the analysis of the CHir phase a two shell composite flow model was chosen. The analysis is presented in Appendix 2-33.

Selected representative parameters

The recommended transmissivity of 1.2E–5 m^2/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 9.0E–6 to 3.0E–5 m^2/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 4,917.8 kPa.

The analyses of the CHi and CHir phases show some inconsistencies concerning the flow model. But the general results are very similar and no further analysis is recommended.

6.2.25 Section 566.98–586.98 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 relatively slow 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 195 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the CHi phase is adequate for quantitative analysis. The injection rate decreased from 116 mL/min at start of the CHi phase to 21 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 flat derivative at late times, indicating a flow dimension of two (radial flow). An infinite acting homogeneous flow model was chosen for the analysis of the Chi phase. The CHir phase shows an upward trend at late times, which is indicative for decreasing transmissivity at some distance from the borehole. For the analysis of the CHir phase a two shell composite flow model was chosen. The analysis is presented in Appendix 2-34.

Selected representative parameters

The recommended transmissivity of 1.2E–8 m^2/s was derived from the analysis of the CHi phase, which shows the clearest radial flow. The confidence range for the interval transmissivity is estimated to be 8.0E–9 to 3.0E–8 m^2/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 5,083.0 kPa.

The analyses of the CHi and CHir phases show some inconsistencies concerning the flow model. In case further analysis of the test is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history.

6.2.26 Section 587.02–607.02 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 59Pa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/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 2-35.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.2.27 Section 607.06–627.06 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 recovery of the pulse test was very slow, indicating 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.

During the brief injection phase a total volume of about 18 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 183 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 9.9E–12 m^3/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 Pi phase shows a flat part at middle and late times, which is indicative for a flow dimension of 2 (radial flow). The analysis is presented in Appendix 2-36.

Selected representative parameters

The recommended transmissivity of 9.3E–11 m^2/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 5E–11 to 4E–10 m^2/s (the outer zone transmissivity is considered as most representative).The flow dimension displayed during the test is 2. No static pressure could be derived.

6.2.28 Section 627.10–647.10 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 relatively fast 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the CHi phase is adequate for quantitative analysis. The injection rate decreased from 0.43 L/min at start of the CHi phase to 0.33 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 flat derivative at late times, indicating a flow dimension of two (radial flow). An infinite acting homogeneous flow model was chosen for the analysis of the Chi phase. The CHir phase shows an upward trend at late times, which is indicative for a change to lower transmissivity at some distance from the borehole. For the analysis of the CHir phase a two shell composite flow model was chosen. The analysis is presented in Appendix 2-37.

Selected representative parameters

The recommended transmissivity of 4.9E–7 m^2/s was derived from the analysis of the CHi phase, which shows the clearest radial flow and best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–7 to 6.0E–7 m^2/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 5,551.2 kPa.

The analyses of the CHi and CHir phases show some inconsistencies concerning the flow model. The outer zone transmissivity of the CHir phase is equal to the transmissivity derived from the Chi phase. In case further analysis of the test is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects.

6.2.29 Section 647.11–667.11 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 relatively slow recovery of the pulse test indicated a moderate to 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 213 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the CHi phase is adequate for quantitative analysis. The injection rate decreased from 162 mL/min at start of the CHi phase to 68 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 flat derivative at middle and late times, indicating a flow dimension of two (radial flow). The CHir phase does not show radial flow clearly, anyway, a flow dimension of two was assumed. An infinite acting homogeneous flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-38.

Selected representative parameters

The recommended transmissivity of 6.0E–8 m^2/s was derived from the analysis of the CHi phase, which shows the clearest radial flow and best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E–8 to 9.0E–8 m^2/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 5,702.8 kPa.

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

6.2.30 Section 667.09–687.09 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 recovery of the pulse test was very slow, indicating 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.

During the brief injection phase a total volume of about 19 mL was injected (derived from the flowmeter readings). This injected volume produced a pressure increase of 237 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 8.1E–11 m^3/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 Pi phase shows an upward trend at middle times followed by a horizontal stabilisation, which is indicative for a flow dimension of two. For the analysis a radial two shell composite flow model was used. The analysis is presented in Appendix 2-39.

Selected representative parameters

The recommended transmissivity of 5.6E–10 m^2/s was derived from the analysis of the Pi phase (outer zone). 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–10 to 1E–9 m^2/s.The flow dimension displayed during the test is 2. No static pressure could be derived.

6.2.31 Section 687.12–707.12 m, test no 2, 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 relatively slow 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 207 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the CHi phase is adequate for quantitative analysis. The injection rate decreased from 58 mL/min at start of the CHi phase to 6 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 both phases show an upward trend at middle times, indicating a decrease in transmissivity or a change in flow dimension. The derivative of the CHi phase shows a stabilisation at late times, which is indicative for a flow dimension of two. For the analysis of both phases a radial two shell composite flow model was chosen. The analysis is presented in Appendix 2-40.

Selected representative parameters

The recommended transmissivity of 2.2E–9 m^2/s was derived from the analysis of the CHi 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 6.0E–9 m^2/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 analyses of the CHi and CHir phases show good consistency. No further analysis is recommended.

6.2.32 Section 707.15–727.15 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 relatively slow 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 to the adjacent zones was observed. The injection rate control during the CHi phase was good and the CHi phase is adequate for quantitative analysis. The injection rate decreased from 129 mL/min at start of the CHi phase to 10 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 both phases show an upward trend at middle times, indicating a decrease in transmissivity or a change in flow dimension. The derivative of the CHi phase shows a stabilisation at late times, which is indicative for a flow dimension of two. For the analysis of both phases a radial two shell composite flow model was chosen. The analysis is presented in Appendix 2-41.

Selected representative parameters

The recommended transmissivity of 2.4E–9 m^2/s was derived from the analysis of the CHi phase (outer zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E–9 to 7.0E–9 m^2/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 analyses of the CHi and CHir phases show good consistency. No further analysis is recommended.

6.2.33 Section 727.19–747.19 m, test no 1 and 2, injection and slug 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 219 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the injection was good and the CHi phase is amenable for quantitative analysis. The injection rate decreased from 122 mL/min at start of the CHi phase to 27 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no problems and is adequate for quantitative analysis.

Additionally, a slug injection test was performed over night.

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 middle and late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase does not allow for a specific determination of the flow dimension. It shows a downward trend at middle and late times, indicating whether a flow dimension unequal to two or a change in transmissivity. The analysis was conducted using a radial two shell composite flow model. The derivative of the slug injection (Si) phase is noisy, but it shows a flat part at late times, indicating a flow dimension of two. This phase was analysed using an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-43.

Selected representative parameters

The recommended transmissivity of 2.6E–8 m^2/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–8 to 5.0E–8 m^2/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 6,304.2 kPa.

The analyses of the CHi and CHir phases show some inconsistencies concerning the flow model. In case further analysis of the test is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects.

The analysis of the slug injection test is consistent with the results of the CHi phase of the injection test. The derived transmissivity is 4.0E–8 m^2/s.

6.2.34 Section 747.22–767.22 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 recovery of the pulse test was very slow, indicating 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.

During the brief injection phase a total volume of about 60 mL was injected (derived from the replacement in injection vessel). This injected volume produced a pressure increase of 190 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 3.0E–10 m^3/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 Pi phase shows does not allow for a specific determination of the flow dimension. For the analysis radial flow conditions were (flow dimension of 2) were assumed and an infinite acting radial flow model was chosen. The analysis is presented in Appendix 2-43.

Selected representative parameters

The recommended transmissivity of 1.2E–10 m^2/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 3E–10 m^2/s. A flow dimension of 2 was assumed. No static pressure could be derived.

6.2.35 Section 767.25–787.25 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 relatively fast 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 220 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was not very good at the beginning and it took about 1 minute to get stable pressure conditions. However, the second part is of good quality and as such adequate for quantitative analysis. The injection rate decreased from 5.79 L/min at start of the CHi phase to 2.55 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 flat derivative at late times, indicating a flow dimension of two. This phase was analysed using an infinite acting radial flow model. The CHir phase shows at middle times an upward trend followed by a horizontal stabilisation, which is indicative for a transition to a zone of lower transmissivity at some distance from the borehole. For the analysis of this phase, a radial two shell composite flow model was chosen. The analysis is presented in Appendix 2-44.

Selected representative parameters

The recommended transmissivity of 6.4E–7 m^2/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 5.0E–7 to 2.0E–6 m^2/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 6,577.8 kPa.

The analyses of the CHi and CHir phases show some inconsistencies, especially concerning the flow model. In case further analysis of the test is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects and change in flow rates during the injection phase.

6.2.36 Section 787.28–807.28 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 101Pa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/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 2-45.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.2.37 Section 807.31–827.31 m, test no 2, 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 relatively slow 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.

connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the data of the CHi phase are of good quality and as such adequate for quantitative analysis. The injection rate decreased from 235 mL/min at start of the CHi phase to 38 mL/min at the end, indicating a relatively moderate to low interval transmissivity. The CHir phase shows no problems and is of good quality and as such 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 none of the two phases allows determining clearly the flow dimension. For both phases a flow dimension of two was assumed and an infinite acting radial flow model was chosen for the analysis. The analysis is presented in Appendix 2-46.

Selected representative parameters

The recommended transmissivity of 7.7E–9 m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the smoothest data and derivative quality. Due to the fact that none of the phases reached radial flow, the confidence range for the interval transmissivity is estimated to be 4.0E–9 to 3.0E–8 m^2/s. The flow dimension assumed for this 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 6,866.7 kPa.

The analyses of the CHi and CHir phases show some inconsistencies, especially concerning the flow model. In case further analysis of the test is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects and change in flow rates during the injection phase.

6.2.38 Section 827.33–847.33 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 222 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was not very good; the pressure in the section started to rose after about 7 minutes of injection and kept rising until end of injection by 6 kPa. However, the data is still ok and amenable for quantitative analysis. The injection rate decreased from 135 mL/min at start of the CHi phase to 114 mL/min at the end, indicating a moderate interval transmissivity. The CHir phase shows very fast recovery and as such the results should be regarded as order of magnitude only.

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, although it is noisy, shows a flat derivative at middle and late times, indicating a flow dimension of two. The CHir phase does not allow for a specific determination of the flow dimension, a flow dimension of two was assumed. Both phases were analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2-47.

Selected representative parameters

The recommended transmissivity of 2.1E–7 m^2/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 9.0E–8 to 5.0E–7 m^2/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 6,998.4 kPa.

The analyses of the CHi and CHir phases show some inconsistencies, mainly caused by the fast recovery of the CHir phase. No further analysis is recommended.

6.2.39 Section 847.39–867.39 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 relatively slow 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 214 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the data of the Chi phase is adequate for quantitative analysis. The injection rate decreased from 22 mL/min at start of the CHi phase to 12 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no 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 CHi phase, although it is very noisy, shows a flat derivative at middle and late times, indicating a flow dimension of two. Due to the fact that the CHir phase did not reach radial flow conditions, it does not allow for a specific determination of the flow dimension. Both phases were analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2-48.

Selected representative parameters

The recommended transmissivity of 1.1E–8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality and radial flow. The confidence range for the interval transmissivity is estimated to be 8.0E–9 to 4.0E–8 m^2/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 7,133.9 kPa.

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

6.2.40 Section 867.46–887.46 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 45Pa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/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 2-49.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.2.41 Section 887.48–907.48 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 135Pa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/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 2-50.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.2.42 Section 907.49–927.49 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 235 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the data of the Chi phase are adequate for quantitative analysis. The injection rate decreased from 43 mL/min at start of the CHi phase to 23 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no 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 CHi phase, although it is very noisy, shows a flat derivative at middle and late times, indicating a flow dimension of two. The CHir phase shows a flat derivative at late times, as well. Both phases were analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2-51.

Selected representative parameters

The recommended transmissivity of 1.6E–8 m^2/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 8.0E–9 to 4.0E–8 m^2/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 7,508.7 kPa.

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

6.2.43 Section 927.50–947.50 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 relatively slow 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 211 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate control during the CHi phase was good and the data of the Chi phase are adequate for quantitative analysis. The injection rate decreased from 126 mL/min at start of the CHi phase to 44 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows no 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 CHi phase shows a flat derivative at middle and late times, indicating a flow dimension of two. The CHir phase shows an upward trend at middle times followed by a horizontal stabilisation, which is indicative for a transition to a zone of lower transmissivity and radial flow. The CHi phase was analysed using an infinite radial acting flow model. The CHir phase was analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-52.

Selected representative parameters

The recommended transmissivity of 2.6E–8 m^2/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–9 to 4.0E–8 m^2/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 7,652.2 kPa.

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

6.2.44 Section 947.50–967.50 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 500Pa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/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 2-53.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.2.45 Section 967.50–987.50 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 about 500Pa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m^2/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 2-54.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than 1E–11 m^2/s.

No further analysis recommended.

6.3 5 m single hole pumping tests

The nomenclature and symbols used during evaluation and for presentation of the results of the pump tests and flow logging are according to the SKB documents "Instruction for analysis of single-hole injection and pump tests" (SKB MD 320.004, Instruktion för analysis av injections- och enhålspumptester). If additional symbols are used, they are explained in the report text.

6.3.1 260.00–265.00 m

Comments to test

The test was conducted as a constant rate pump phase (CRw) followed by a pressure recovery phase (CRwr). The flow rate during the pumping phase was at about 8.1 L/min at a drawdown of ca 48 kPa at the end of the perturbation phase. A slight connection to the lower and upper section was observed. After 48 hours of pumping the final water chemistry sample was taken. The CHwr phase took 21 hours. 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 CRw and the CRwr phase show a flat derivative at late times, indicating a flow dimension of 2. For the analysis of both phases a homogeneous radial flow model was chosen. The analysis is presented in Appendix 2-55.

Selected representative parameters

The recommended transmissivity of 1.0E–4 m^2/s was derived from the analysis of the CRwr phase, which shows the best data and derivative quality. The confidence range for the transmissivity is estimated to be 8.0E–5 to 3.0E–4 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHwr phase using straight line extrapolation in the Horner plot to a value of 2,399.4 kPa.

The analysis of the CRw and CRwr phases shows good consistency. No further analysis is recommended.

6.3.2 558.20–563.20 m

Comments to test

The test was conducted as a constant rate pump phase (CRw) followed by a pressure recovery phase (CRwr). The flow rate during the pumping phase was at about 1.4 L/min for the first 14 hours. Due to the fact, that the pressure in the interval stabilized, the rate was increased to 4.0 L/min for the next 130 hours. The drawdown at the end of the perturbation phase was at about 140 kPa. A connection the bottom zone was observed. Except of the first two hours, the uranine concentration rose during the entire perturbation phase. With agreement of the hydrogeochemist of SKB, the final water sample was taken at an uranine concentration of about 46 µg/L (~20%). The recovery took 24 hours. Both phases were analysed quantitatively.

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 flat derivative at middle times followed by an upward trend. This indicates after radial flow at middle times, a transition to a zone of lower transmissivity at some distance from the borehole. The flow dimension for both zones is 2. A radial two shell composite flow model was chosen for the anlysis of both phases. The analysis is presented in Appendix 2-56.

Selected representative parameters

The recommended transmissivity of 1.1E–5 m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows good data and derivative quality. The confidence range for the transmissivity is estimated to be 6.0E–6 to 3.0E–5 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CRwr phase using straight line extrapolation in the Horner plot to a value of 4,881.0 kPa.

The analysis of the CRw and CRwr phases shows good consistency. No further analysis is recommended.

6.3.3 776.20–781.20 m

Comments to test

The test was conducted as a constant rate pump phase (CRw) followed by a pressure recovery phase (CRwr). For the first 3.5 hours, the rate was at about 1.5 L/min. Because of a too big drawdown, the rate was decreased to 1.2 L/min. The total perturbation phase took aboput 137 hours. The flow rate was very noisy, the reason for this is unknown, but air inside the system could have caused this problem. The drwdown of the test ionterval was at 235 kPa. The pressure in the bottom zone decreased by up to 95 kPa, indicating a connection to the interval along fractures. The Uranin concentration rose for the first 50 hours to a value of about 50–60 µg/L (20–25%). For the rest of the pumping the concentration was more or less stable at this value. After 137 hours of pumping, it was decided to take the final water sample for analysis. The test interval was shut in and the recovery phase (CRwr) took 22 hours. The CRw phase is very nouisy, but still amenable for quantitative analysis. The data quality of the CRwr phase is good and the phase could be analysed quantitatively.

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 CRw phase is very noisy, so that no identification of the flow model can be clearly made. A flow dimension of two was assumed. The CRwr phase shows a flat derivative at middle times with a downward trend at late times, indicating a transition to a zone of higher transmissivity at some distance from the borehole. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-57.

Selected representative parameters

The recommended transmissivity of 6.6E–7 m^2/s was derived from the analysis of the CRwr phase (inner zone), which shows the best data and derivative quality. The confidence range for the transmissivity is estimated to be 6.0E–7 to 1.0E–6 m^2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHwr phase using straight line extrapolation in the Horner plot to a value of 6,540.0 kPa.

Although the derivative of the CRw phase is very noisy, the analysis of the CRw and CRwr phases shows good consistency. No further analysis is recommended.

6.4 Water sampling

6.4.1 Uranine concentration

Three different sections were chosen for the watersampling campaign. The length of these sections was 5 m. The target for pumping was to achieve an uranine concentration of 5% or less of the initial value.

Figures 6-1 to 6-3 show the uranine concentration versus pumping time for all three tests. Basis for these diagrams are the field measurements of the uranine concentration. The field-measured concentrations of these samples are very similar to the values measured in the SKB laboratory.

All three curves show very different shapes. In the uppermost section the uranine concentration rose in the first two to three hours very steep to decrease afterwards very slowly. After two days of pumping and a concentration of about 6%, the final water sample was taken. This sample was analysed according to SKB chemistry class 4.

In the second section from 558.20–563.20 m the content of uranine decreased at the very beginning. After two to three hours, the uranine concentration started to rise. For the next 130 hours it kept rising nearly linear. The final water sample was taken at a uranine concentration of ca 20% (~45 µg/L). It was analysed according to SKB chemistry class 5.

The curve of the last section (Figure 6-3) shows a third kind of shape. The first 48 hours are very similar to section 558.20–563.20 m, but in this section, the uranine concentration stayed approximately stable between 22 and 27%. After 136 hours of pumping, the decision was made to take the final water sample for chemical analysis. As well as the sample before, this was analysed according to SKB chemistry class 5. Partial results from the analysis of the water is presented in Table 6-1.

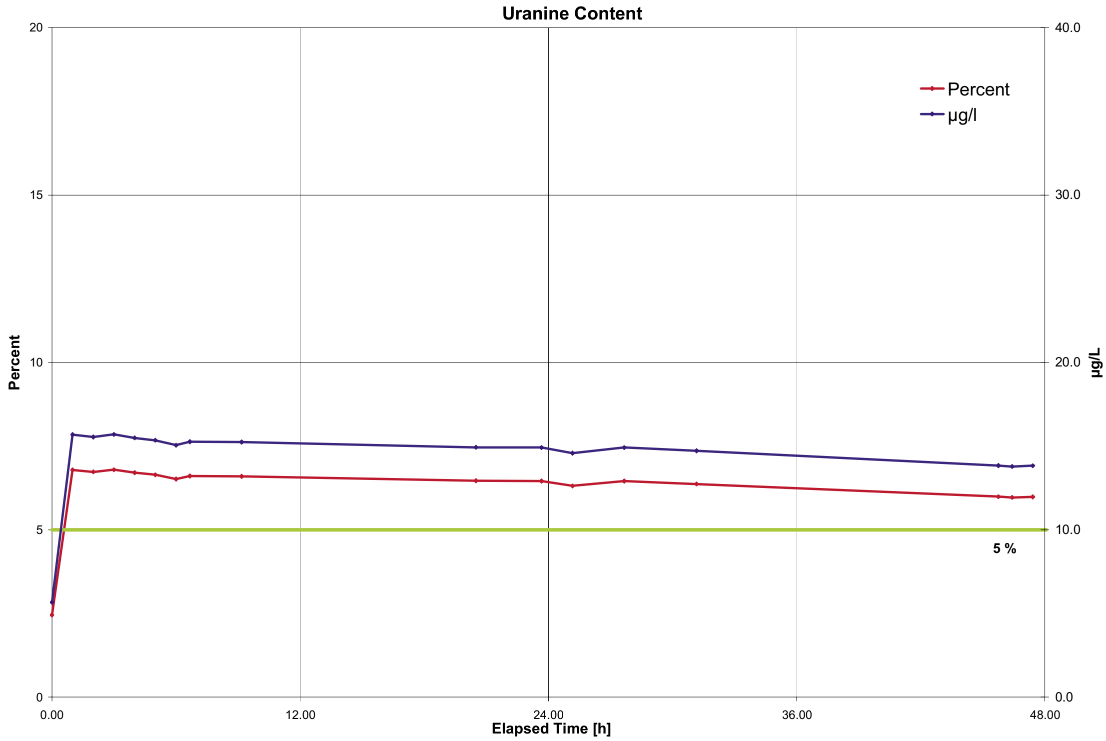

***Figure 6-1.** Uranine concentration during pumping in section 260.00–265.00.*

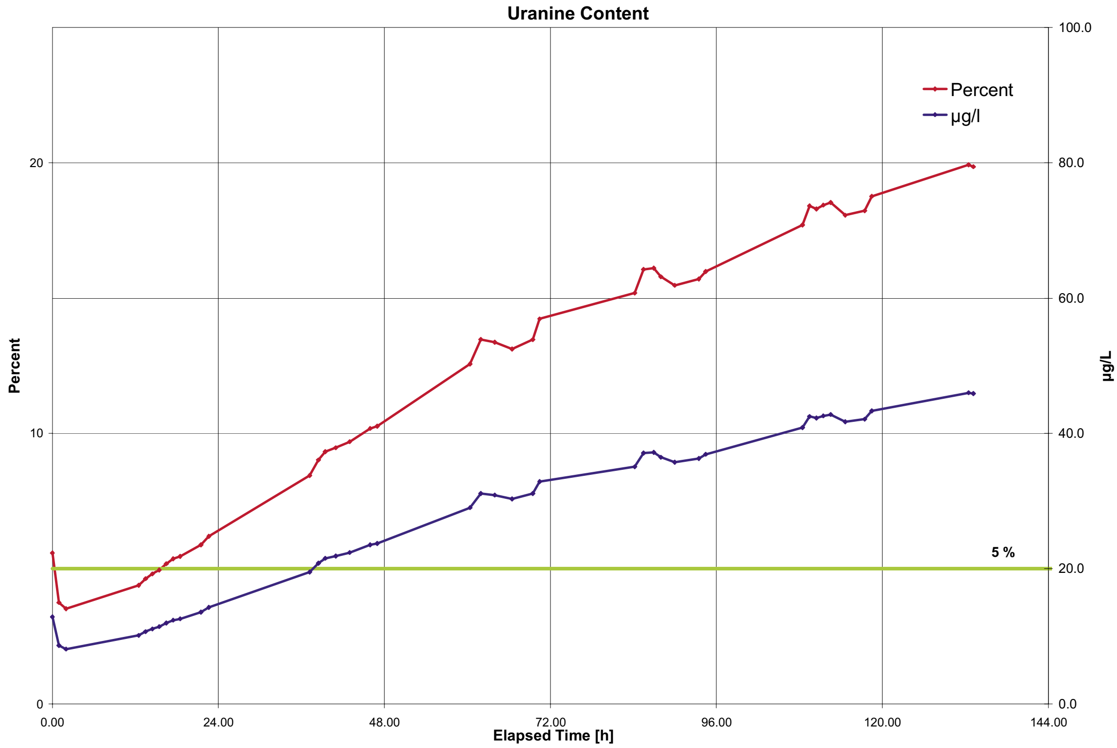

***Figure 6-2.** Uranine concentration during pumping in section 558.20–563.20.*

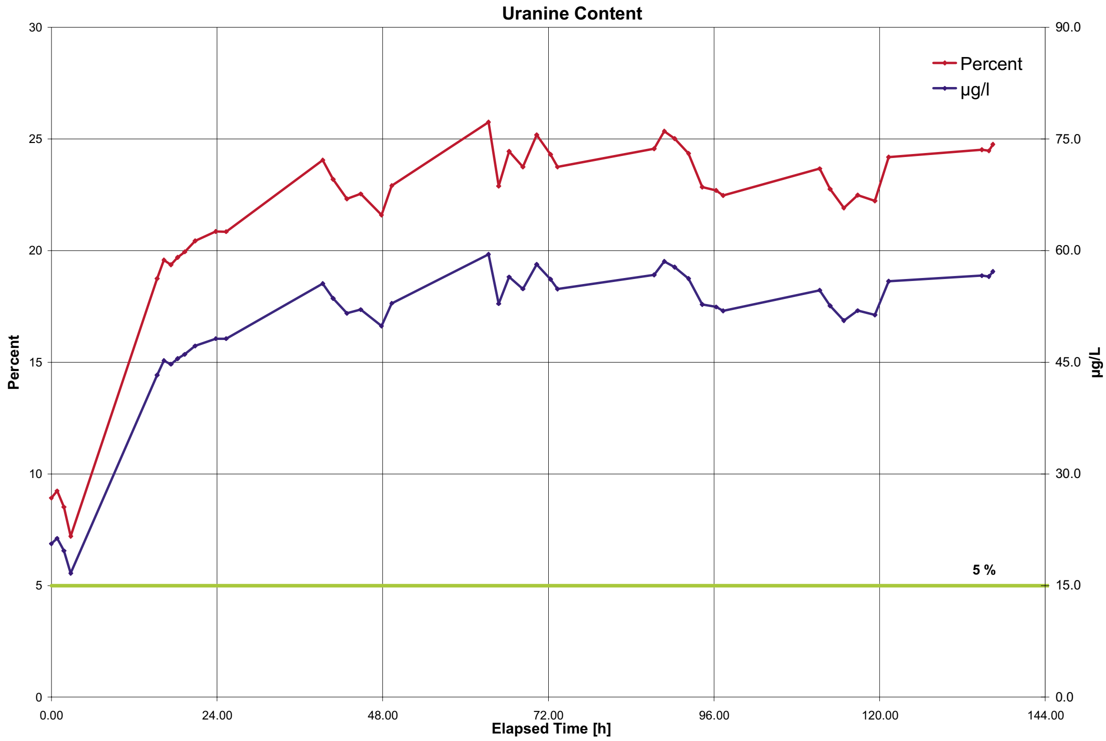

Figure 6-3. *Uranine concentration during pumping in section 776.20–781.20.*

Table 6-1. Water chemistry KLX06, analyses results.

Sampling date	Secup (m)	Seclow (m)	Sample no	HCO_3 (mg/L)	Cl (mg/L)	pH	El. cond (mS/m)	Drill water (%)
2005-03-09 11:00	260.00	265.00	10122	226.00	36.8	8.72	56.7	5.68
2005-03-16 08:30	558.20	583.20	10130	155.00	348.0	8.39	169.0	21.40
2005-03-23 09:10	776.20	781.20	10147	107.00	1,240.0	7.94	487.0	23.20

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 KLX06.

Borehole secup (m)	Borehole seclow (m)	Date and time for test. start YYYYMMDD hh:mm	Date and time for test. stop YYYYMMDD hh:mm	Q_p (m**3/s)	Q_m (m**3/s)	p (s)	t_F (s)	p_0 (kPa)	p_i (kPa)	p_p (kPa)	p_F (kPa)	Te_w (°C)	Test phases measured Analysed test phases marked bold
106.38	206.38	20050402 17:03	20050402 19:34	3.22E–04	3.64E–04	1,800	900	1,873	1,874	1,886	1,875	10.3	**CHi / CHir**
206.52	306.52	20050403 10:16	20050403 12:37	3.43E–04	3.54E–04	1,800	1,800	2,757	2,764	2,823	2,767	11.4	**CHi / CHir**
306.68	406.68	20050403 14:20	20050403 16:03	2.50E–04	2.68E–04	1,800	600	3,622	3,625	3,743	3,625	12.6	**CHi / CHir**
406.83	506.83	20050403 17:33	20050403 23:08	1.83E–06	2.00E–06	1,800	14,400	4,457	4,442	4,658	4,436	13.8	**CHi / CHir**
506.92	606.92	20050404 09:33	20050404 12:08	2.05E–04	2.22E–04	1,800	3,600	5,255	5,236	5,437	5,241	15.4	**CHi / CHir**
607.06	707.06	20050404 13:36	20050404 15:37	6.17E–06	6.67E–06	1,800	1,800	6,021	6,010	6,211	6,015	16.7	**CHi / CHir**
707.15	807.15	20050404 17:04	20050405 01:08	3.96E–05	5.45E–05	1,800	21,600	6,742	6,728	6,948	6,717	17.9	**CHi / CHir**
807.31	907.31	20050405 09:30	20050405 13:01	2.02E–06	2.88E–06	1,800	3,600	7,401	7,398	7,598	7,403	19.1	**CHi / CHir**
887.48	987.48	20050405 14:30	20050405 16:36	1.22E–06	1.42E–06	1,800	1,800	7,900	7,886	8,078	7,893	19.9	**CHi / CHir**
106.38	126.38	20050407 09:07	20050407 10:43	3.45E–04	3.70E–04	1,200	1,200	1,178	1,179	1,198	1,180	9.4	**CHi / CHir**
126.42	146.42	20050407 11:26	20050407 14:17	3.88E–07	4.47E–07	1,200	1,200	1,355	1,359	1,589	1,358	9.6	**CHi / Chir / Si**
146.44	166.44	20050407 14:56	20050407 16:28	7.60E–06	7.88E–06	1,200	300	1,532	1,534	1,747	1,533	9.8	**CHi / CHir**
166.47	186.47	20050407 17:08	20050407 18:34	3.15E–04	3.30E–04	1,200	600	1,709	1,711	1,769	1,711	10.1	**CHi / CHir**
186.49	206.49	20050408 08:44	20050408 10:05	2.75E–04	2.77E–04	1,200	600	1,886	1,886	2,085	1,886	10.2	**CHi / CHir**
206.52	226.52	20050408 11:19	20050408 12:58	9.45E–05	9.72E–05	1,200	1,200	2,055	2,062	2,263	2,062	10.3	**CHi / CHir**
226.56	246.56	20050408 13:53	20050408 15:36	1.29E–04	1.33E–04	1,200	600	2,237	2,240	2,441	2,240	10.7	**CHi / CHir**
246.62	266.62	20050408 16:26	20050408 17:53	3.42E–04	3.50E–04	1,200	900	2,413	2,417	2,549	2,416	11.0	**CHi / CHir**
266.64	286.64	20050409 10:01	20050409 11:22	4.38E–05	4.65E–05	1,200	900	2,588	2,589	2,790	2,589	11.2	**CHi / CHir**
286.68	306.68	20050409 12:09	20050409 13:32	2.44E–05	2.56E–05	1,200	600	2,763	2,765	2,966	2,765	11.4	**CHi / CHir**
306.68	326.68	20050409 14:16	20050409 15:35	6.20E–05	6.48E–05	1,200	600	2,936	2,937	3,138	2,938	11.7	**CHi / CHir**
326.69	346.69	20050409 16:16	20050409 17:36	1.16E–04	1.22E–04	1,200	600	3,108	3,110	3,310	3,110	11.9	**CHi / CHir**
346.74	366.74	20050409 18:11	20050409 19:37	1.37E–04	1.44E–04	1,200	1,200	3,281	3,281	3,482	3,282	12.1	**CHi / CHir**
356.77	376.77	20050410 08:40	20050410 09:52	1.12E–04	1.18E–04	1,200	300	3,362	3,365	3,566	3,366	12.2	**CHi / CHir**

Borehole secup (m)	Borehole seclow (m)	Date and time for test. start YYYYMMDD hh:mm	Date and time for test. stop YYYYMMDD hh:mm	Q_p (m**3/s)	Q_m (m**3/s)	p (s)	t_F (s)	p_0 (kPa)	p_i (kPa)	p_p (kPa)	p_F (kPa)	Te_w (°C)	Test phases measured Analysed test phases marked bold
376.80	396.80	20050410 13:14	20050410 14:50	4.65E–06	5.13E–06	1,800	1,500	3,538	3,538	3,739	3,540	12.5	**CHi / CHir / Si**
391.80	411.80	20050410 15:31	20050410 17:58	1.02E–06	1.67E–04	1,200	1,800	3,664	3,662	3,893	3,718	12.6	**CHi / CHir**
406.83	426.83	20050411 08:32	20050411 10:02	2.67E–07	3.03E–07	1,200	1,200	3,792	3,777	4,029	3,777	12.8	**CHi / CHir**
426.86	446.86	20050411 10:48	20050411 12:18	2.56E–07	2.73E–07	1,200	1,200	3,961	3,940	4,172	3,939	13.0	**CHi / CHir**
446.88	466.88	20050411 13:03	20050411 14:40	#NV	#NV	#NV	3,240	4,130	4,132	#NV	#NV	13.2	**Pi**
466.89	486.89	20050411 15:15	20050411 16:55	6.83E–07	7.08E–07	1,200	1,200	4,291	4,268	4,483	4,269	13.6	**CHi / CHir / Si**
486.90	506.90	20050412 08:44	20050412 12:02	5.25E–07	6.16E–07	1,200	1,200	4,456	4,438	4,648	4,452	13.7	**CHi / CHir**
506.92	526.92	20050413 15:39	20050413 17:22	8.02E–06	1.67E–04	1,800	1,800	4,592	4,594	4,795	4,609	14.1	**CHi / CHir**
526.94	546.94	20050413 18:08	20050413 20:21	6.27E–07	6.83E–07	1,200	3,600	4,779	4,760	4,988	4,758	14.4	**CHi / CHir**
546.97	566.97	20050414 08:24	20050414 10:03	2.02E–04	2.16E–04	1,200	1,200	4,937	4,922	5,124	4,932	14.8	**CHi / CHir**
566.98	586.98	20050414 10:42	20050414 12:44	3.50E–07	4.82E–07	1,200	2,400	5,101	5,099	5,294	5,104	15.1	**CHi / CHir**
587.02	607.02	20050414 13:25	20050414 14:30	#NV	#NV	#NV	#NV	5,261	#NV	#NV	#NV	15.4	**CHi / CHir**
607.06	627.06	20050414 15:07	20050414 16:17	#NV	#NV	#NV	1,200	5,414	#NV	#NV	#NV	15.7	**Pi**
627.10	647.10	20050414 17:04	20050414 19:31	5.50E–06	5.87E–06	1,200	3,600	5,568	5,555	5,755	5,554	15.9	**CHi / CHir**
647.11	667.11	20050415 08:32	20050415 10:07	1.14E–06	1.25E–06	1,200	1,200	5,713	5,705	5,915	5,708	16.2	**CHi / CHir**
667.09	687.09	20050415 10:40	20050415 11:57	#NV	#NV	#NV	1,800	5,868	#NV	#NV	#NV	16.4	**Pi**
687.12	707.12	20050415 13:52	20050415 14:50	1.02E–07	1.72E–07	1,200	1,200	6,023	6,023	6,230	6,097	16.7	**CHi / CHir**
707.15	727.15	20050415 15:22	20050415 17:07	1.62E–07	3.15E–07	1,200	1,200	6,169	6,169	6,370	6,253	16.9	**CHi / CHir**
727.19	747.19	20050415 17:48	20050415 21:00	7.67E–07	9.00E–07	1,200	7,200	6,312	6,303	6,522	6,306	17.2	**CHi / CHir / Si**
747.22	767.22	20050416 08:51	20050416 10:17	#NV	#NV	#NV	2,460	6,456	6,457	#NV	#NV	17.4	**Pi**
767.25	787.25	20050416 10:54	20050416 13:38	4.25E–05	6.25E–05	1,200	3,600	6,600	6,584	6,803	6,597	17.7	**CHi / CHir**
787.28	807.28	20050416 14:19	20050416 15:21	#NV	#NV	#NV	#NV	6,743	#NV	#NV	#NV	17.9	**–**
807.31	827.31	20050416 17:33	20050417 00:32	6.33E–07	2.02E–06	1,200	21,600	6,876	6,880	7,079	6,899	18.2	**CHi / CHir**
827.33	847.33	20050417 08:42	20050417 09:59	1.92E–06	1.98E–06	1,200	300	7,013	6,999	7,223	7,000	18.4	**CHi / CHir**
847.39	867.39	20050417 10:29	20050417 12:05	2.00E–07	2.17E–07	1,200	1,600	7,148	7,135	7,349	7,135	18.6	**CHi / CHir**
867.46	887.46	20050417 12:42	20050417 13:42	#NV	#NV	#NV	#NV	7,275	#NV	#NV	#NV	18.9	**–**

Borehole secup (m)	Borehole seclow (m)	Date and time for test. start YYYYMMDD hh:mm	Date and time for test. stop YYYYMMDD hh:mm	Q_p (m**3/s)	Q_m (m**3/s)	p (s)	t_F (s)	p_0 (kPa)	p_i (kPa)	p_p (kPa)	p_F (kPa)	Te_w (°C)	Test phases measured Analysed test phases marked bold
887.48	907.48	20050417 14:29	20050417 15:33	#NV	#NV	#NV	#NV	7,403	#NV	#NV	#NV	19.1	**–**
907.49	927.49	20050417 16:15	20050417 17:58	3.67E–07	3.95E–07	1,200	1,200	7,565	7,510	7,745	7,511	19.3	**CHi / CHir**
927.50	947.50	20050418 08:42	20050418 10:12	7.22E–07	9.23E–07	1,200	1,200	7,658	7,647	7,857	7,680	19.5	**CHi / CHir**
947.5	967.5	20050418 11:01	20050418 12:09	#NV	#NV	#NV	#NV	7,797	#NV	#NV	#NV	19.7	**–**
967.5	987.5	20050418 13:29	20050418 14:37	#NV	#NV	#NV	#NV	7,900	#NV	#NV	#NV	19.9	**–**
260.00	265.00	20050307 08:59	20050310 08:15	1.35E–04	1.35E–04	175,392	79,800	2,397	2,400	2,351	2,398	11.0	**CRw / CRwr**
558.20	563.20	20050310 18:56	20050317 08:19	6.28E–05	6.25E–05	479,400	85,020	4,901	4,884	4,748	4,831	14.5	**CRw / CRwr**
776.20	781.20	20050317 16:07	20050323 07:08	1.97E–05	1.95E–05	490,740	77,400	6,549	6,529	6,317	6,506	17.6	**CRw / CRwr**

#NV not analysed
CHi: Constant Head injection phase
CHir: Recovery phase following the constant head injection phase
CRw: Constant Rate with drawal phase
CRwr: Recovery phase folloing the constant rate with drawal
Pi: Pulse injection
Si : Slug injection

Table 7-2. Results from analysis of constant head tests in KLX06.

Interval position		Stationary flow parameters		Transient analysis													Static conditions	
				Flow regime		Formation parameters												
up m btoc	low m btoc	Q/s m²/s	T_M m²/s	Perturb Phase	Recovery Phase	T_{f1} 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	ξ –	dt_1 min	dt_2 min	p* kPa	h_{wif} masl
106.38	206.38	2.63E–04	3.42E–04	2	2	2.1E–04	#NV	2.1E–04	#NV	2.1E–04	1.0E–04	4.0E–04	3.7E–08	–5.3	0.3	3.1	1,874.0	13.06
206.52	306.52	5.70E–05	7.43E–05	2	2	1.3E–04	#NV	1.1E–04	#NV	1.3E–04	6.0E–05	3.0E–04	2.0E–08	4.3	0.8	19.4	2,767.0	14.88
306.68	406.68	2.08E–05	2.70E–05	2	2	2.9E–05	#NV	7.4E–05	#NV	2.9E–05	1.0E–05	8.0E–05	8.0E–09	–0.4	3.4	29.9	3,626.6	15.39
406.83	506.83	8.33E–08	1.08E–07	2	22	9.0E–08	#NV	5.8E–08	1.4E–07	9.0E–08	6.0E–08	2.0E–07	1.8E–10	0.8	2.2	25.7	4,437.7	13.19
506.92	606.92	9.98E–06	1.30E–05	2	22	1.1E–05	#NV	1.6E–05	8.4E–06	1.1E–05	2.0E–05	8.0E–06	2.0E–08	–1.6	5.4	28.7	5,233.5	12.98
607.06	707.06	3.01E–07	3.92E–07	2	2	4.5E–07	#NV	5.9E–07	#NV	4.5E–07	3.0E–07	6.0E–07	9.6E–10	2.2	8.6	26.0	6,010.1	14.55
707.15	807.15	1.77E–06	2.30E–06	2	2	6.8E–07	#NV	6.5E–07	#NV	6.5E–07	5.0E–07	1.0E–06	4.9E–08	–5.4	21.9	44.9	6,714.3	13.15
807.31	907.31	9.89E–08	1.29E–07	2	2	5.1E–08	#NV	9.1E–08	#NV	9.1E–08	5.0E–08	2.0E–07	9.3E–09	–1.2	#NV	#NV	7,372.2	12.29
887.48	987.48	6.22E–08	8.10E–08	2	2	5.6E–08	#NV	5.7E–08	#NV	5.7E–08	4.0E–08	8.0E–08	5.2E–10	–0.9	10.0	14.0	7,874.9	13.07
106.38	126.38	1.78E–04	1.86E–04	2	2	1.8E–04	#NV	2.3E–04	#NV	1.8E–04	8.0E–05	3.0E–04	1.8E–08	–3.6	7.4	17.3	1,178.8	14.17
126.42	146.42	1.66E–08	1.73E–08	2	2	2.2E–08	#NV	4.3E–08	#NV	2.2E–08	9.0E–09	4.0E–08	1.8E–10	3.2	0.9	6.6	1,352.6	13.77
146.44	166.44	3.50E–07	3.66E–07	2	2	5.9E–07	#NV	1.6E–06	#NV	5.9E–07	3.5E–07	8.0E–07	1.6E–10	3.9	1.9	14.6	1,532.2	14.06
166.47	186.47	5.35E–05	5.58E–05	22	2	5.0E–05	1.3E–04	5.9E–05	#NV	5.9E–05	3.0E–05	8.0E–05	6.0E–09	–2.1	0.3	3.8	1,708.9	14.06
186.49	206.49	1.36E–05	1.42E–05	22	2	1.6E–05	8.4E–05	4.7E–05	#NV	4.7E–05	3.0E–05	8.0E–05	1.5E–09	13.5	2.5	18.6	1,884.4	14.00
206.52	226.52	4.61E–06	4.82E–06	22	2	6.8E–06	4.5E–05	2.1E–05	#NV	6.8E–06	3.0E–06	1.0E–05	1.2E–09	1.2	0.6	1.6	2,062.8	14.22
226.56	246.56	6.28E–06	6.57E–06	2	2	1.3E–05	#NV	2.2E–05	#NV	1.3E–05	8.0E–06	4.0E–05	4.9E–10	4.6	4.8	16.9	2,238.5	14.20
246.62	266.62	2.54E–05	2.65E–05	22	2	3.6E–05	1.0E–04	6.4E–05	#NV	6.4E–05	4.0E–05	1.0E–04	1.7E–08	0.0	0.6	1.0	2,415.2	14.34
266.64	286.64	2.14E–06	2.24E–06	2	2	4.4E–06	#NV	7.7E–06	#NV	4.4E–06	2.0E–06	8.0E–06	1.0E–09	4.7	1.1	18.1	2,590.1	14.41
286.68	306.68	1.19E–06	1.25E–06	2	2	2.2E–06	#NV	4.4E–06	#NV	2.2E–06	9.0E–05	4.0E–06	5.9E–11	3.3	1.1	17.7	2,764.8	14.55
306.68	326.68	3.03E–06	3.17E–06	2	2	4.2E–06	#NV	1.1E–05	#NV	4.2E–06	1.5E–06	7.0E–06	6.5E–10	0.7	3.1	15.8	2,937.8	14.66
326.69	346.69	5.70E–06	5.96E–06	2	2	1.0E–05	#NV	2.7E–05	#NV	1.0E–05	7.0E–06	3.0E–05	9.2E–10	2.4	1.1	17.4	3,109.7	14.69
346.74	366.74	6.66E–06	6.97E–06	2	2	9.3E–06	#NV	3.3E–05	#NV	9.3E–06	6.0E–06	3.0E–05	2.9E–10	0.6	1.0	11.7	3,282.7	14.90
356.77	376.77	5.46E–06	5.71E–06	2	WBS2	1.1E–05	#NV	2.5E–05	#NV	1.1E–05	7.0E–06	4.0E–05	7.4E–10	3.8	1.5	15.3	3,366.2	14.74
376.80	396.80	2.27E–07	2.37E–07	2	WBS2	3.0E–07	#NV	4.6E–07	#NV	3.0E–07	8.0E–08	6.0E–07	8.7E–09	1.3	14.7	25.6	3,523.8	13.44

Interval position		Stationary flow parameters		Transient analysis															Static conditions	
				Flow regime		Formation parameters														
up m btoc	low m btoc	Q/s m^2/s	T_M m^2/s	Perturb Phase	Recovery Phase	T_{f1} m^2/s	T_{f2} m^2/s	T_{s1} m^2/s	T_{s2} m^2/s	T_T m^2/s	T_{TMIN} m^2/s	T_{TMAX} m^2/s	C m^3/Pa	ξ –	dt_1 min	dt_2 min	p* kPa	h_{wif} masl
391.80	411.80	4.35E–08	4.55E–08	2	WBS2	4.2E–08	#NV	1.1E–07	#NV	4.2E–08	1.0E–08	8.0E–08	4.2E–09	0.3	9.9	19.2	#NV	#NV
406.83	426.83	1.04E–08	1.09E–08	2	WBS2	1.1E–08	#NV	4.9E–08	#NV	1.1E–08	7.0E–09	3.0E–08	6.2E–11	1.6	0.9	19.3	3,775.5	13.23
426.86	446.86	1.08E–08	1.13E–08	2	WBS2	1.3E–08	#NV	3.8E–08	#NV	1.3E–08	7.0E–09	3.0E–08	5.6E–11	2.3	0.8	15.5	3,935.8	12.43
446.88	466.88	#NV	#NV	#NV	WBS2	#NV	#NV	7.8E–11	1.8E–10	7.8E–11	3.0E–11	3.0E–10	8.0E–11	–0.1	2.2	13.1	#NV	#NV
466.89	486.89	3.12E–08	3.26E–08	2	WBS2	5.1E–08	#NV	6.7E–08	#NV	6.7E–08	3.0E–08	9.0E–04	5.7E–11	4.7	0.6	13.7	4,264.7	12.19
486.90	506.90	2.45E–08	2.57E–08	22	WBS22	4.3E–08	1.3E–08	4.9E–08	1.1E–08	1.1E–08	7.0E–09	3.0E–08	5.3E–11	0.7	7.1	18.9	4,415.2	10.87
506.92	526.92	3.91E–07	4.09E–07	2	WBS2	3.4E–07	#NV	4.8E–07	#NV	3.4E–07	1.0E–07	7.0E–07	2.8E–08	–1.5	7.8	23.0	4,586.5	11.81
526.94	546.94	2.70E–08	2.82E–08	2	WBS2	3.0E–08	#NV	5.8E–08	#NV	3.0E–08	1.0E–08	6.0E–08	1.7E–10	1.4	1.5	6.6	4,756.6	12.75
546.97	566.97	9.86E–06	1.03E–05	2	WBS22	1.2E–05	#NV	2.0E–05	9.1E–06	1.2E–05	9.0E–06	3.0E–05	7.3E–09	–1.0	4.0	17.2	4,917.8	12.91
566.98	586.98	1.76E–08	1.84E–08	2	WBS2	1.2E–08	#NV	1.5E–07	1.0E–08	1.2E–08	8.0E–09	3.0E–08	1.4E–10	–1.1	9.5	19.8	5,083.0	13.60
587.02	607.02	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
607.06	627.06	#NV	#NV	#NV	WBS22	#NV	#NV	9.3E–11	#NV	9.3E–11	5.0E–11	4.0E–10	9.9E–12	5.5	2.4	14.3	#NV	#NV
627.10	647.10	2.70E–07	2.82E–07	2	WBS22	4.9E–07	#NV	9.8E–07	4.4E–07	4.9E–07	2.0E–07	6.0E–07	5.6E–10	4.4	1.7	13.7	5,551.2	13.79
647.11	667.11	5.33E–08	5.58E–08	2	WBS2	6.0E–08	#NV	9.5E–08	#NV	6.0E–08	4.0E–08	9.0E–08	1.6E–10	1.4	3.4	15.5	5,702.8	13.70
667.09	687.09	#NV	#NV	#NV	WBS22	#NV	#NV	2.8E–09	5.6E–10	5.6E–10	2.0E–10	1.0E–09	8.1E–11	–2.7	#NV	#NV	#NV	#NV
687.12	707.12	4.82E–09	5.04E–09	22	WBS22	1.7E–08	2.2E–09	4.0E–08	2.9E–09	2.2E–09	1.0E–09	6.0E–09	7.4E–11	0.2	7.5	16.7	#NV	#NV
707.15	727.15	7.89E–09	8.25E–09	22	WBS22	1.4E–08	2.4E–09	1.1E–07	4.5E–09	2.4E–09	2.0E–09	7.0E–09	2.9E–10	2.2	0.2	0.3	#NV	#NV
727.19	747.19	3.43E–08	3.59E–08	2	WBS22	2.6E–08	#NV	4.3E–08	9.2E–08	2.6E–08	1.0E–08	5.0E–08	1.6E–10	–0.9	1.5	15.9	6,304.2	14.64
747.22	767.22	#NV	#NV	#NV	WBS2	#NV	#NV	1.2E–10	#NV	1.2E–10	6.0E–11	3.0E–10	3.0E–10	–2.2	12.4	40.8	#NV	#NV
767.25	787.25	1.90E–06	1.99E–06	2	WBS22	6.4E–07	#NV	1.7E–05	1.2E–06	6.4E–07	5.0E–07	2.0E–06	3.5E–08	–5.2	7.6	16.5	6,577.8	13.40
787.28	807.28	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
807.31	827.31	3.12E–08	3.27E–08	2	WBS22	1.2E–09	#NV	1.3E–07	7.7E–09	7.7E–09	4.0E–09	3.0E–08	6.9E–09	–5.4	10.3	16.5	6,866.7	14.58
827.33	847.33	8.39E–08	8.78E–08	2	WBS2	2.1E–07	#NV	5.3E–06	#NV	2.1E–07	9.0E–08	5.0E–07	5.7E–11	9.3	1.7	13.8	6,998.4	14.21
847.39	867.39	9.17E–09	9.59E–09	2	WBS2	1.1E–08	#NV	4.8E–08	#NV	1.1E–08	8.0E–09	4.0E–08	4.8E–11	2.5	0.9	17.5	7,133.9	14.43

Interval position		Stationary flow parameters		Transient analysis														
				Flow regime		Formation parameters											Static conditions	
up m btoc	low m btoc	Q/s m^2/s	T_M m^2/s	Perturb Phase	Recovery Phase	T_{f1} m^2/s	T_{f2} m^2/s	T_{s1} m^2/s	T_{s2} m^2/s	T_T m^2/s	T_{TMIN} m^2/s	T_{TMAX} m^2/s	C m^3/Pa	ξ –	dt_1 min	dt_2 min	p* kPa	h_{wif} masl
867.46	887.46	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
887.48	907.48	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
907.49	927.49	1.53E–08	1.60E–08	2	WBS2	1.6E–08	#NV	5.5E–08	#NV	1.6E–08	8.0E–09	4.0E–08	6.0E–11	15.2	#NV	#NV	7,508.7	13.31
927.50	947.50	3.37E–08	3.53E–08	2	WBS22	1.6E–08	#NV	1.5E–07	2.6E–08	2.6E–08	9.0E–09	5.0E–08	9.8E–11	1.3	6.8	13.3	7,652.2	15.41
947.50	967.50	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
967.50	987.50	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
260.00	265.00	#NV	#NV	2	WBS2	1.3E–04	#NV	1.0E–04	#NV	1.0E–04	6.0E–05	3.0E–04	2.6E–08	12.1	2.8	678.0	2,399.4	14.16
558.20	563.20	#NV	#NV	22	WBS22	1.2E–05	2.8E–06	1.1E–05	8.3E–07	1.1E–05	6.0E–06	3.0E–05	2.2e–9	–3.3	1.2	48.0	4,881.0	12.20
776.20	781.20	#NV	#NV	22	WBS22	6.6E–07	1.7E–06	6.6E–07	1.2E–06	6.6E–07	6.0E–07	1.0E–06	7.0e–8	–5.0	60.0	480.0	6,540.0	13.89

Notes

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 T_T 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. WBS2 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.*

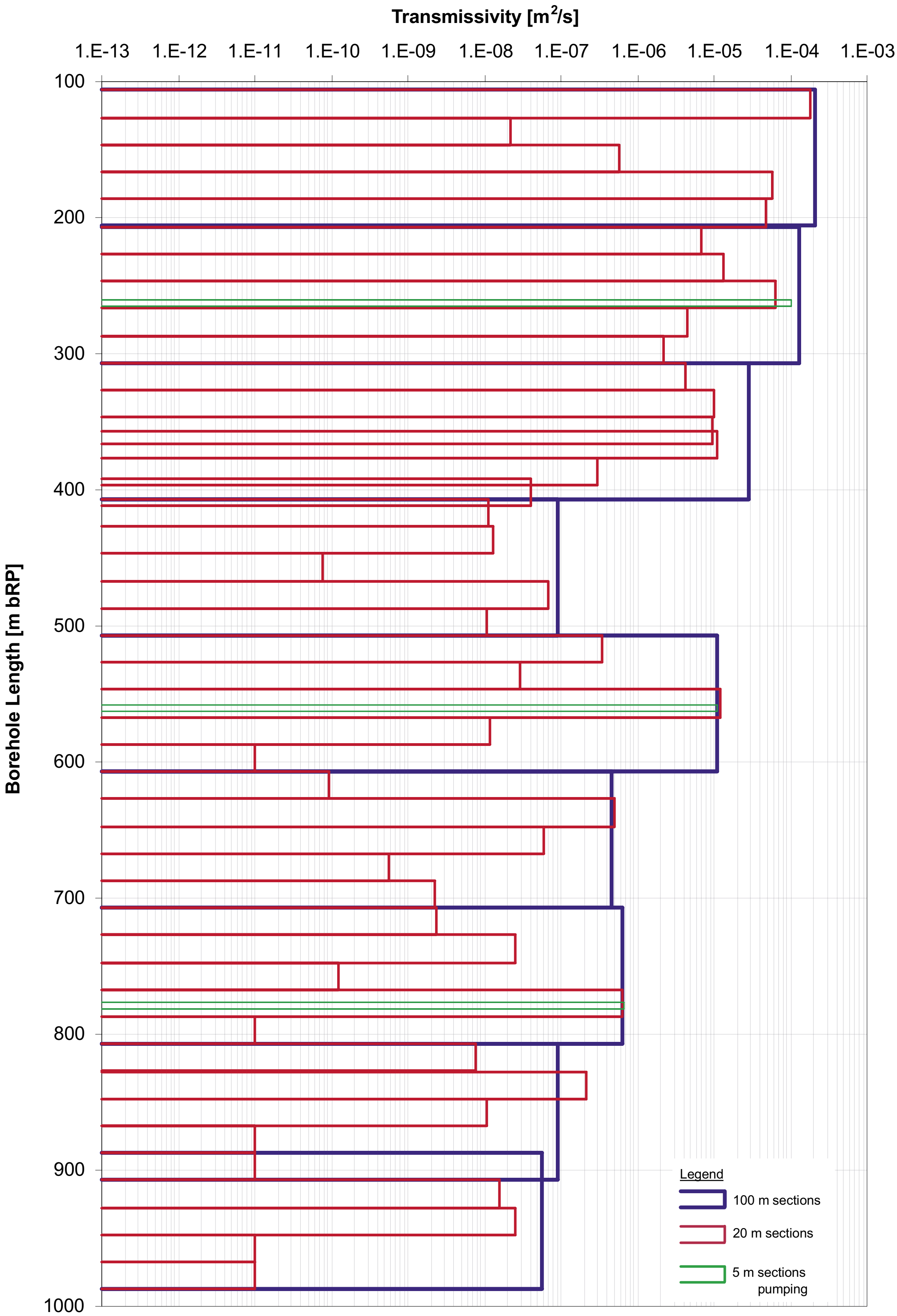

Figure 7-2. *Results summary – profile of transmissivity.*

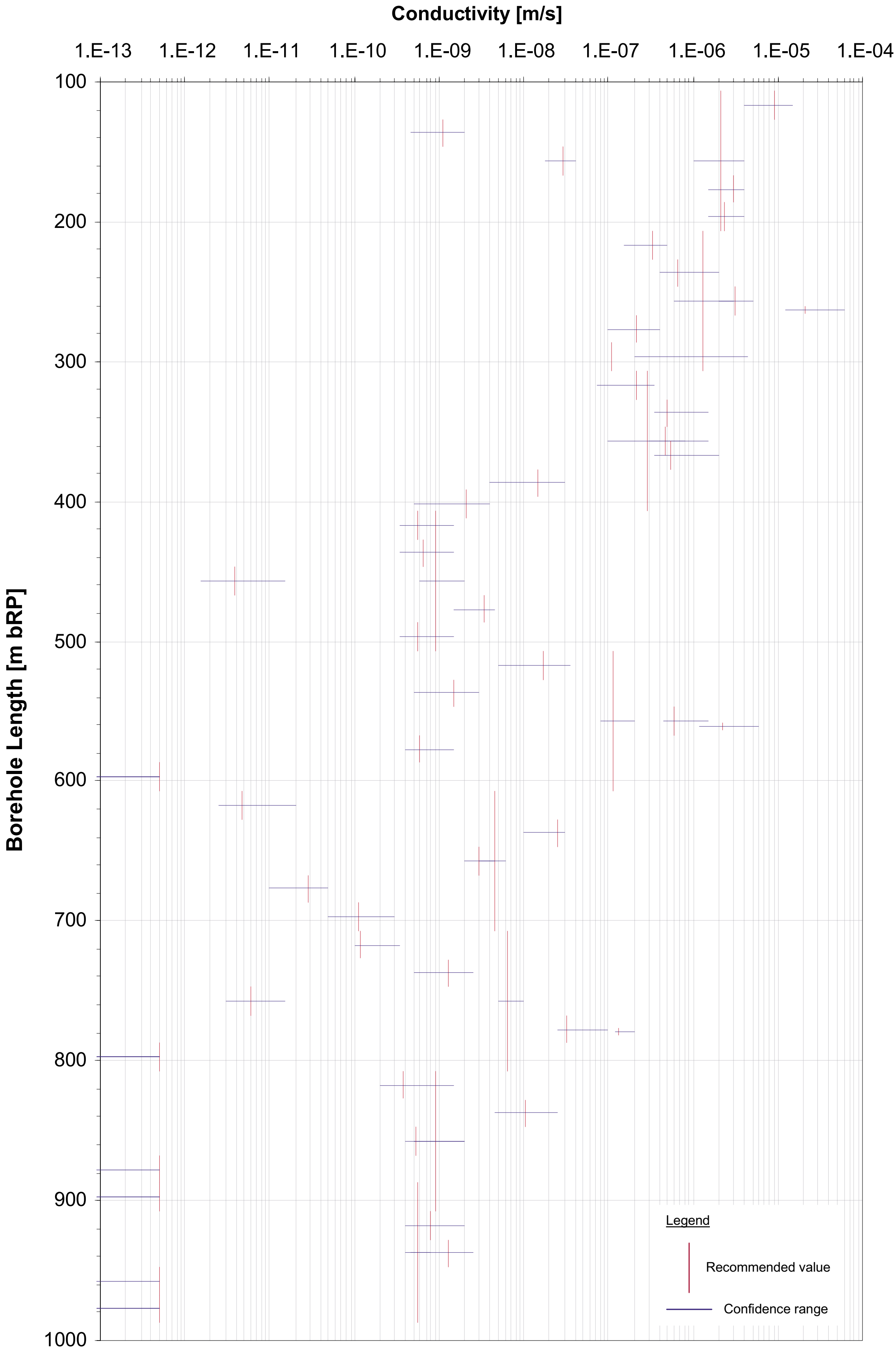

Figure 7-3. *Results summary – profile of hydraulic conductivity.*

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. Recommended transmissivities above 1.0E–07 m^2/s are in most cases slightly higher than the values of the steady state analysis. At values below 1.0E–07 m^2/s. the trend seems to be the other way around.

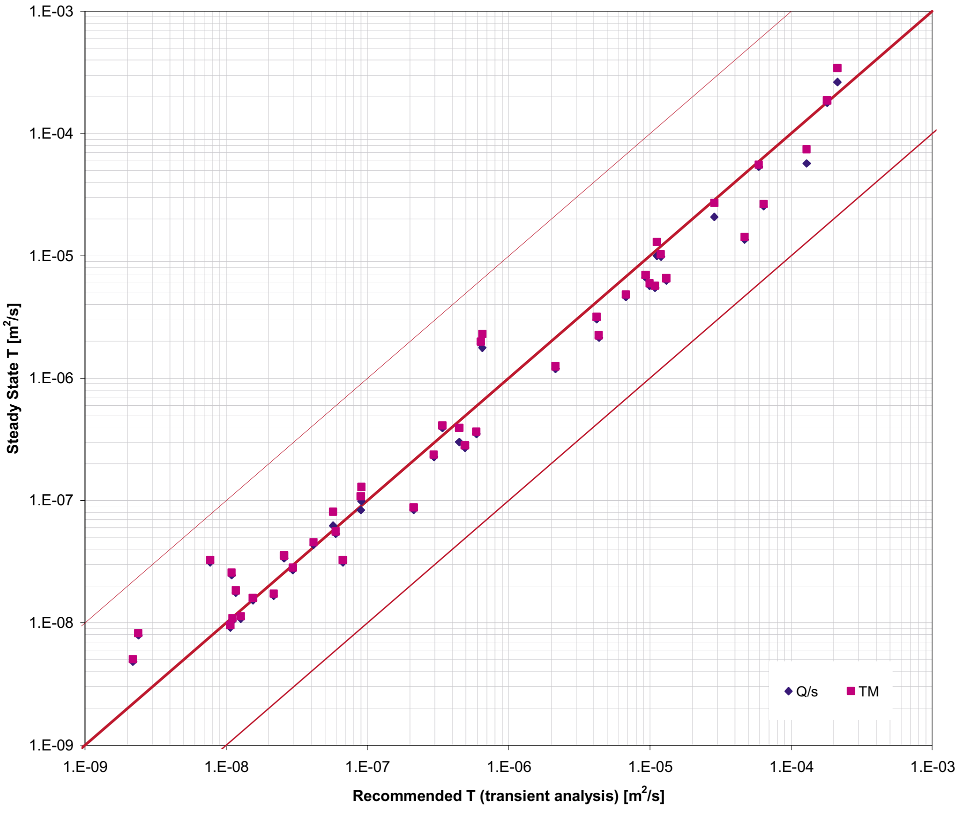

Figure 7-4. Correlation analysis of transmissivities derived by steady state and transient methods.

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 approx 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.

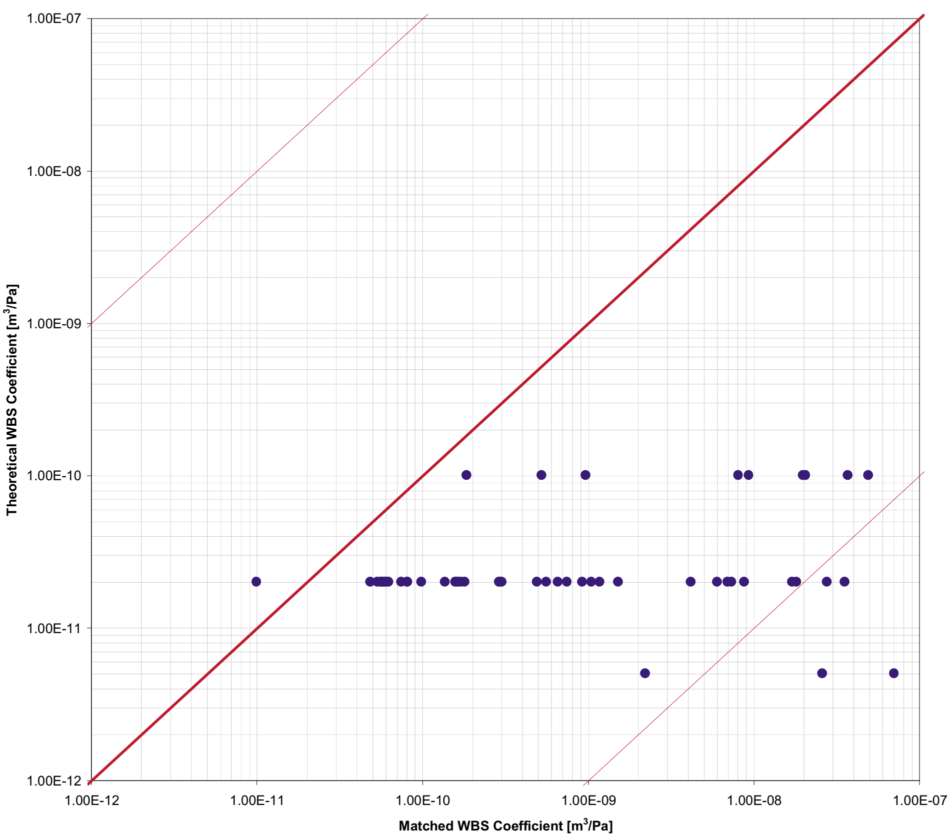

***Figure 7-5.** Correlation analysis of theoretical and matched wellbore storage coefficients.*

It can be seen that the matched wellbore storage coefficients are up to three orders of magnitude and more 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.

In addition. the observed large skin factor and large borehole coefficients is described in /Spivey et al. 2002/ and explained by turbulent flow taking place in the formation (i.e. along fractures).

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. Altogether 4 Pulse injection tests were performed and the recommended transmissivities of these sections range between 7.8E–11 m^2/s and 5.6E–10 m^2/s. Recommended transmissivities of the injection tests range between 2.2E–9 m^2/s and 2.1E–4 m^2/s. Additionaly. 4 slug injection tests (Si) were performed in tight sections over night. The analyses of the Si-phases and the former conducted injection tests in the corresponding sections show in all cases concistence. The transmissivities of the 3 pump tests (5 m section) range beetween 6.6E–7 m^2/s and 1.0E–4 m^2/s.

The transmissivity profiles in Figures 7-1 and 7-2 show for the 100 m more or less an decreasing of transmissivities by increasing of the depth. The highest transmissivity of 2.1E–4 m^2/s was derived in the uppermost section (106.38–206.38 m) and the lowest transmissivity of 5.7E–8 m^2/s in the last section (887.48–987.48 m). The section from 506.92 m to 606.92 m with a transmissivity of 9E–8 m^2/s is an exception. not following the downward trend. The derived high transmissivity is a result of one highly transmissive interval at 558.20–563.20 m bToC. A pump test was conducted at this interval and the derived transmissivity is 1.1E–05 m^2/s.

For the 20 m sections. the transmissivities range from 7.8E–11 m^2/s to 1.8E–4 m^2/s. The highest transmissivities (2.2E–8 m^2/s to 1.8E–4 m^2/s) were derived in the upper area of the borehole in a depth between 100 m and 400 m. Below 400 m the measured transmissivities range from 7.8E–11 m^2/s to 6.6E–07 m^2/s (excluding skipped tests). An exception is the section from 546.97–566.97 m with a transmissivity of 1.2E–5 m^2/s. caused by the above mentioned highly transmissive section from 558.20–563.20 m.

Only one 20 m section (827.33–847.33 m) and one 5 m section (260.00–265.00 m) show larger transmissivities than the appropriate longer interval. The difference is small and covered by the confidence range.

8.2 Equivalent freshwater head

Figure 7-1 presents a profile of the derived equivalent freshwater head expressed in meters 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 oszillating between 10.9 and 15.3 masl. Figure 7-1 shows no trend for increasing or decreasing of the head downwards the hole. The profile shows a wide head range. which could be explained with a not very well-defined vertical connectivity around the borehole.

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 m^2/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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APPENDIX 1

File Description Table

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX06				
TEST- AND FILEPROTOCOL					**Testorder dated : 2005-03-05**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2005-03-07	08:58	260,00	265,00	___KLX06_0260.00_200503070858.ht2	KLX06_260.00-265.00_050307_1_CRwr_Q_r.csv	CRwr	2005-04-20	2005-03-11	
2005-03-10	18:55	558,20	563,20	___KLX06_0558.20_200503101855.ht2	KLX06_558.20-563.20_050310_1_CRwr_Q_r.csv	CRwr	2005-04-20	2005-03-17	
2005-03-17	16:06	776,20	781,20	___KLX06_0776.20_200503171606.ht2	KLX06_776.20-781.20_050317_1_CRwr_Q_r.csv	CRwr	2005-04-20	2005-03-24	
2005-04-01	14:25	106,38	206,38	___KLX06_0106.38_200504011425.ht2	KLX06_106.38-206.38_050401_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-02	
2005-04-02	17:03	106,38	206,38	___KLX06_0106.38_200504021703.ht2	KLX06_106.38-206.38_050402_2_CHir_Q_r.csv	CHir	2005-04-20	2005-04-02	
2005-04-03	10:16	206,52	306,52	___KLX06_0206.52_200504031016.ht2	KLX06_206.52-306.52_050403_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-03	
2005-04-03	14:20	306,68	406,68	___KLX06_0306.68_200504031420.ht2	KLX06_306.68-406.68_050403_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-03	
2005-04-03	17:33	406,83	506,83	___KLX06_0406.83_200504031733.ht2	KLX06_406.83-506.83_050403_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-04	
2005-04-04	09:33	506,92	606,92	___KLX06_0506.92_200504040933.ht2	KLX06_506.92-606.92_050404_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-04	
2005-04-04	13:36	607,06	707,06	___KLX06_0607.06_200504041336.ht2	KLX06_607.06-707.06_050404_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-04	
2005-04-05	09:30	807,31	907,31	___KLX06_0807.31_200504050930.ht2	KLX06_807.31-907.31_050405_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-05	
2005-04-07	09:07	106,38	126,38	___KLX06_0106.38_200504070907.ht2	KLX06_106.38-126.38_050407_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-07	
2005-04-07	11:26	126,42	146,42	___KLX06_0126.42_200504071126.ht2	KLX06_126.42-146.42_050407_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-07	
2005-04-07	14:56	146,44	166,44	___KLX06_0146.44_200504071456.ht2	KLX06_146.44-166.44_050407_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-07	
2005-04-07	17:08	166,47	186,47	___KLX06_0166.47_200504071708.ht2	KLX06_166.47-186.47_050407_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-07	

HYDROTESTING WITH PSS — DRILLHOLE IDENTIFICATION NO.: KLX06

TEST- AND FILEPROTOCOL — Testorder dated : 2005-03-05

Teststart Date	Time	Interval boundaries Upper	Interval boundaries Lower	Name of Datafiles (*.HT2-file)	Name of Datafiles (*.CSV-file)	Testtype	Copied to disk/CD	Plotted (date)	Sign.
2005-04-07	19:24	126,42	146,42	___KLX06_0126.42_200504071924.ht2	KLX06_126.42-146.42_050407_2_SI_Q_r.csv	SI	2005-04-20	2005-04-08	
2005-04-08	08:44	186,49	206,49	___KLX06_0186.49_200504080844.ht2	KLX06_186.49-206.49_050408_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-08	
2005-04-08	11:19	206,52	226,52	___KLX06_0206.52_200504081119.ht2	KLX06_206.52-226.52_050408_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-08	
2005-04-08	13:53	226,56	246,56	___KLX06_0226.56_200504081353.ht2	KLX06_226.56-246.56_050408_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-08	
2005-04-08	16:26	246,62	266,62	___KLX06_0246.62_200504081626.ht2	KLX06_246.62-266.62_050408_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-08	
2005-04-09	08:06	266,64	286,64	___KLX06_0266.64_200504090806.ht2	KLX06_266.64-286.64_050409_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-09	
2005-04-09	10:01	266,64	286,64	___KLX06_0266.64_200504091001.ht2	KLX06_266.64-286.64_050409_2_CHir_Q_r.csv	CHir	2005-04-20	2005-04-09	
2005-04-09	12:09	286,68	306,68	___KLX06_0286.68_200504091209.ht2	KLX06_286.68-306.68_050409_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-09	
2005-04-09	14:16	306,68	326,68	___KLX06_0306.68_200504091416.ht2	KLX06_306.68-326.68_050409_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-09	
2005-04-09	16:16	326,69	346,69	___KLX06_0326.69_200504091616.ht2	KLX06_326.69-346.69_050409_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-09	
2005-04-09	18:11	346,74	366,74	___KLX06_0346.74_200504091811.ht2	KLX06_346.74-366.74_050409_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-10	
2005-04-10	08:40	356,77	376,77	___KLX06_0356.77_200504100840.ht2	KLX06_356.77-376.77_050410_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-10	
2005-04-10	10:57	376,80	396,80	___KLX06_0376.80_200504101057.ht2	KLX06_376.80-396.80_050410_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-10	
2005-04-10	13:14	376,80	396,80	___KLX06_0376.80_200504101314.ht2	KLX06_376.80-396.80_050410_2_CHir_Q_r.csv	CHir	2005-04-20	2005-04-10	
2005-04-10	15:31	391,80	411,80	___KLX06_0391.80_200504101531.ht2	KLX06_391.80-411.80_050410_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-10	
2005-04-10	18:30	376,80	396,80	___KLX06_0376.80_200504101830.ht2	KLX06_376.80-396.80_050410_3_SI_Q_r.csv	SI	2005-04-20	2005-04-11	

HYDROTESTING WITH PSS | **DRILLHOLE IDENTIFICATION NO.: KLX06**

TEST- AND FILEPROTOCOL | **Testorder dated : 2005-03-05**

Teststart Date	Time	Interval boundaries Upper	Lower	Name of Datafiles (*.HT2-file)	(*.CSV-file)	Testtype	Copied to disk/CD	Plotted (date)	Sign.
2005-04-11	08:32	406,83	426,83	___KLX06_0406.83_200504110832.ht2	KLX06_406.83-426.83_050411_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-11	
2005-04-11	10:48	426,86	446,86	___KLX06_0426.86_200504111048.ht2	KLX06_426.86-446.86_050411_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-11	
2005-04-11	13:03	446,88	466,88	___KLX06_0446.88_200504111303.ht2	KLX06_446.88-466.88_050411_1_PI_Q_r.csv	PI	2005-04-20	2005-04-11	
2005-04-11	15:15	466,89	486,89	___KLX06_0466.89_200504111515.ht2	KLX06_466.89-486.89_050411_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-11	
2005-04-11	16:58	466,89	486,89	___KLX06_0466.89_200504111658.ht2	KLX06_466.89-486.89_050411_1_SI_Q_r.csv	SI	2005-04-20	2005-04-12	
2005-04-12	08:44	486,90	506,90	___KLX06_0486.90_200504120844.ht2	KLX06_486.90-506.90_050412_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-12	
2005-04-12	13:00	506,92	526,92	___KLX06_0506.92_200504121300.ht2	KLX06_506.92-526.92_050412_1_CHir_Q_r.XLS	CHir	2005-04-20	2005-04-12	
2005-04-13	12:20	506,92	526,92	___KLX06_0506.92_200504131220.ht2	KLX06_506.92-526.92_050413_2_CHir_Q_r.csv	CHir	2005-04-20	2005-04-13	
2005-04-13	15:39	506,92	526,92	___KLX06_0506.92_200504131539.ht2	KLX06_506.92-526.92_050413_3_CHir_Q_r.csv	CHir	2005-04-20	2005-04-13	
2005-04-13	18:08	526,94	546,94	___KLX06_0526.94_200504131808.ht2	KLX06_526.94-546.94_050413_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-14	
2005-04-14	08:24	546,97	566,97	___KLX06_0546.97_200504140824.ht2	KLX06_546.97-566.97_050414_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-14	
2005-04-14	10:42	566,98	586,98	___KLX06_0566.98_200504141042.ht2	KLX06_566.98-586.98_050414_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-14	
2005-04-14	13:25	587,02	607,02	___KLX06_0587.02_200504141325.ht2	KLX06_587.02-607.02_050414_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-14	
2005-04-14	15:07	607,06	627,06	___KLX06_0607.06_200504141507.ht2	KLX06_607.06-627.06_050414_1_PI_Q_r.csv	PI	2005-04-20	2005-04-14	
2005-04-14	17:04	627,10	647,10	___KLX06_0627.10_200504141704.ht2	KLX06_627.10-647.10_050414_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-15	

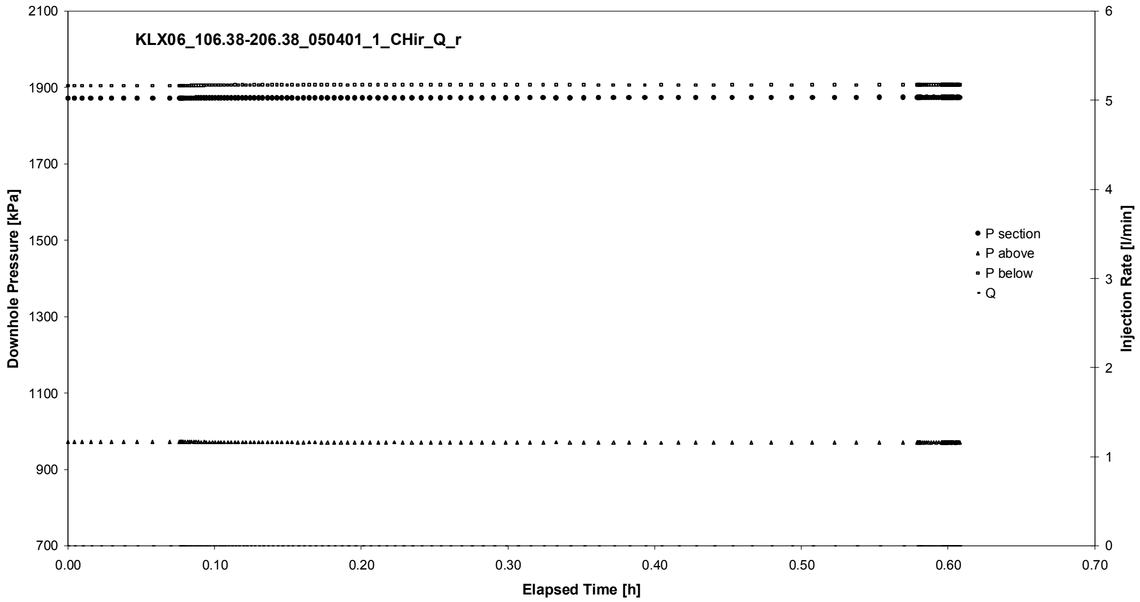
HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX06				
TEST- AND FILEPROTOCOL					**Testorder dated : 2005-03-05**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted (date)	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD		
2005-04-15	08:32	647,11	667,11	___KLX06_0647.11_200504150832.ht2	KLX06_647.11-667.11_050415_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-15	
2005-04-15	10:40	667,09	687,09	___KLX06_0667.09_200504151040.ht2	KLX06_667.09-687.09_050415_1_PI_Q_r.csv	PI	2005-04-20	2005-04-15	
2005-04-15	12:34	687,12	707,12	___KLX06_0687.12_200504151234.ht2	KLX06_687.12-707.12_050415_1_PI_Q_r.csv	PI	2005-04-20	2005-04-15	
2005-04-15	13:52	687,12	707,12	___KLX06_0687.12_200504151352.ht2	KLX06_687.12-707.12_050415_2_CHir_Q_r.csv	CHir	2005-04-20	2005-04-15	
2005-04-15	15:22	707,15	727,15	___KLX06_0707.15_200504151522.ht2	KLX06_707.15-727.15_050415_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-15	
2005-04-15	17:48	727,19	747,19	___KLX06_0727.19_200504151748.ht2	KLX06_727.19-747.19_050415_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-16	
2005-04-15	21:44	727,19	747,19	___KLX06_0727.19_200504152144.ht2	KLX06_727.19-747.19_050415_2_SI_Q_r.csv	SI	2005-04-20	2005-04-16	
2005-04-16	08:51	747,22	767,22	___KLX06_0747.22_200504160851.ht2	KLX06_747.22-767.22_050416_1_PI_Q_r.csv	PI	2005-04-20	2005-04-16	
2005-04-16	10:54	767,25	787,25	___KLX06_0767.25_200504161054.ht2	KLX06_767.25-787.25_050416_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-16	
2005-04-16	14:19	787,28	807,28	___KLX06_0787.28_200504161419.ht2	KLX06_787.28-807.28_050416_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-16	
2005-04-16	15:57	807,31	827,31	___KLX06_0807.31_200504161557.ht2	KLX06_807.31-827.31_050416_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-16	
2005-04-16	17:33	807,31	827,31	___KLX06_0807.31_200504161733.ht2	KLX06_807.31-827.31_050416_2_CHir_Q_r.csv	CHir	2005-04-20	2005-04-17	
2005-04-17	08:42	827,33	847,33	___KLX06_0827.33_200504170842.ht2	KLX06_827.33-847.33_050417_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-17	
2005-04-17	10:29	847,39	867,39	___KLX06_0847.39_200504171029.ht2	KLX06_847.39-867.39_050417_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-17	
2005-04-17	12:42	867,46	887,46	___KLX06_0867.46_200504171242.ht2	KLX06_867.46-887.46_050417_1_CHir_Q_r.XLS	CHir	2005-04-20	2005-04-17	
2005-04-17	14:29	887,48	907,48	___KLX06_0887.48_200504171429.ht2	KLX06_887.48-907.48_050417_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-17	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX06				
TEST- AND FILEPROTOCOL					Testorder dated : 2005-03-05				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted (date)	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD		
2005-04-17	16:15	907,49	927,49	___KLX06_0907.49_200504171615.ht2	KLX06_907.49-927.49_050417_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-17	
2005-04-18	08:42	927,50	947,50	___KLX06_0927.50_200504180842.ht2	KLX06_927.50-947.50_050418_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-18	
2005-04-18	11:01	947,50	967,50	___KLX06_0947.50_200504181101.ht2	KLX06_947.50-967.50_050418_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-18	
2005-04-18	13:29	967,50	987,50	___KLX06_0967.50_200504181329.ht2	KLX06_967.50-987.50_050418_1_CHir_Q_r.csv	CHir	2005-04-20	2005-04-18	
2005-04-18	17:14	827,33	847,33	___KLX06_0827.33_200504181714.ht2	KLX06_827.33-847.33_050418_2_CHir_Q_r.csv	CHir	2005-04-20	2005-04-19	
2005-04-19	09:03	827,33	847,33	___KLX06_0827.33_200504190903.ht2	KLX06_827.33-847.33_050419_3_CHir_Q_r.csv	CHir	2005-04-20	2005-04-19	
2005-04-19	17:38	346,74	366,74	___KLX06_0346.74_200504191738.ht2	KLX06_346.74-366.74_050419_2_CHir_Q_r.csv	CHir	2005-04-20	2005-04-20	

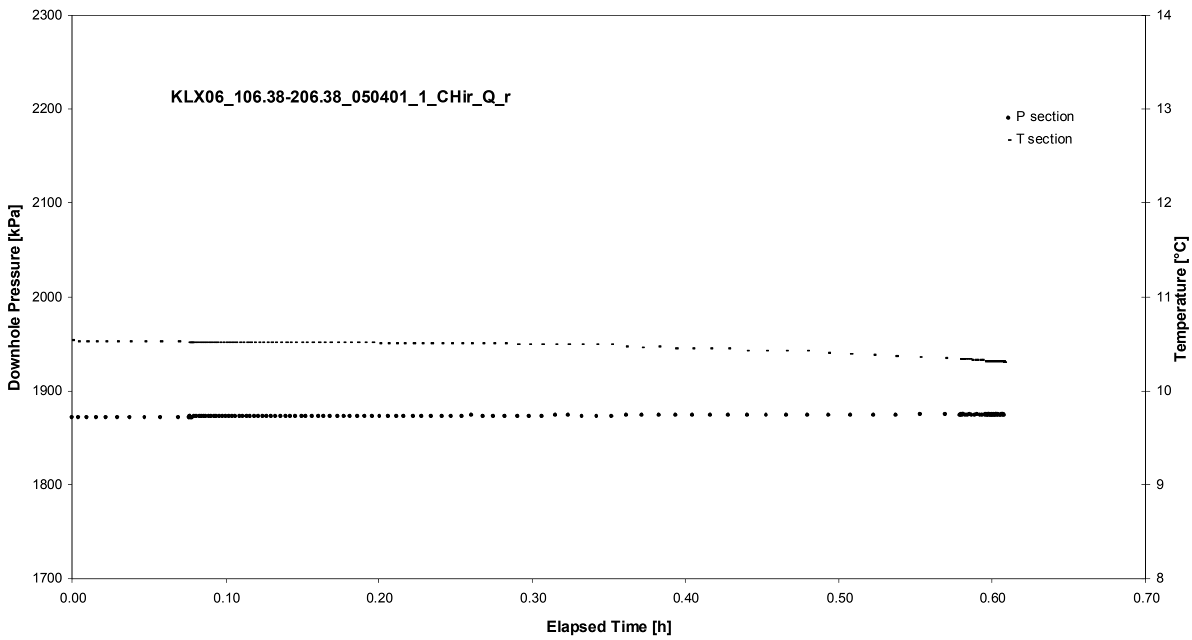
APPENDIX 2-1

Test 106.38 – 206.38 m

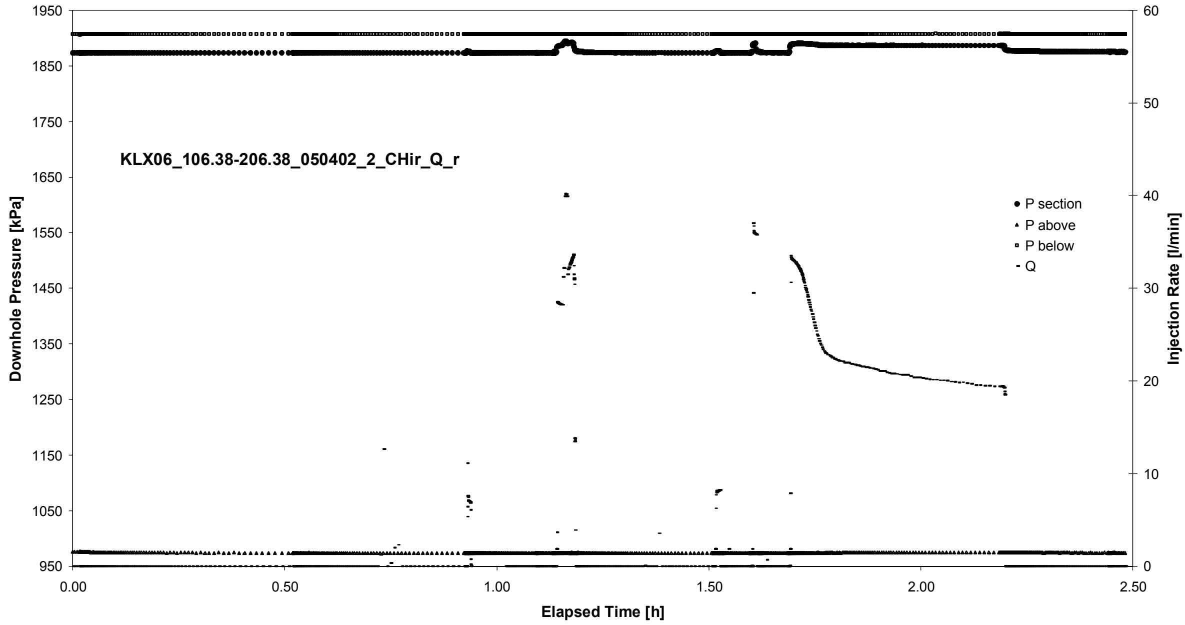
Analysis diagrams



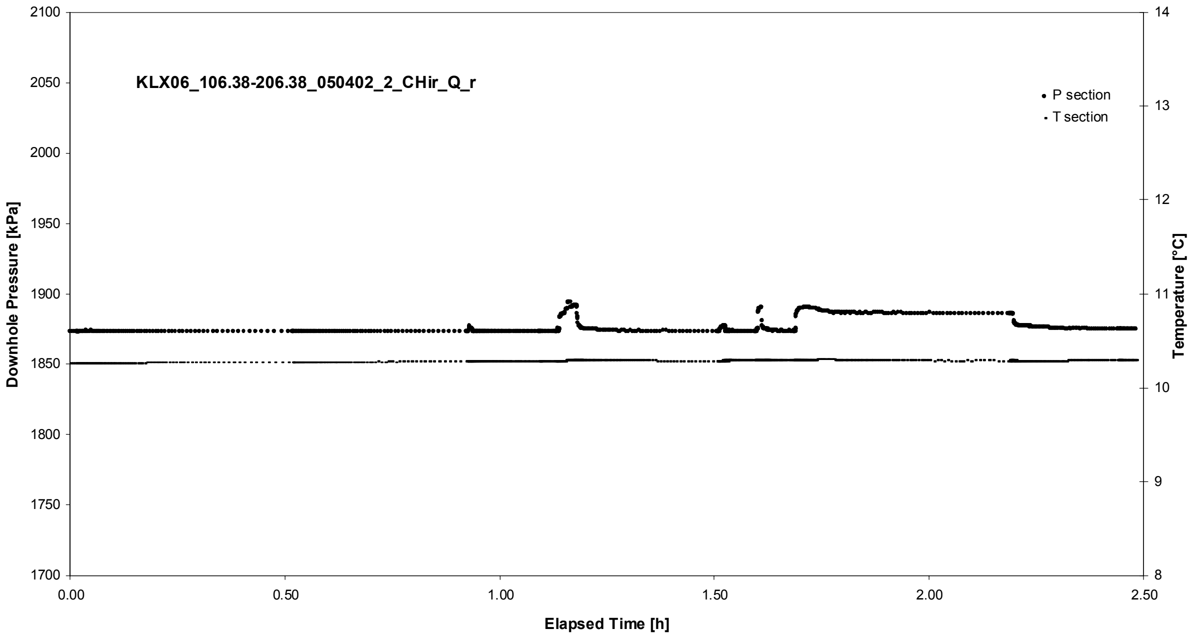
Pressure and flow rate vs. time; cartesian plot (test repeated)



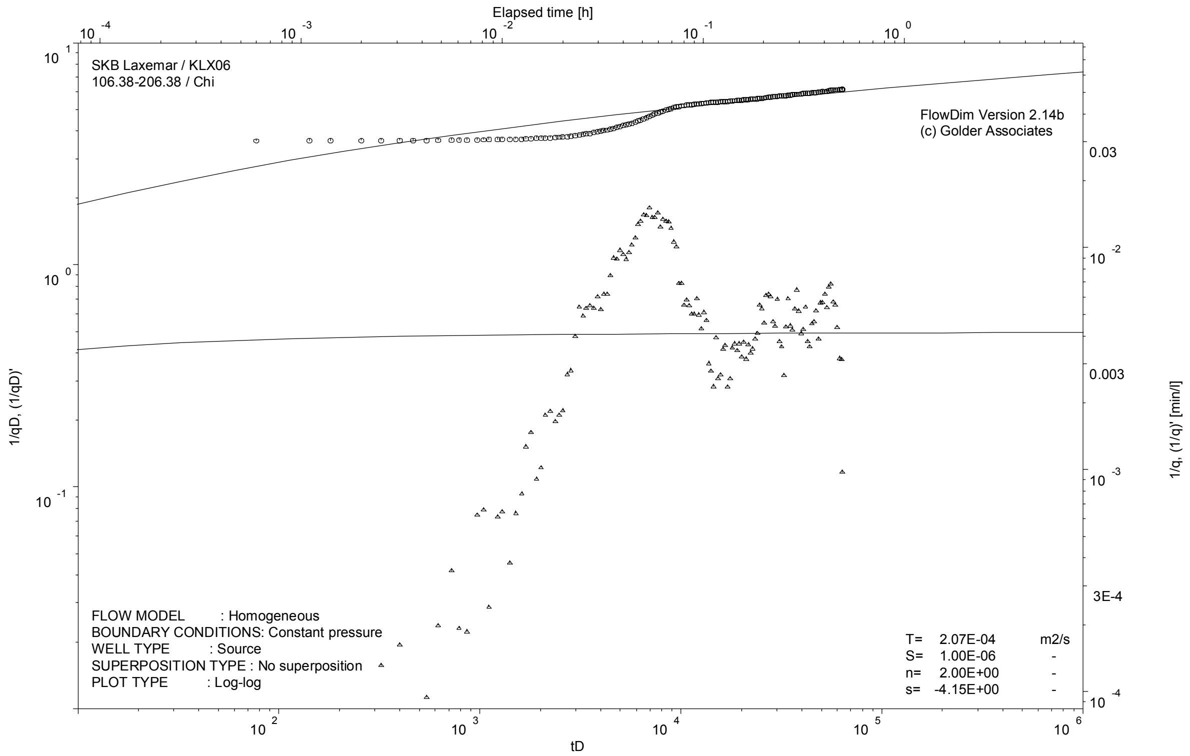
Interval pressure and temperature vs. time; cartesian plot (test repeated)



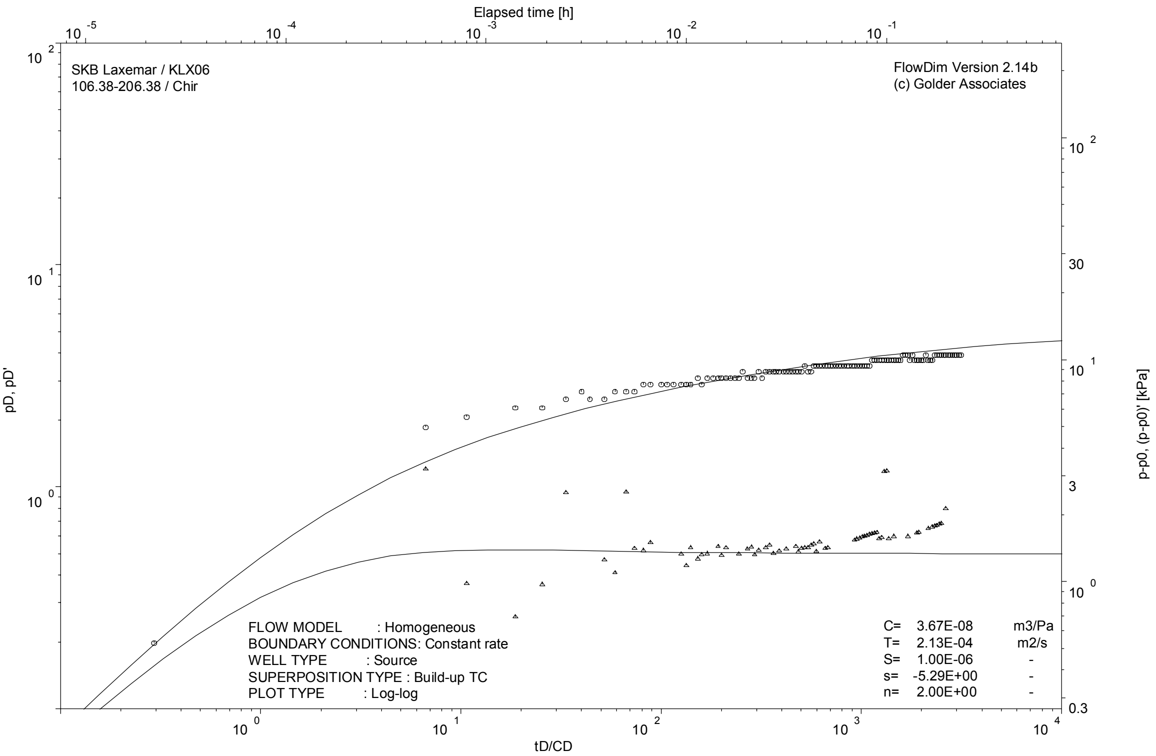
Pressure and flow rate vs. time; cartesian plot (analysed)



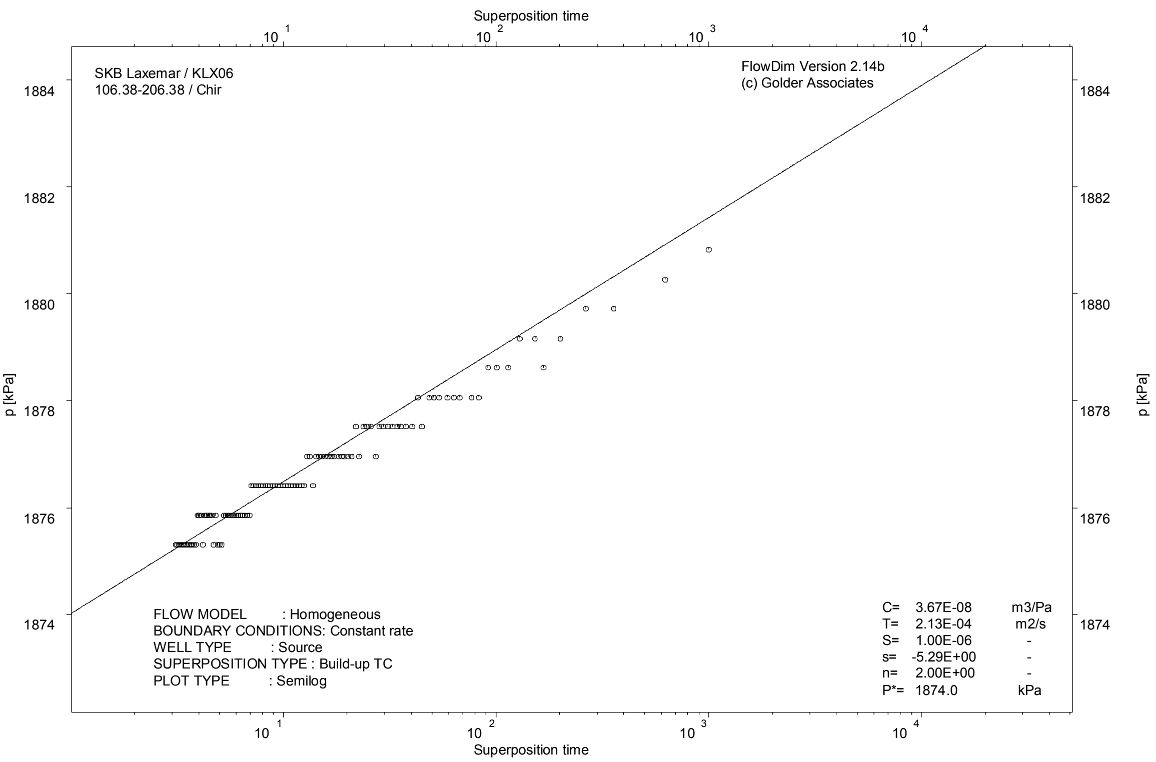
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

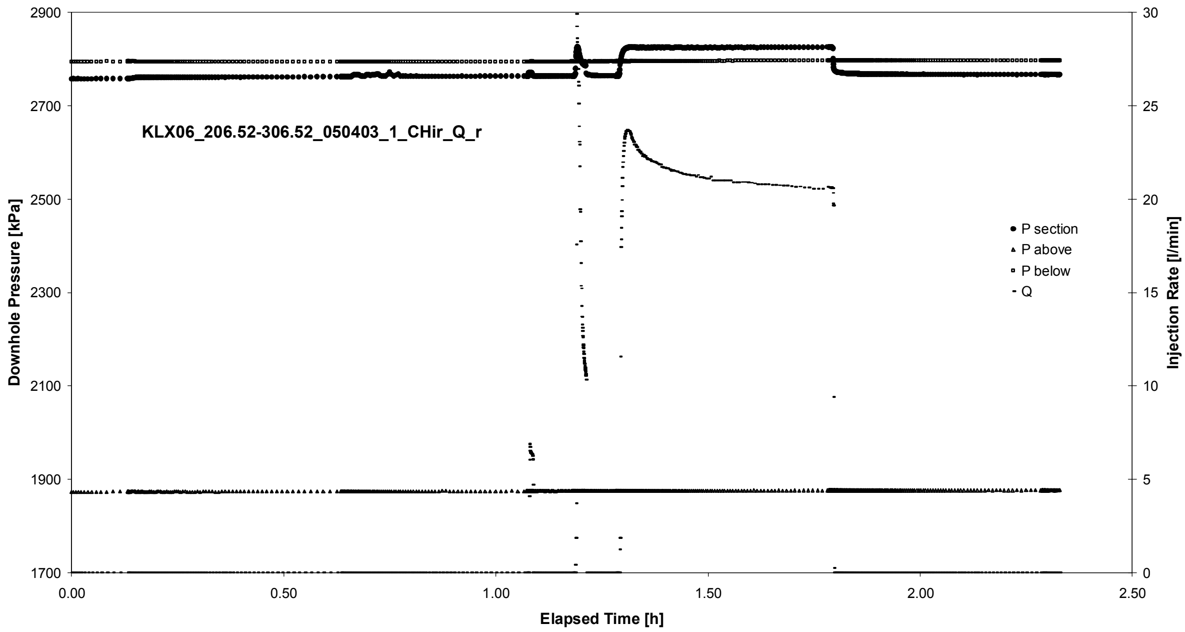


CHIR phase; HORNER match

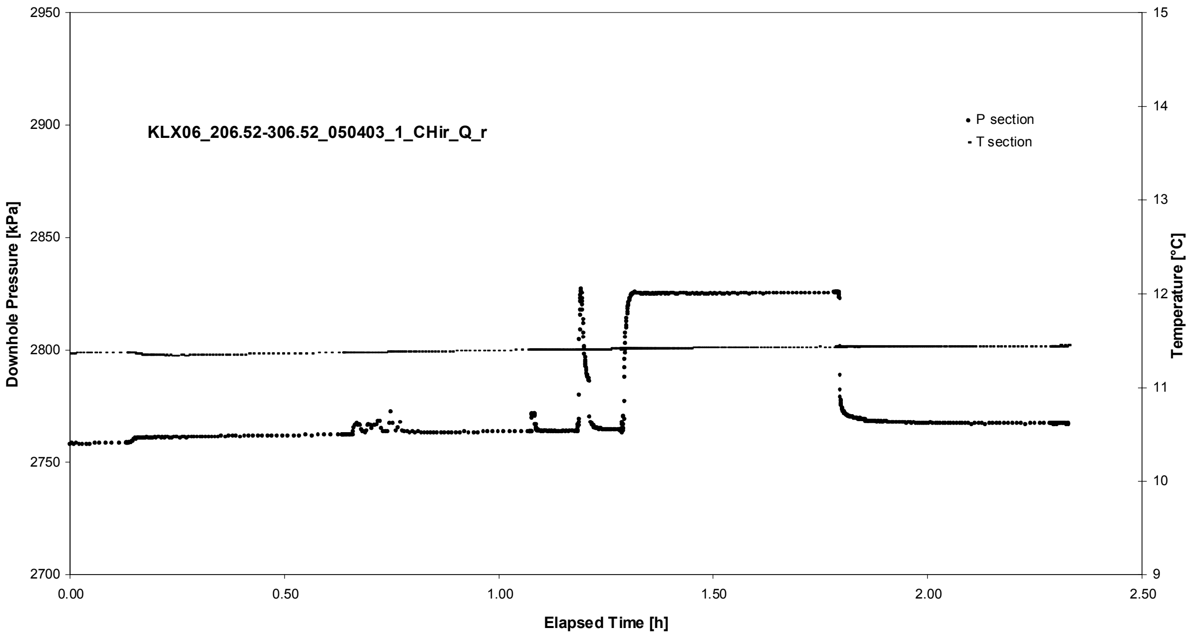
APPENDIX 2-2

Test 206.52 – 306.52 m

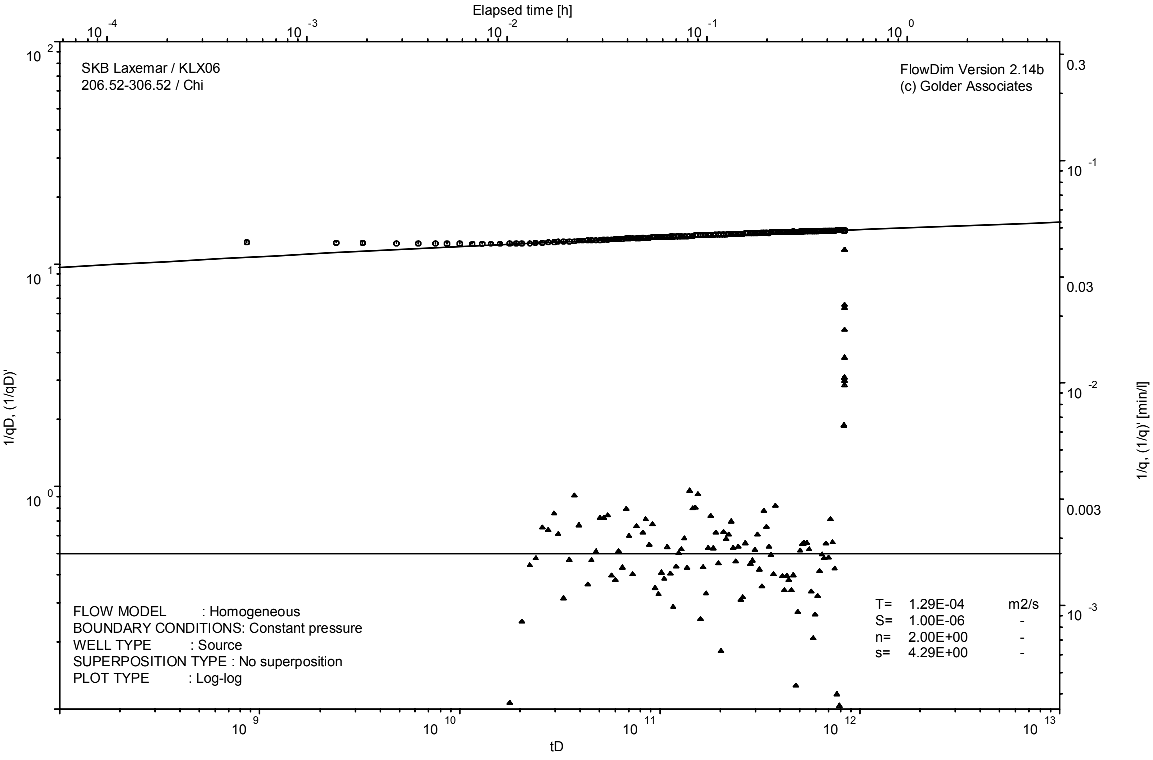
Analysis diagrams



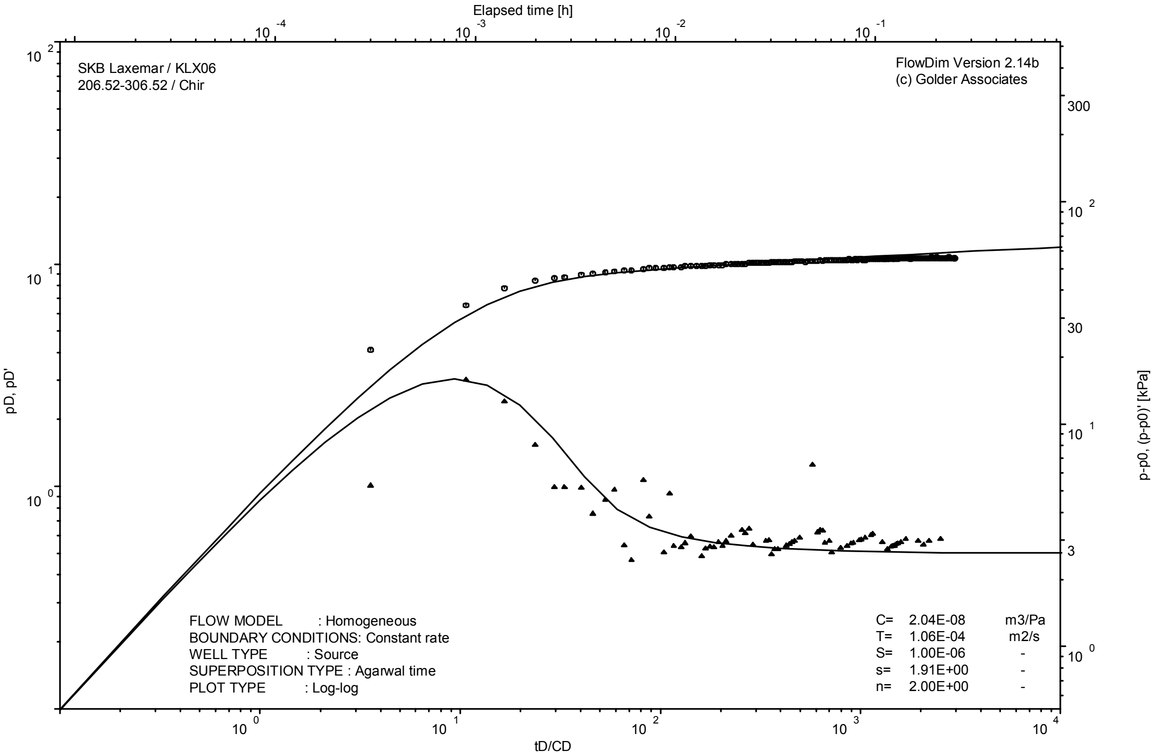
Pressure and flow rate vs. time; cartesian plot



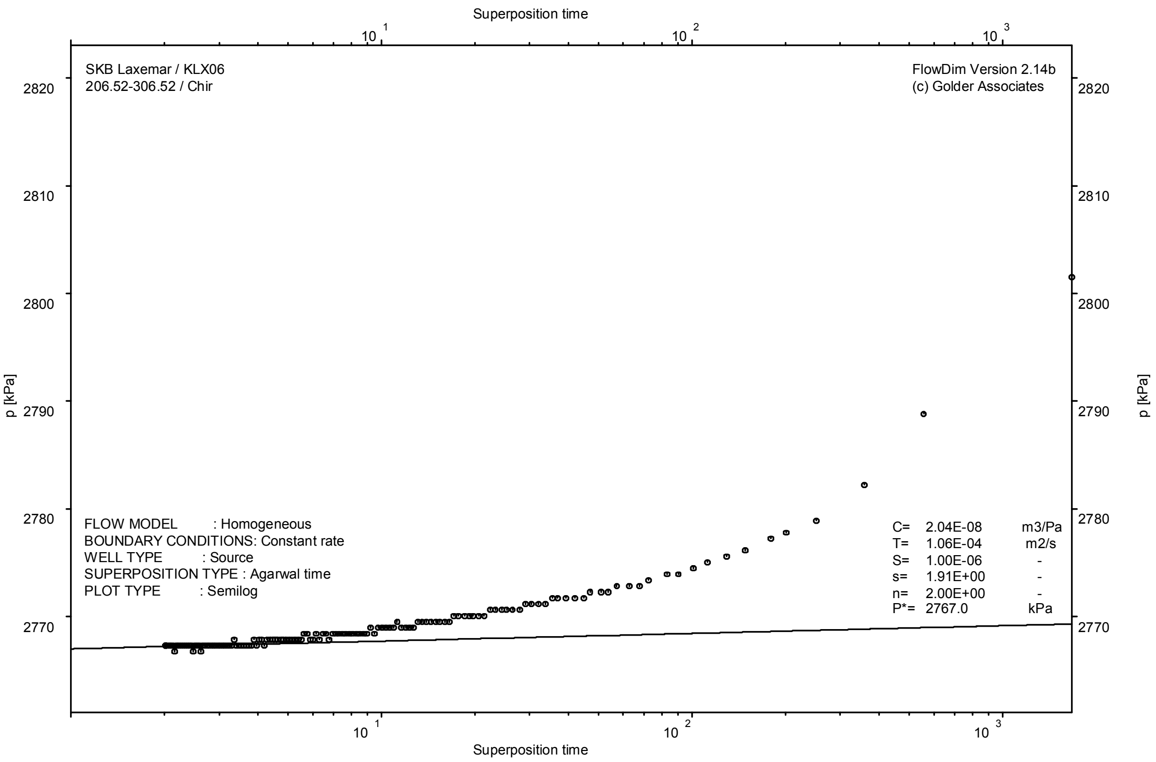
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

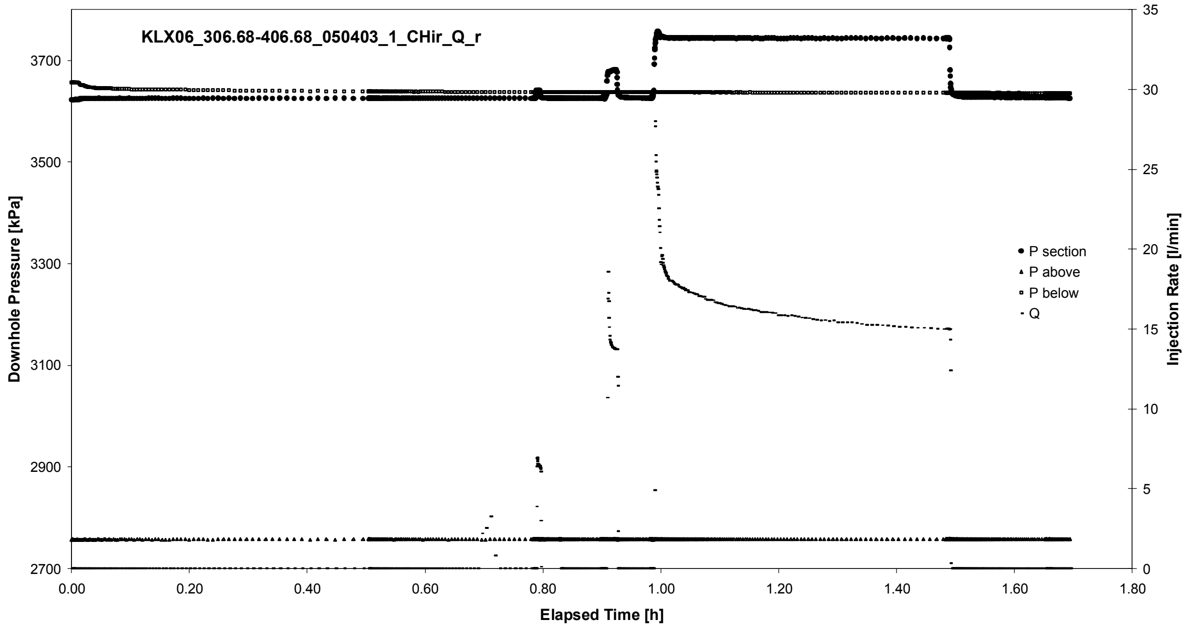


CHIR phase; HORNER match

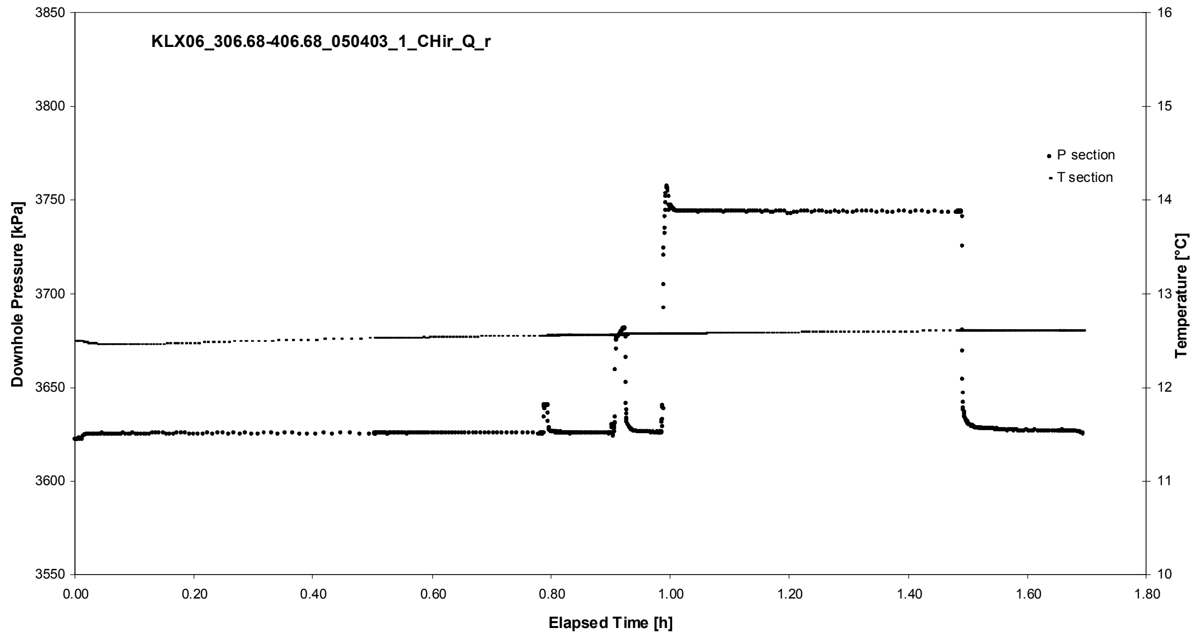
APPENDIX 2-3

Test 306.68 – 406.68 m

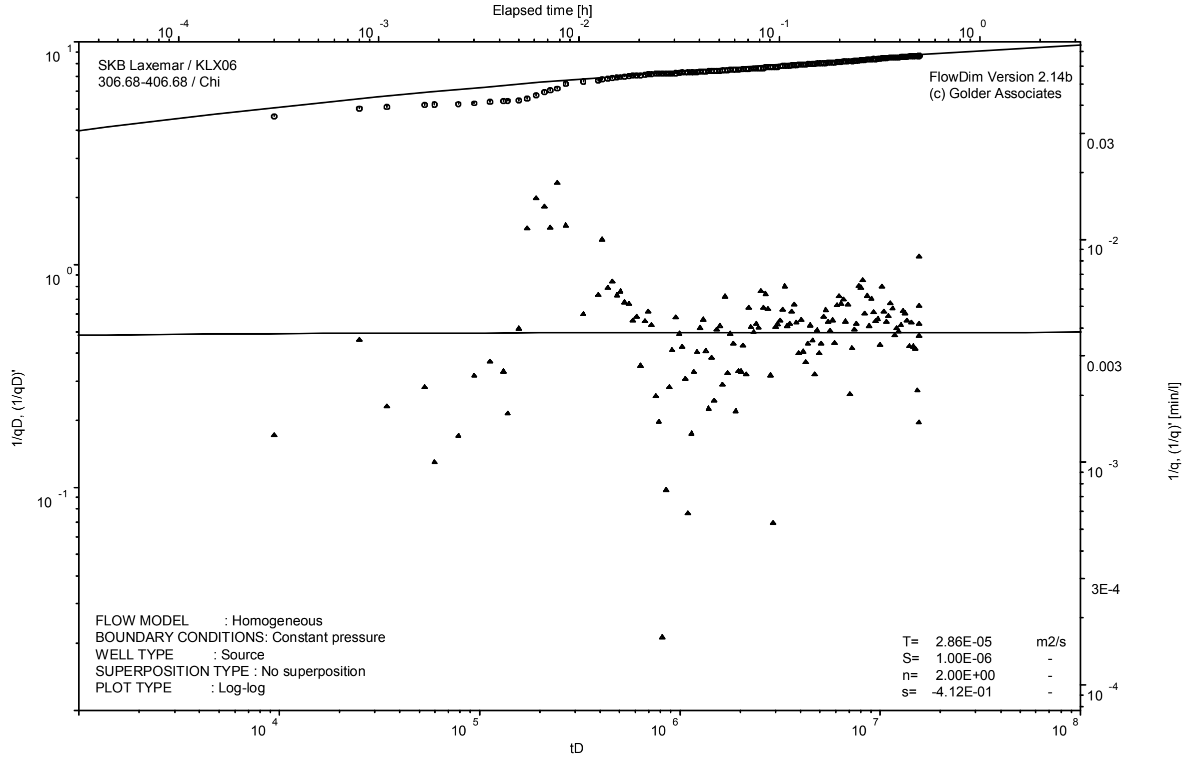
Analysis diagrams



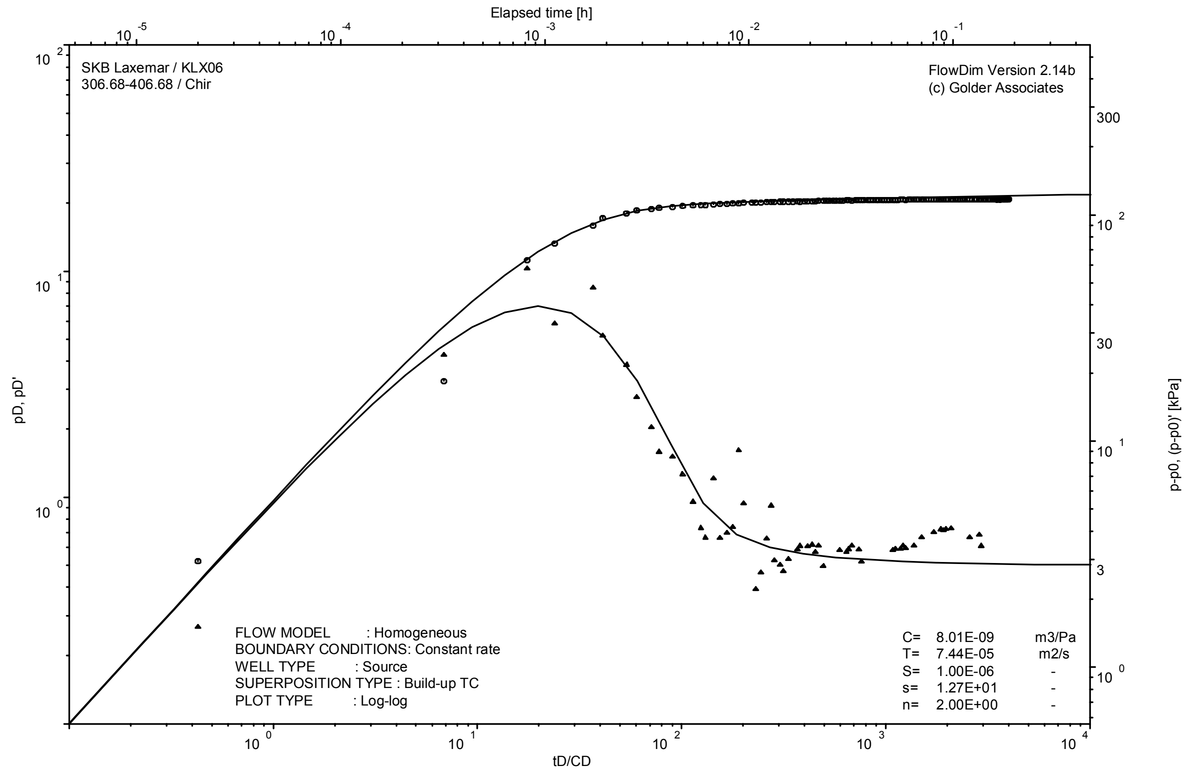
Pressure and flow rate vs. time; cartesian plot



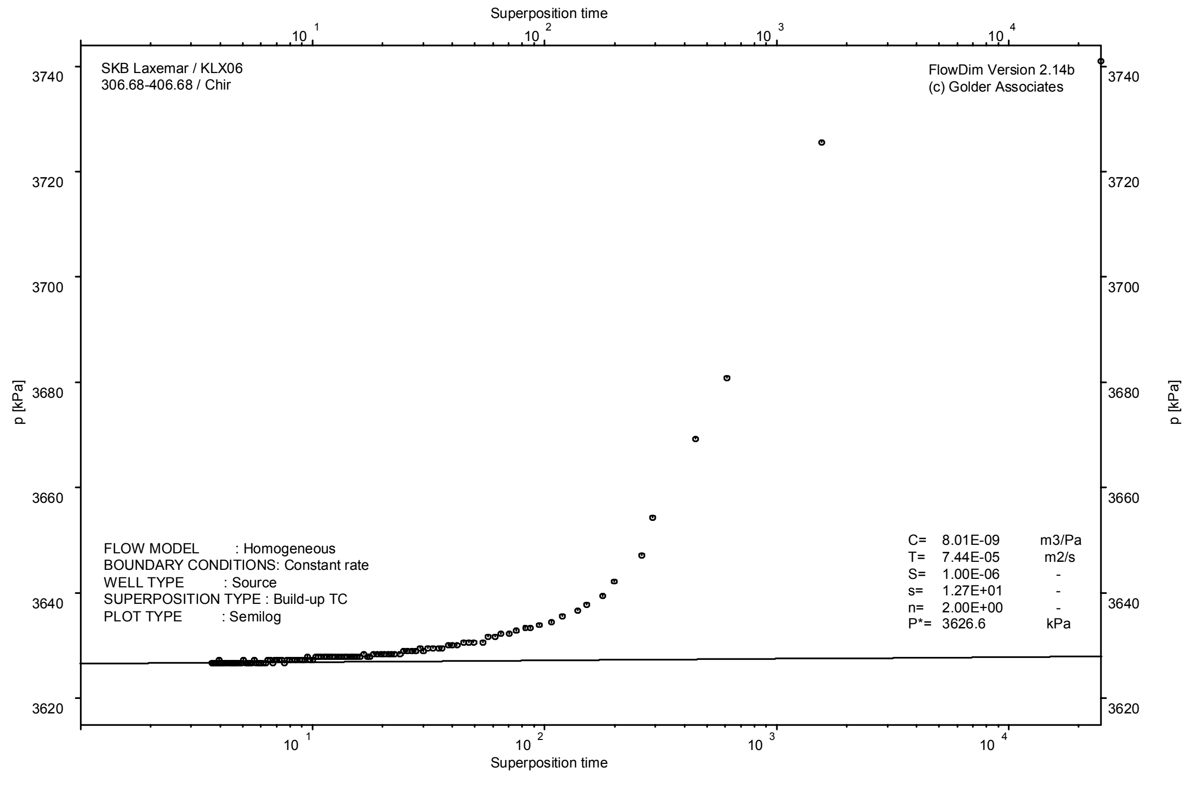
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

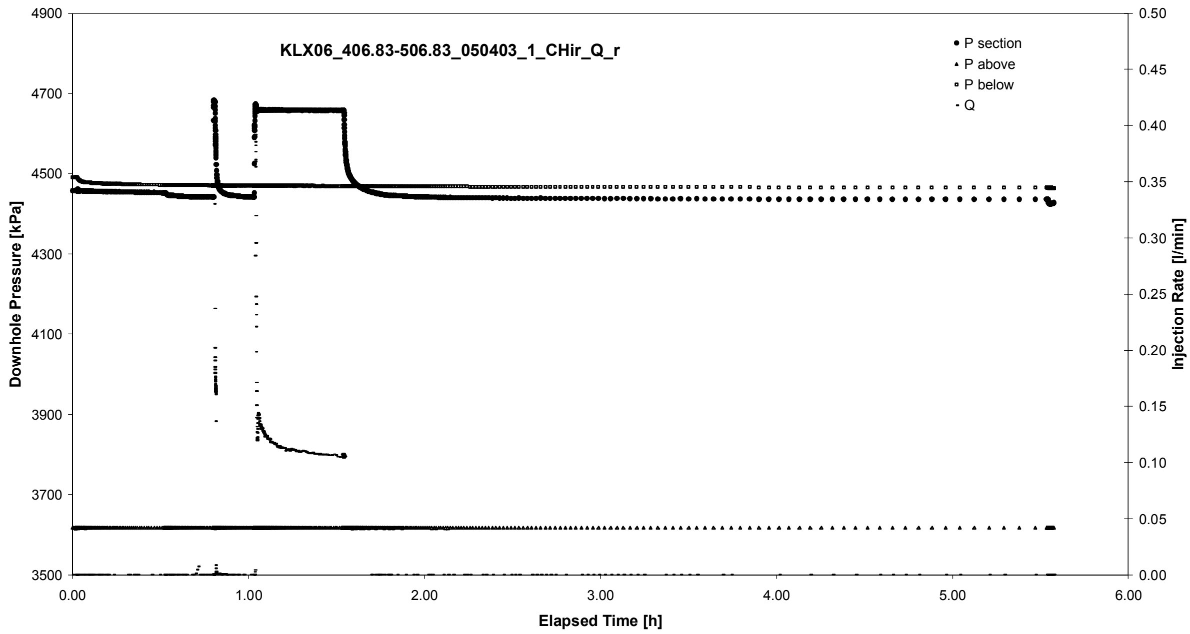


CHIR phase; HORNER match

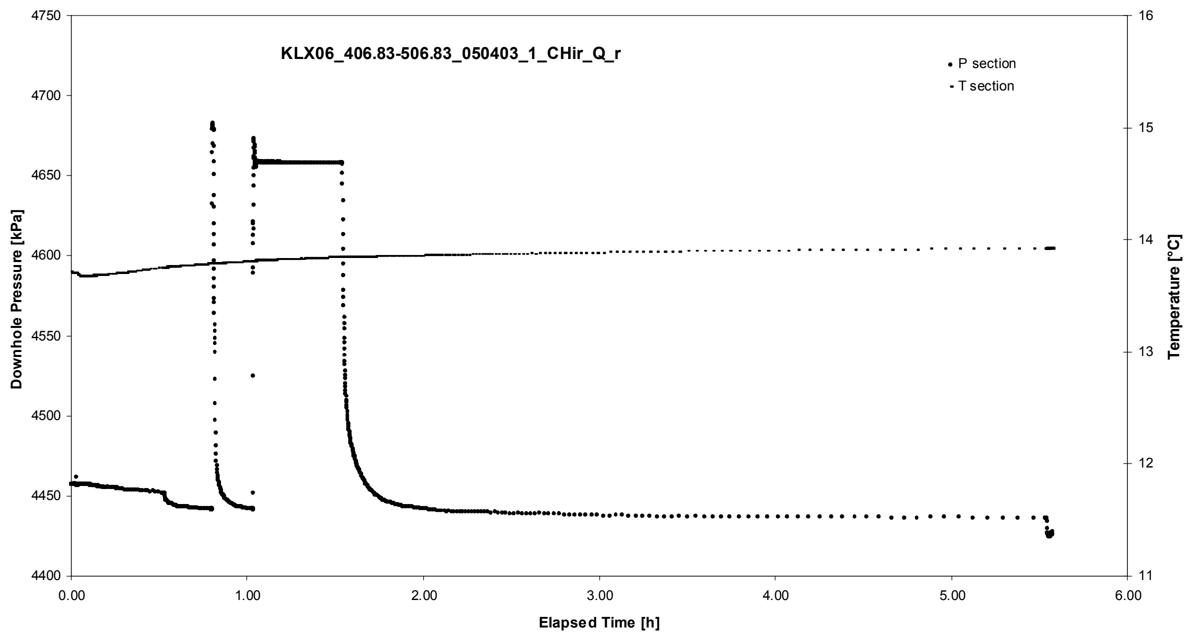
APPENDIX 2-4

Test 406.83 – 506.83 m

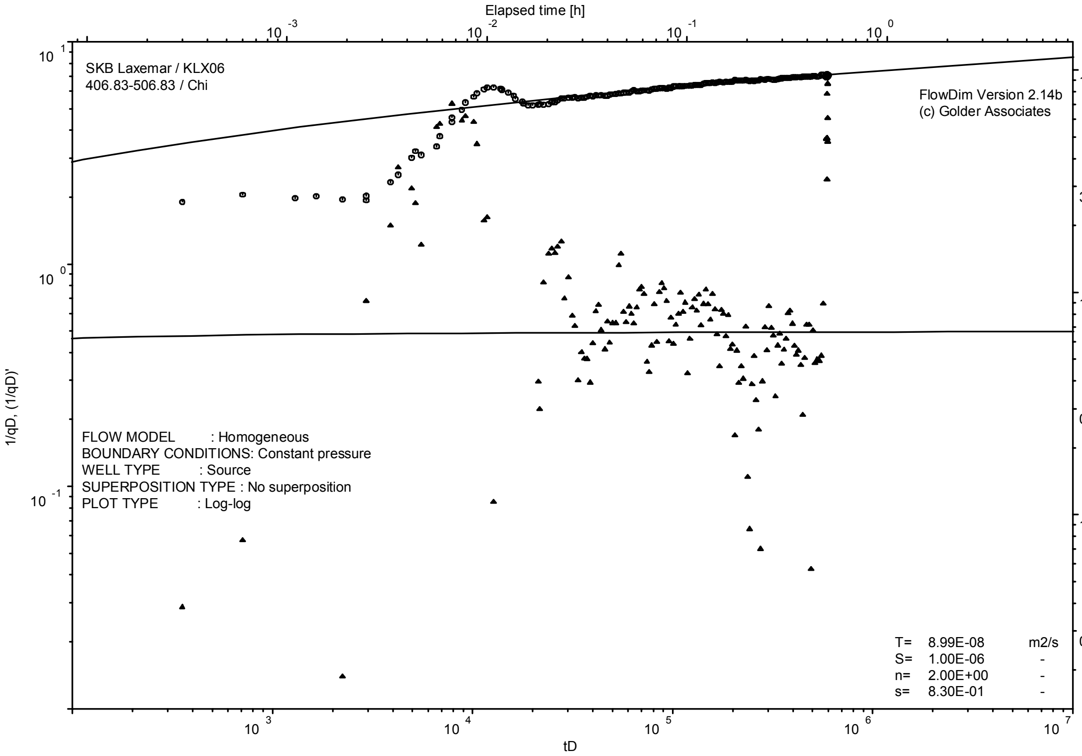
Analysis diagrams



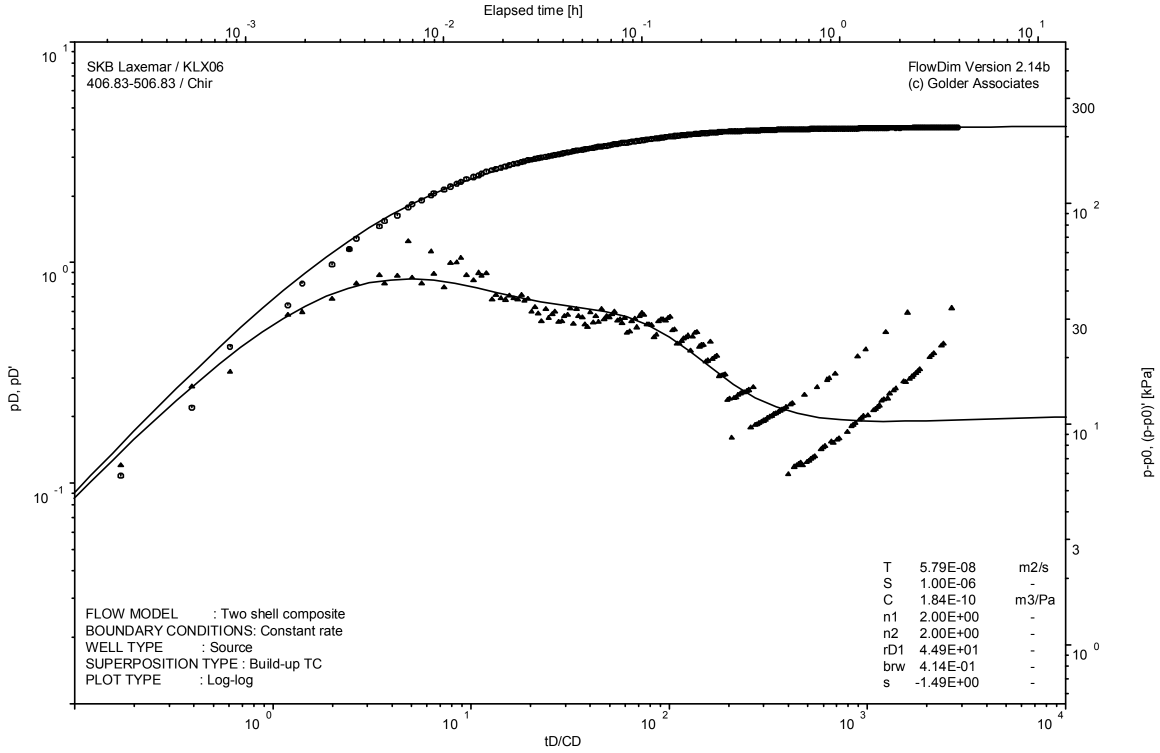
Pressure and flow rate vs. time; cartesian plot



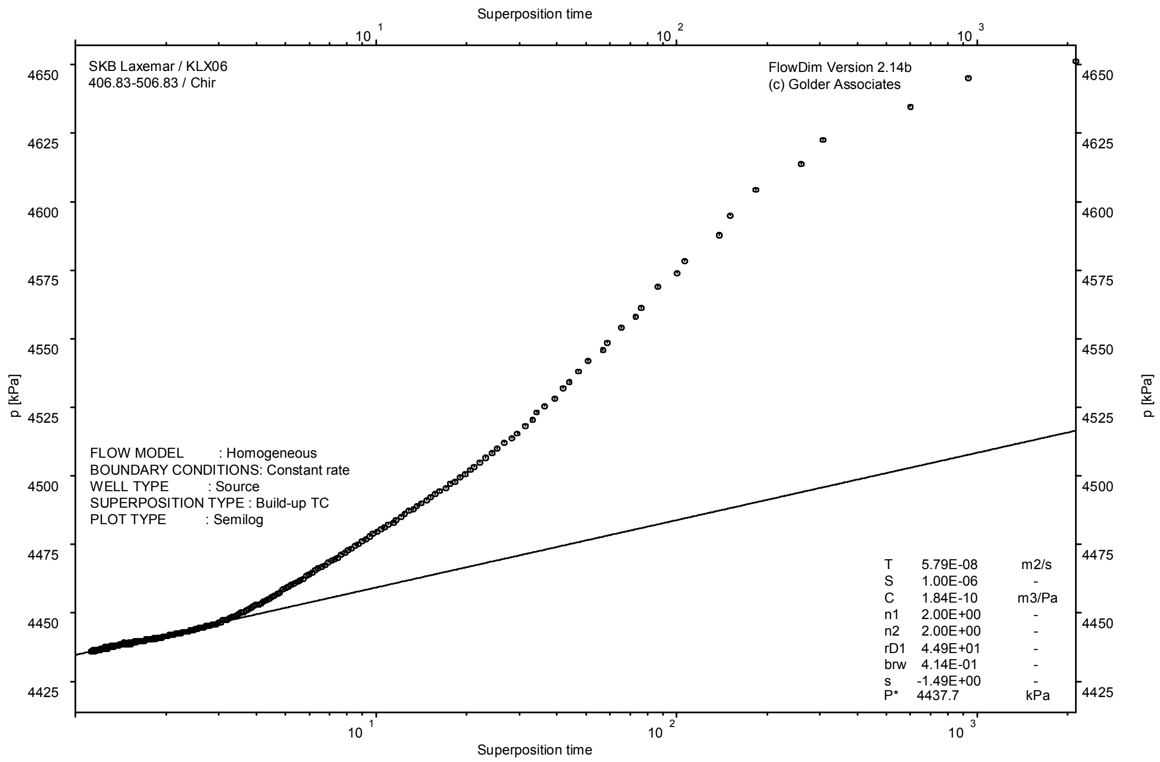
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

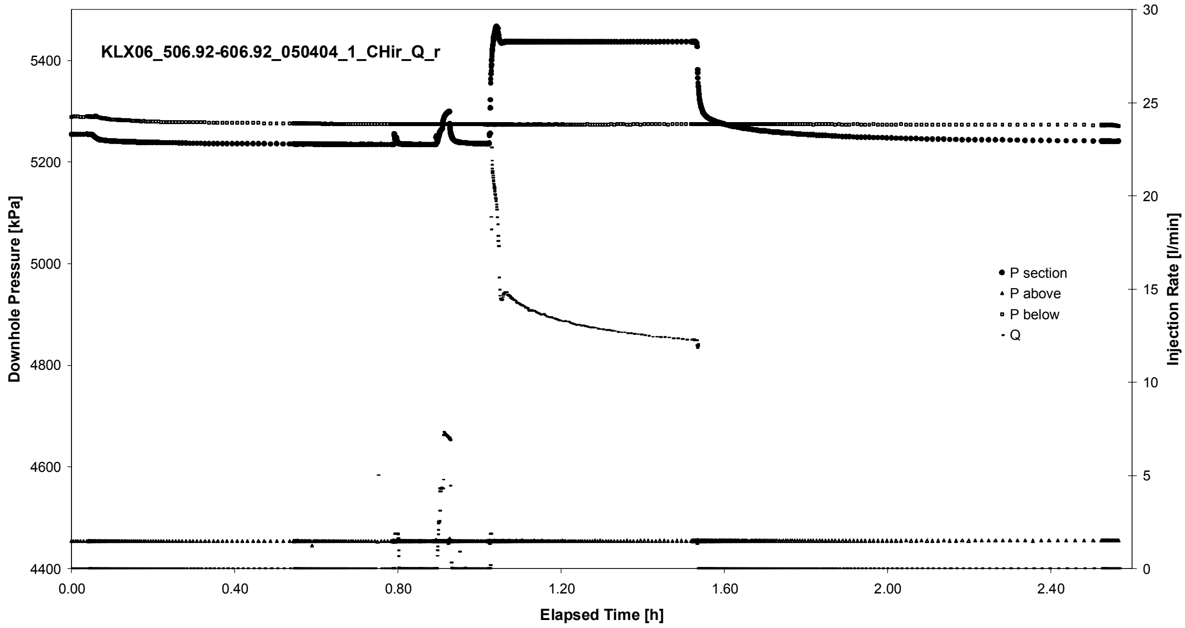


CHIR phase; HORNER match

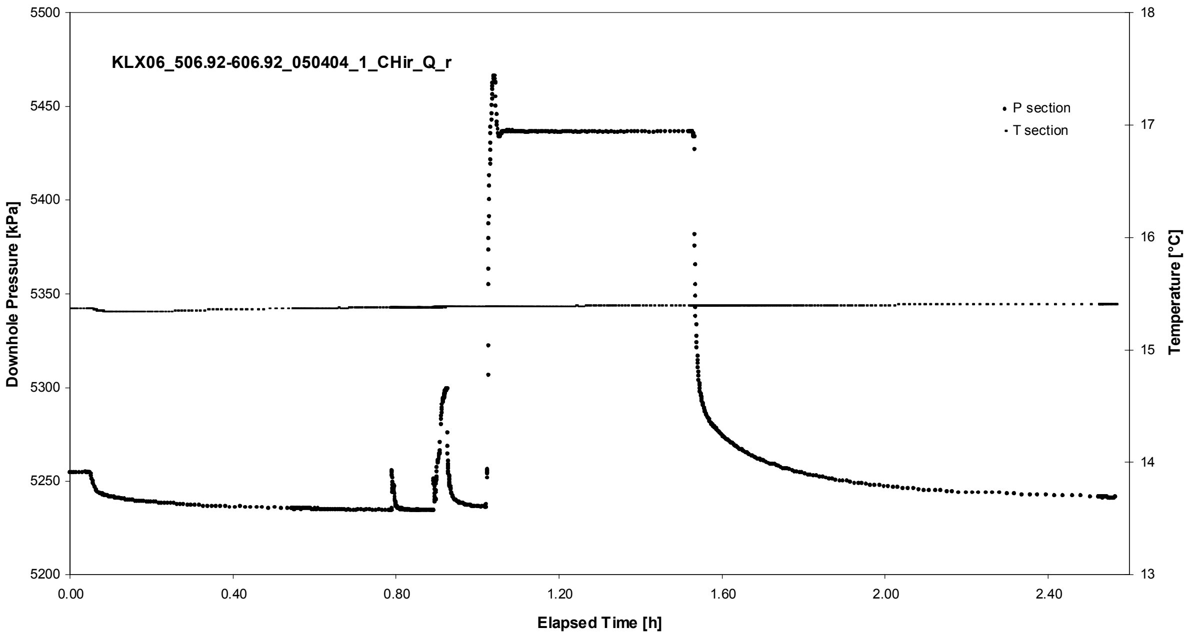
APPENDIX 2-5

Test 506.92 – 606.92 m

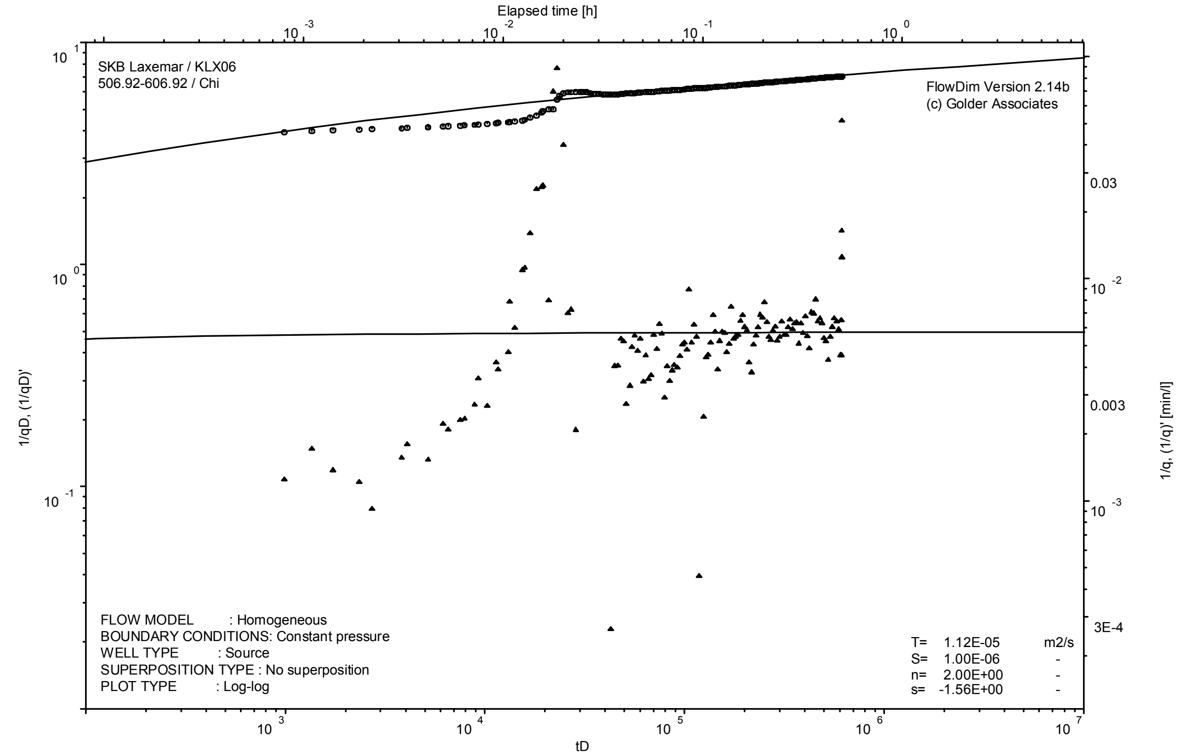
Analysis diagrams



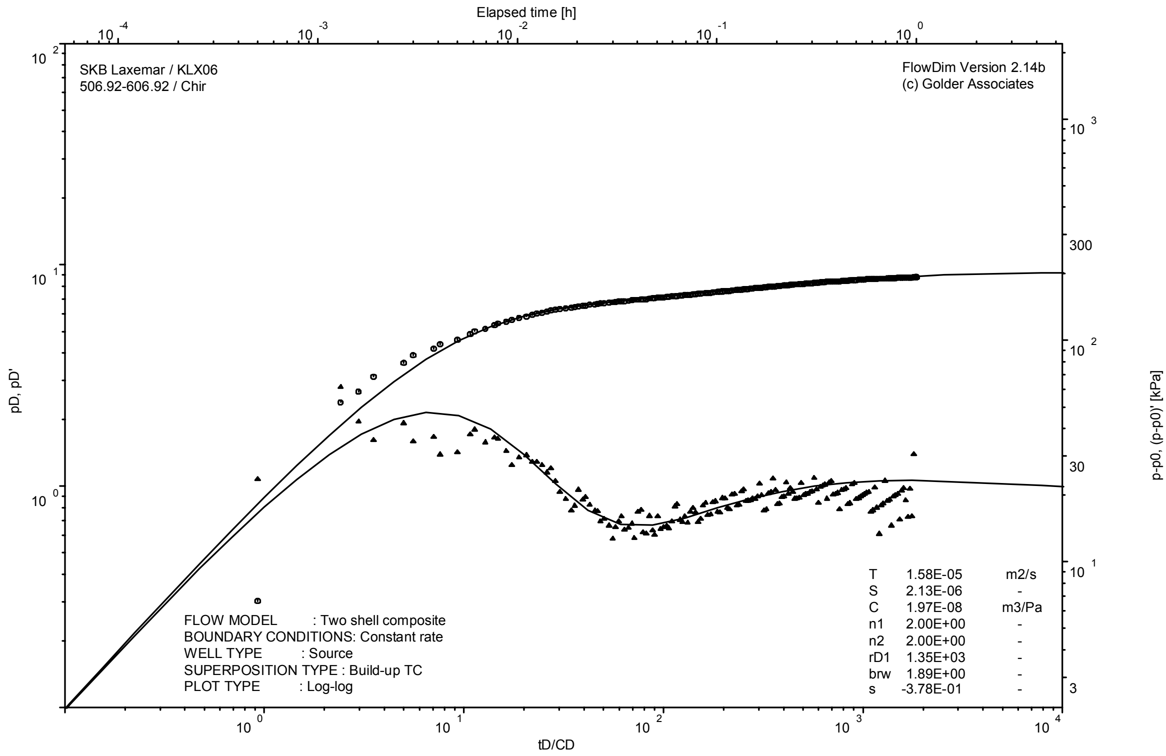
Pressure and flow rate vs. time; cartesian plot



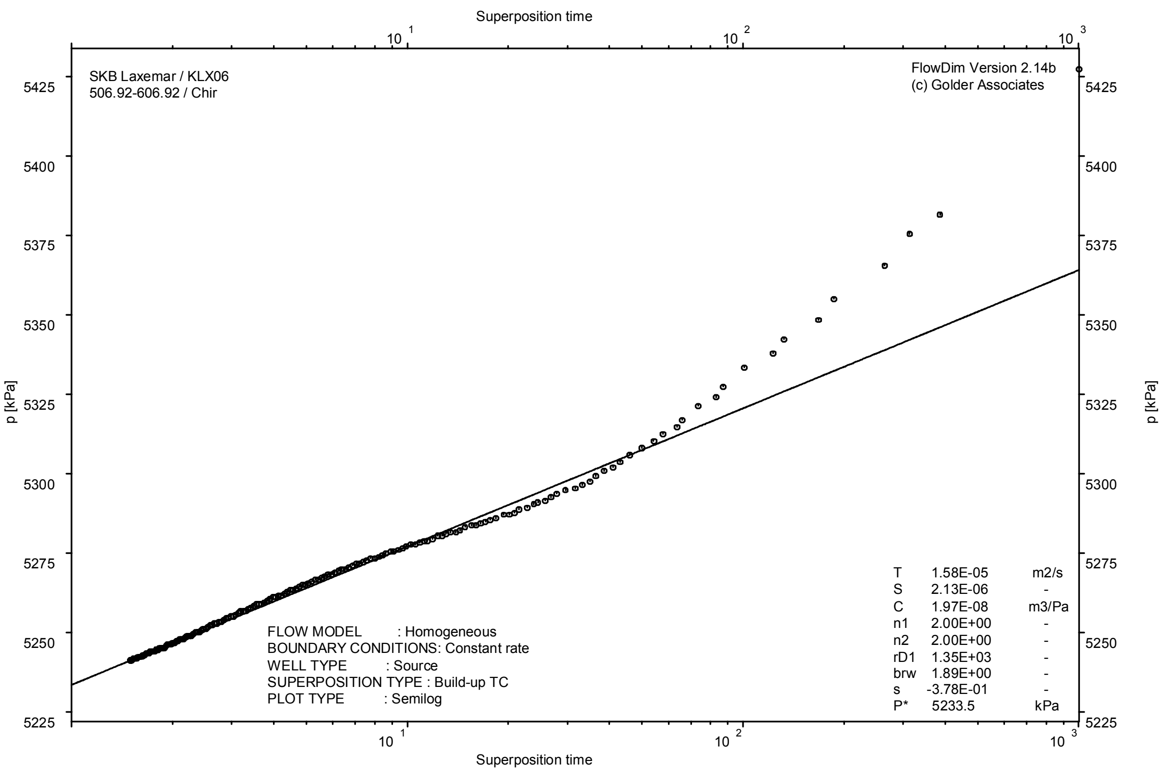
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

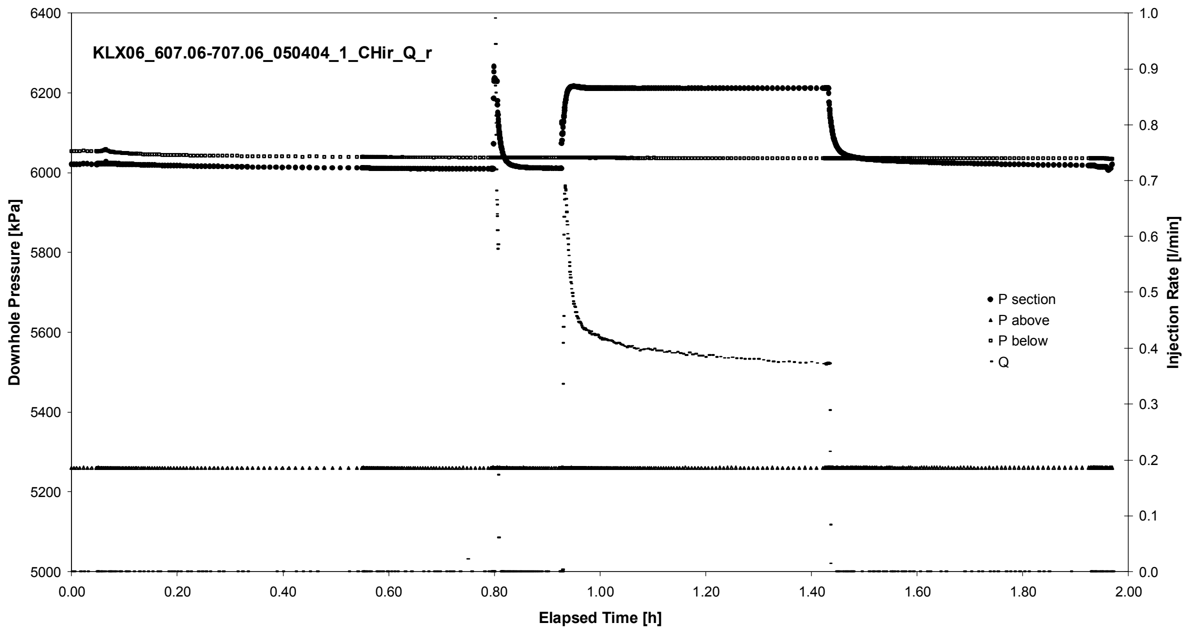


CHIR phase; HORNER match

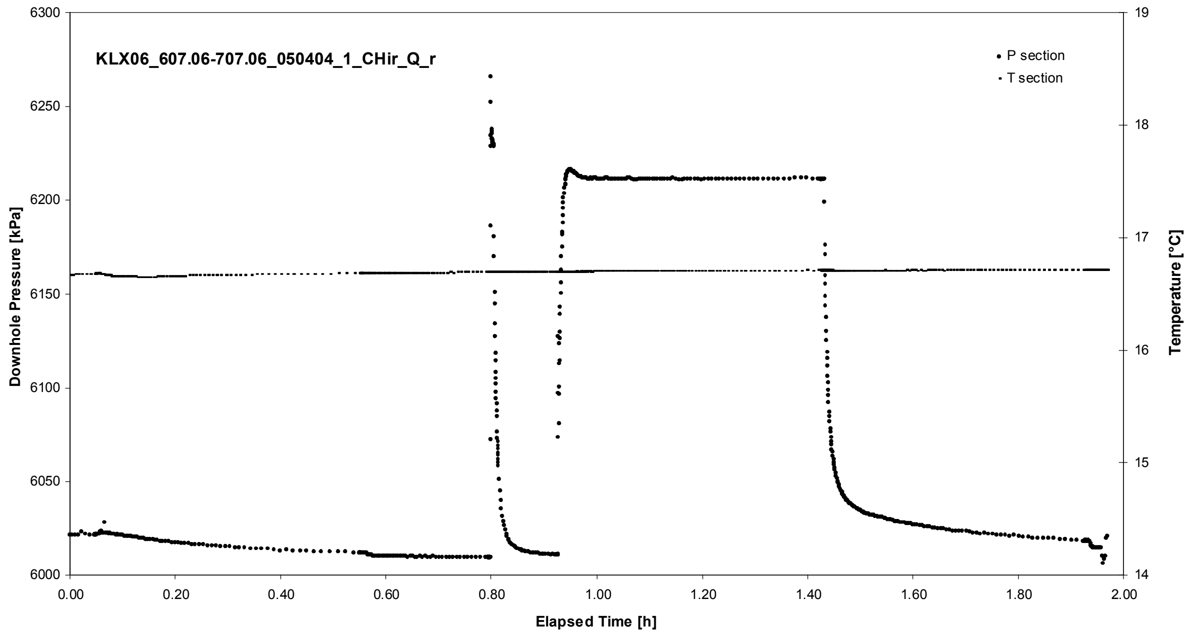
APPENDIX 2-6

Test 607.06 – 707.06 m

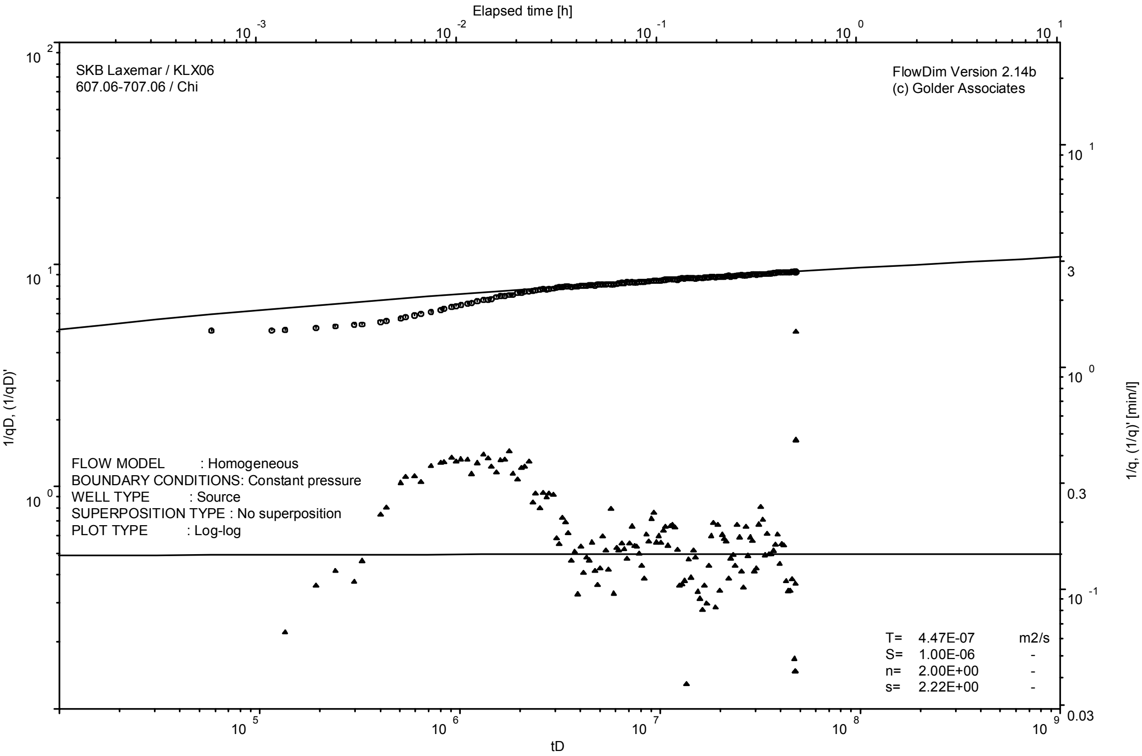
Analysis diagrams



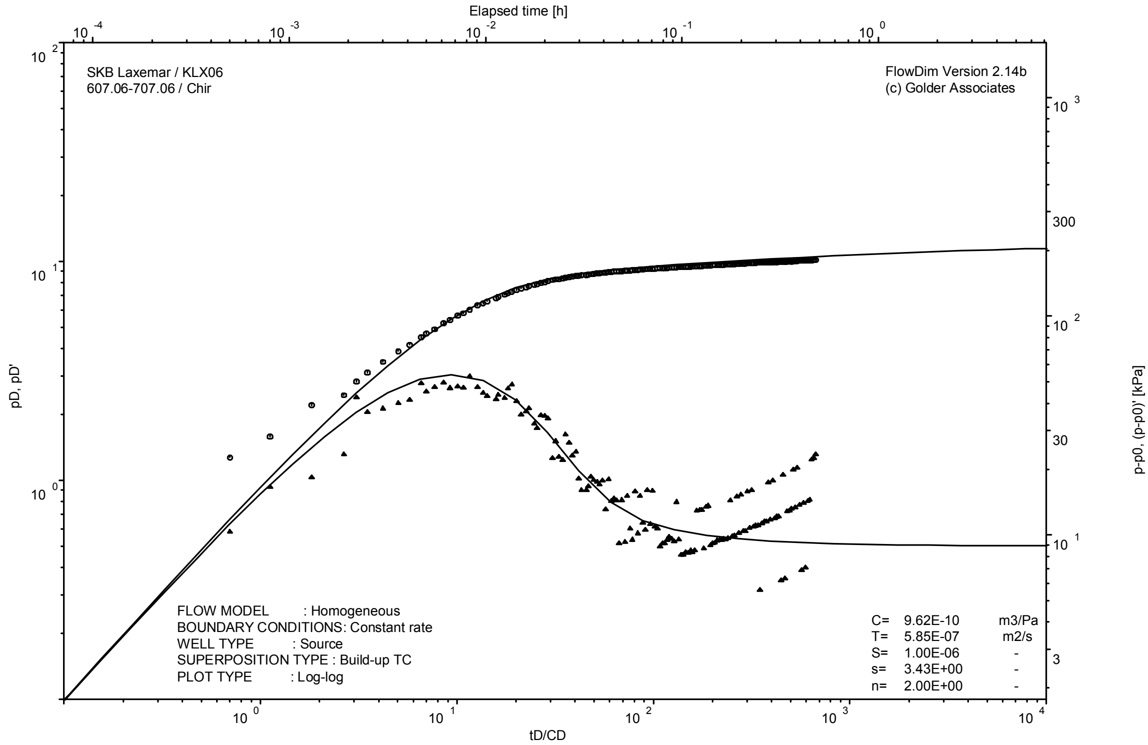
Pressure and flow rate vs. time; cartesian plot



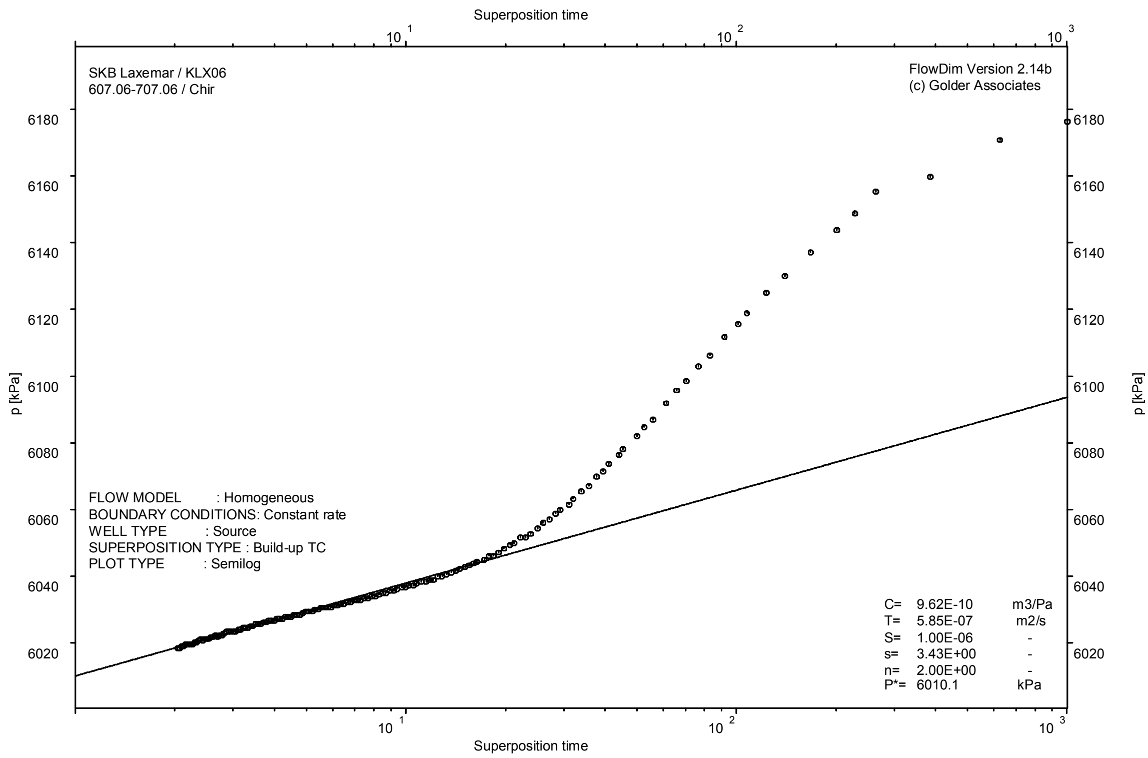
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

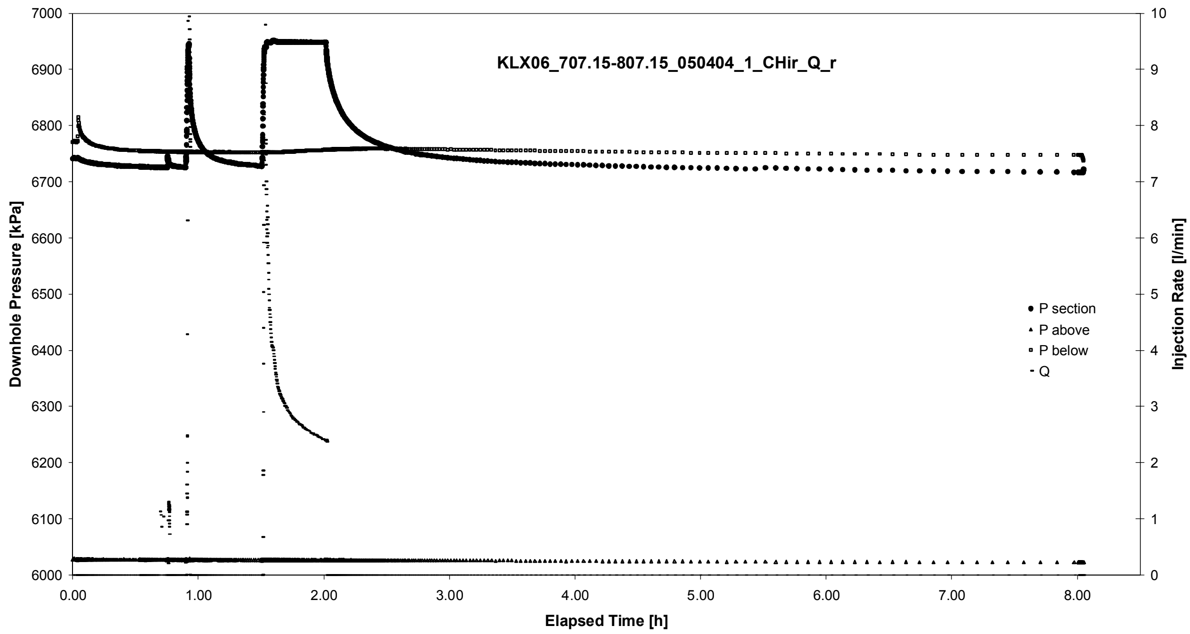


CHIR phase; HORNER match

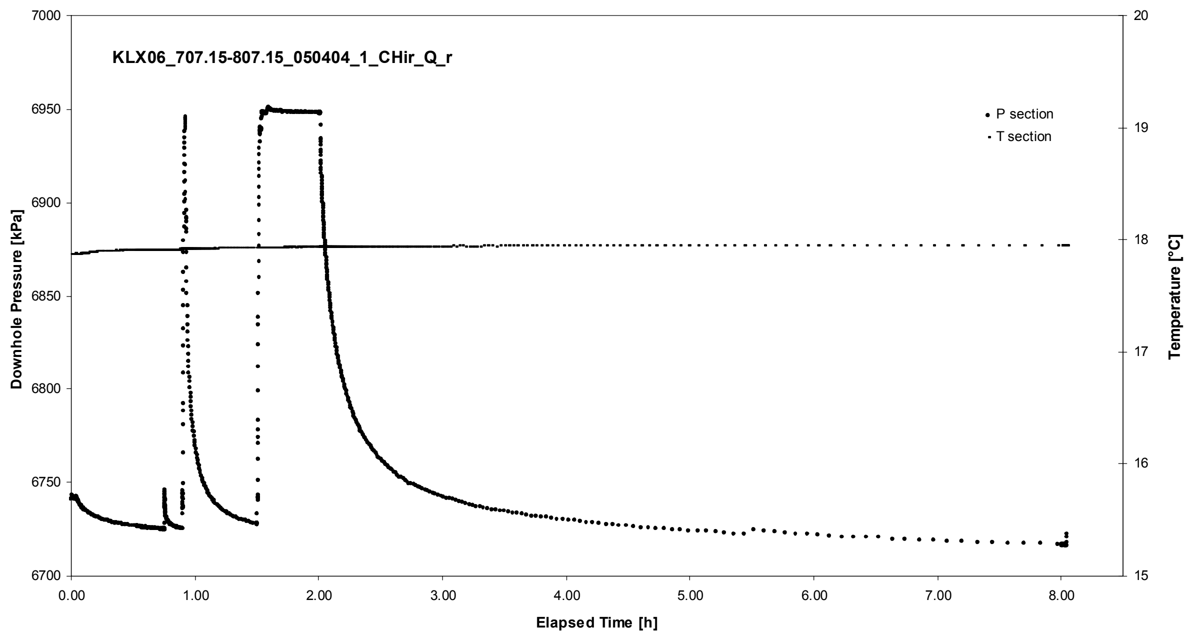
APPENDIX 2-7

Test 707.15 – 807.15 m

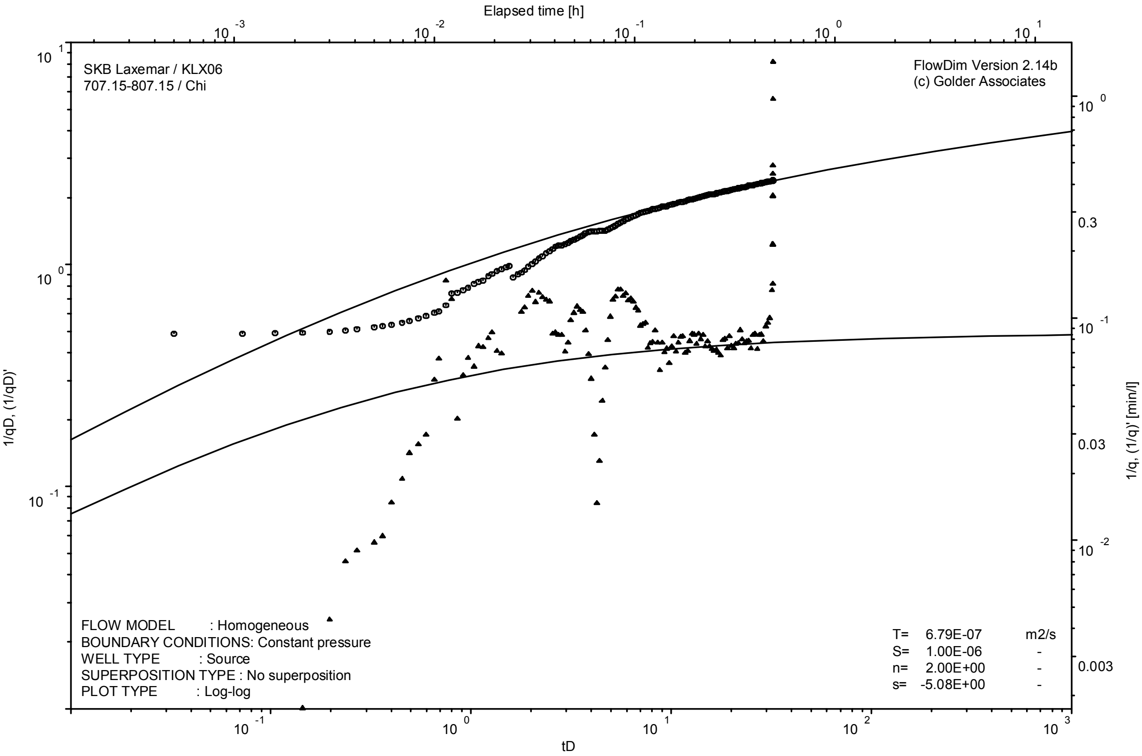
Analysis diagrams



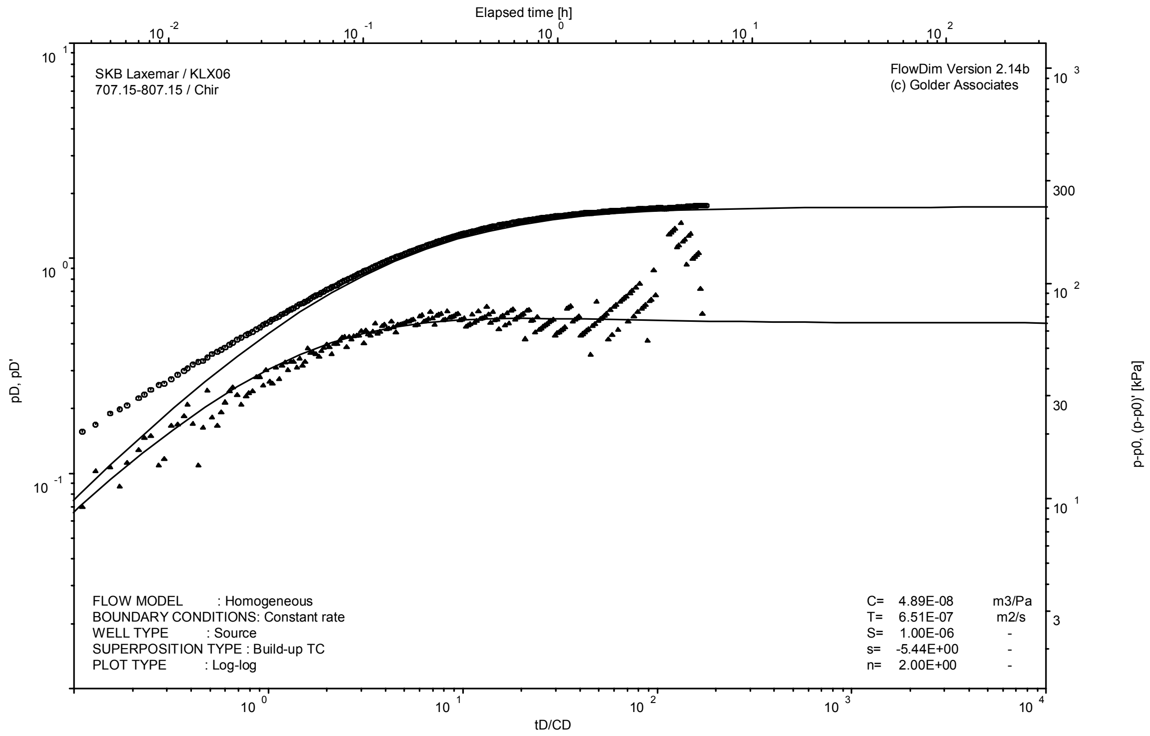
Pressure and flow rate vs. time; cartesian plot



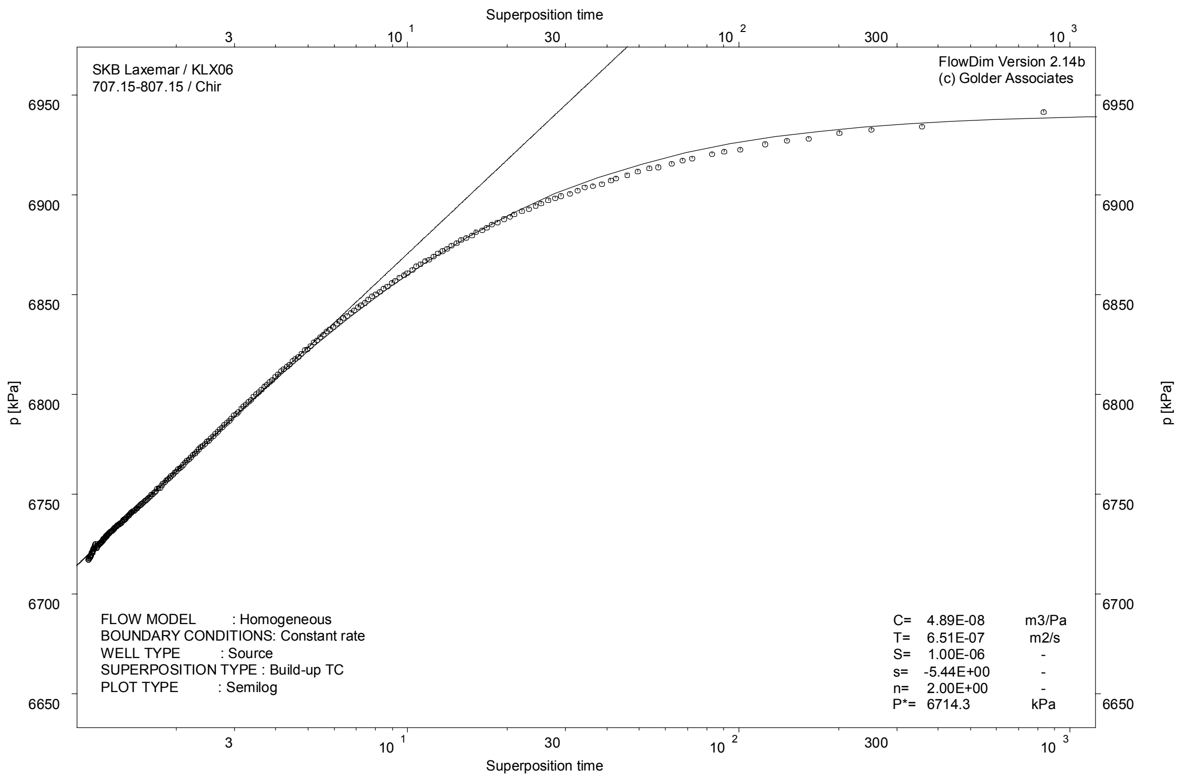
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

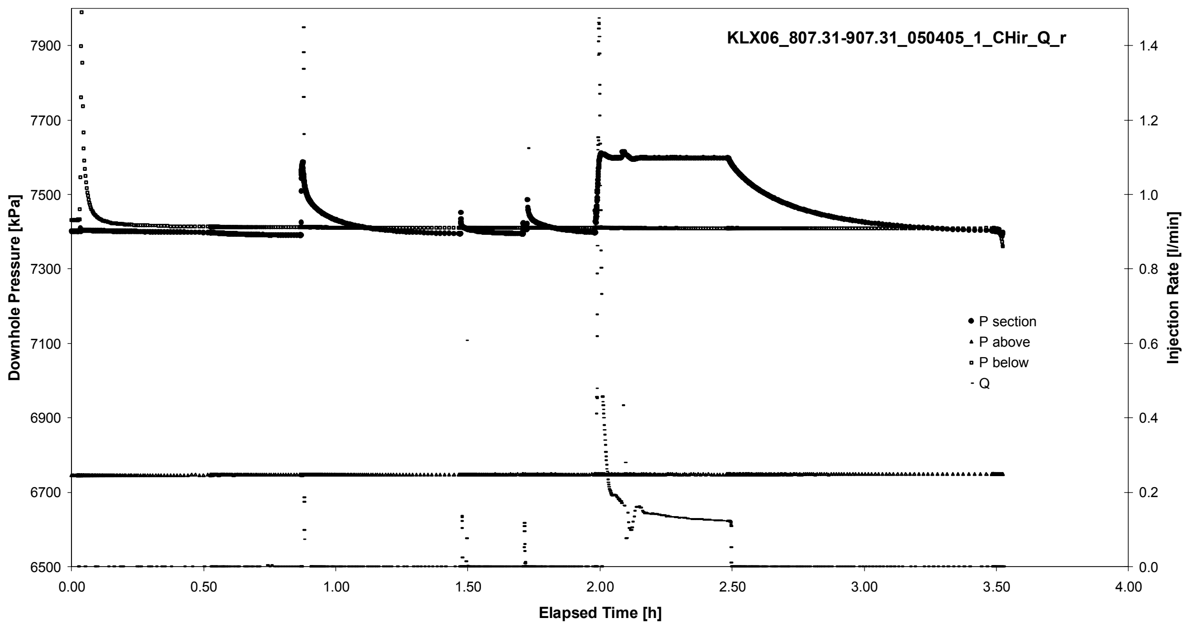


CHIR phase; HORNER match

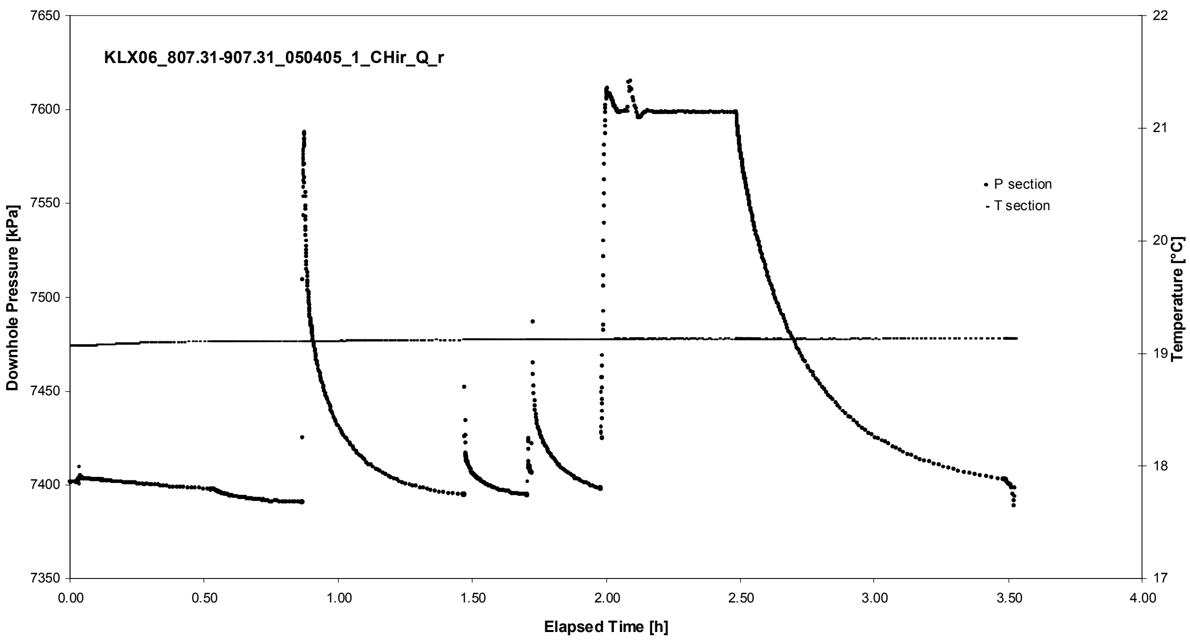
APPENDIX 2-8

Test 807.31 – 907.31 m

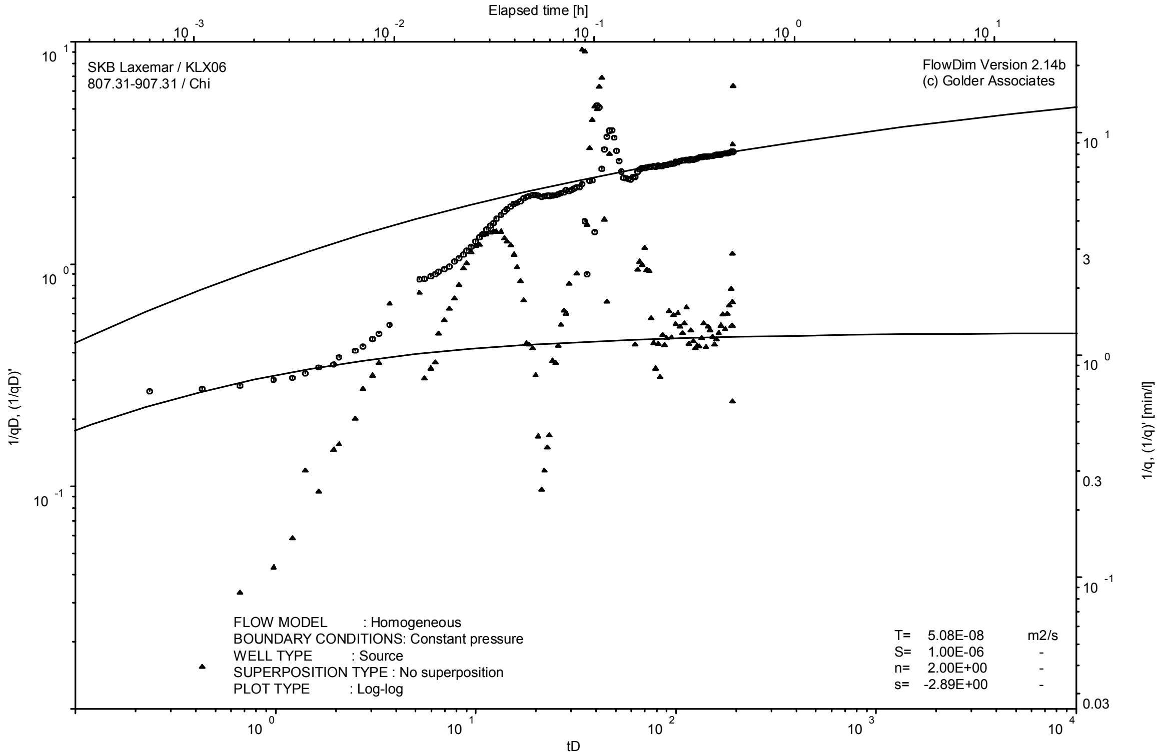
Analysis diagrams



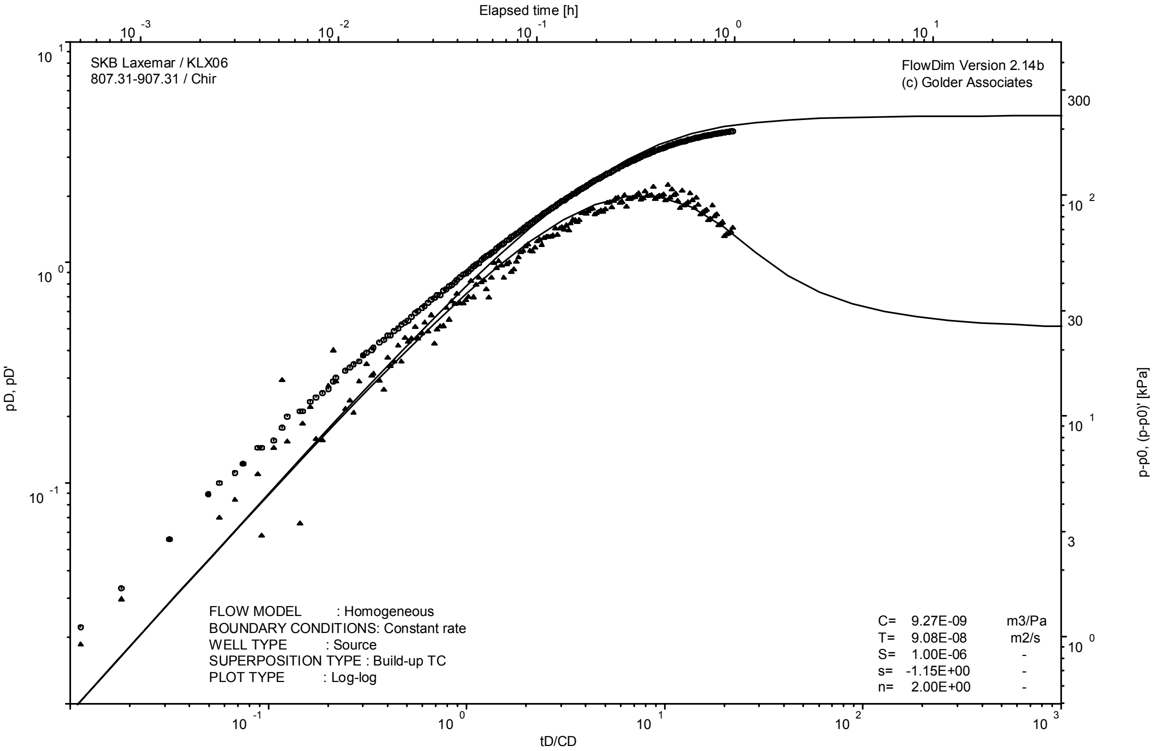
Pressure and flow rate vs. time; cartesian plot



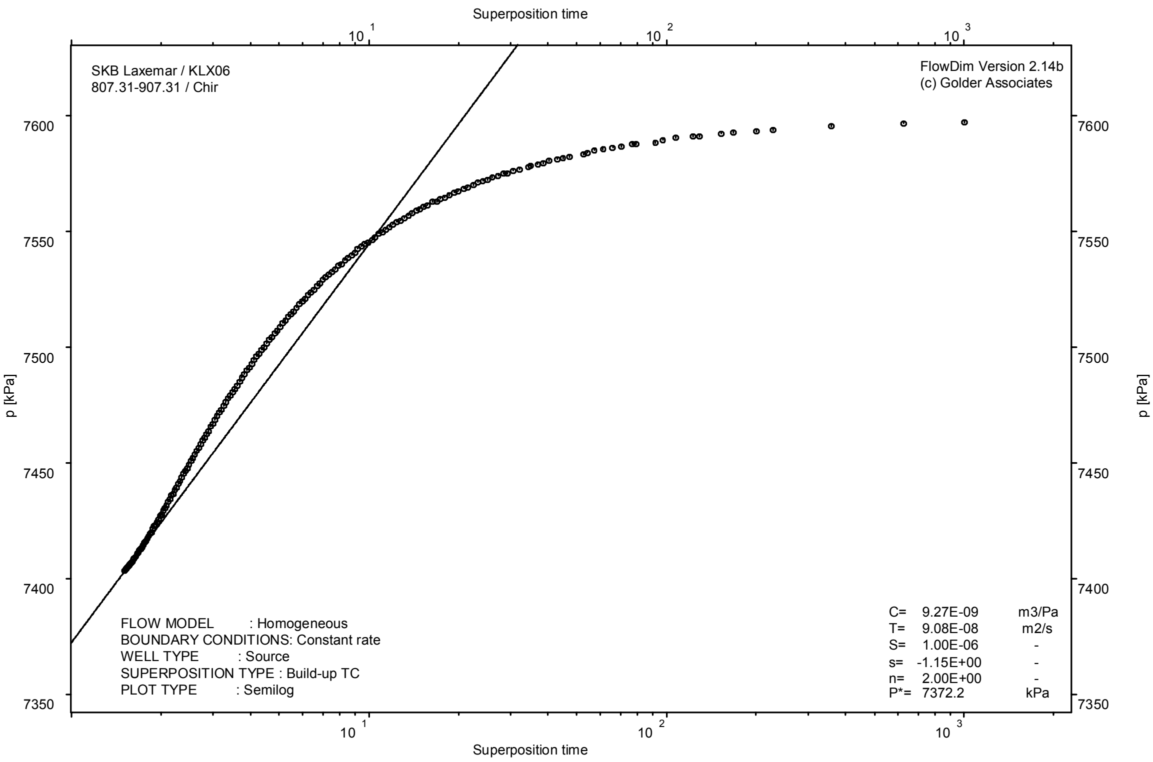
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

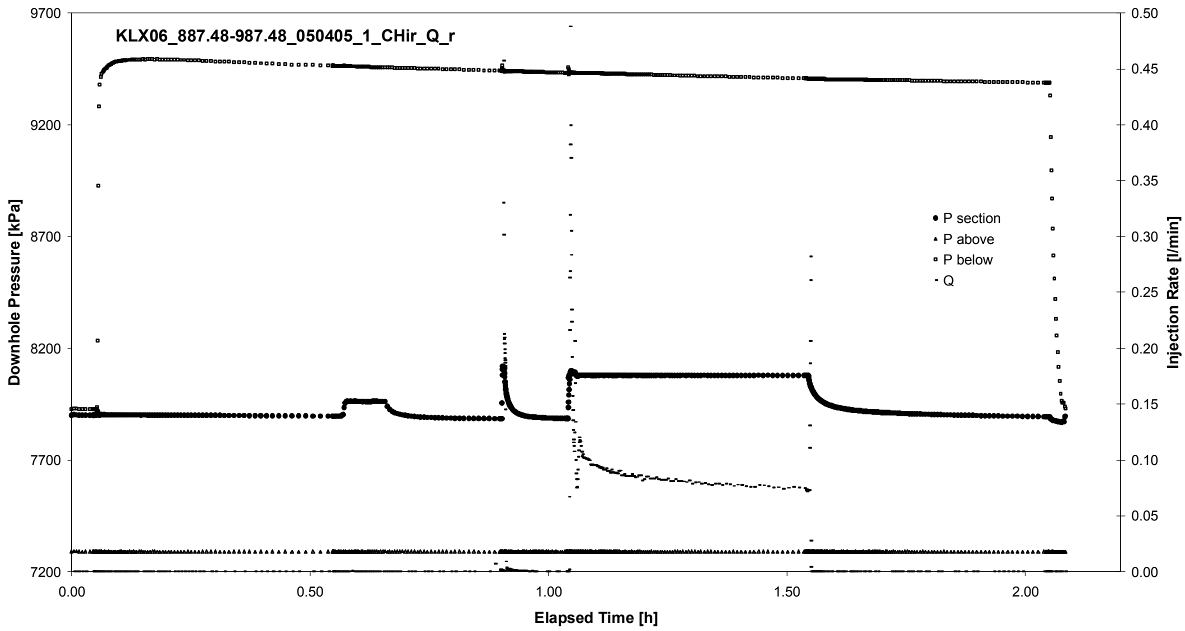


CHIR phase; HORNER match

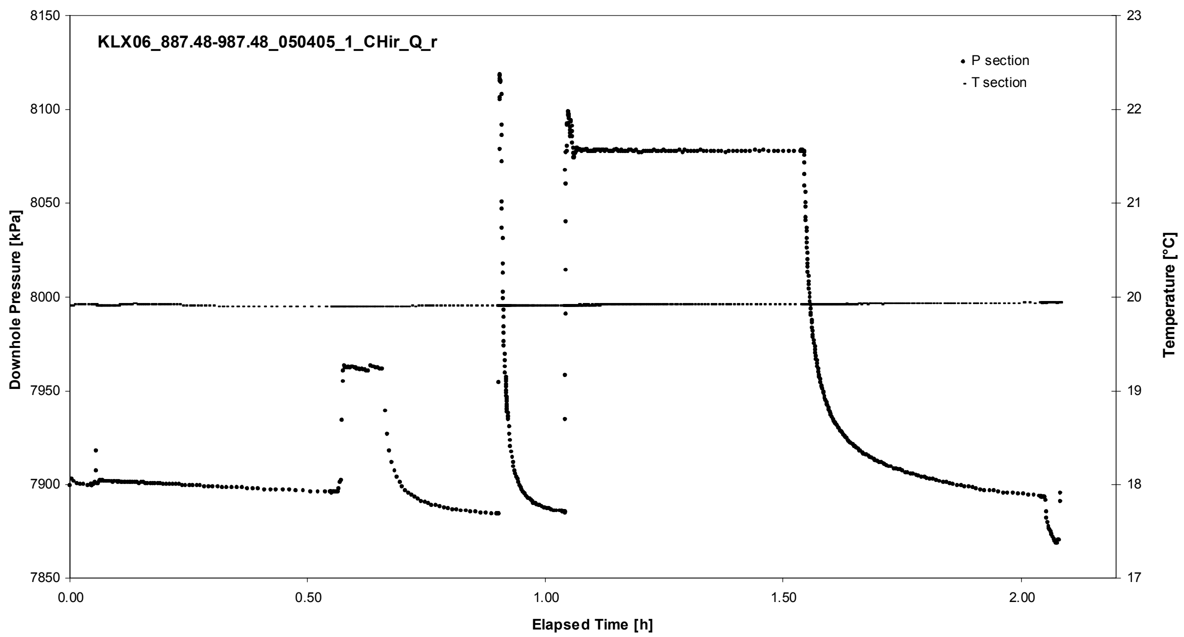
APPENDIX 2-9

Test 887.48 – 987.48 m

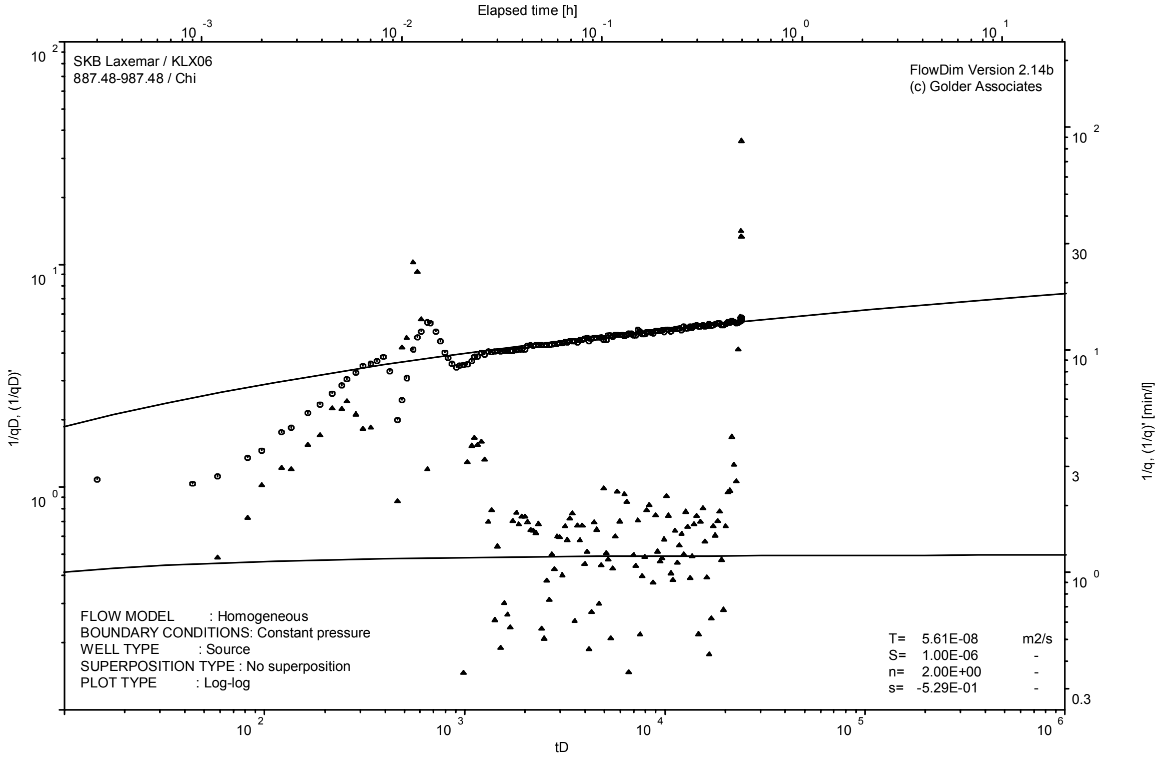
Analysis diagrams



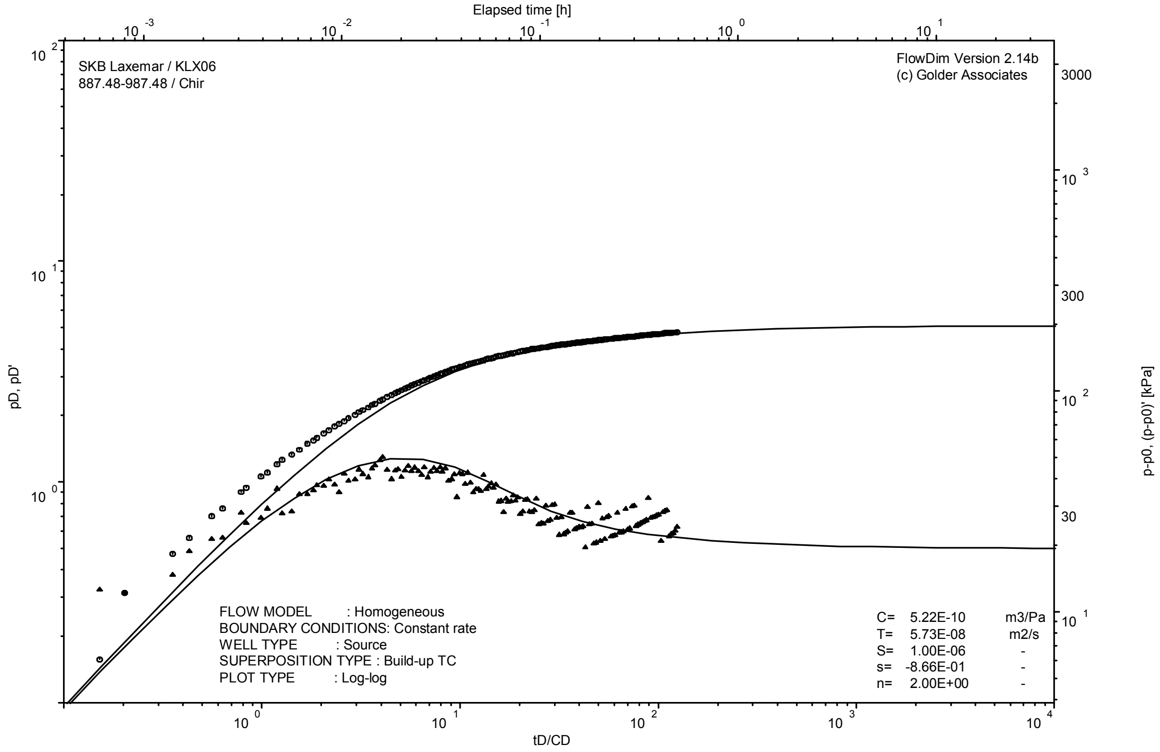
Pressure and flow rate vs. time; cartesian plot



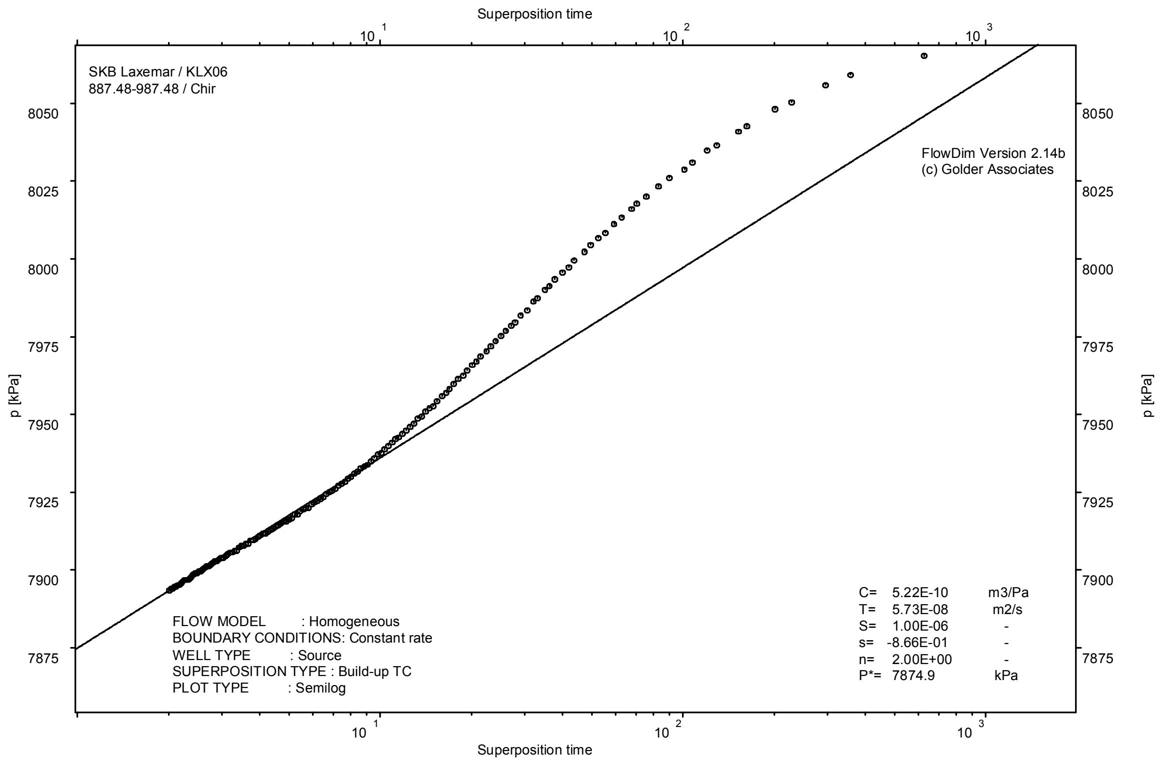
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

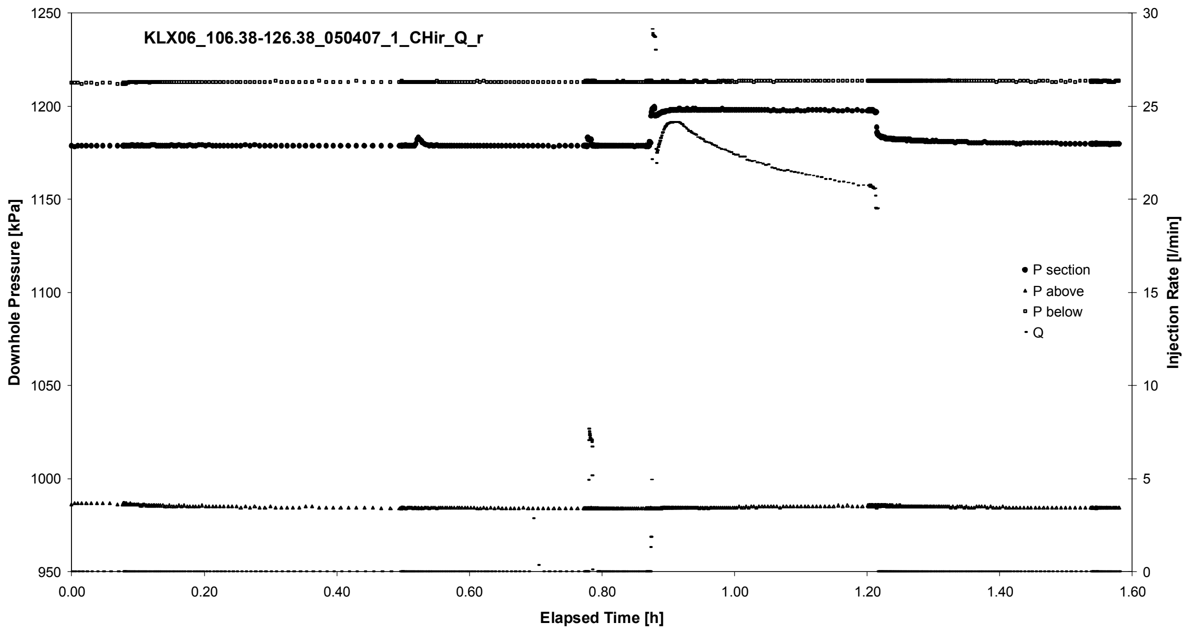


CHIR phase; HORNER match

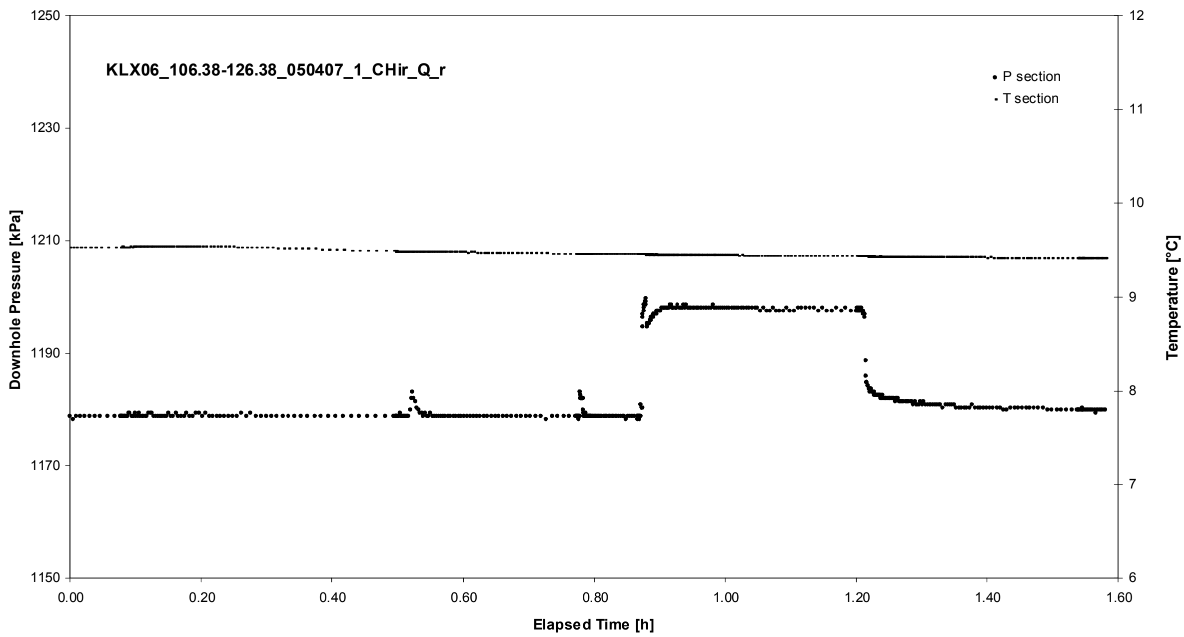
APPENDIX 2-10

Test 106.38 – 126.38 m

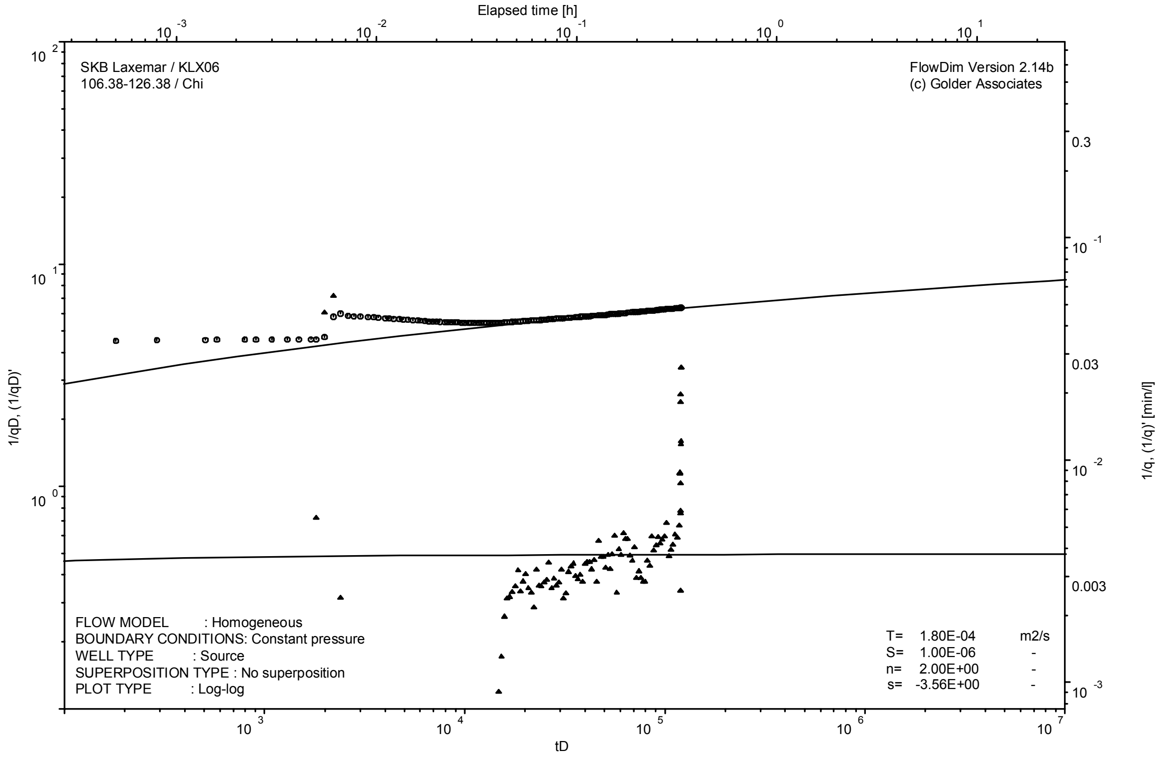
Analysis diagrams



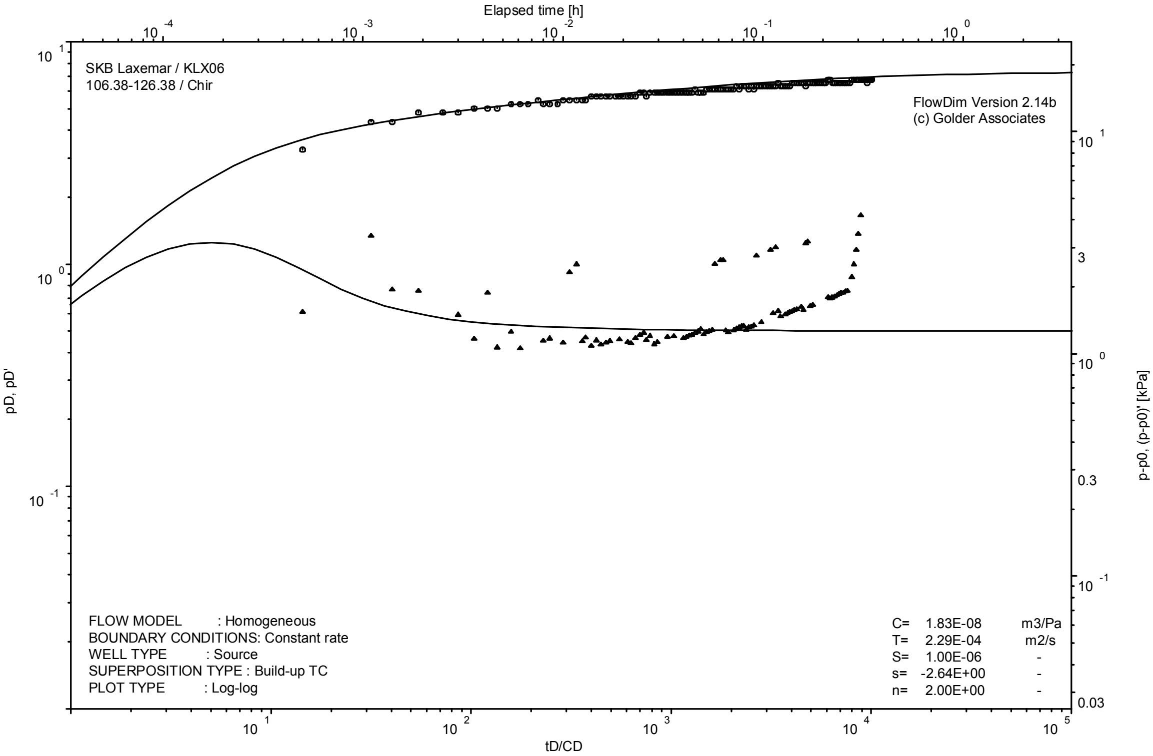
Pressure and flow rate vs. time; cartesian plot



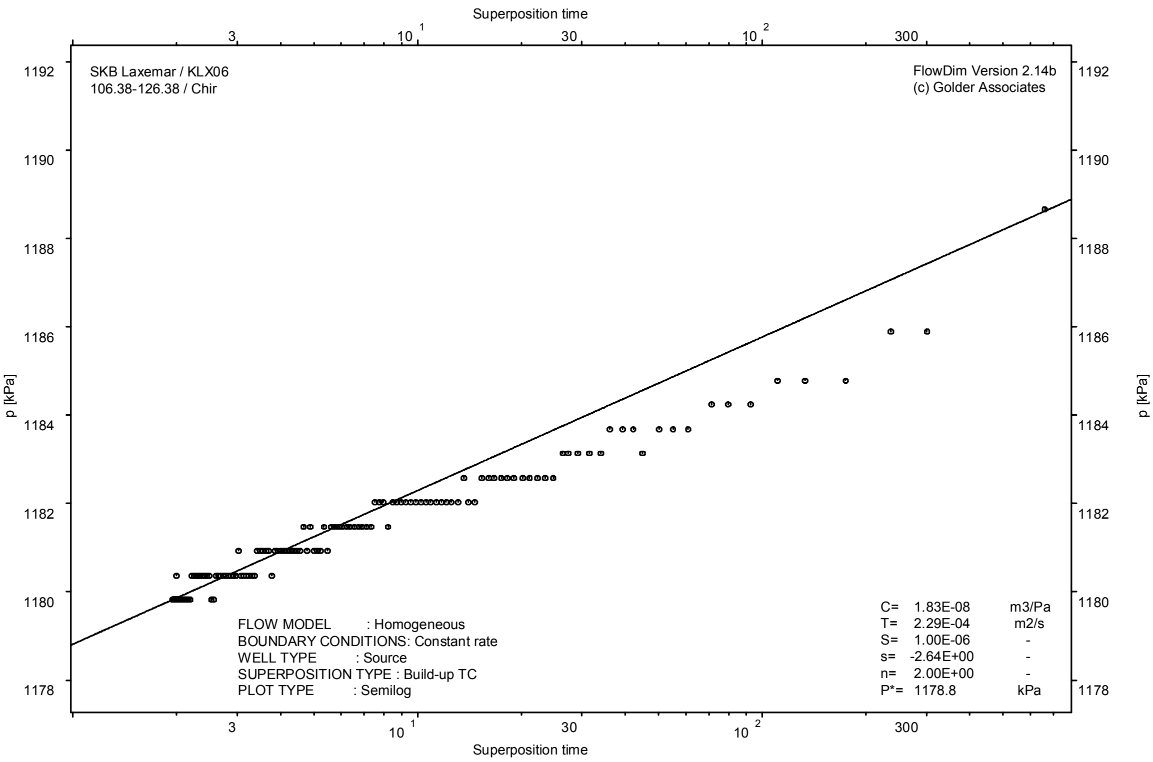
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

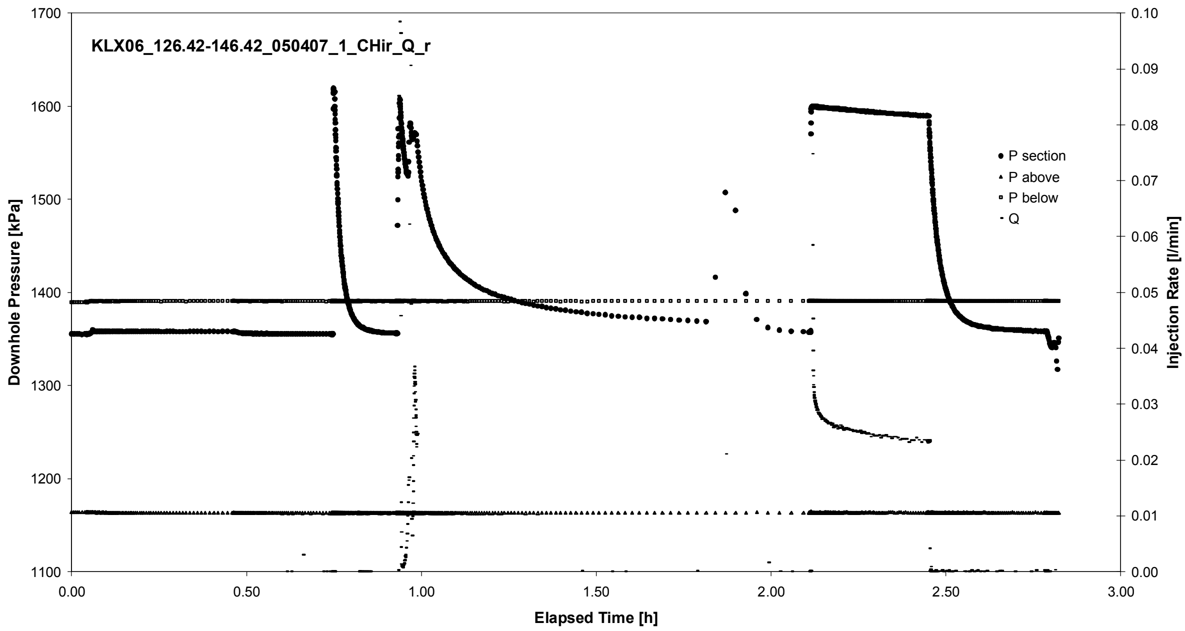


CHIR phase; HORNER match

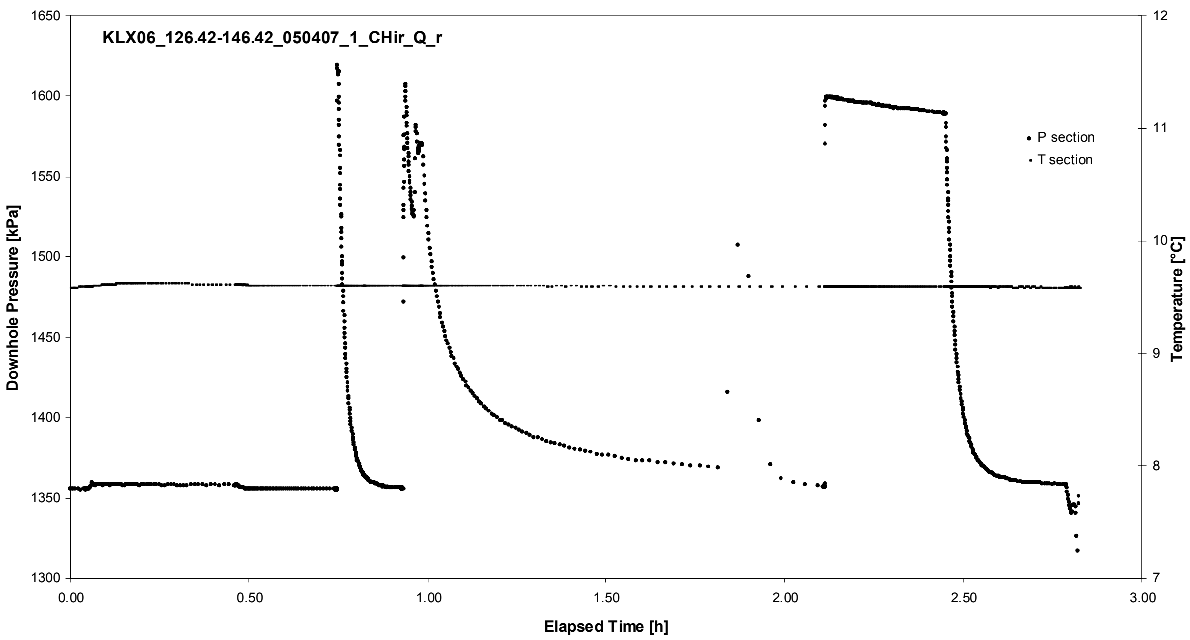
APPENDIX 2-11

Test 126.42 – 146.42 m

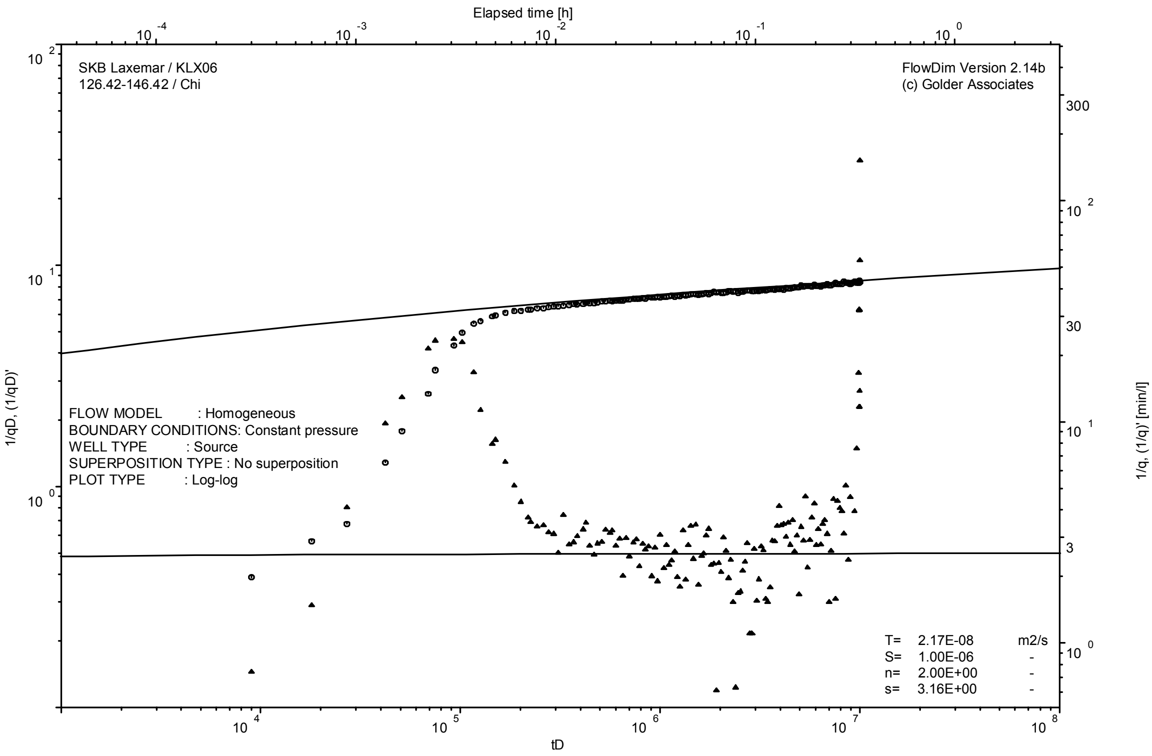
Analysis diagrams



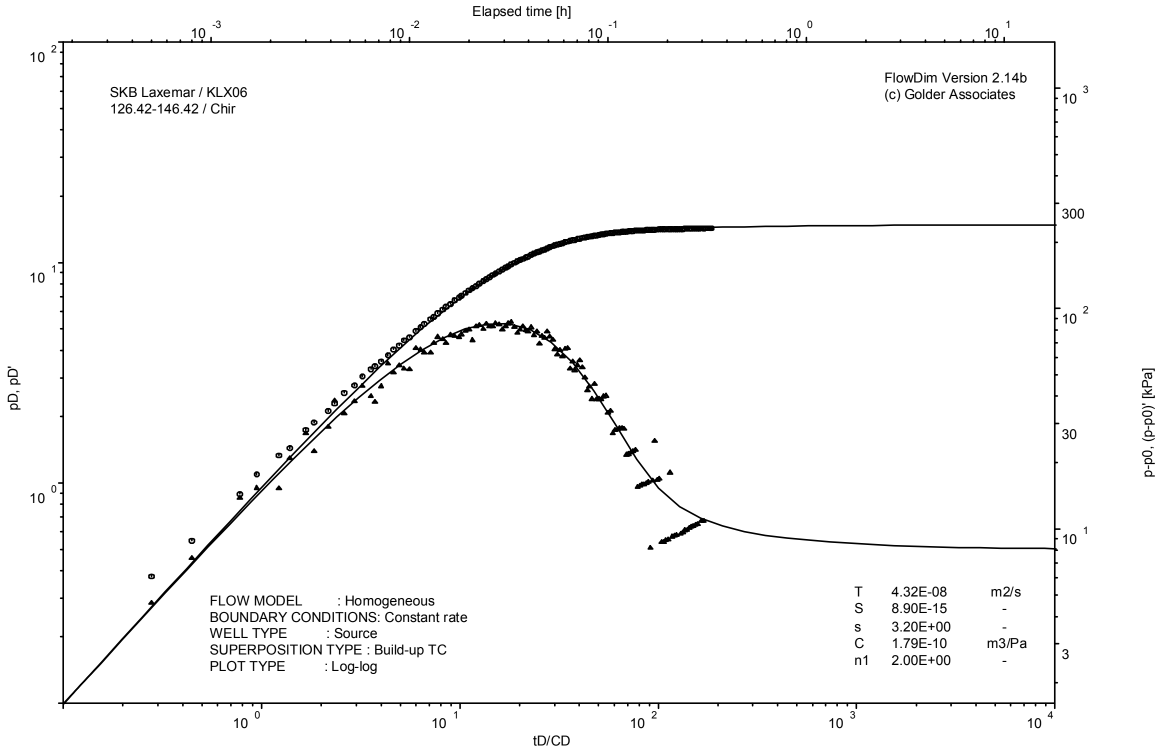
Pressure and flow rate vs. time; cartesian plot



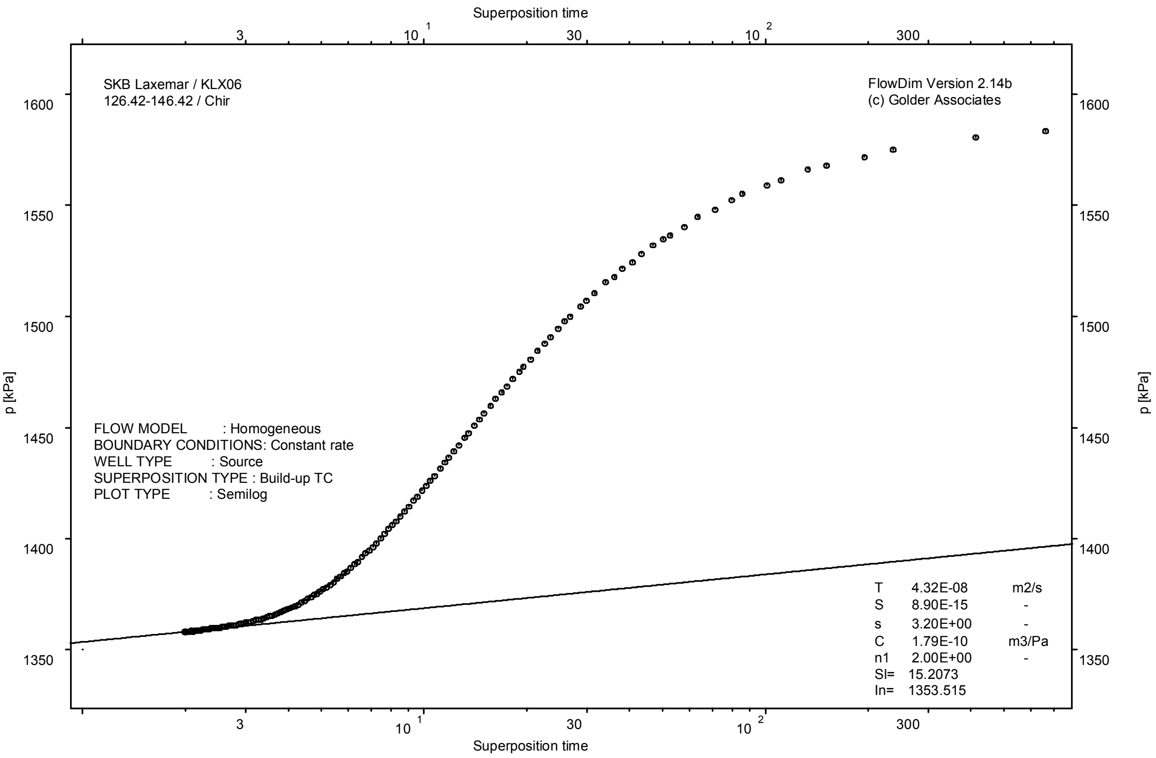
Interval pressure and temperature vs. time; cartesian plot



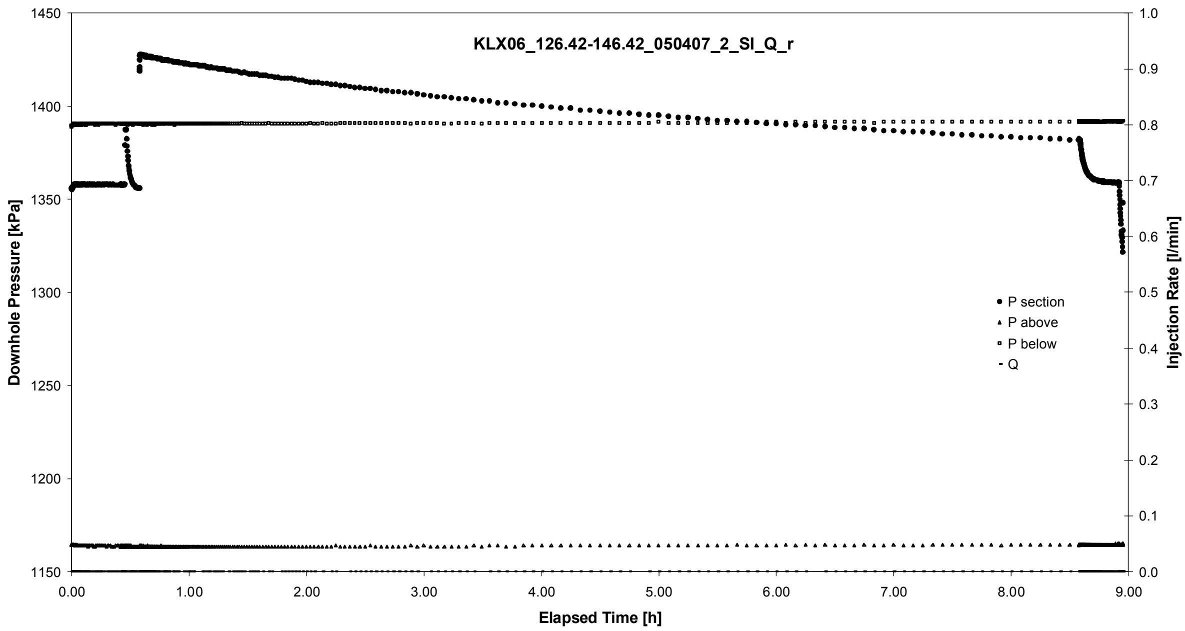
CHI phase; log-log match



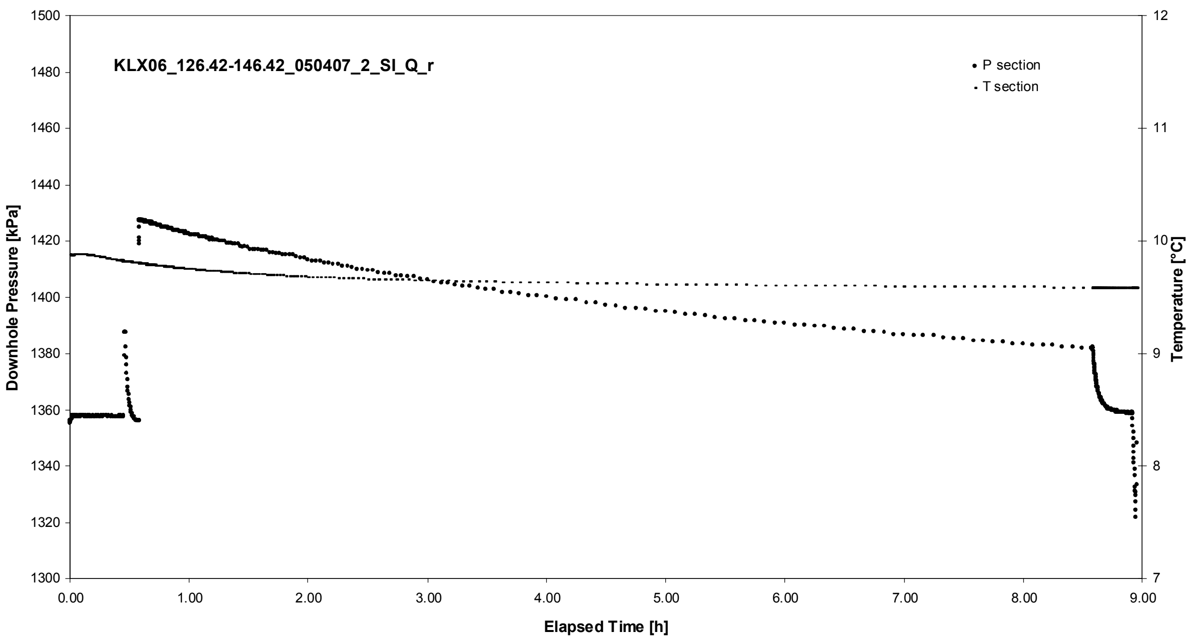
CHIR phase; log-log match



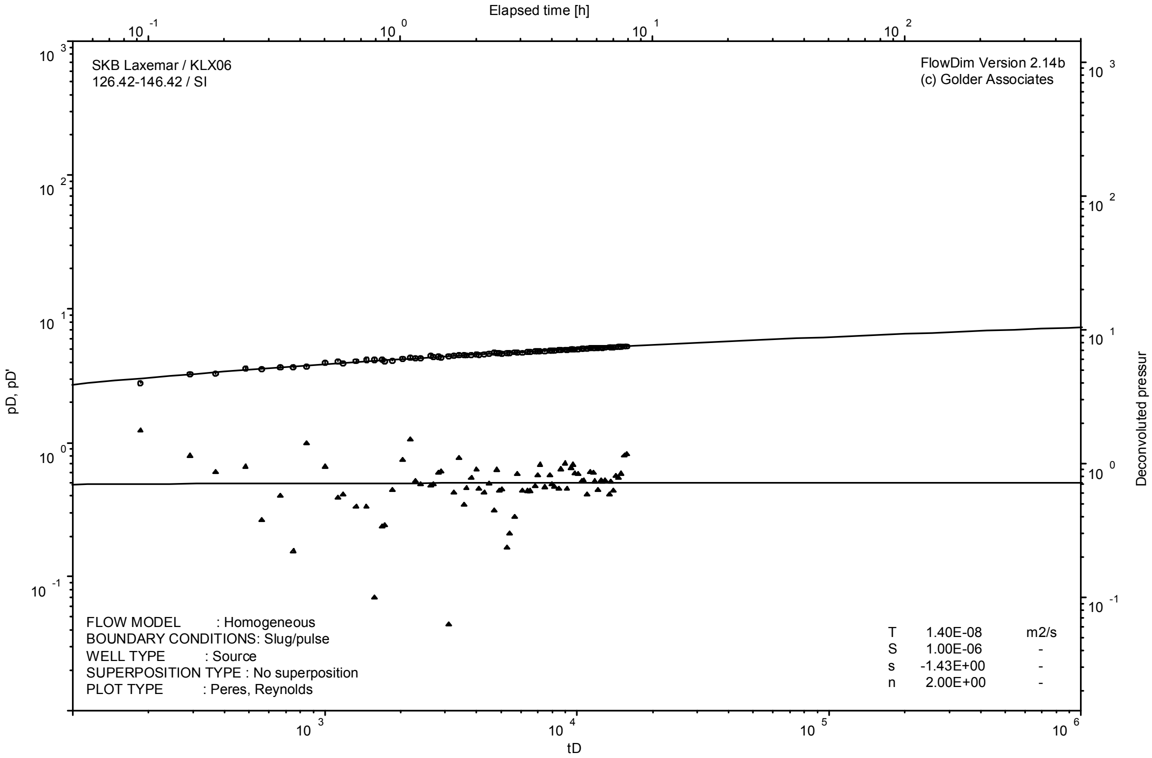
CHIR phase; HORNER match



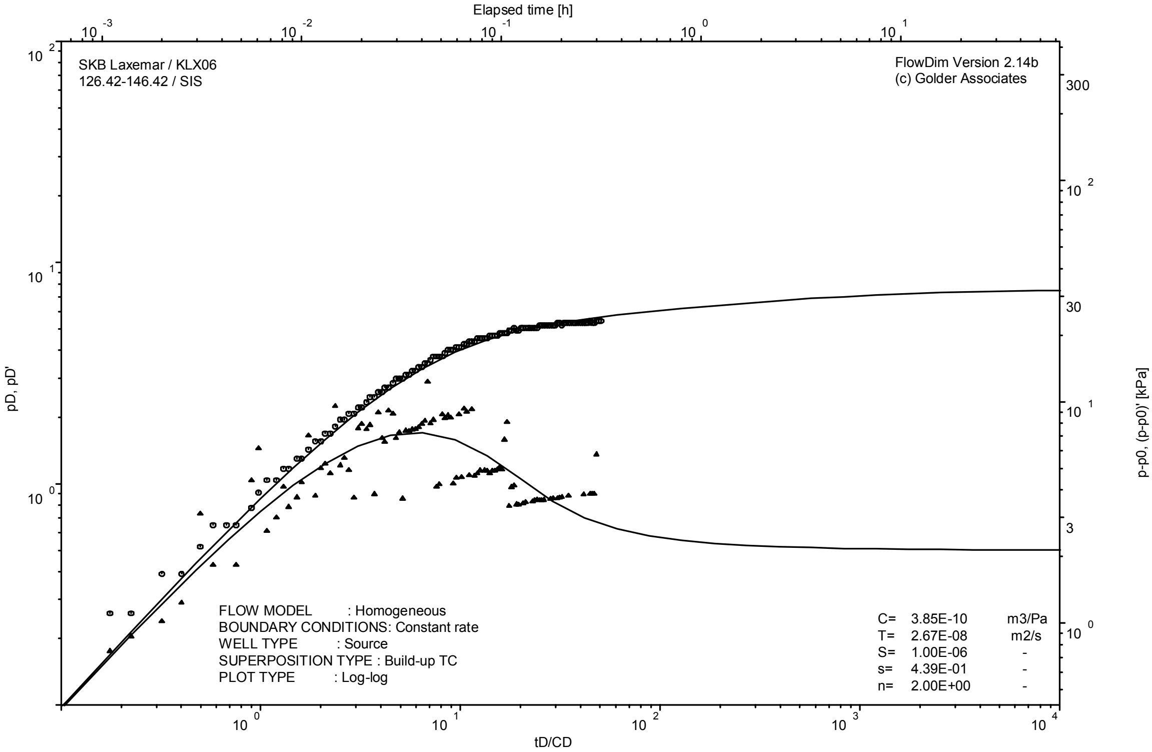
Pressure and flow rate vs. time; cartesian plot, long term measured over night



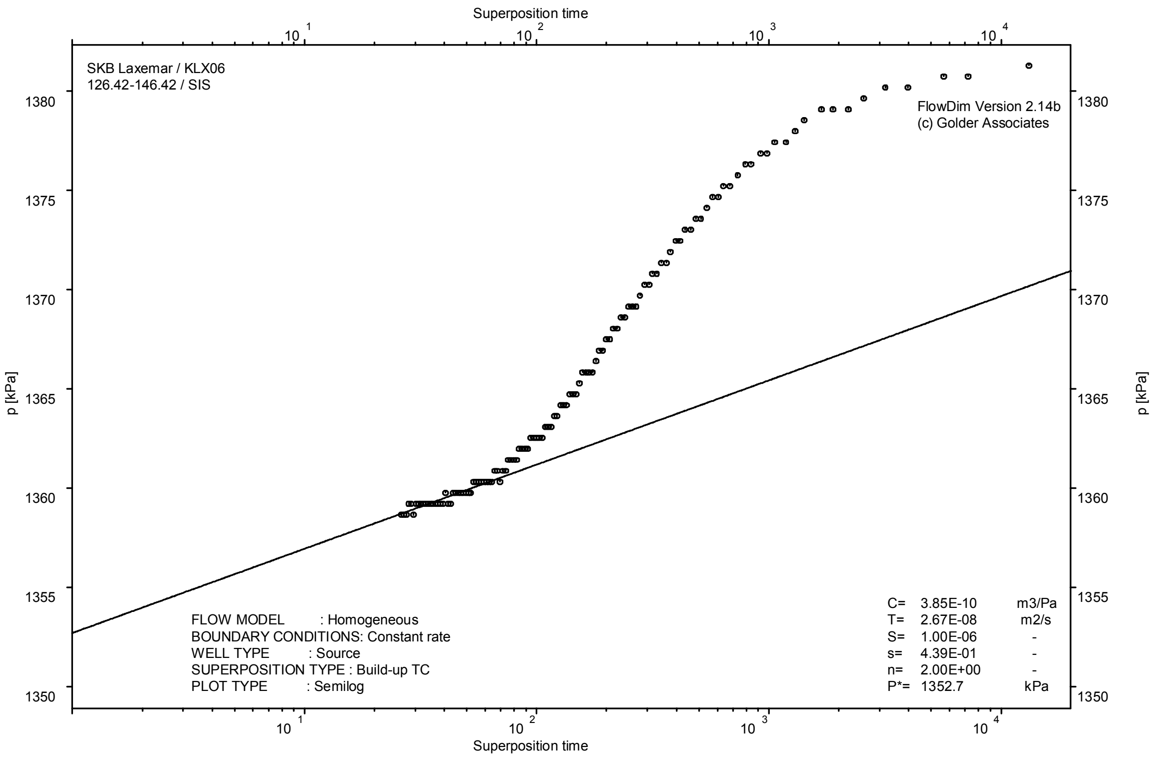
Interval pressure and temperature vs. time; cartesian plot, long term measured over night



SI phase; log-log match, long term measured over night



SIS phase; log-log match, long term measured over night

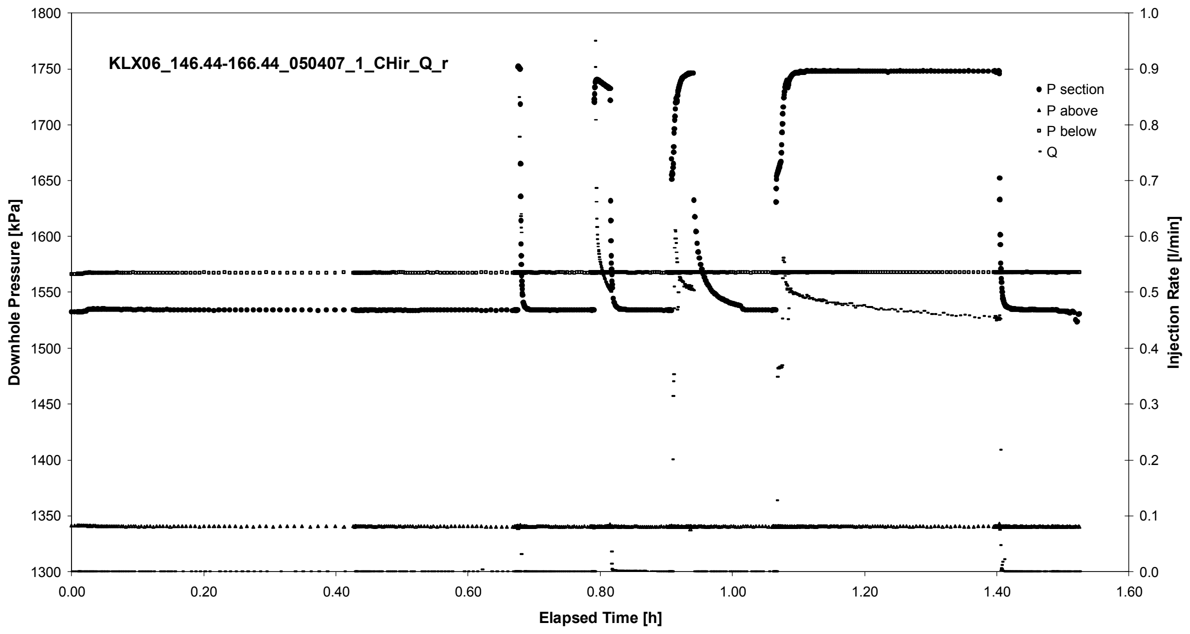


SIS phase; HORNER match, long term measured over night

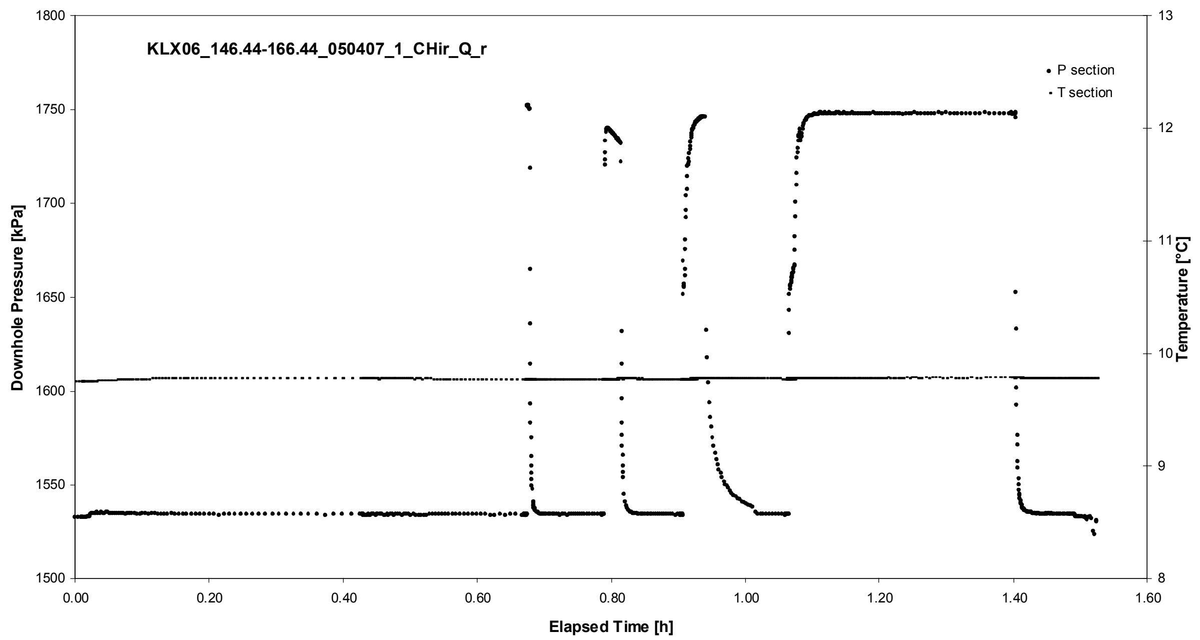
APPENDIX 2-12

Test 146.44 – 166.44 m

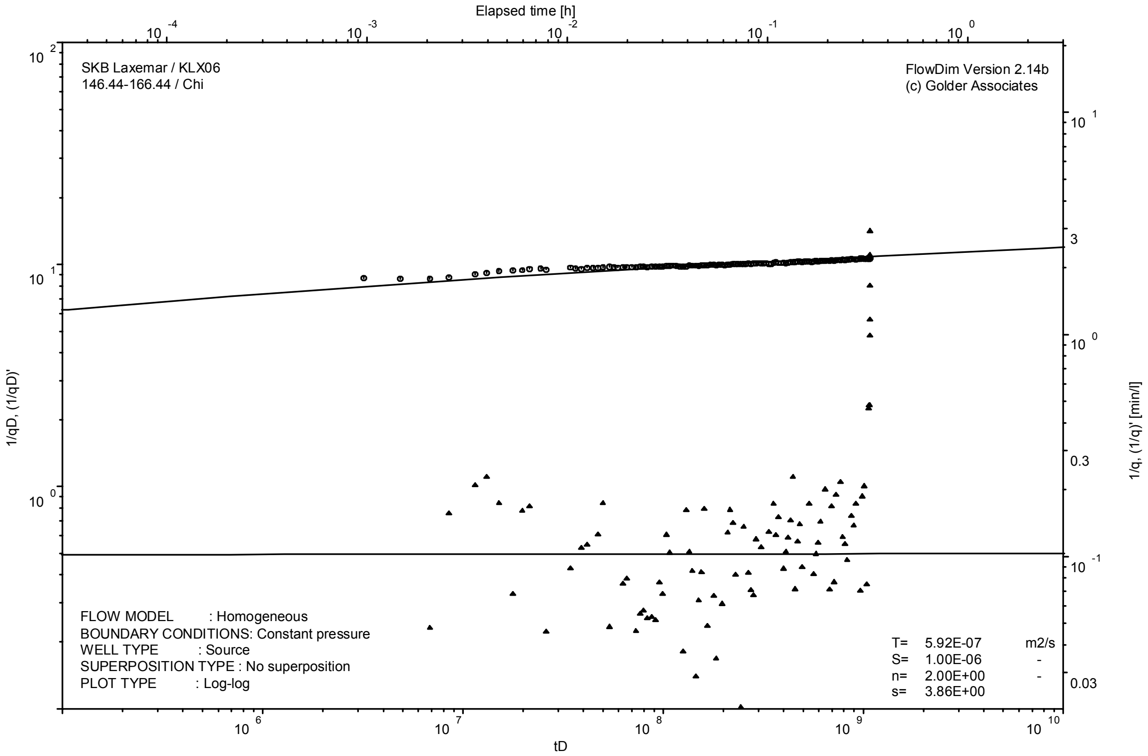
Analysis diagrams



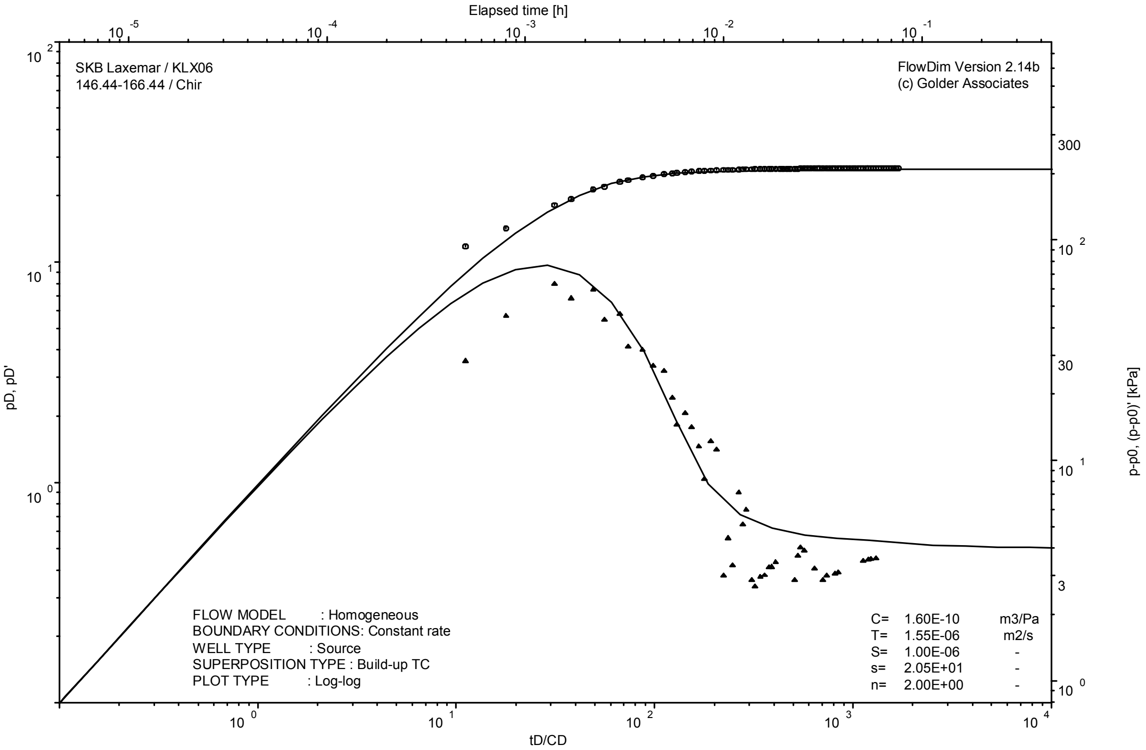
Pressure and flow rate vs. time; cartesian plot



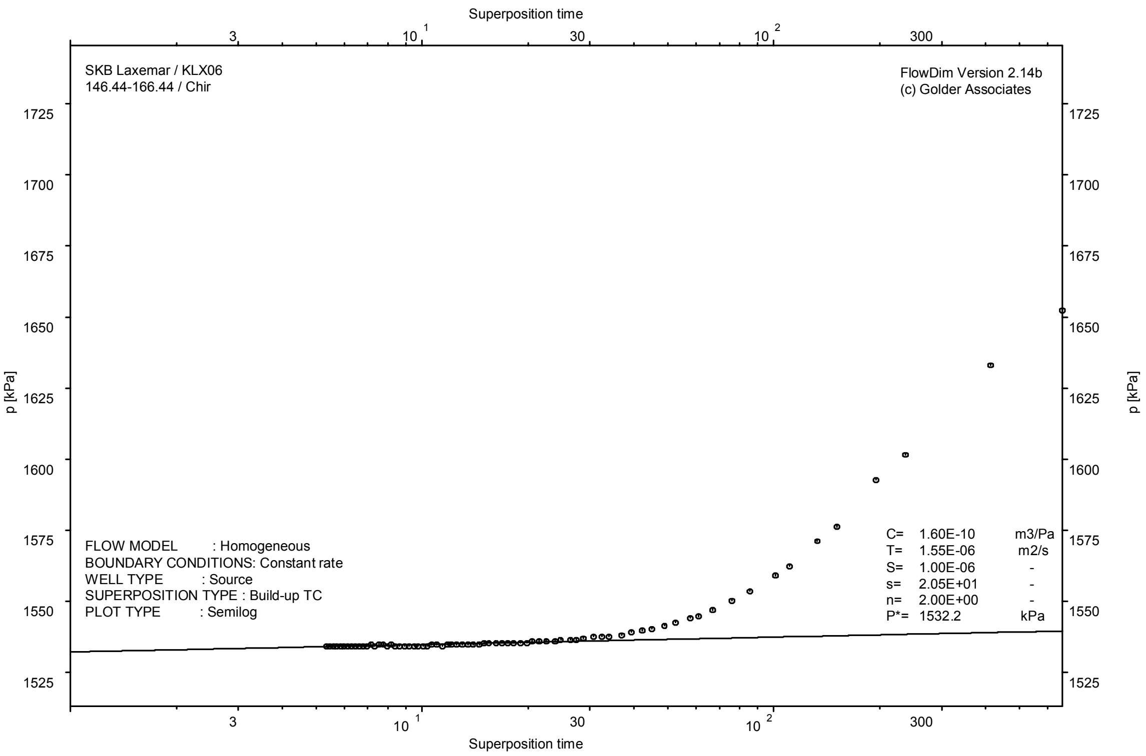
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

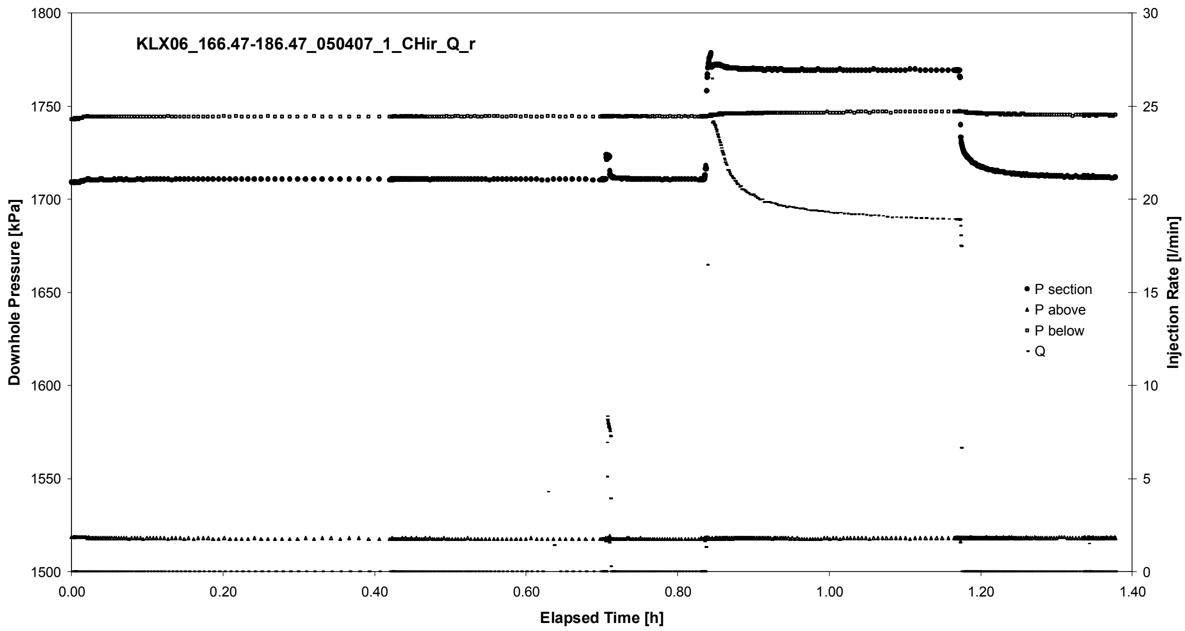


CHIR phase; HORNER match

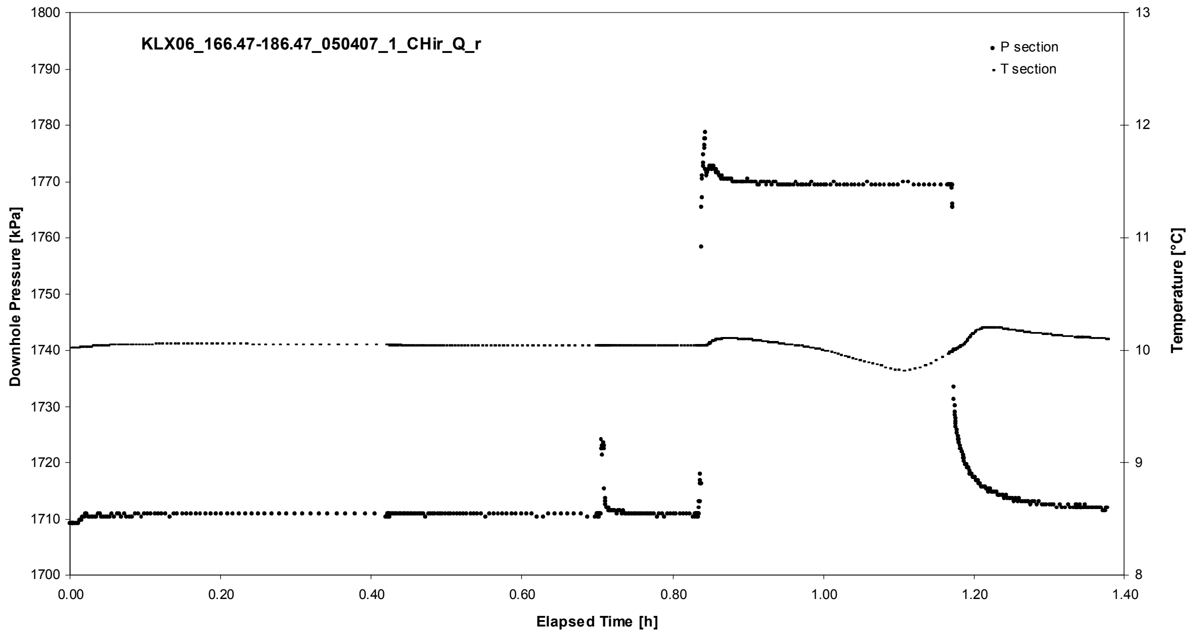
APPENDIX 2-13

Test 166.47 – 186.47 m

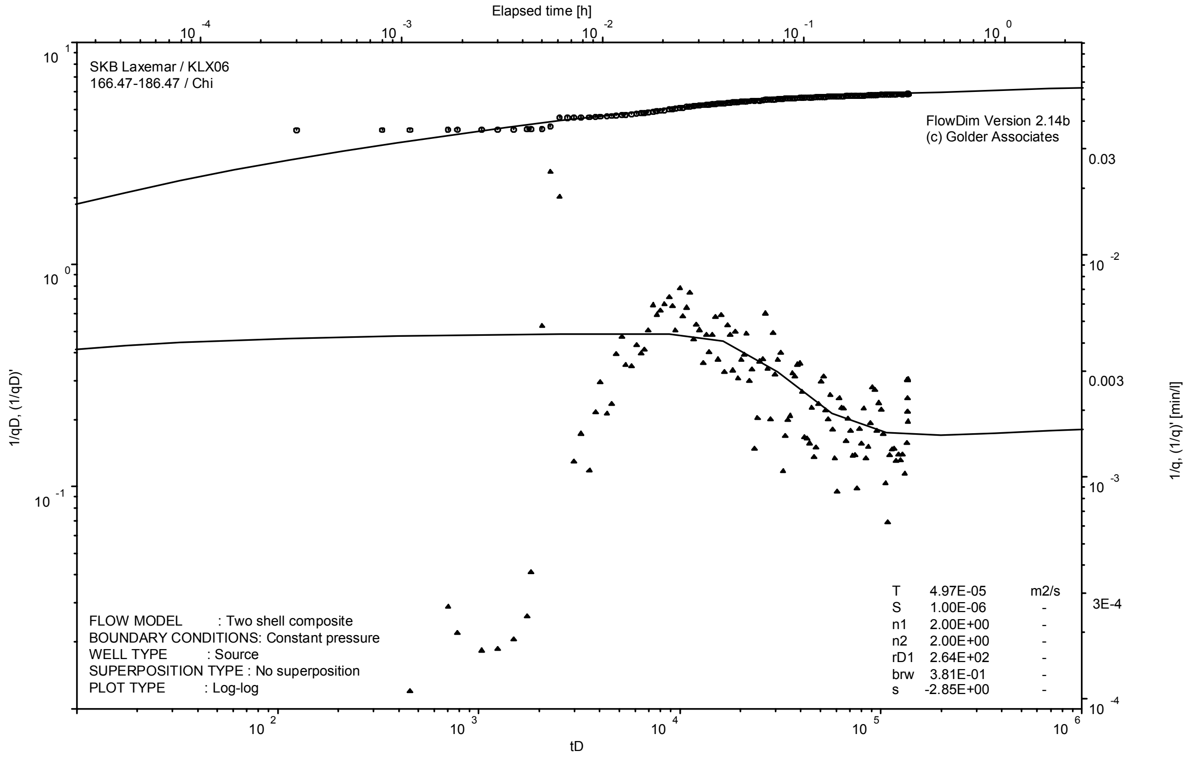
Analysis diagrams



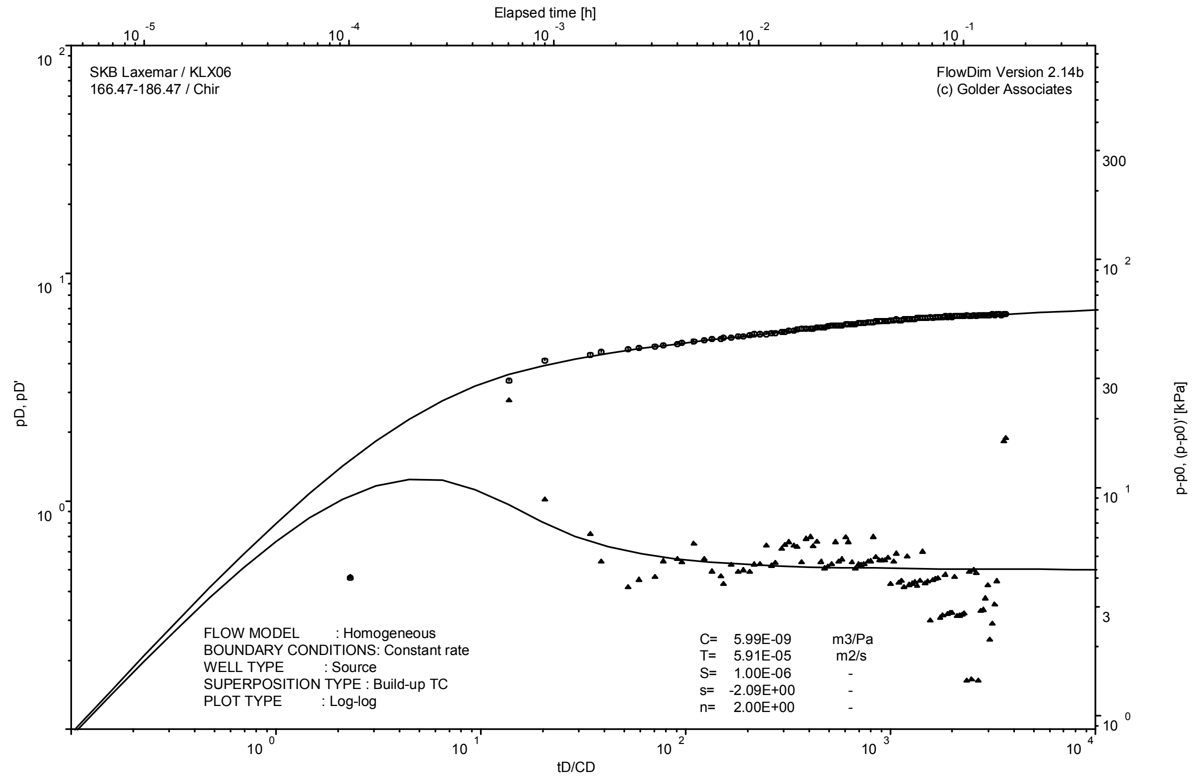
Pressure and flow rate vs. time; cartesian plot



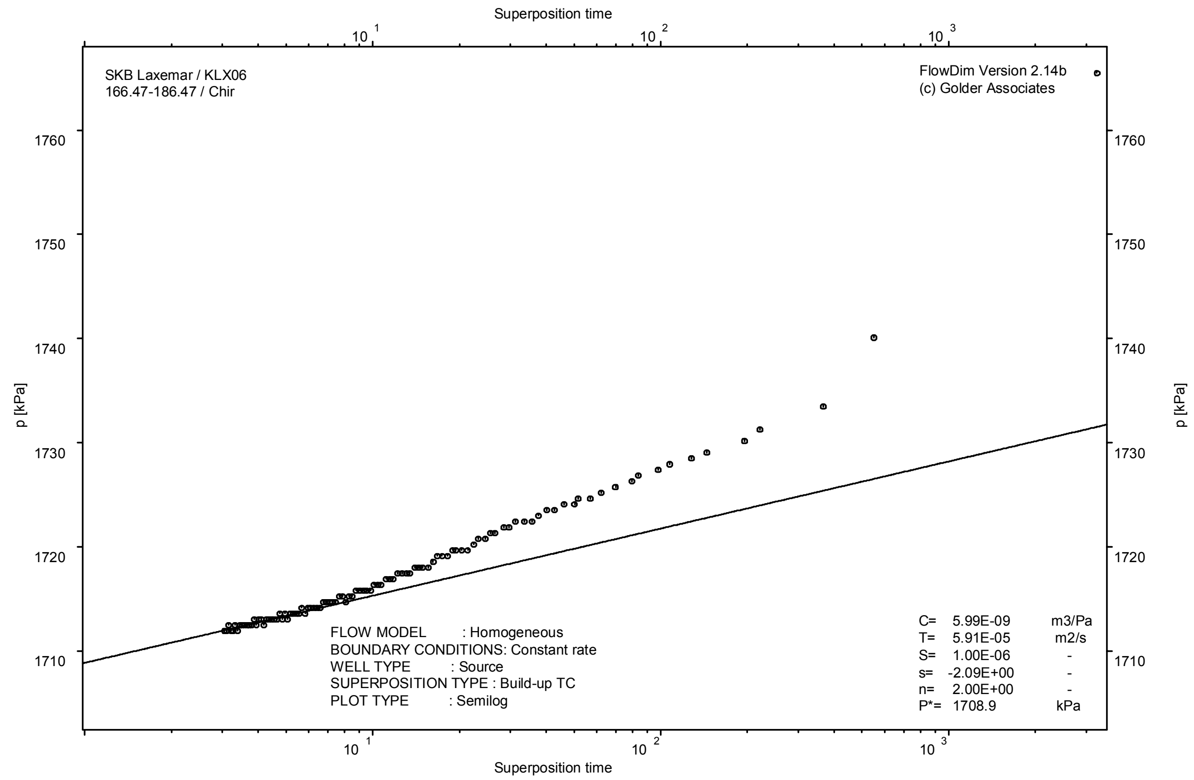
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

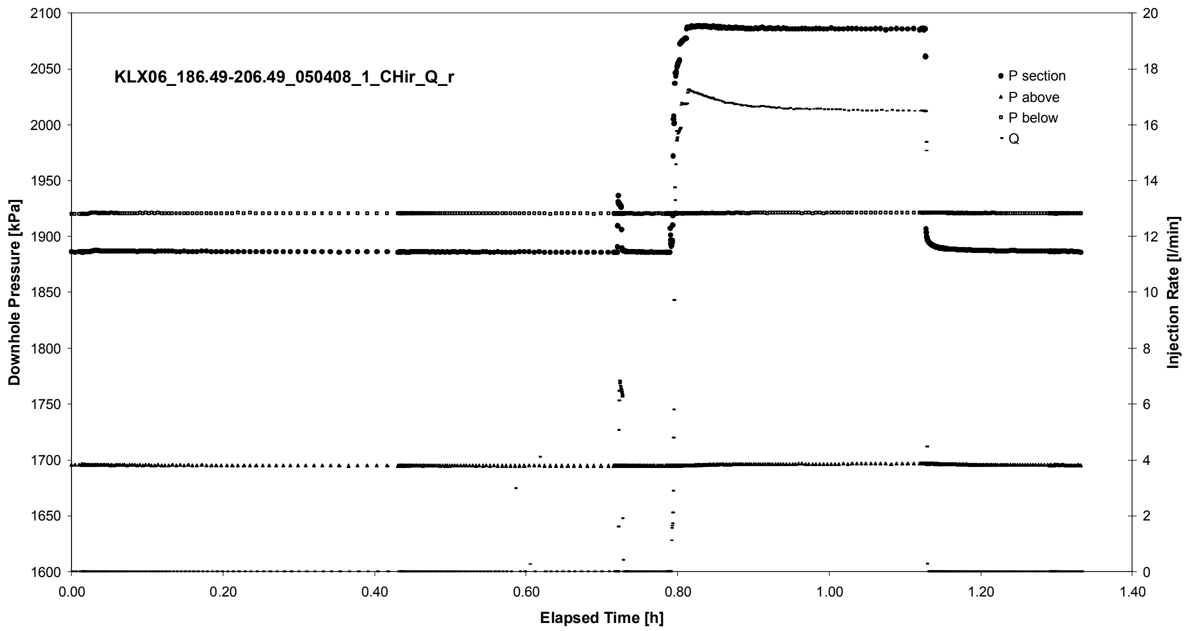


CHIR phase; HORNER match

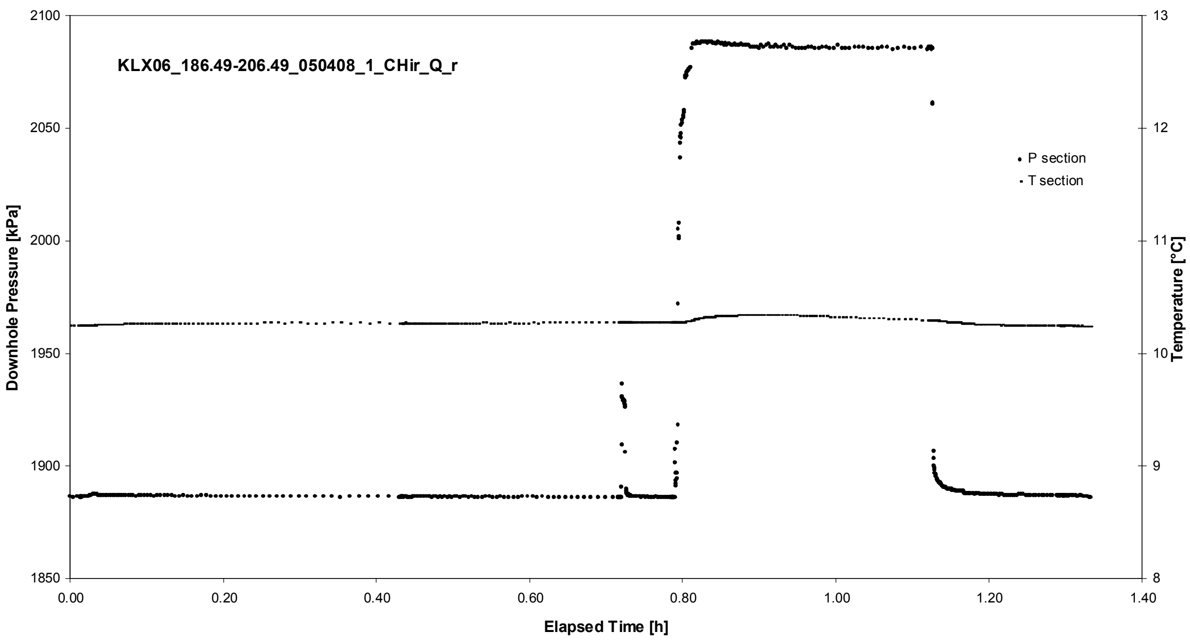
APPENDIX 2-14

Test 186.49 – 206.49 m

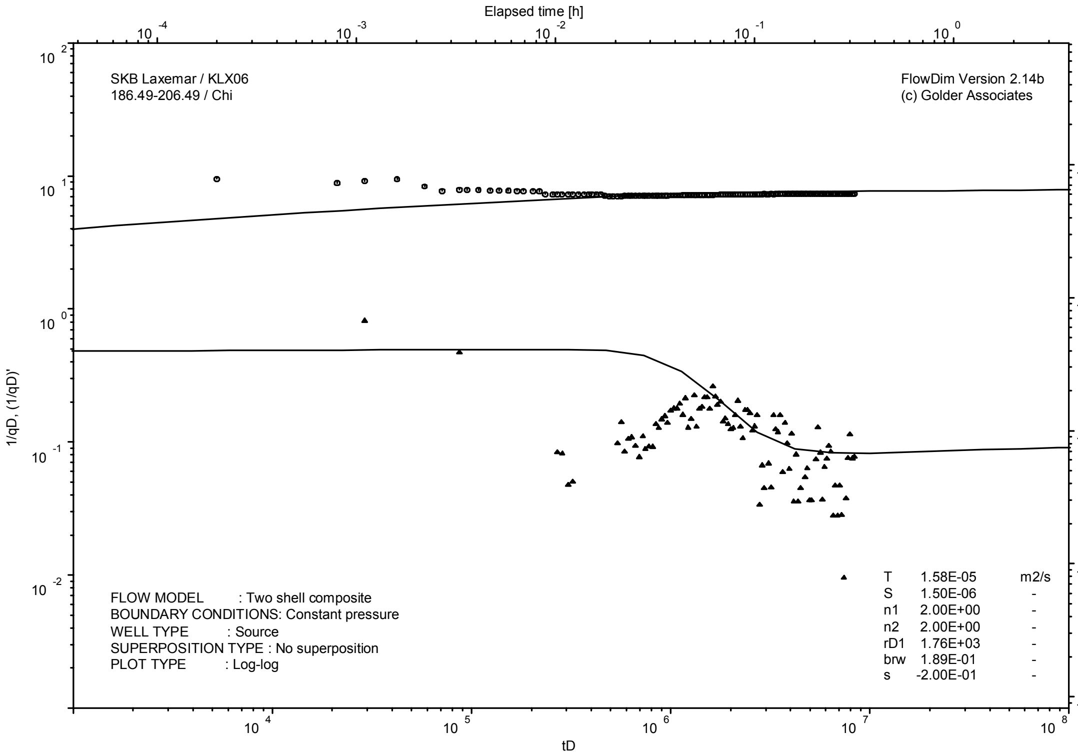
Analysis diagrams



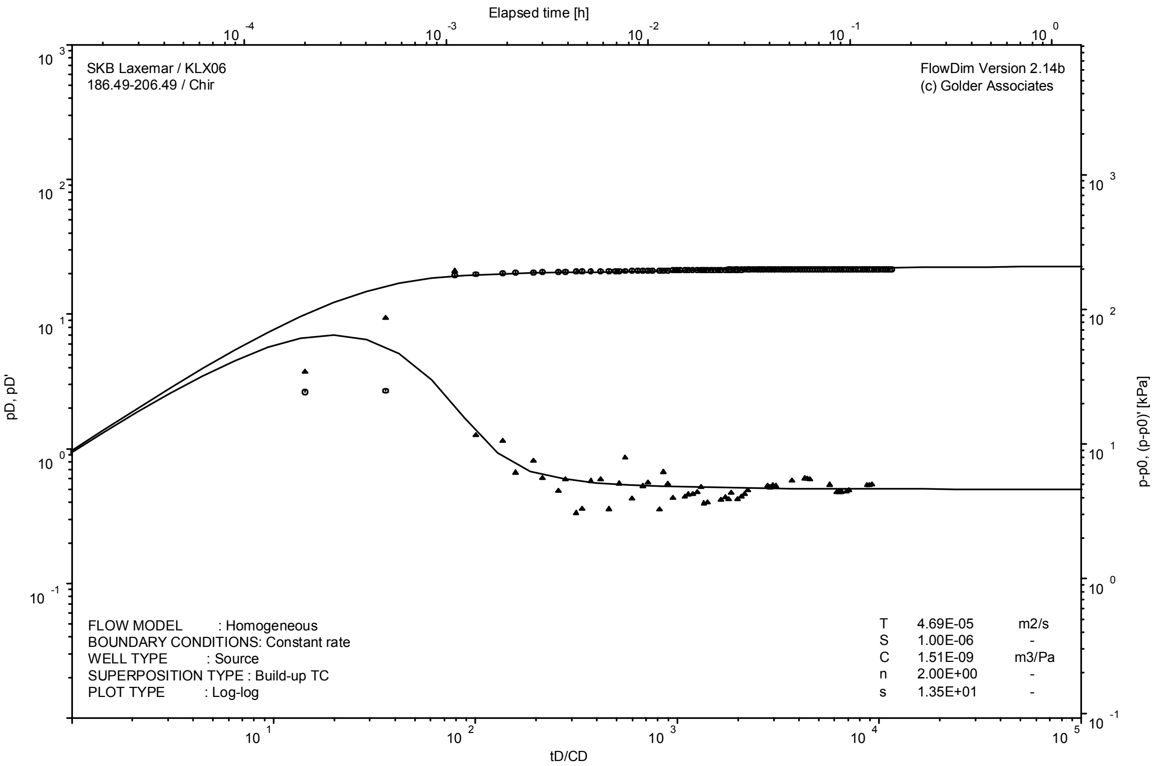
Pressure and flow rate vs. time; cartesian plot



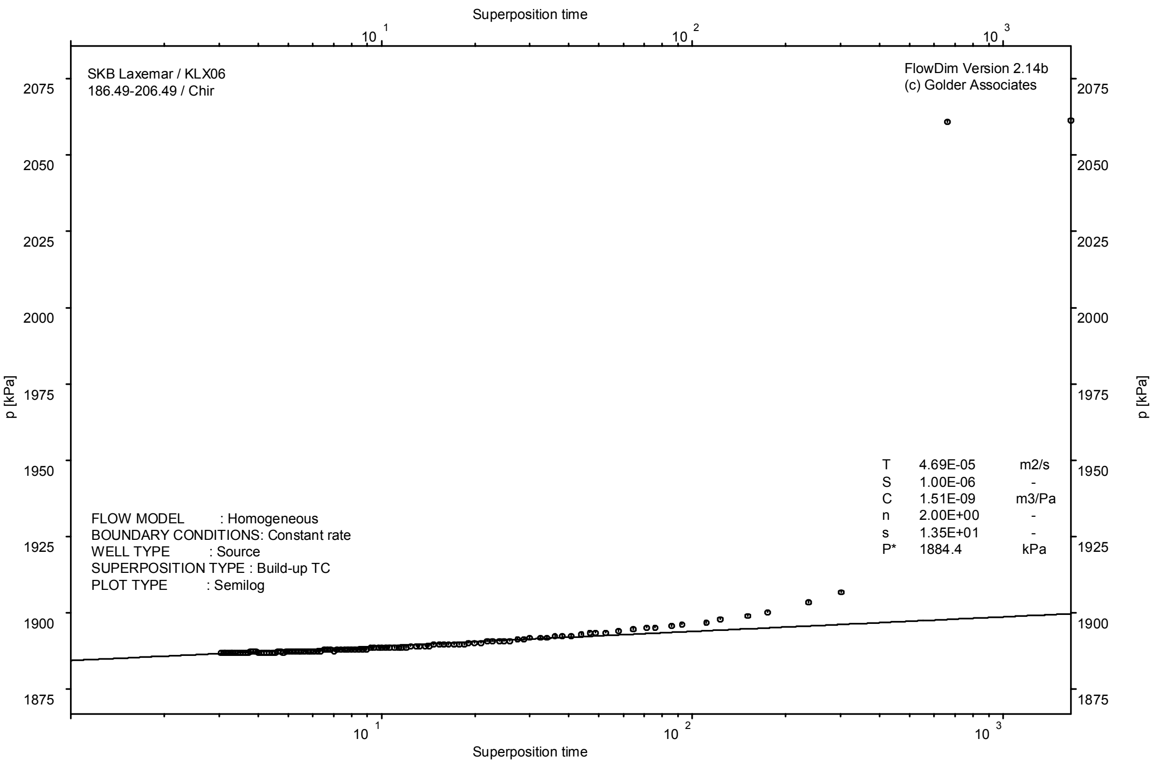
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

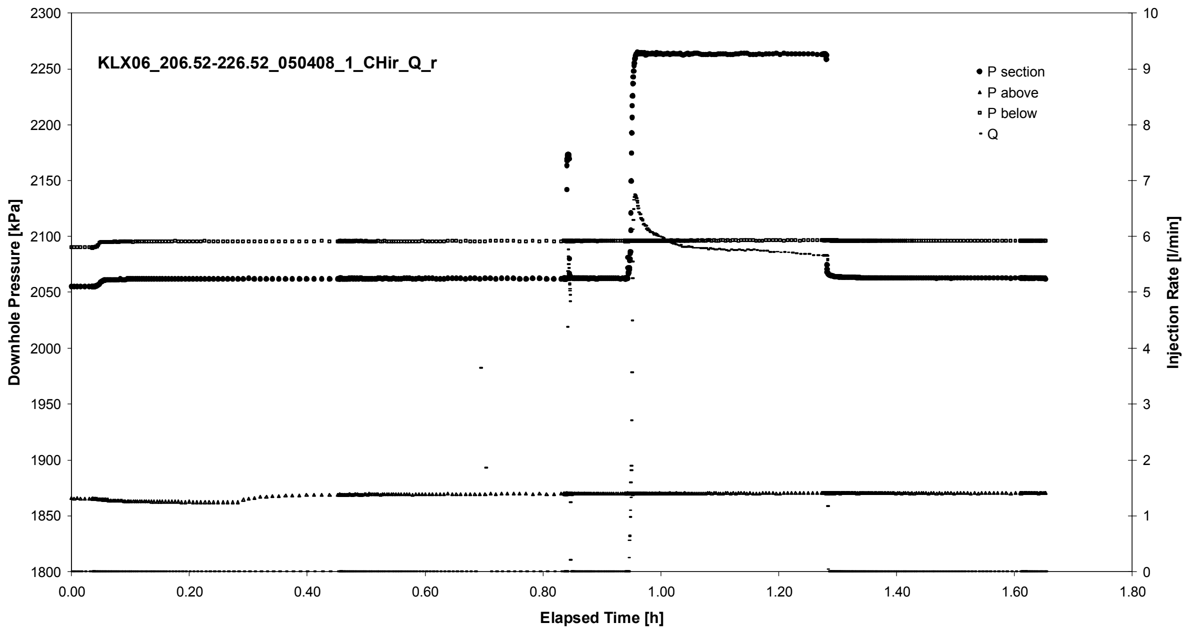


CHIR phase; HORNER match

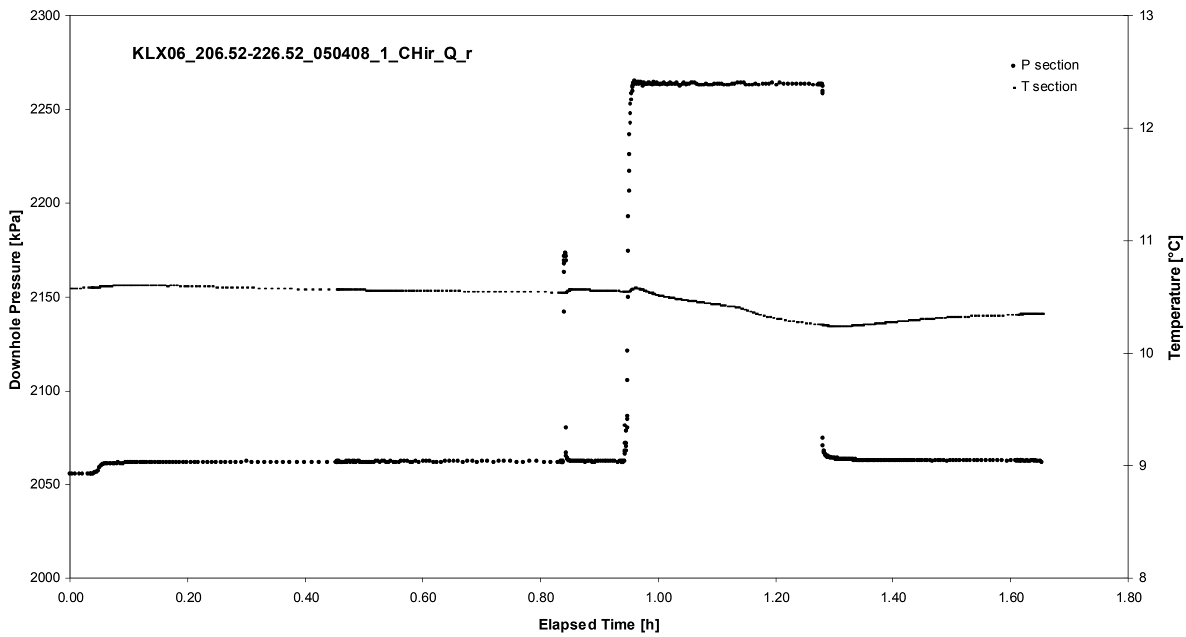
APPENDIX 2-15

Test 206.52 – 226.52 m

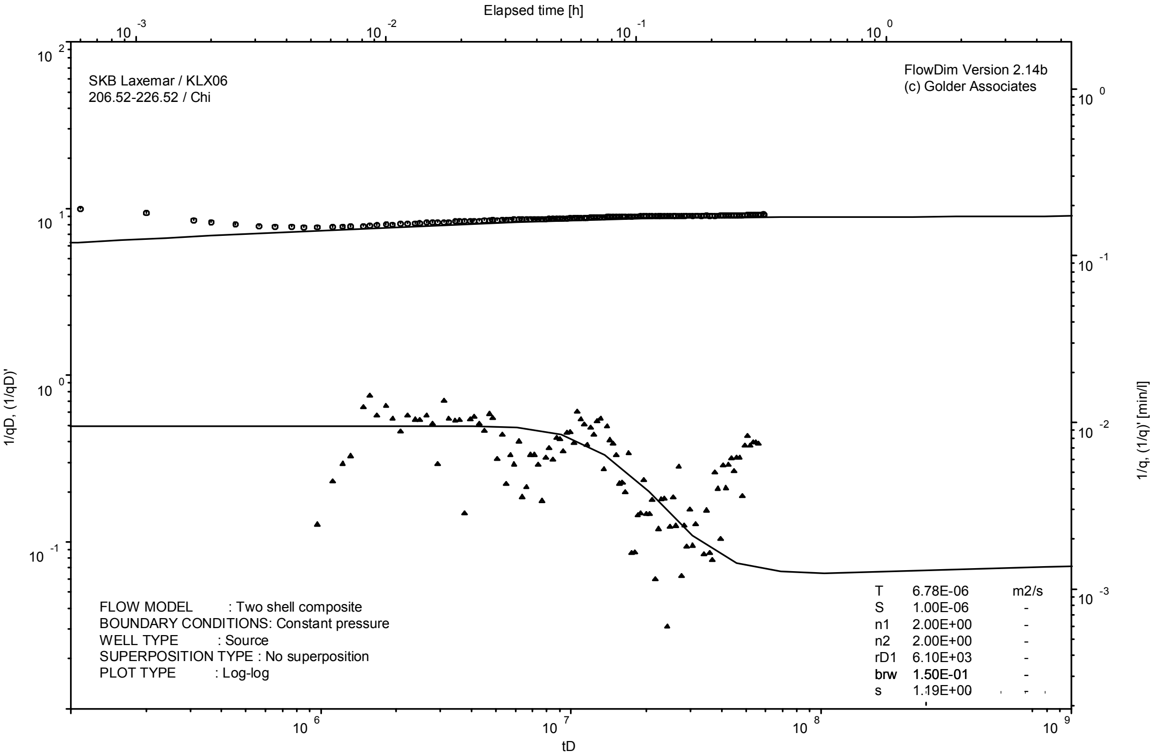
Analysis diagrams



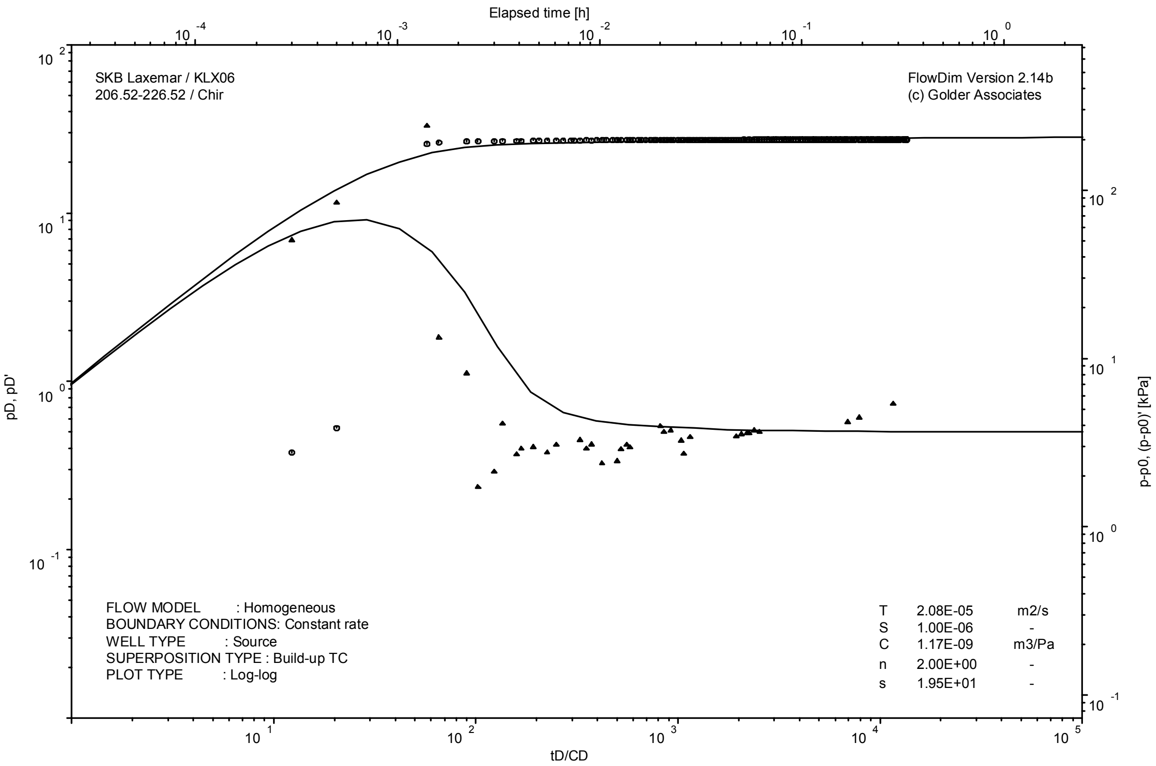
Pressure and flow rate vs. time; cartesian plot



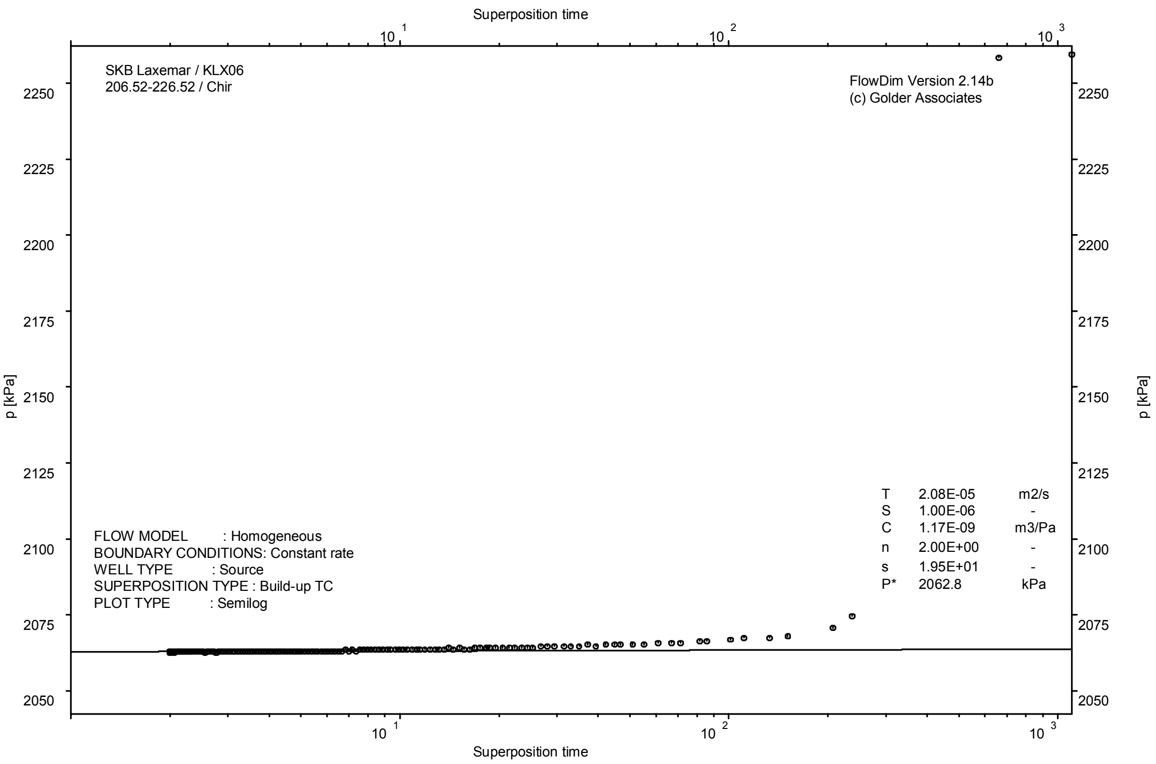
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

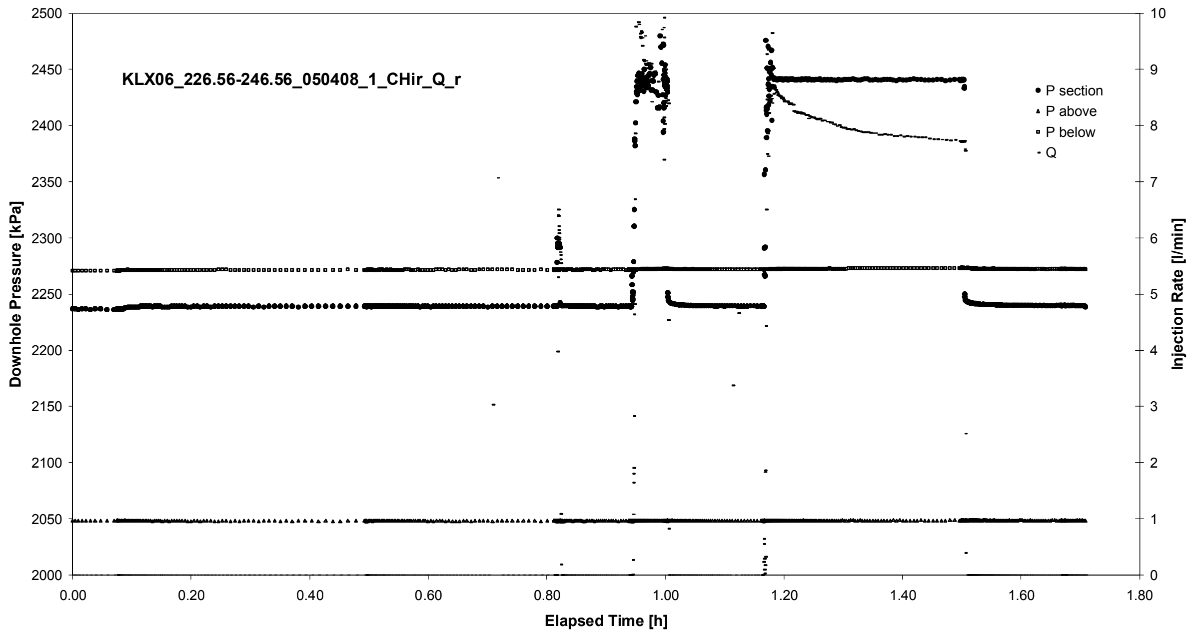


CHIR phase; HORNER match

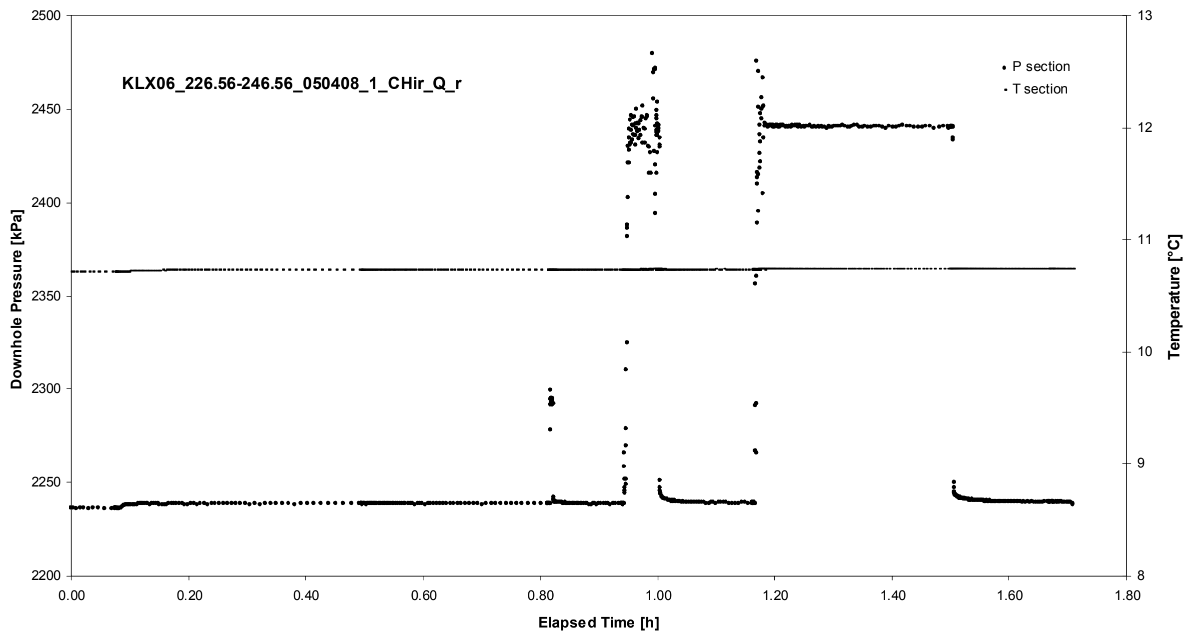
APPENDIX 2-16

Test 226.56 – 246.56 m

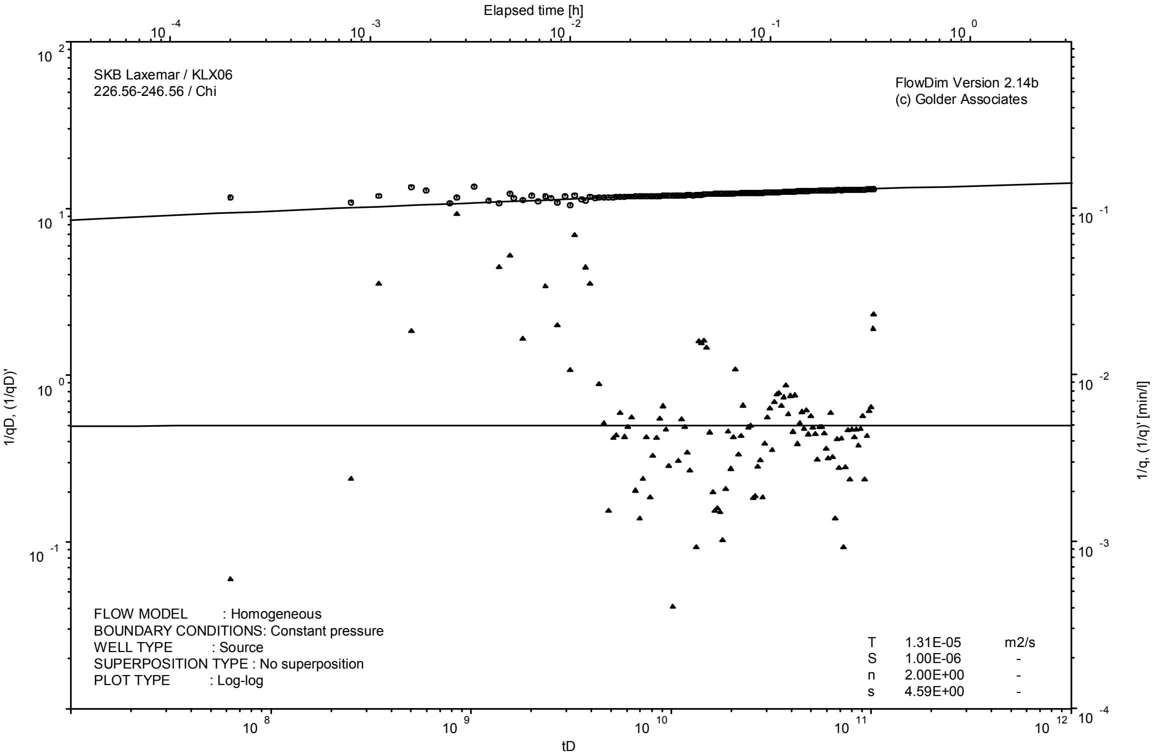
Analysis diagrams



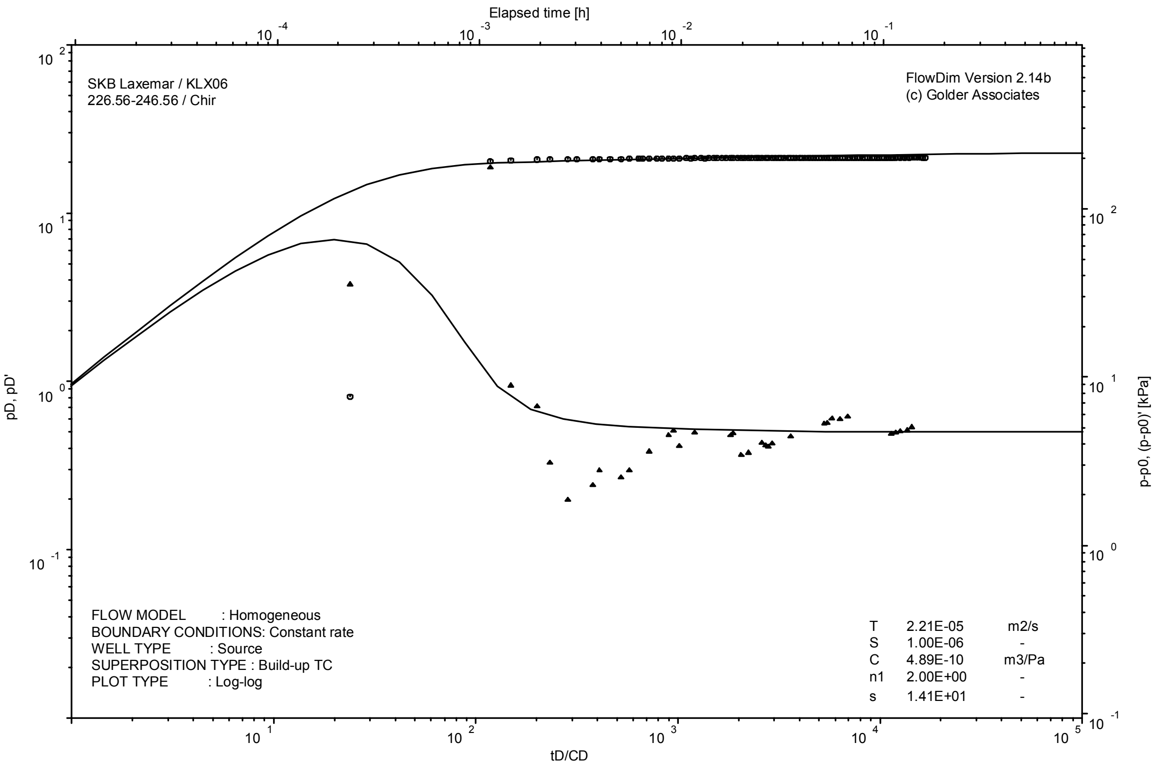
Pressure and flow rate vs. time; cartesian plot



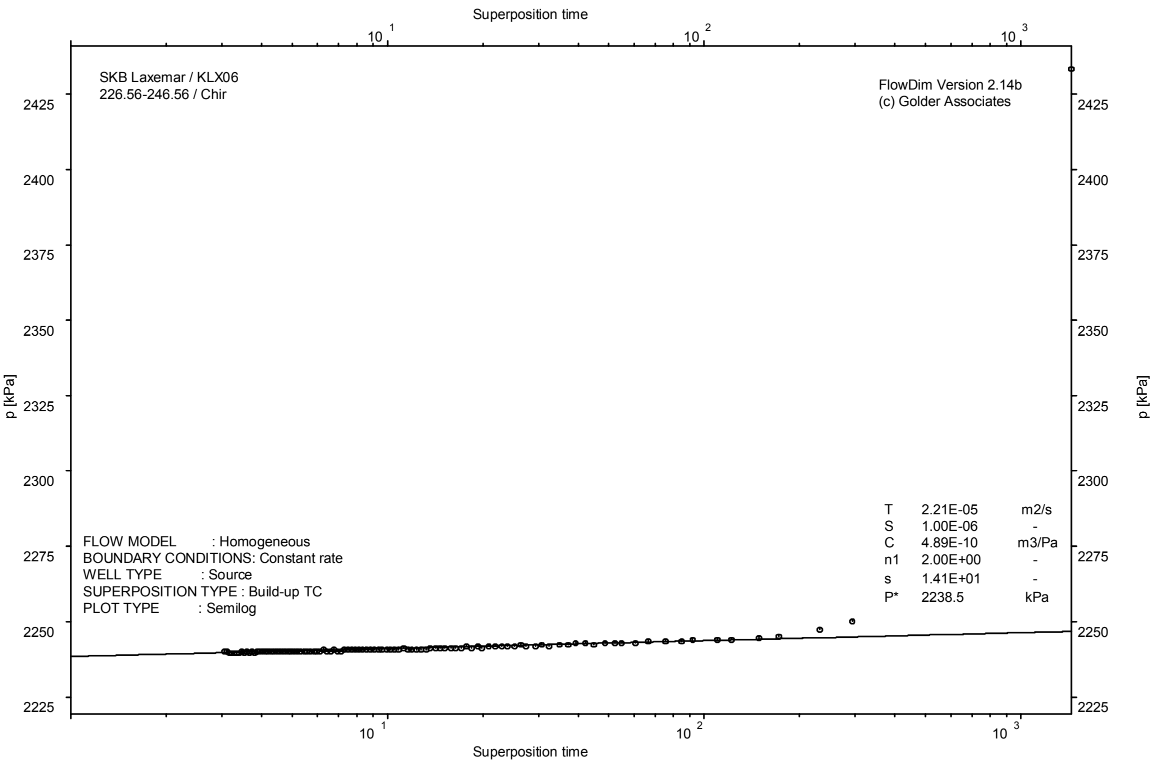
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

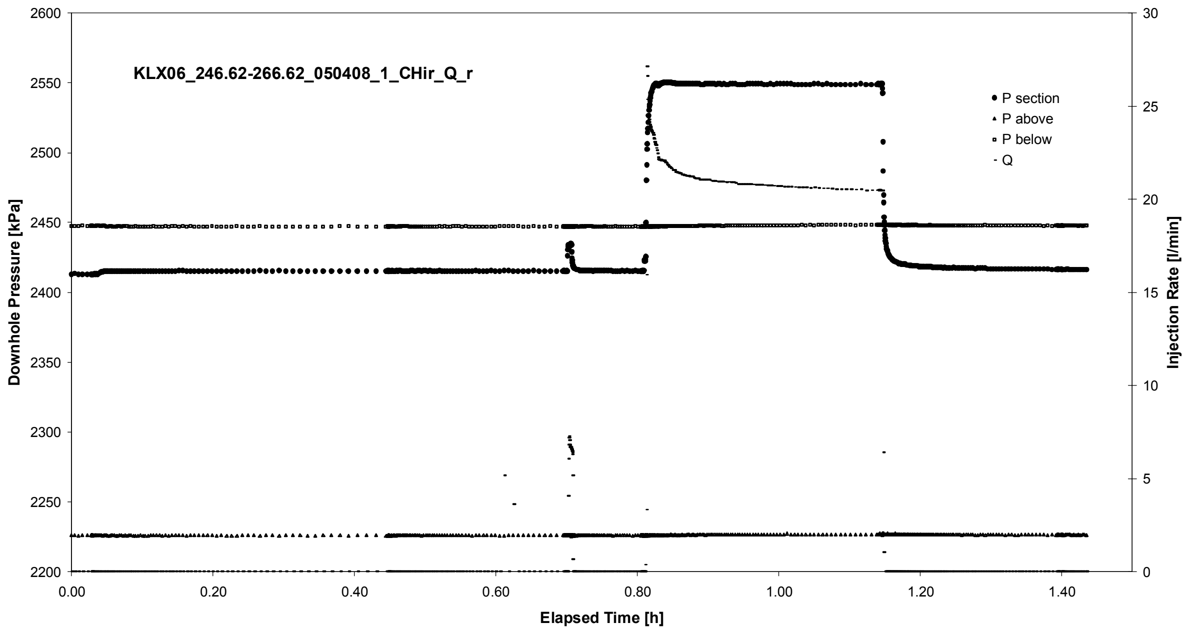


CHIR phase; HORNER match

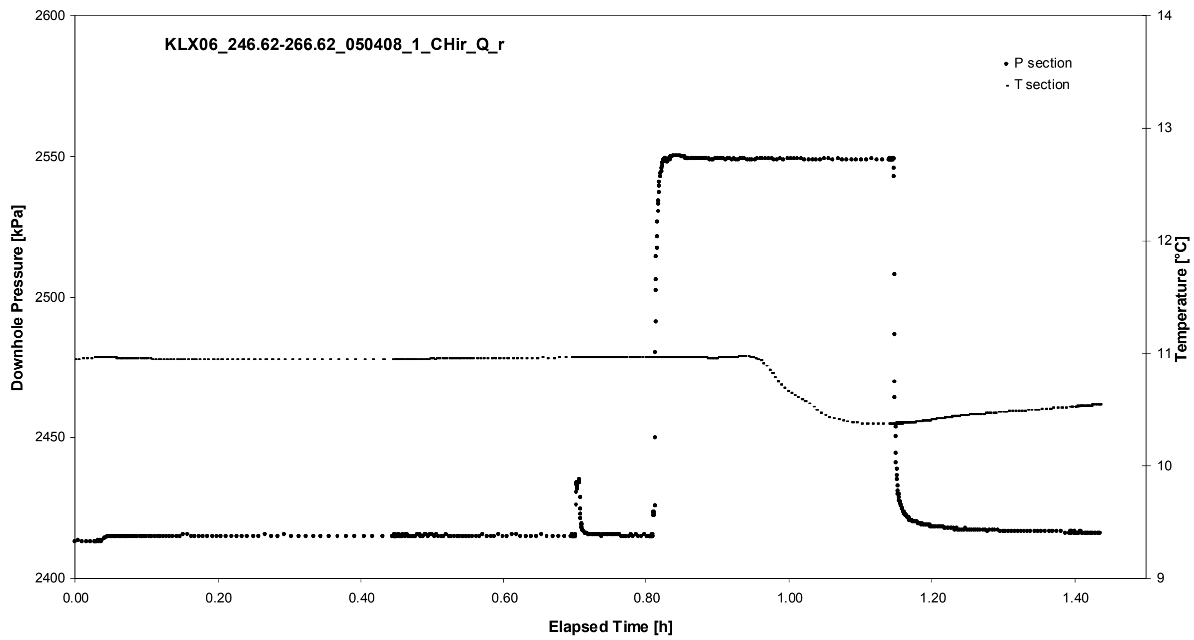
APPENDIX 2-17

Test 246.62 – 266.62 m

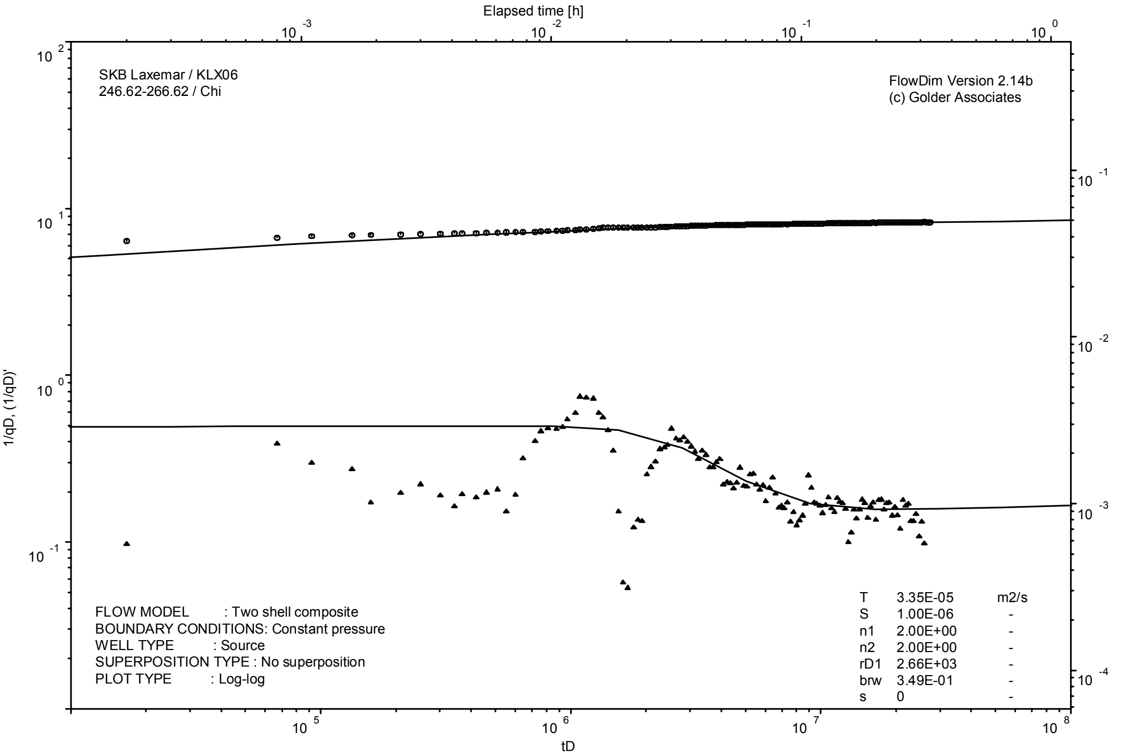
Analysis diagrams



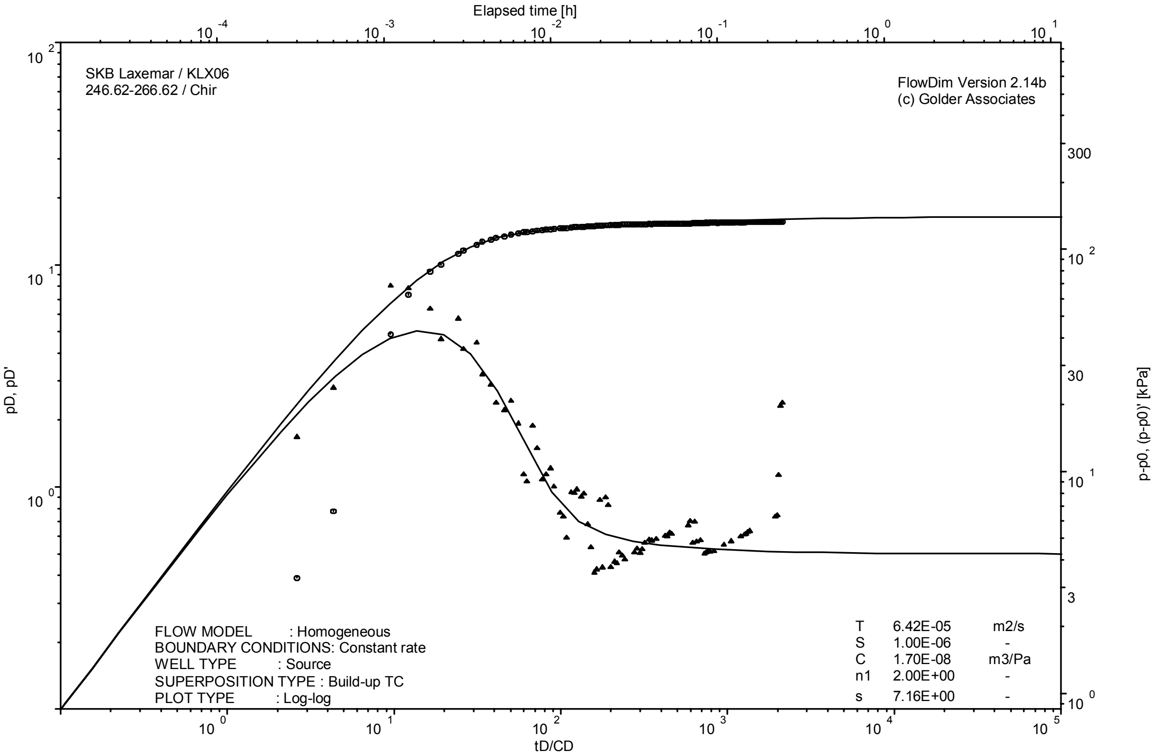
Pressure and flow rate vs. time; cartesian plot



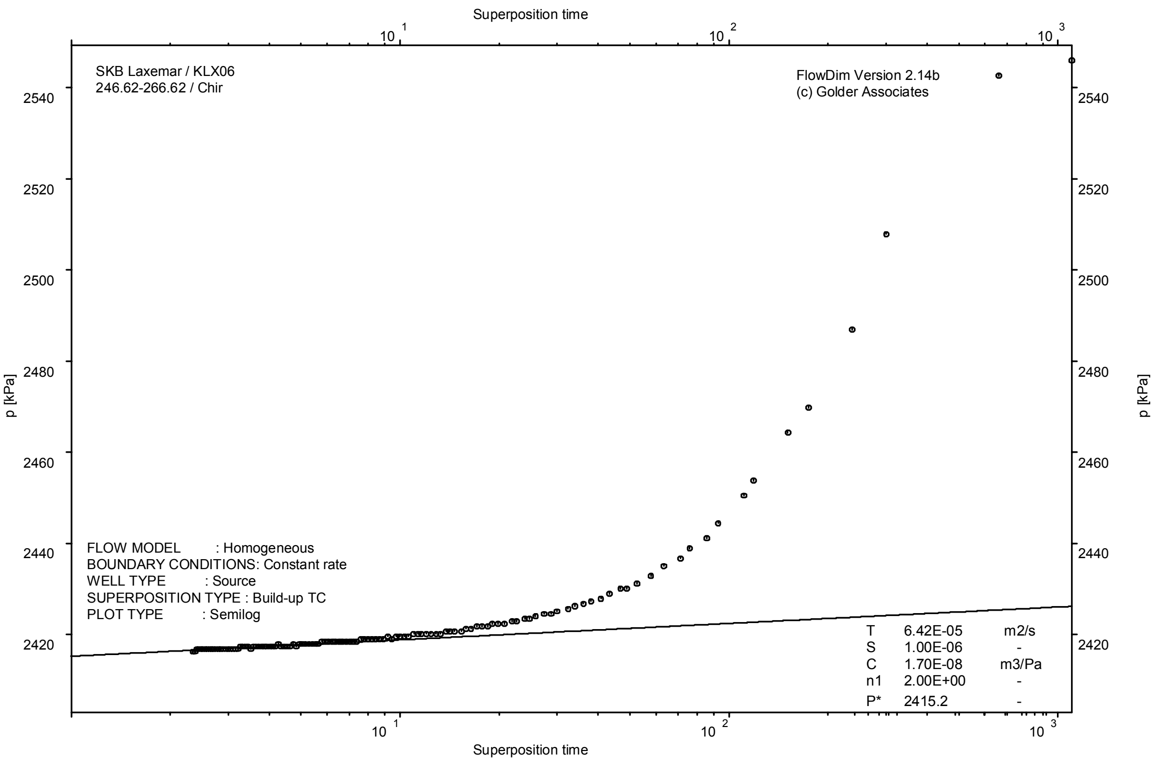
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

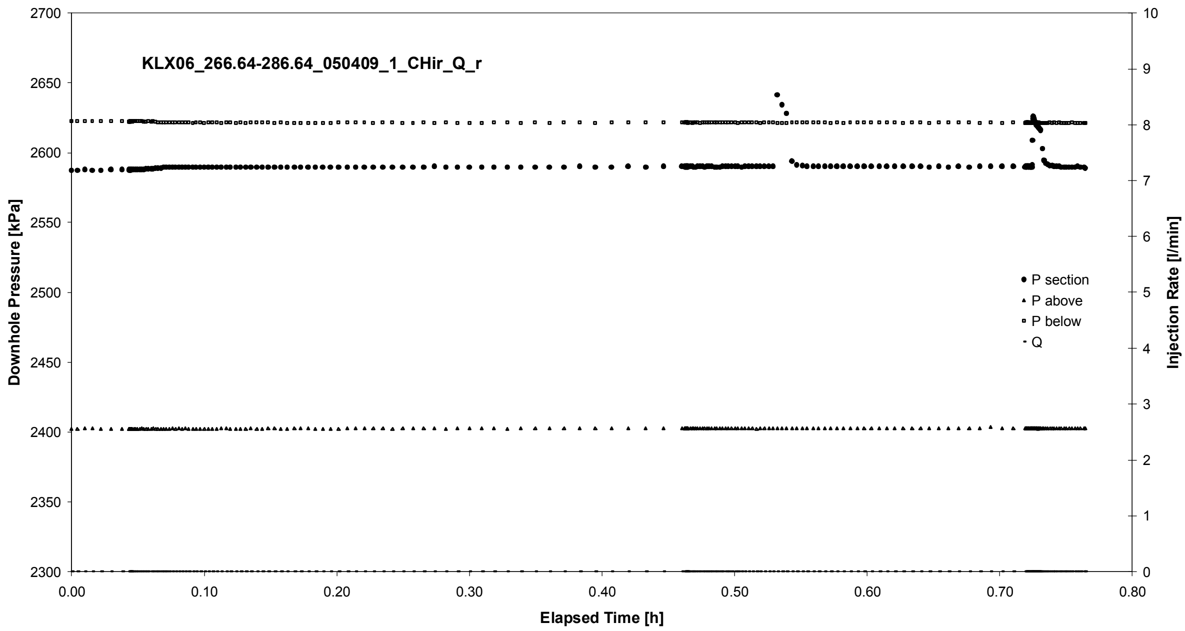


CHIR phase; HORNER match

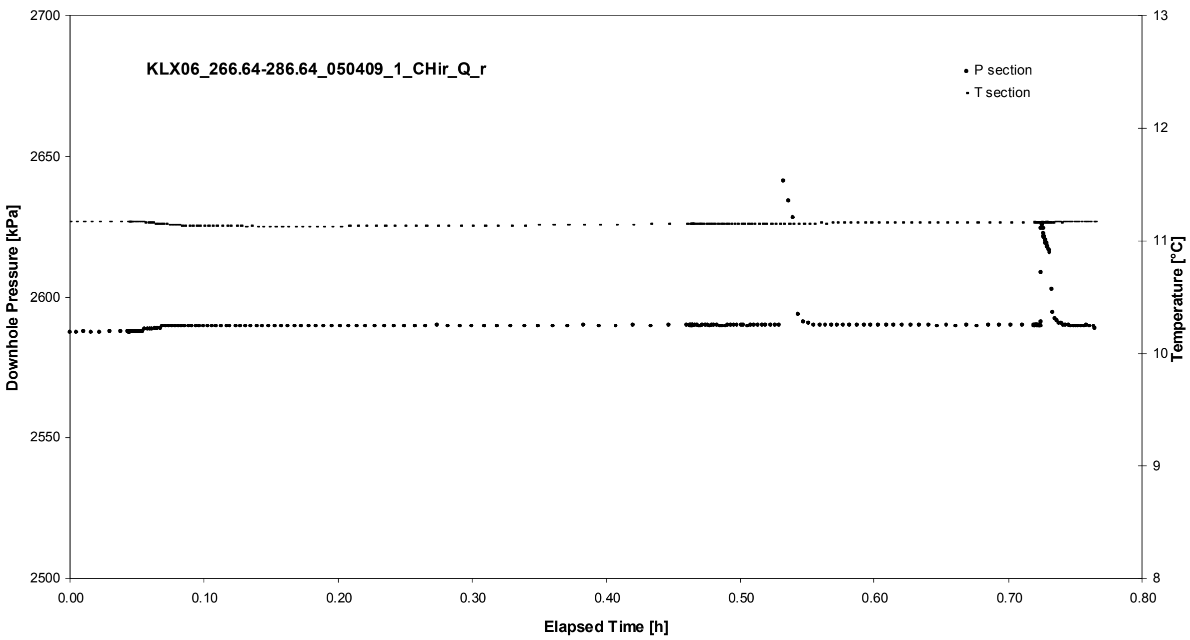
APPENDIX 2-18

Test 266.64 – 286.64 m

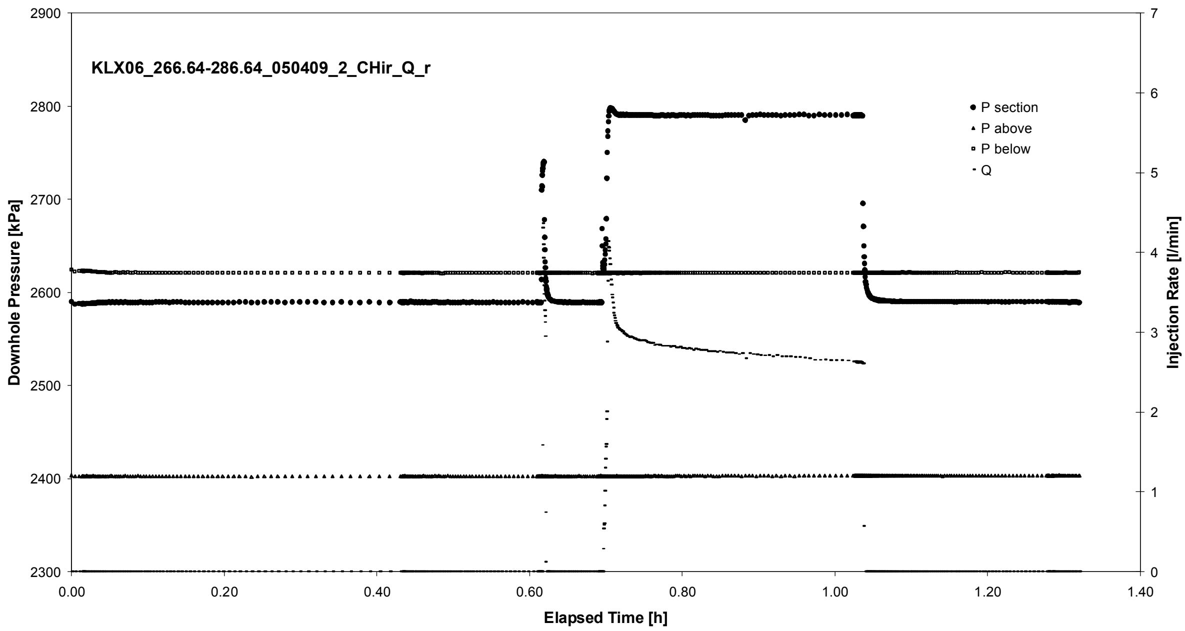
Analysis diagrams



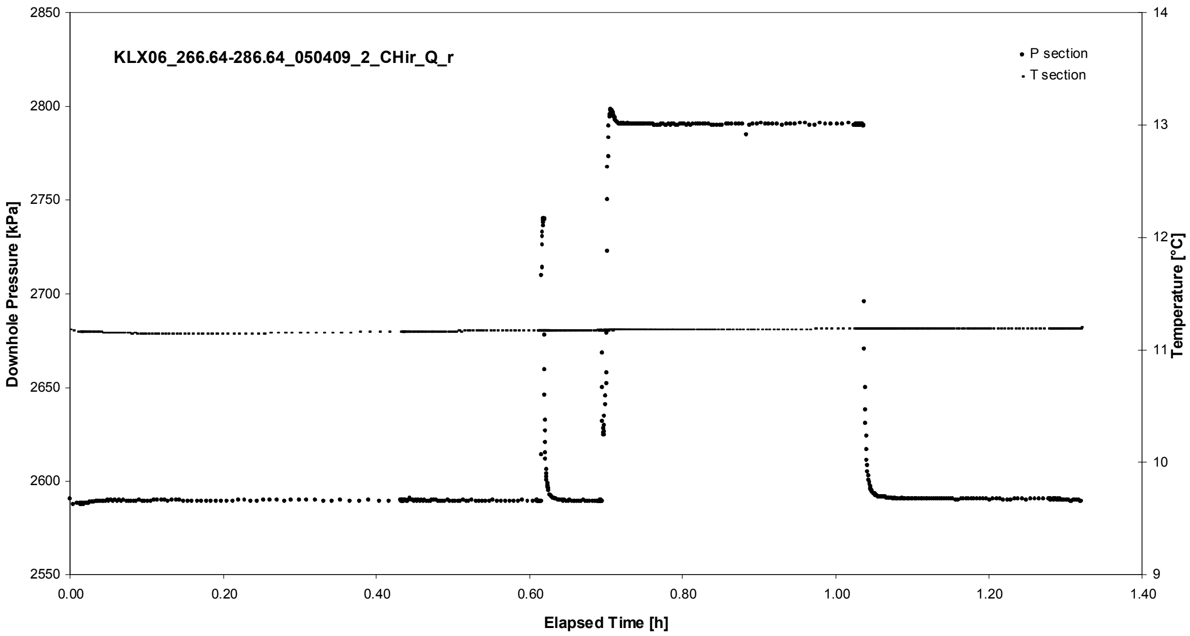
Pressure and flow rate vs. time; cartesian plot (test repeated)



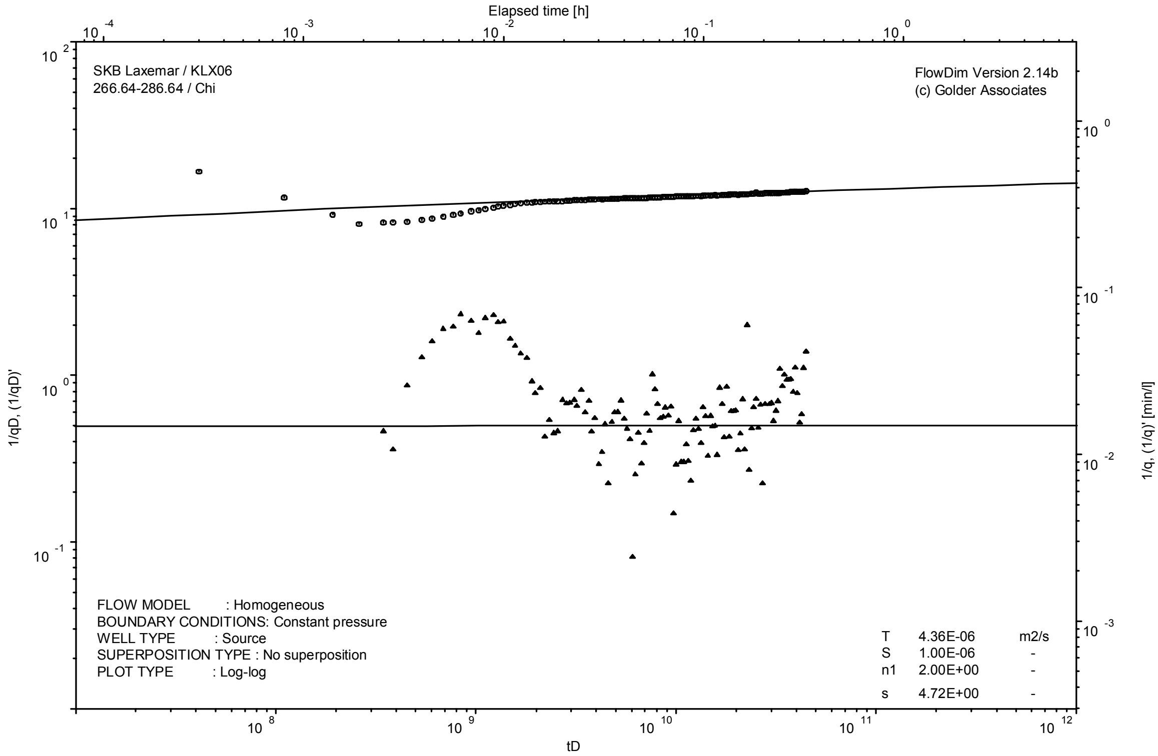
Interval pressure and temperature vs. time; cartesian plot (test repeated)



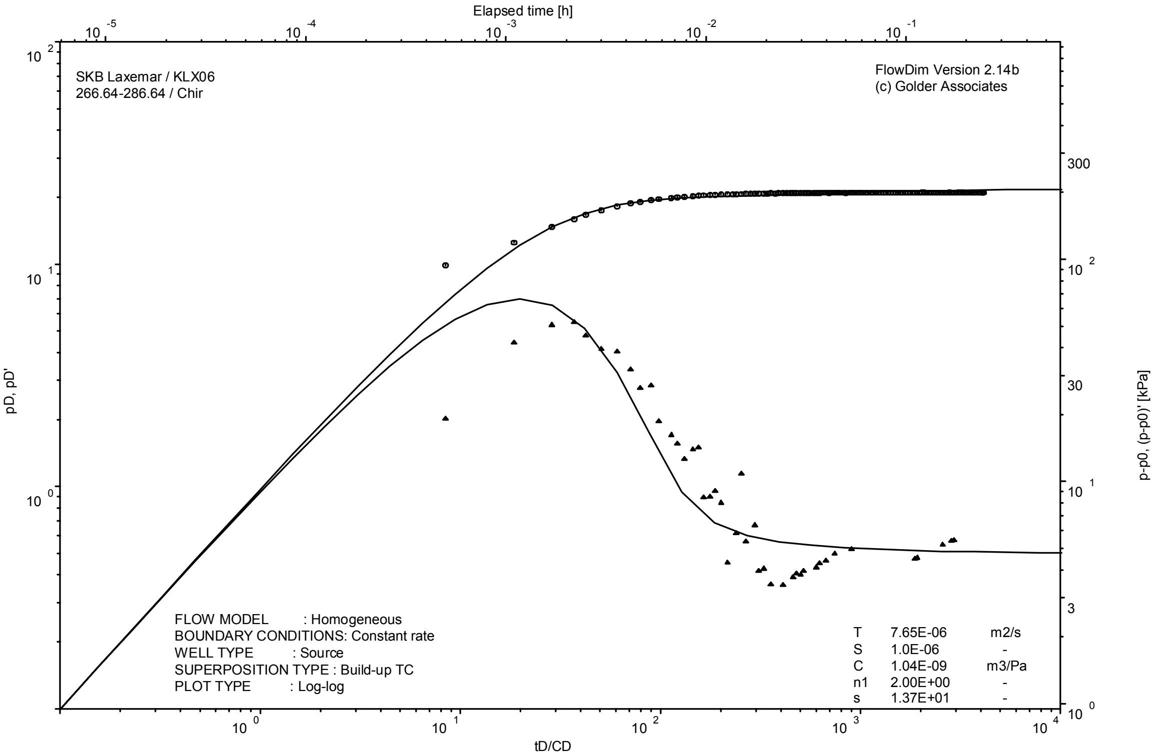
Pressure and flow rate vs. time; cartesian plot (analysed)



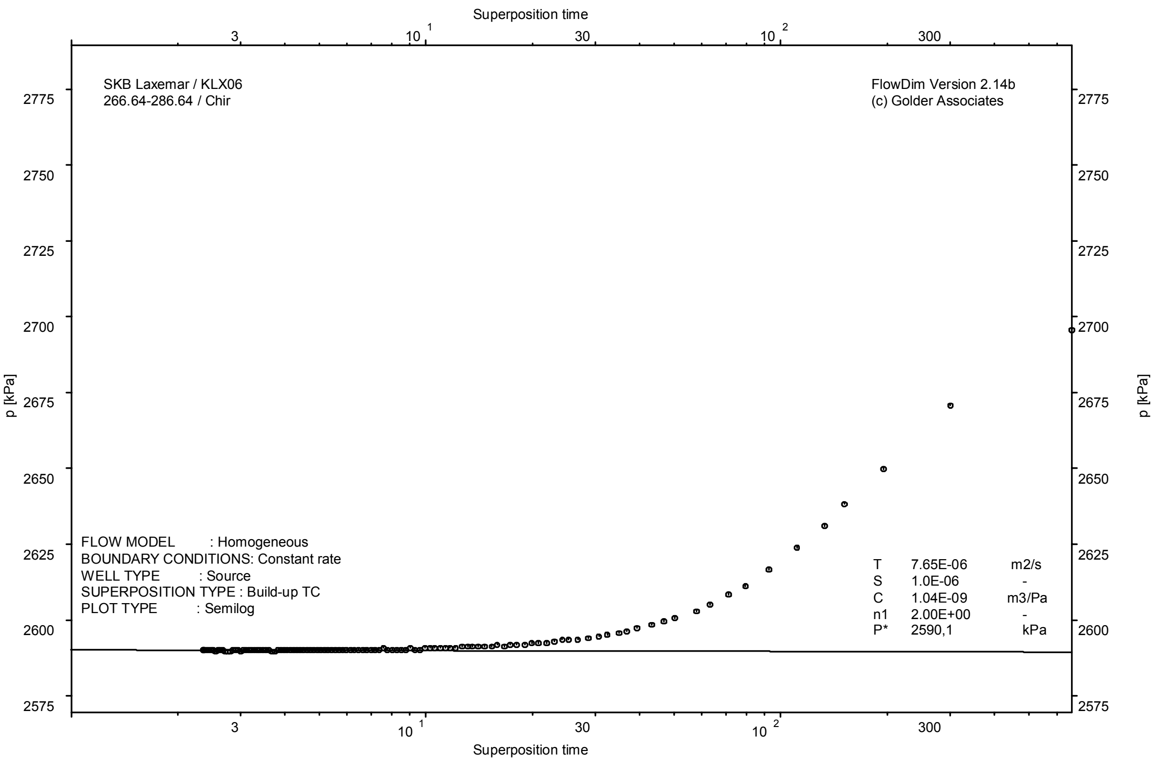
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

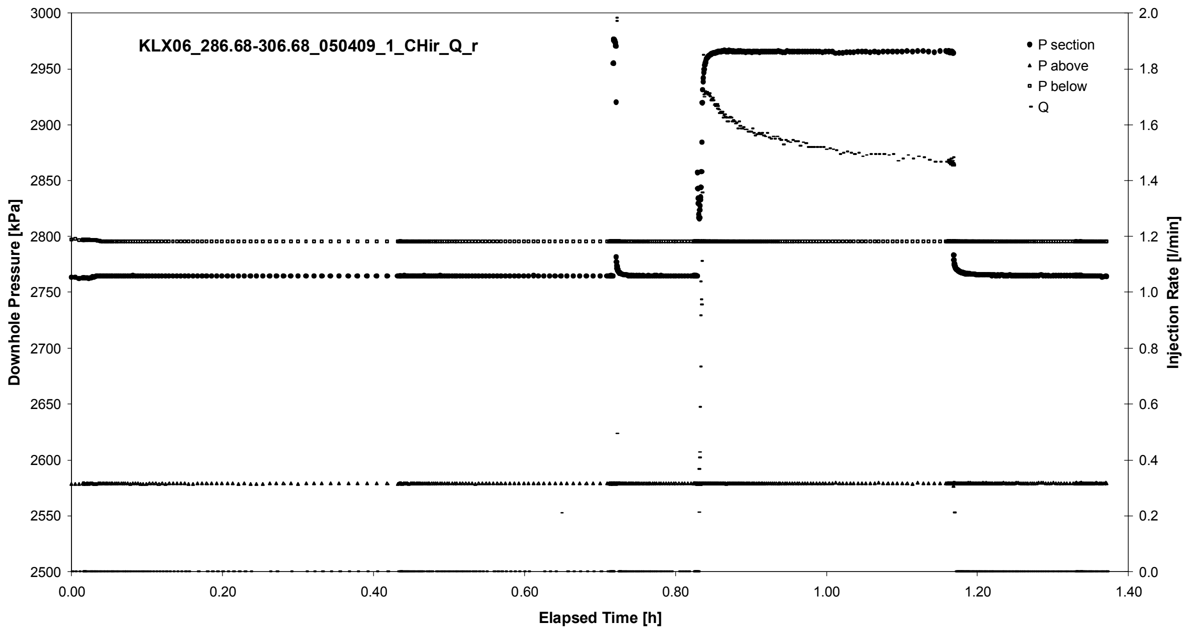


CHIR phase; HORNER match

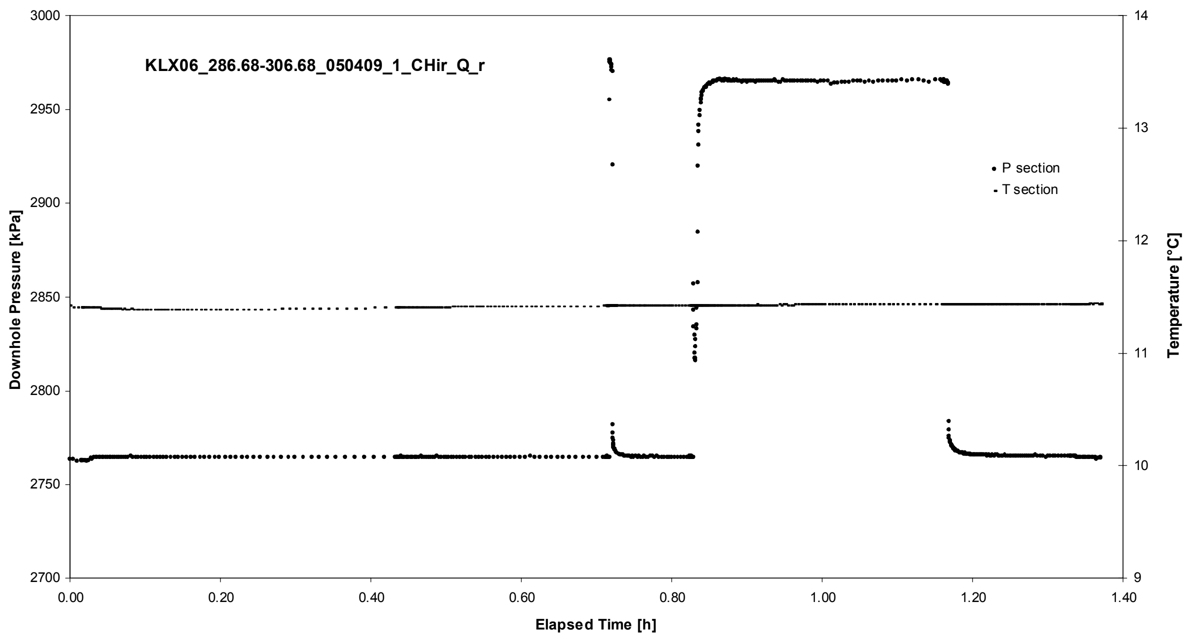
APPENDIX 2-19

Test 286.68 – 306.68 m

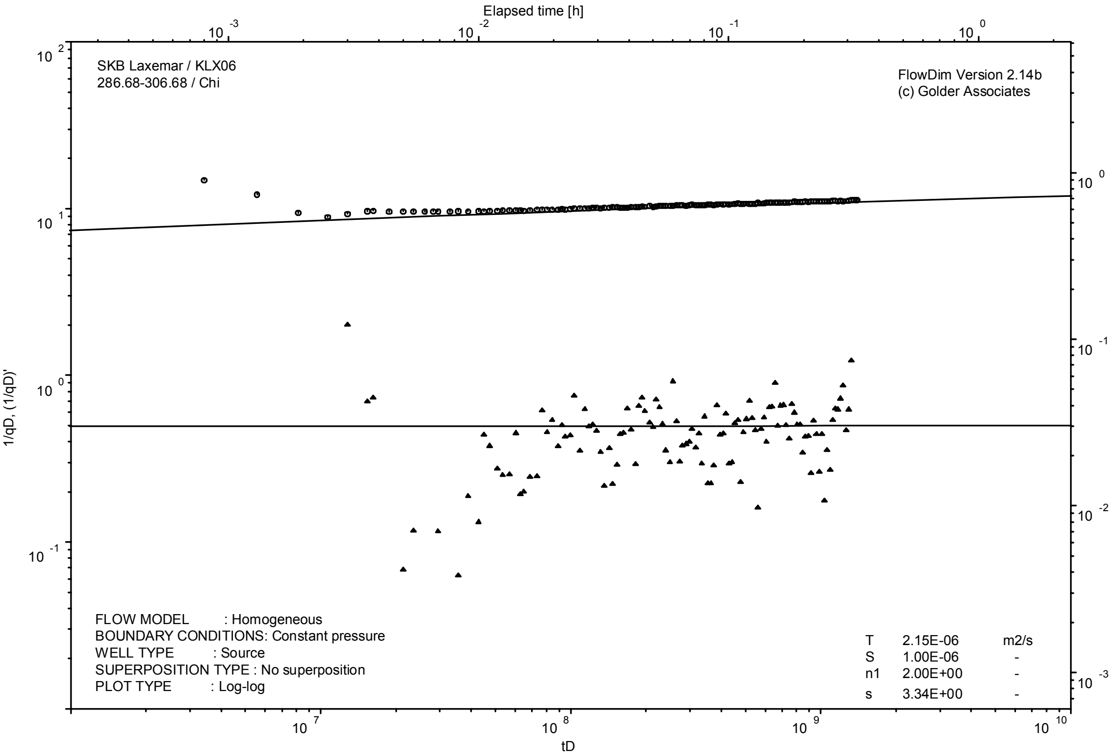
Analysis diagrams



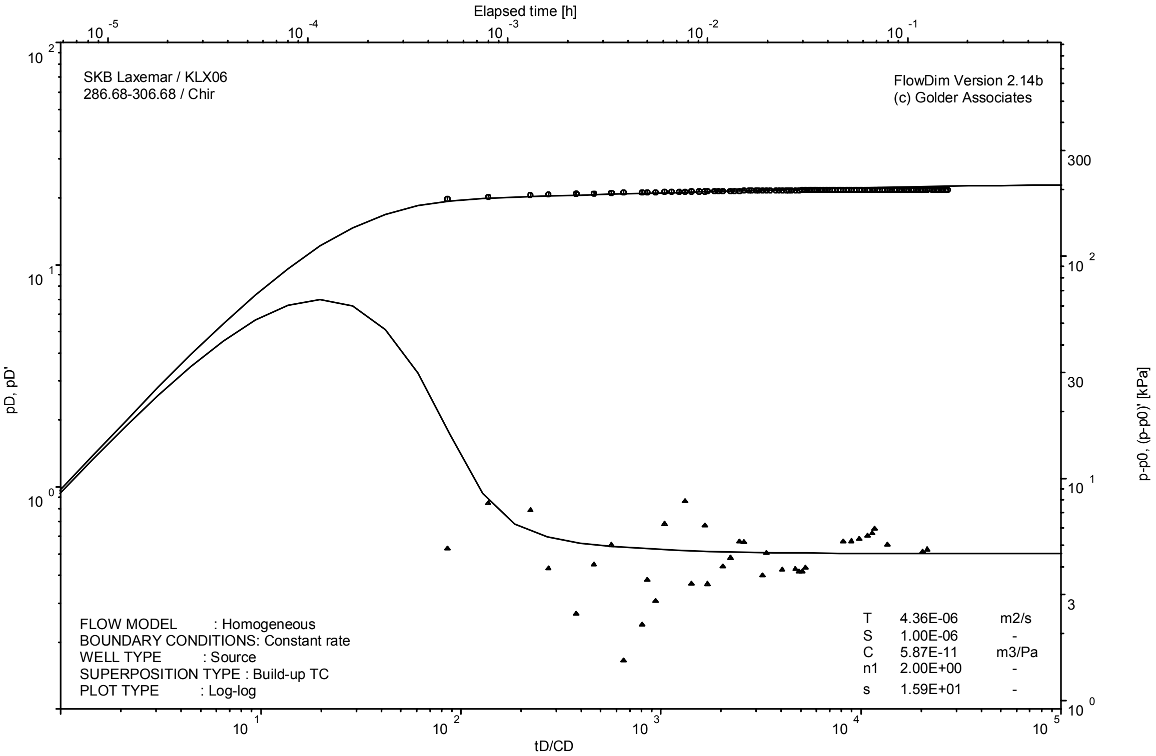
Pressure and flow rate vs. time; cartesian plot



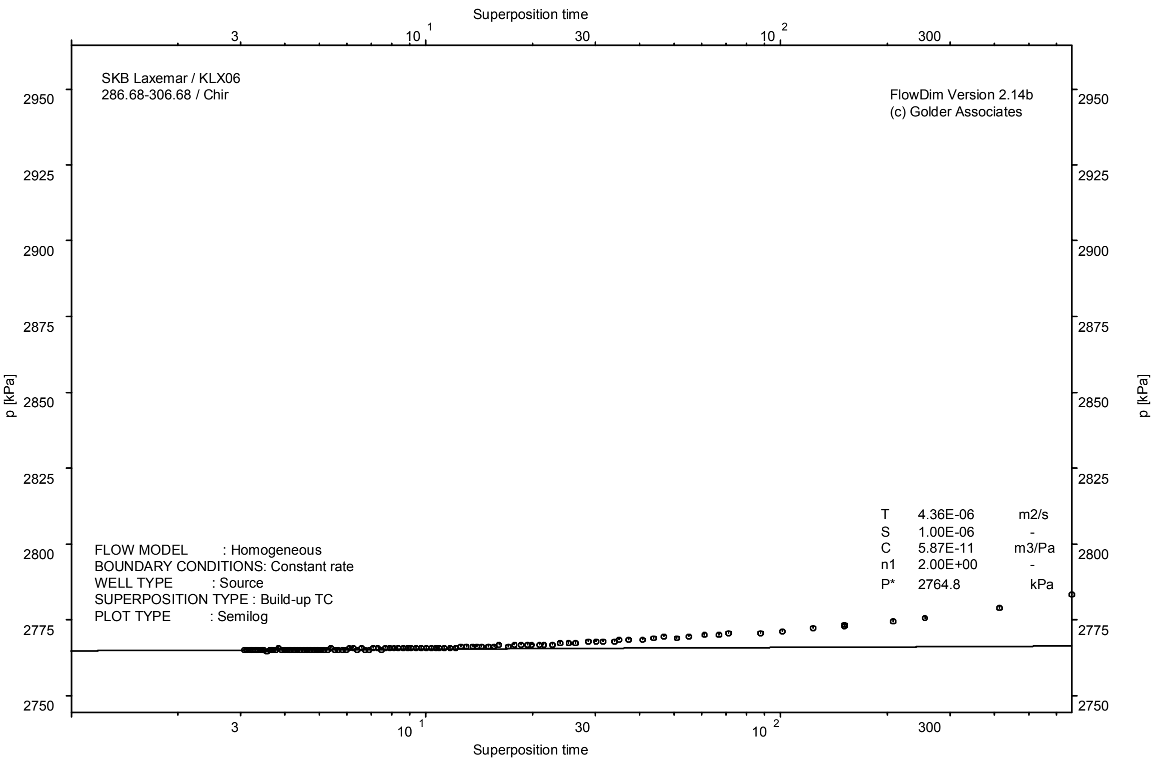
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

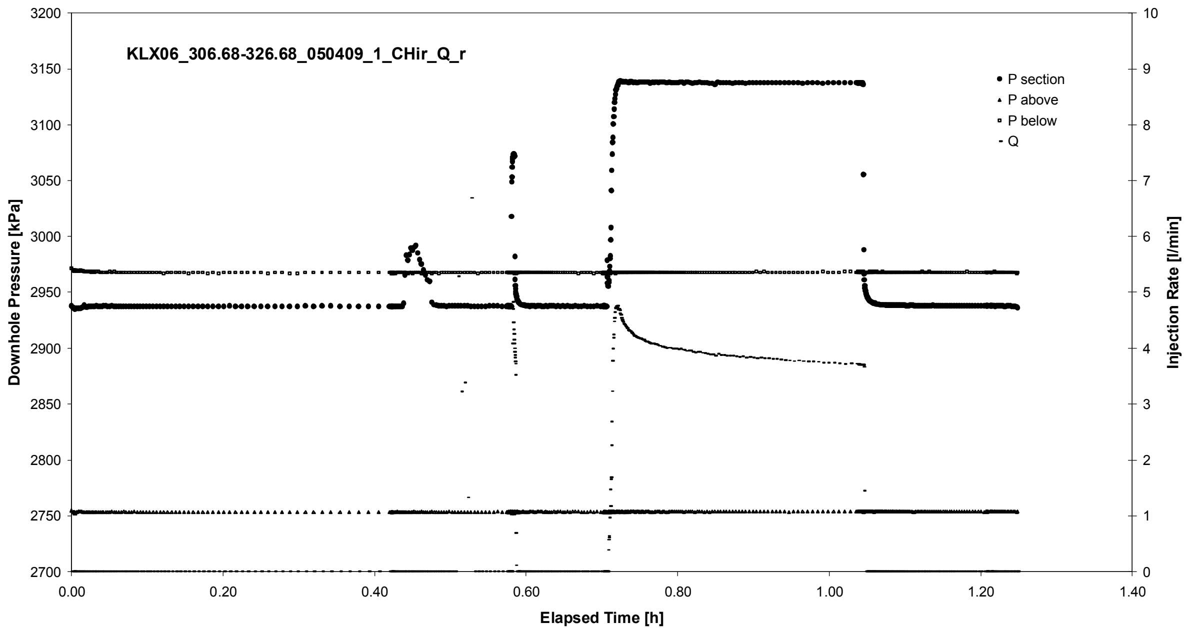


CHIR phase; HORNER match

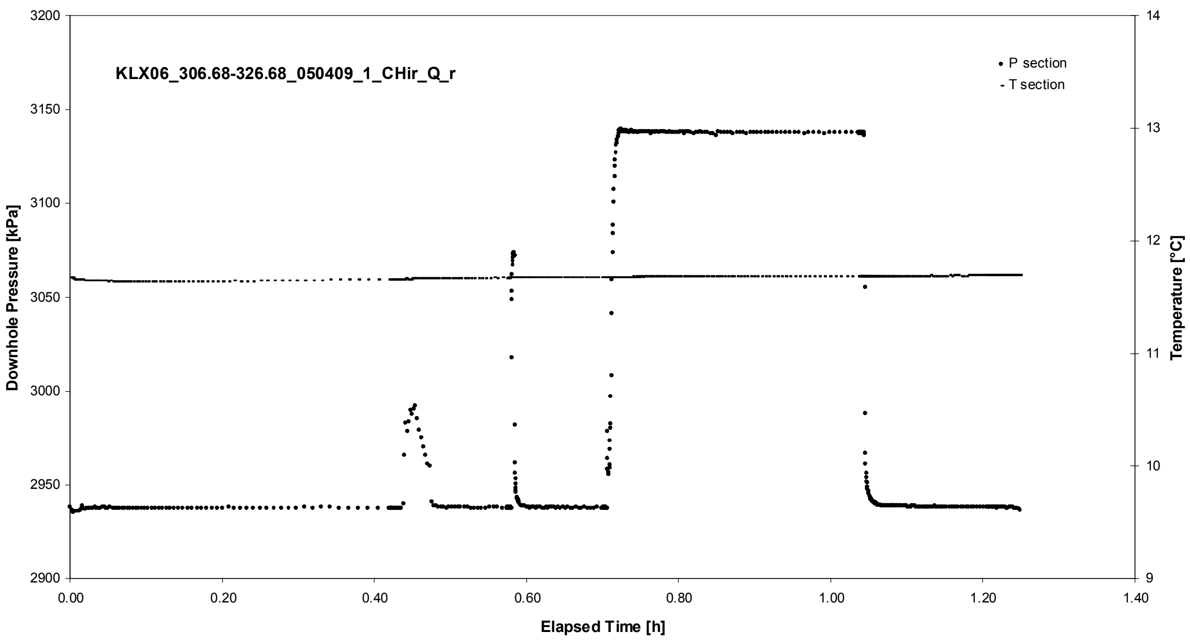
APPENDIX 2-20

Test 306.68 – 326.68 m

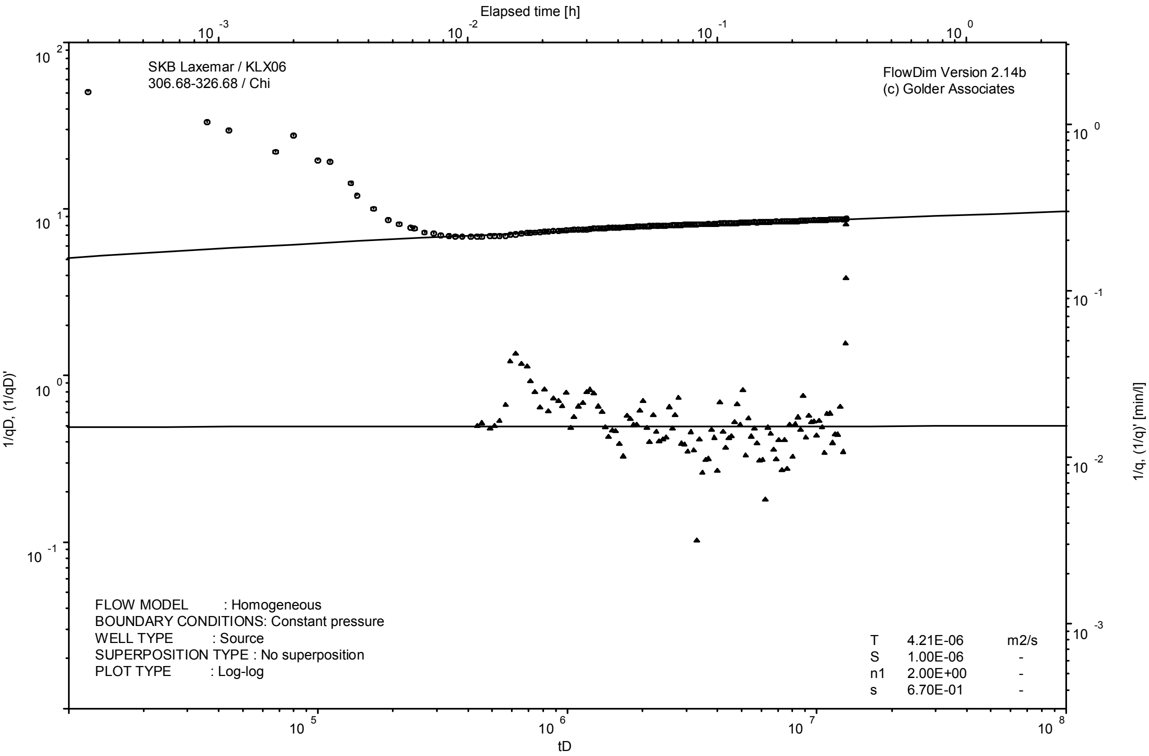
Analysis diagrams



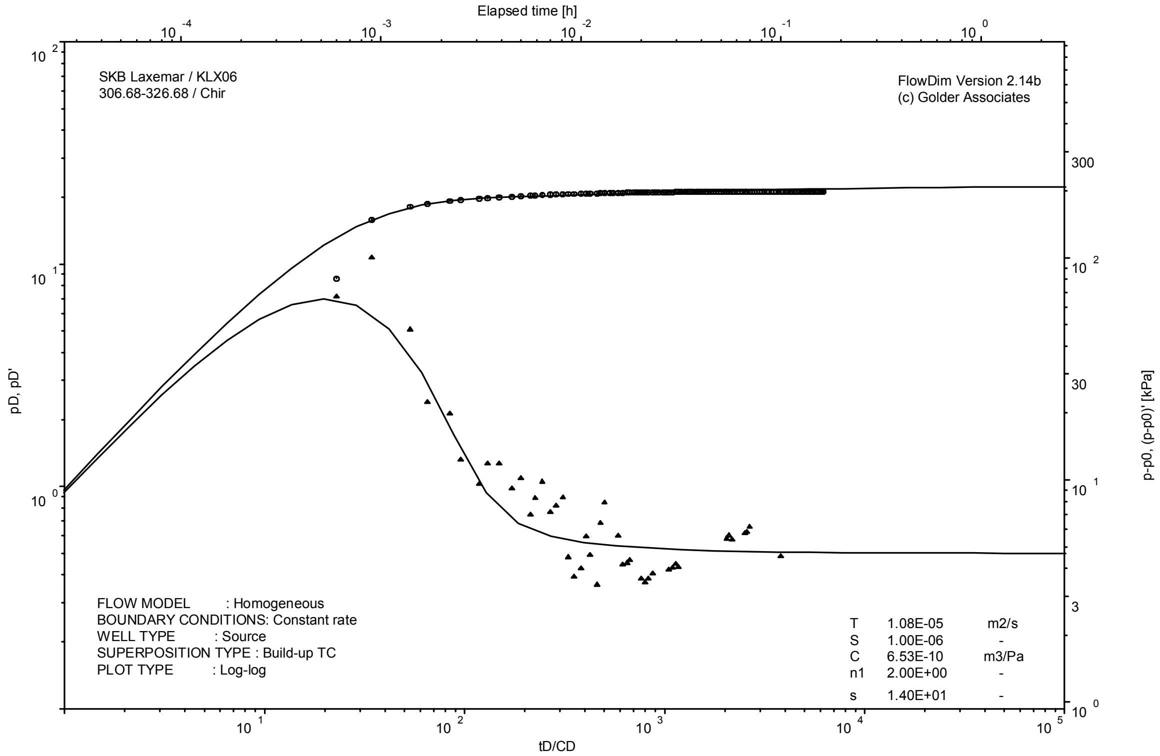
Pressure and flow rate vs. time; cartesian plot



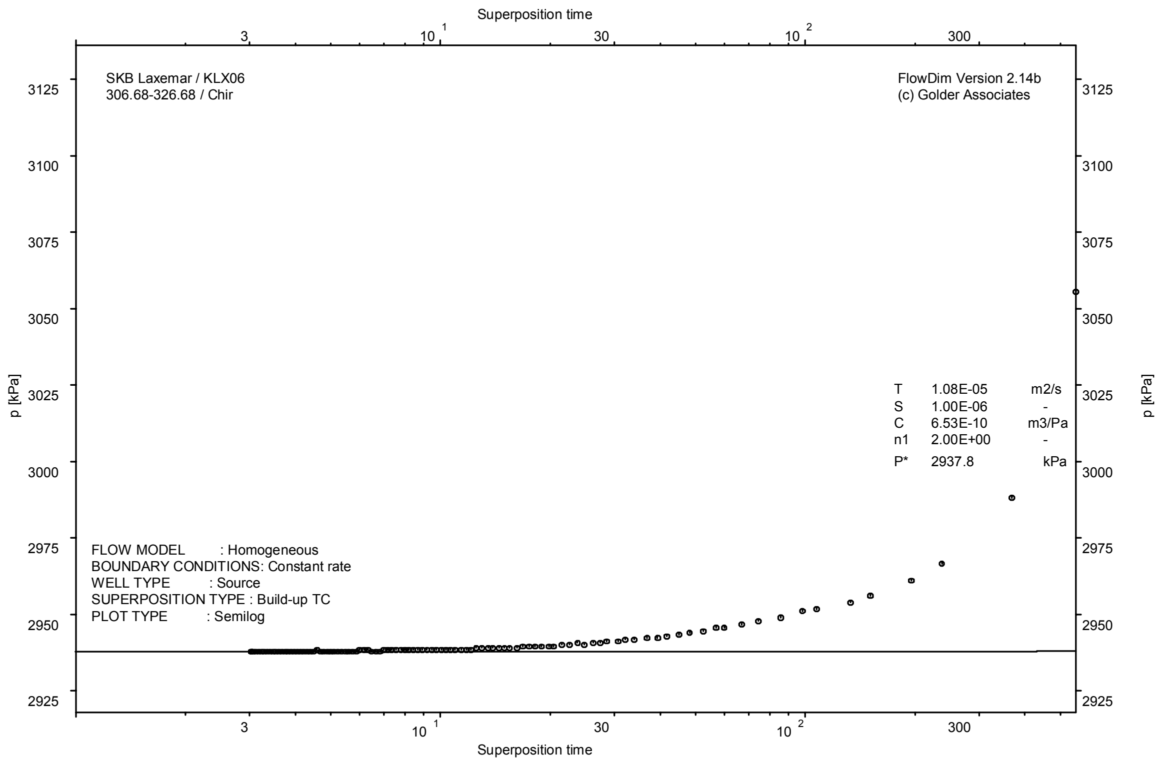
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

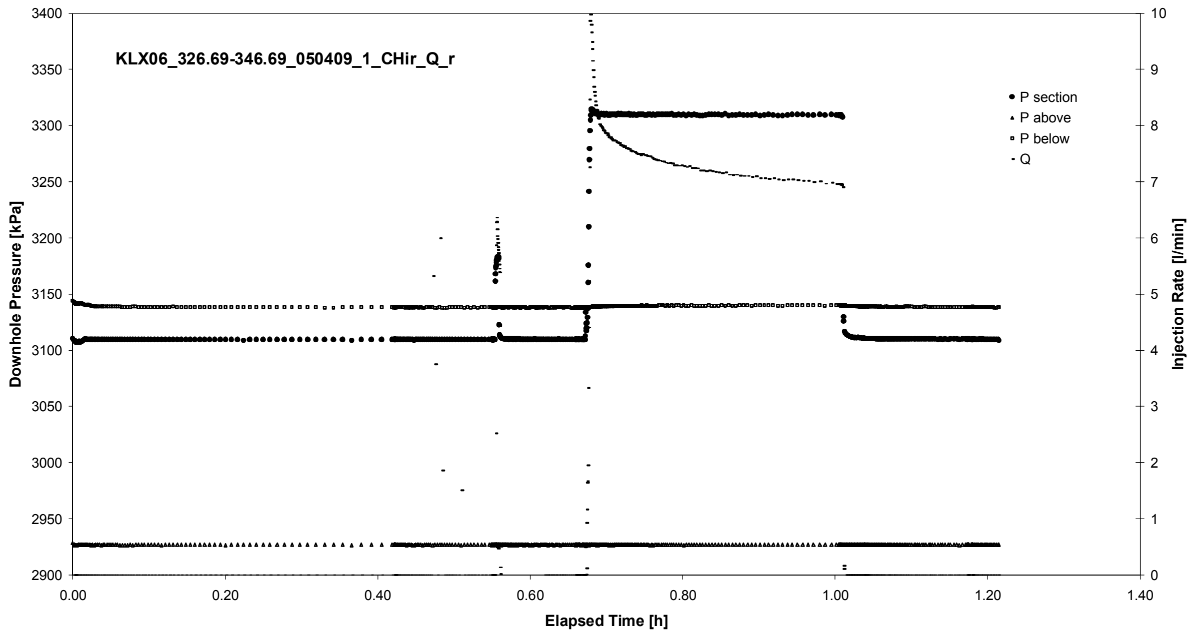


CHIR phase; HORNER match

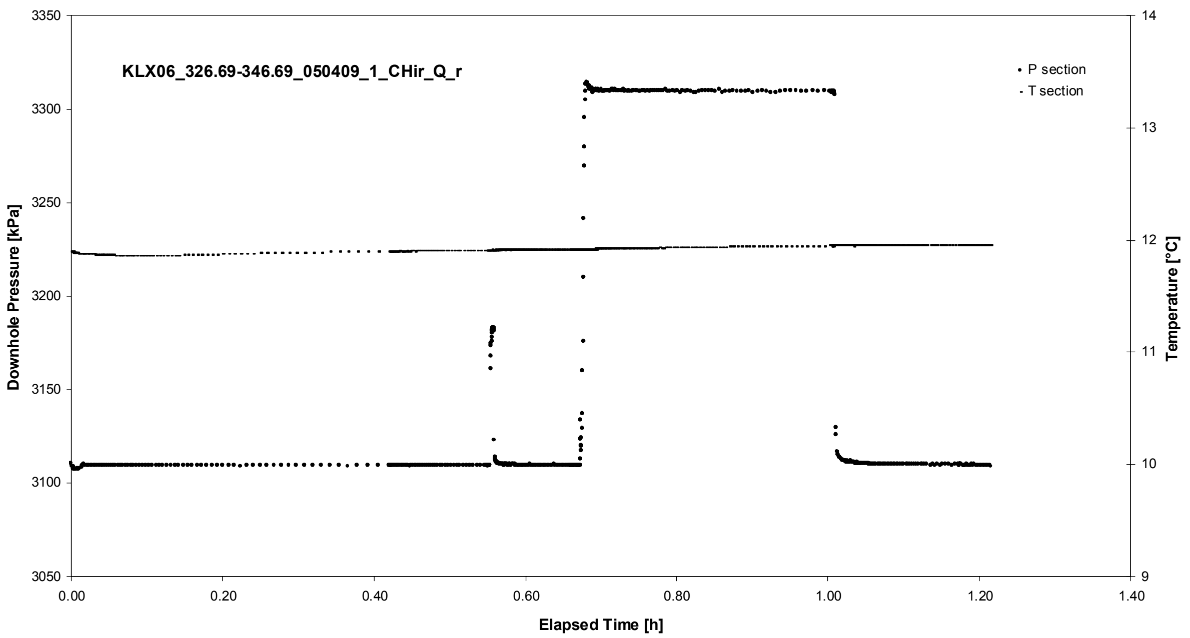
APPENDIX 2-21

Test 326.69 – 346.69 m

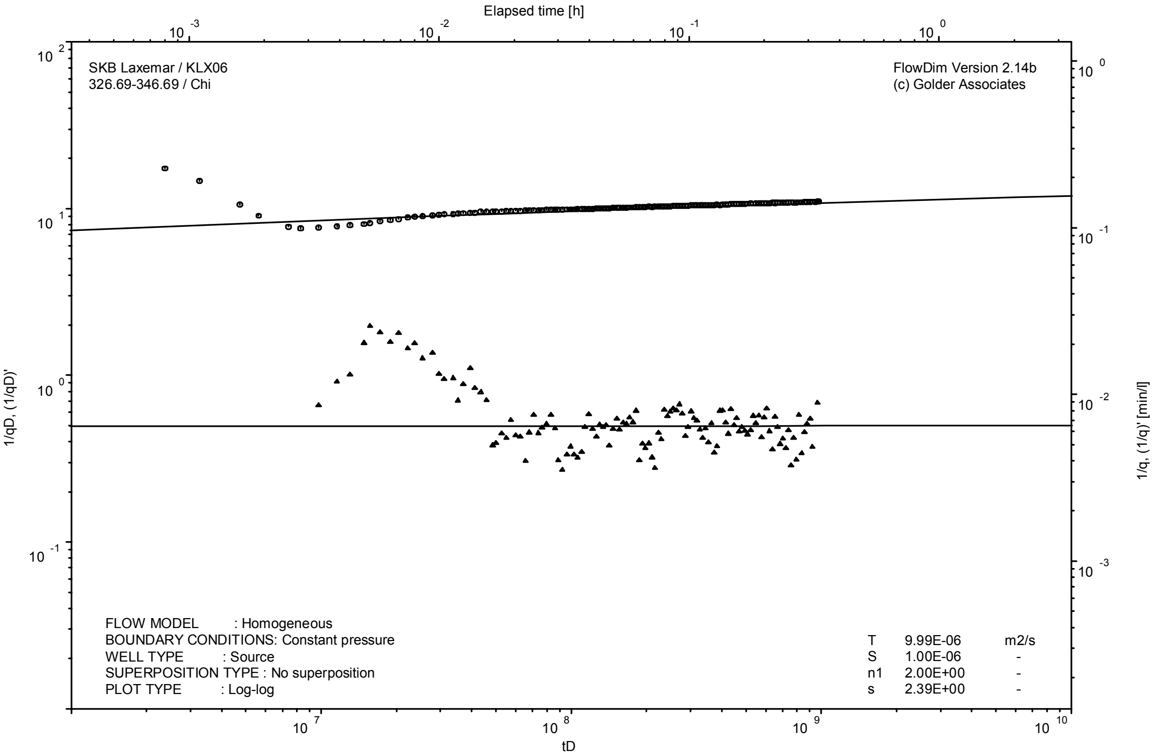
Analysis diagrams



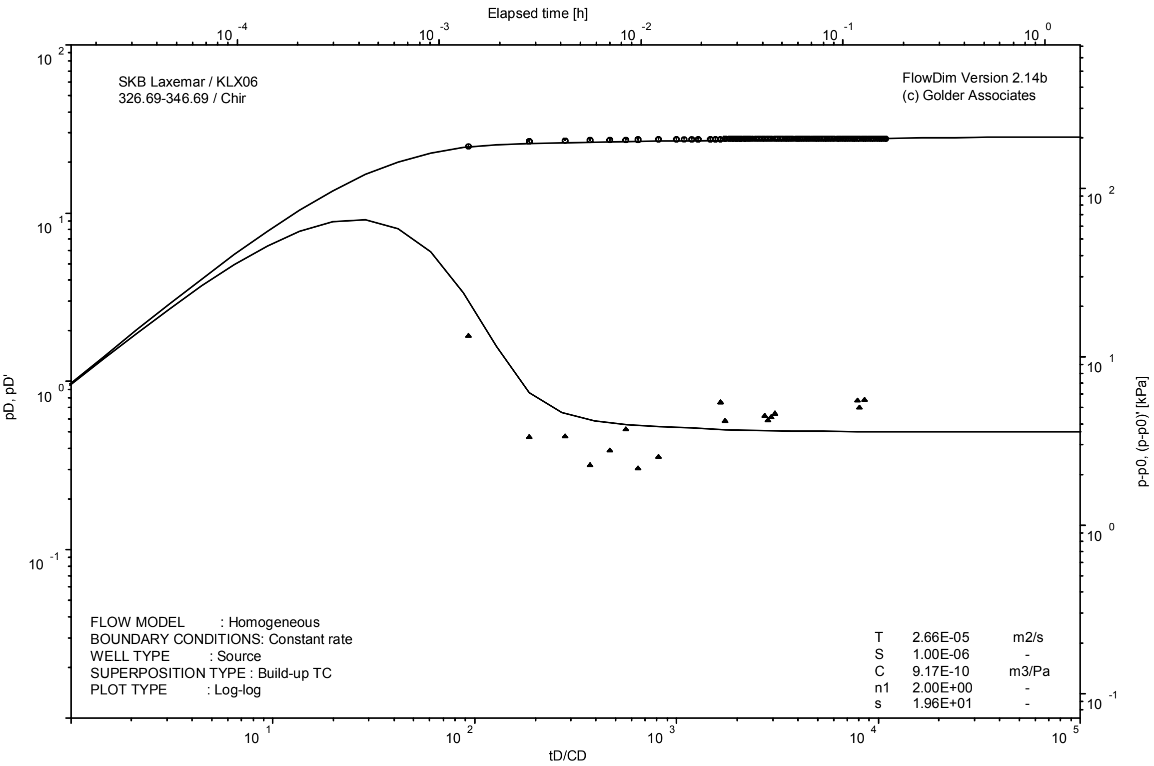
Pressure and flow rate vs. time; cartesian plot



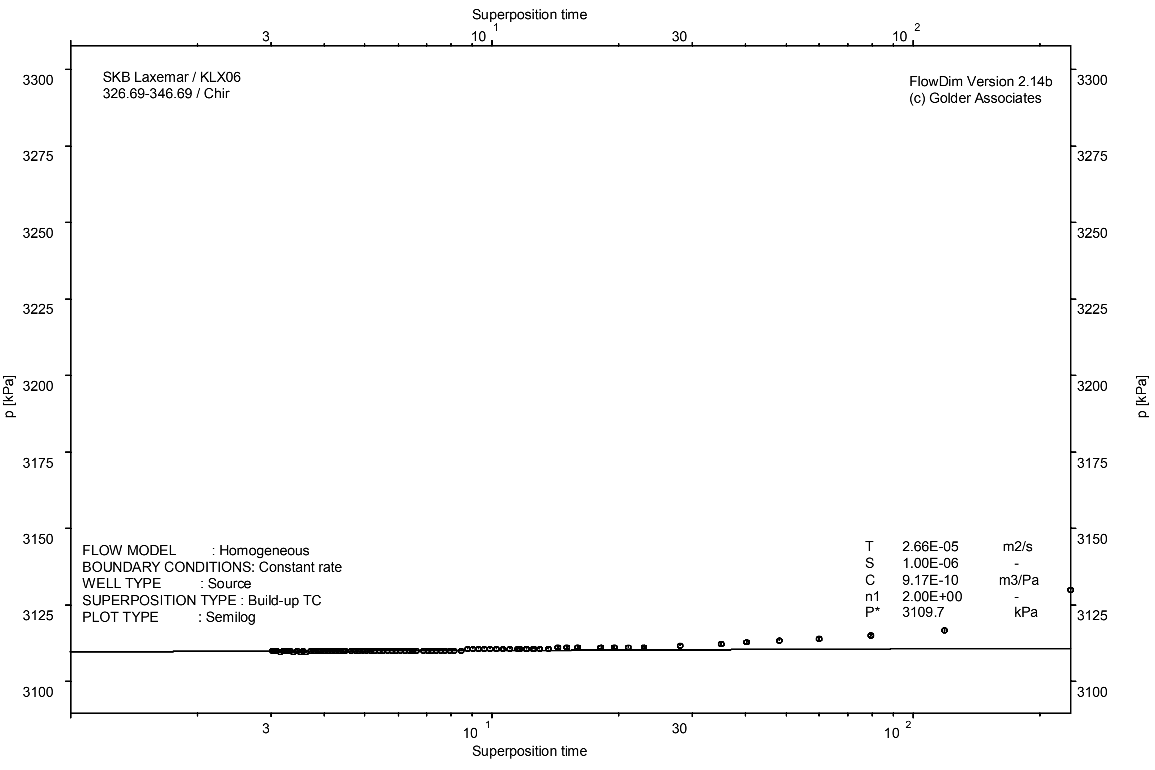
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

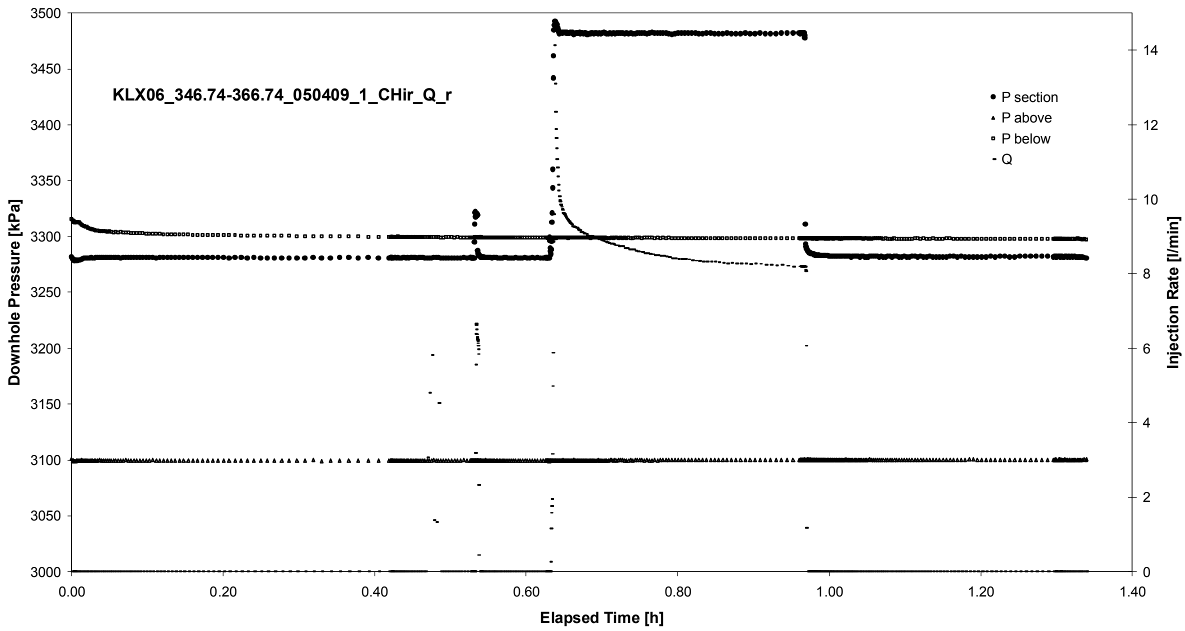


CHIR phase; HORNER match

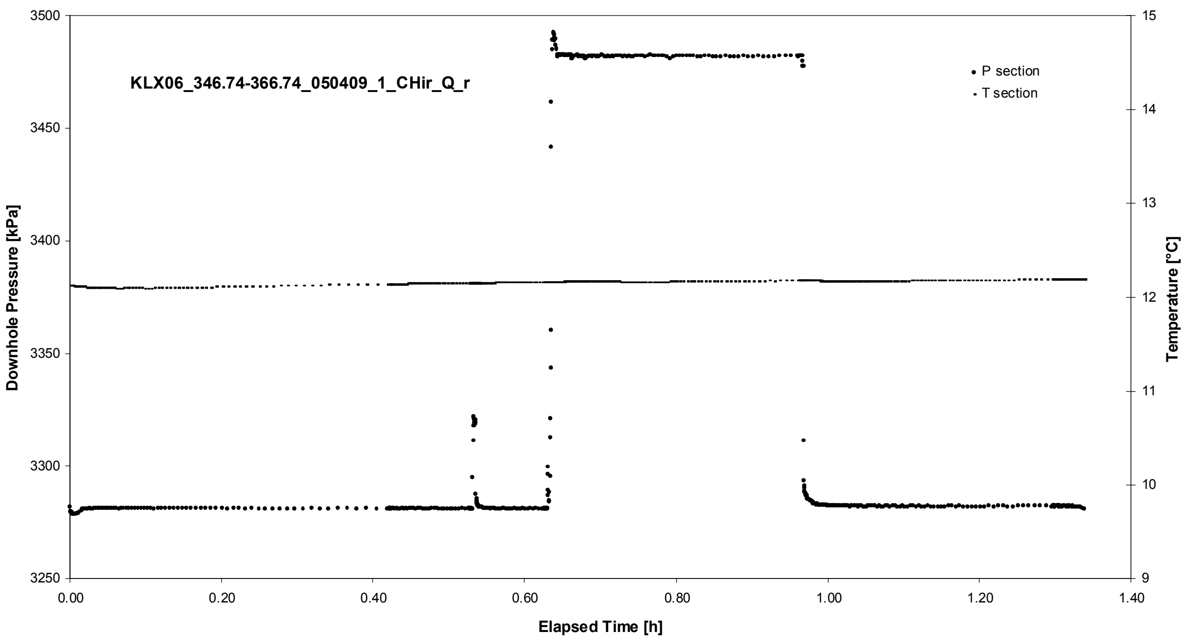
APPENDIX 2-22

Test 346.74 – 366.74 m

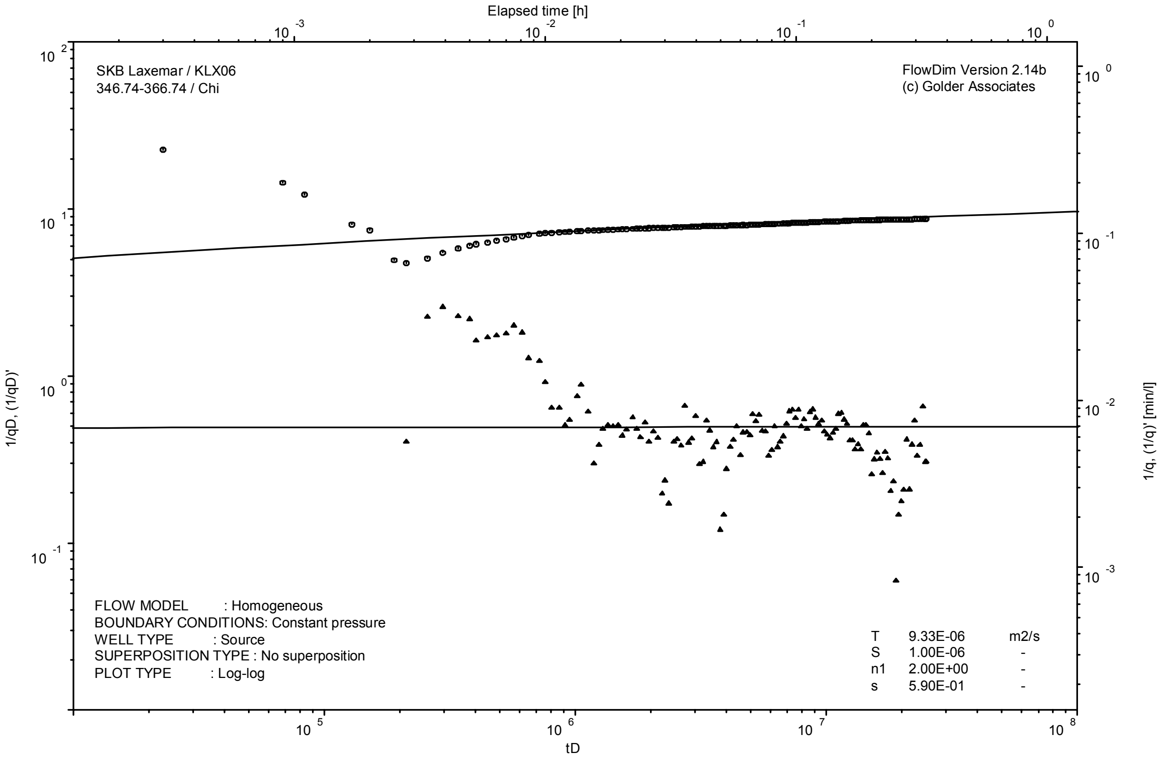
Analysis diagrams



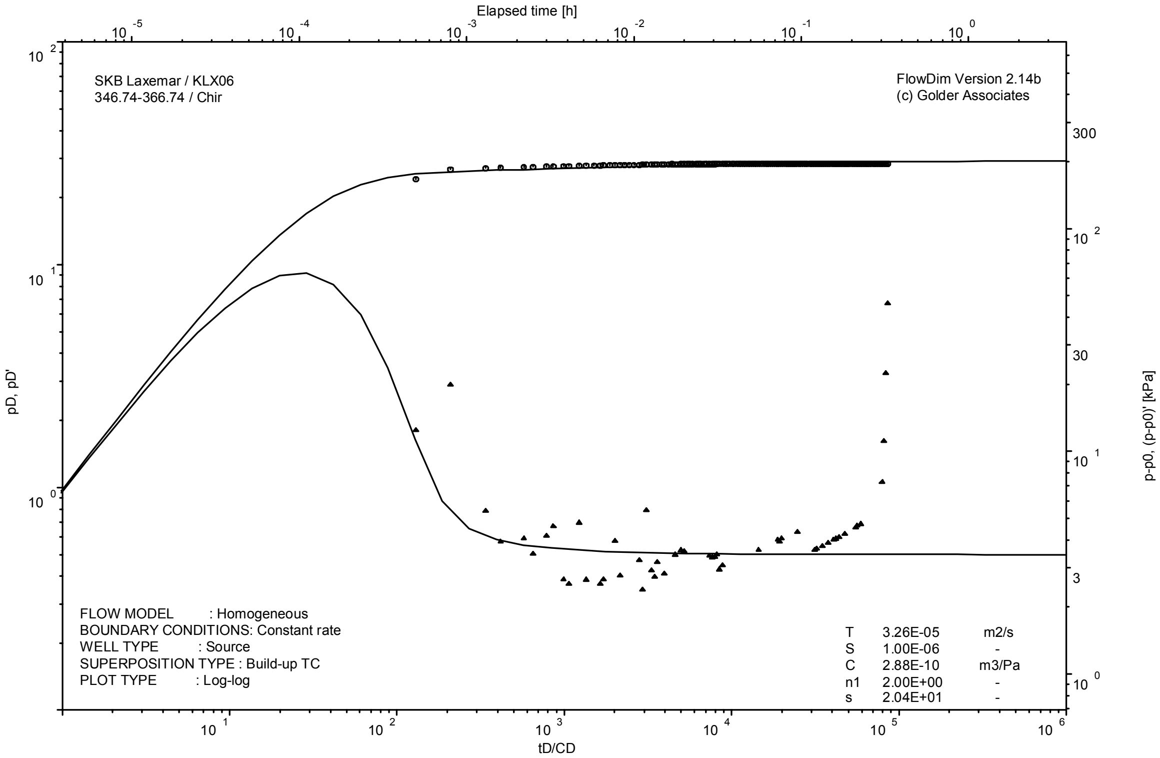
Pressure and flow rate vs. time; cartesian plot



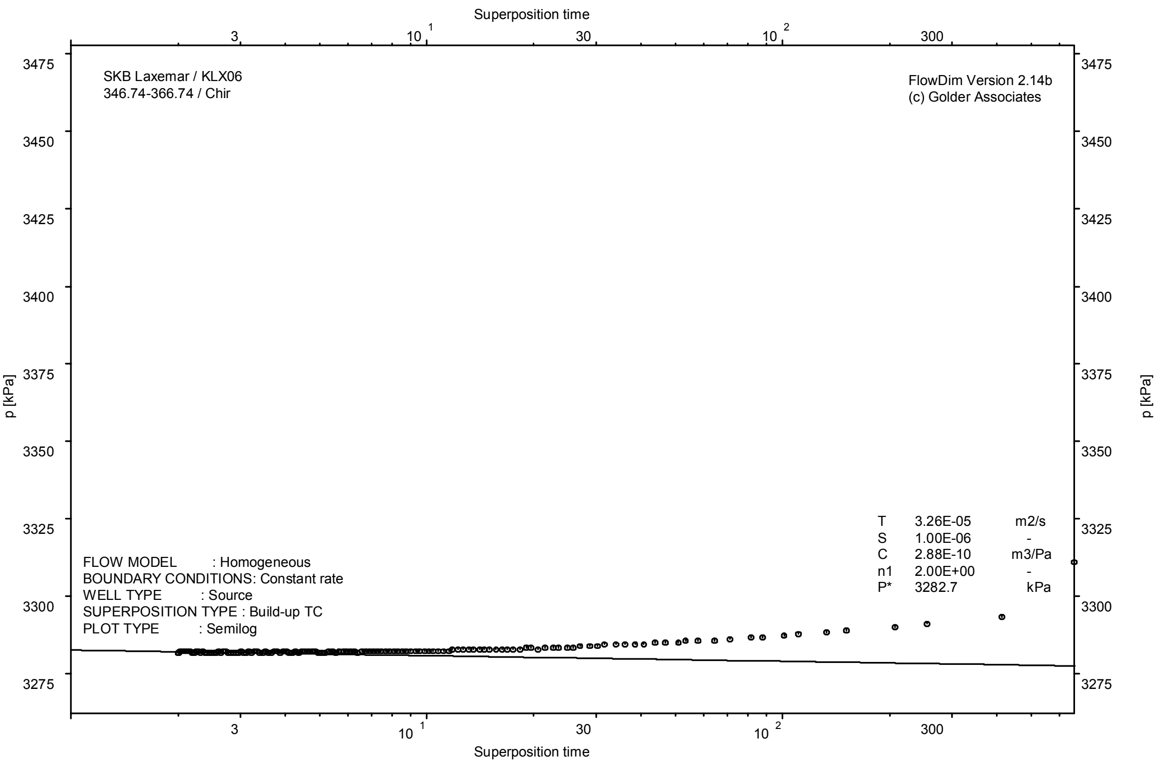
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

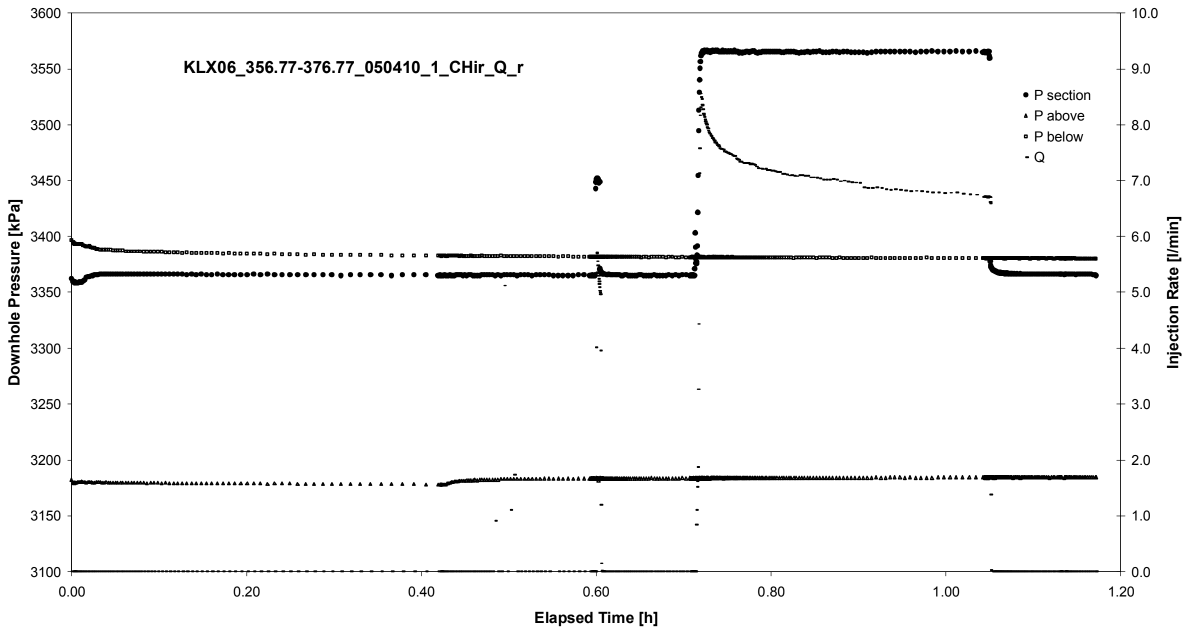


CHIR phase; HORNER match

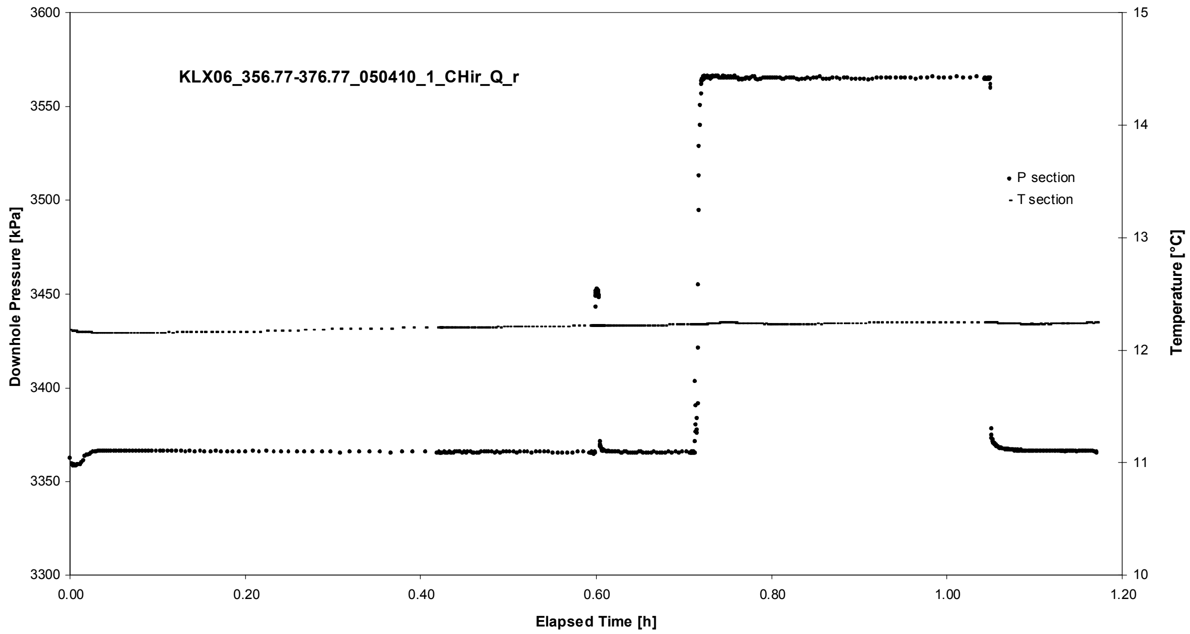
APPENDIX 2-23

Test 356.77 – 376.77 m

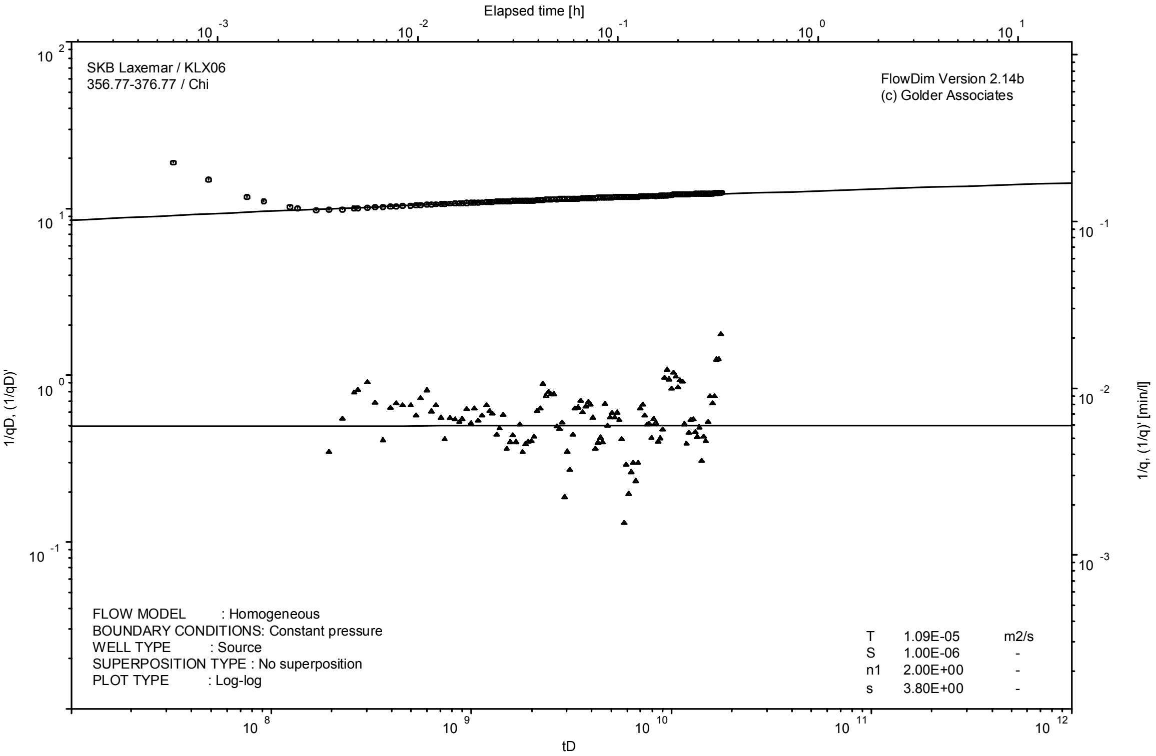
Analysis diagrams



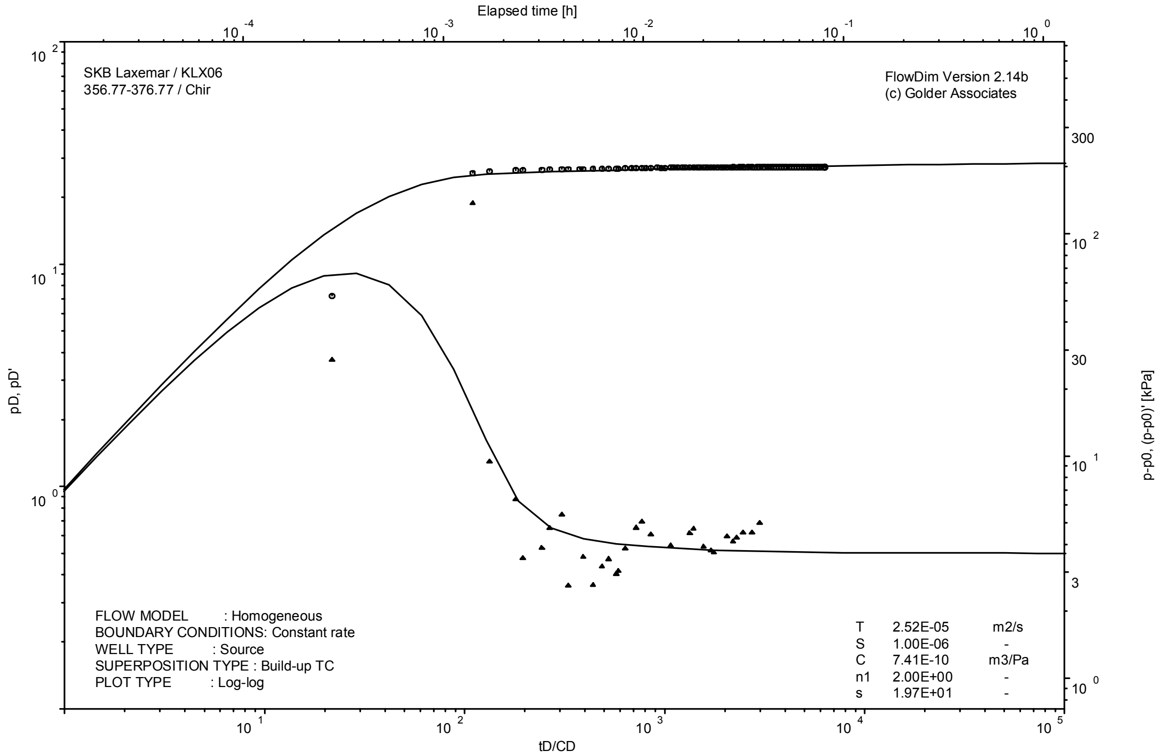
Pressure and flow rate vs. time; cartesian plot



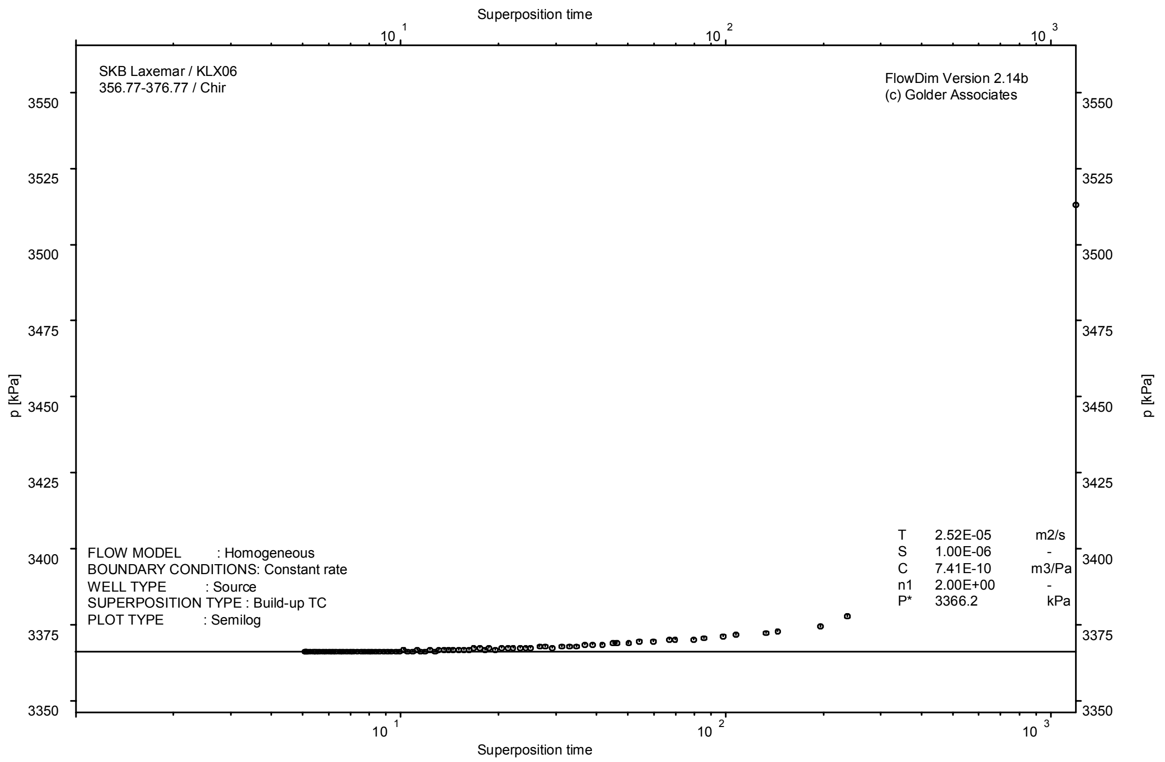
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

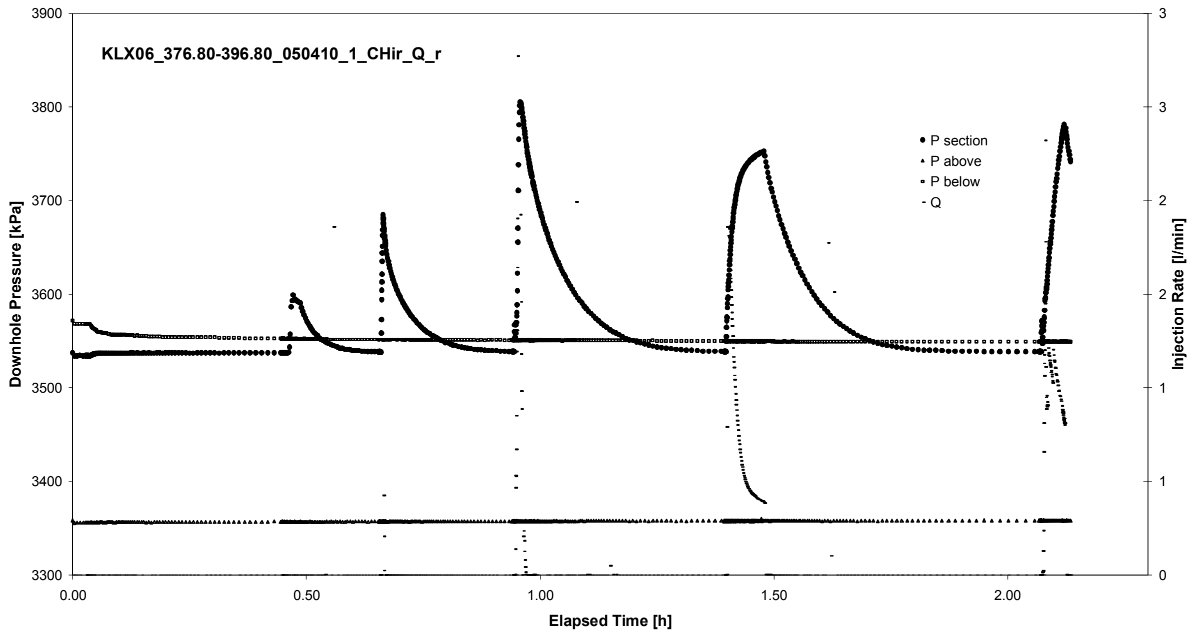


CHIR phase; HORNER match

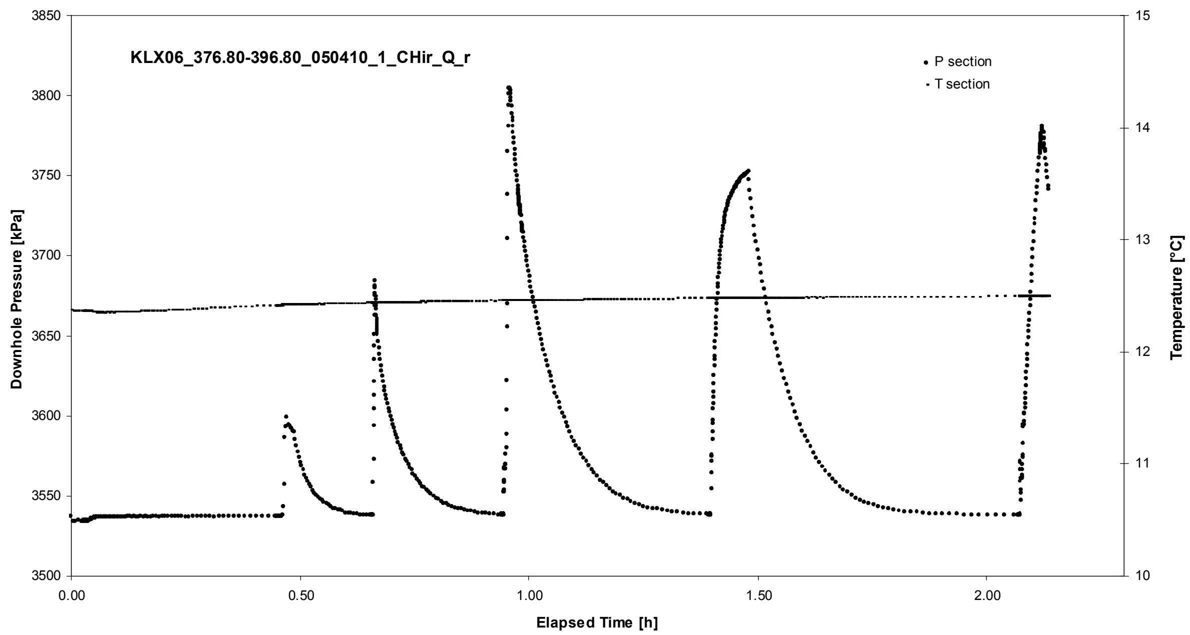
APPENDIX 2-24

Test 376.80 – 396.80 m

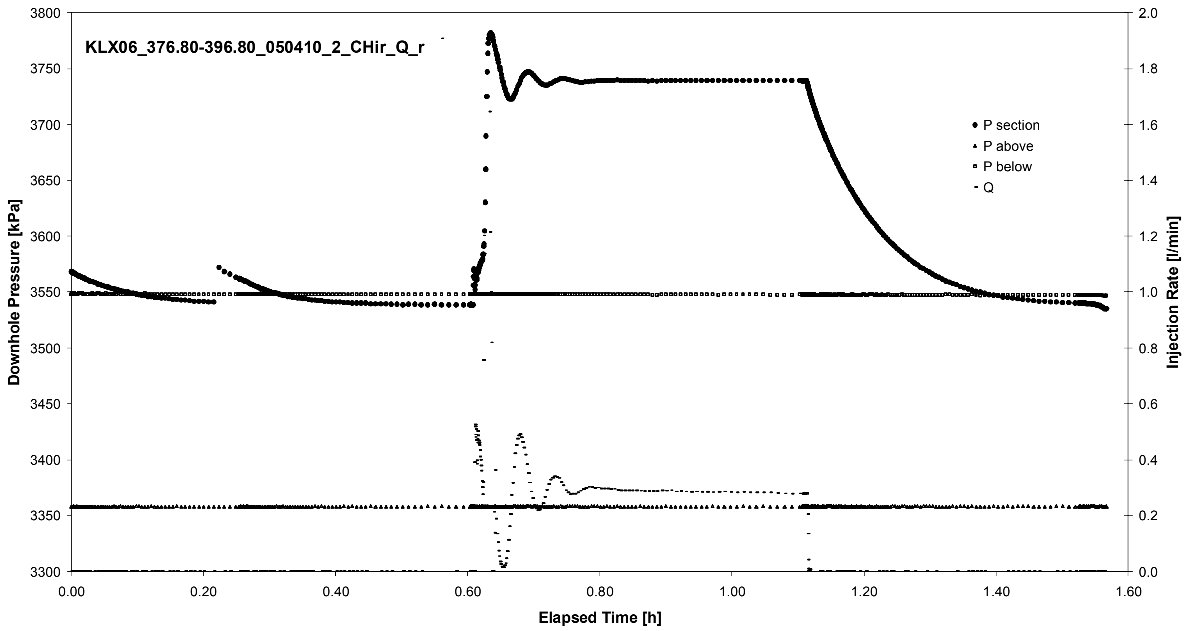
Analysis diagrams



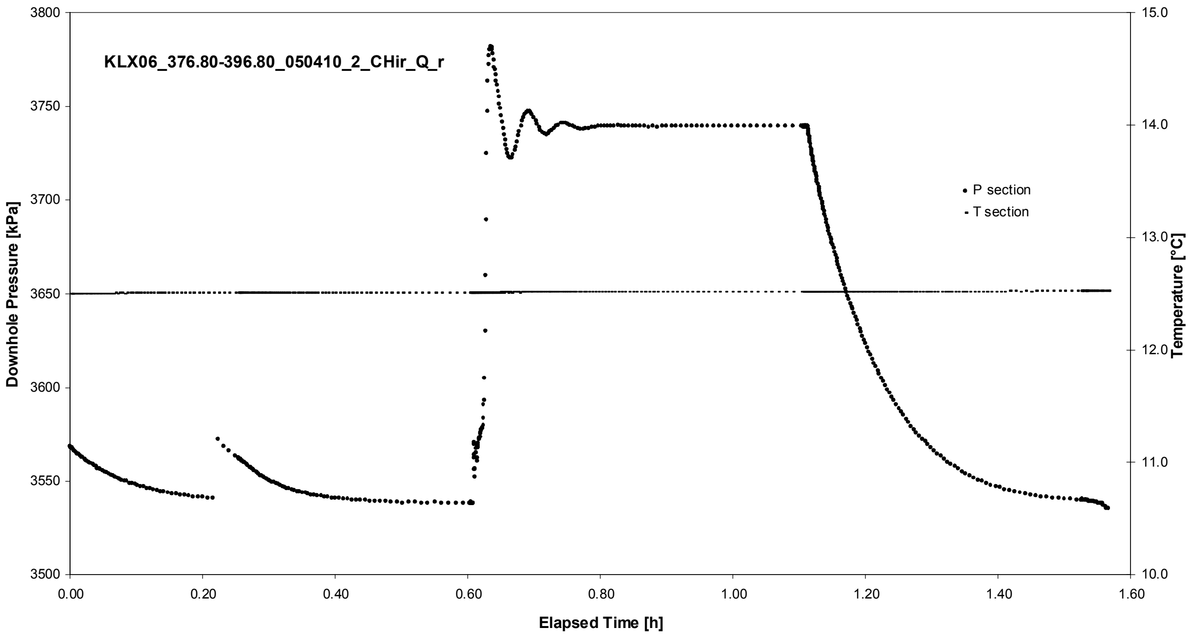
Pressure and flow rate vs. time; cartesian plot (test repeated)



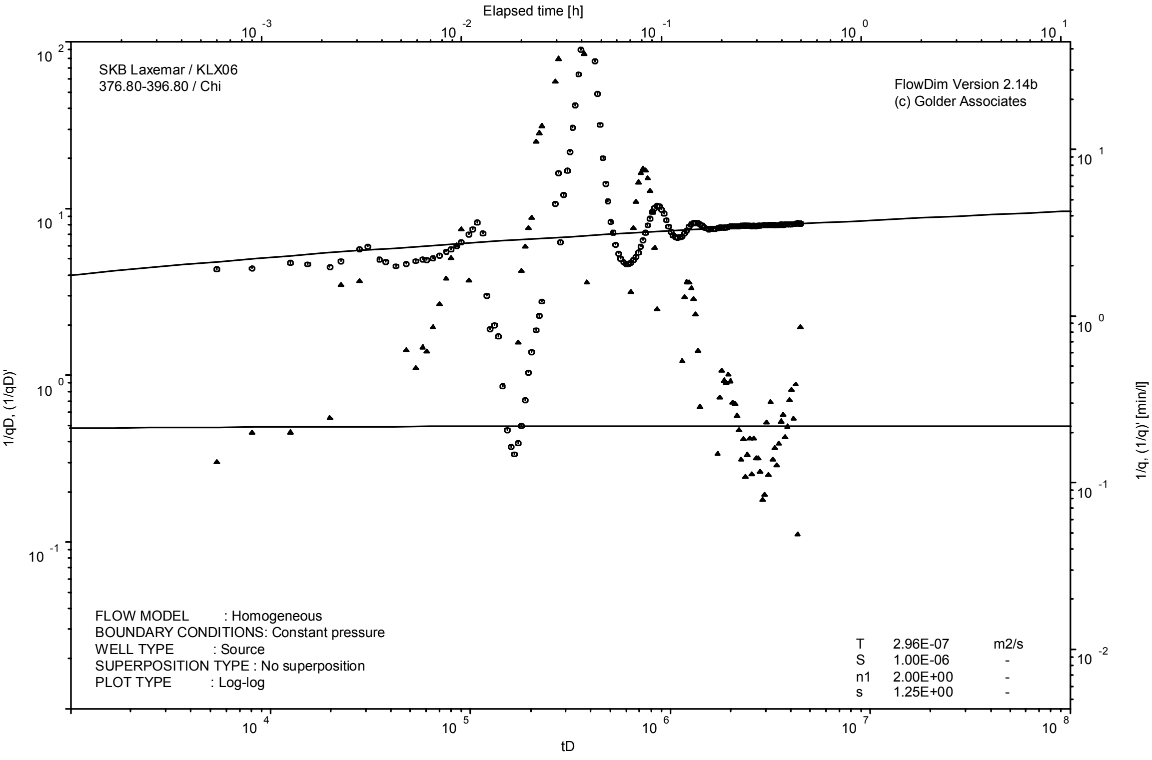
Interval pressure and temperature vs. time; cartesian plot (test repeated)



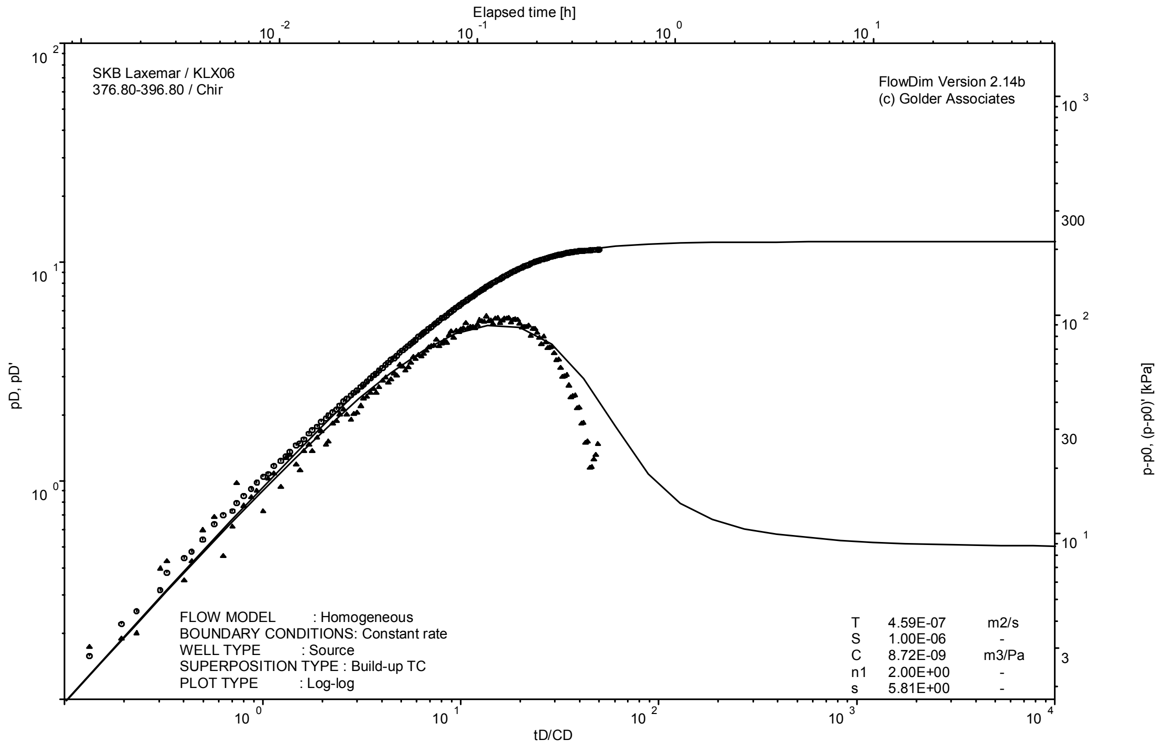
Pressure and flow rate vs. time; cartesian plot (analysed)



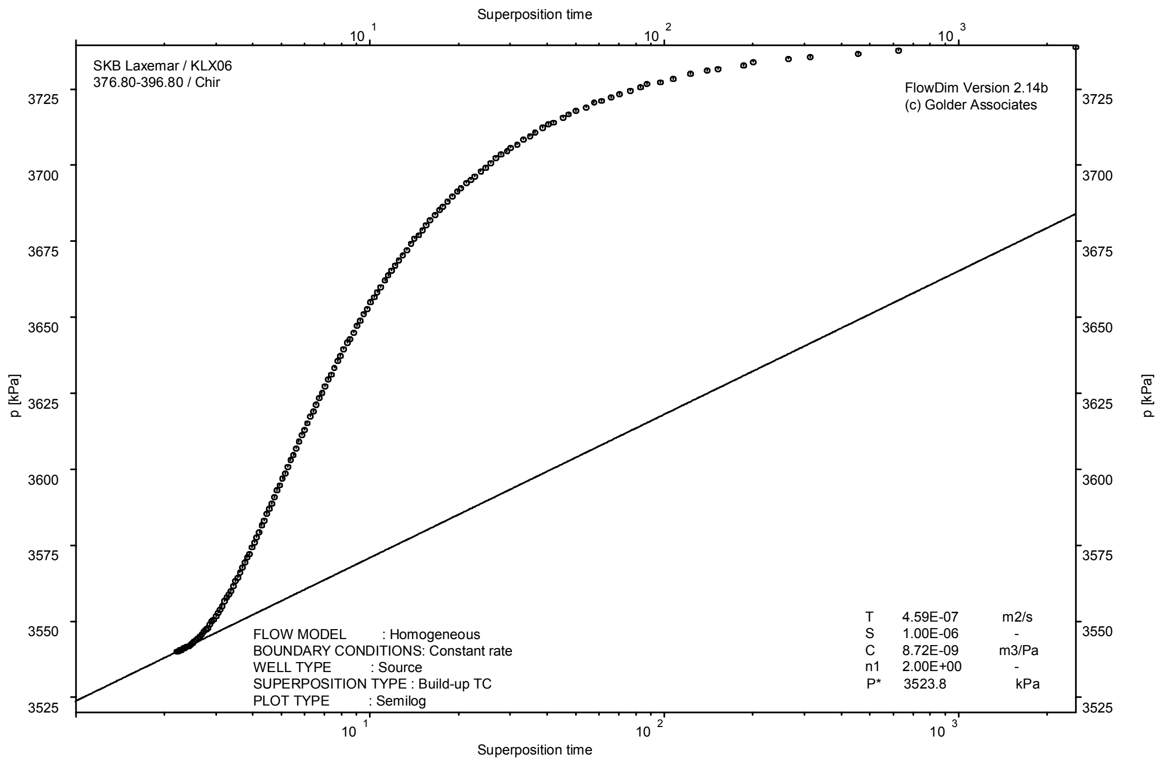
Interval pressure and temperature vs. time; cartesian plot (analysed)



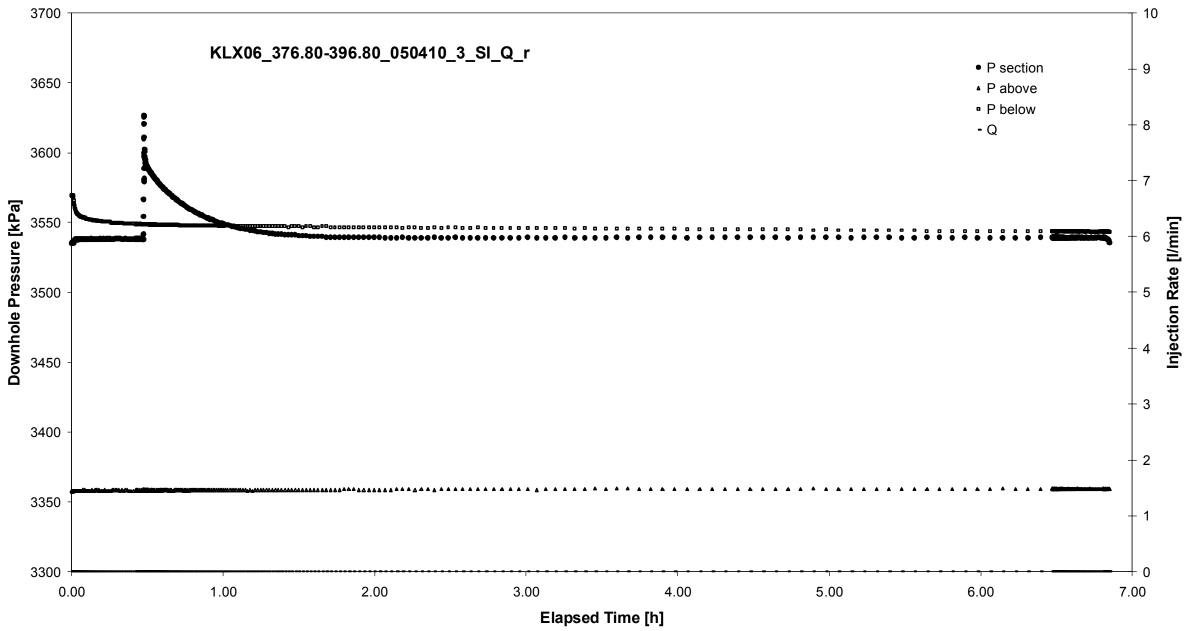
CHI phase; log-log match



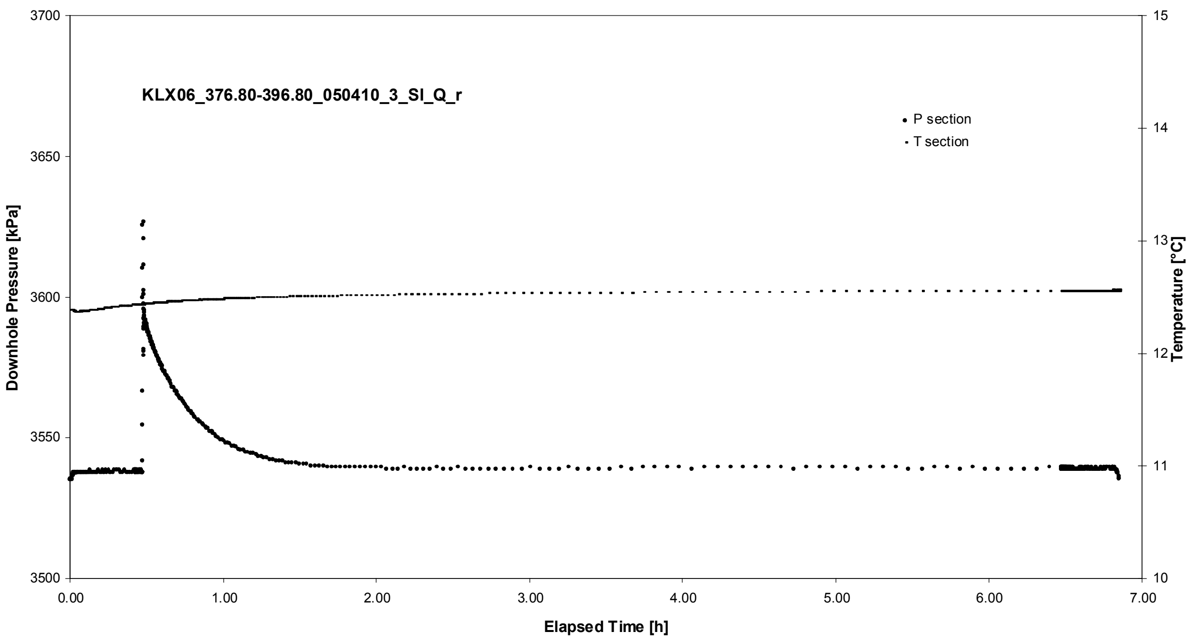
CHIR phase; log-log match



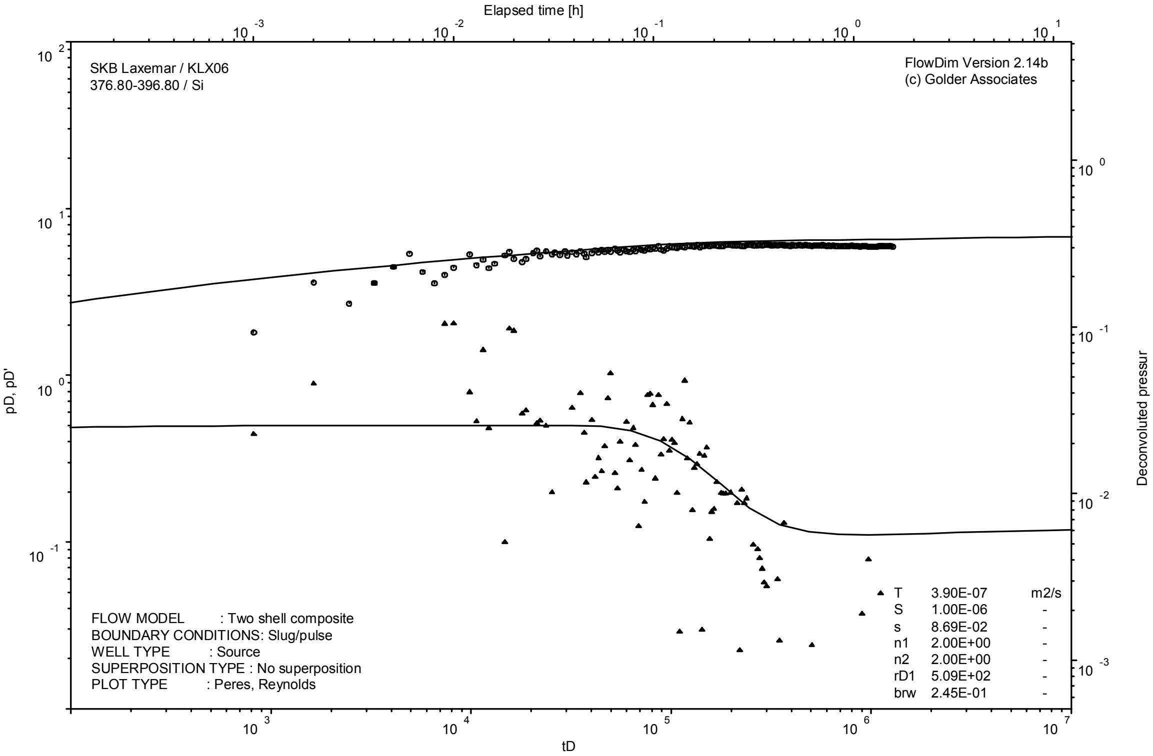
CHIR phase; HORNER match



Pressure and flow rate vs. time; cartesian plot, long term measured over night



Interval pressure and temperature vs. time; cartesian plot, long term measured over night

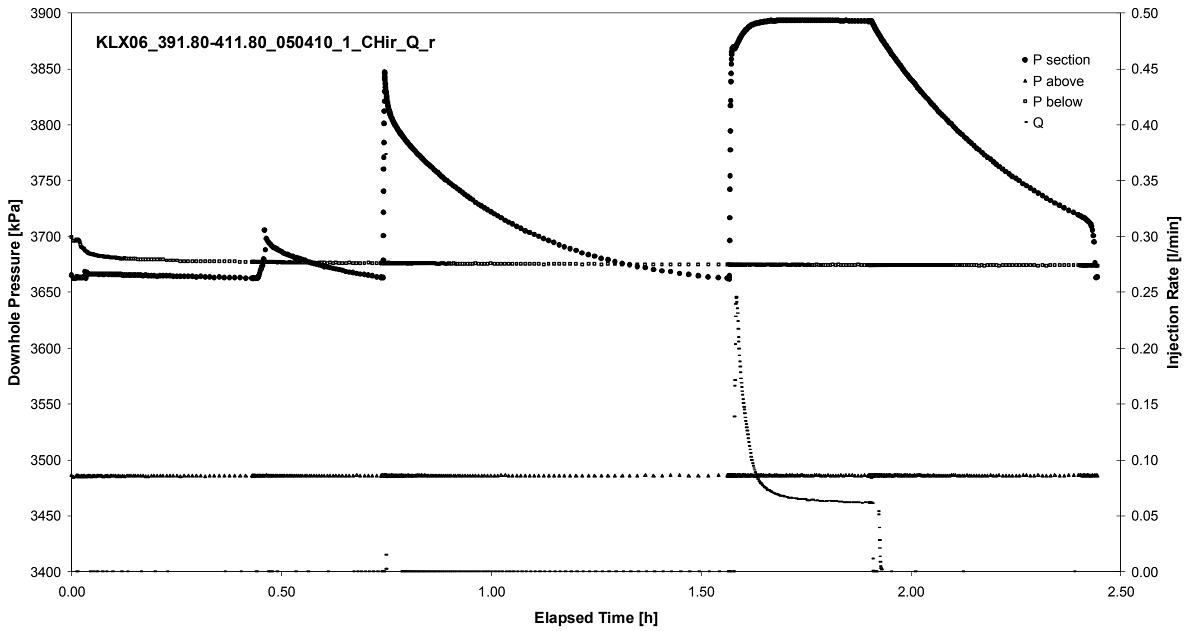


SI phase; log-log match, long term measured over night

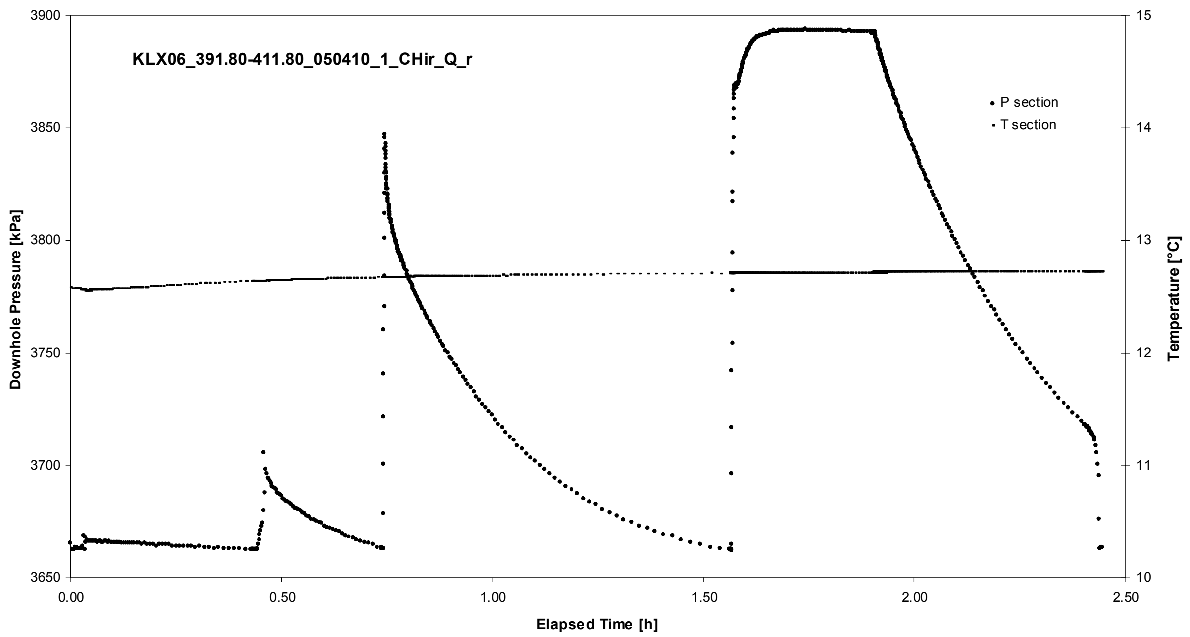
APPENDIX 2-25

Test 391.80 – 411.80 m

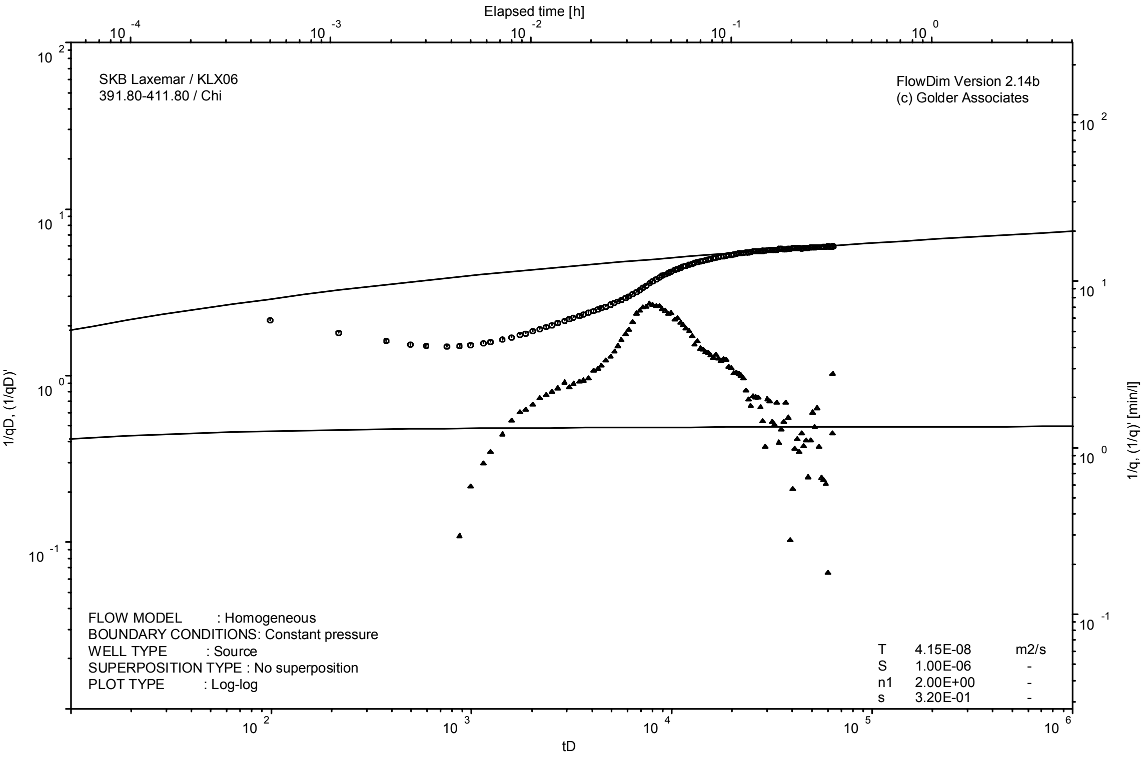
Analysis diagrams



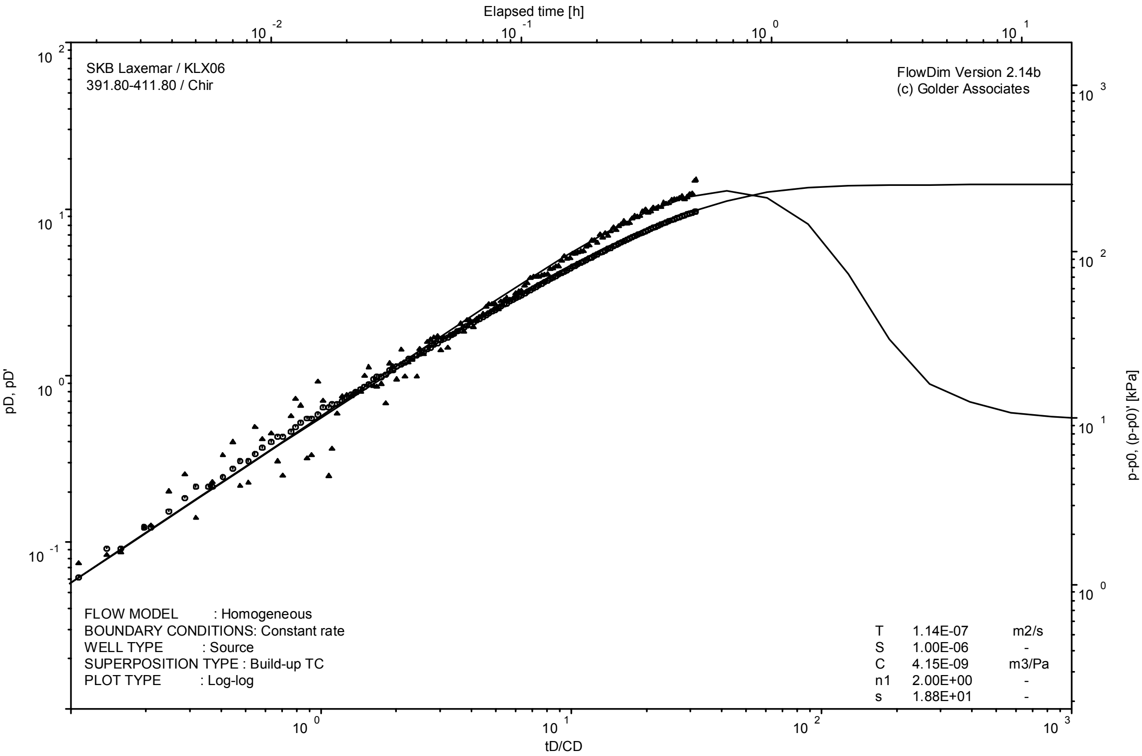
Pressure and flow rate vs. time; cartesian plot



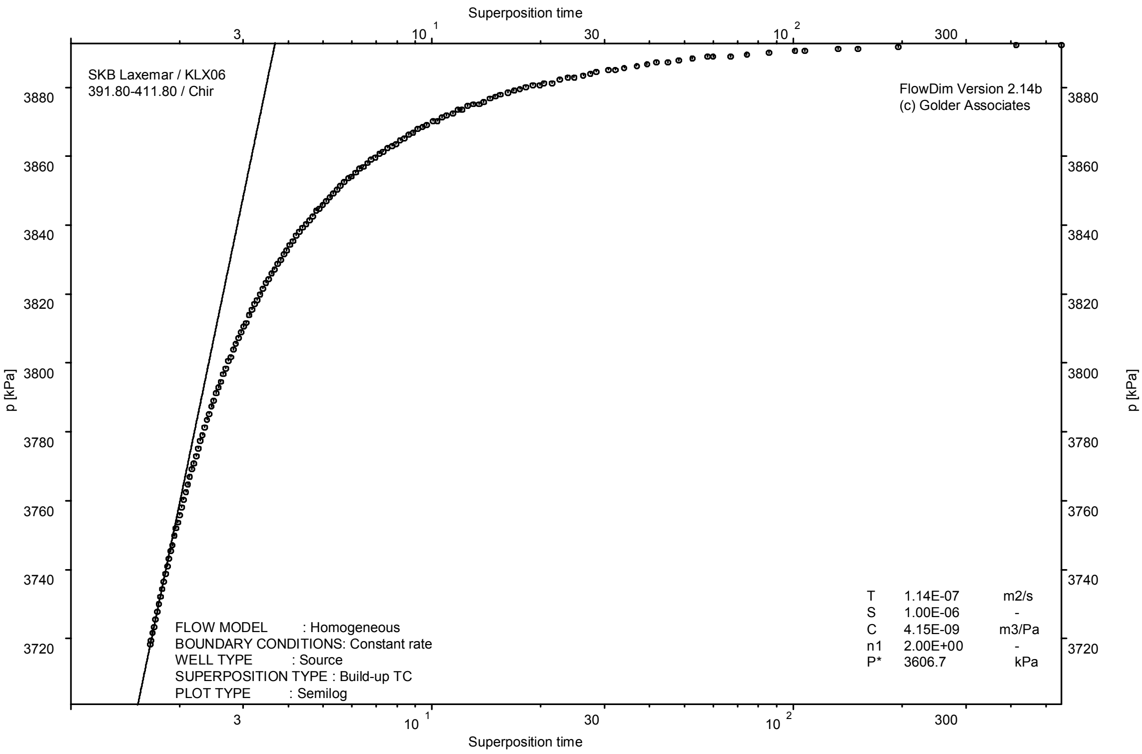
Interval pressure and temperature vs. time; cartesian plot



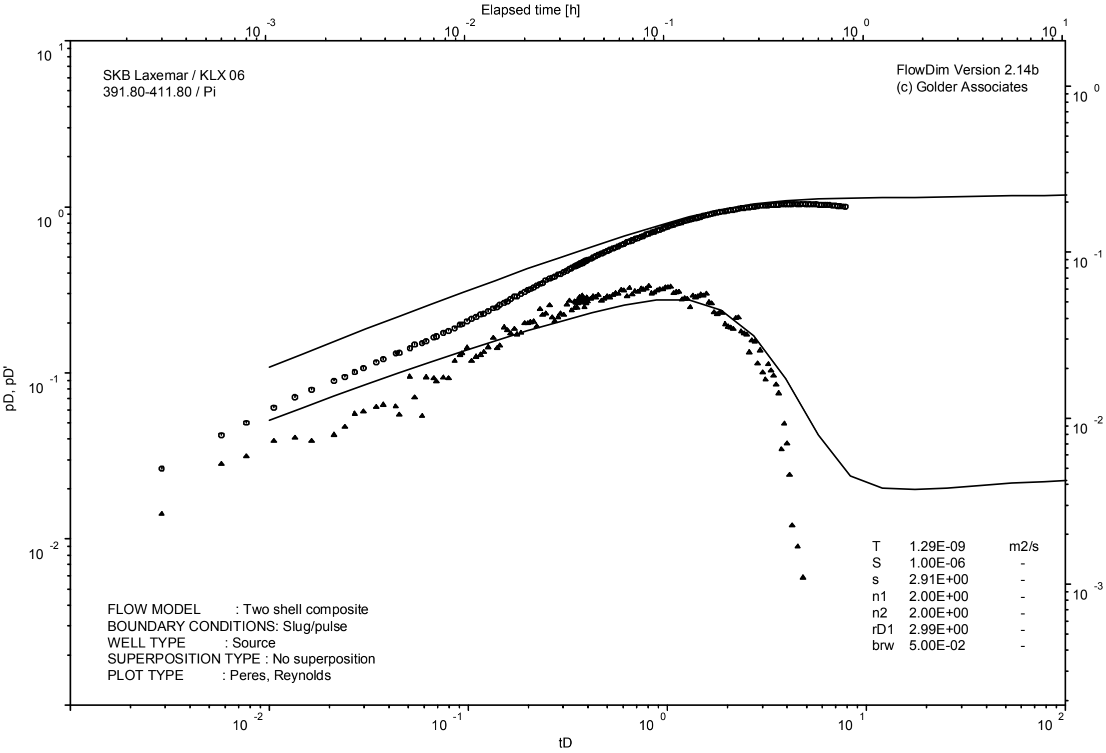
CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

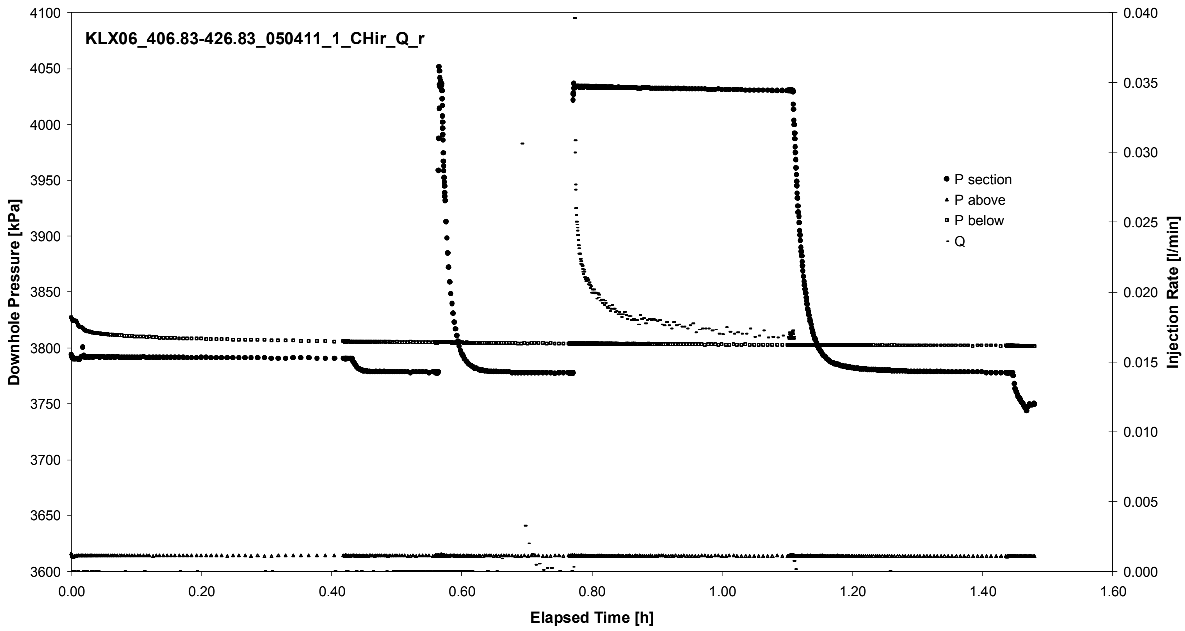


CHIR phase analysed as pulse injection; deconvolution match

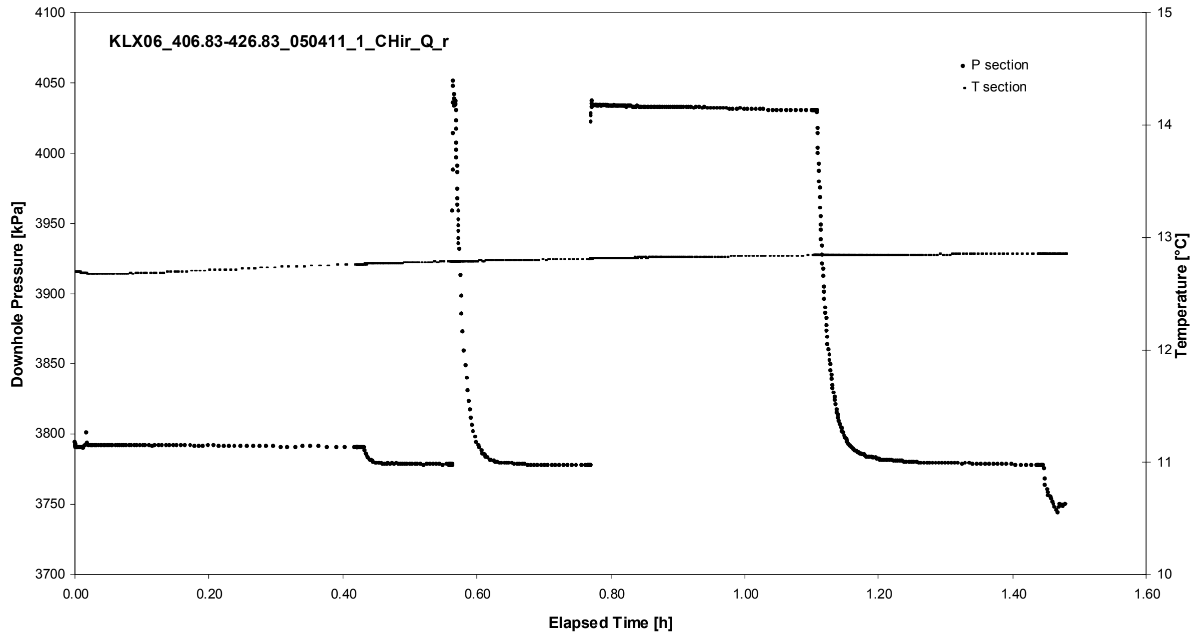
APPENDIX 2-26

Test 406.83 – 426.83 m

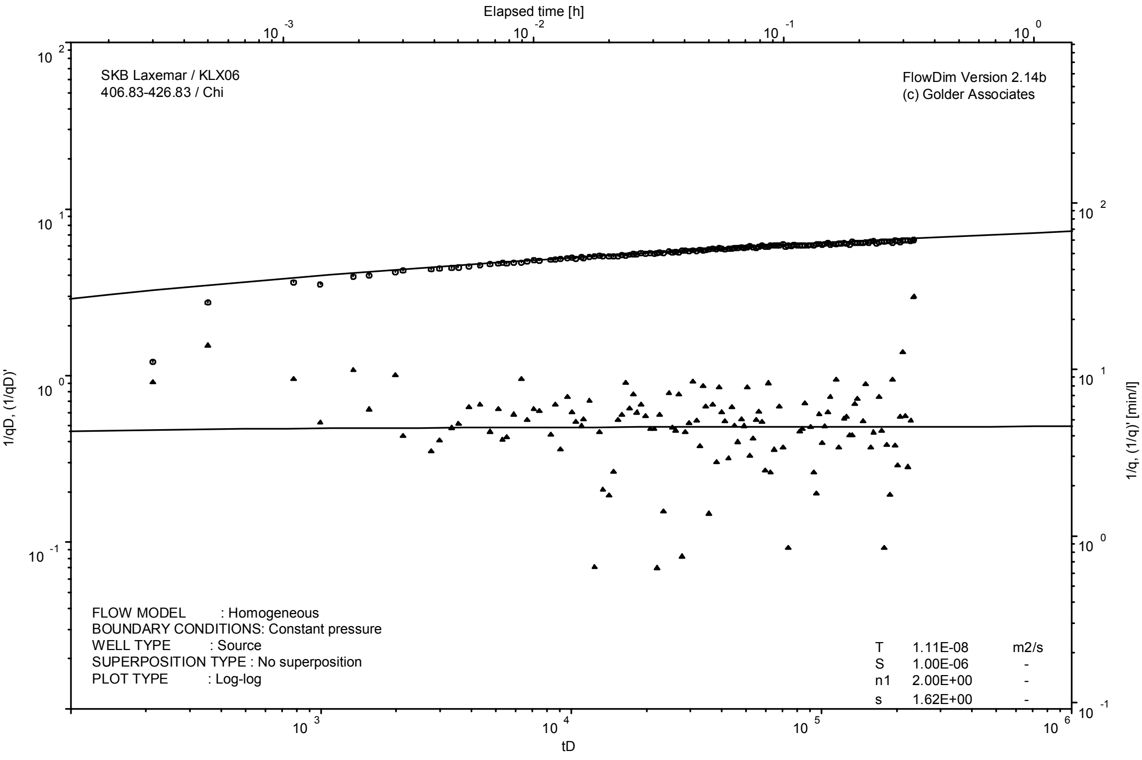
Analysis diagrams



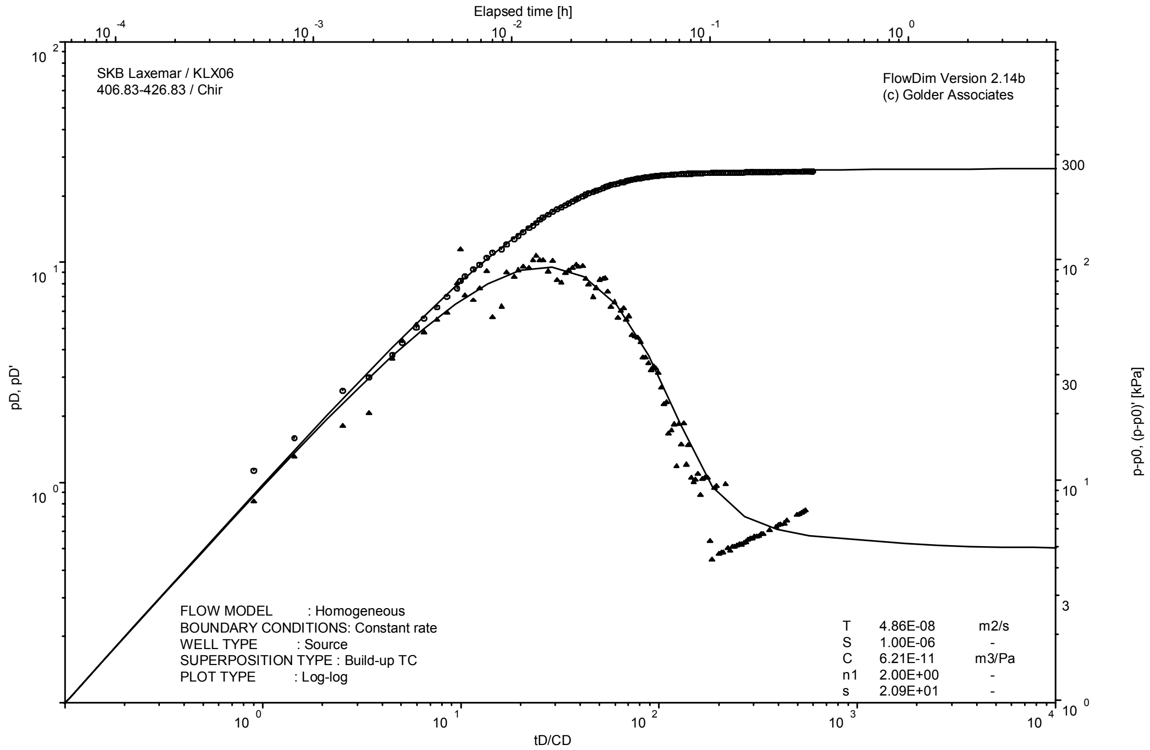
Pressure and flow rate vs. time; cartesian plot



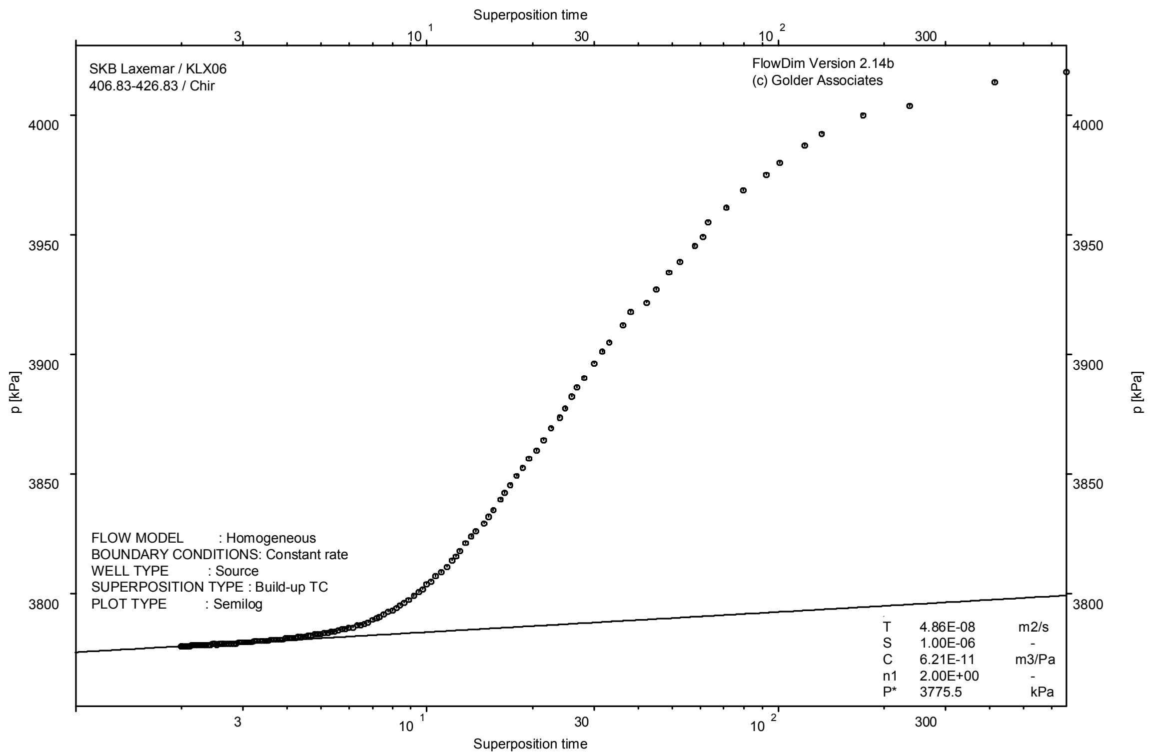
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

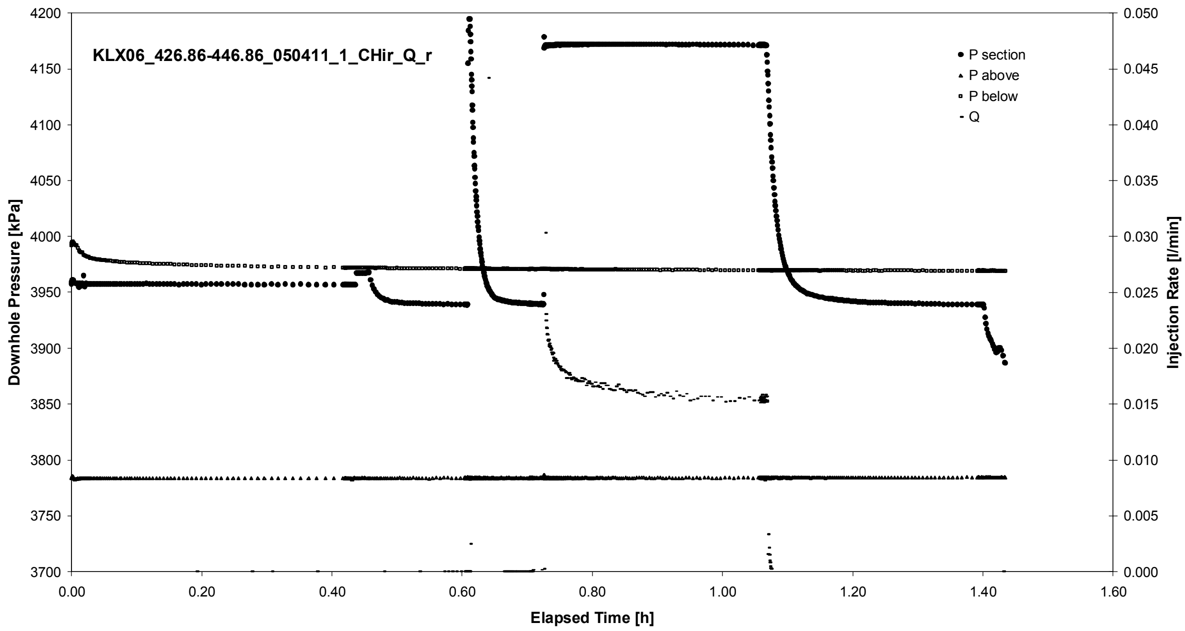


CHIR phase; HORNER match

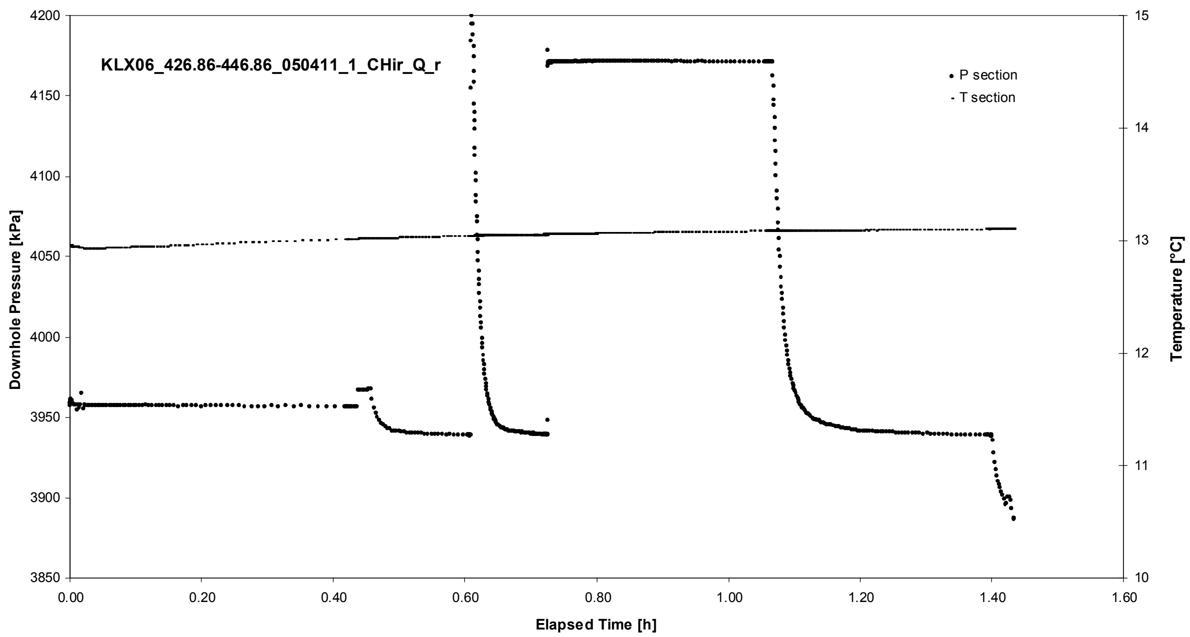
APPENDIX 2-27

Test 426.86 – 446.86 m

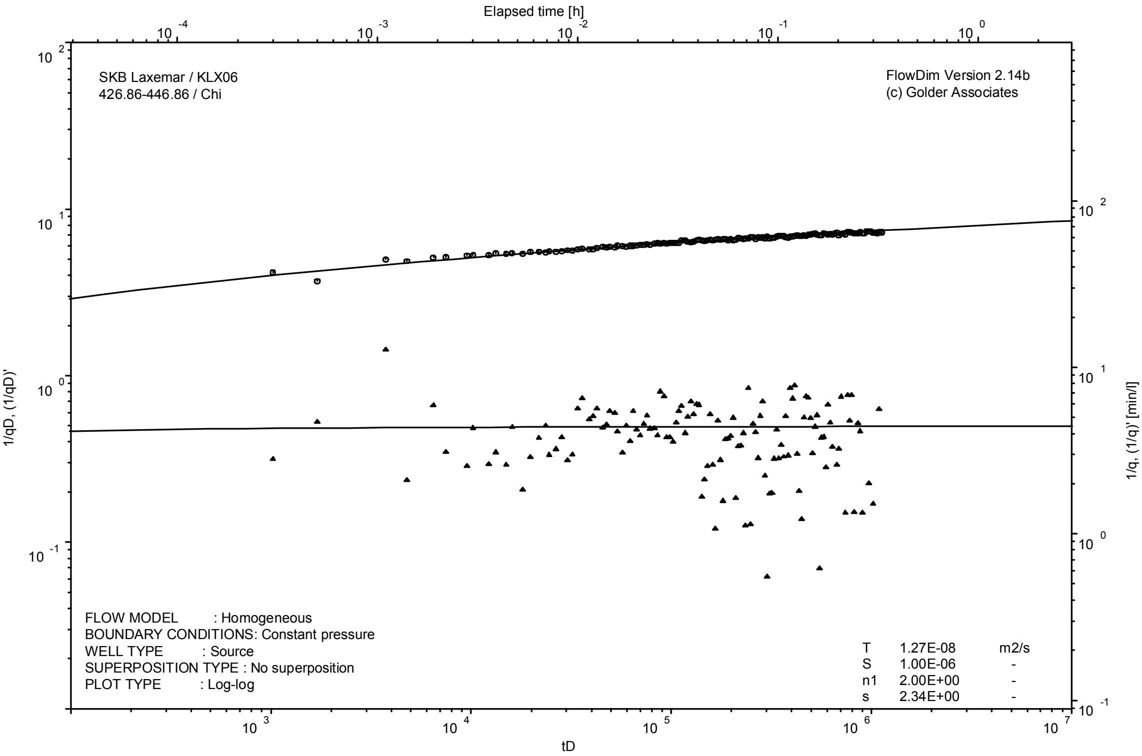
Analysis diagrams



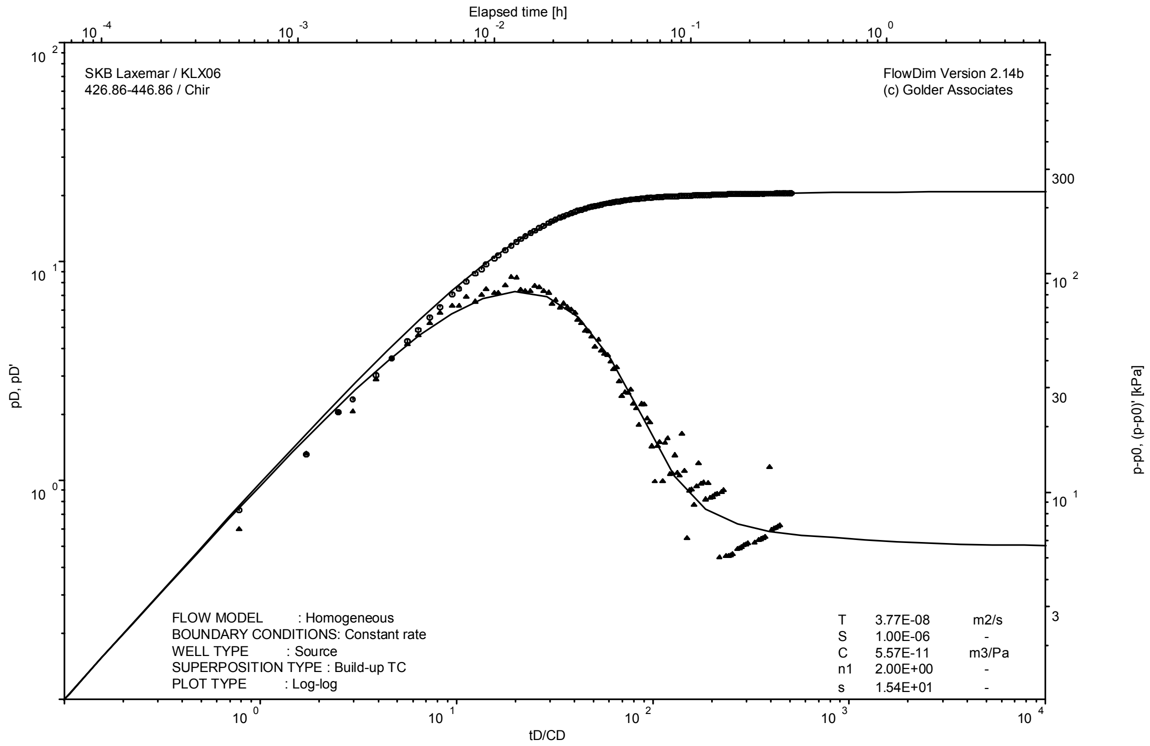
Pressure and flow rate vs. time; cartesian plot



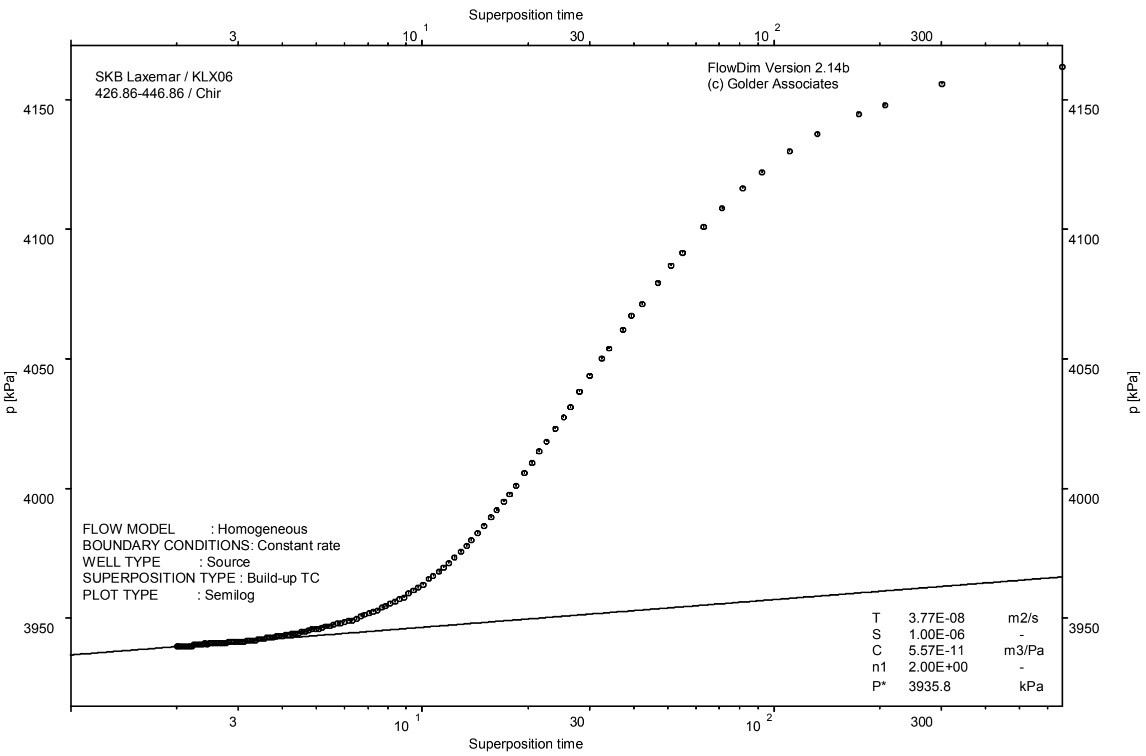
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

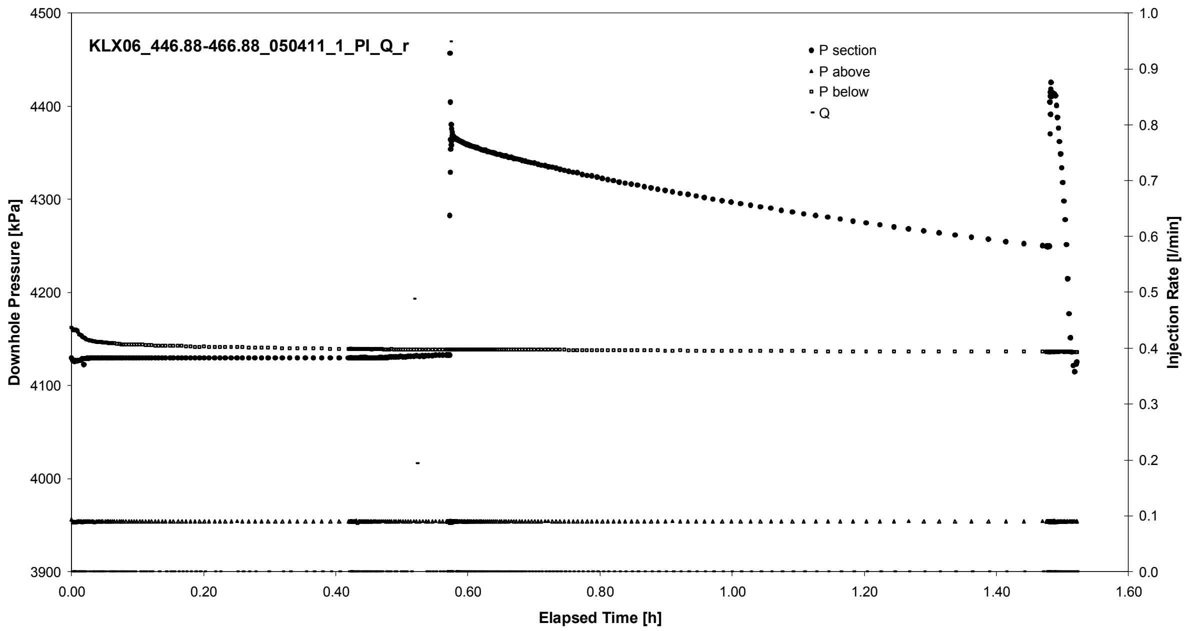


CHIR phase; HORNER match

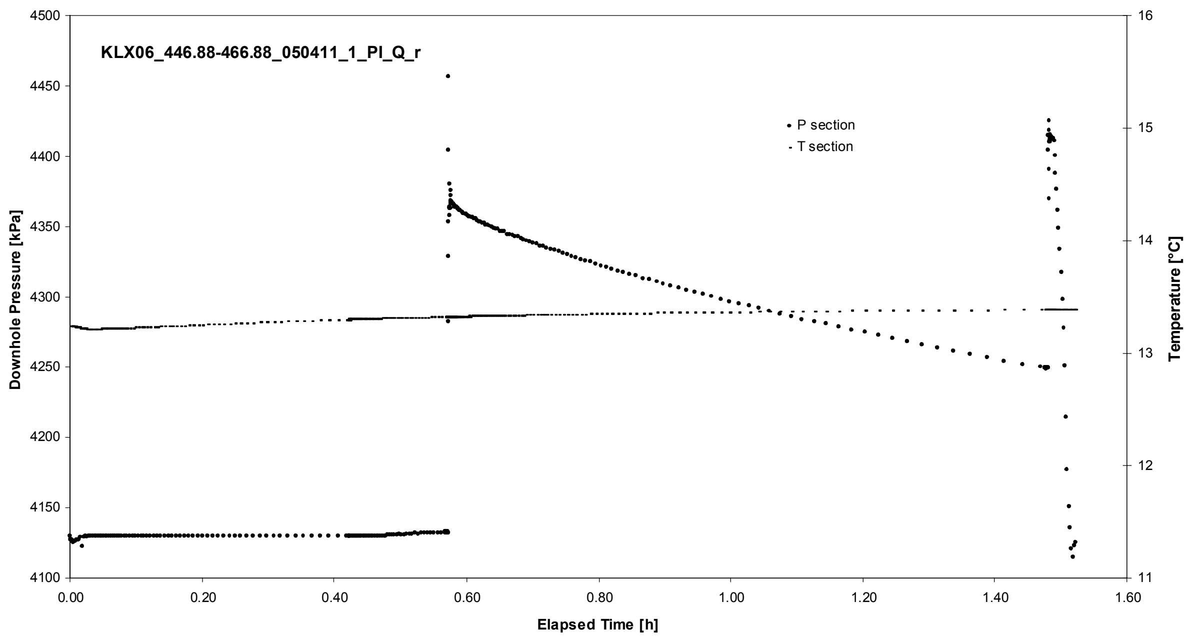
APPENDIX 2-28

Test 446.88 – 466.88 m

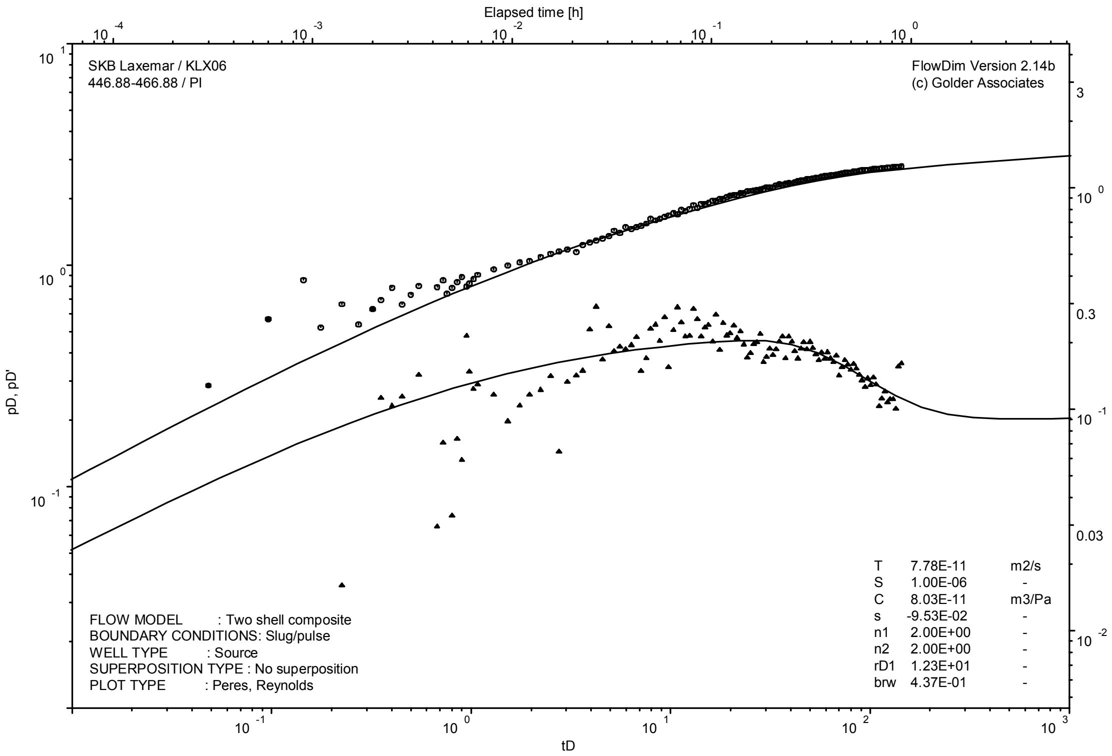
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

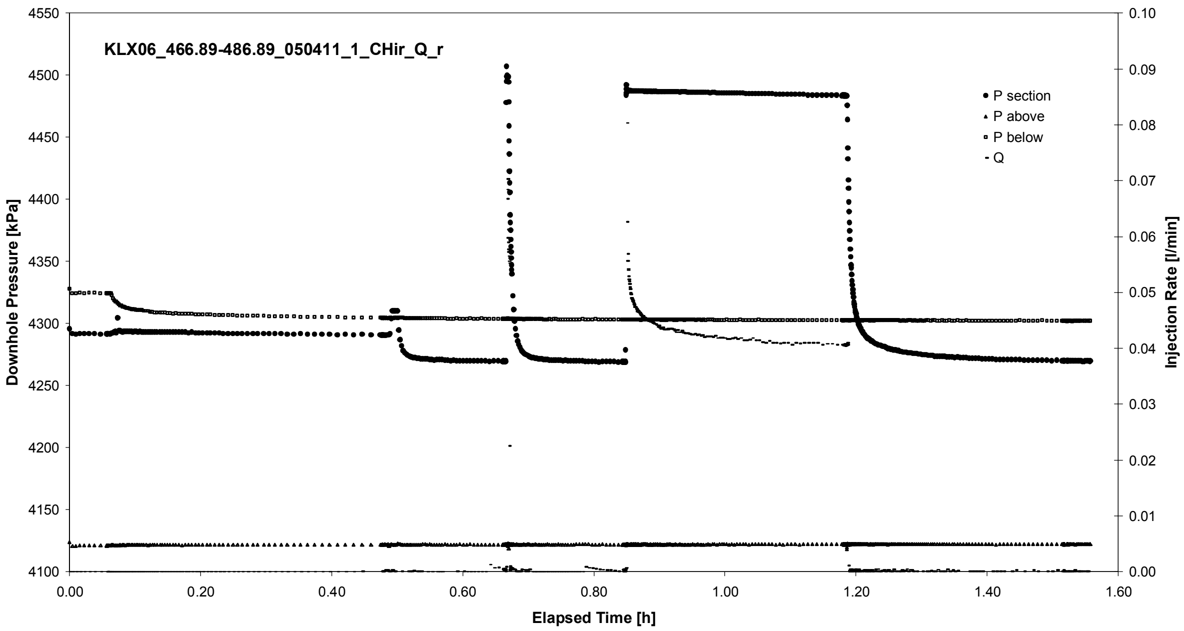


CHIR phase analysed as pulse injection; deconvolution match

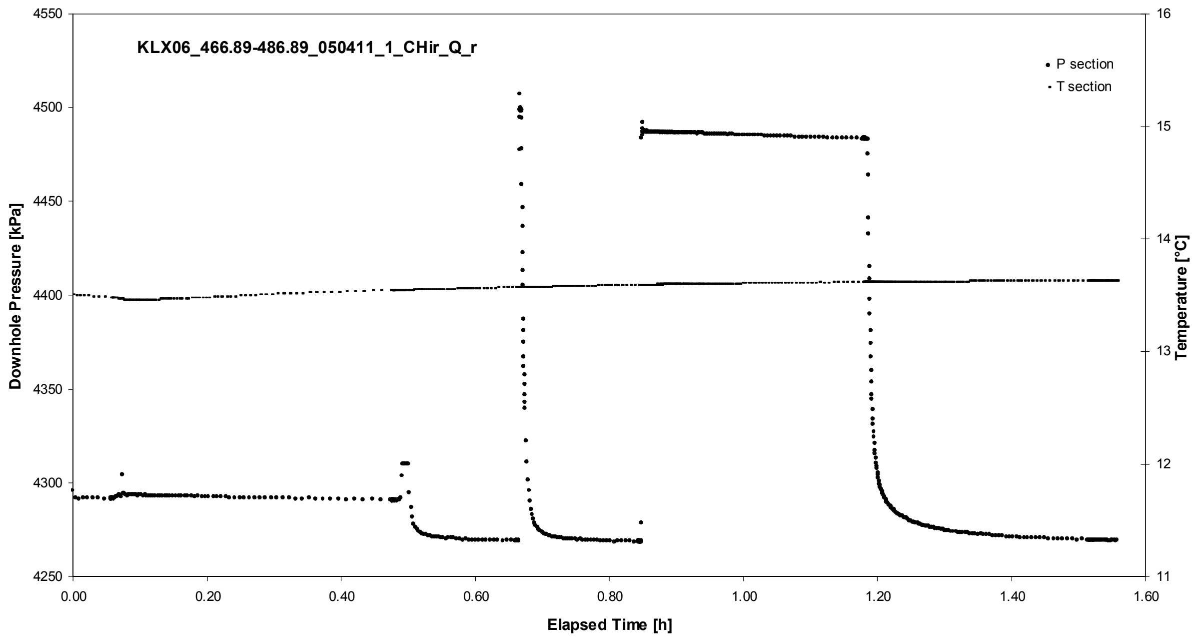
APPENDIX 2-29

Test 466.89 – 486.89 m

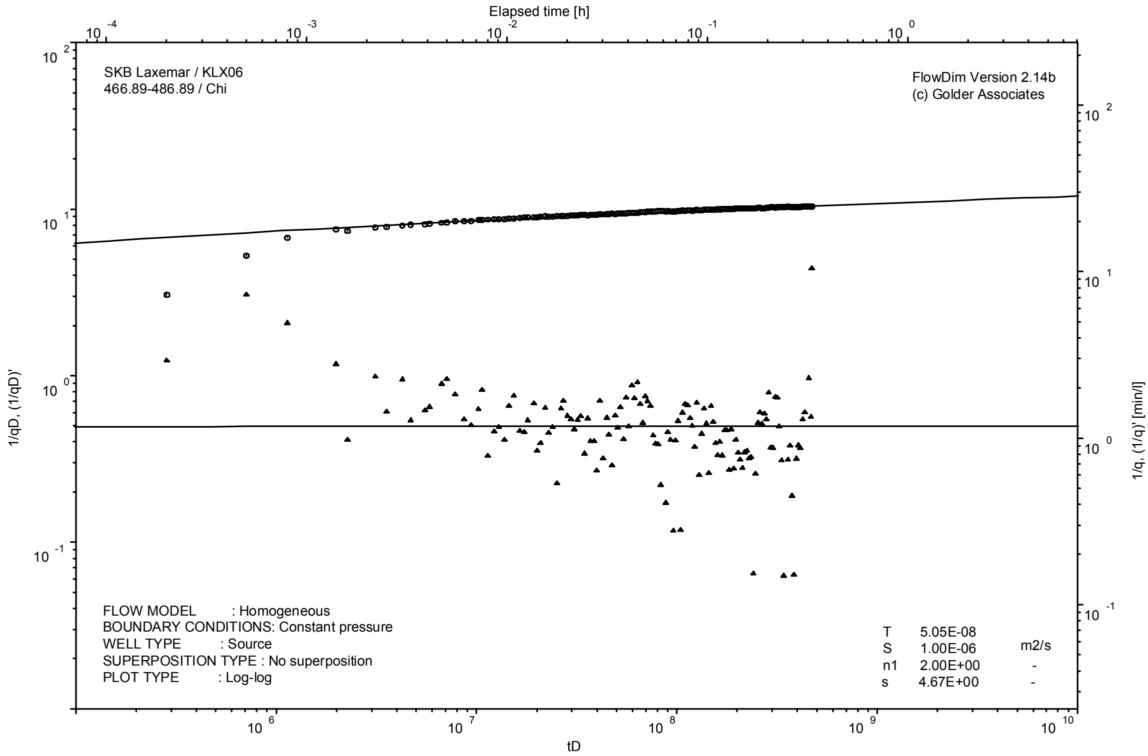
Analysis diagrams



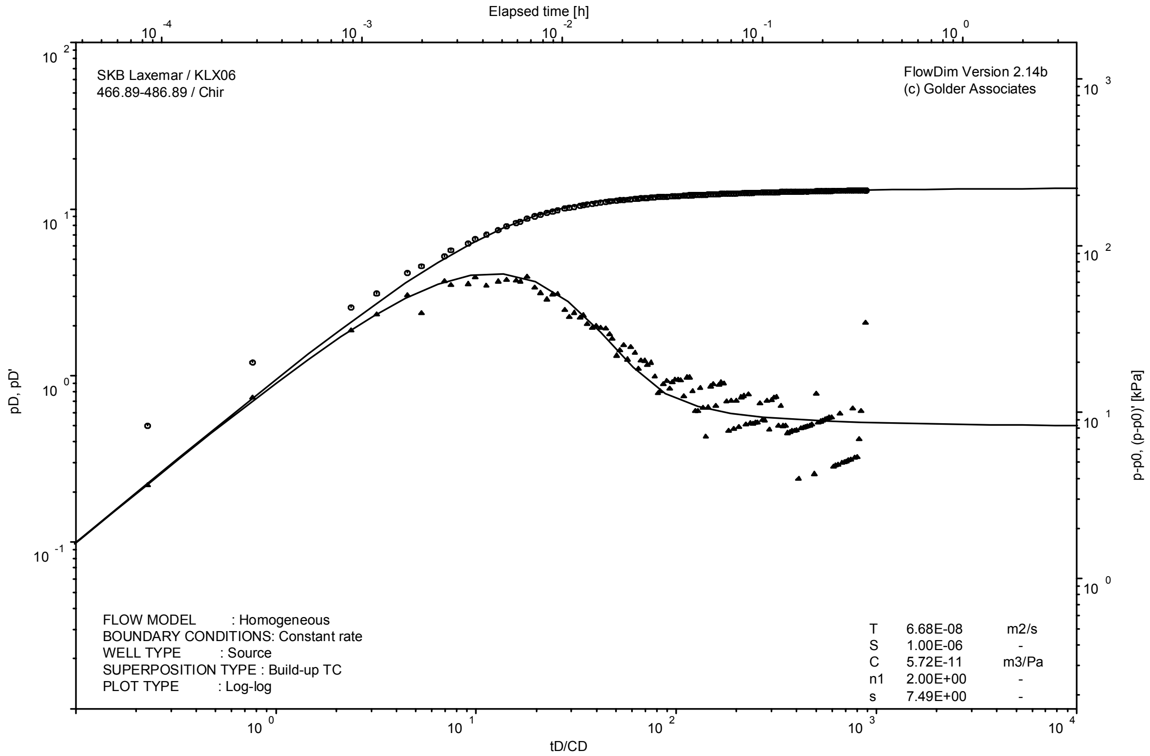
Pressure and flow rate vs. time; cartesian plot



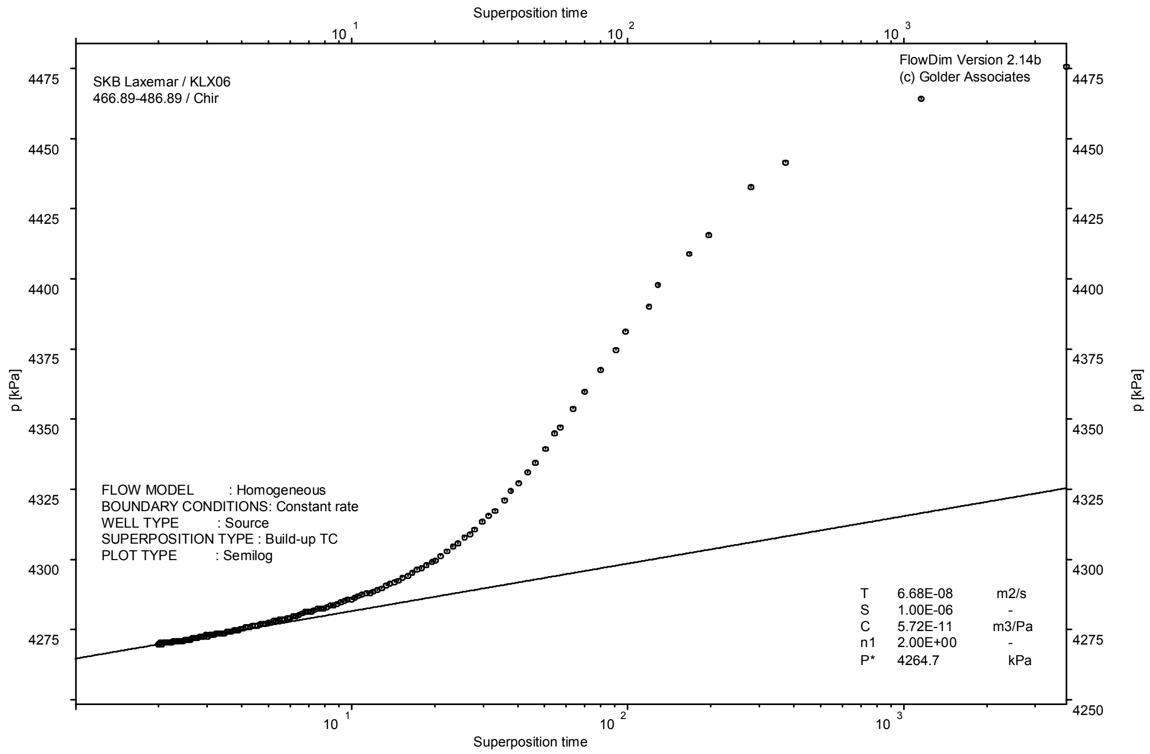
Interval pressure and temperature vs. time; cartesian plot



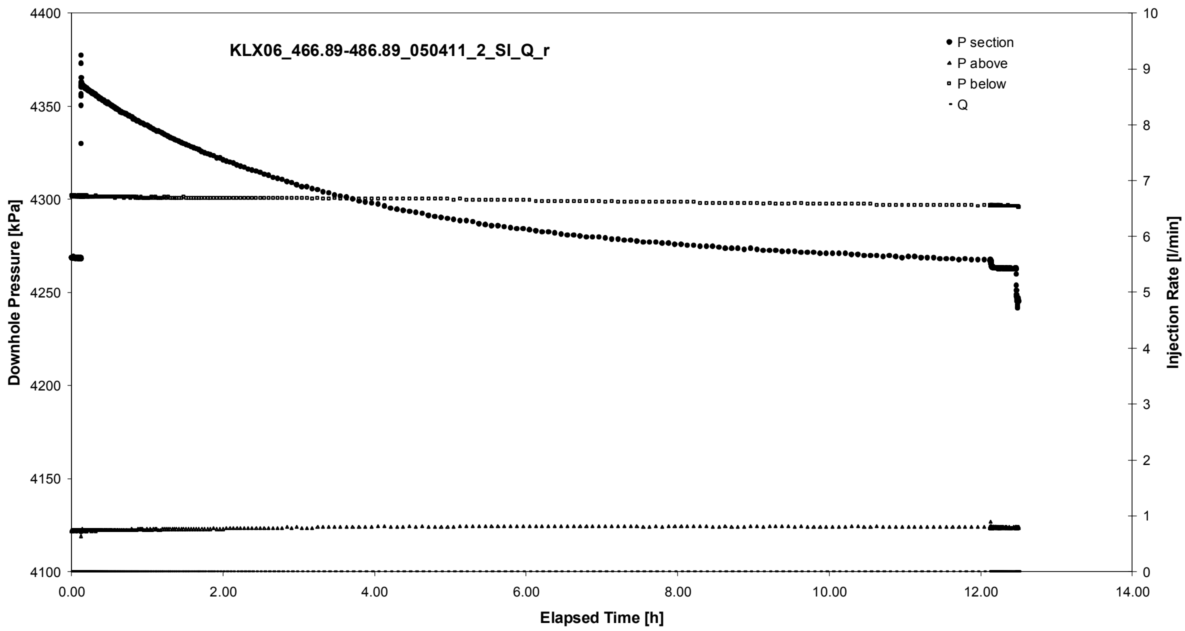
CHI phase; log-log match



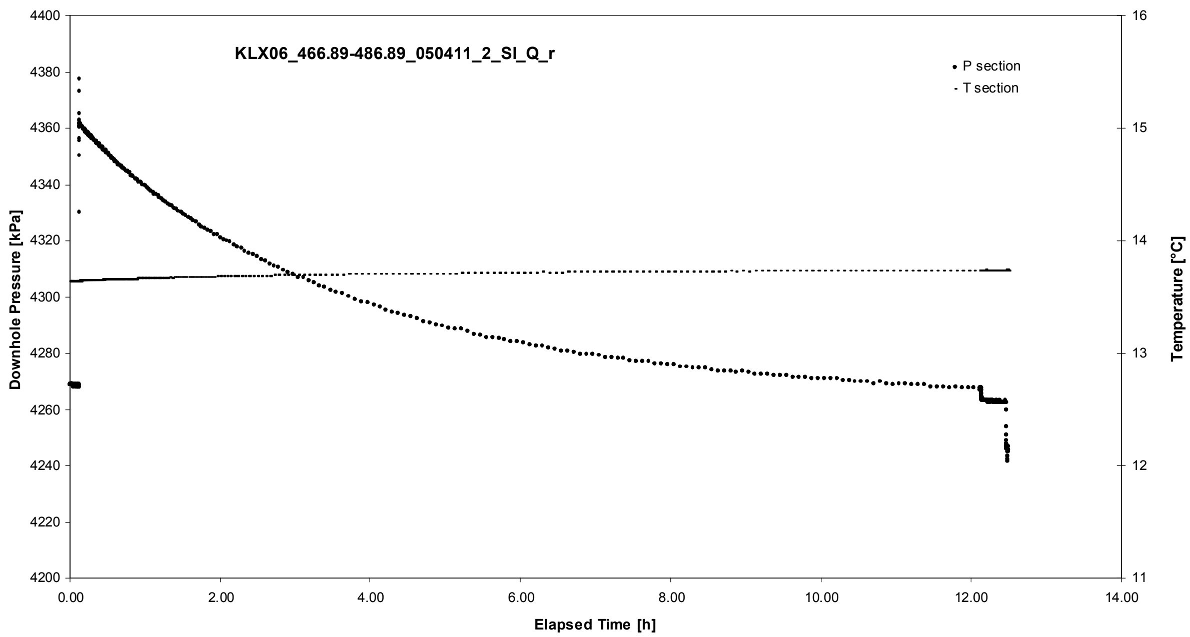
CHIR phase; log-log match



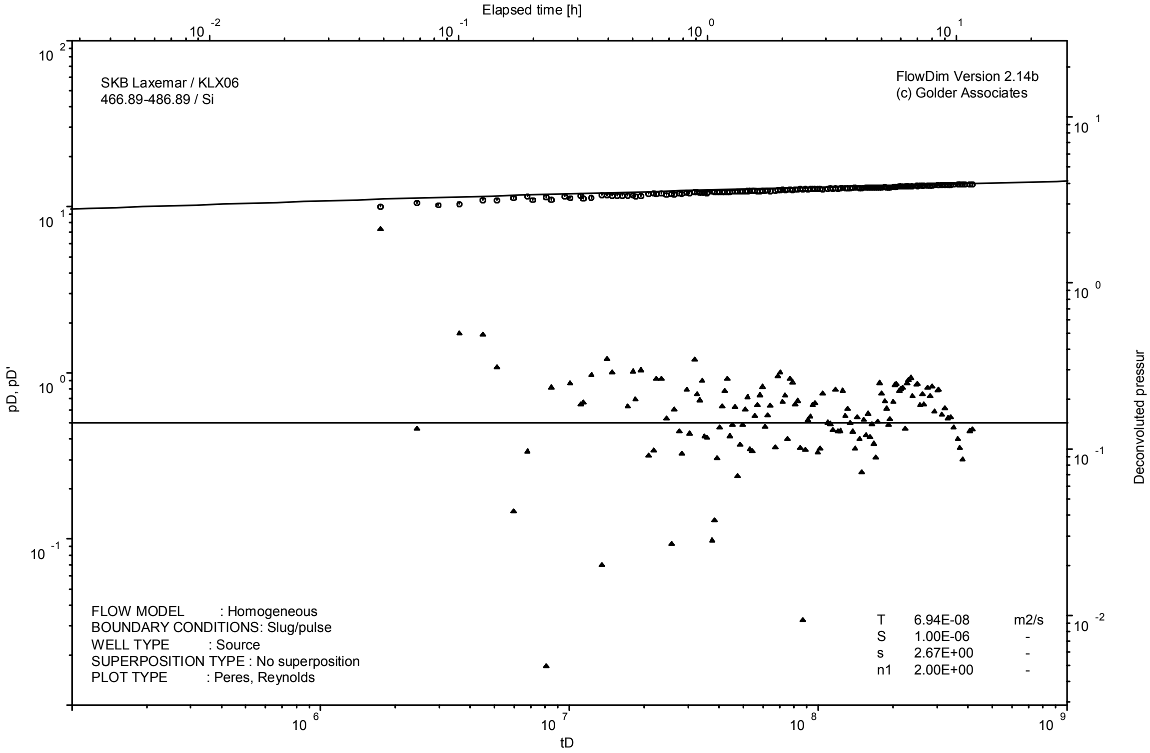
CHIR phase; HORNER match



Pressure and flow rate vs. time; cartesian plot, long term measured over night



Interval pressure and temperature vs. time; cartesian plot, long term measured over night

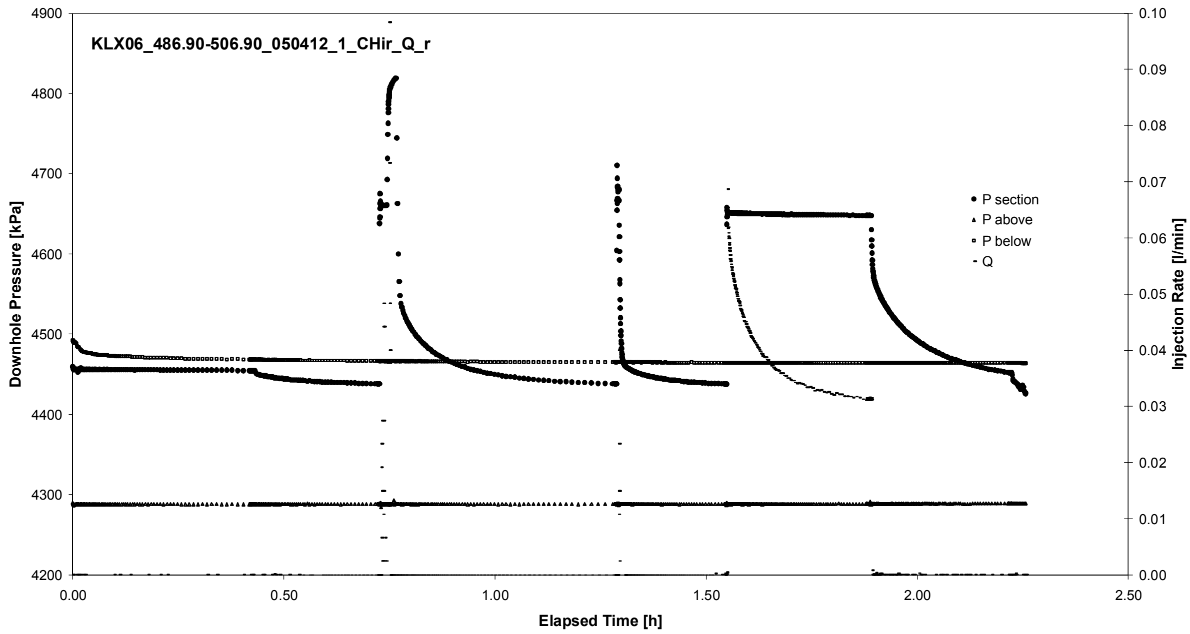


SI phase; log-log match, long term measured over night

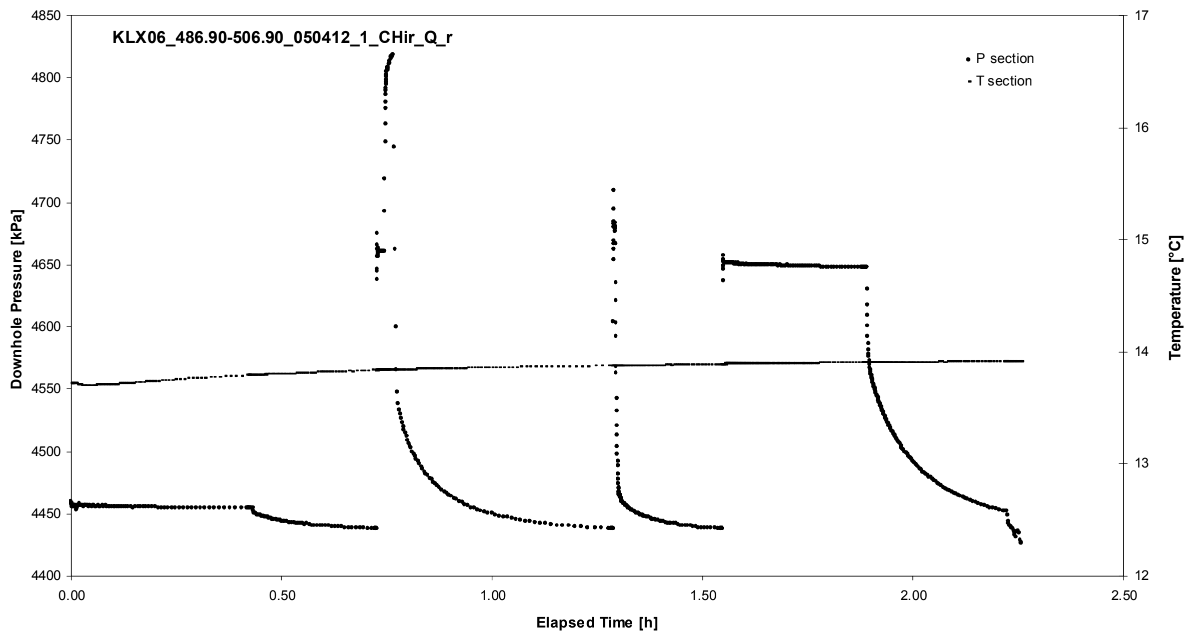
APPENDIX 2-30

Test 486.90 – 506.90 m

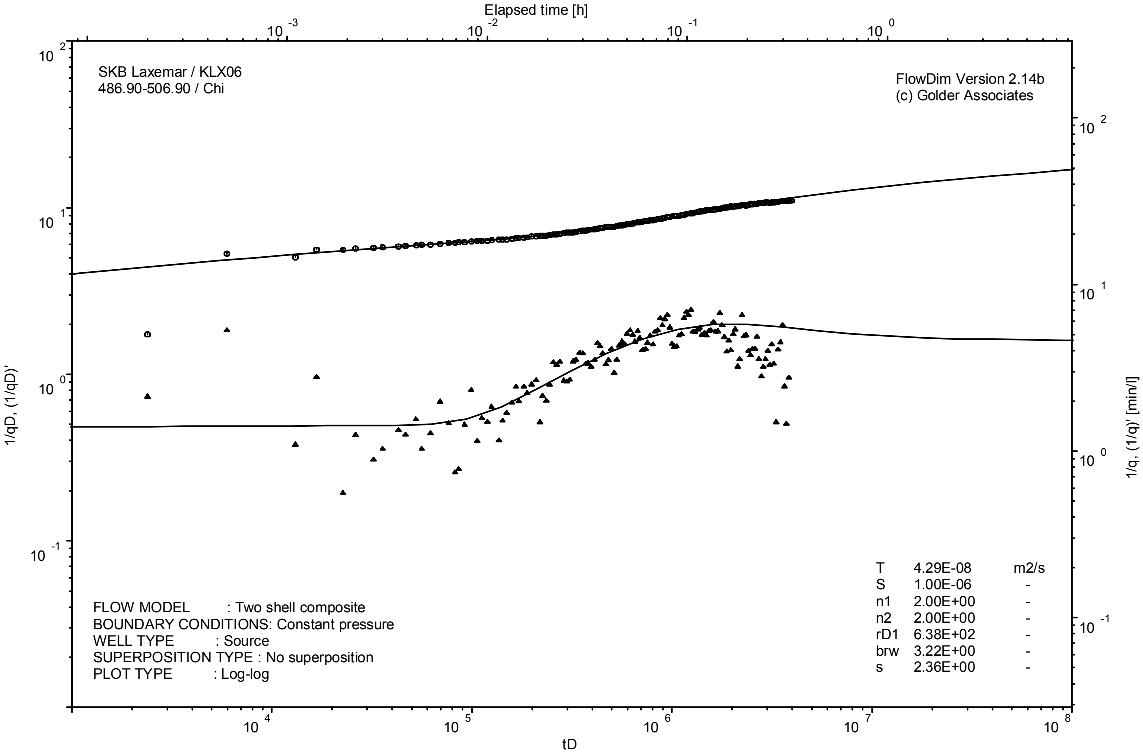
Analysis diagrams



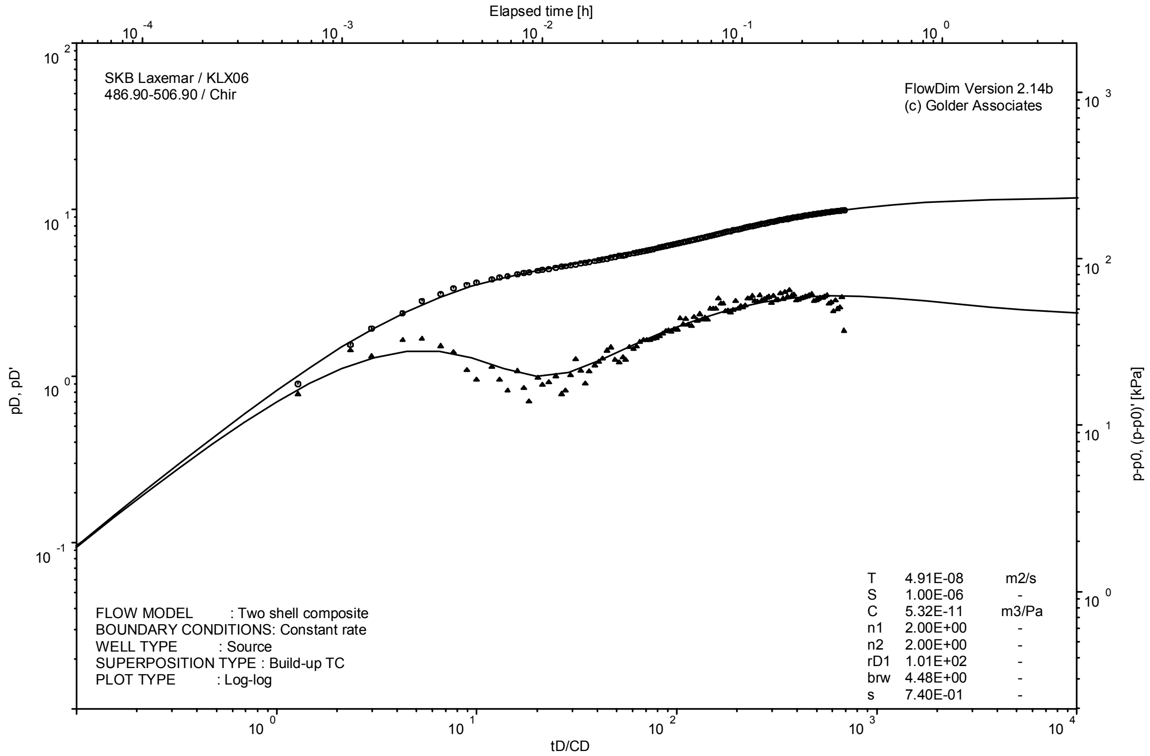
Pressure and flow rate vs. time; cartesian plot



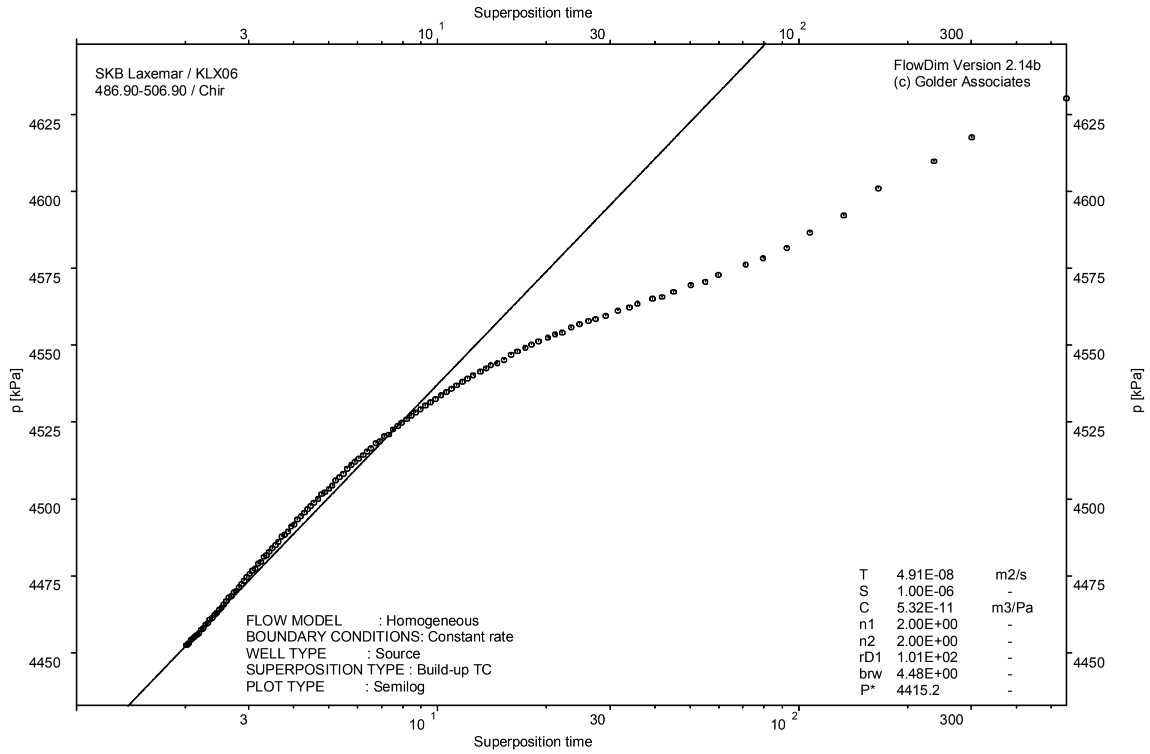
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

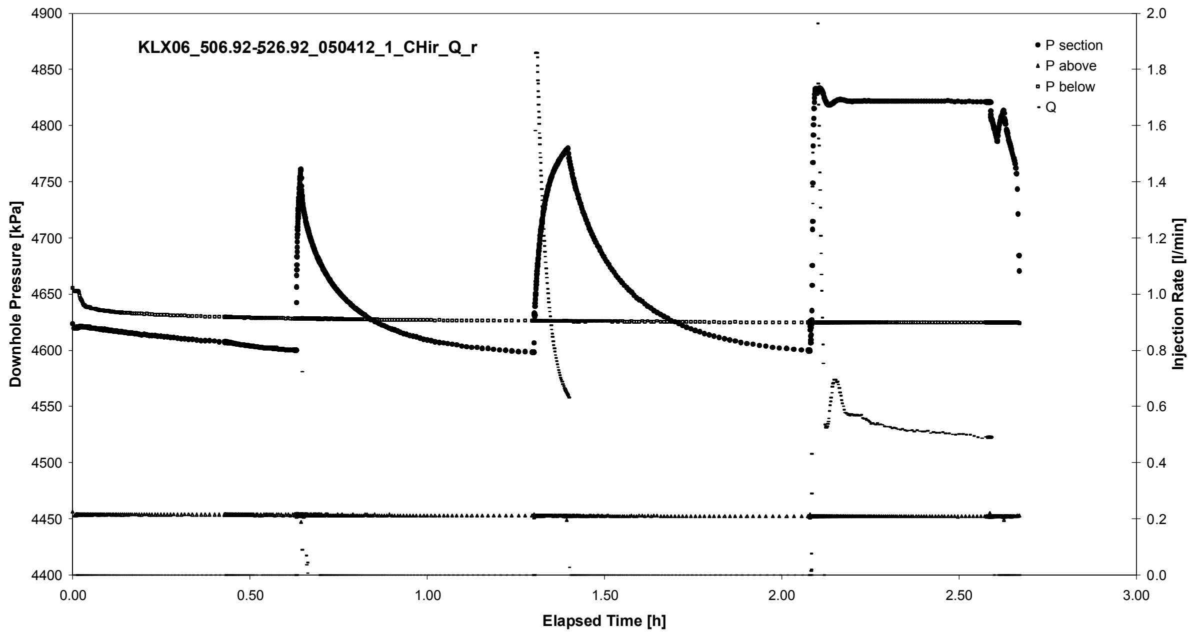


CHIR phase; HORNER match

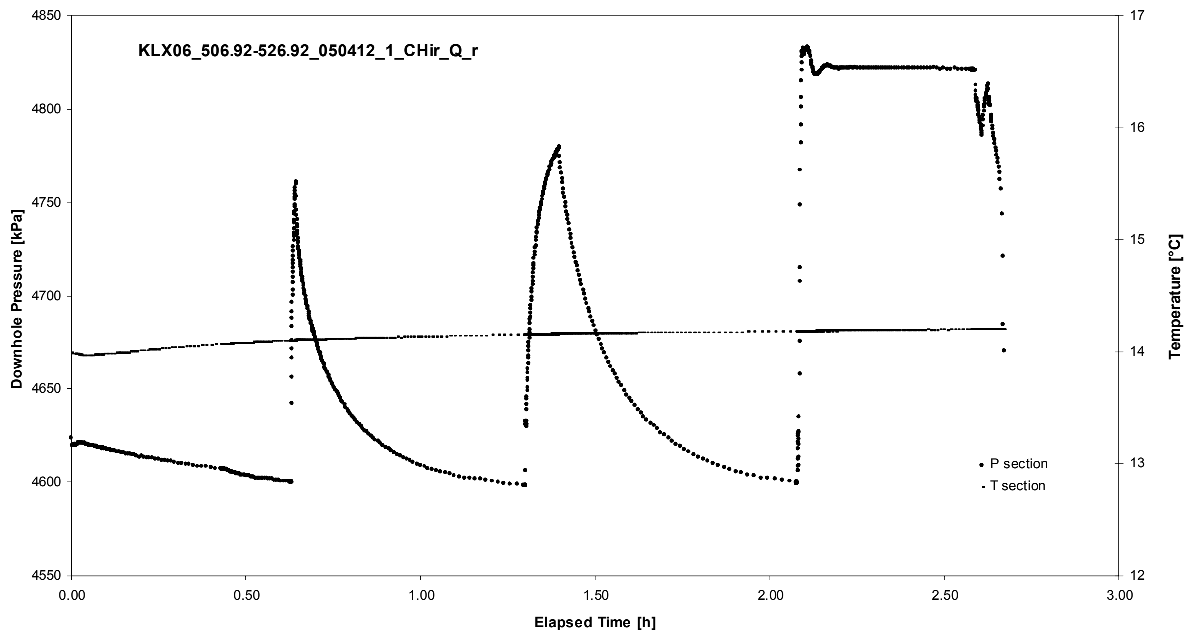
APPENDIX 2-31

Test 506.92 – 526.92 m

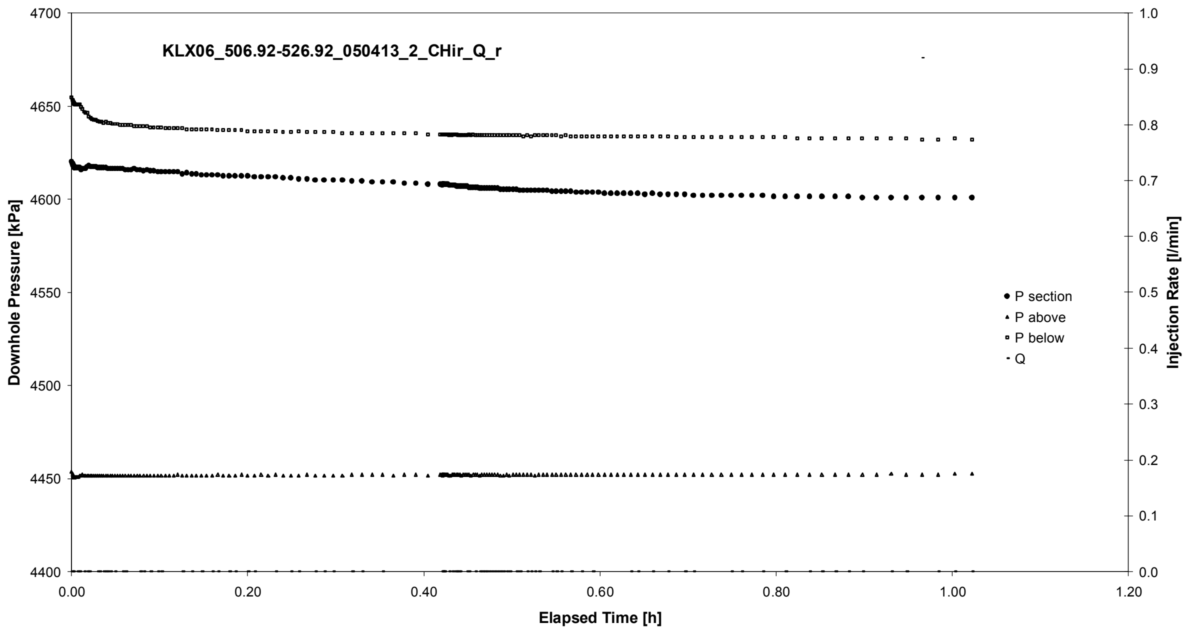
Analysis diagrams



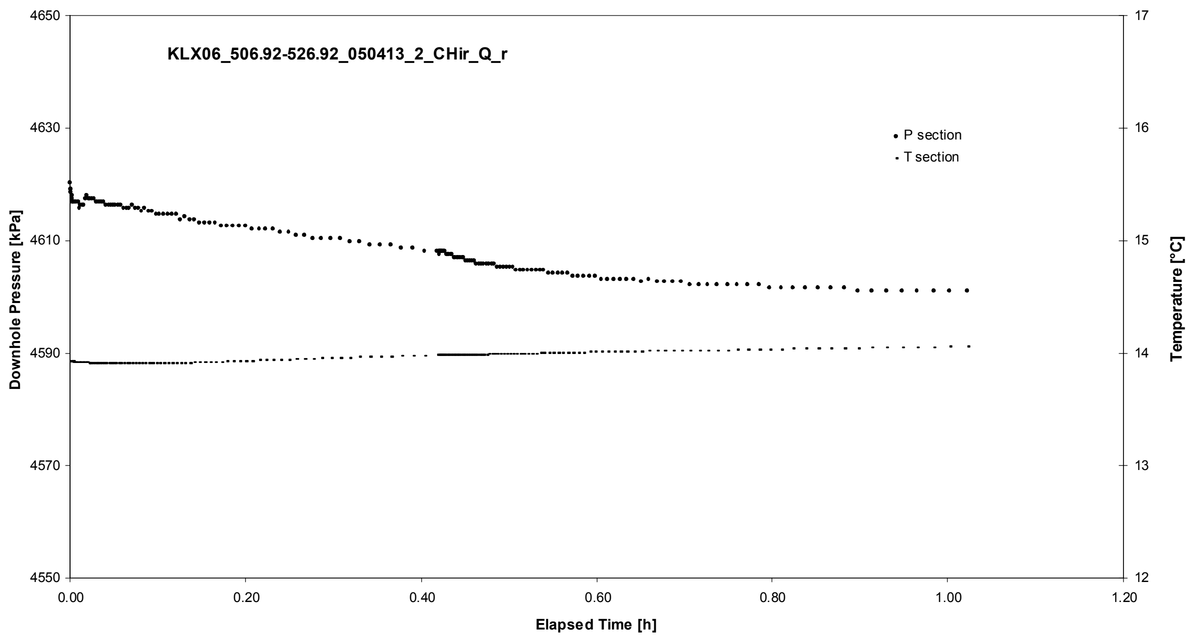
Pressure and flow rate vs. time; cartesian plot (test repeated)



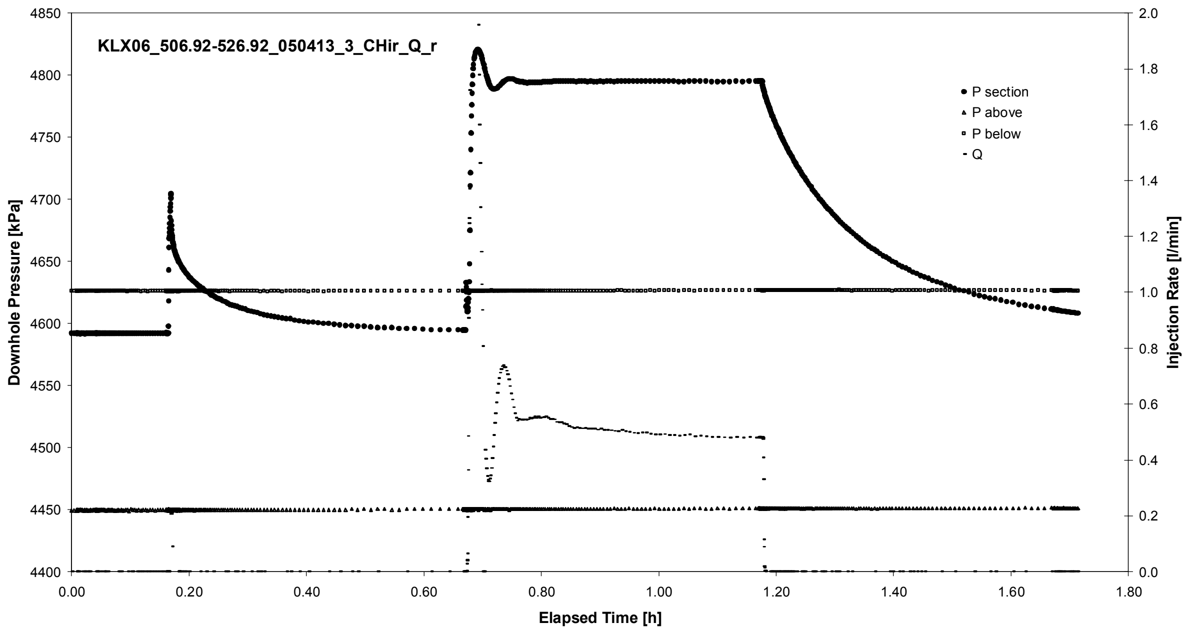
Interval pressure and temperature vs. time; cartesian plot (test repeated)



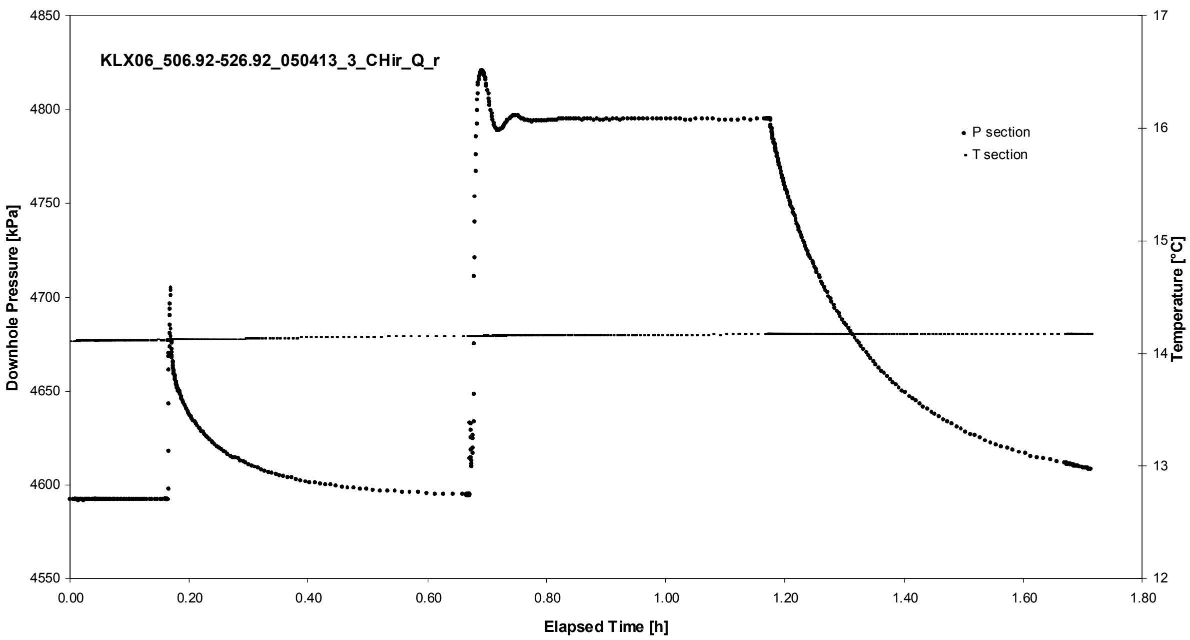
Pressure and flow rate vs. time; cartesian plot (test repeated)



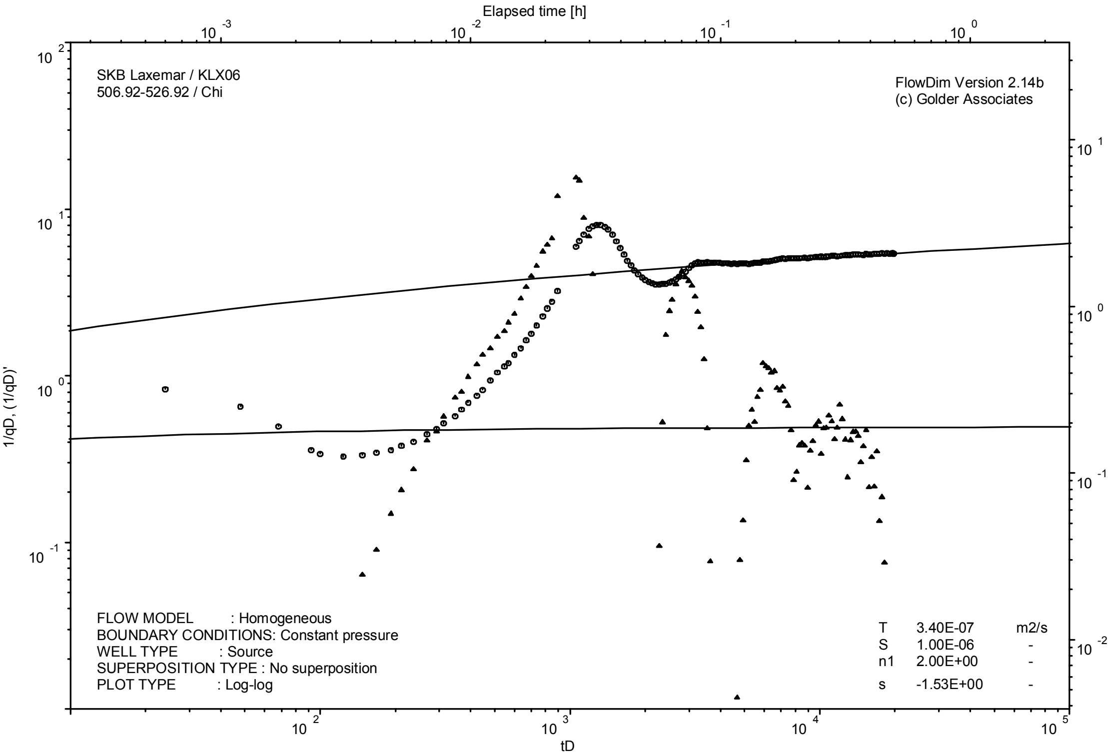
Interval pressure and temperature vs. time; cartesian plot (test repeated)



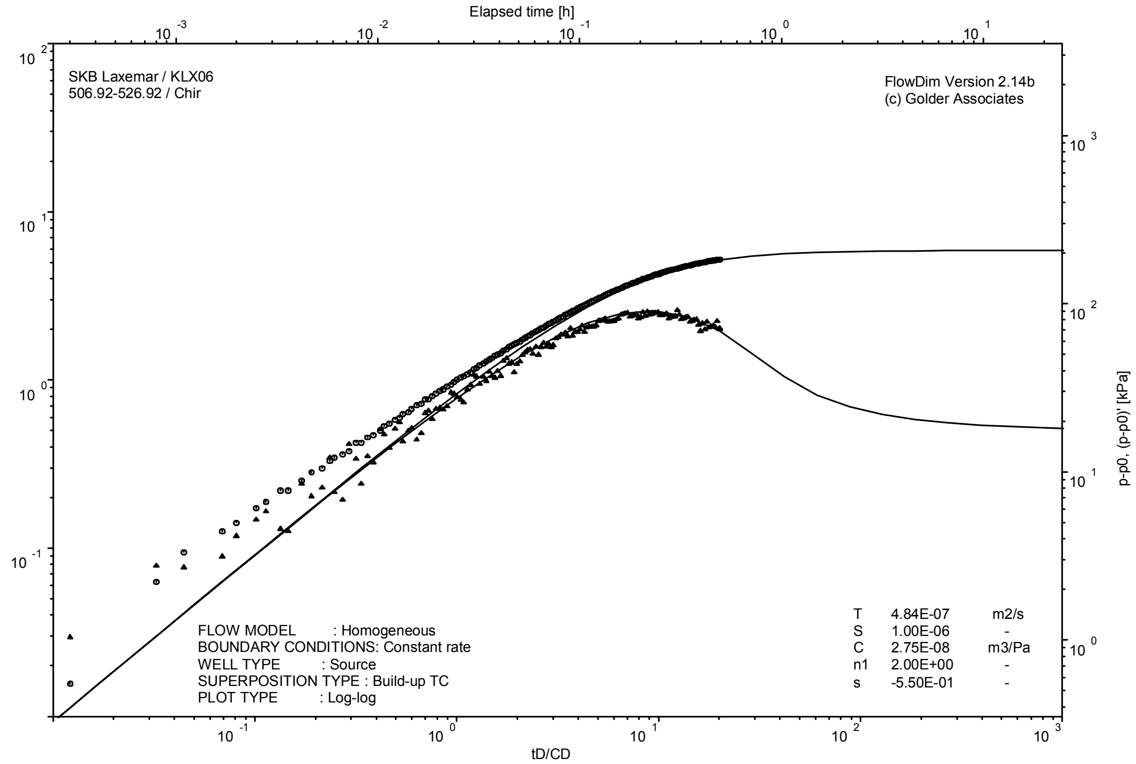
Pressure and flow rate vs. time; cartesian plot (analysed)



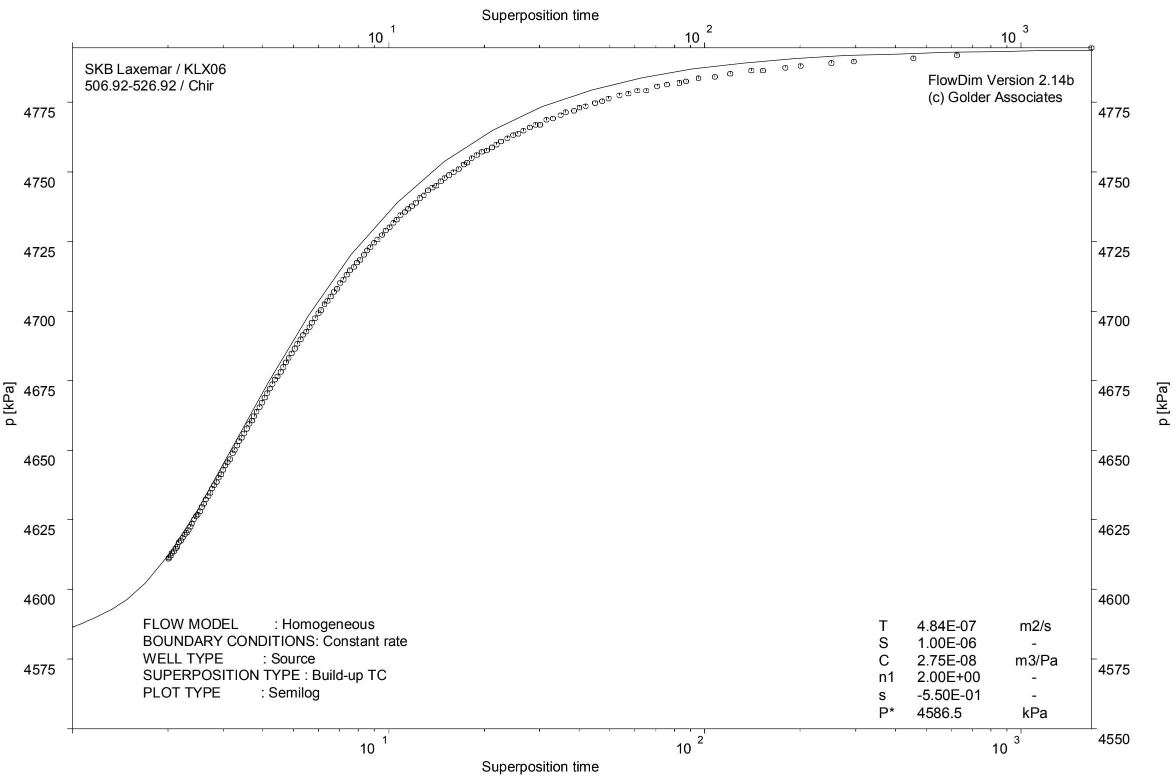
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

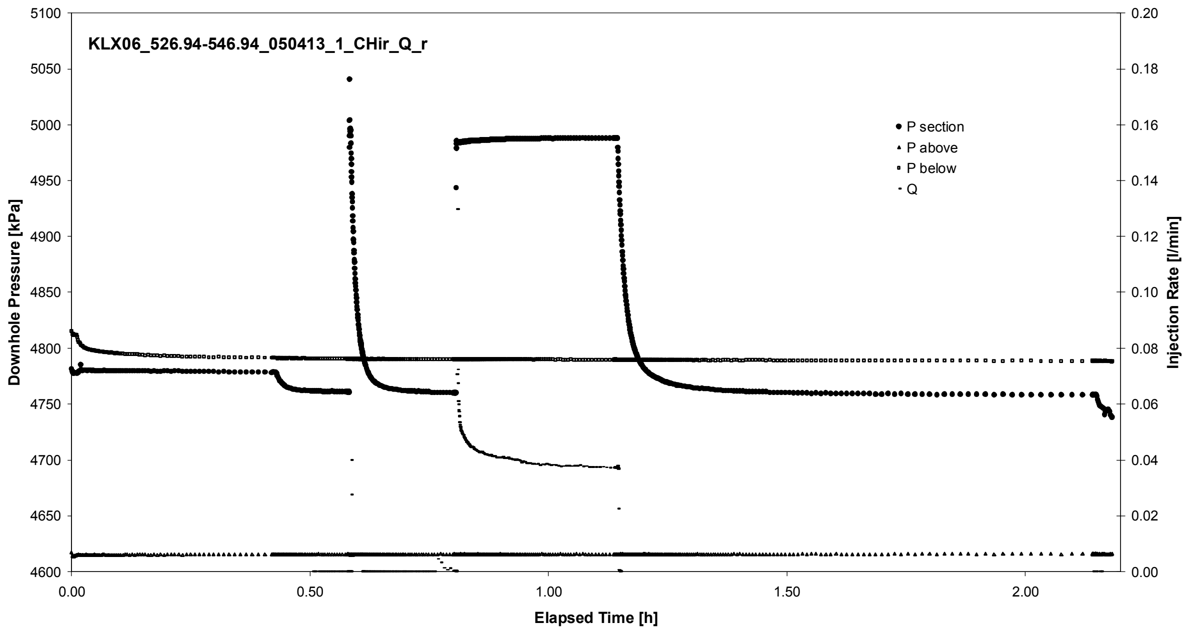


CHIR phase; HORNER match

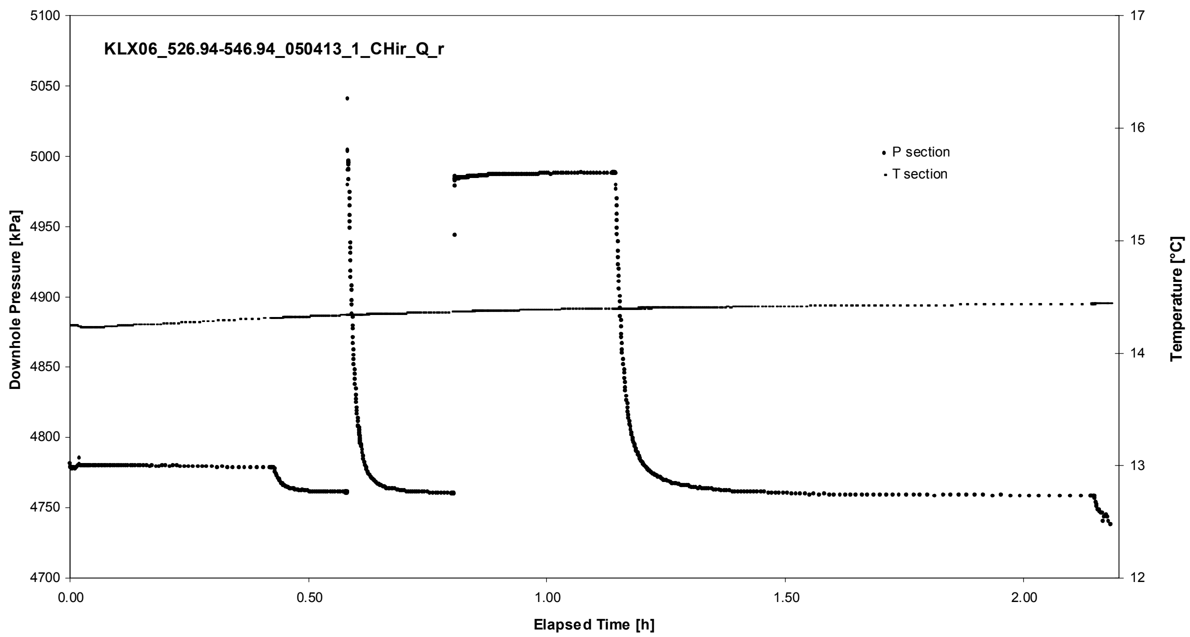
APPENDIX 2-32

Test 526.94 – 546.94 m

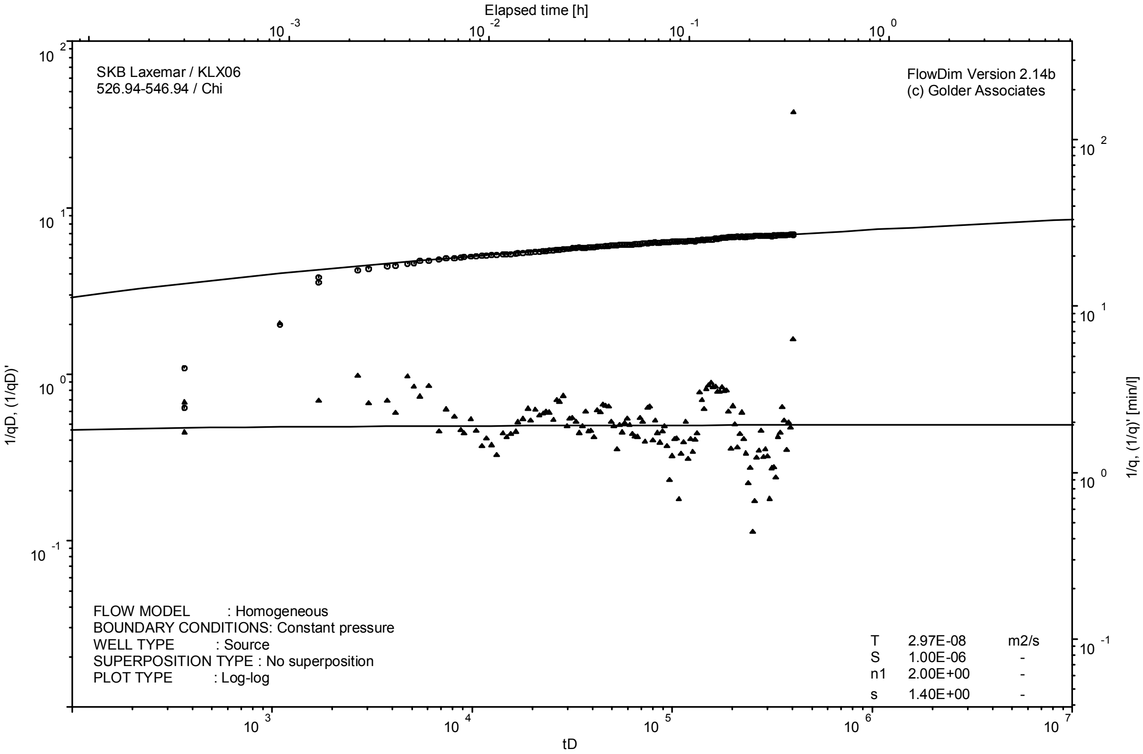
Analysis diagrams



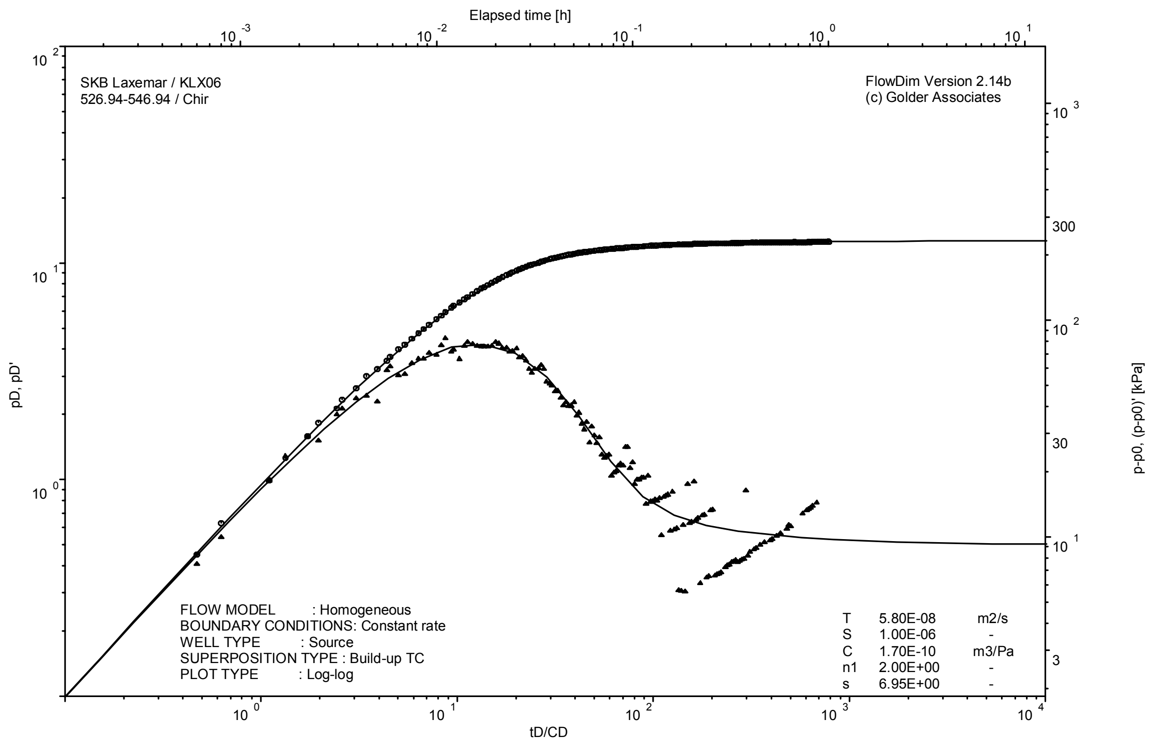
Pressure and flow rate vs. time; cartesian plot



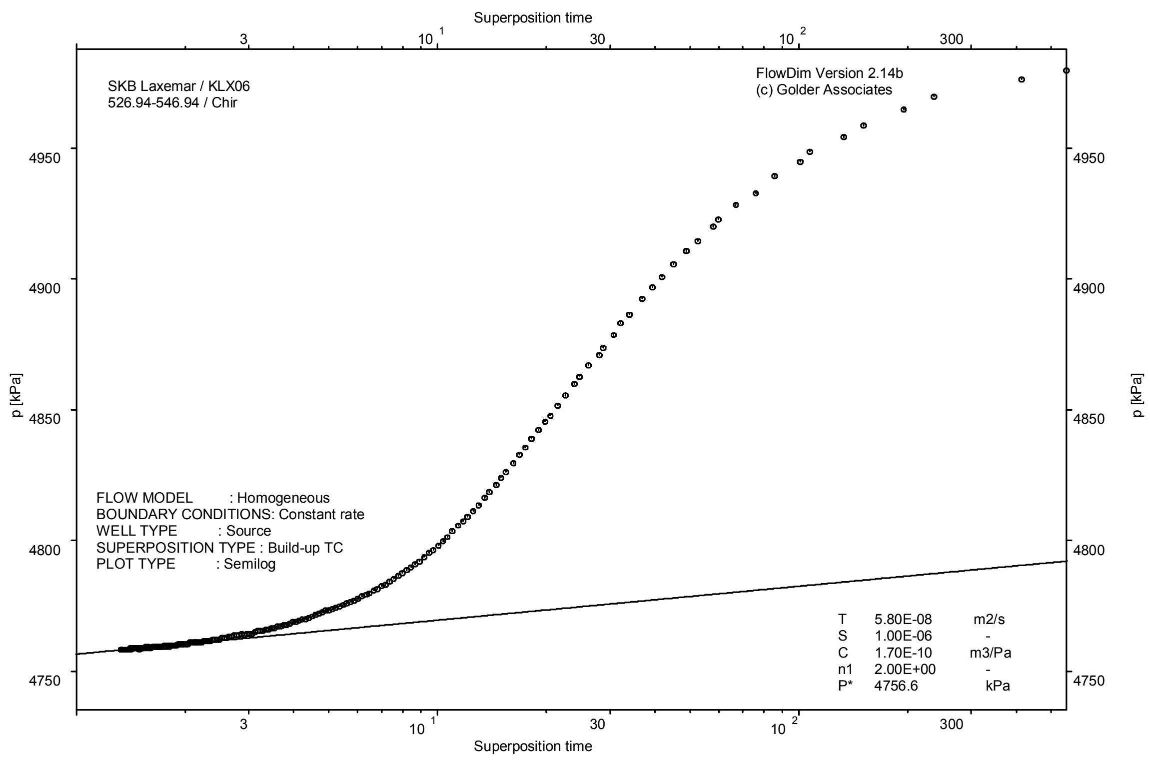
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

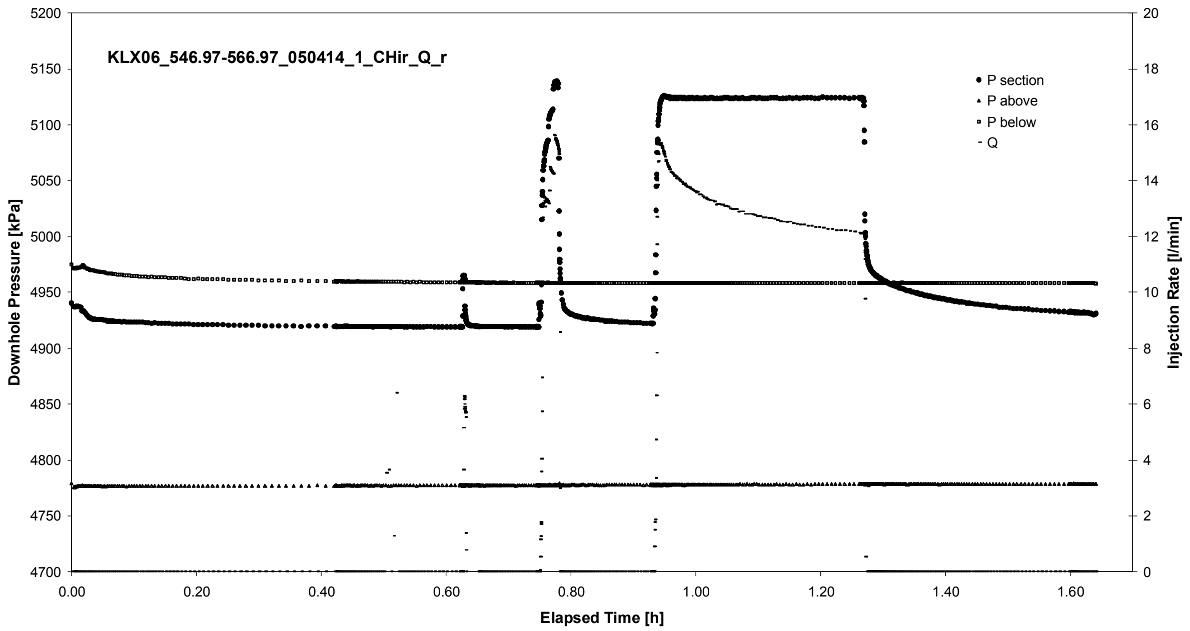


CHIR phase; HORNER match

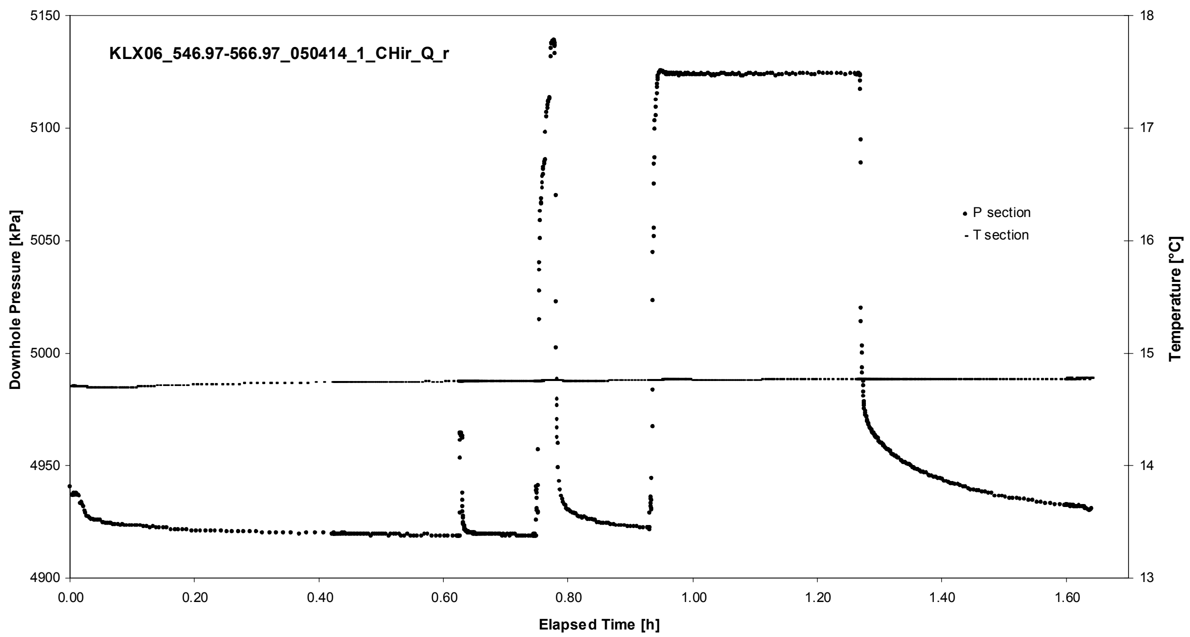
APPENDIX 2-33

Test 546.97 – 566.97 m

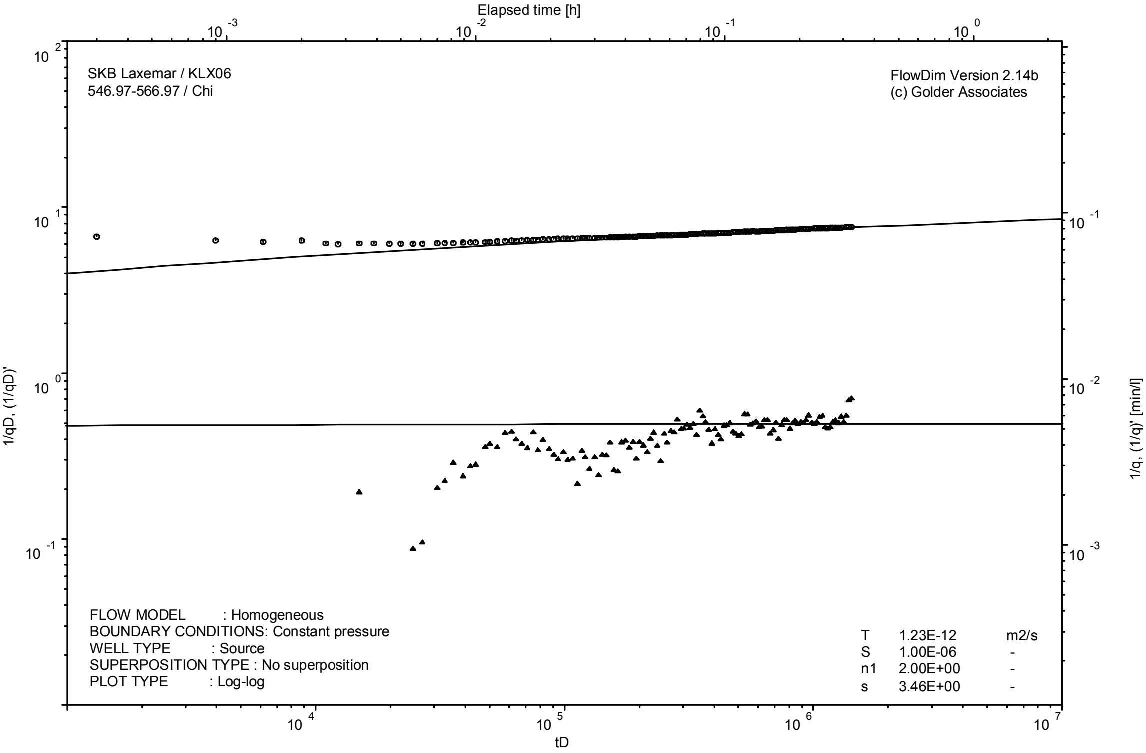
Analysis diagrams



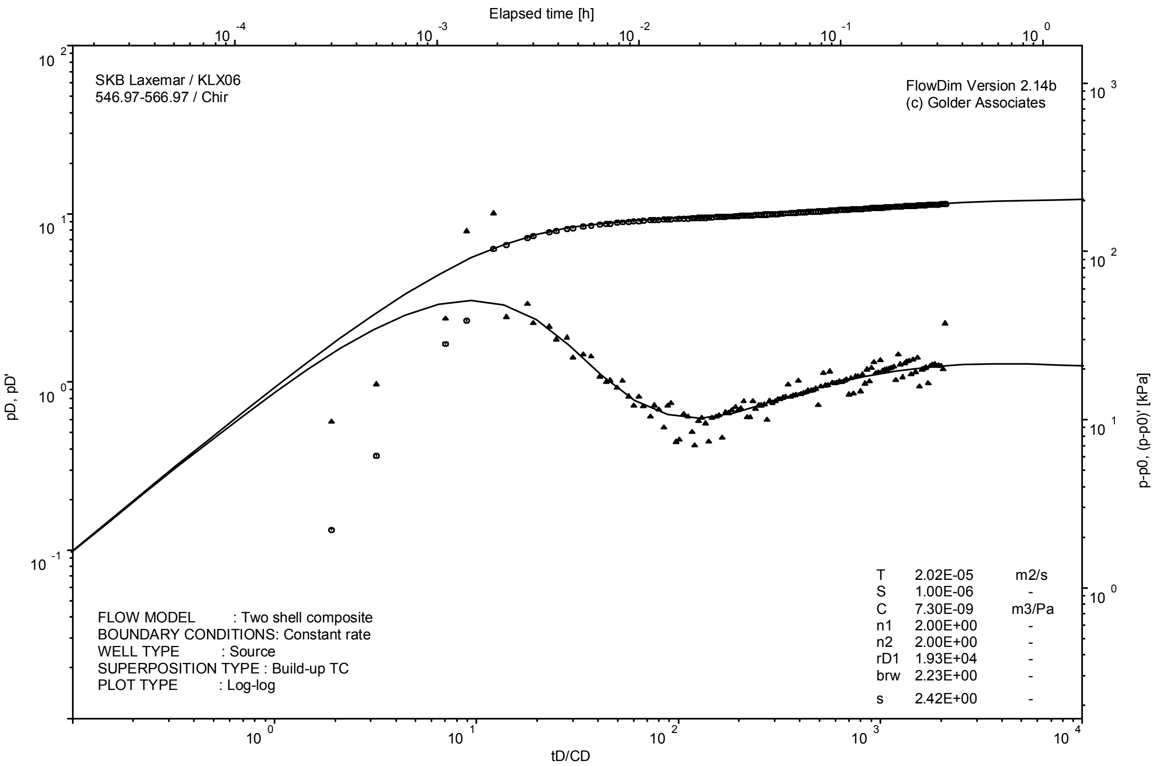
Pressure and flow rate vs. time; cartesian plot



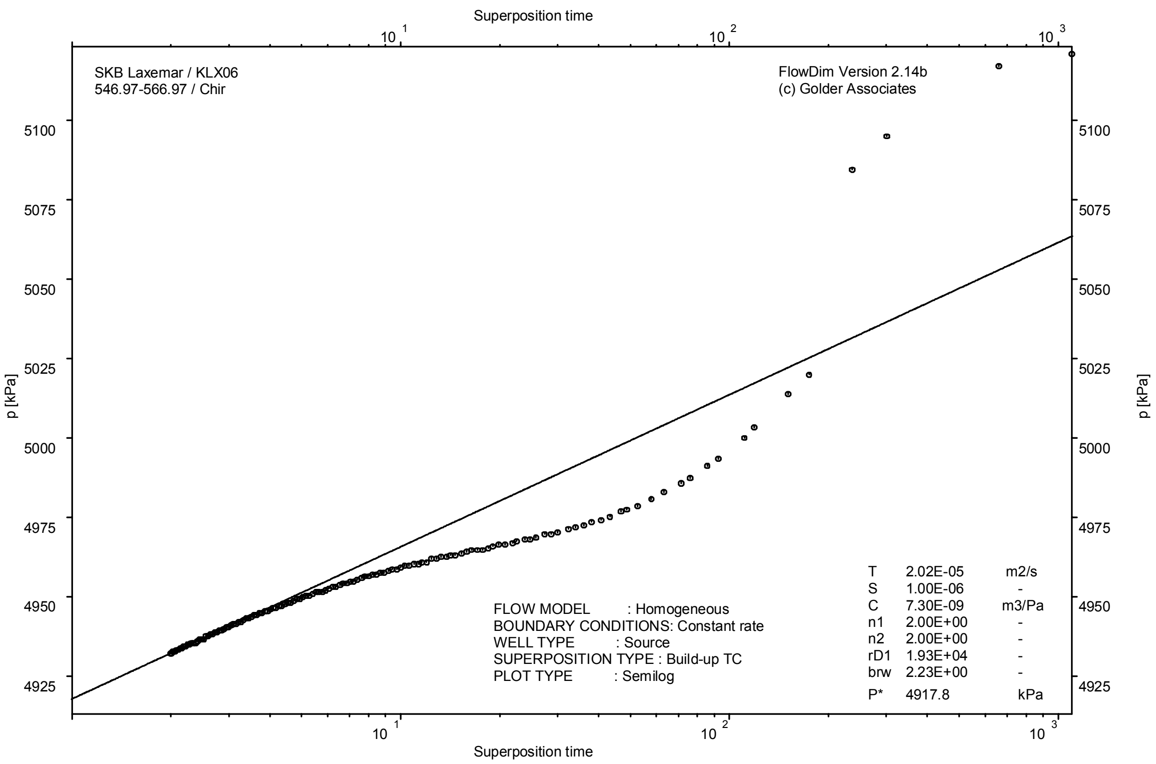
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

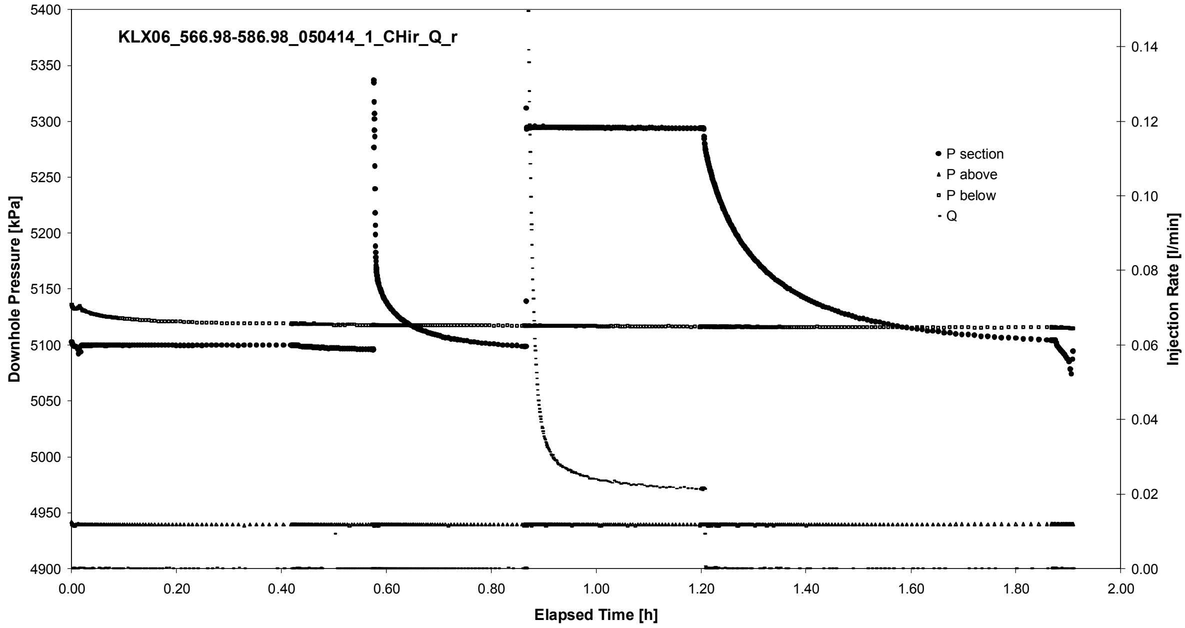


CHIR phase; HORNER match

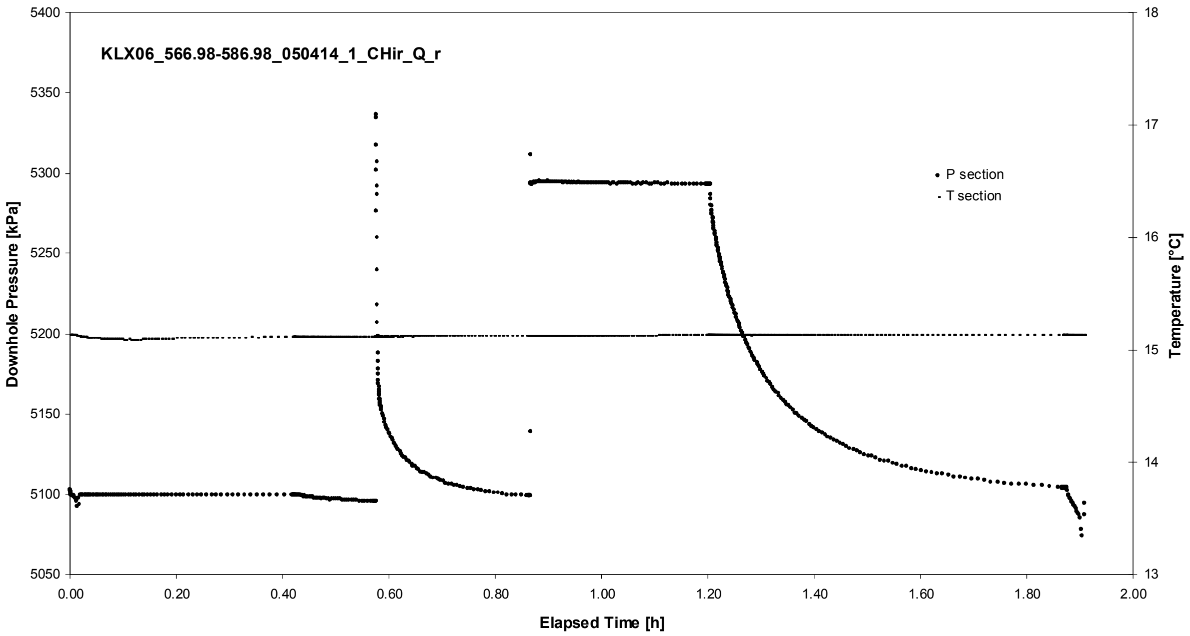
APPENDIX 2-34

Test 566.98 – 586.98 m

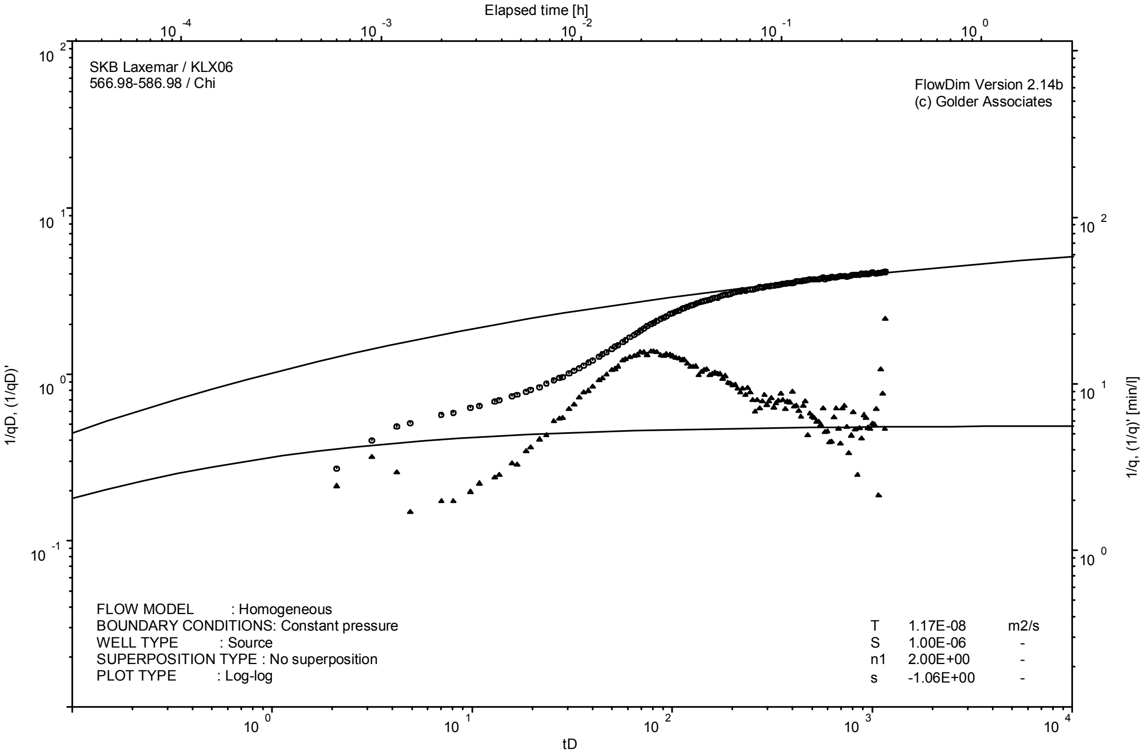
Analysis diagrams



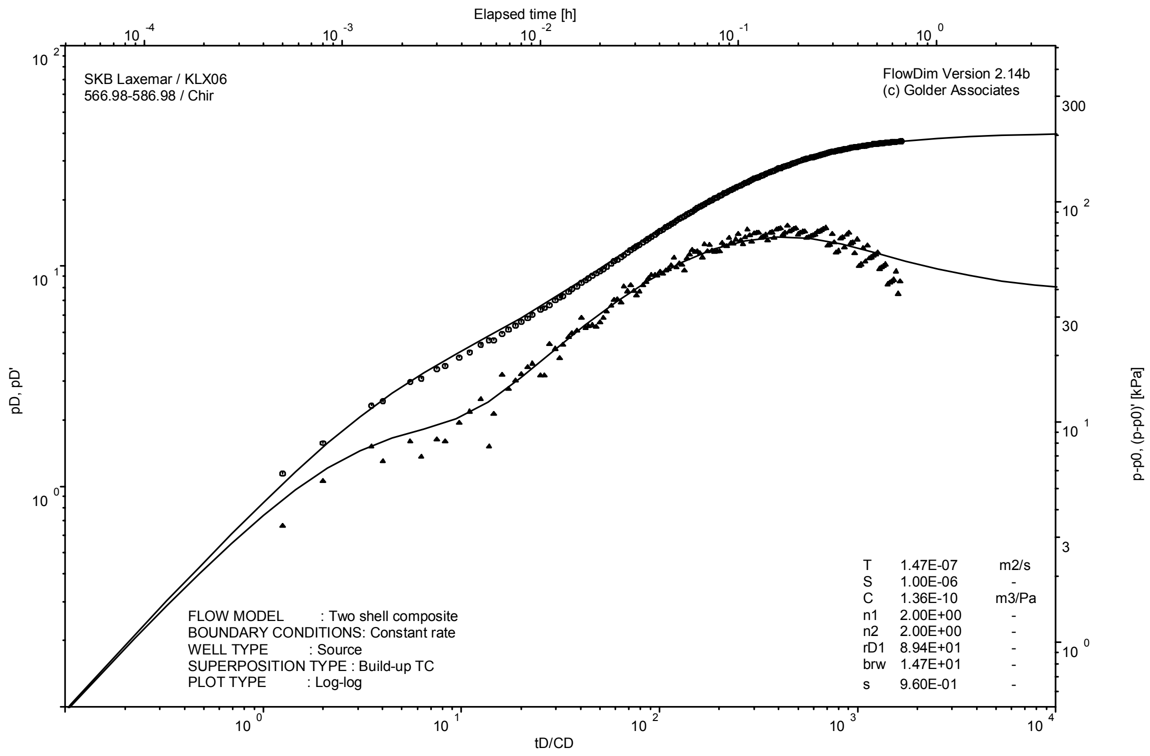
Pressure and flow rate vs. time; cartesian plot



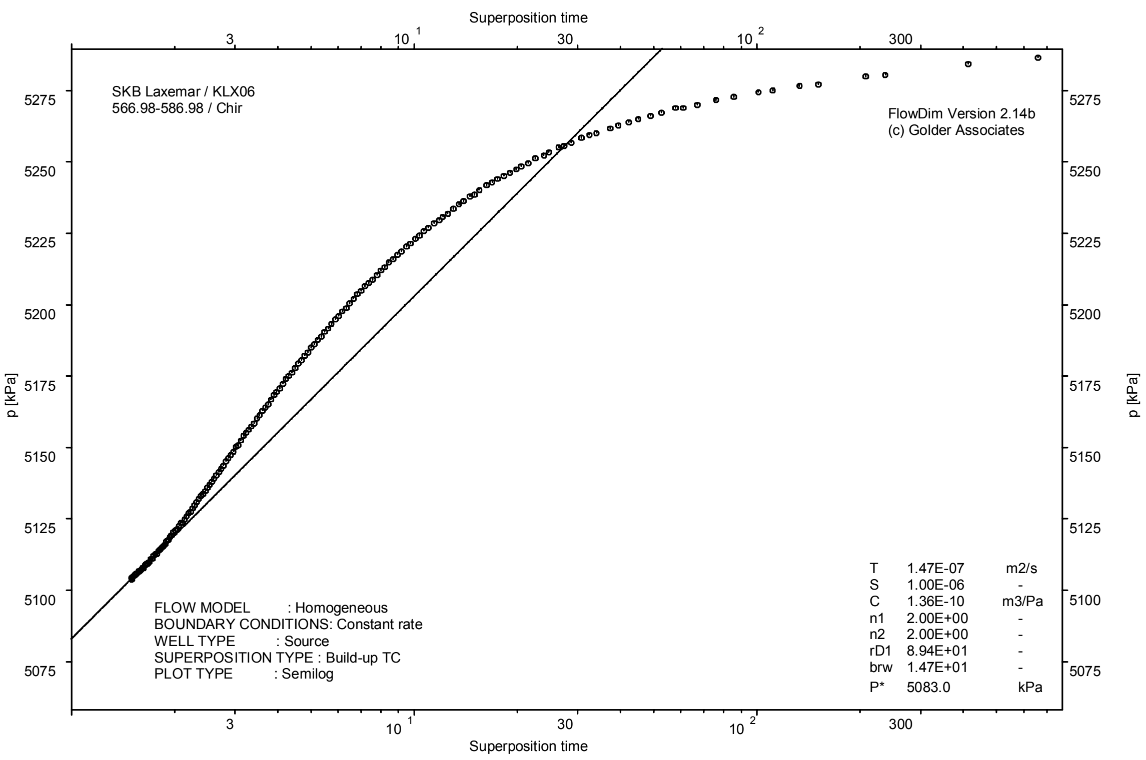
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

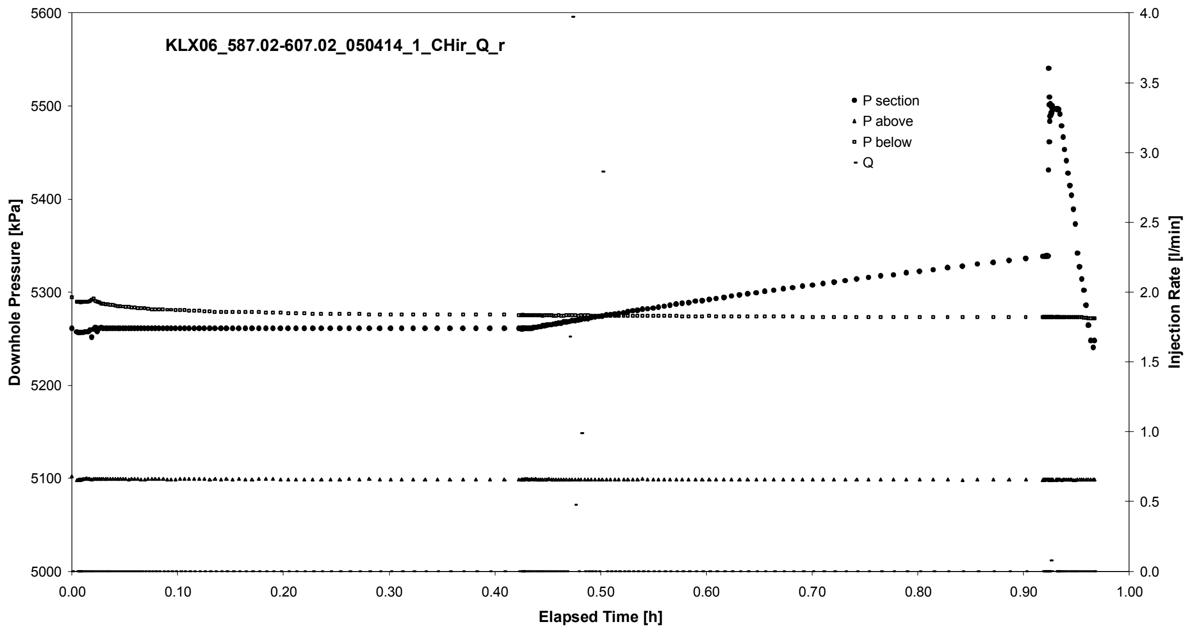


CHIR phase; HORNER match

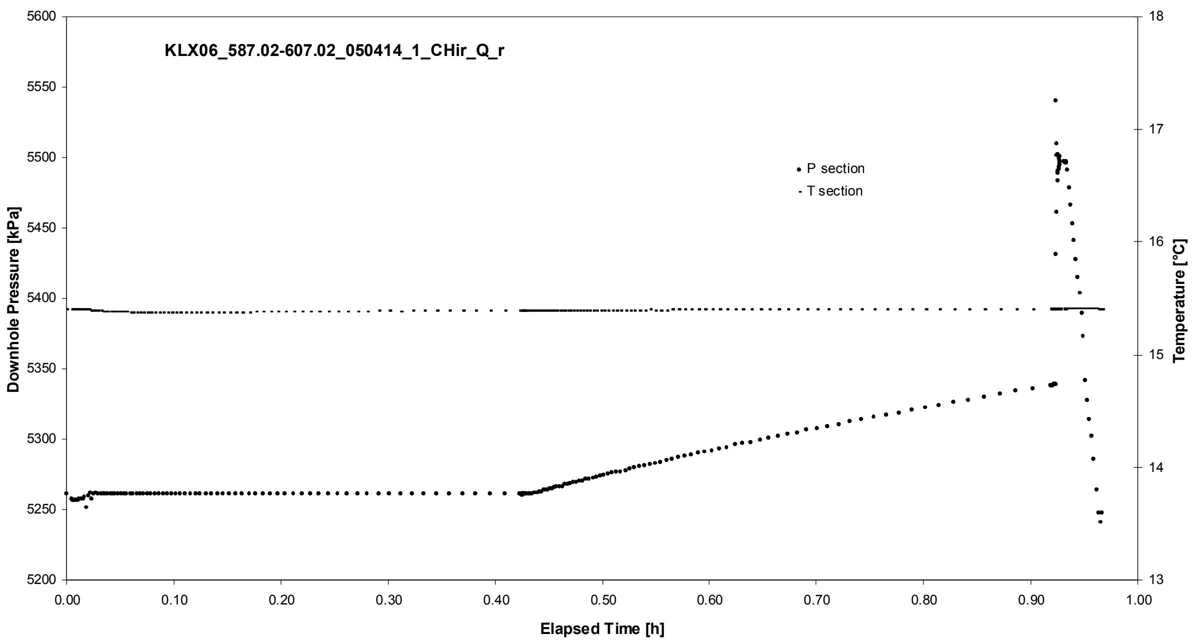
APPENDIX 2-35

Test 587.02 – 607.02 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

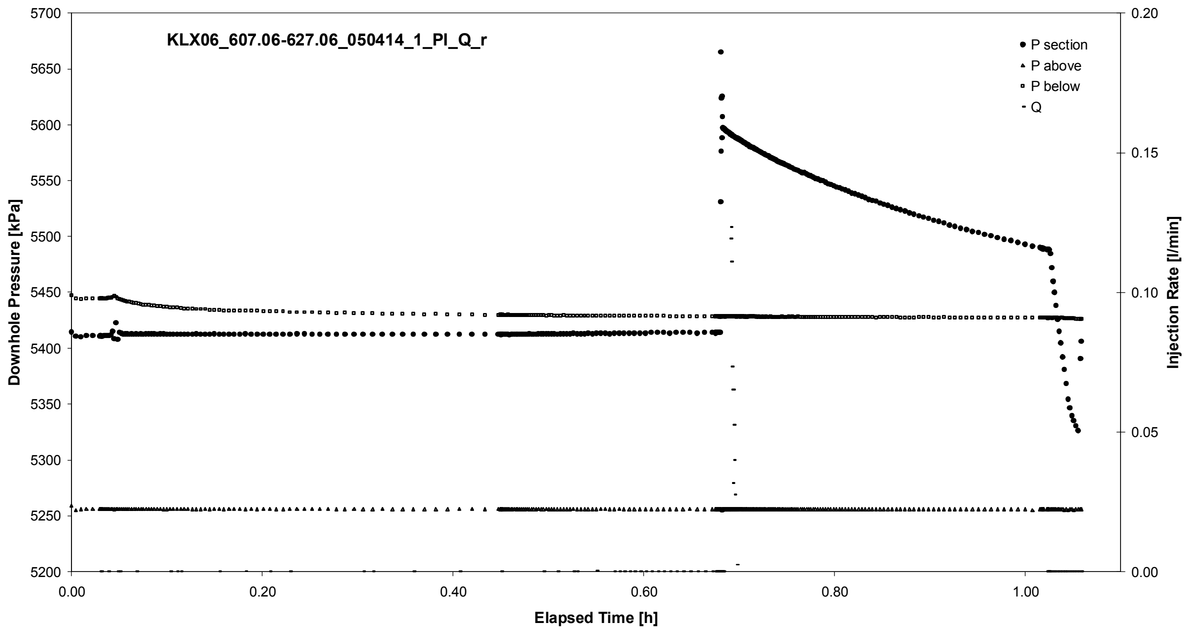
Not Analysed

CHIR phase; HORNER match

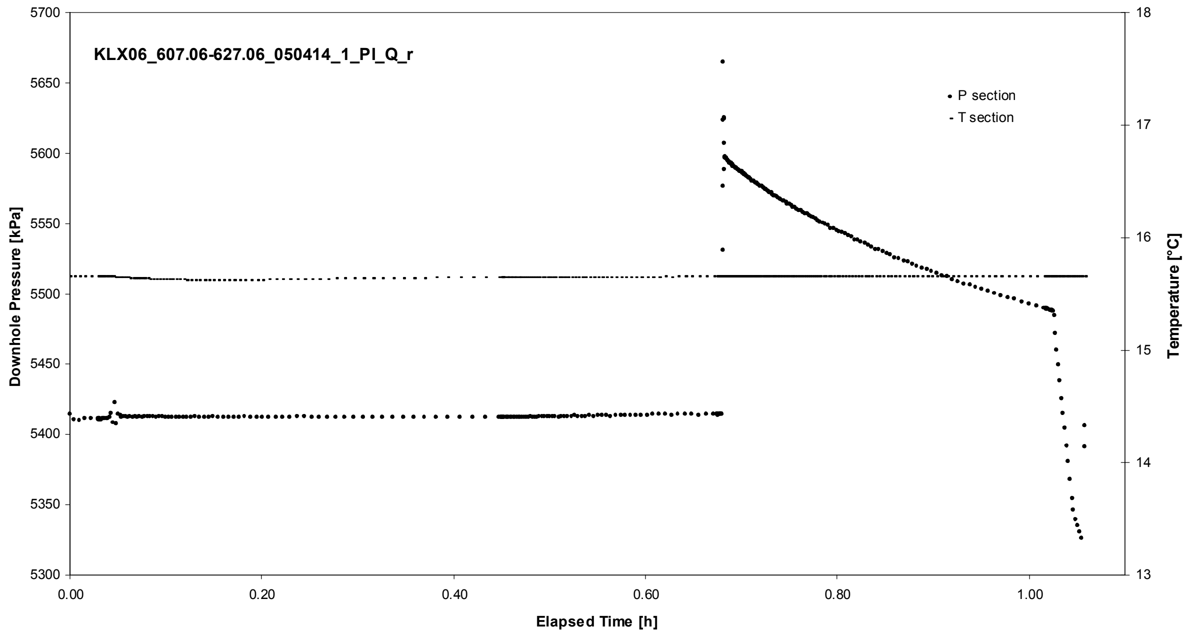
APPENDIX 2-36

Test 607.06 – 627.06 m

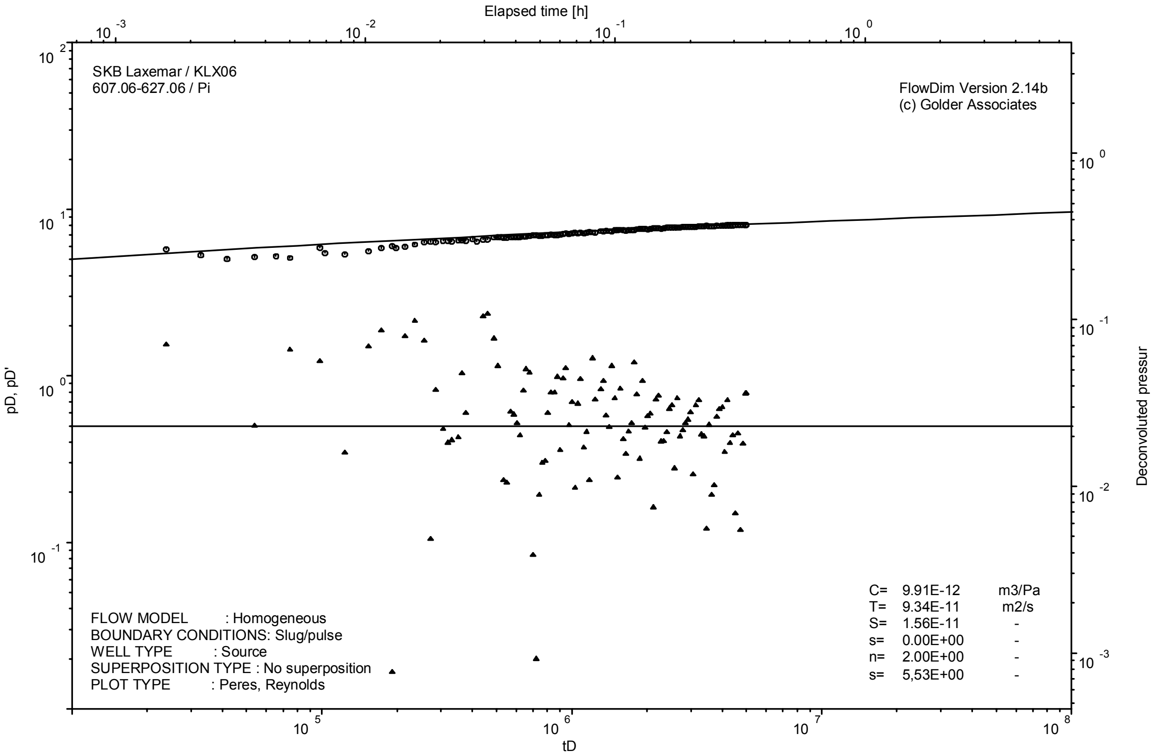
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

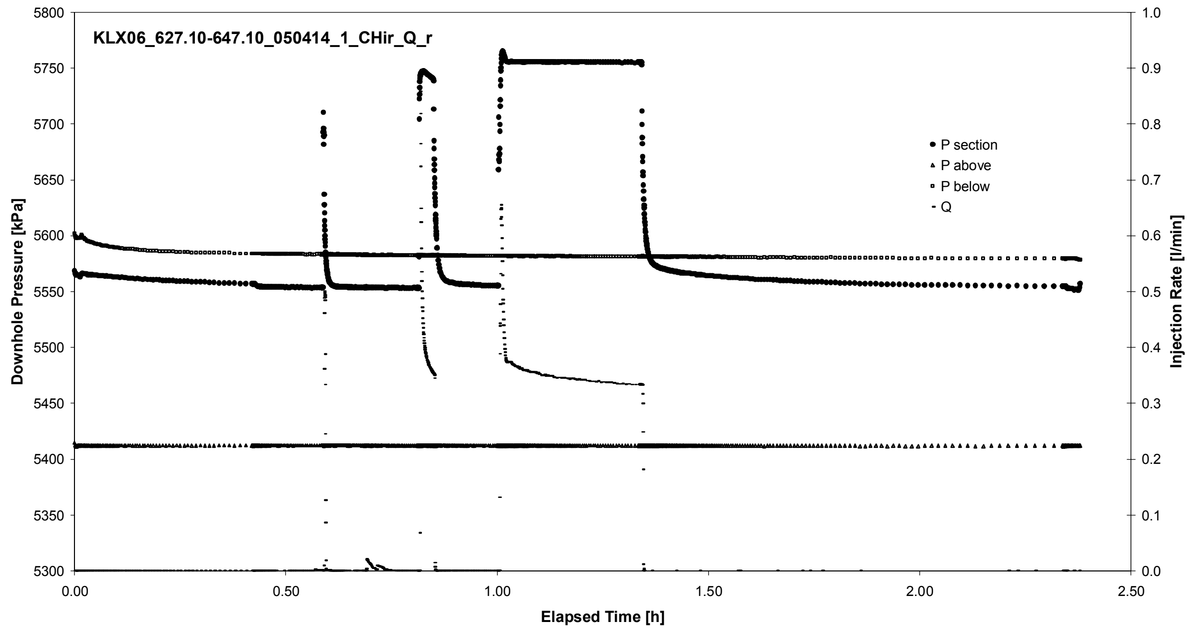


CHIR phase analysed as pulse injection; deconvolution match

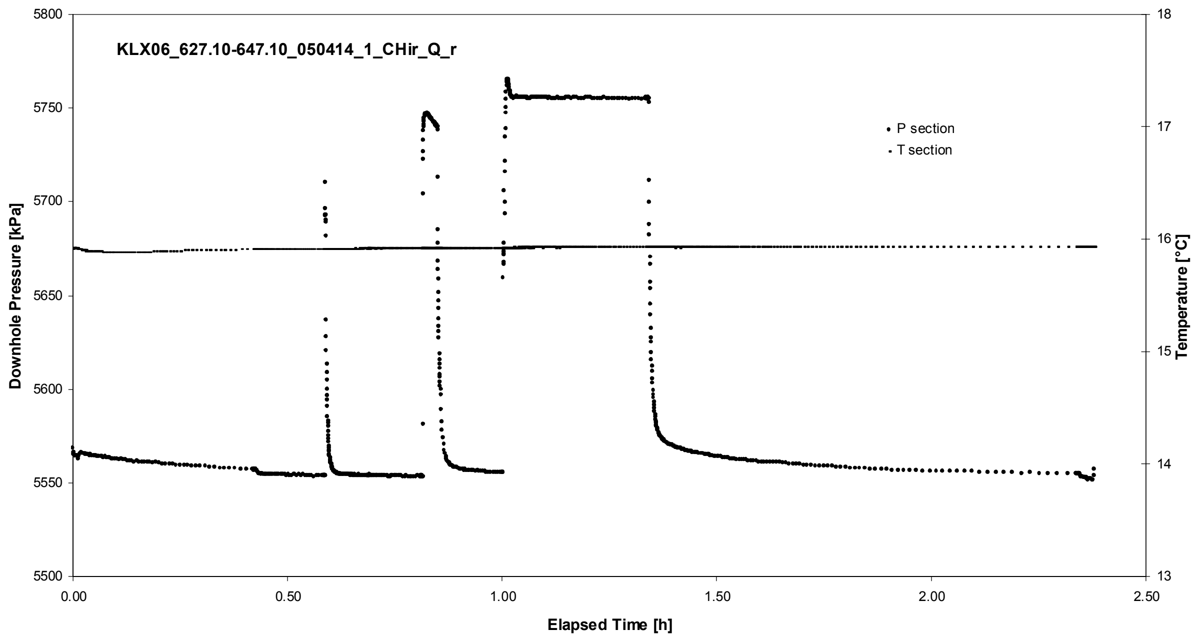
APPENDIX 2-37

Test 627.10 – 647.10 m

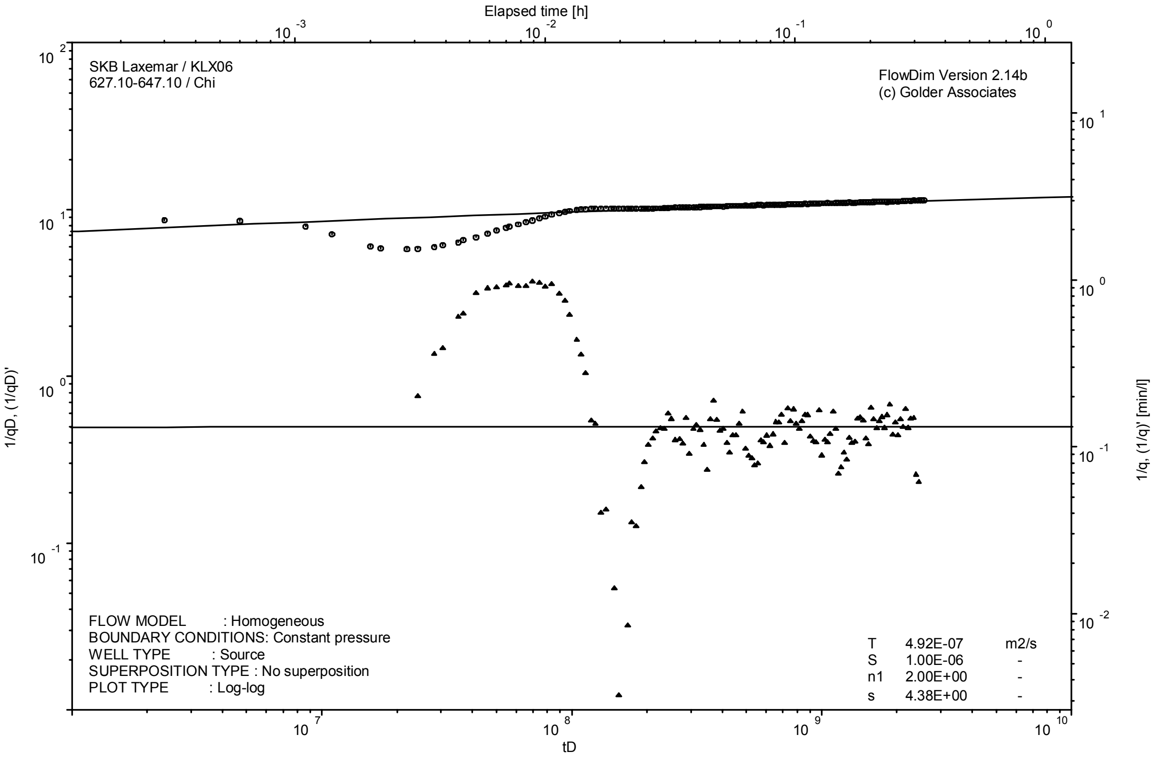
Analysis diagrams



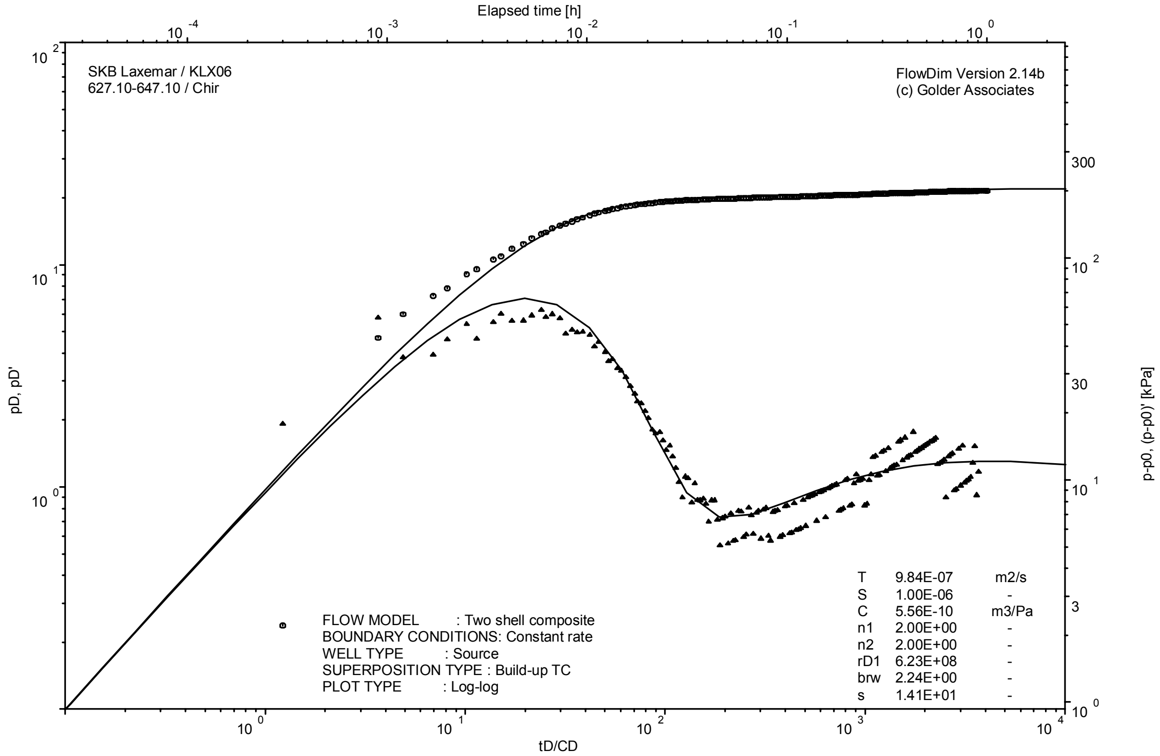
Pressure and flow rate vs. time; cartesian plot



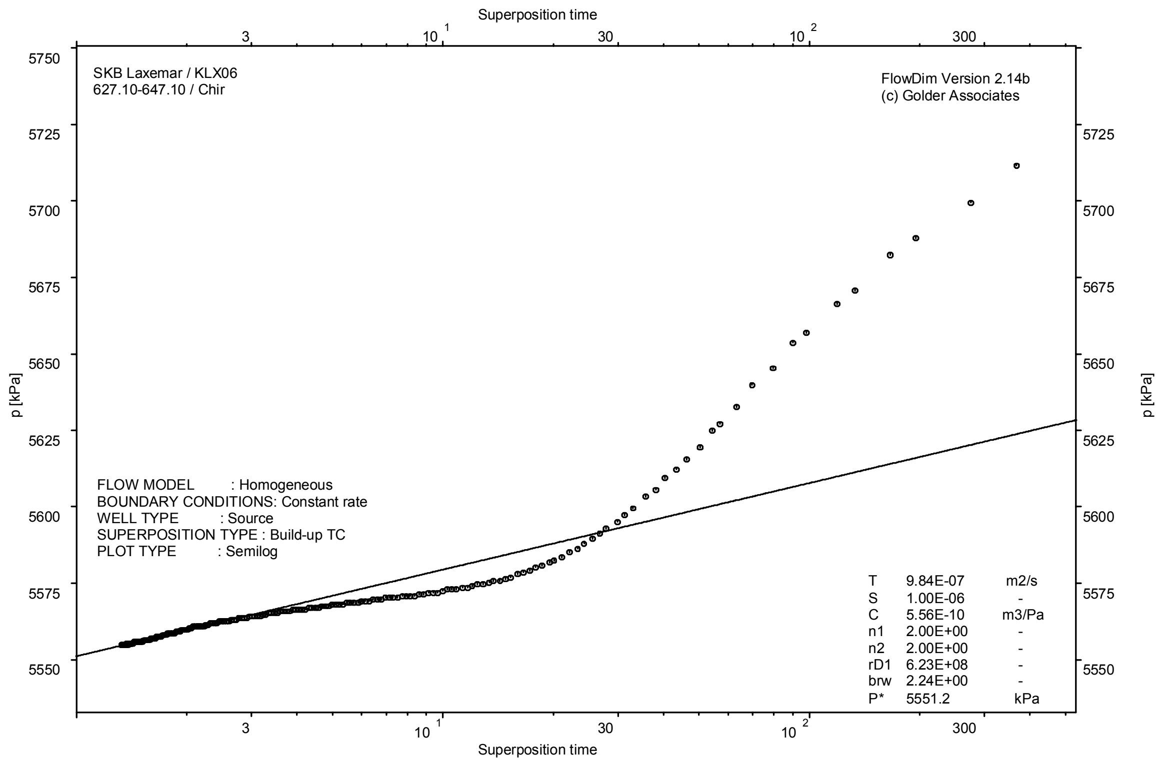
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

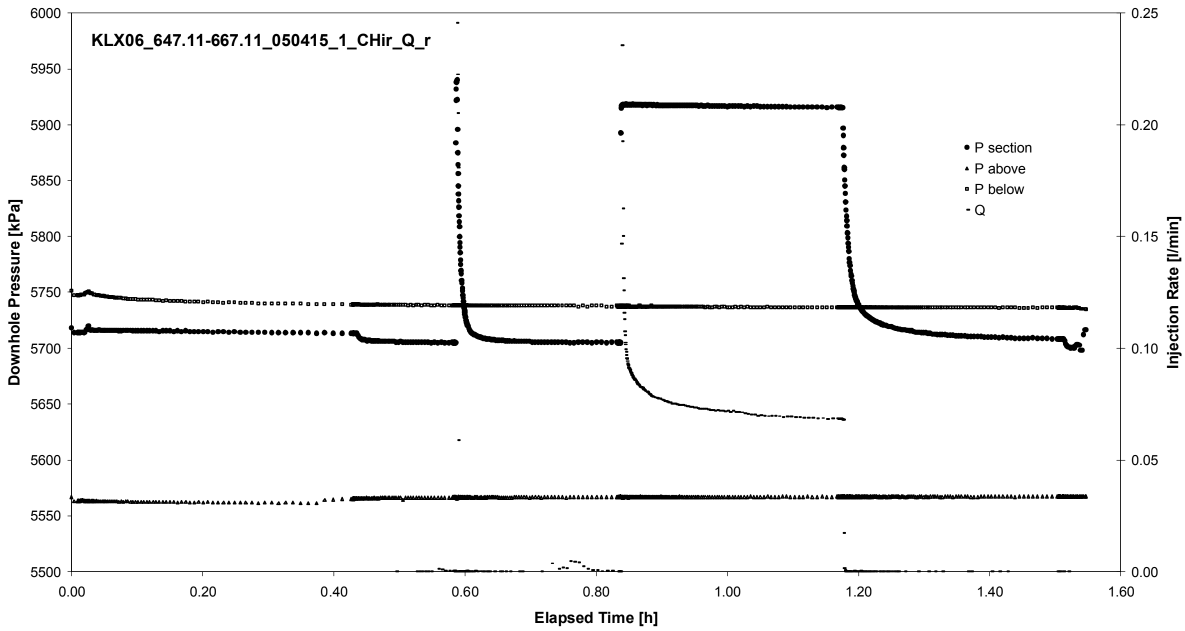


CHIR phase; HORNER match

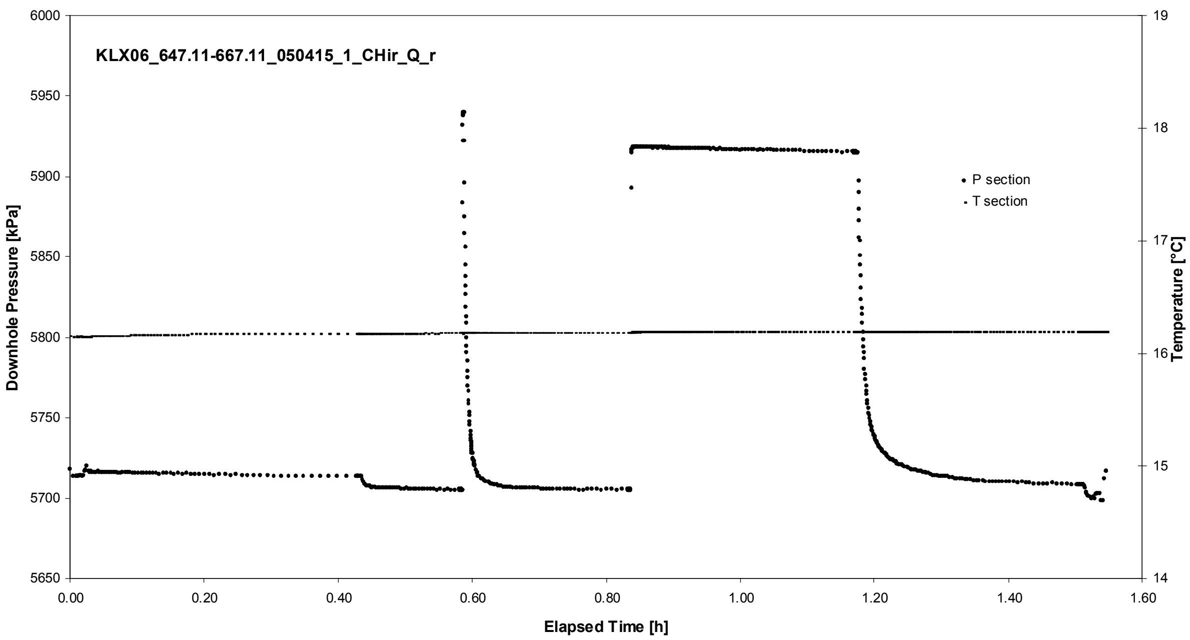
APPENDIX 2-38

Test 647.11 – 667.11 m

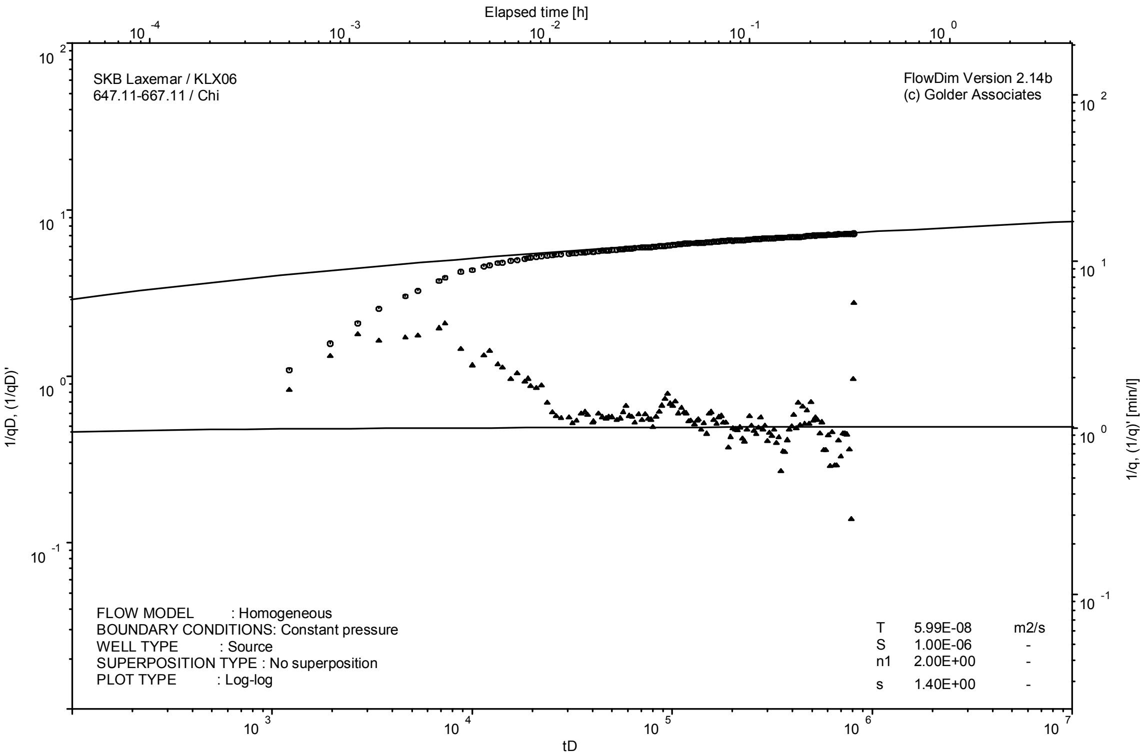
Analysis diagrams



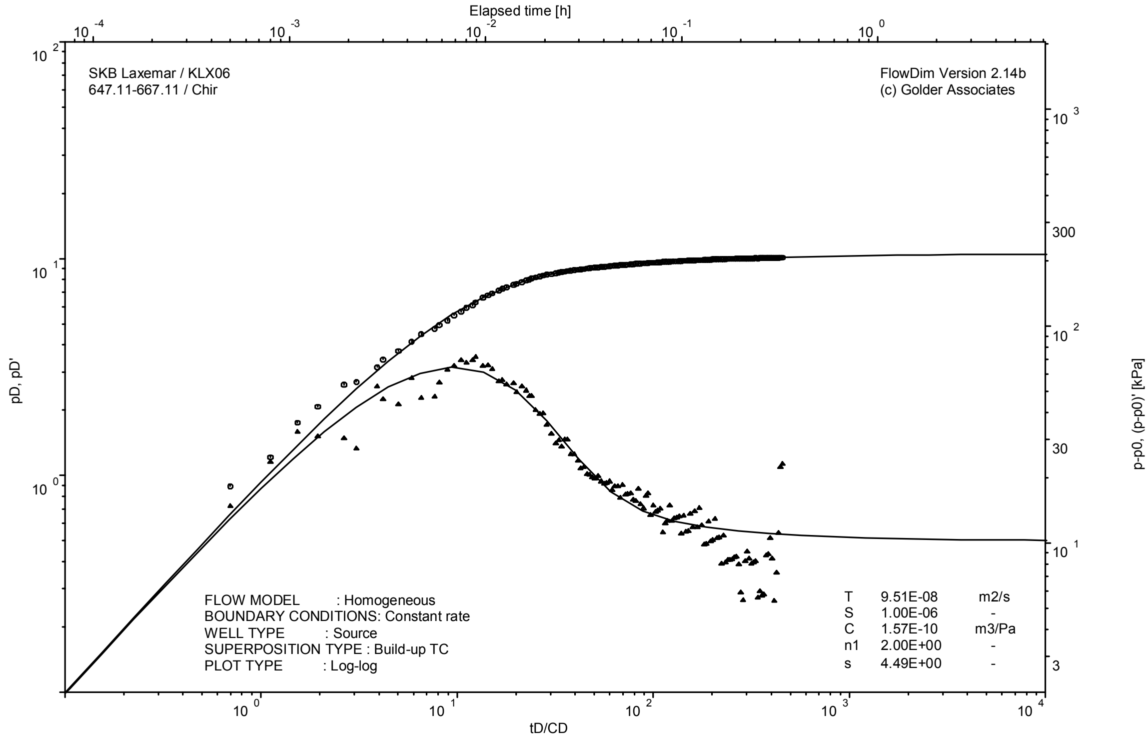
Pressure and flow rate vs. time; cartesian plot



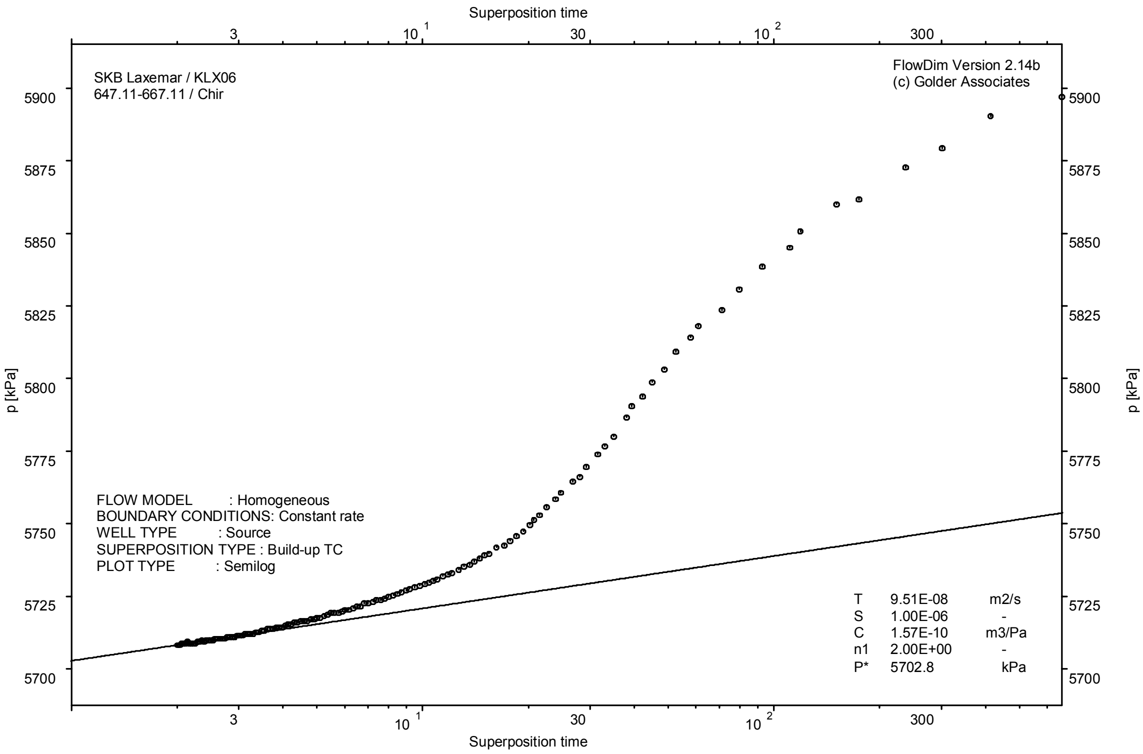
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

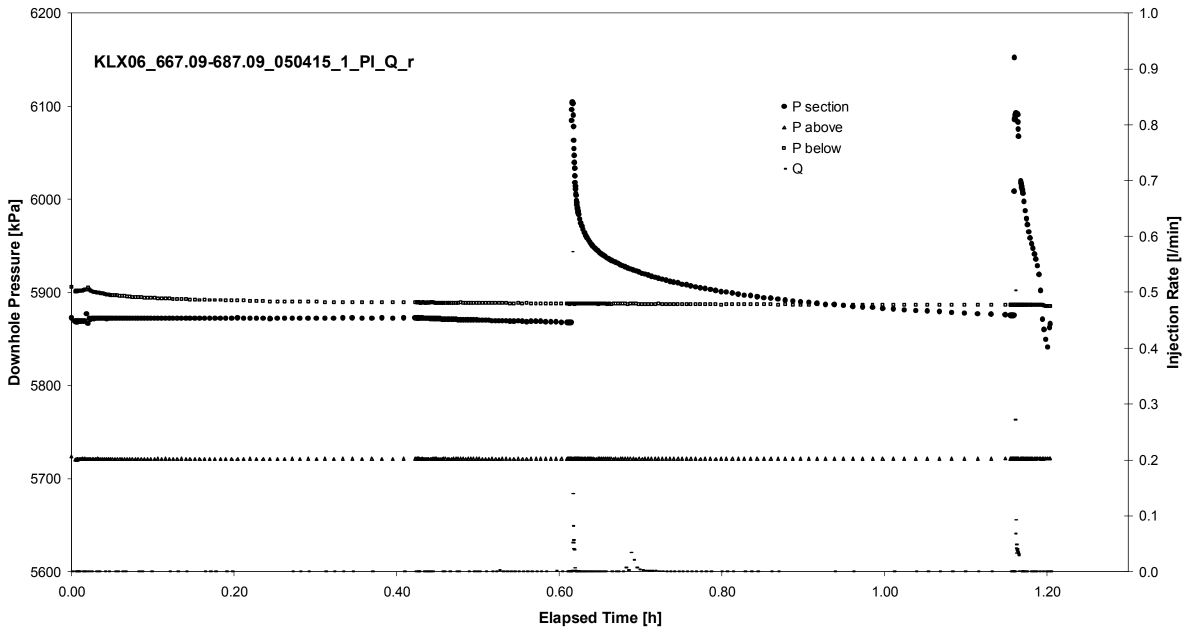


CHIR phase; HORNER match

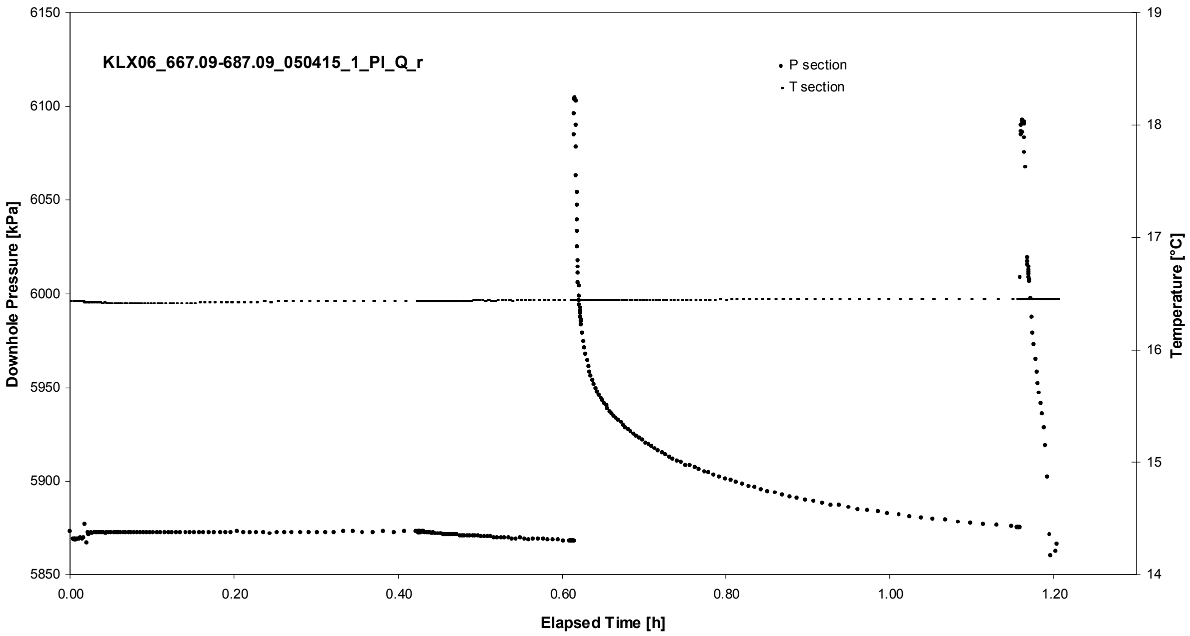
APPENDIX 2-39

Test 667.09 – 687.09 m

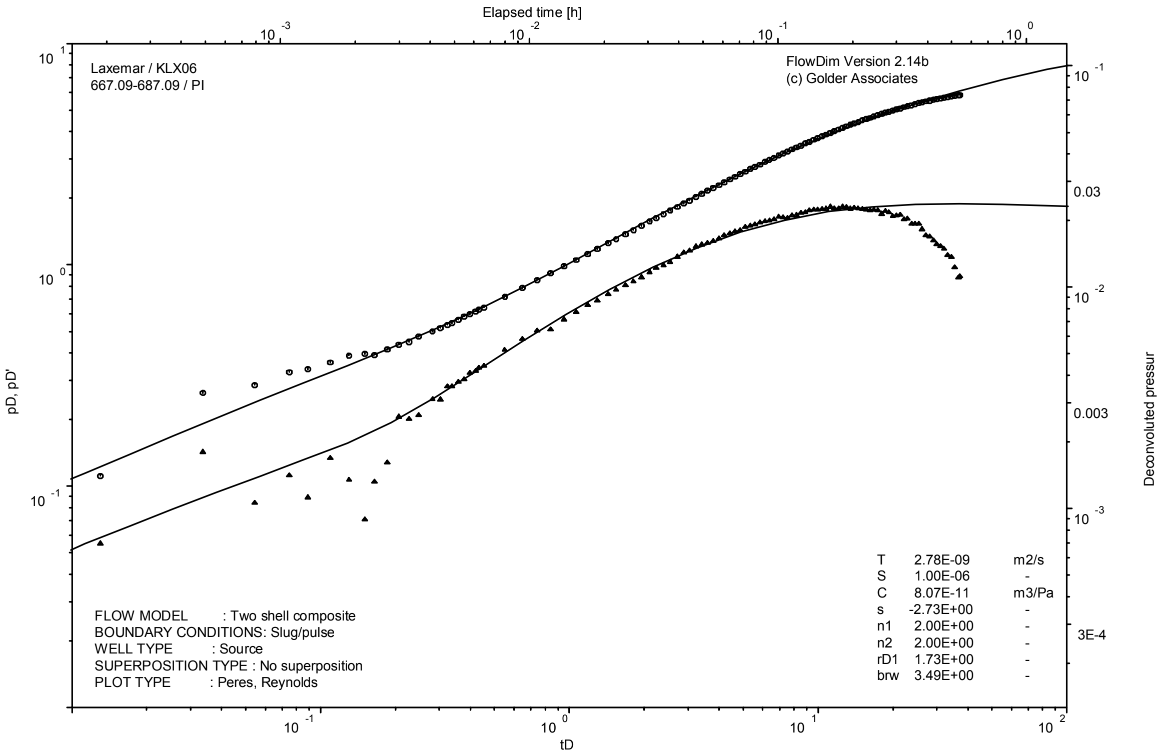
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

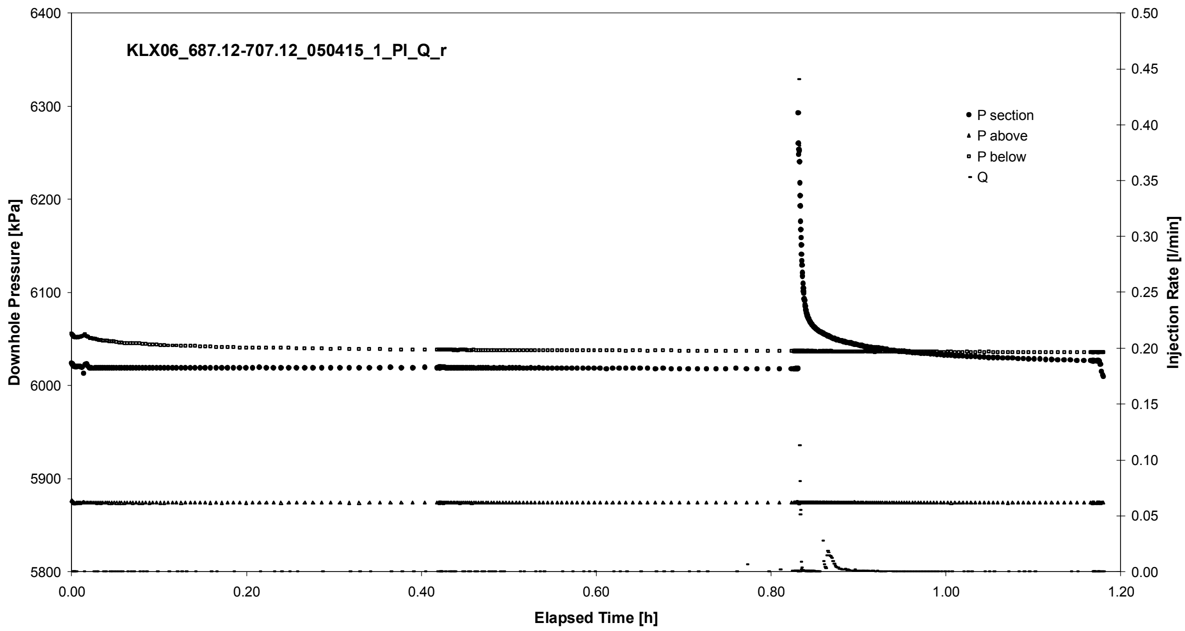


CHIR phase analysed as pulse injection; deconvolution match

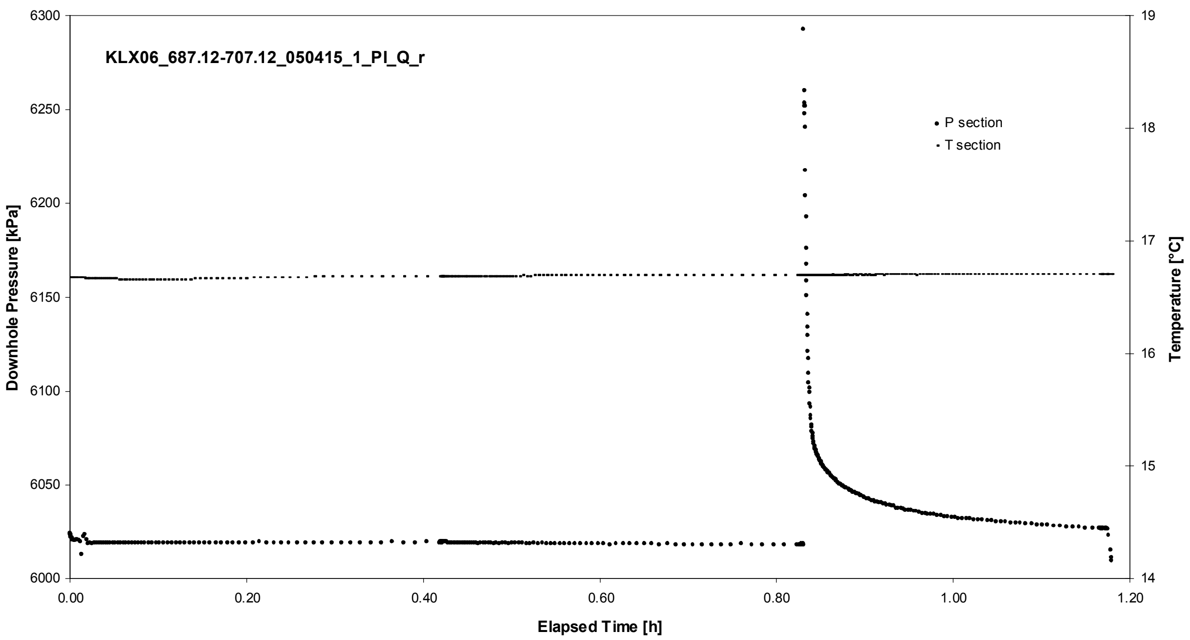
APPENDIX 2-40

Test 687.12 – 707.12 m

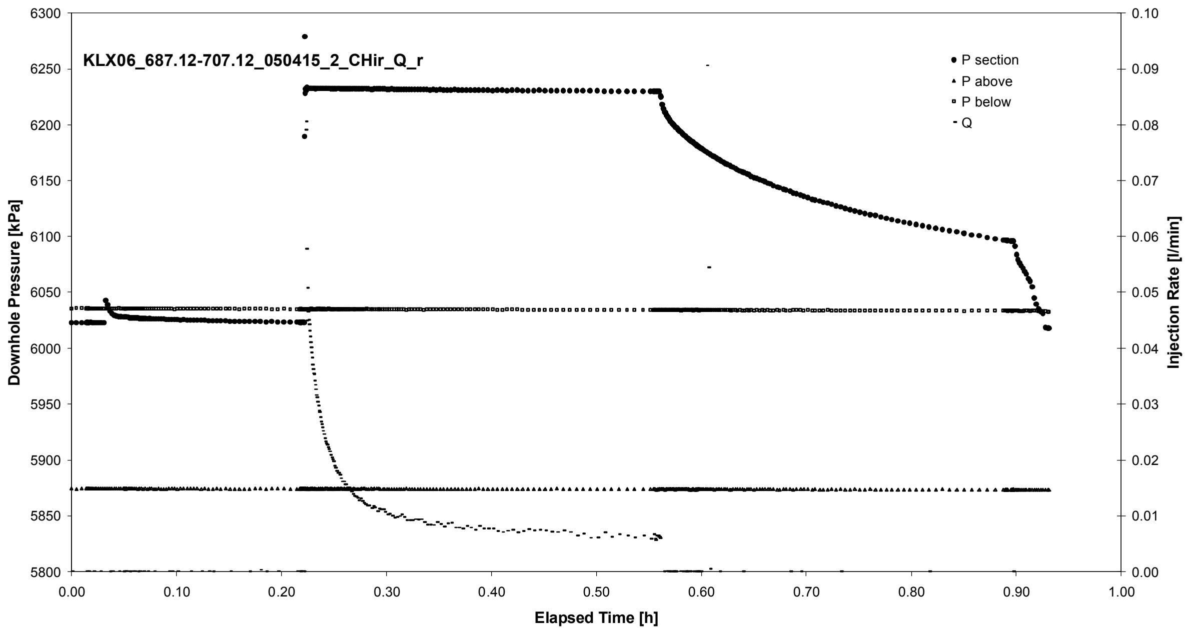
Analysis diagrams



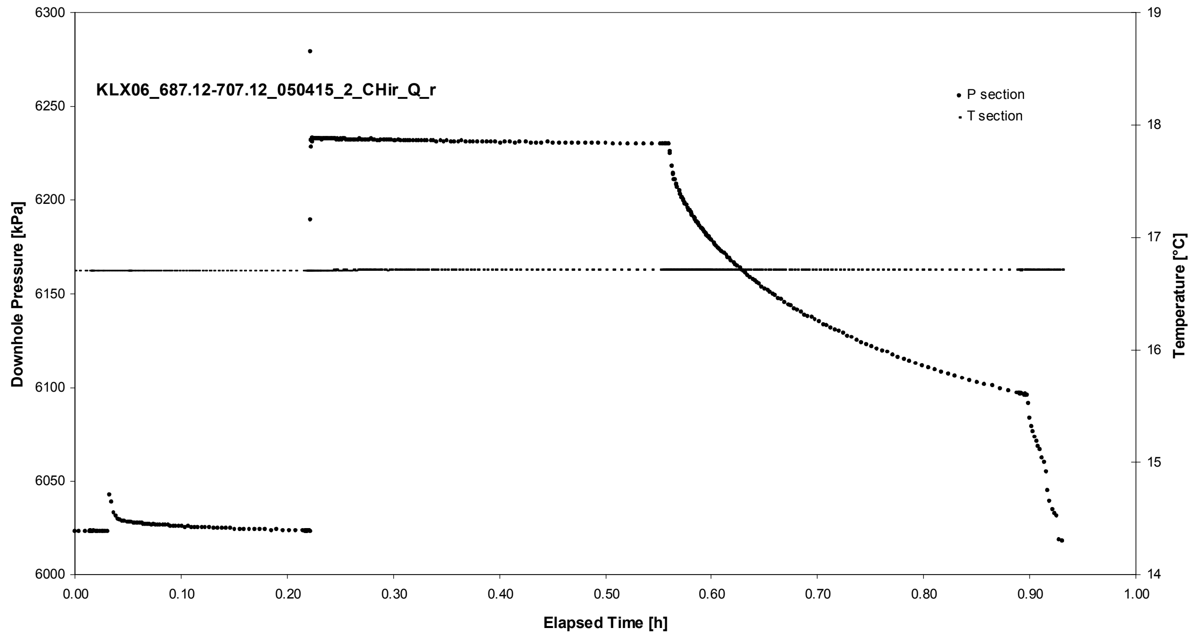
Pressure and flow rate vs. time; cartesian plot (test repeated)



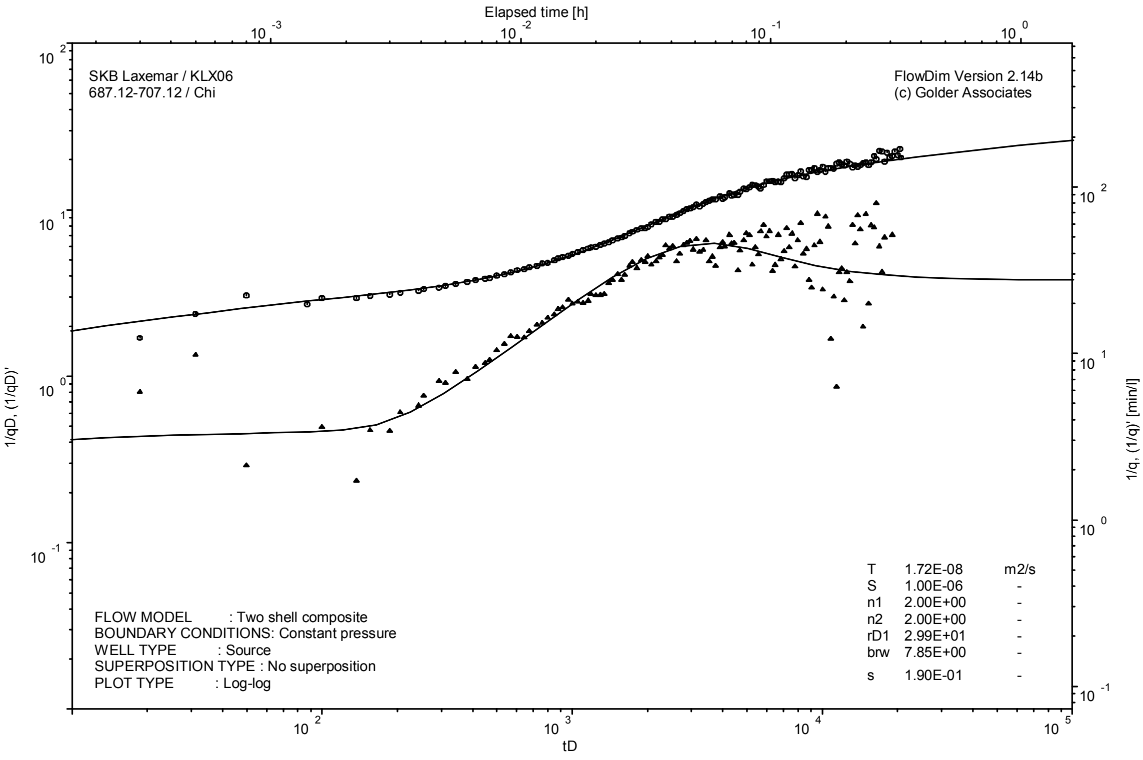
Interval pressure and temperature vs. time; cartesian plot (test repeated)



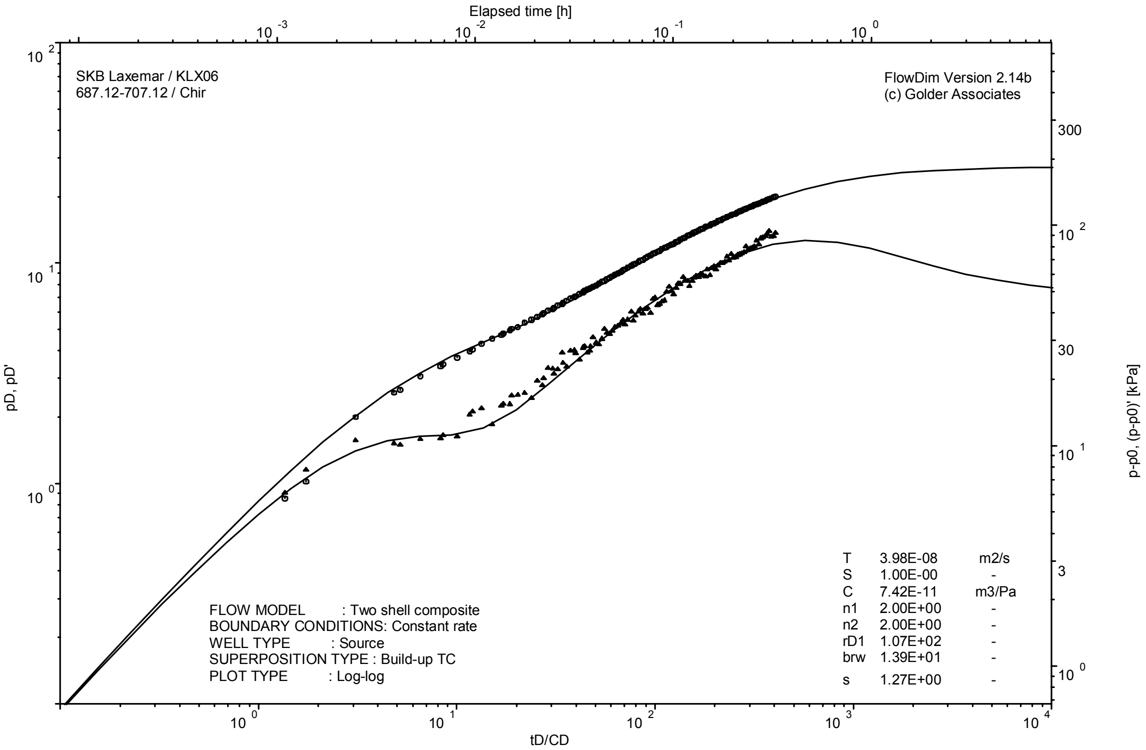
Pressure and flow rate vs. time; cartesian plot (analysed)



Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match

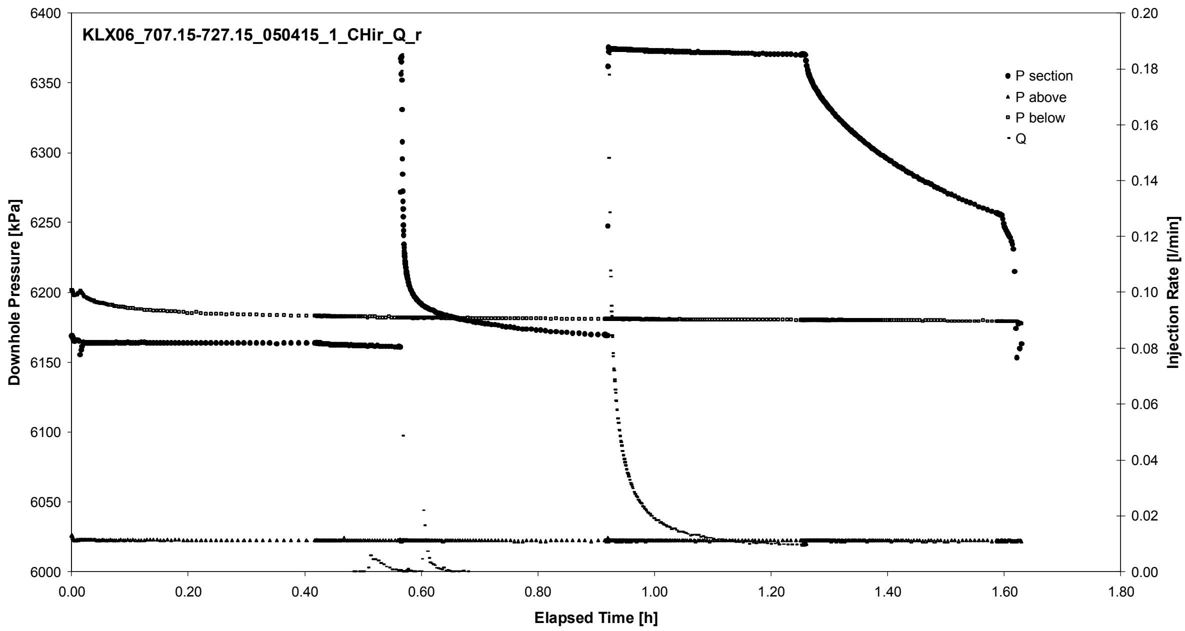


CHIR phase; log-log match

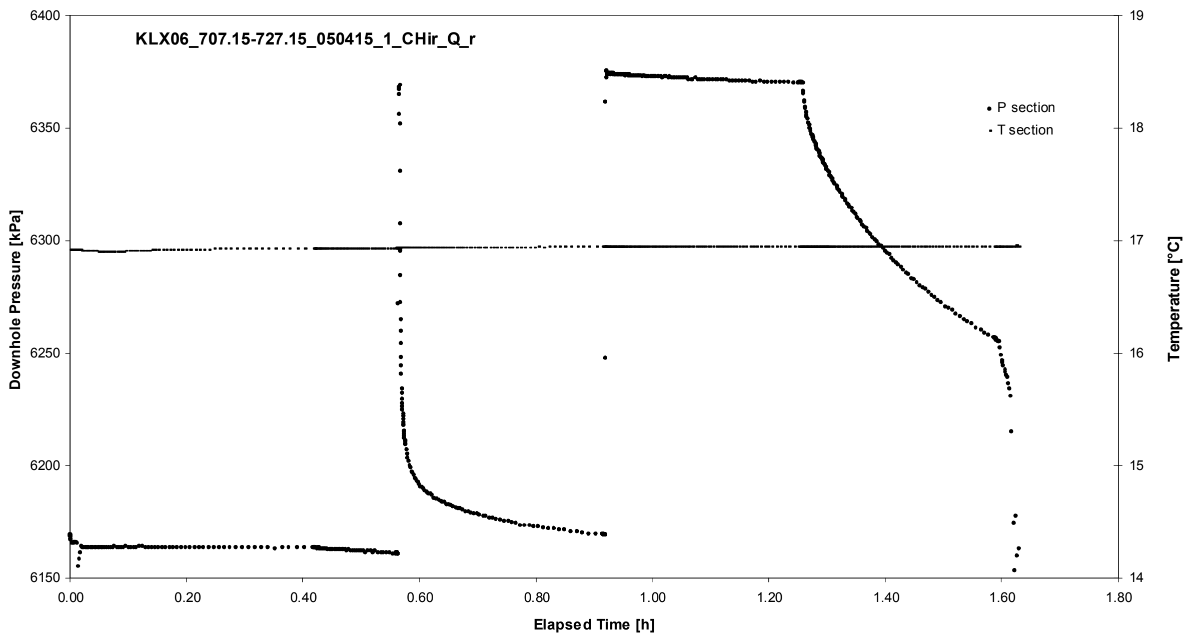
APPENDIX 2-41

Test 707.15 – 727.15 m

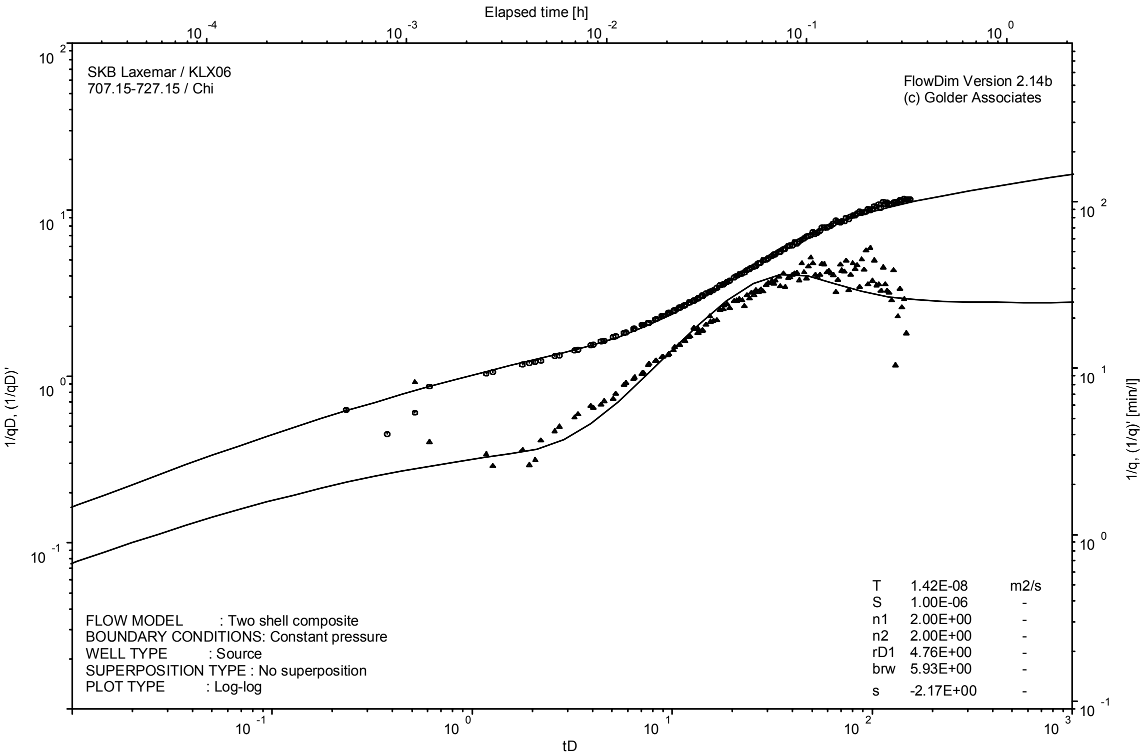
Analysis diagrams



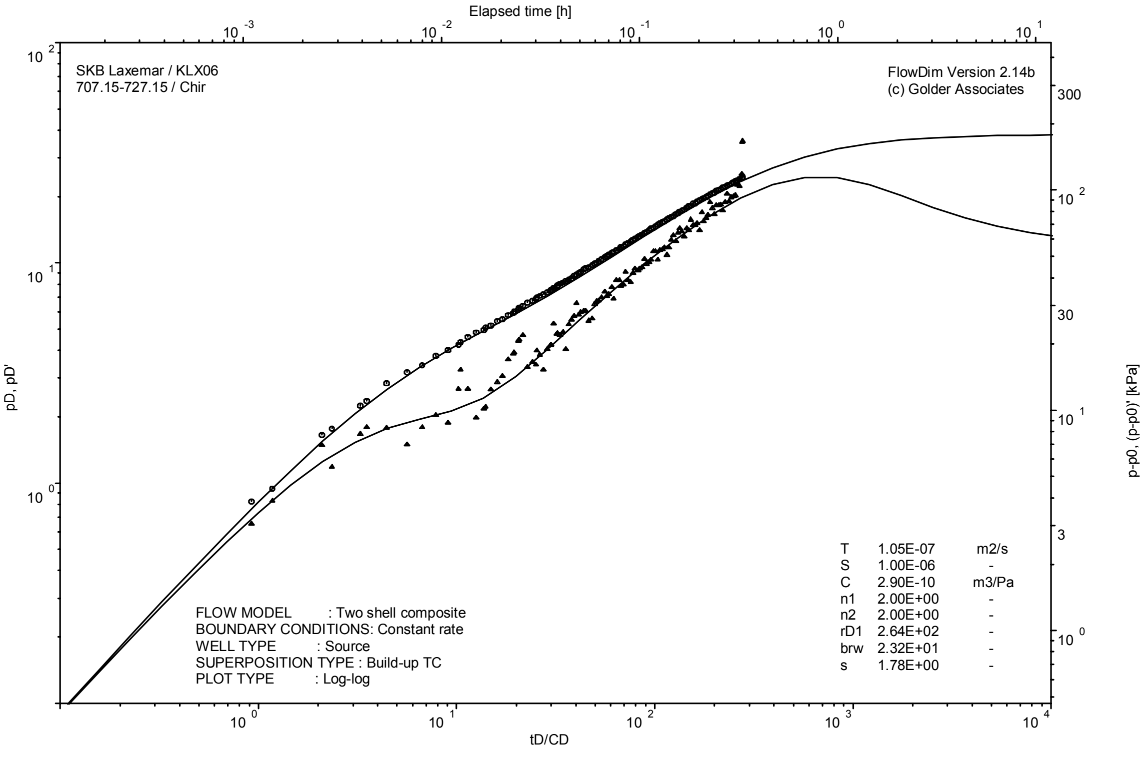
Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match

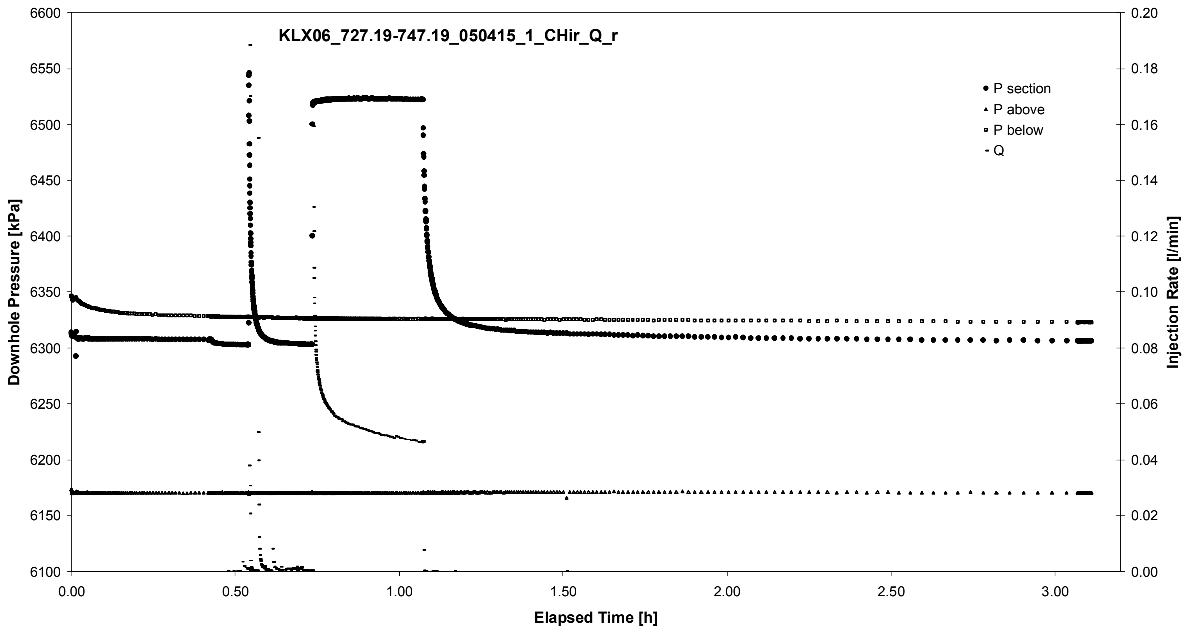


CHIR phase; log-log match

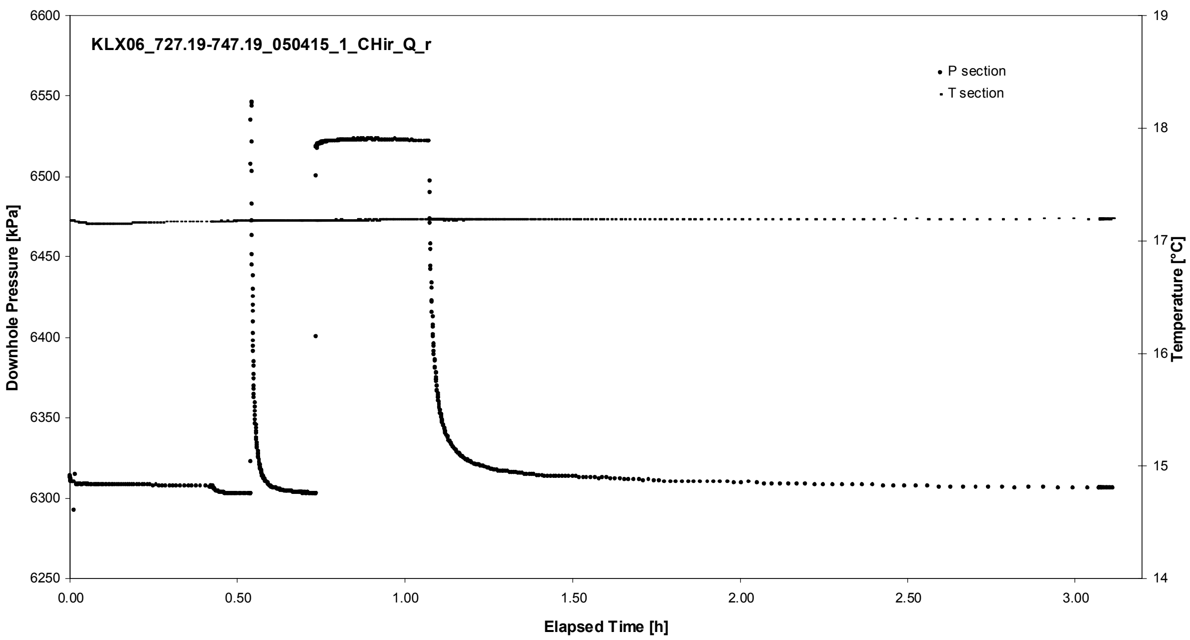
APPENDIX 2-42

Test 727.19 – 747.19 m

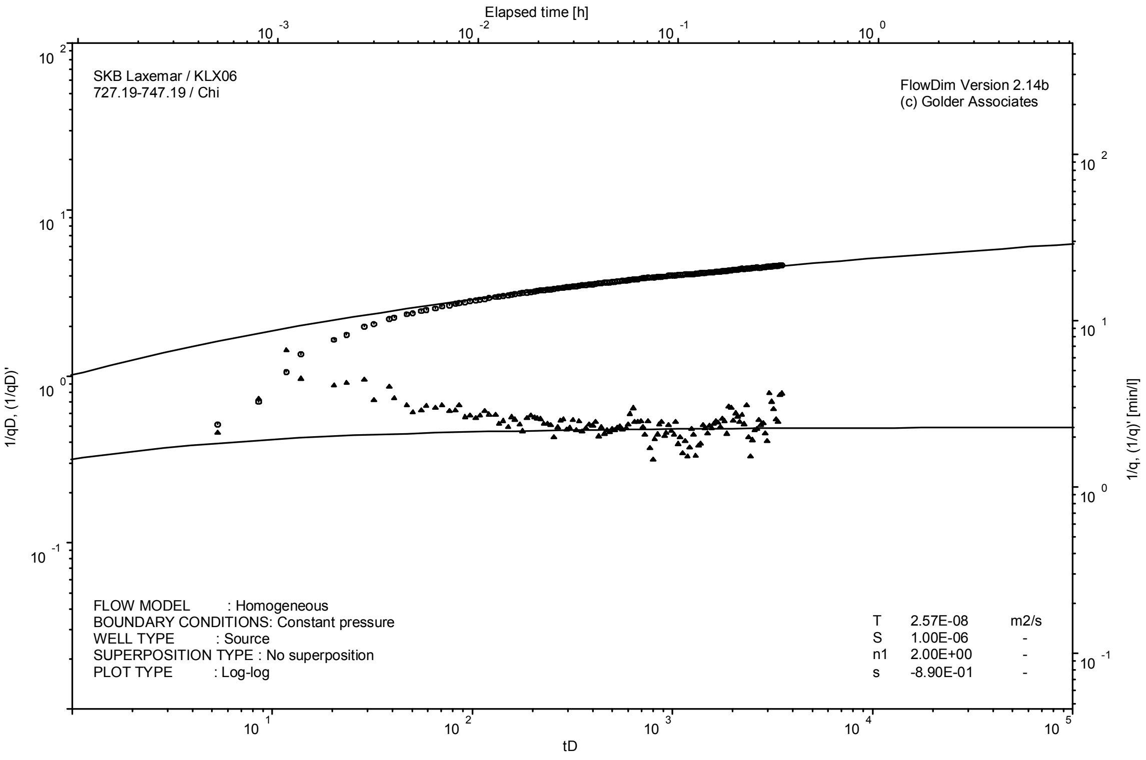
Analysis diagrams



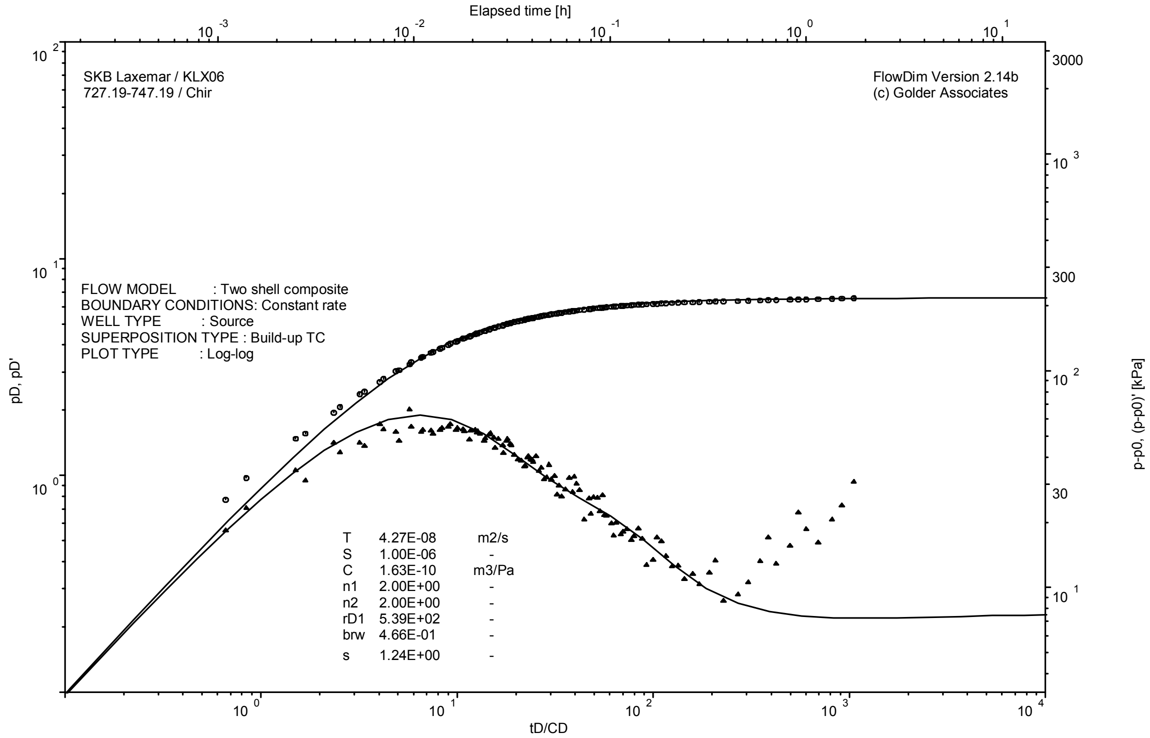
Pressure and flow rate vs. time; cartesian plot



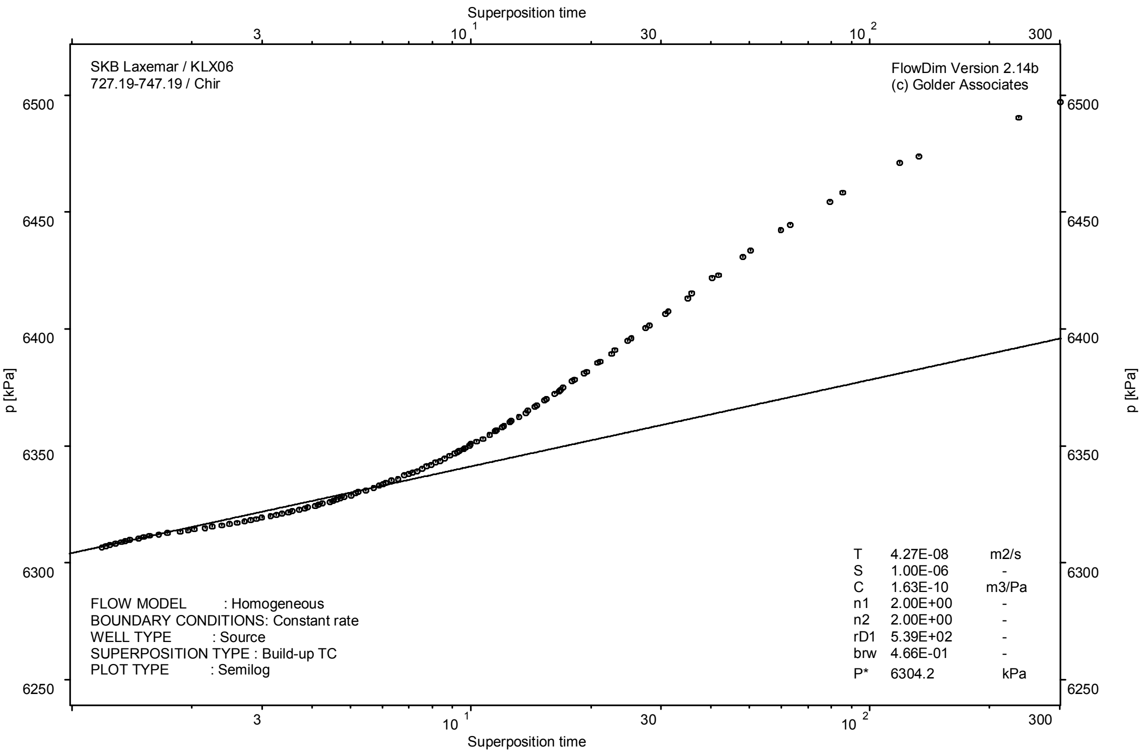
Interval pressure and temperature vs. time; cartesian plot



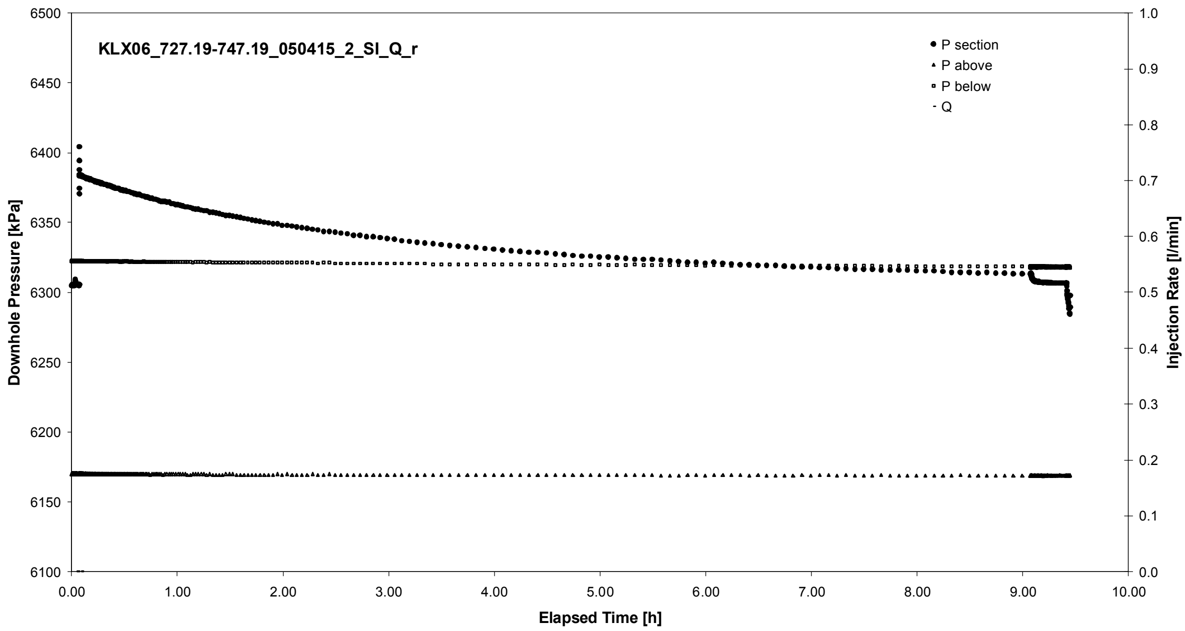
CHI phase; log-log match



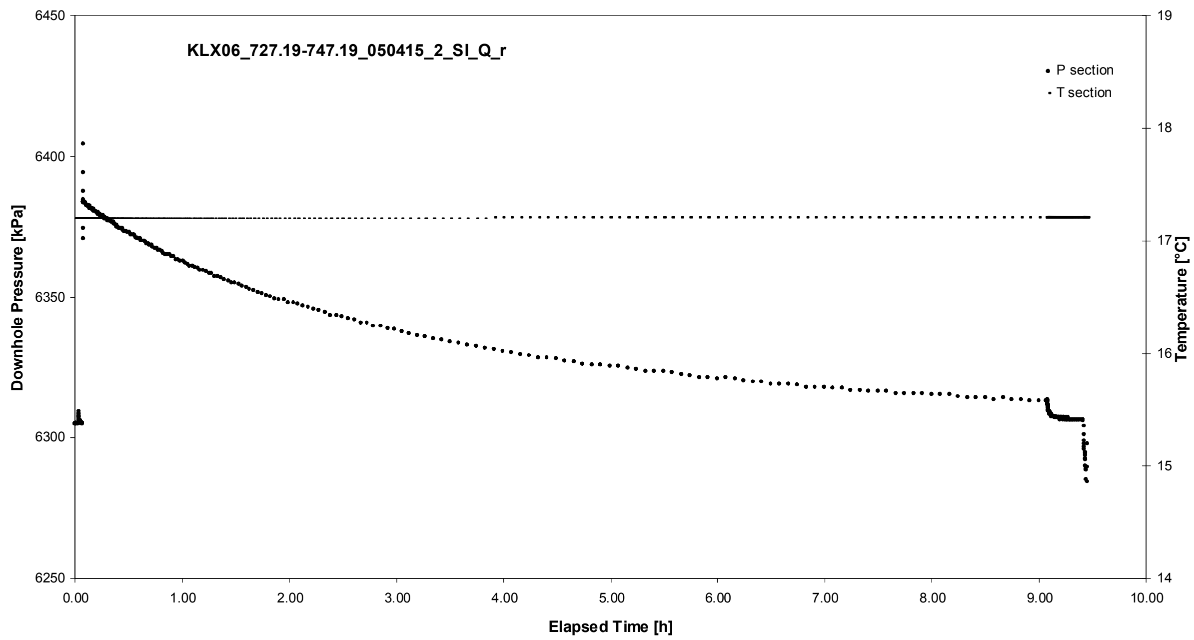
CHIR phase; log-log match



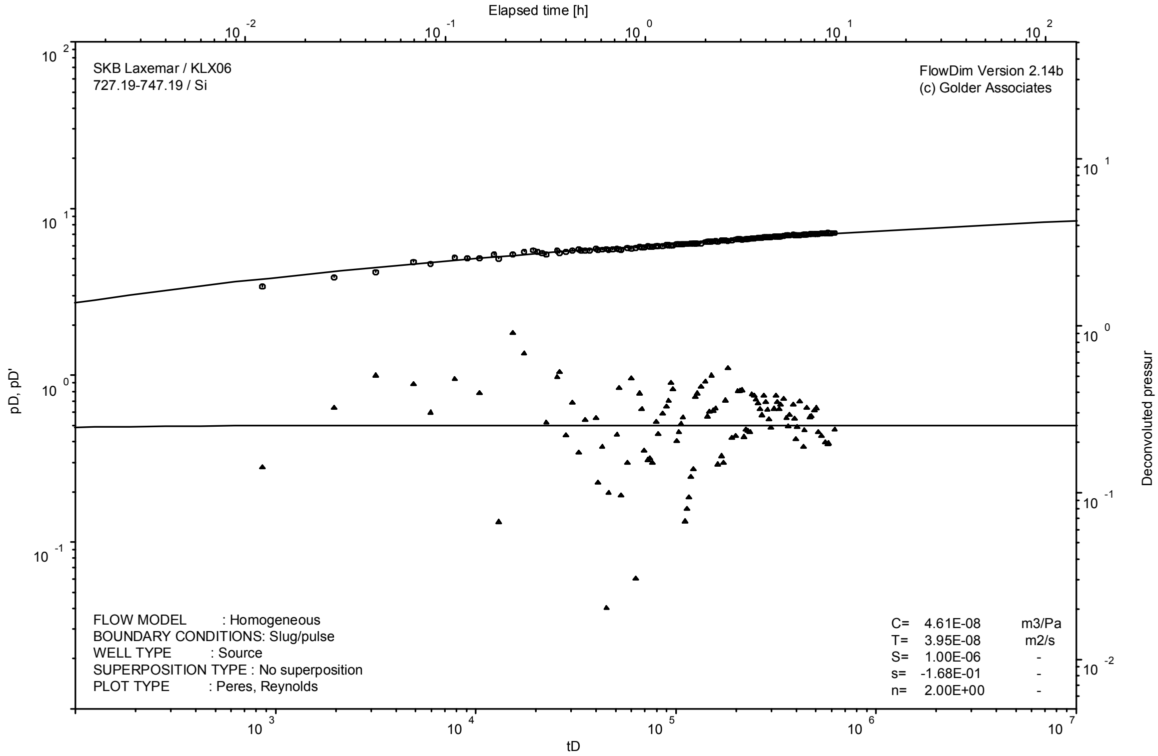
CHIR phase; HORNER match



Pressure and flow rate vs. time; cartesian plot, long term measured over night



Interval pressure and temperature vs. time; cartesian plot, long term measured over night

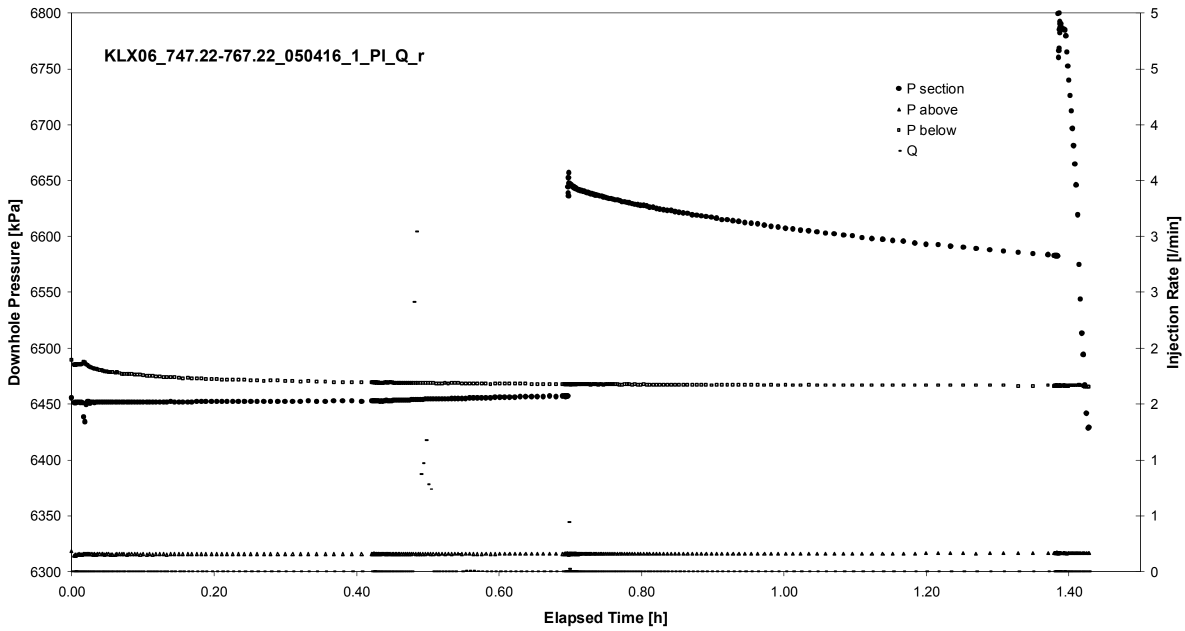


SI phase; log-log match, long term measured over night

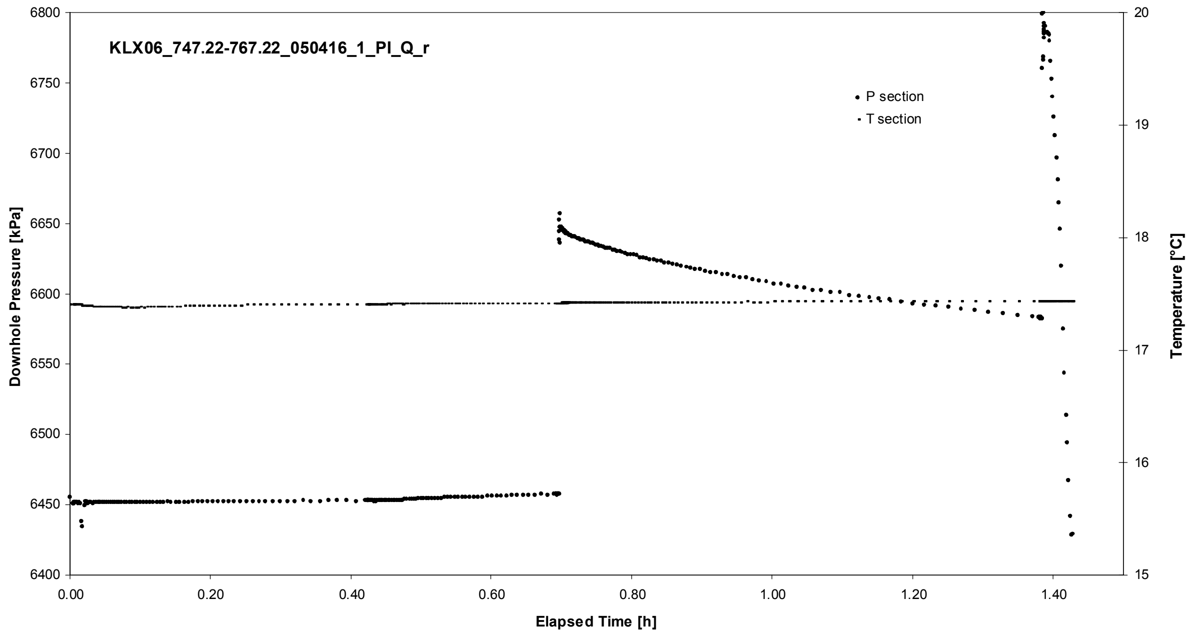
APPENDIX 2-43

Test 747.22 – 767.22 m

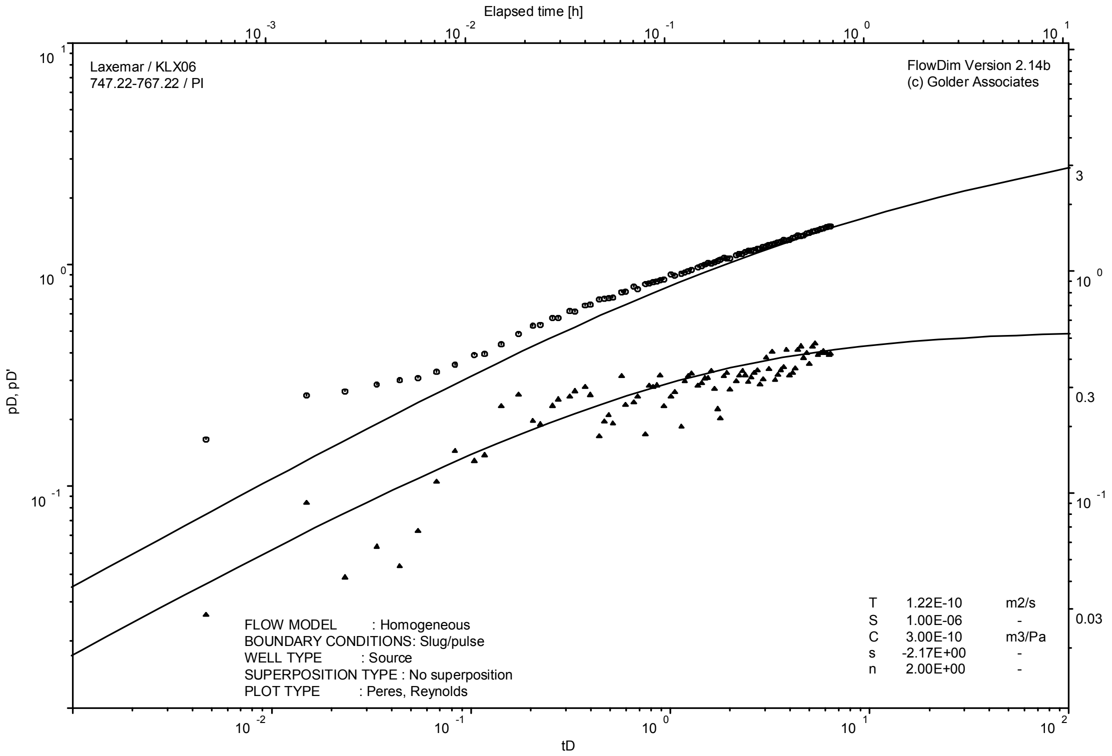
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

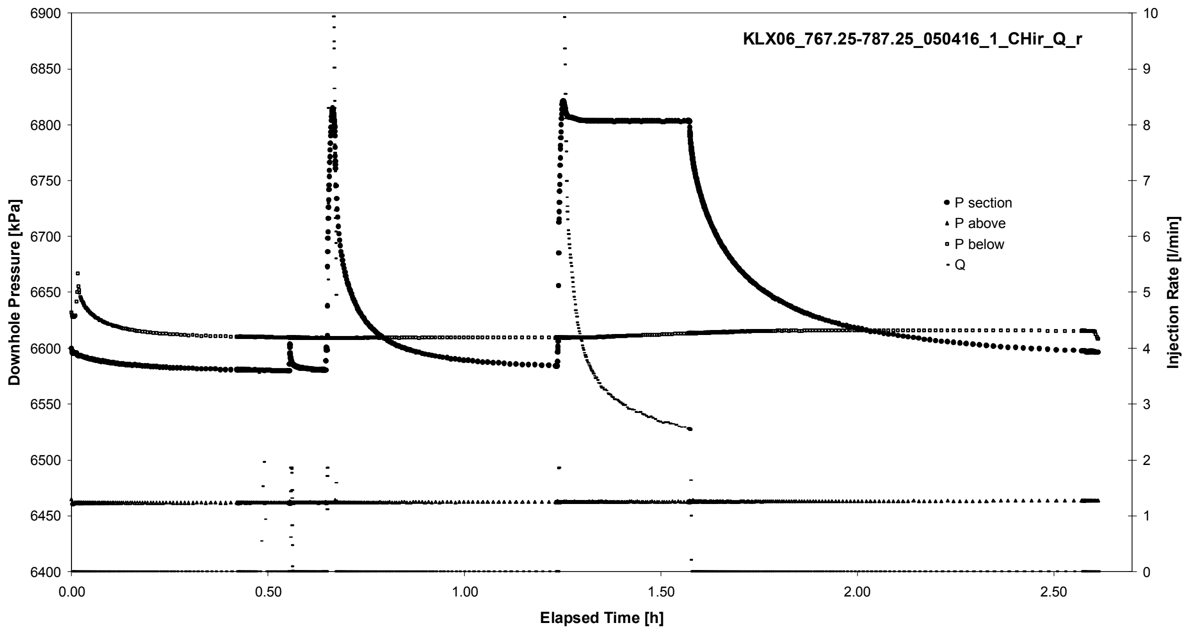


CHIR phase analysed as pulse injection; deconvolution match

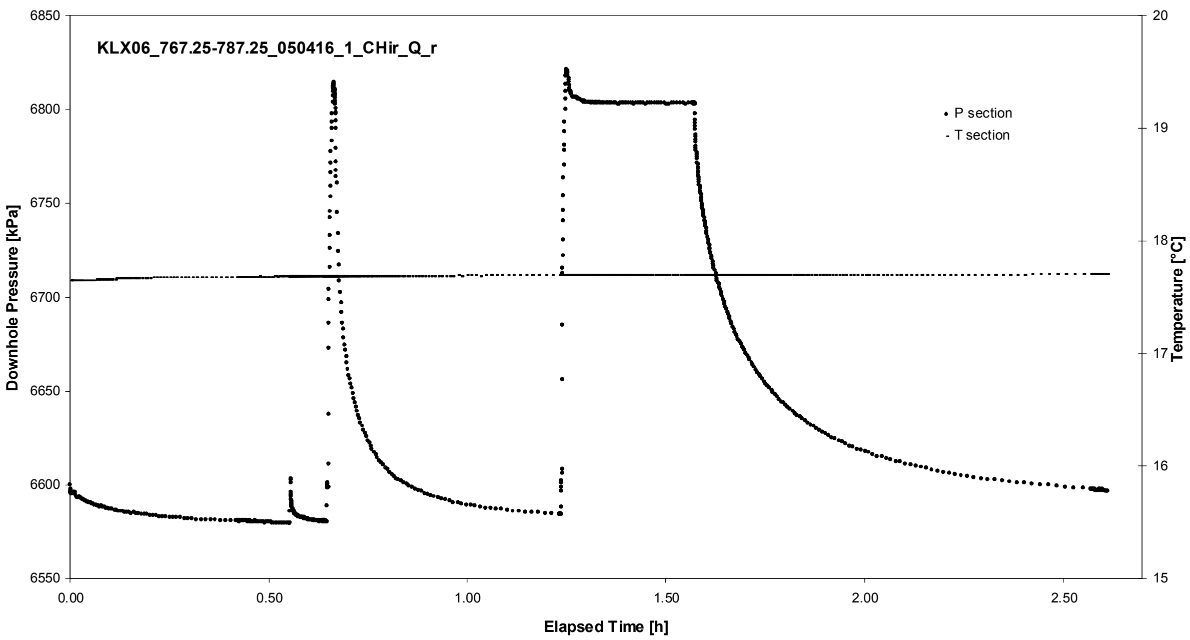
APPENDIX 2-44

Test 767.25 – 787.25 m

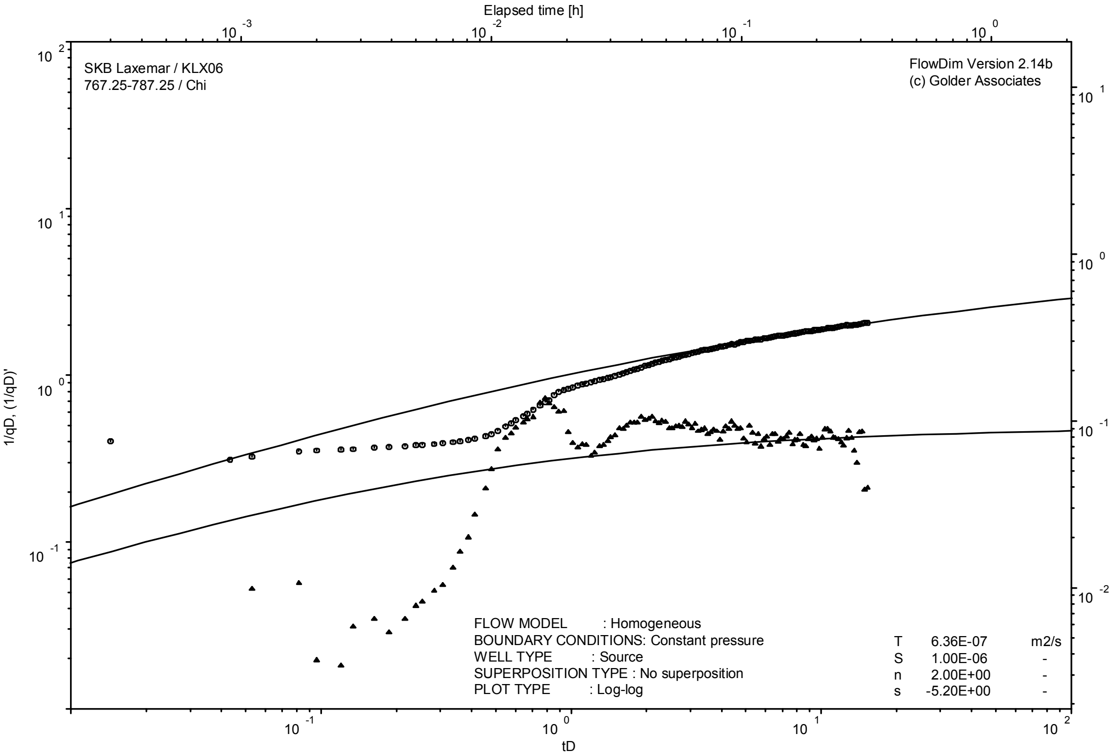
Analysis diagrams



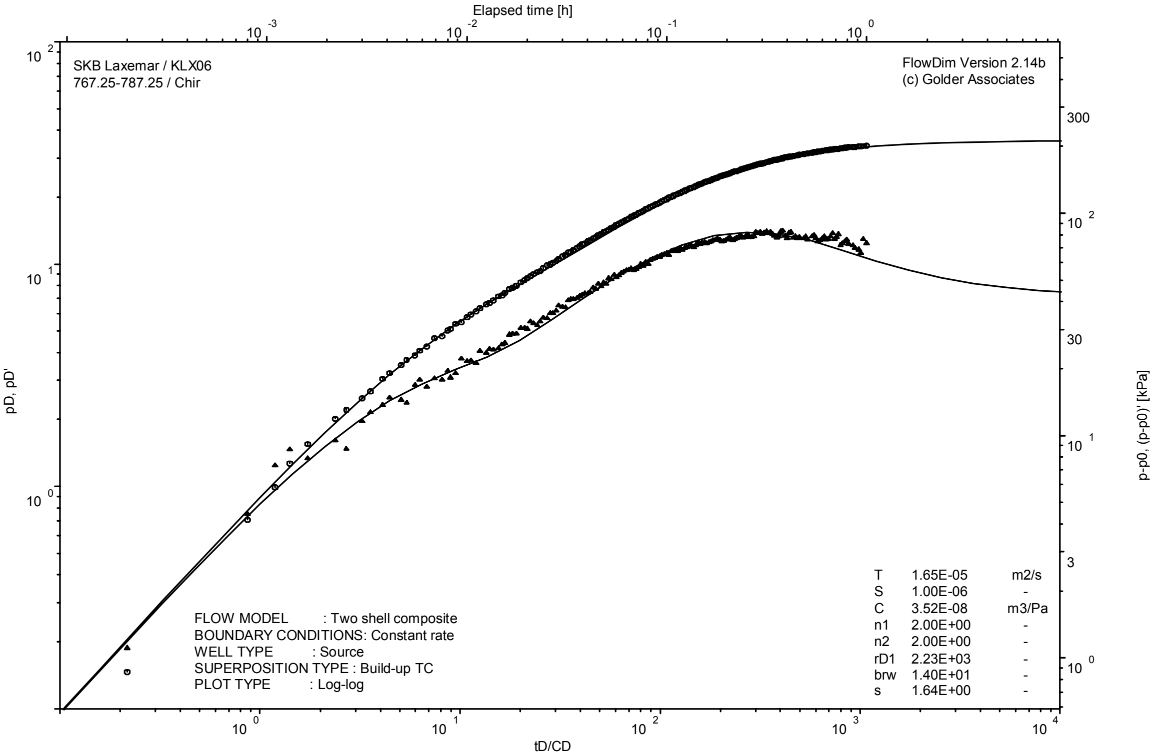
Pressure and flow rate vs. time; cartesian plot



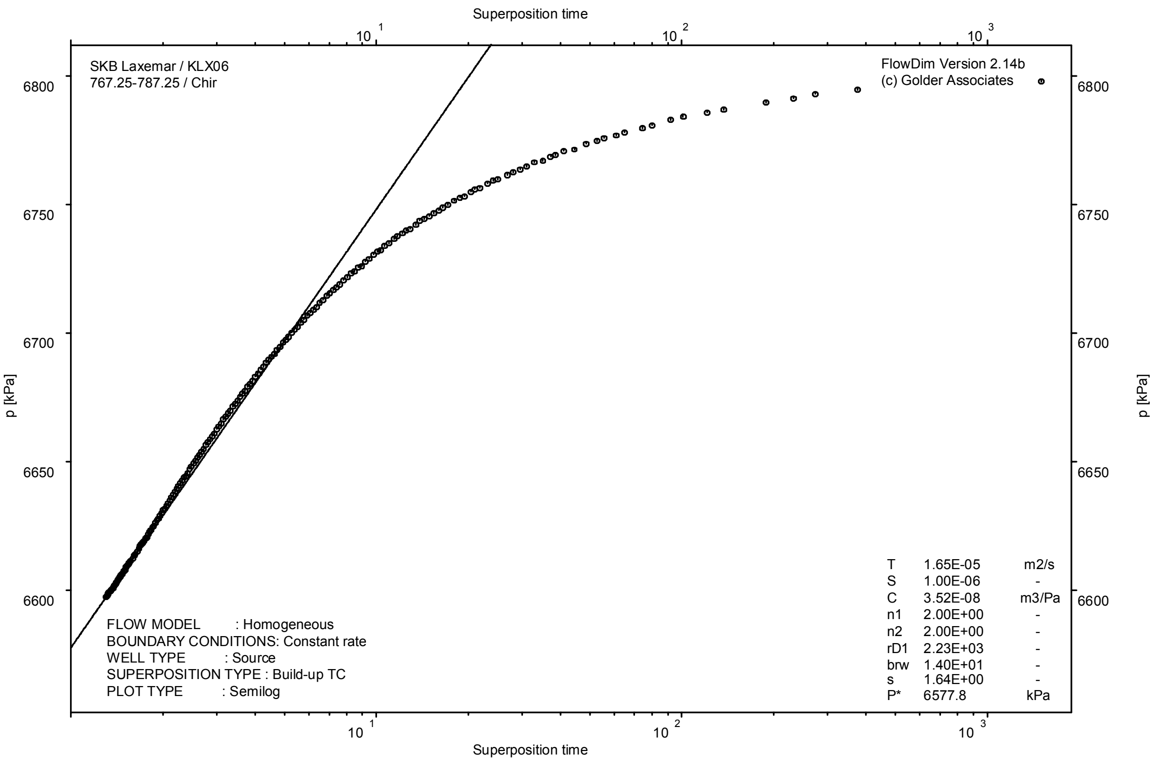
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

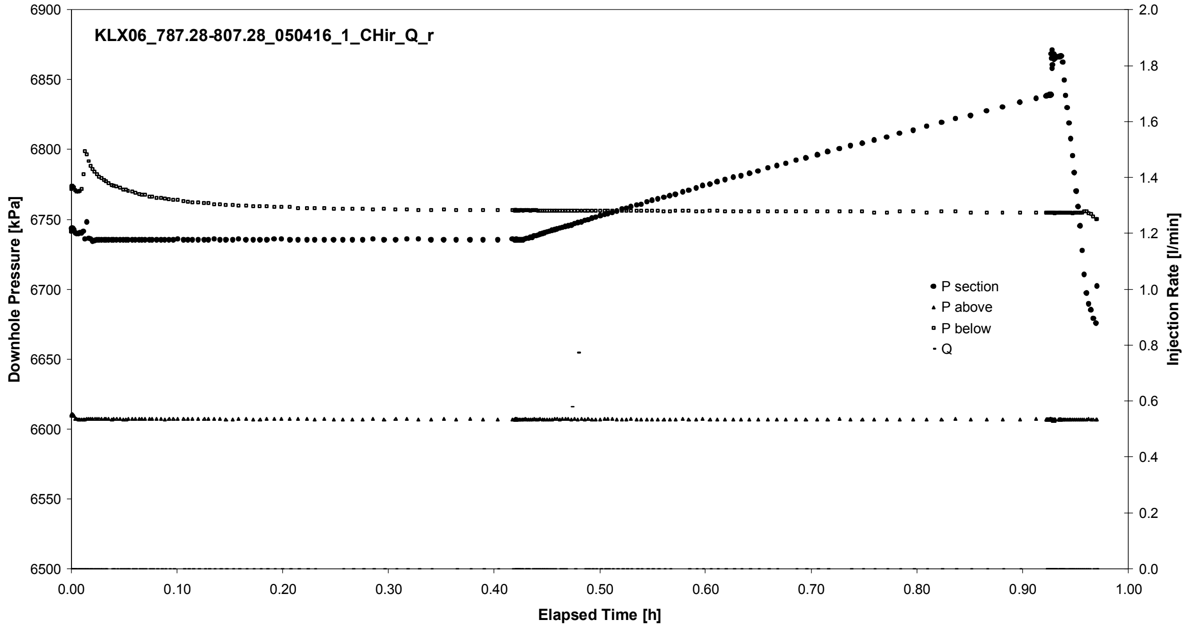


CHIR phase; HORNER match

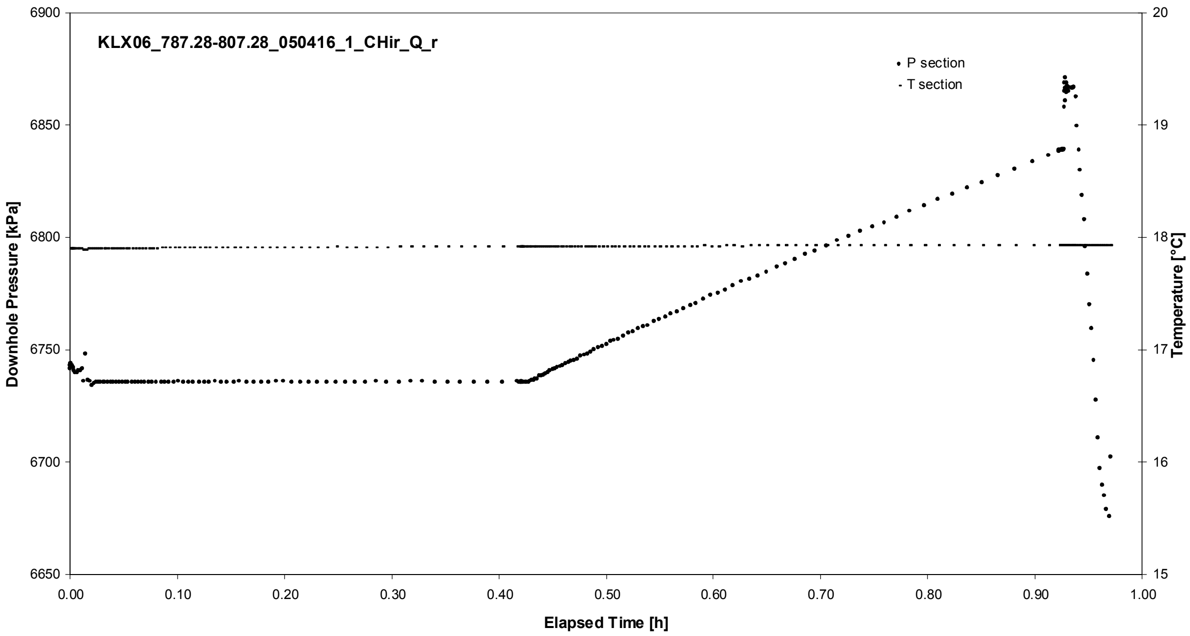
APPENDIX 2-45

Test 787.28 – 807.28 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

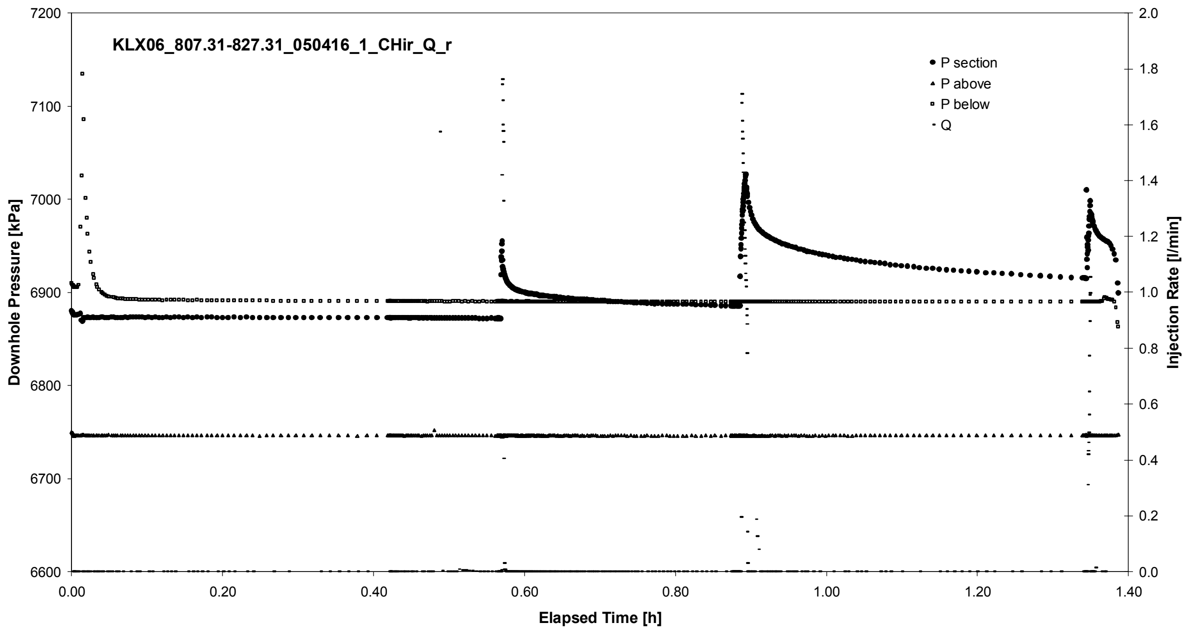
Not Analysed

CHIR phase; HORNER match

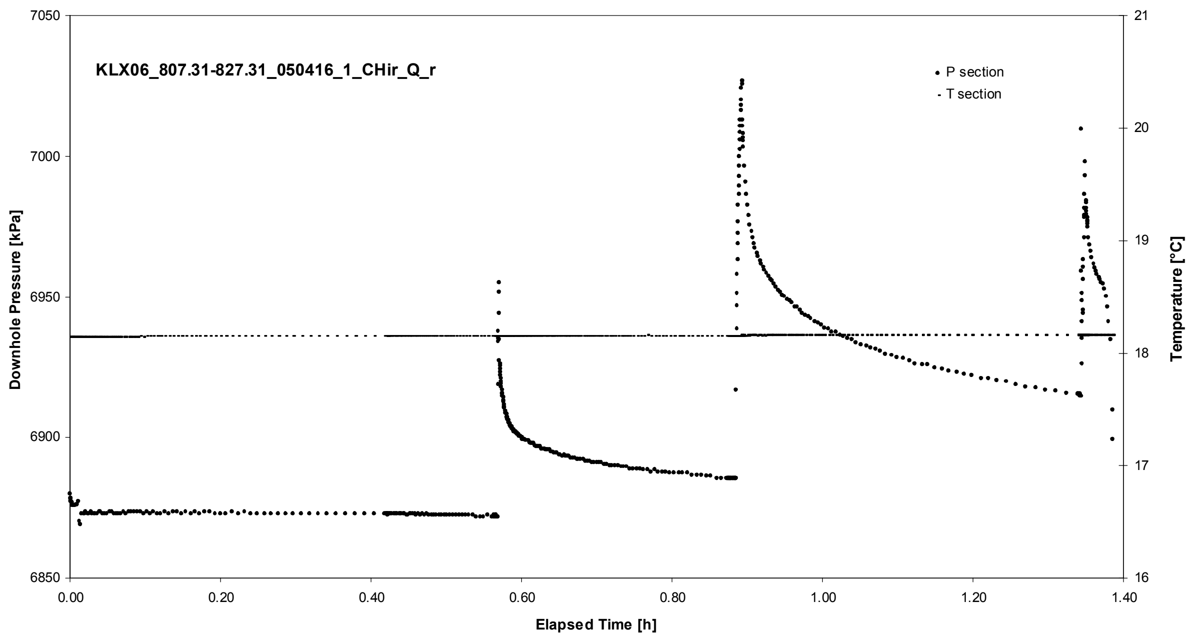
APPENDIX 2-46

Test 807.31 – 827.31 m

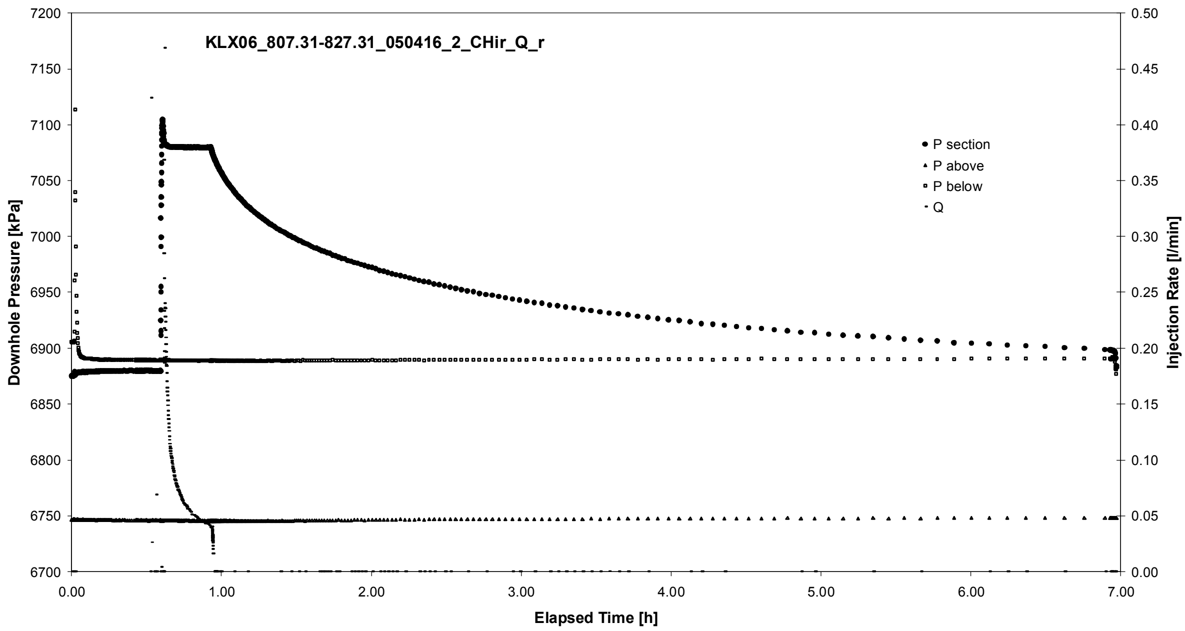
Analysis diagrams



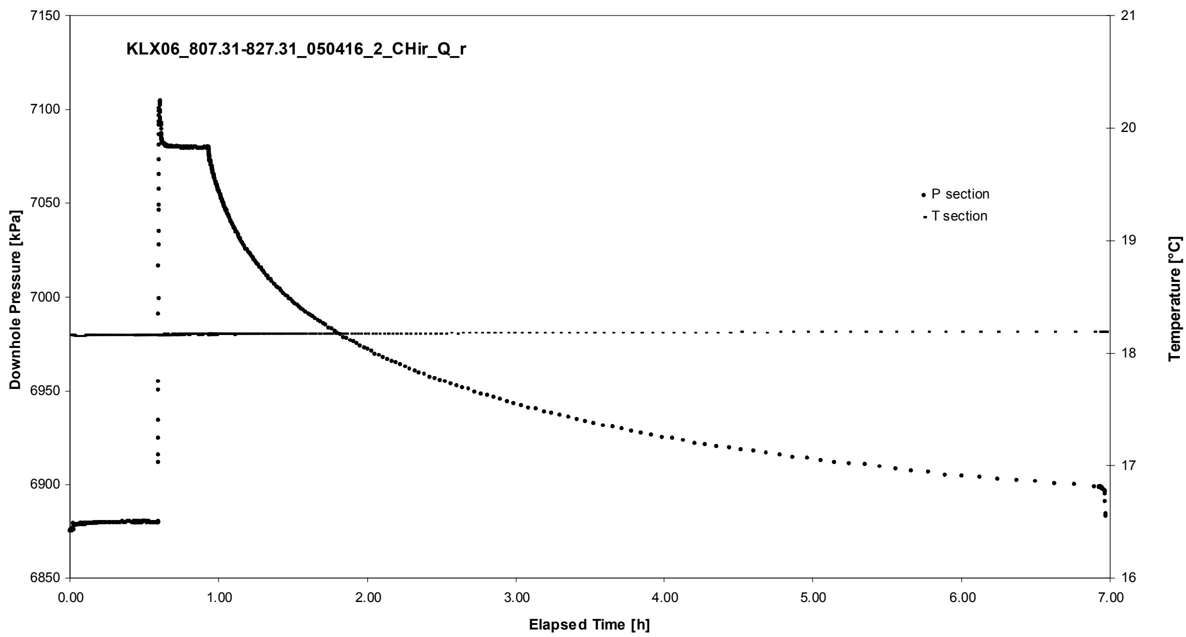
Pressure and flow rate vs. time; cartesian plot



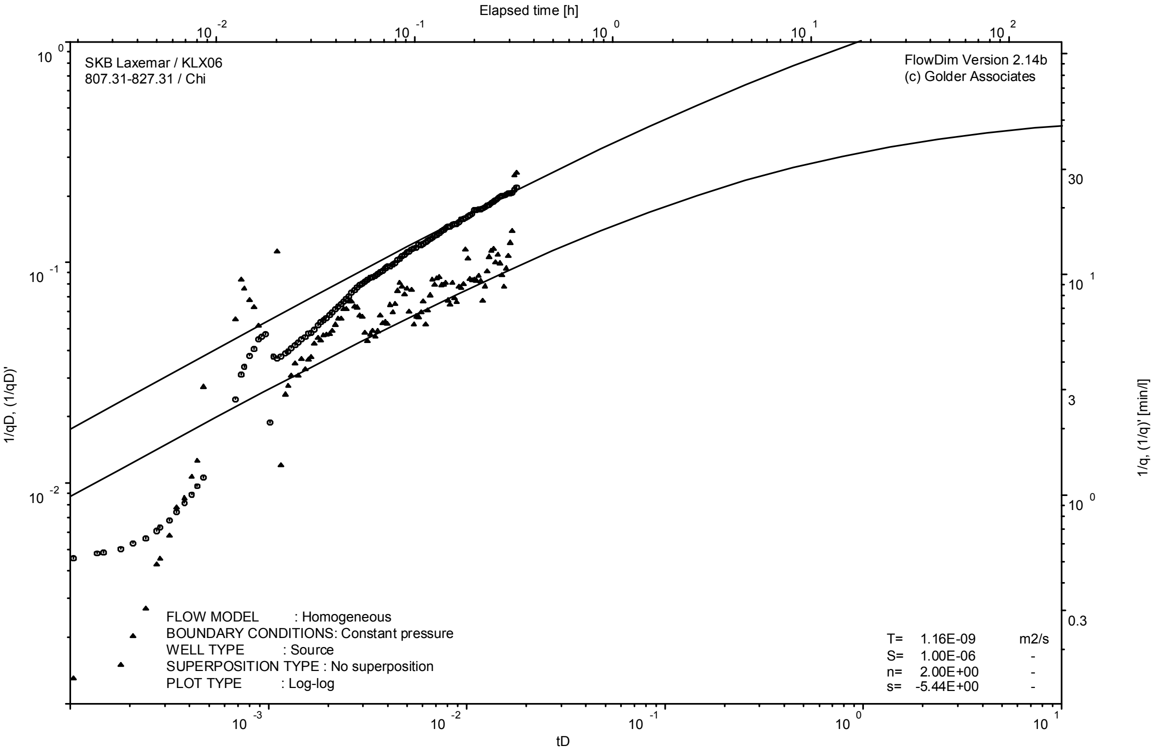
Interval pressure and temperature vs. time; cartesian plot



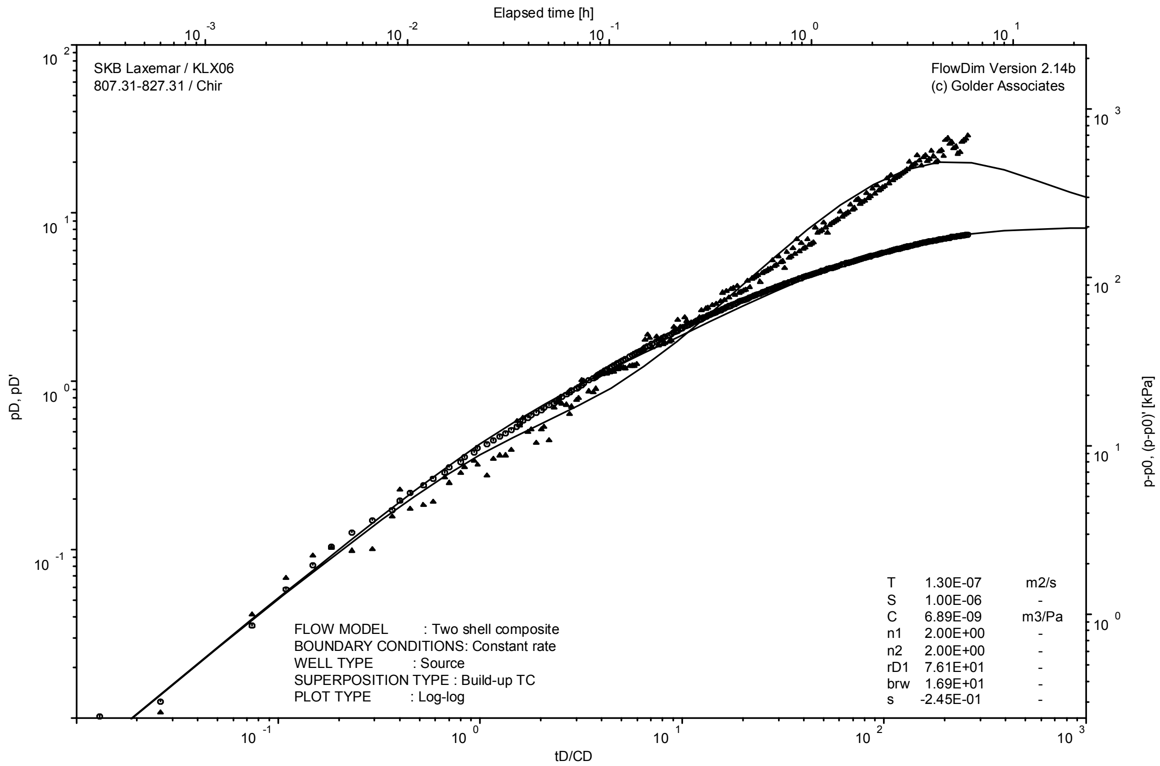
Pressure and flow rate vs. time; cartesian plot, long term measured over night



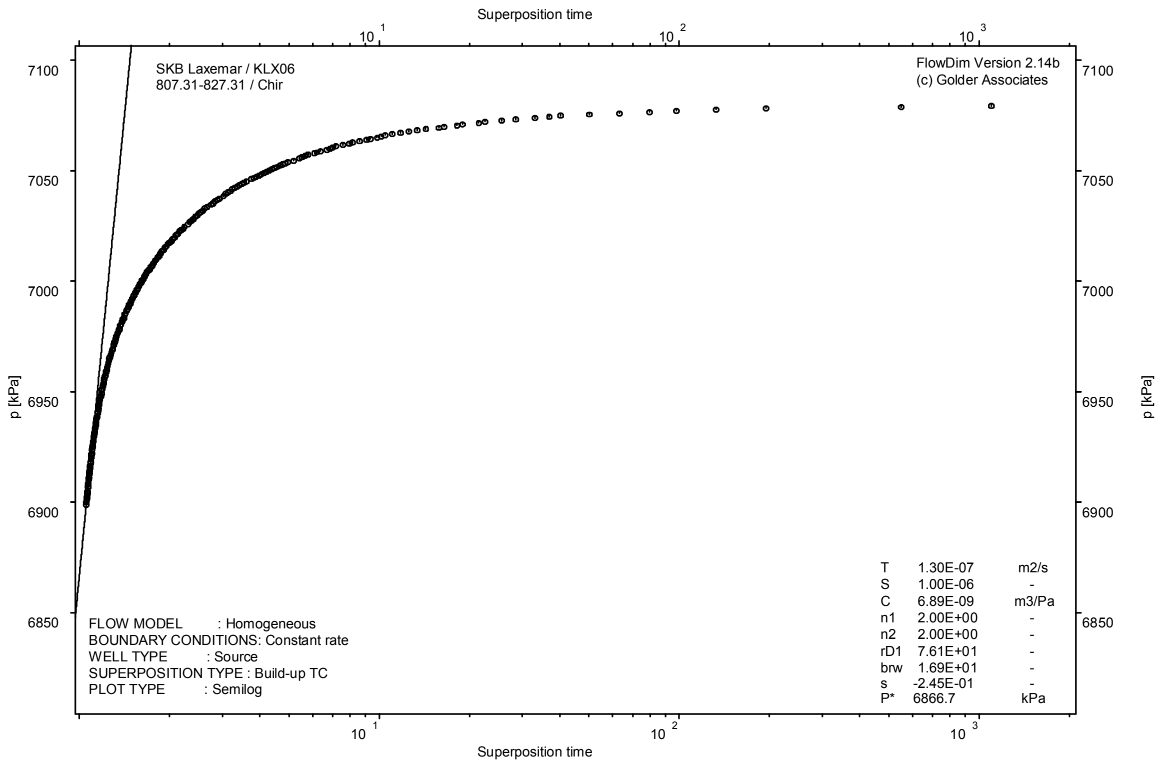
Interval pressure and temperature vs. time; cartesian plot, long term measured over night



CHI phase; log-log match, long term measured over night



CHIR phase; log-log match, long term measured over night

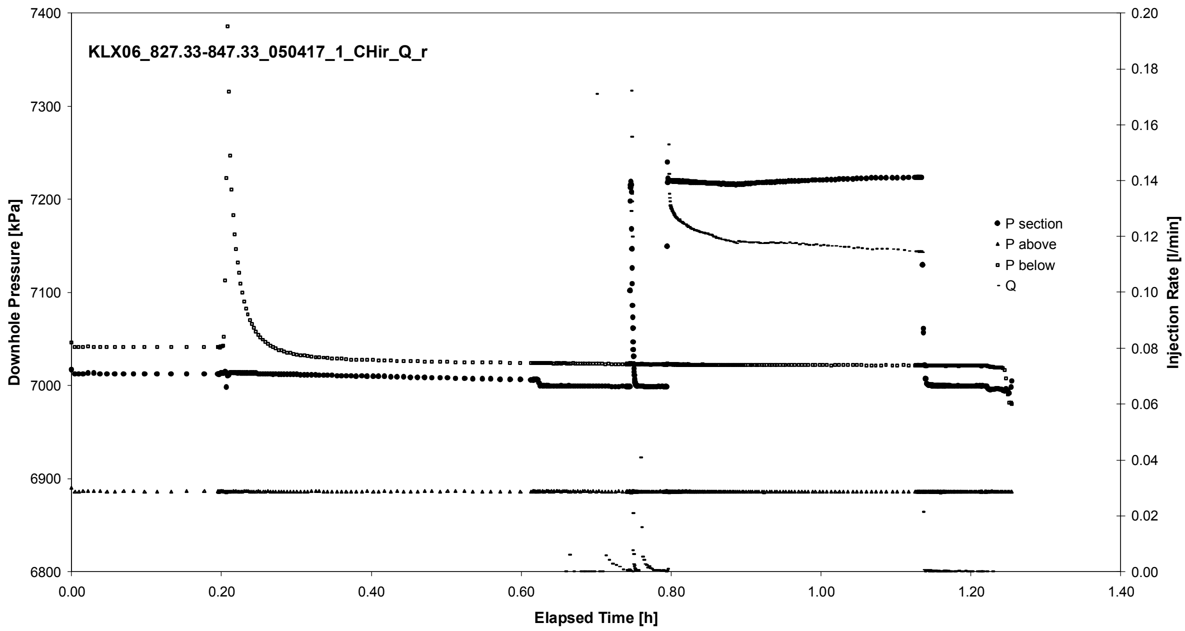


CHIR phase; HORNER match, long term measured over night

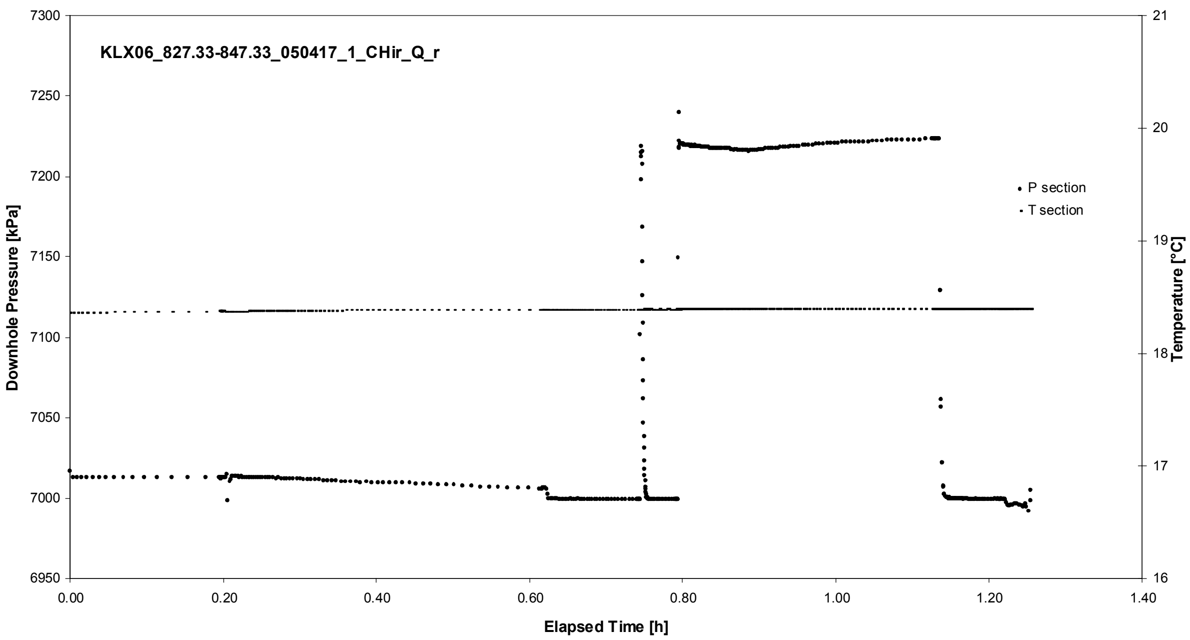
APPENDIX 2-47

Test 827.33 – 847.33 m

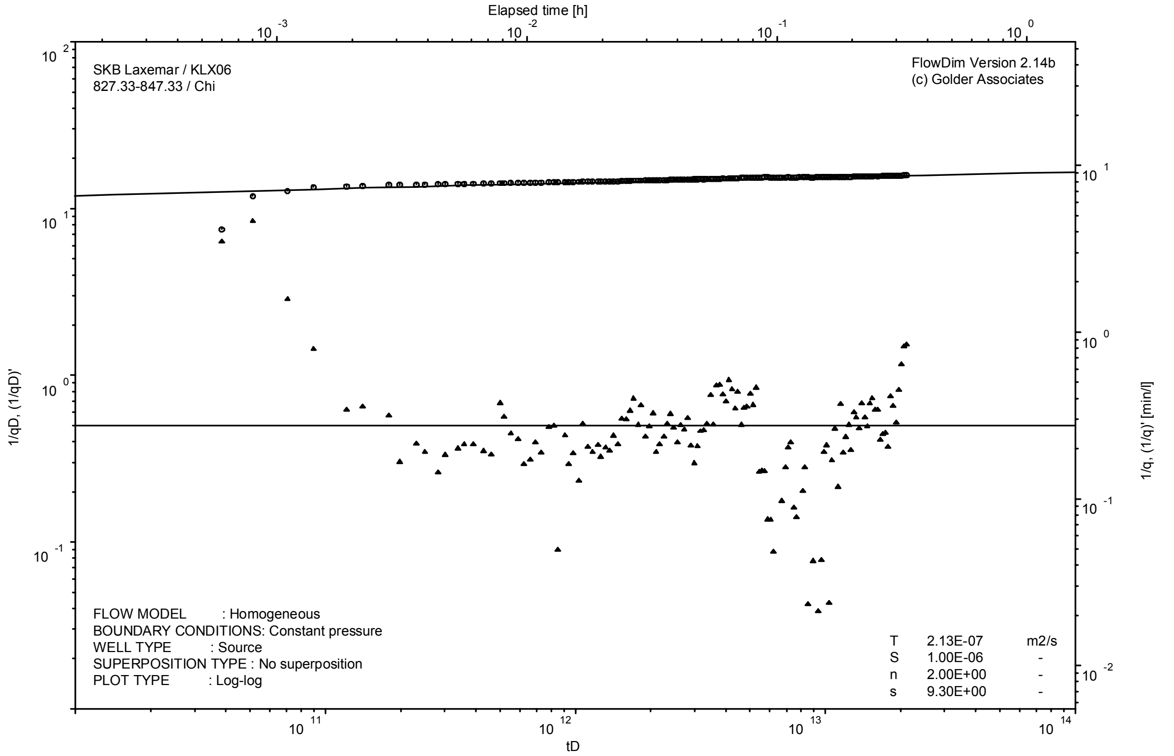
Analysis diagrams



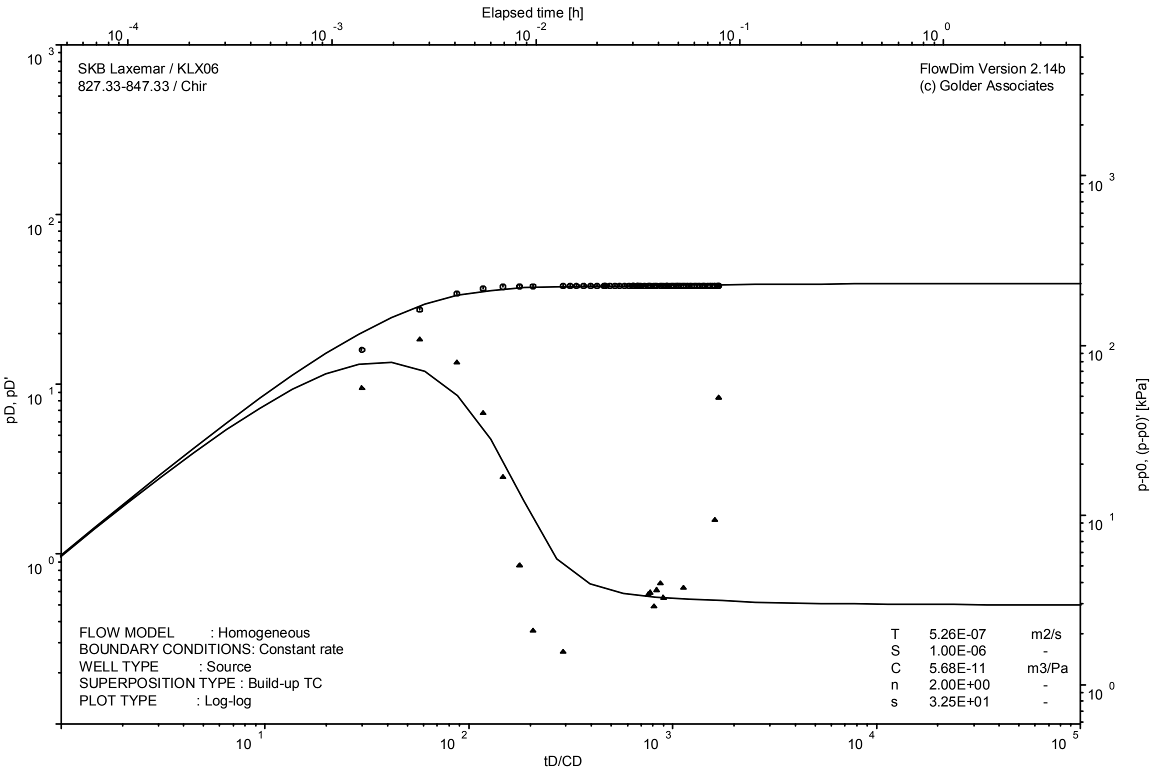
Pressure and flow rate vs. time; cartesian plot



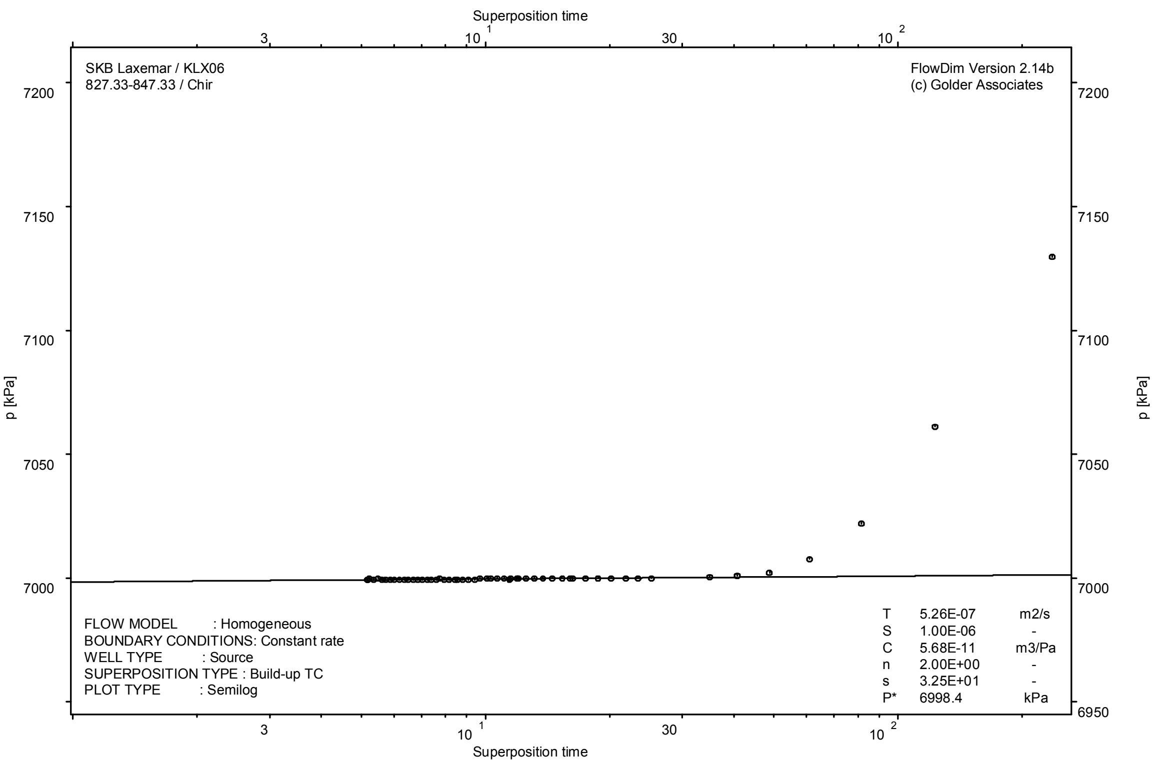
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

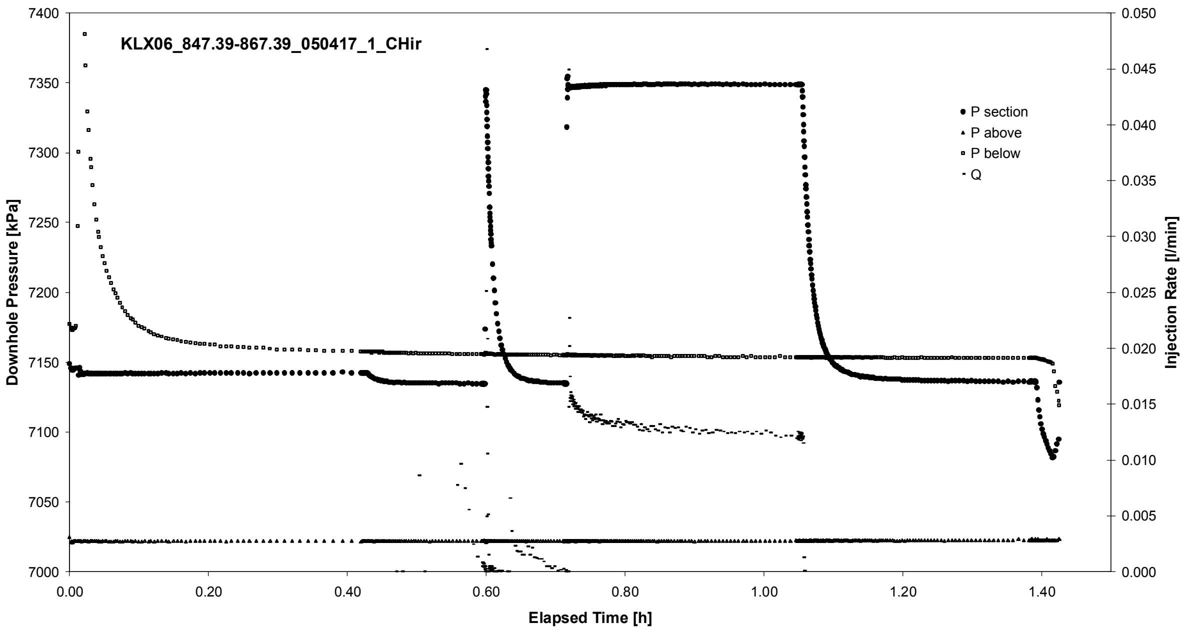


CHIR phase; HORNER match

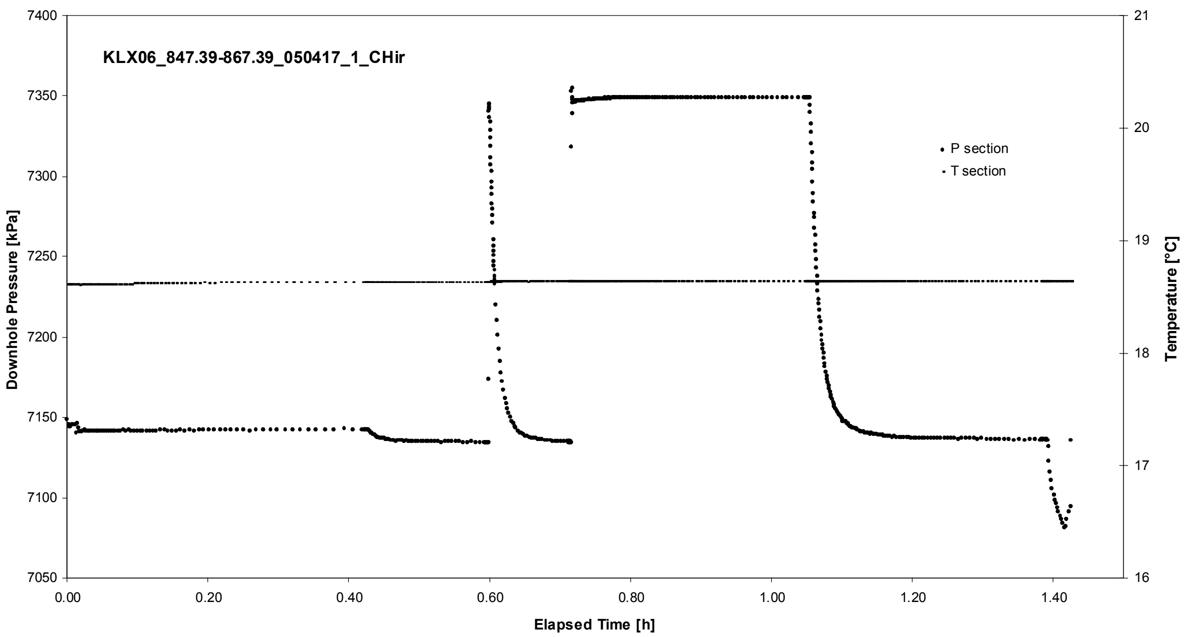
APPENDIX 2-48

Test 847.39 – 867.39 m

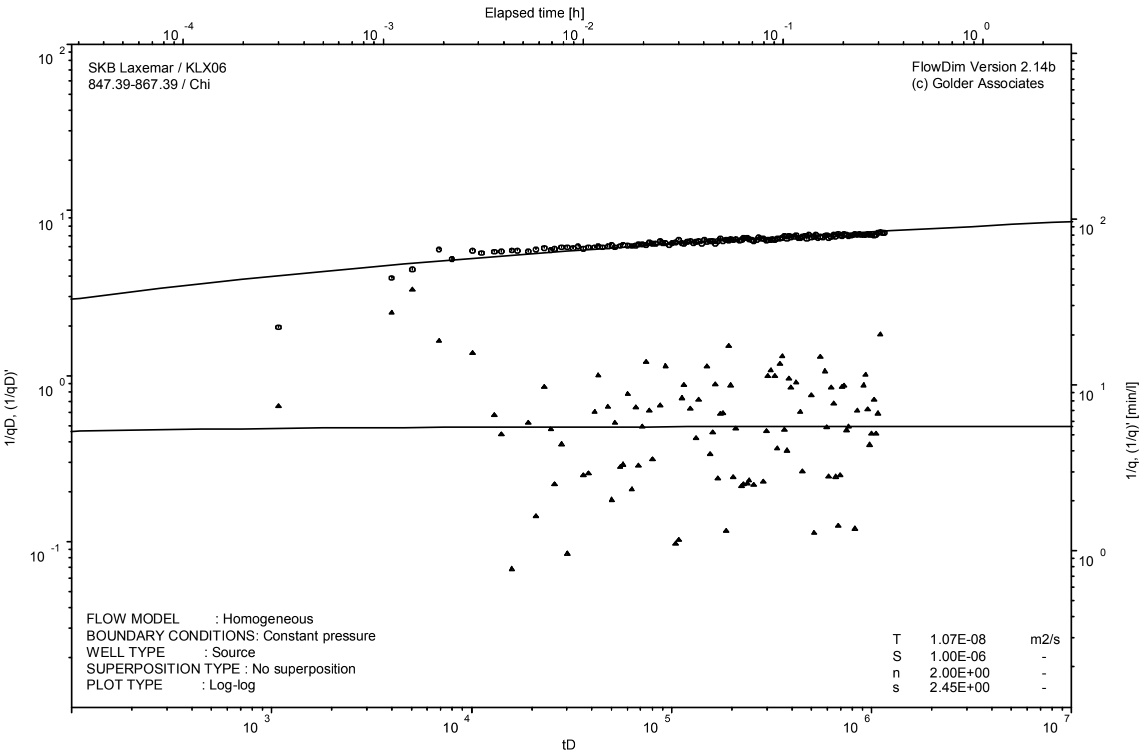
Analysis diagrams



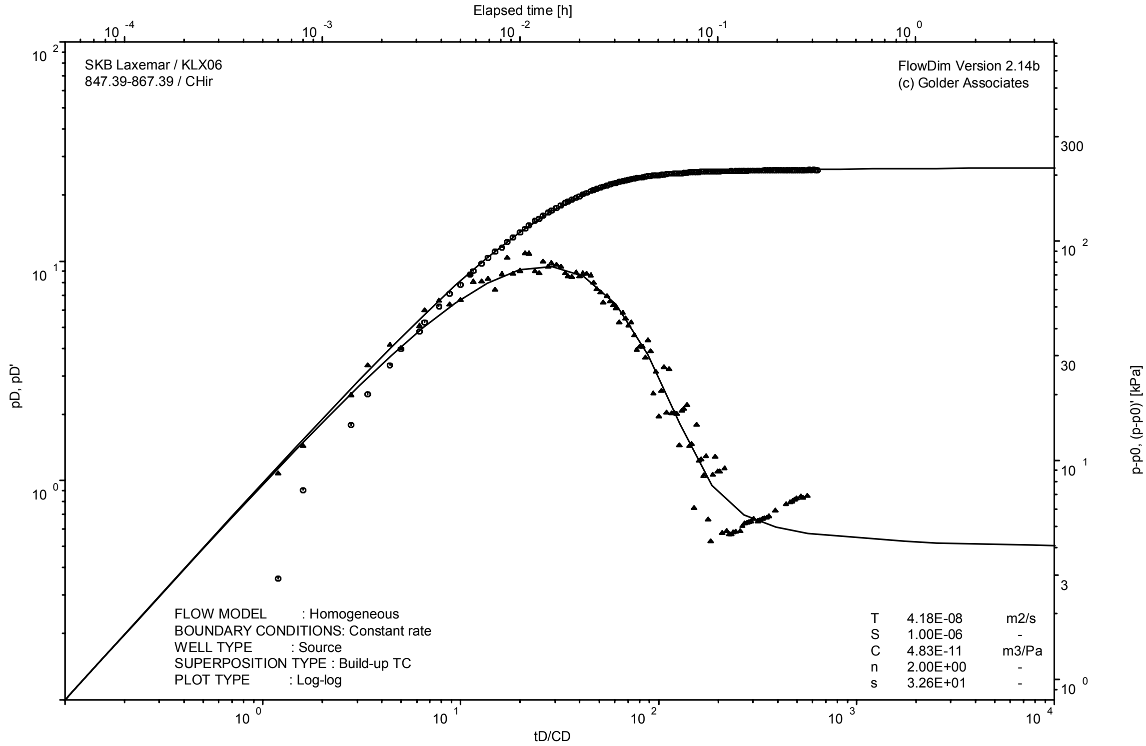
Pressure and flow rate vs. time; cartesian plot



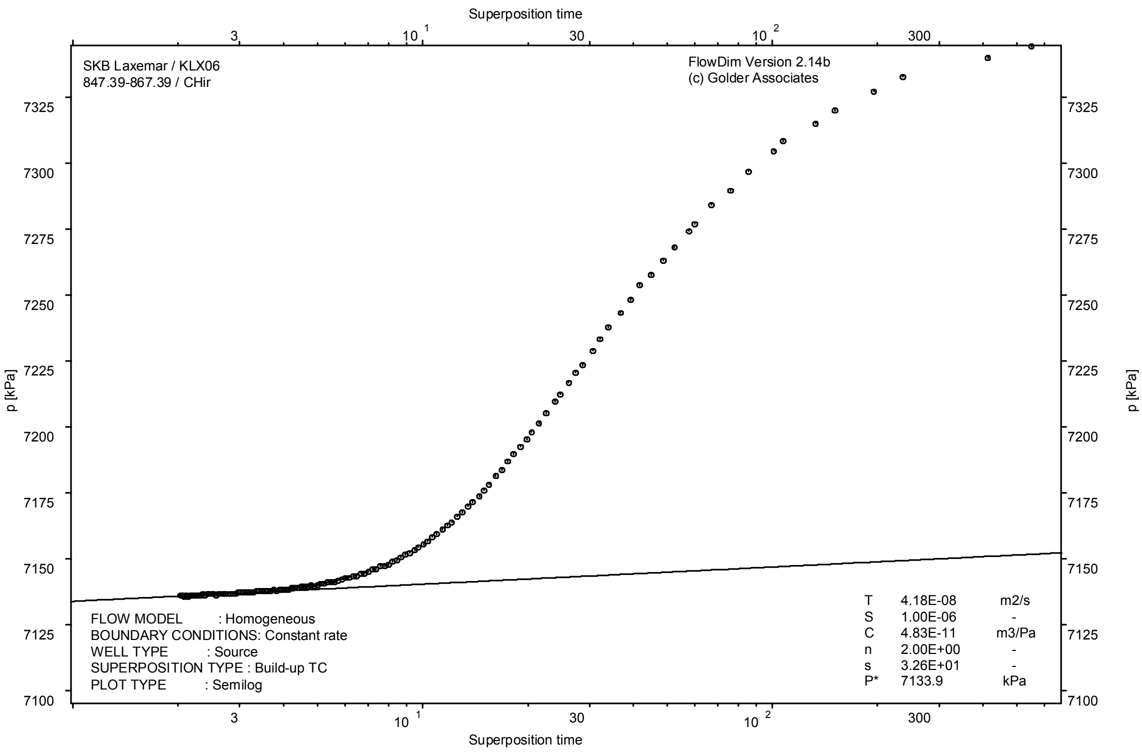
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

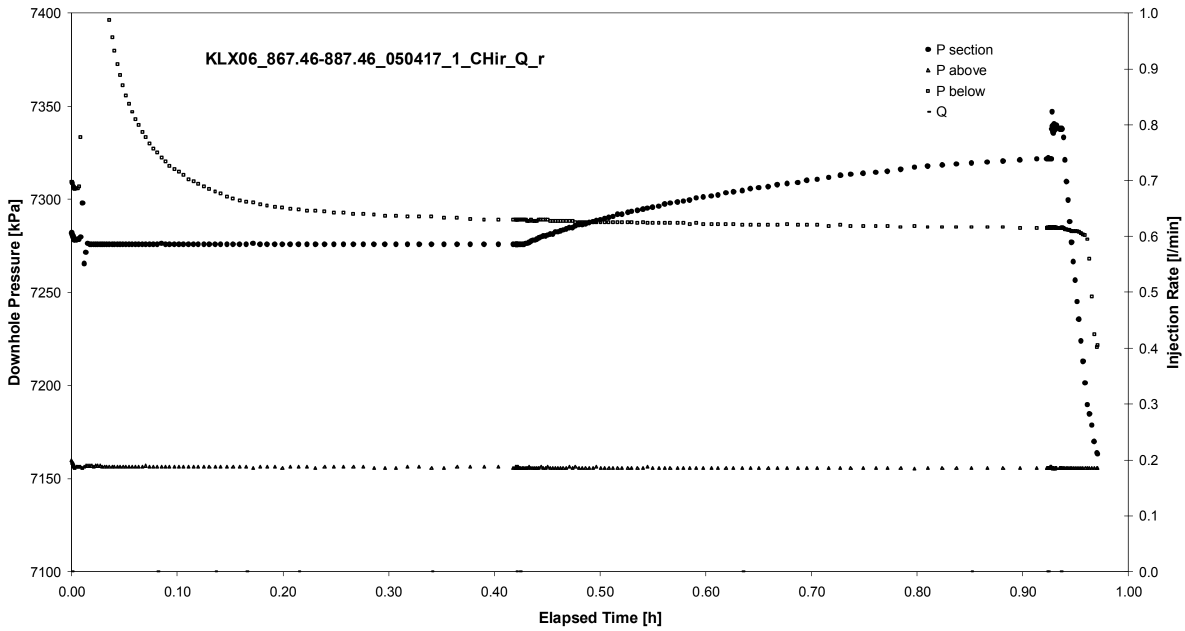


CHIR phase; HORNER match

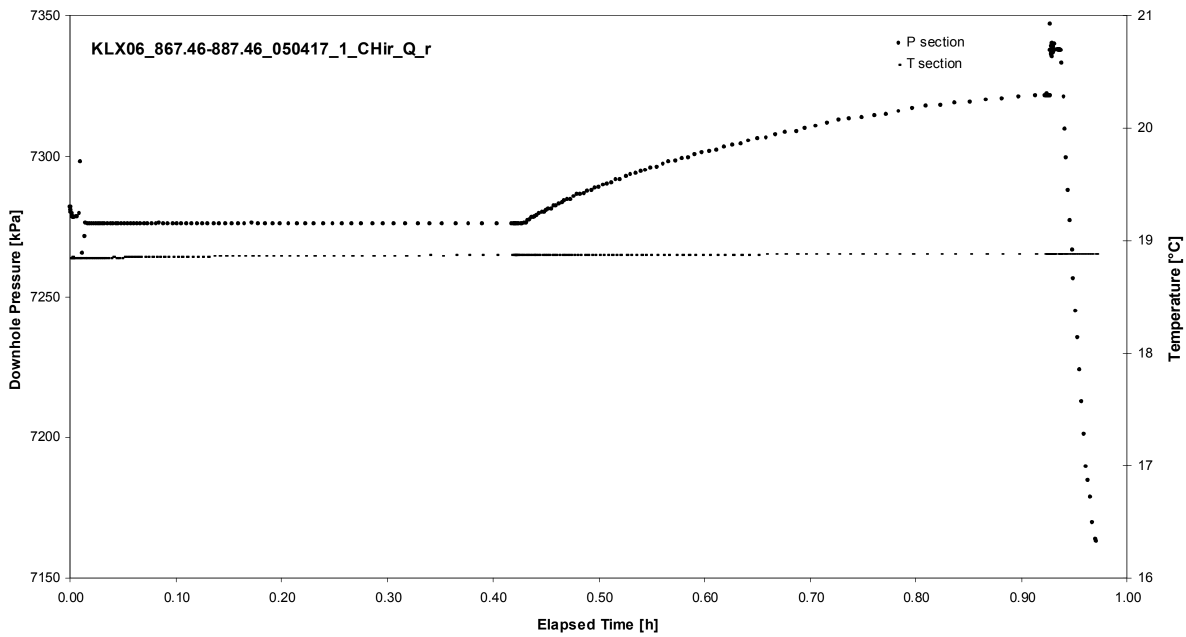
APPENDIX 2-49

Test 867.46 – 887.46 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

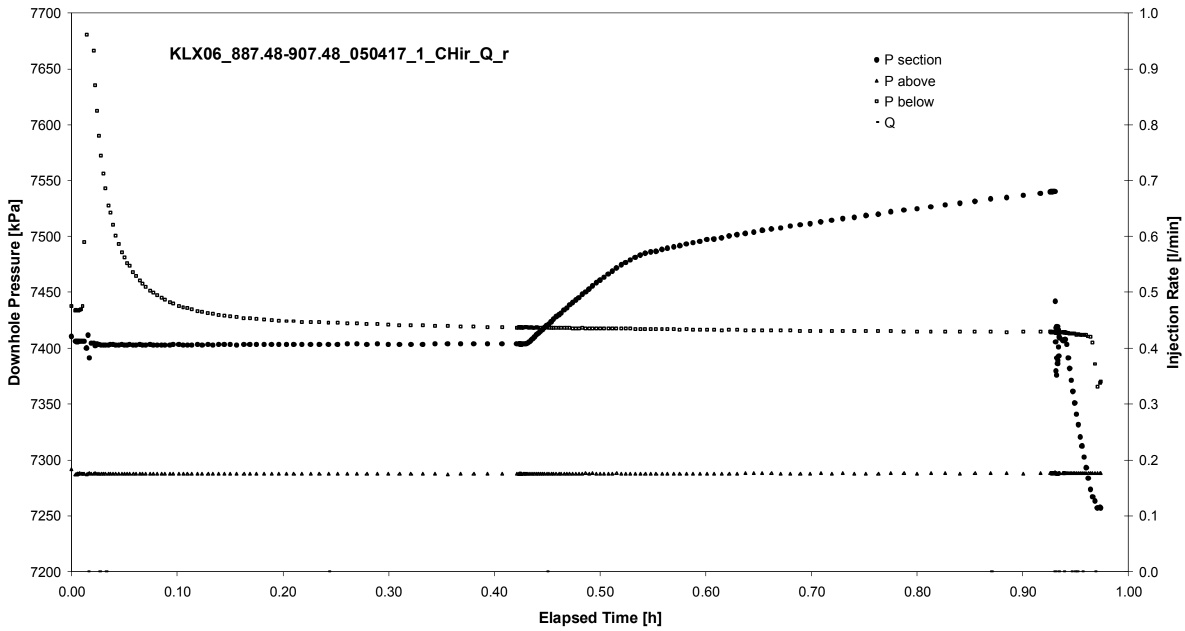
Not Analysed

CHIR phase; HORNER match

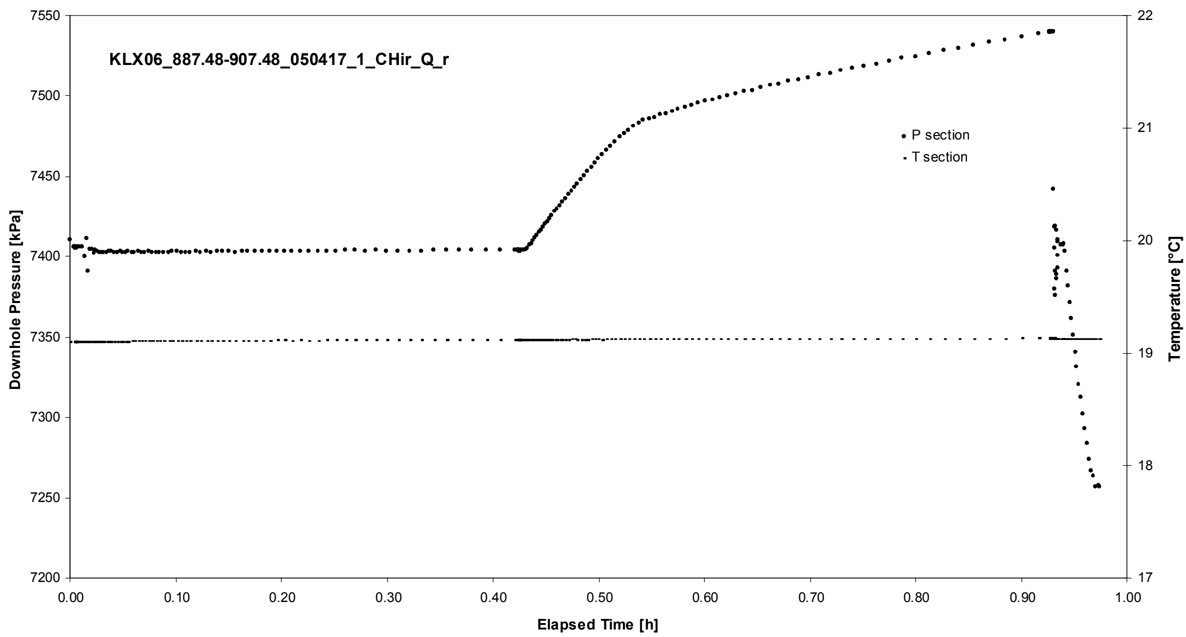
APPENDIX 2-50

Test 887.48 – 907.48 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

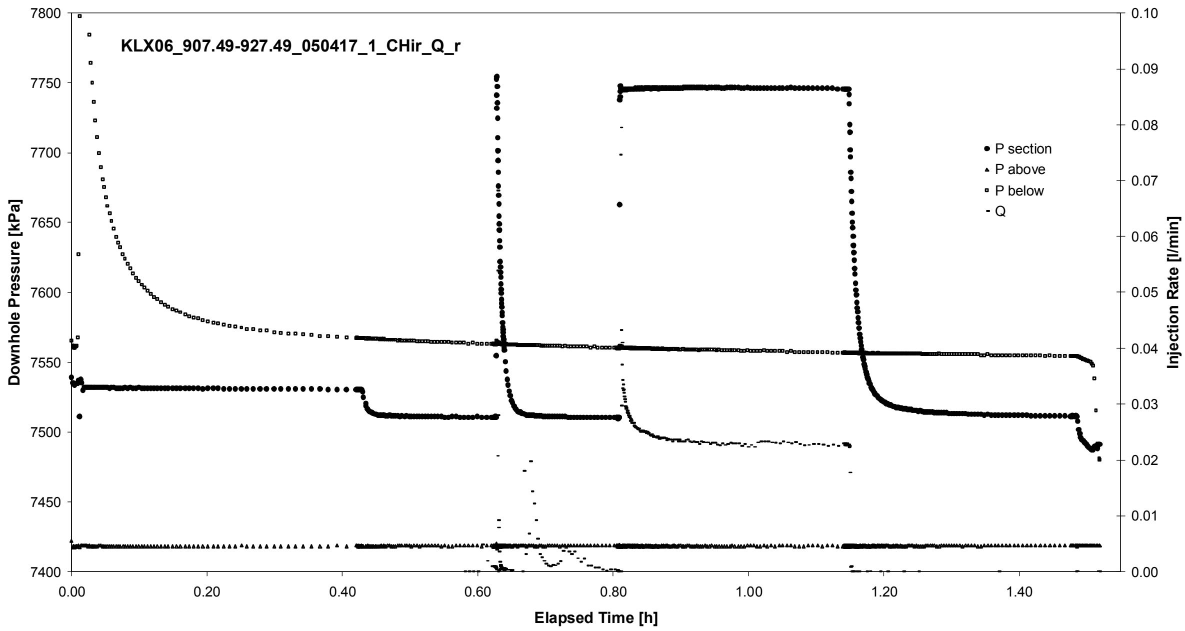
Not Analysed

CHIR phase; HORNER match

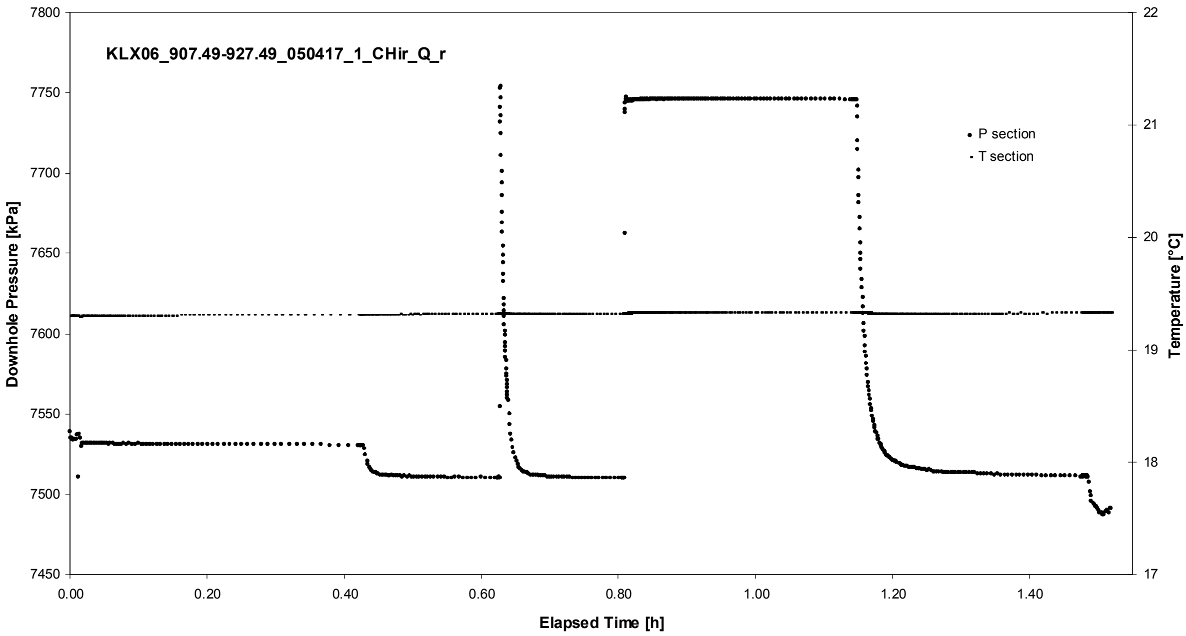
APPENDIX 2-51

Test 907.49 – 927.49 m

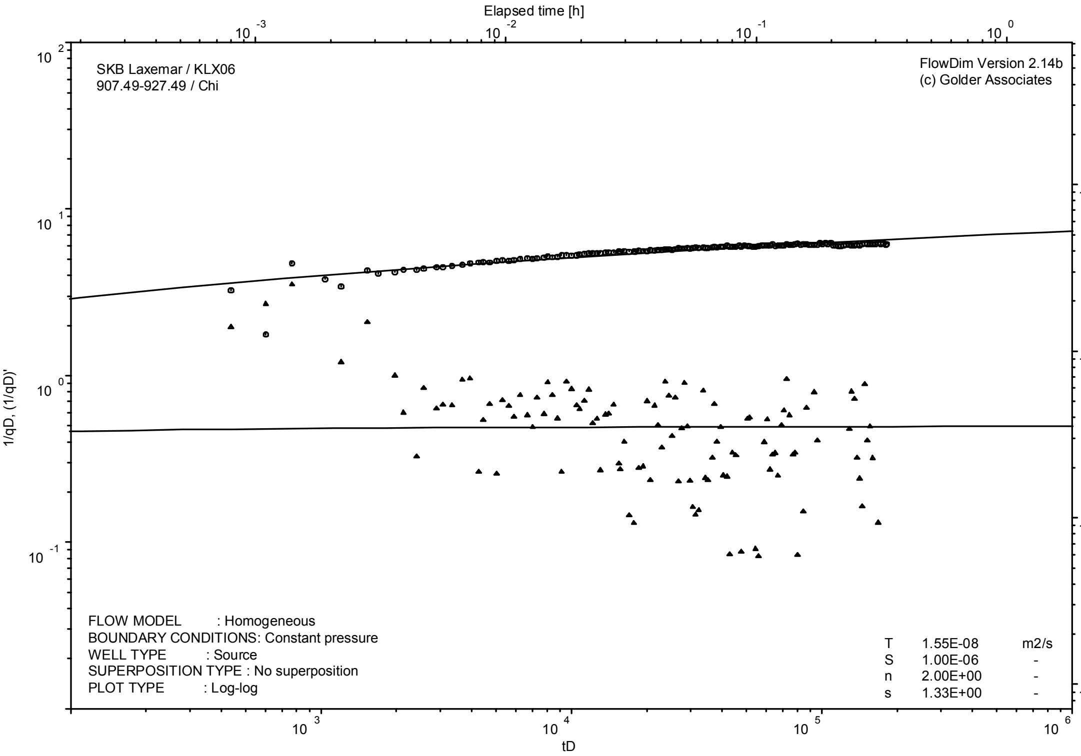
Analysis diagrams



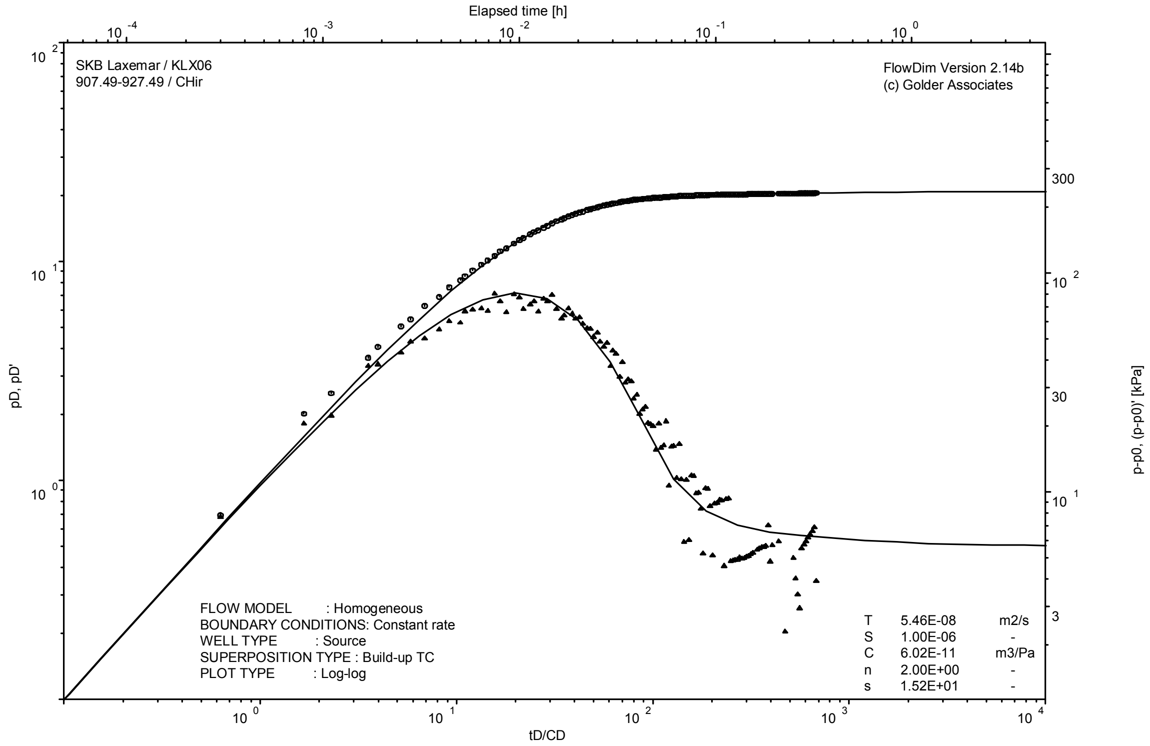
Pressure and flow rate vs. time; cartesian plot



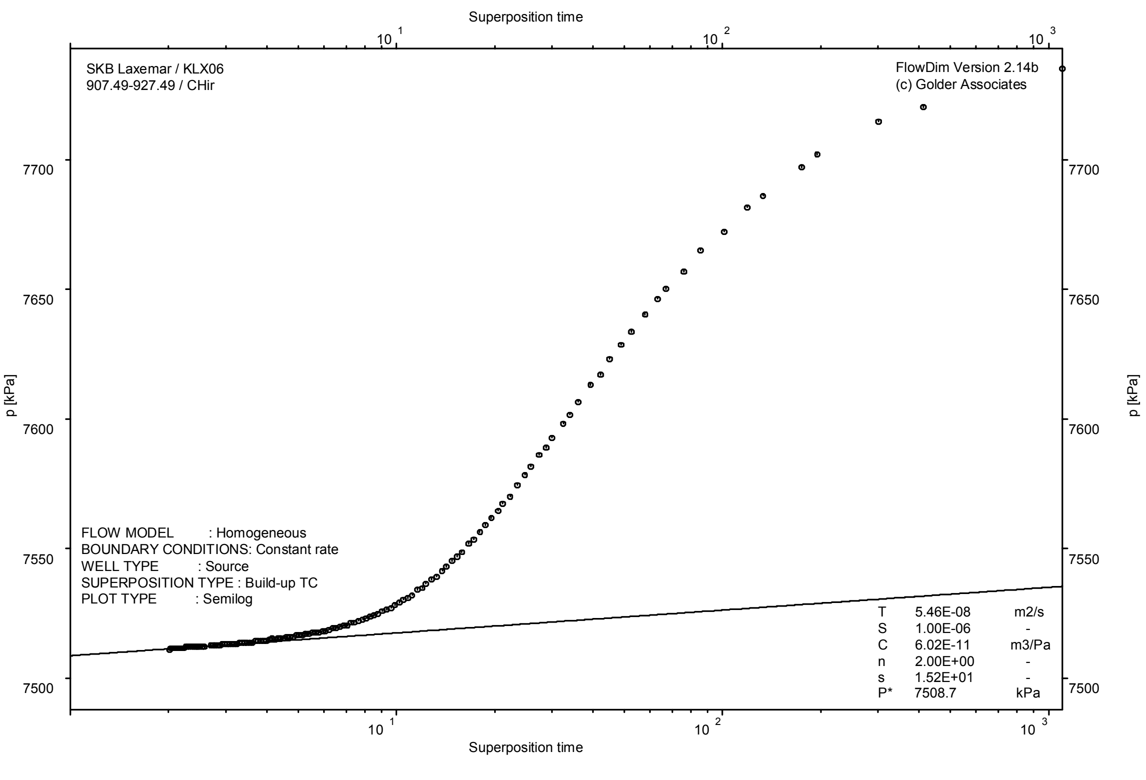
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

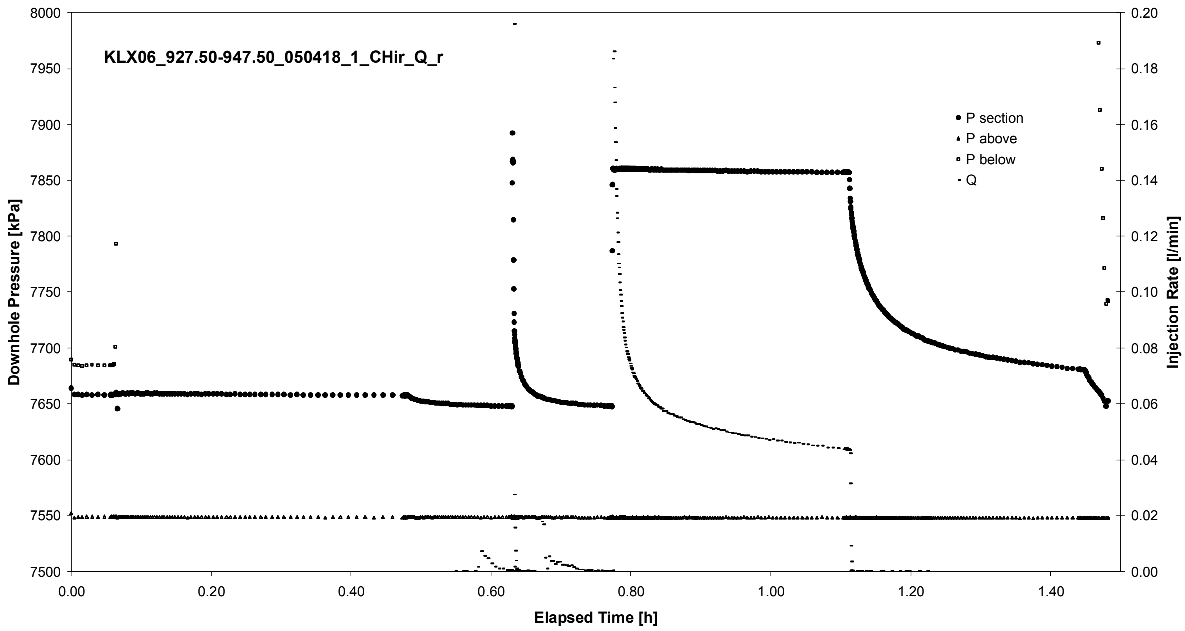


CHIR phase; HORNER match

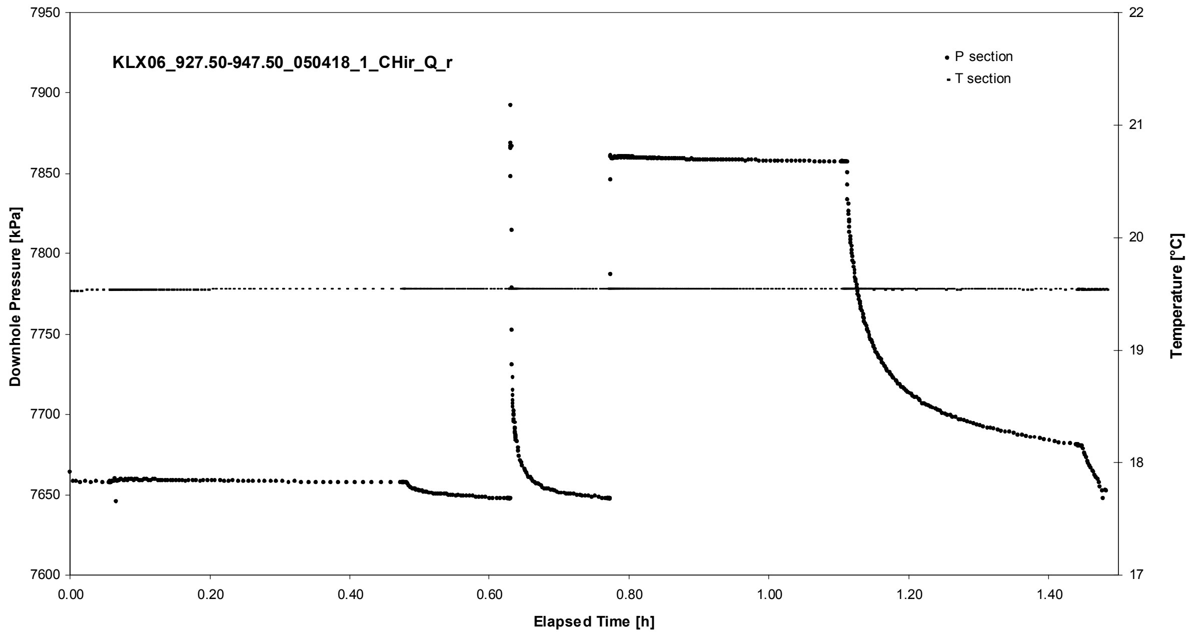
APPENDIX 2-52

Test 927.50 – 947.50 m

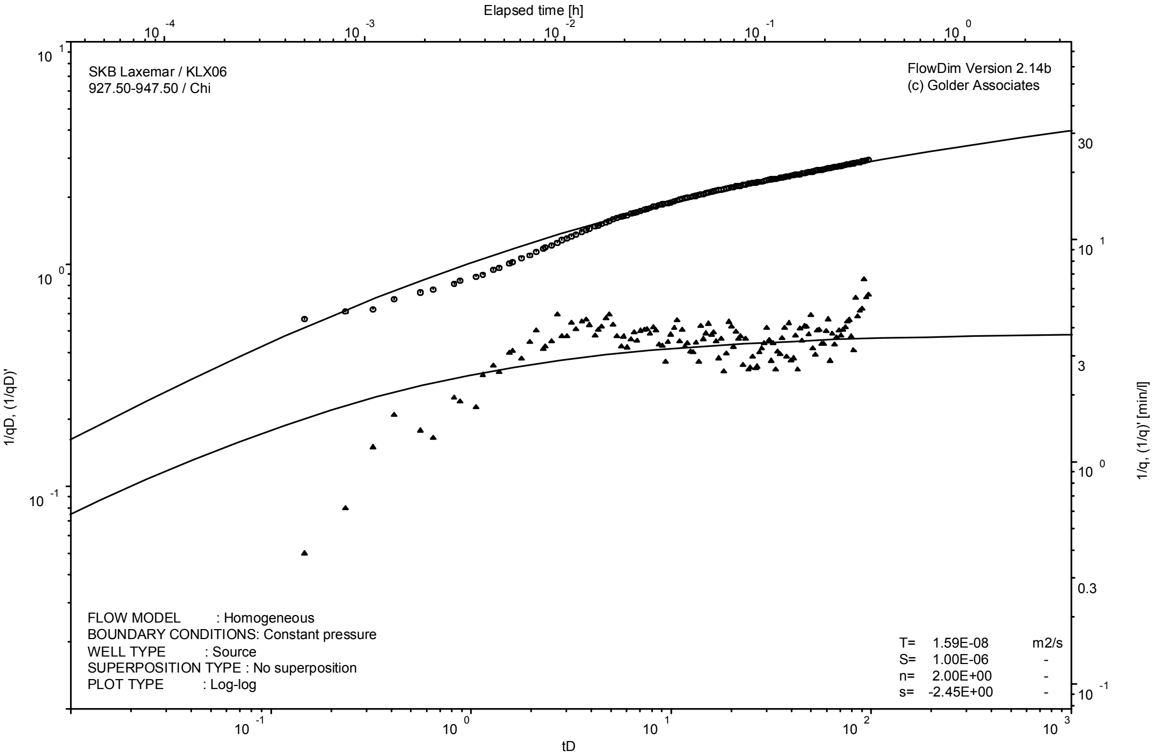
Analysis diagrams



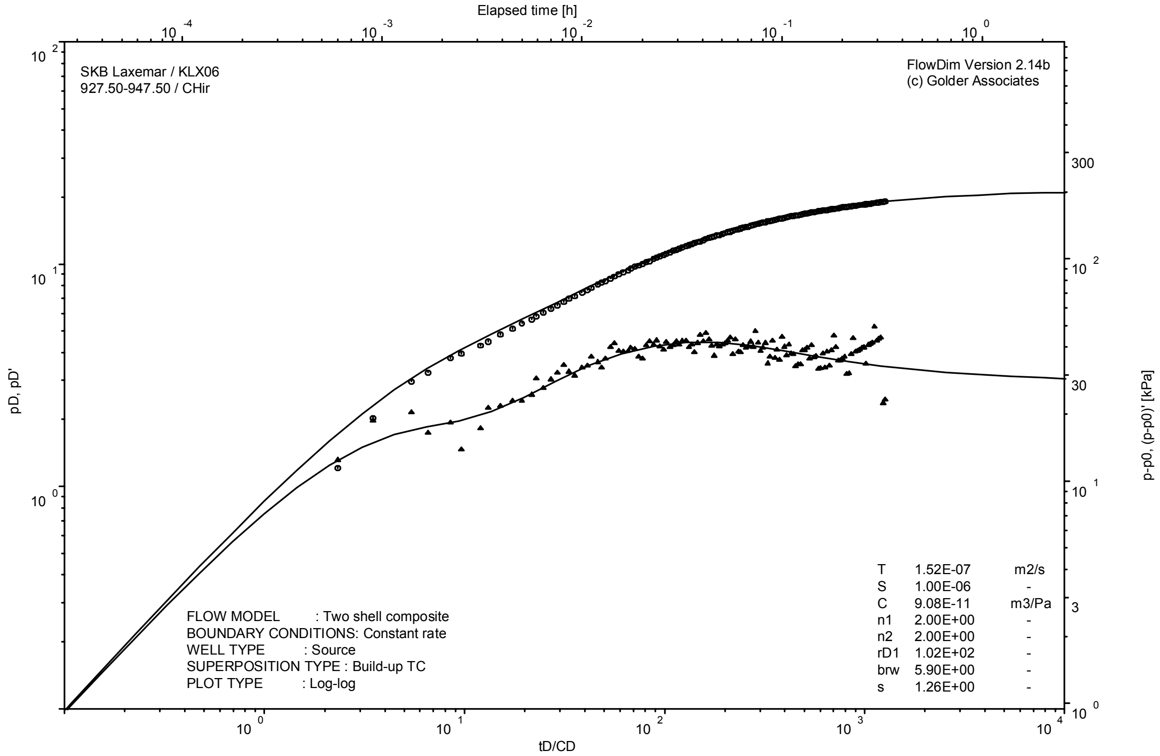
Pressure and flow rate vs. time; cartesian plot



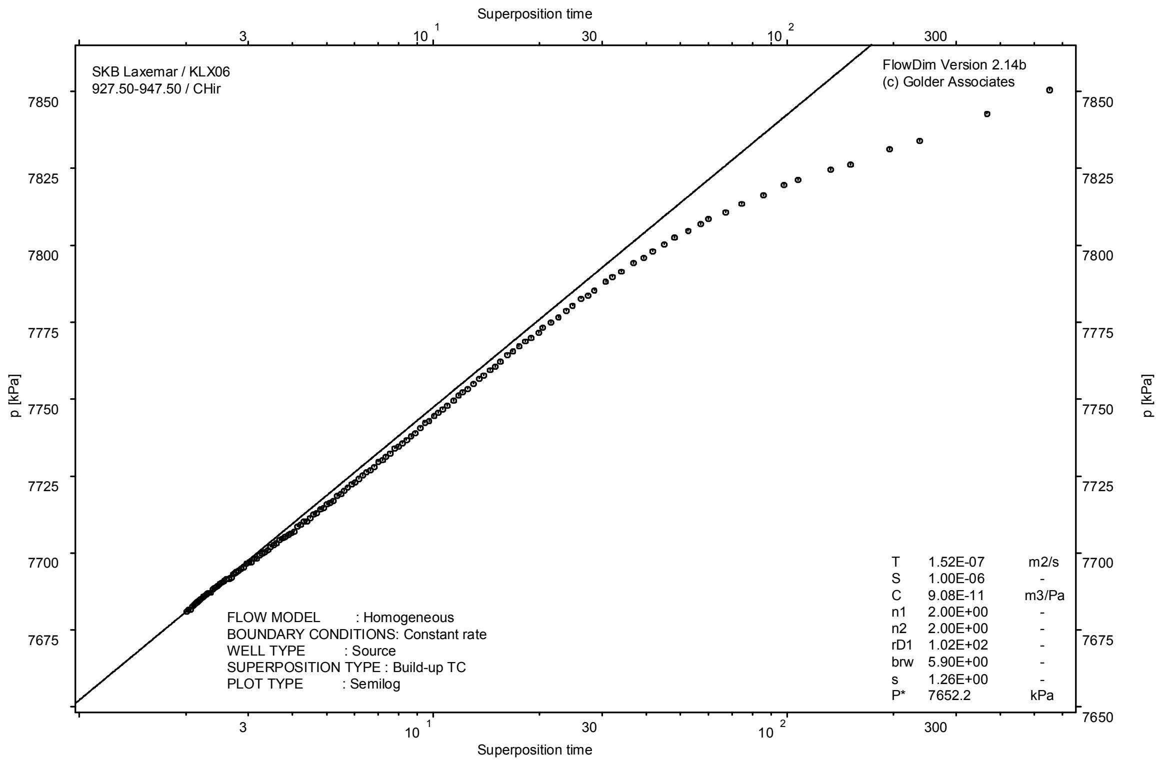
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

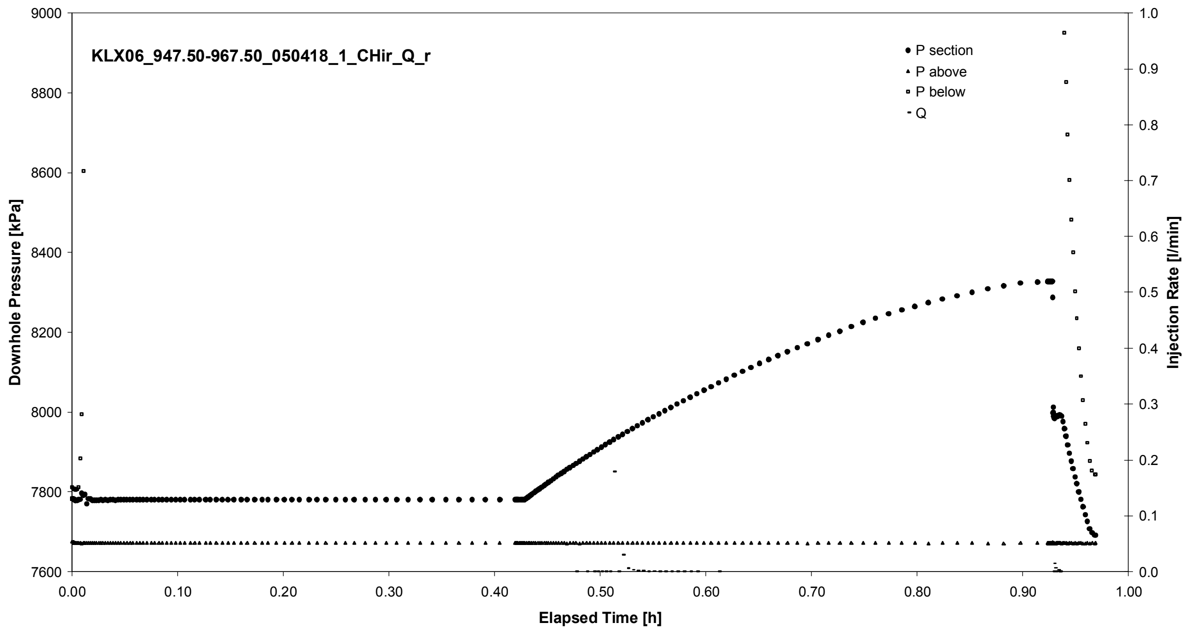


CHIR phase; HORNER match

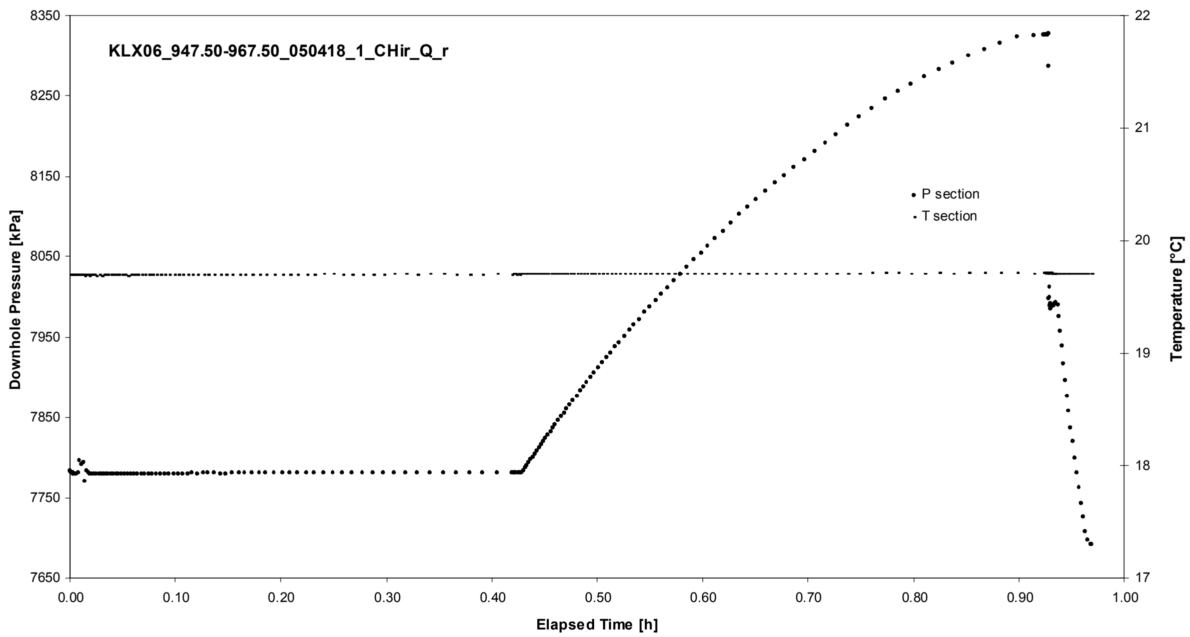
APPENDIX 2-53

Test 947.50 – 967.50 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

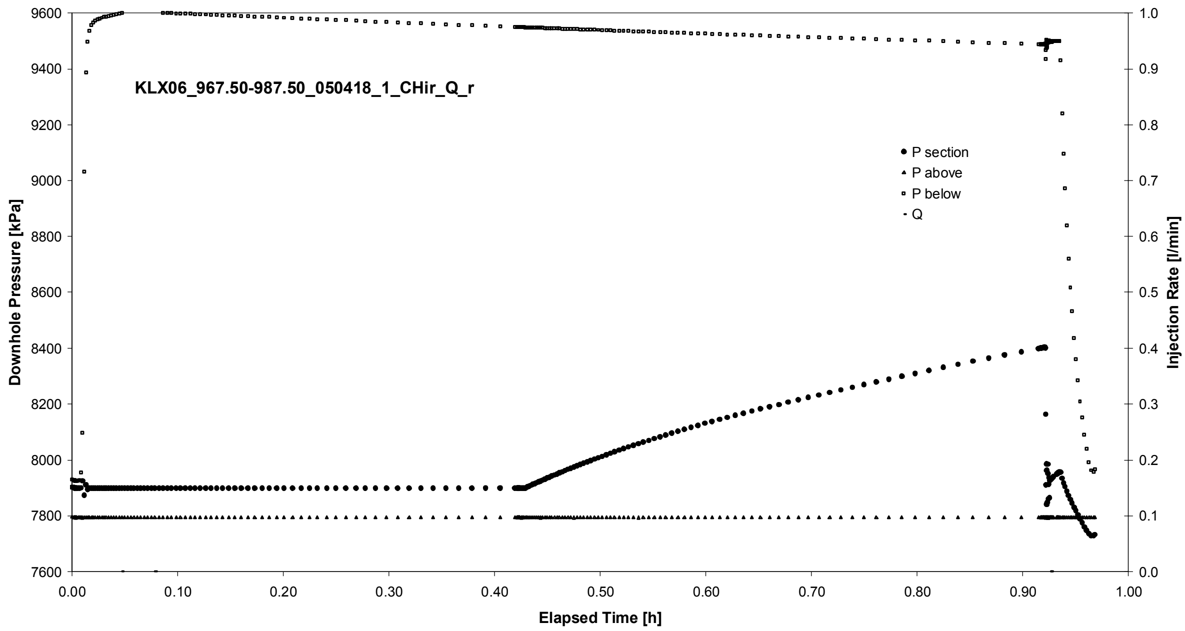
Not Analysed

CHIR phase; HORNER match

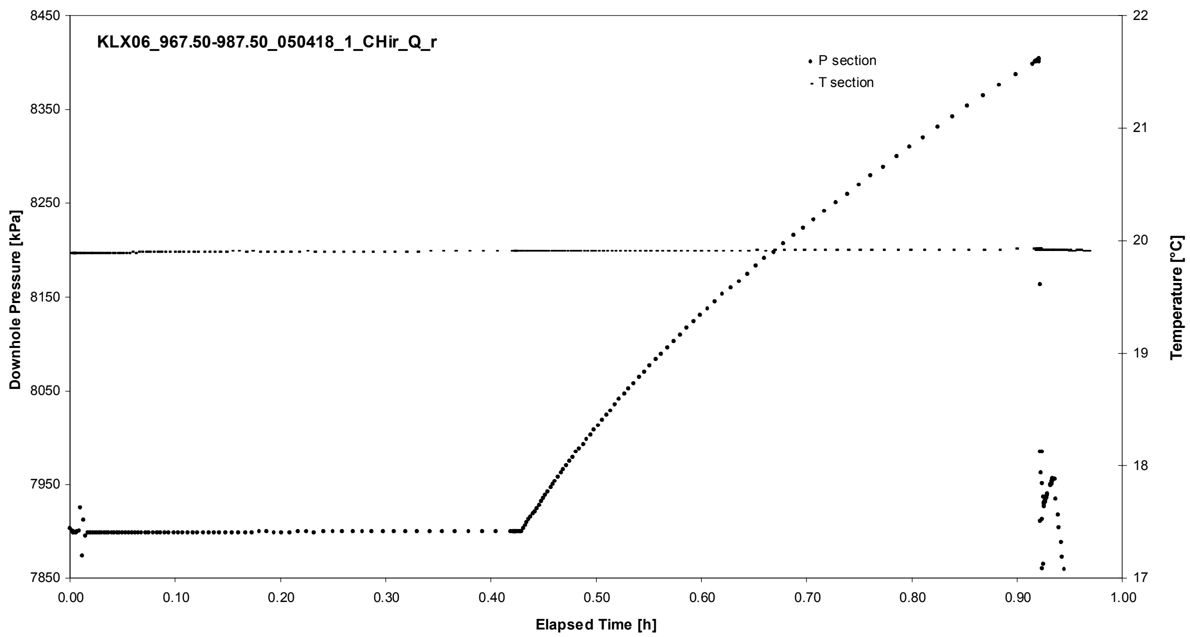
APPENDIX 2-54

Test 967.50 – 987.50 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

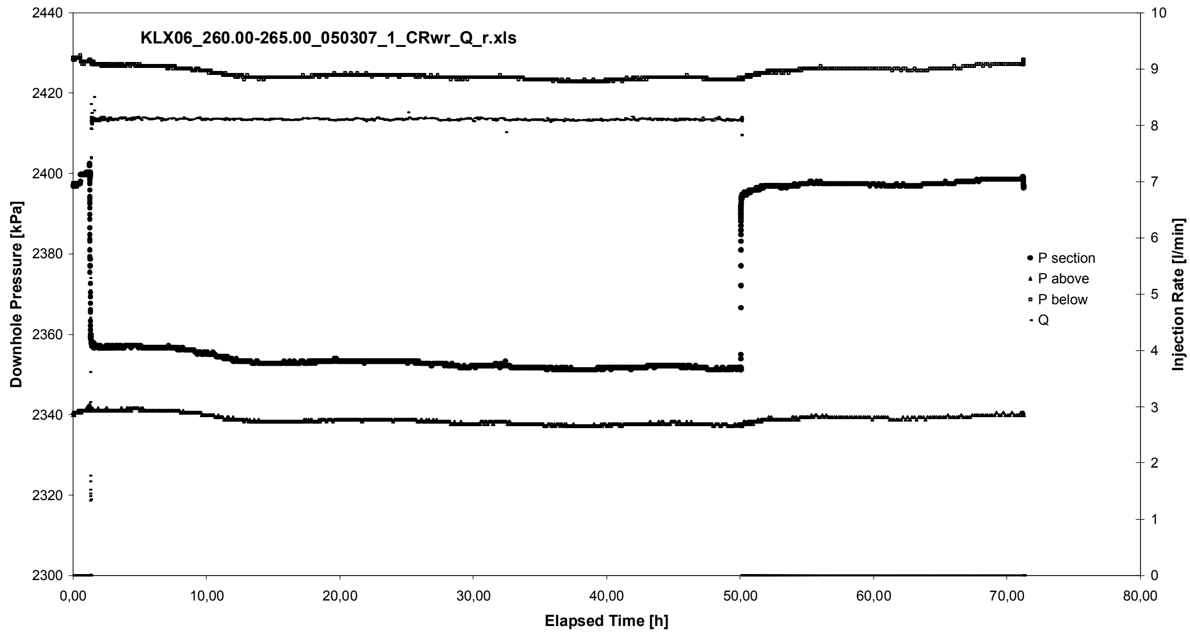
Not Analysed

CHIR phase; HORNER match

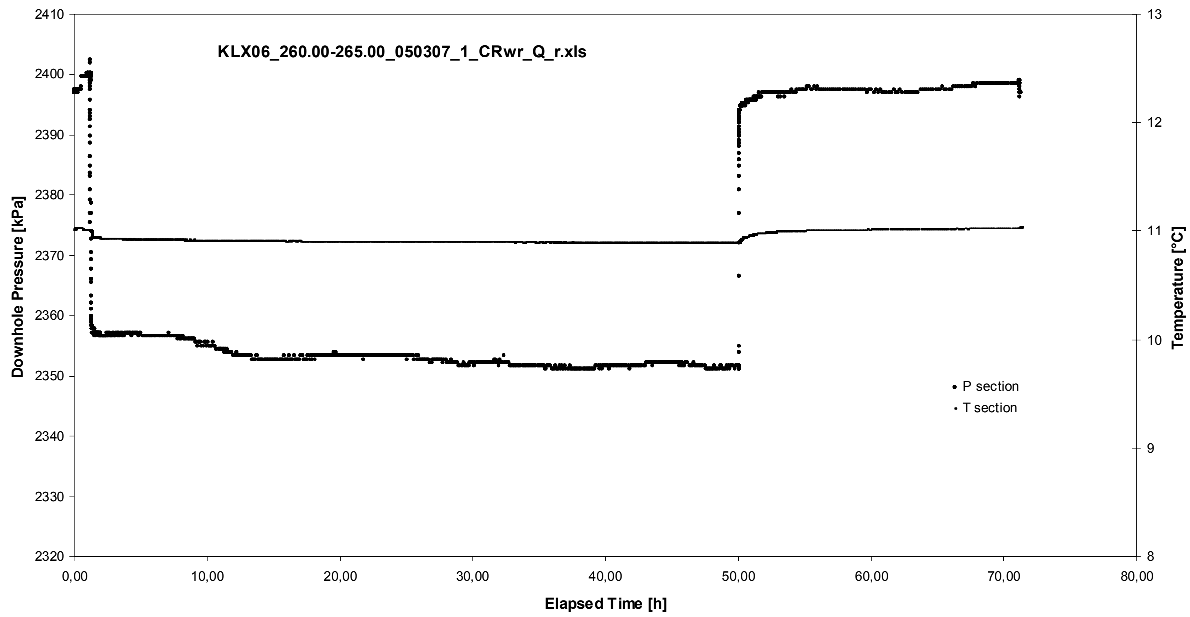
APPENDIX 2-55

Test 260,00 – 265,00 m

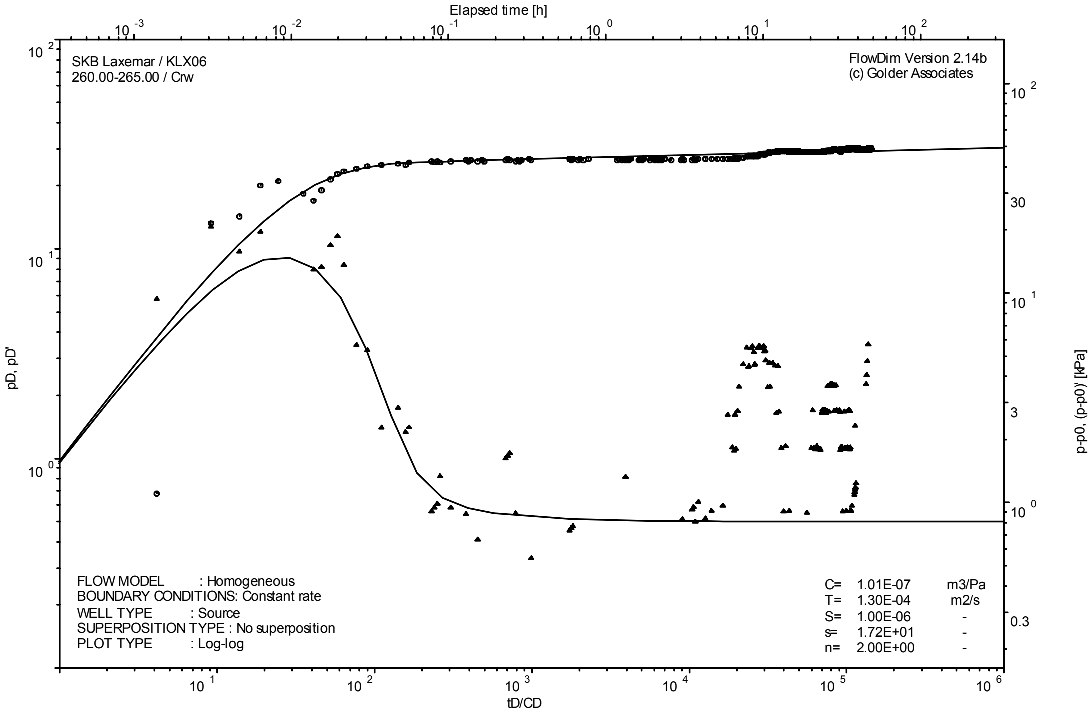
Analysis diagrams



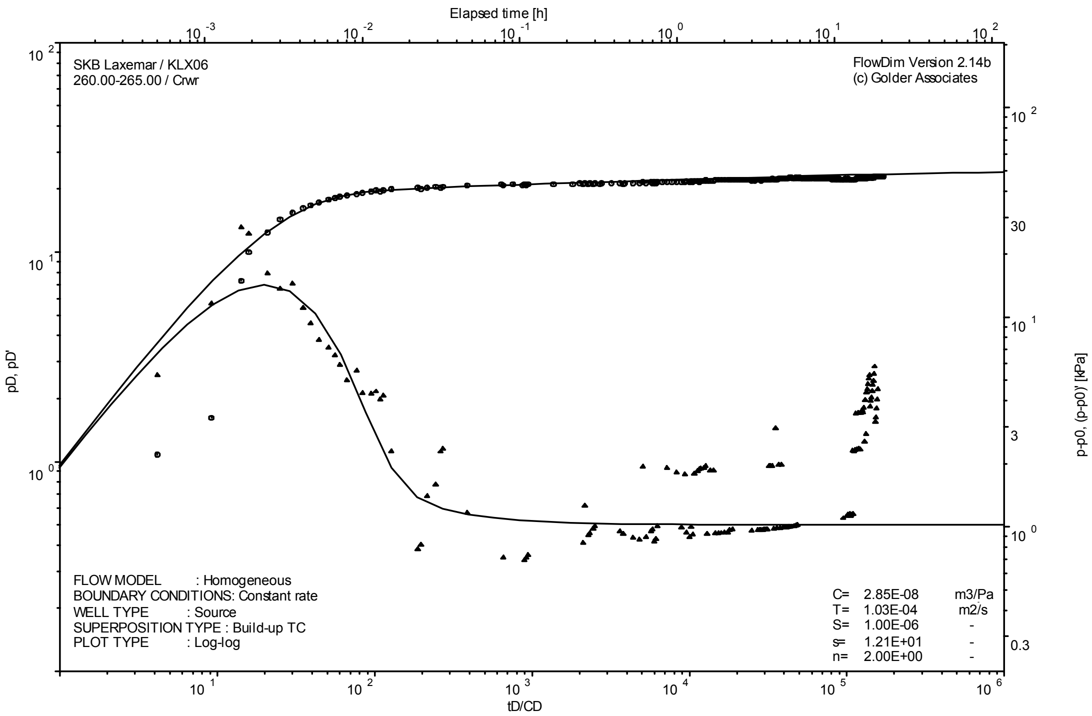
Pressure and flow rate vs. time; cartesian plot



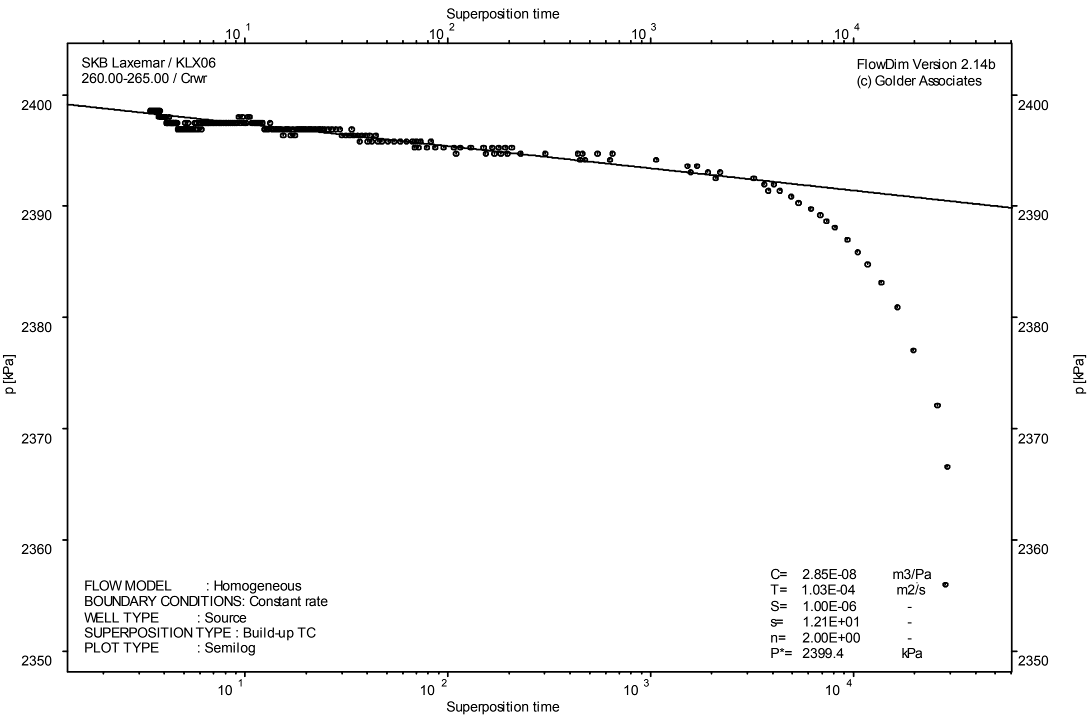
Interval pressure and temperature vs. time; cartesian plot



CRw phase; log-log match



CRwr phase; log-log match

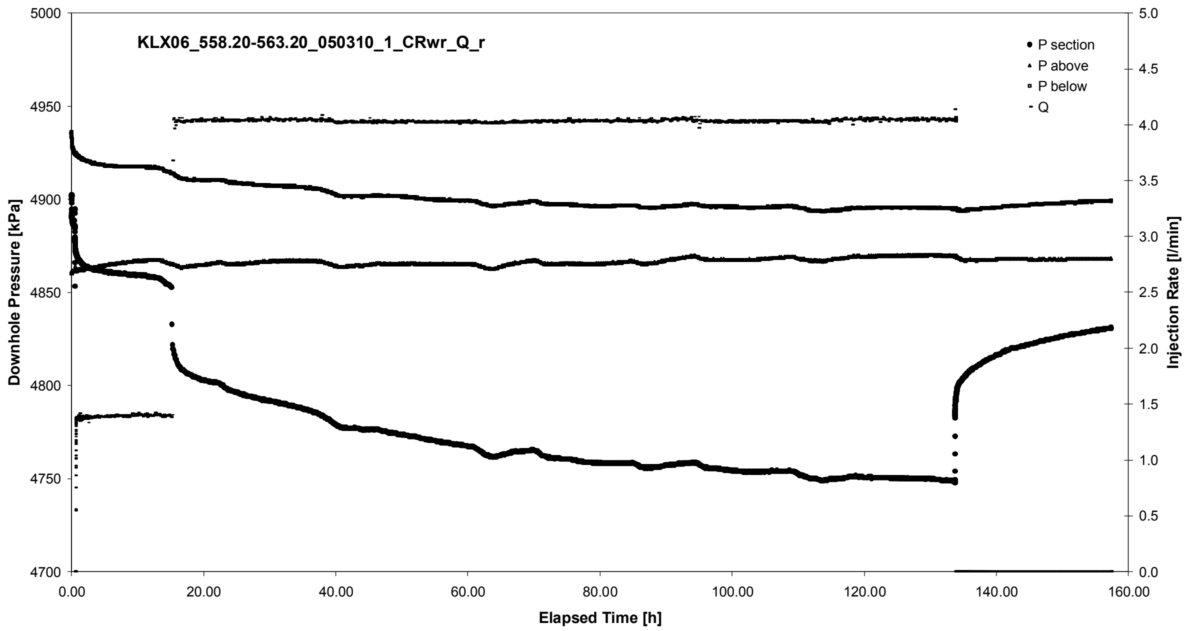


CRwr phase; HORNER match

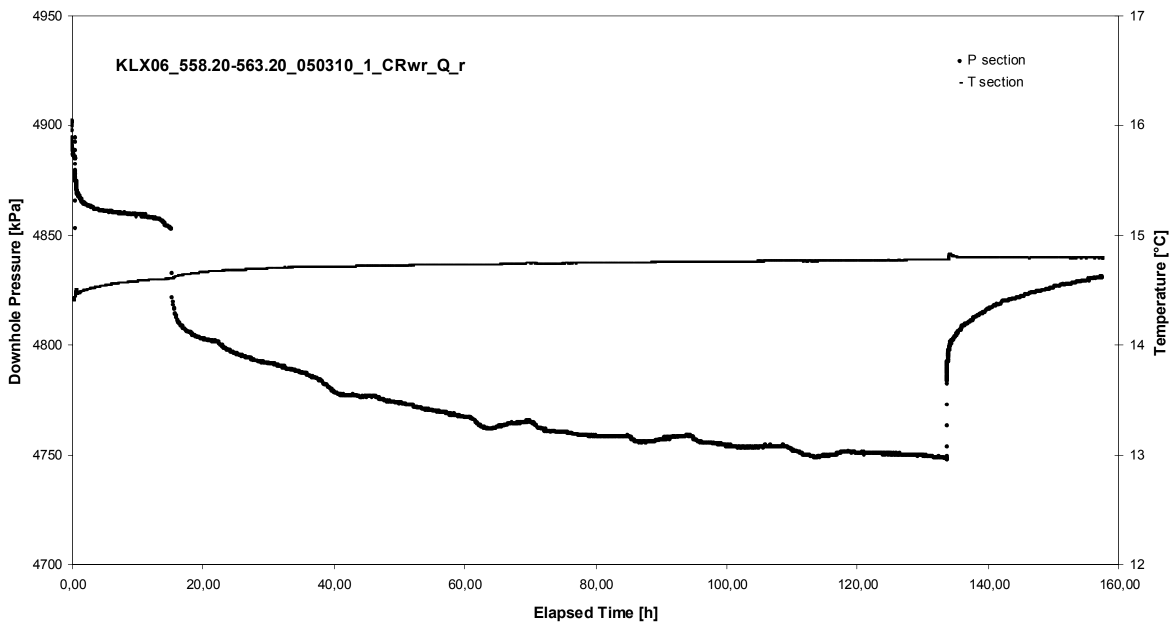
APPENDIX 2-56

Test 558,20 – 563,20 m

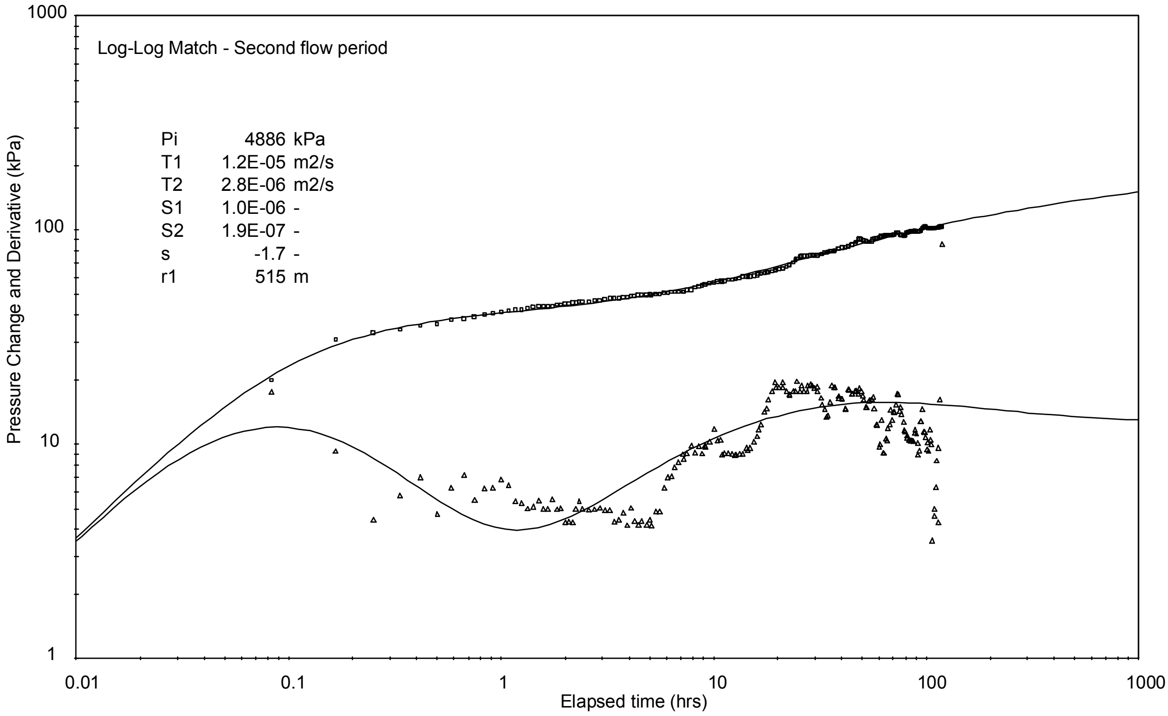
Analysis diagrams



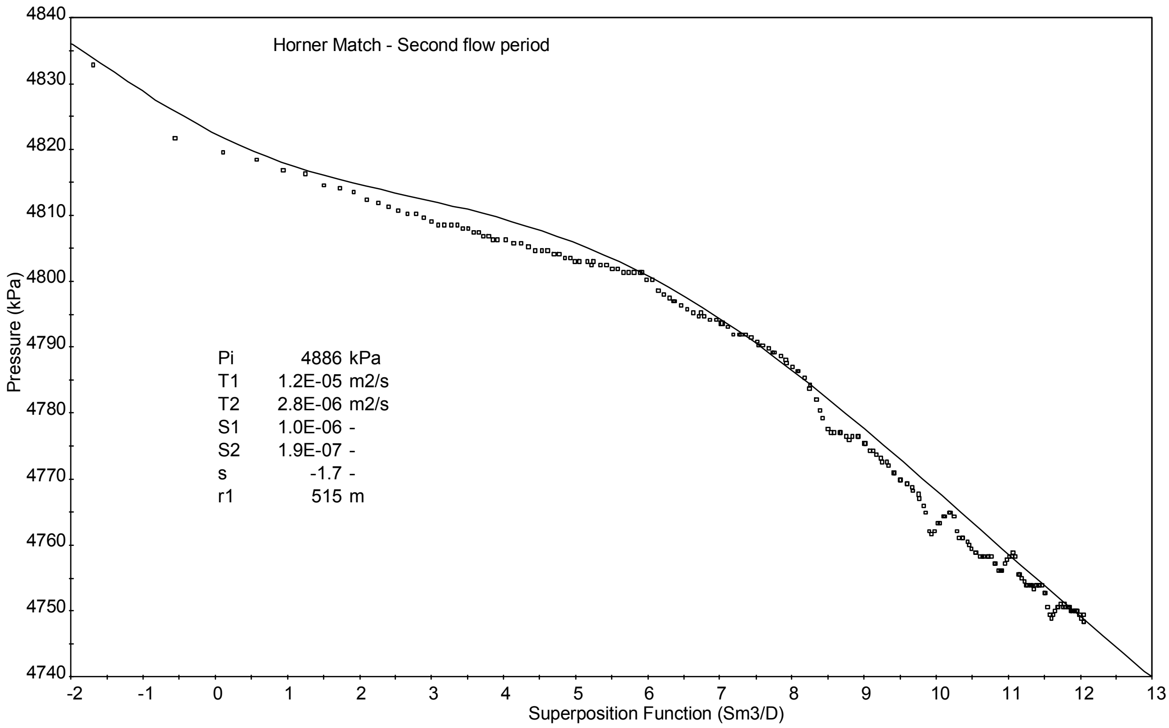
Pressure and flow rate vs. time; cartesian plot



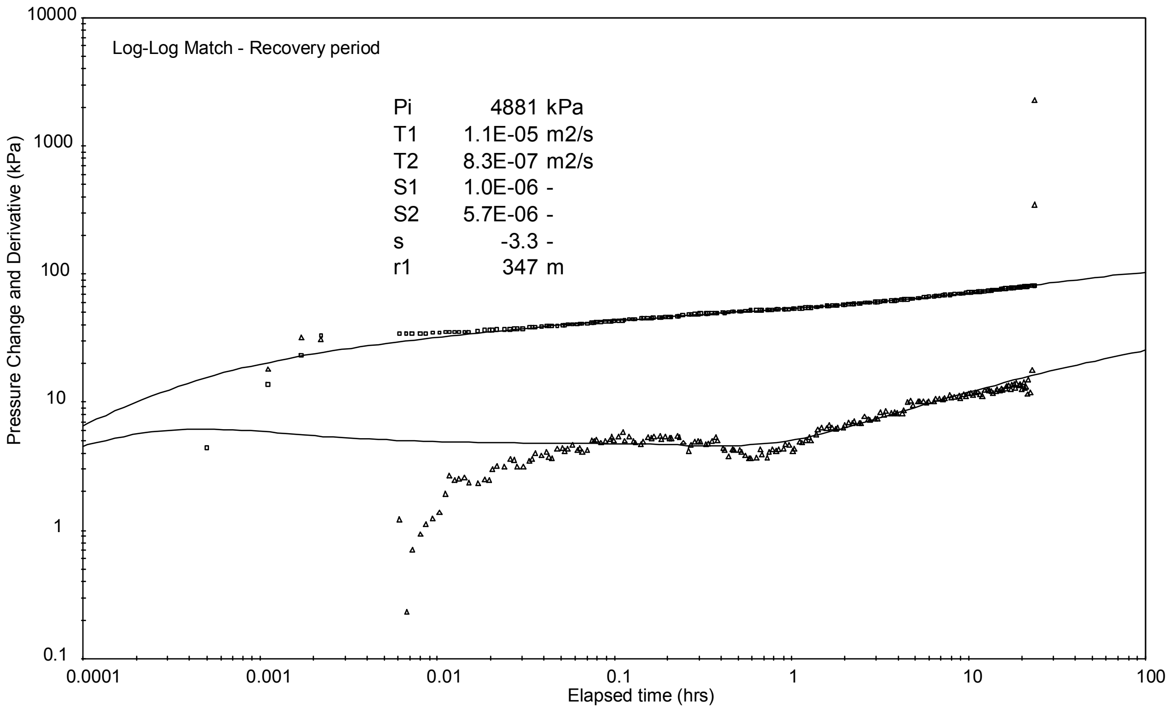
Interval pressure and temperature vs. time; cartesian plot



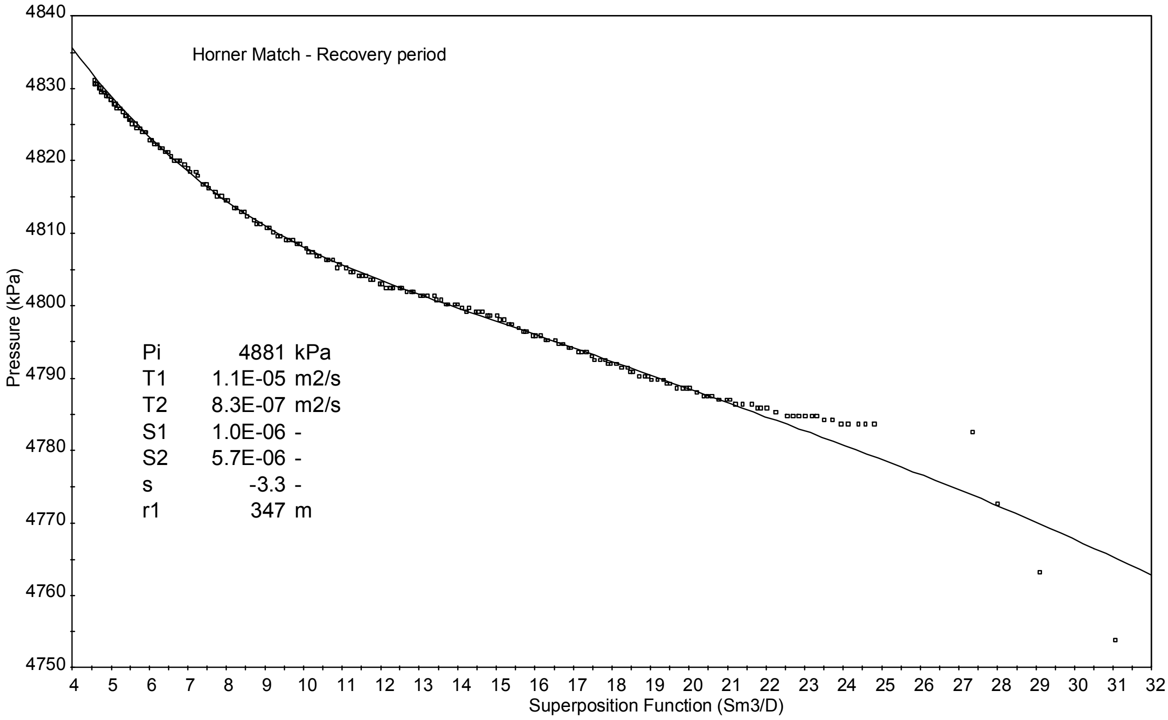
CRw phase; log-log match



CRw phase; HORNER match



CRwr phase; log-log match

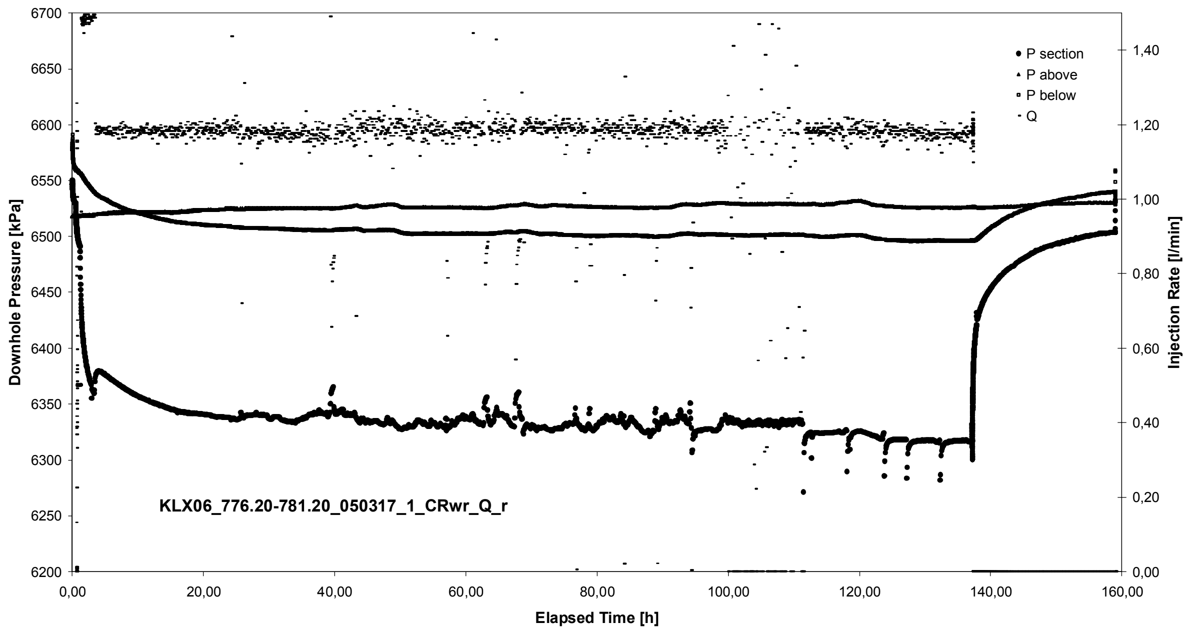


CRwr phase; HORNER match

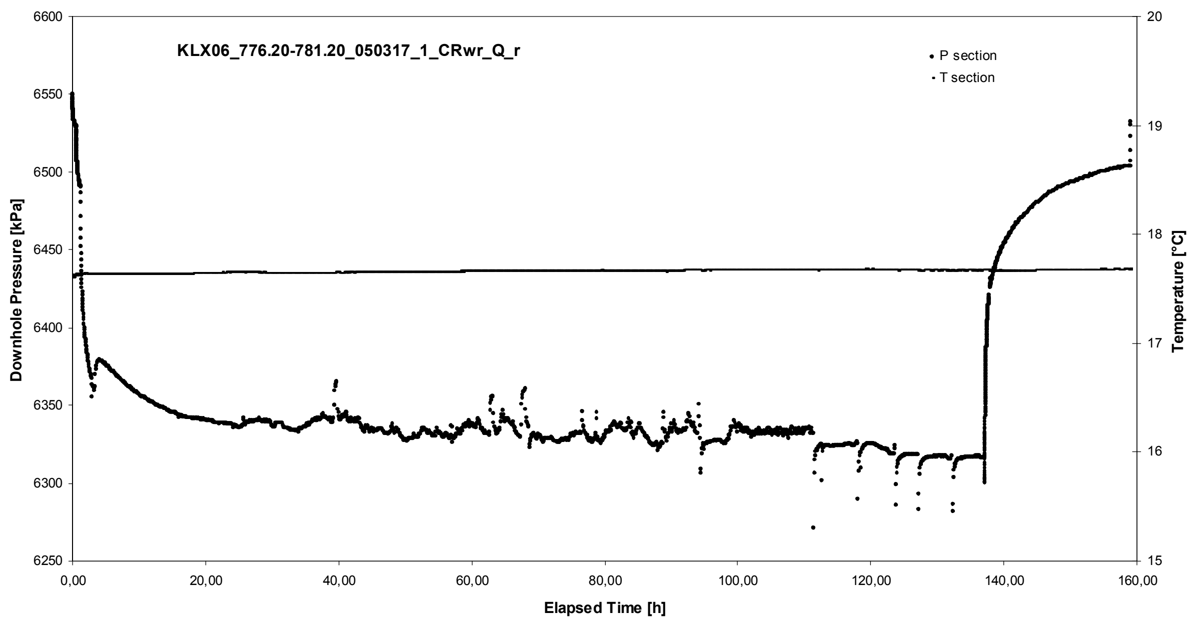
APPENDIX 2-57

Test 776,20 – 781,20 m

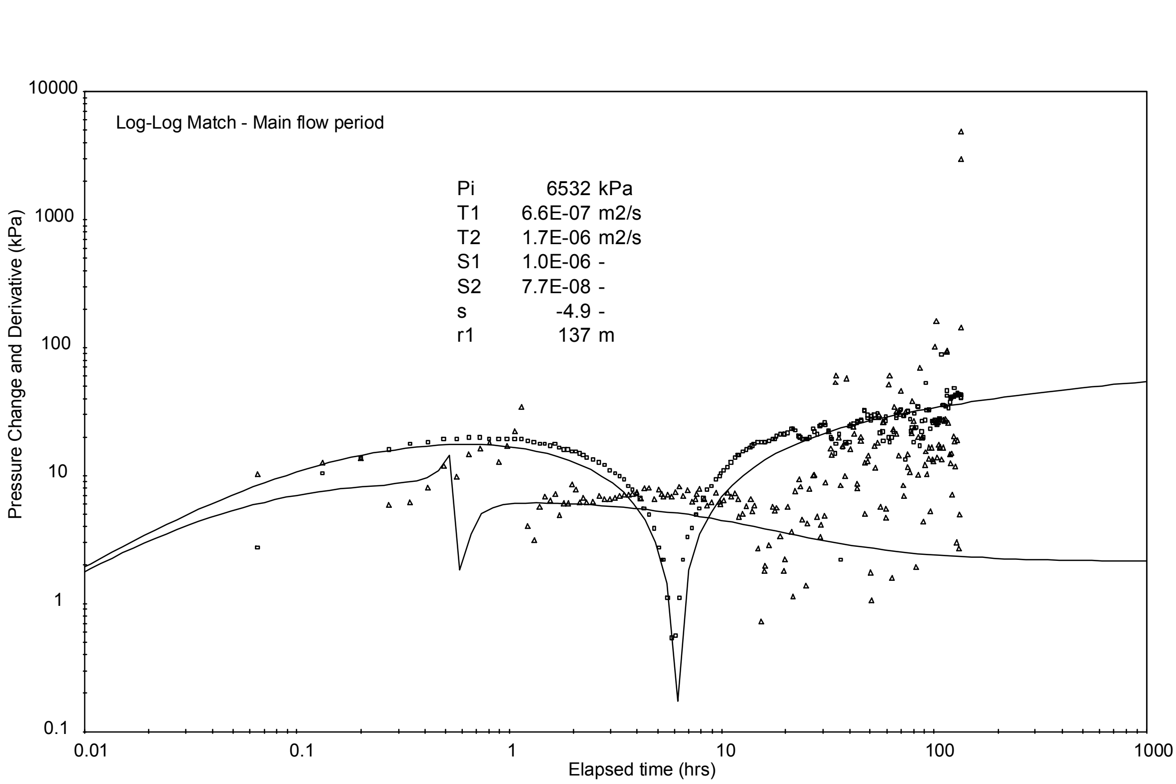
Analysis diagrams



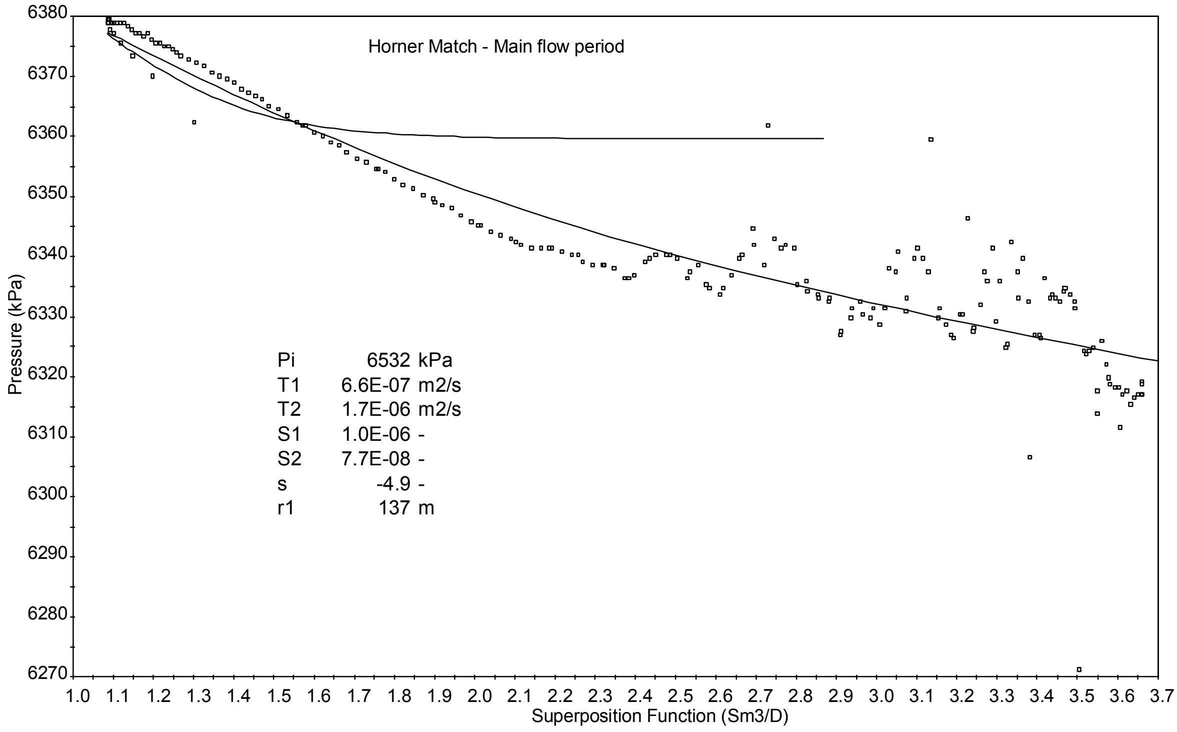
Pressure and flow rate vs. time; cartesian plot



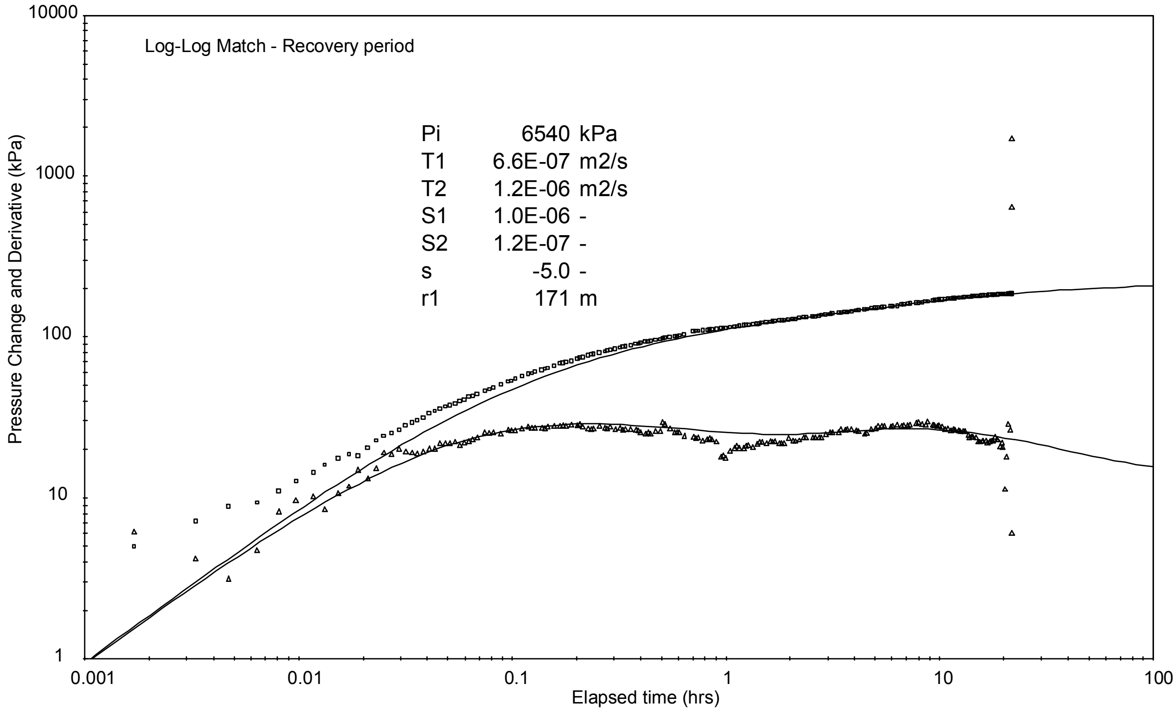
Interval pressure and temperature vs. time; cartesian plot



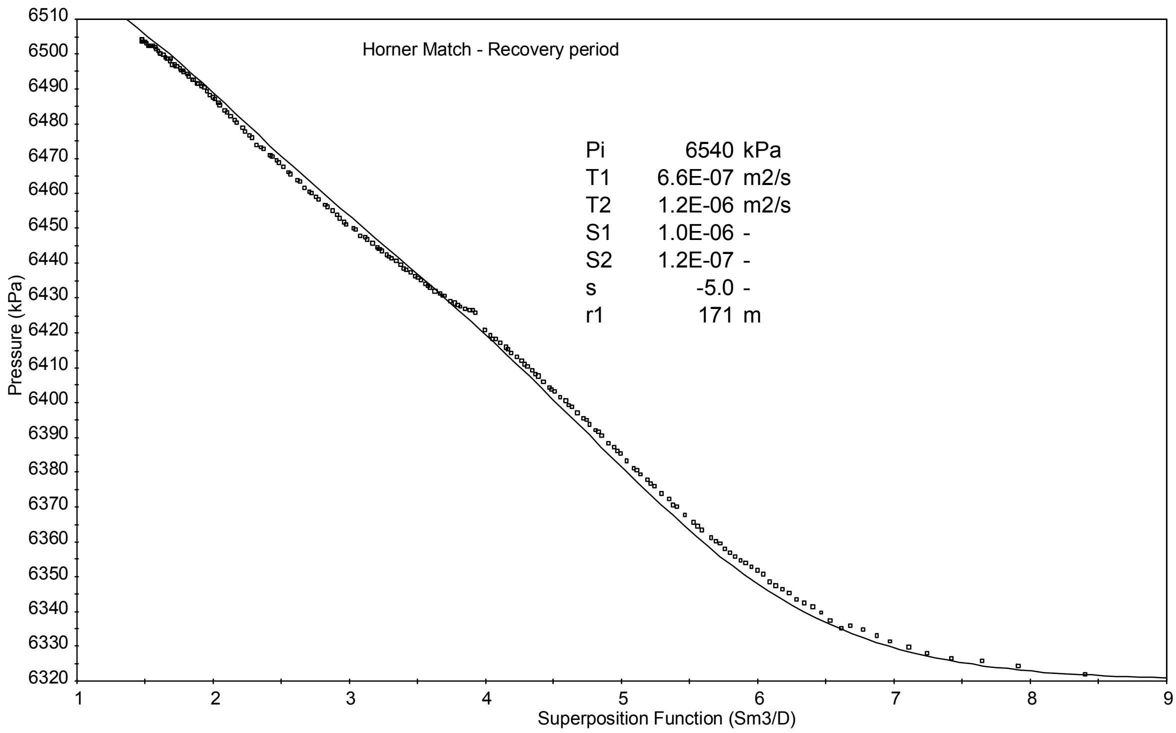
CRw phase; log-log match



CRw phase; HORNER match



CRwr phase; log-log match



CRwr phase; HORNER match

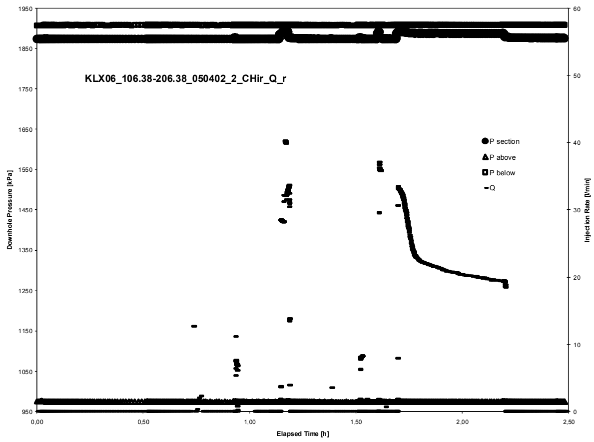
APPENDIX 3

Test Summary Sheets

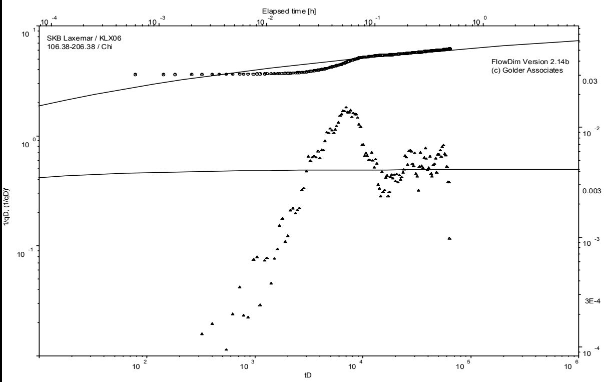
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX06	Test start:	050402 17:03
Test section from - to (m):	106.38-206.38 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

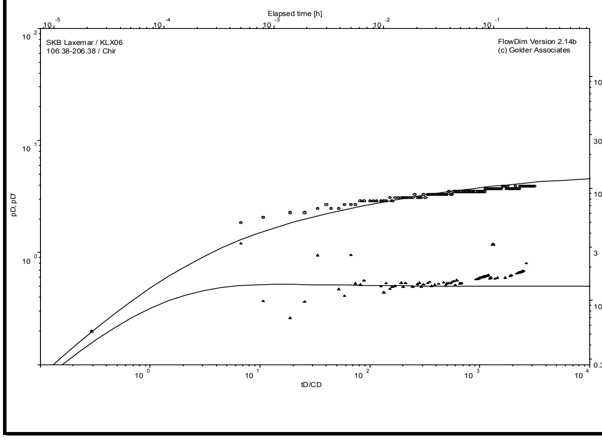
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1873		
p_i (kPa) =	1874		
p_p(kPa) =	1886	p_F (kPa) =	1875
Q_p (m^3/s)=	3,22E-04		
tp (s) =	1800	t_F (s) =	900
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10,3		
Derivative fact.=	0,02	Derivative fact.=	0,08
Results		**Results**	
Q/s (m^2/s)=	2,6E-04		
T_M (m^2/s)=	3,4E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	11,16	dt_1 (min) =	0,33
dt_2 (min) =	27,90	dt_2 (min) =	3,06
T (m^2/s) =	2,1E-04	T (m^2/s) =	2,1E-04
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,1E-06	K_s (m/s) =	2,1E-06
S_s (1/m) =	1,0E-08	S_s (1/m) =	1,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3,7E-08
C_D (-) =	NA	C_D (-) =	4,0E+00
ξ (-) =	-4,15	ξ (-) =	-5,29
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0,33	C (m^3/Pa) =	3,7E-08
dt_2 (min) =	3,06	C_D (-) =	4,0E+00
T_T (m^2/s) =	2,1E-04	ξ (-) =	-5,29
S (-) =	1,0E-06		
K_s (m/s) =	2,1E-06		
S_s (1/m) =	1,0E-08		

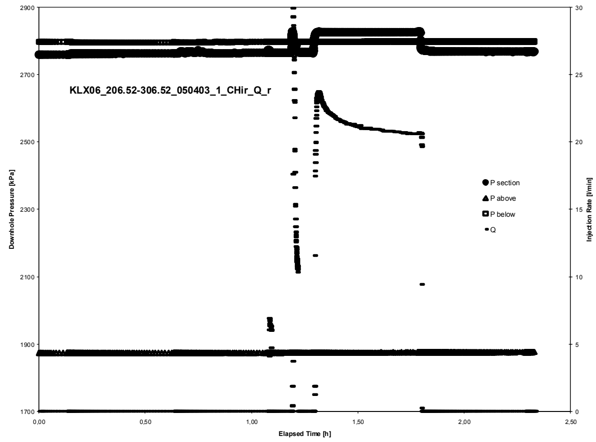
Comments:

The recommended transmissivity of 2.1E-4 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-4 to 4.0E-4 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 1874.0 kPa.

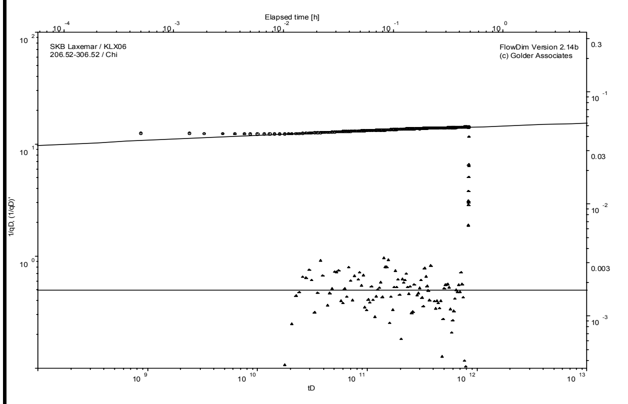
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050403 10:19
Test section from - to (m):	206.52-306.52 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

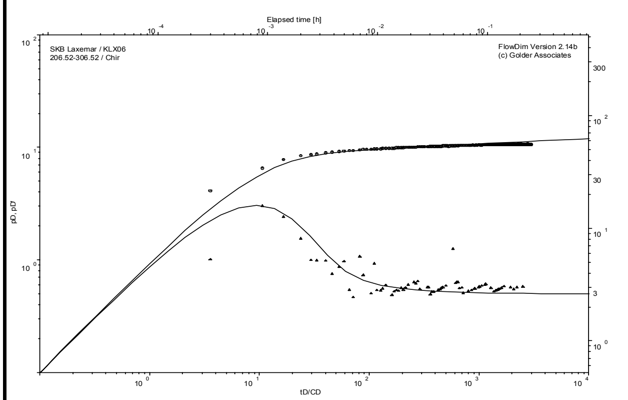
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2757		
p_i (kPa) =	2764		
p_p(kPa) =	2823	p_F (kPa) =	2767
Q_p (m^3/s)=	3,43E-04		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11,4		
Derivative fact.=	0,02	Derivative fact.=	0,03
Results		**Results**	
Q/s (m^2/s)=	5,7E-05		
T_M (m^2/s)=	7,4E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,83	dt_1 (min) =	1,44
dt_2 (min) =	19,38	dt_2 (min) =	12,60
T (m^2/s) =	1,3E-04	T (m^2/s) =	1,1E-04
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,3E-06	K_s (m/s) =	1,1E-06
S_s (1/m) =	1,0E-08	S_s (1/m) =	1,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2,0E-08
C_D (-) =	NA	C_D (-) =	2,2E+00
ξ (-) =	4,29	ξ (-) =	1,91
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	
Selected representative parameters.			
dt_1 (min) =	0,83	C (m^3/Pa) =	2,0E-08
dt_2 (min) =	19,38	C_D (-) =	2,2E+00
T_T (m^2/s) =	1,3E-04	ξ (-) =	4,29
S (-) =	1,0E-06		
K_s (m/s) =	1,3E-06		
S_s (1/m) =	1,0E-08		

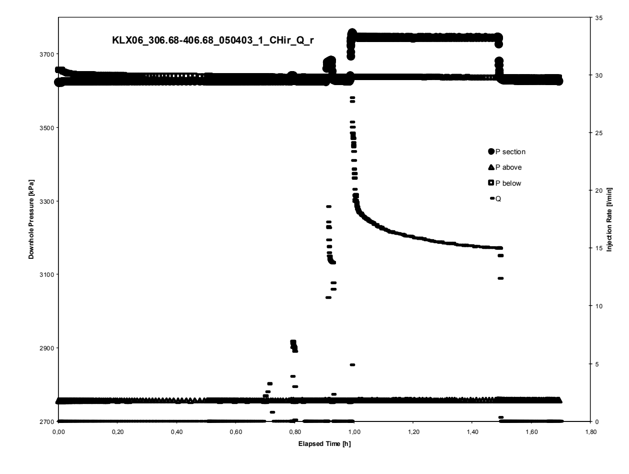
Comments:

The recommended transmissivity of 1.3E-4 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-5 to 3.0E-4 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 2767.0 kPa.

Test Summary Sheet

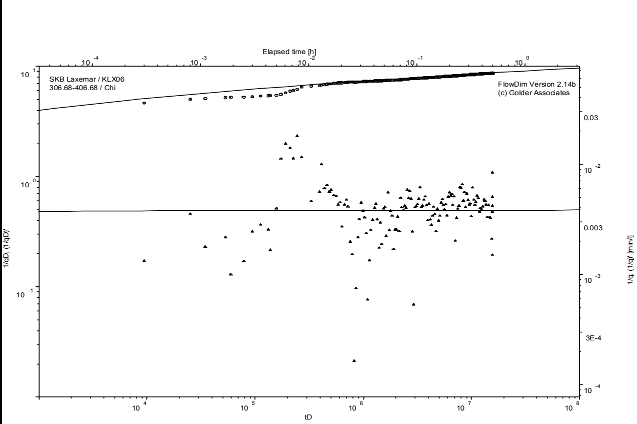
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050403 14:20
Test section from - to (m):	306.68-406.68 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

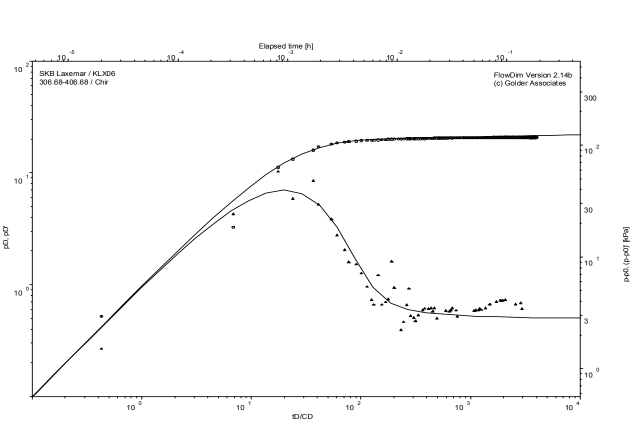


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3622		
p_i (kPa) =	3625		
p_p(kPa) =	3743	p_F (kPa) =	3625
Q_p (m^3/s)=	2,50E-04		
tp (s) =	1800	t_F (s) =	600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12,6		
Derivative fact.=	0,02	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	2,1E-05		
T_M (m^2/s)=	2,7E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3,41	dt_1 (min) =	1,27
dt_2 (min) =	29,88	dt_2 (min) =	3,52
T (m^2/s) =	2,9E-05	T (m^2/s) =	7,4E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,9E-07	K_s (m/s) =	7,4E-07
S_s (1/m) =	1,0E-08	S_s (1/m) =	1,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8,0E-09
C_D (-) =	NA	C_D (-) =	8,8E-01
ξ (-) =	-0,41	ξ (-) =	12,74
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	3,41	C (m^3/Pa) =	8,0E-09
dt_2 (min) =	29,88	C_D (-) =	8,8E-01
T_T (m^2/s) =	2,9E-05	ξ (-) =	-0,41
S (-) =	1,0E-06		
K_s (m/s) =	2,9E-07		
S_s (1/m) =	1,0E-08		

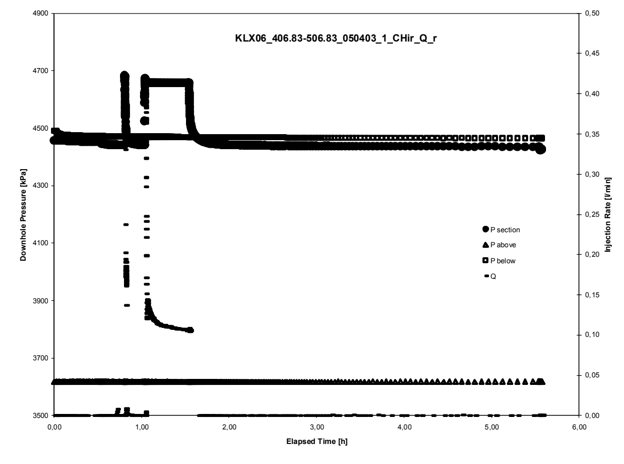
Comments:

The recommended transmissivity of 2.9E-5 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-5 to 8.0E-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 3626.6 kPa.

Test Summary Sheet

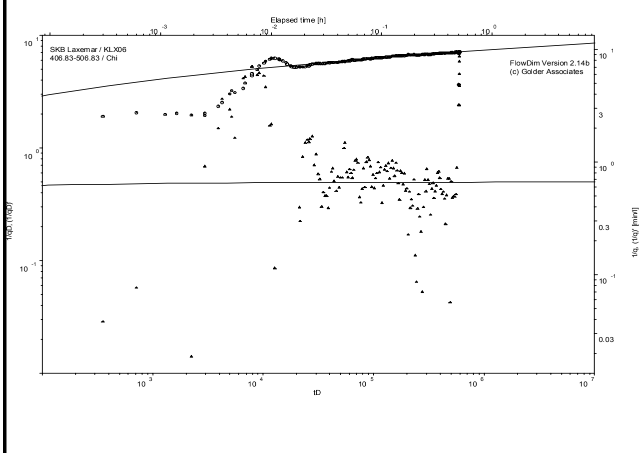
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050403 17:33
Test section from - to (m):	406.83-506.83 m	Responsible for test execution:	Stephan Rohs
Section diameter, 2·r_w (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

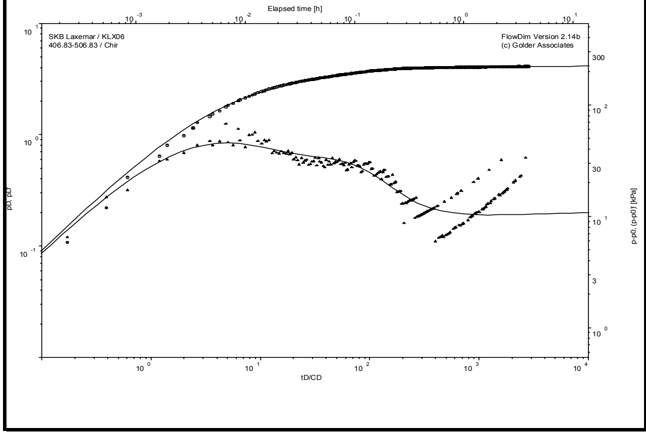


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4457		
p_i (kPa) =	4442		
p_p(kPa) =	4658	p_F (kPa) =	4436
Q_p (m^3/s)=	1,83E-06		
tp (s) =	1800	t_F (s) =	14400
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13,8		
Derivative fact.=	0,06	Derivative fact.=	0,03
Results		**Results**	
Q/s (m^2/s)=	8,3E-08		
T_M (m^2/s)=	1,1E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2,23	dt_1 (min) =	2,11
dt_2 (min) =	25,68	dt_2 (min) =	6,72
T (m^2/s) =	9,0E-08	T (m^2/s) =	5,8E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	9,0E-10	K_s (m/s) =	5,8E-10
S_s (1/m) =	1,0E-08	S_s (1/m) =	1,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,8E-10
C_D (-) =	NA	C_D (-) =	2,0E-02
ξ (-) =	0,83	ξ (-) =	-1,49
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	2,23	C (m^3/Pa) =	1,8E-10
dt_2 (min) =	25,68	C_D (-) =	2,0E-02
T_T (m^2/s) =	9,0E-08	ξ (-) =	0,83
S (-) =	1,0E-06		
K_s (m/s) =	9,0E-10		
S_s (1/m) =	1,0E-08		

Comments:

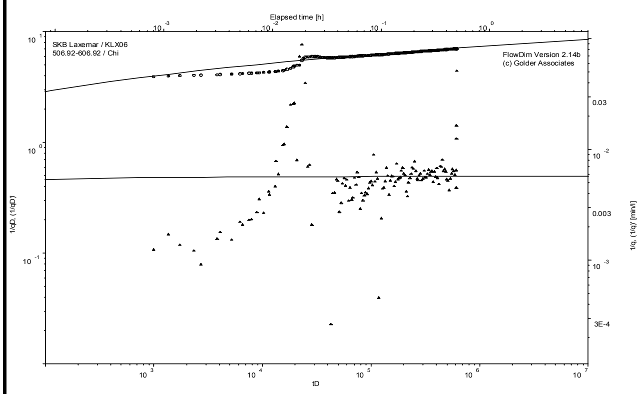
TThe recommended transmissivity of 9.0E-8 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-8 to 2.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4437.7 kPa.

Test Summary Sheet

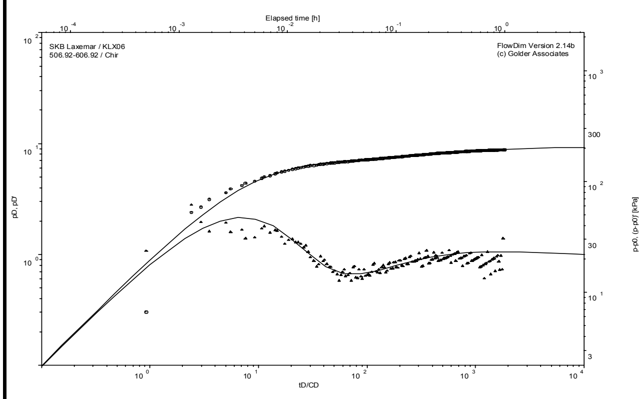
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050404 09:35
Test section from - to (m):	506.92-606.92 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5255		
p_i (kPa) =	5236		
p_p(kPa) =	5437	p_F (kPa) =	5241
Q_p (m^3/s)=	2,05E-04		
tp (s) =	1800	t_F (s) =	3600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15,4		
Derivative fact.=	0,02	Derivative fact.=	0,05
Results		**Results**	
Q/s (m^2/s)=	1,0E-05		
T_M (m^2/s)=	1,3E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	5,42	dt_1 (min) =	11,76
dt_2 (min) =	28,74	dt_2 (min) =	29,28
T (m^2/s) =	1,1E-05	T (m^2/s) =	8,4E-06
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,1E-07	K_s (m/s) =	8,4E-08
S_s (1/m) =	1,0E-08	S_s (1/m) =	1,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2,0E-08
C_D (-) =	NA	C_D (-) =	2,2E+00
ξ (-) =	-1,56	ξ (-) =	-0,38
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	5,42	C (m^3/Pa) =	2,0E-08
dt_2 (min) =	28,74	C_D (-) =	2,2E+00
T_T (m^2/s) =	1,1E-05	ξ (-) =	-1,56
S (-) =	1,0E-06		
K_s (m/s) =	1,1E-07		
S_s (1/m) =	1,0E-08		

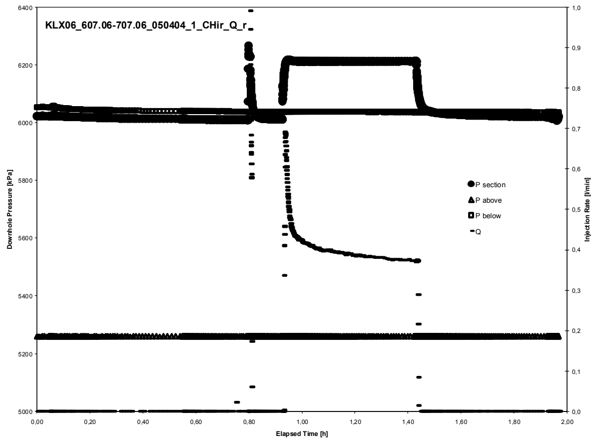
Comments:

The recommended transmissivity of 1.1E-5 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 2.0E-5 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 5233.5 kPa.

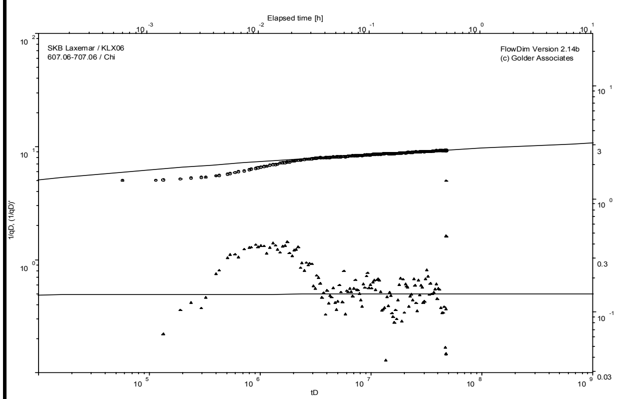
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050404 13:36
Test section from - to (m):	607.06-707.06 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

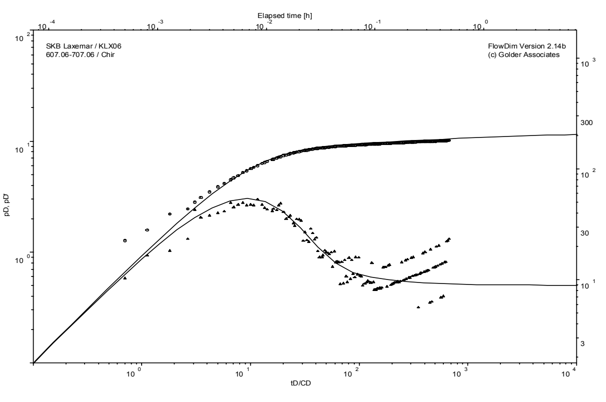
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6021		
p_i (kPa) =	6010		
p_p(kPa) =	6211	p_F (kPa) =	6015
Q_p (m^3/s)=	6,17E-06		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16,7		
Derivative fact.=	0,07	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	3,0E-07		
T_M (m^2/s)=	3,9E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	8,64	dt_1 (min) =	NA
dt_2 (min) =	26,04	dt_2 (min) =	NA
T (m^2/s) =	4,5E-07	T (m^2/s) =	5,9E-07
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	4,5E-09	K_s (m/s) =	5,9E-09
S_s (1/m) =	1,0E-08	S_s (1/m) =	1,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9,6E-10
C_D (-) =	NA	C_D (-) =	1,1E-01
ξ (-) =	2,22	ξ (-) =	3,43
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	8,64	C (m^3/Pa) =	9,60E-10
dt_2 (min) =	26,04	C_D (-) =	1,06E-01
T_T (m^2/s) =	4,5E-07	ξ (-) =	2,22
S (-) =	1,0E-06		
K_s (m/s) =	4,5E-09		
S_s (1/m) =	1,0E-08		

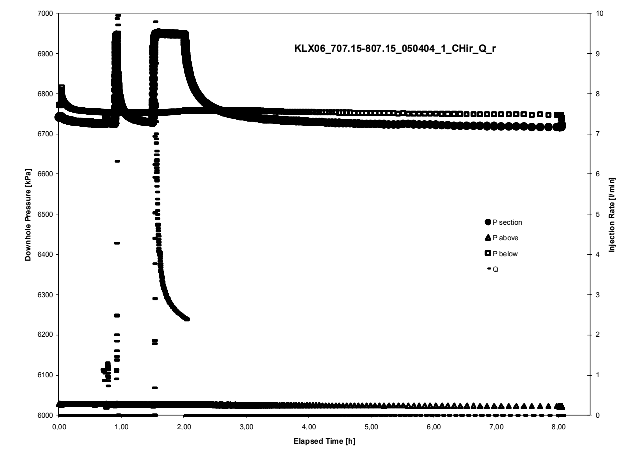
Comments:

The recommended transmissivity of 4.5E-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 3.0E-7 to 7.0E-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 6010.1 kPa.

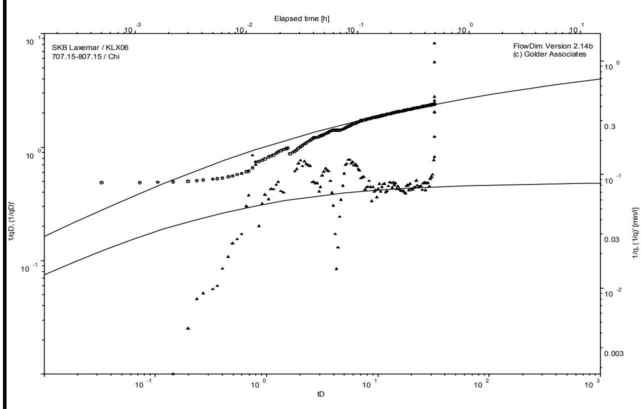
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050404 17:04
Test section from - to (m):	707.15-807.15	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

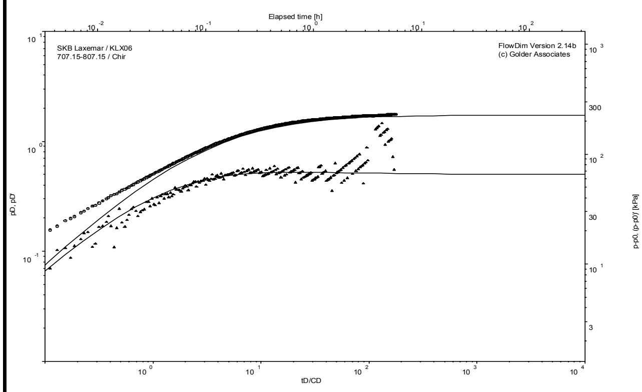
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6742		
p_i (kPa) =	6728		
p_p(kPa) =	6948	p_F (kPa) =	6717
Q_p (m^3/s)=	3,96E-05		
tp (s) =	1800	t_F (s) =	21600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17,9		
Derivative fact.=	0,03	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	1,8E-06		
T_M (m^2/s)=	2,3E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	9,18	dt_1 (min) =	21,90
dt_2 (min) =	22,26	dt_2 (min) =	44,88
T (m^2/s) =	6,8E-07	T (m^2/s) =	6,5E-07
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	6,8E-09	K_s (m/s) =	6,5E-09
S_s (1/m) =	1,0E-08	S_s (1/m) =	1,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4,9E-08
C_D (-) =	NA	C_D (-) =	5,4E+00
ξ (-) =	-5,08	ξ (-) =	-5,44
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	21,90	C (m^3/Pa) =	4,9E-08
dt_2 (min) =	44,88	C_D (-) =	5,4E+00
T_T (m^2/s) =	6,5E-07	ξ (-) =	-5,44
S (-) =	1,0E-06		
K_s (m/s) =	6,5E-09		
S_s (1/m) =	1,0E-08		

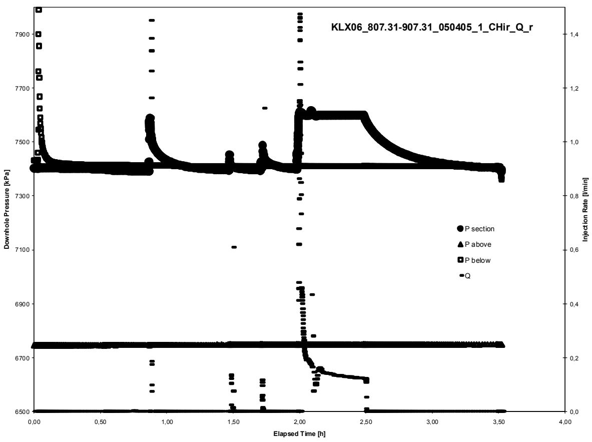
Comments:

The recommended transmissivity of 6.5E-7 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 5.0E-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 6714.3 kPa.

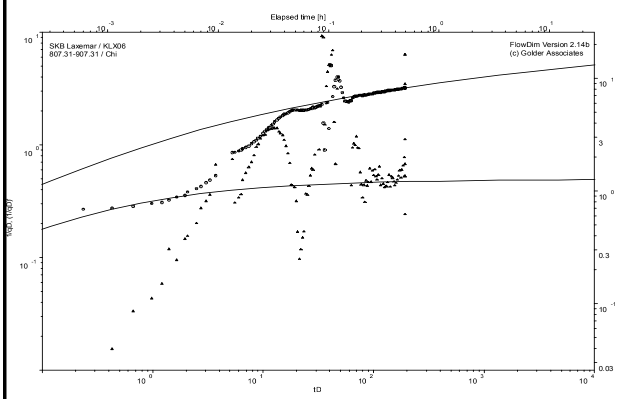
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050405 09:30
Test section from - to (m):	807.31-907.31 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

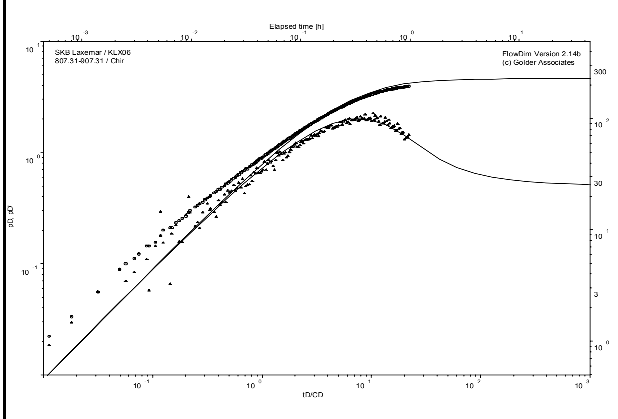
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	7401		
p_i (kPa) =	7398		
p_p(kPa) =	7598	p_F (kPa) =	7403
Q_p (m^3/s)=	2,02E-06		
tp (s) =	1800	t_F (s) =	3600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	19,1		
Derivative fact.=	0,06	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	9,9E-08		
T_M (m^2/s)=	1,3E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	12,48	dt_1 (min) =	NA
dt_2 (min) =	24,54	dt_2 (min) =	NA
T (m^2/s) =	5,1E-08	T (m^2/s) =	9,1E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	5,1E-10	K_s (m/s) =	9,1E-10
S_s (1/m) =	1,0E-08	S_s (1/m) =	1,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9,3E-09
C_D (-) =	NA	C_D (-) =	1,0E+00
ξ (-) =	-2,89	ξ (-) =	-1,15
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	9,3E-09
dt_2 (min) =	NA	C_D (-) =	1,0E+00
T_T (m^2/s) =	9,1E-08	ξ (-) =	-1,15
S (-) =	1,0E-06		
K_s (m/s) =	9,1E-10		
S_s (1/m) =	1,0E-08		

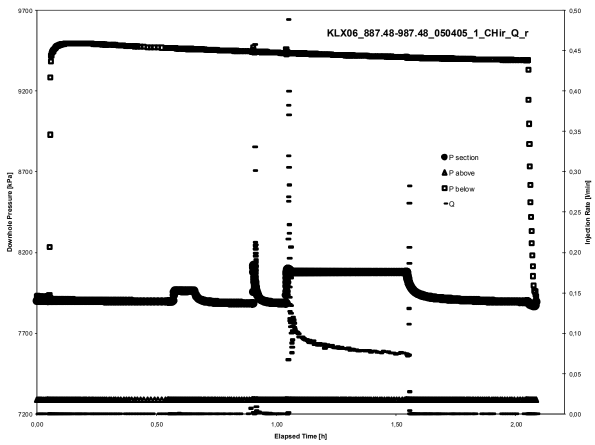
Comments:

The recommended transmissivity of 9.1E-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 5.0E-8 to 2.0E-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 7372.2 kPa.

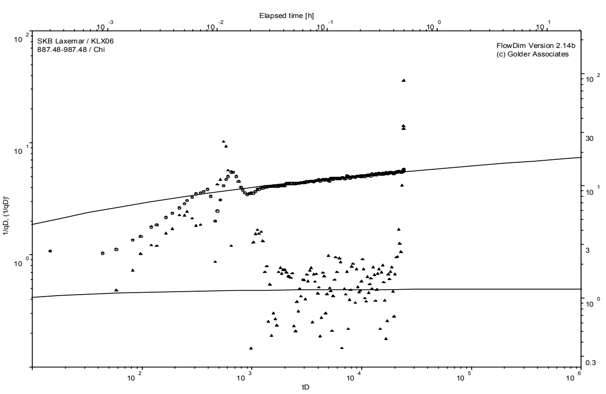
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050405 14:30
Test section from - to (m):	887.48-987.48 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

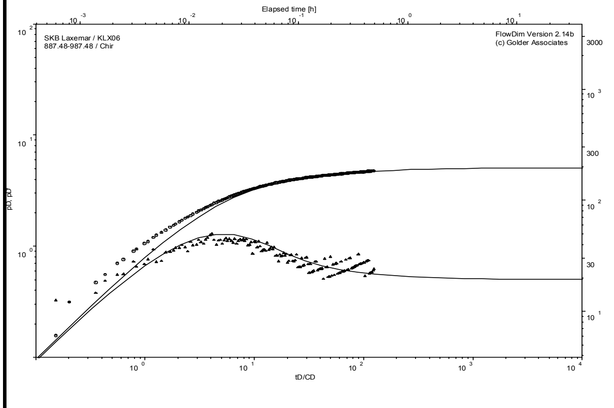
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	7900		
p_i (kPa) =	7886		
p_p(kPa) =	8078	p_F (kPa) =	7893
Q_p (m^3/s)=	1,22E-06		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	19,9		
Derivative fact.=	0,06	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	6,2E-08		
T_M (m^2/s)=	8,1E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3,37	dt_1 (min) =	10,02
dt_2 (min) =	23,76	dt_2 (min) =	14,04
T (m^2/s) =	5,6E-08	T (m^2/s) =	5,7E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	5,6E-10	K_s (m/s) =	5,7E-10
S_s (1/m) =	1,0E-08	S_s (1/m) =	1,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5,2E-10
C_D (-) =	NA	C_D (-) =	5,7E-02
ξ (-) =	-0,53	ξ (-) =	-0,87
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	10,02	C (m^3/Pa) =	5,2E-10
dt_2 (min) =	14,04	C_D (-) =	5,7E-02
T_T (m^2/s) =	5,7E-08	ξ (-) =	-0,87
S (-) =	1,0E-06		
K_s (m/s) =	5,7E-10		
S_s (1/m) =	1,0E-08		

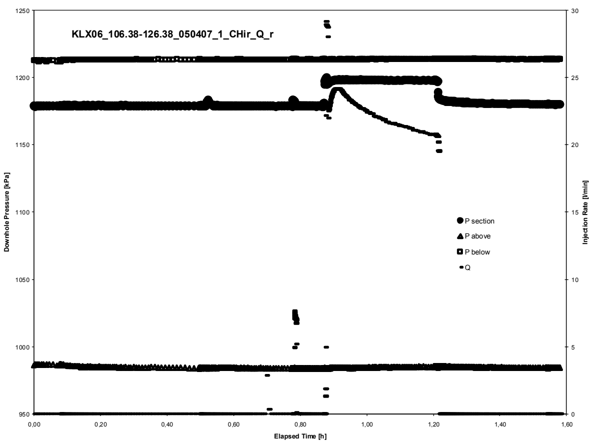
Comments:

The recommended transmissivity of 5.7E-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 4.0E-8 to 8.0E-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 7874.9 kPa.

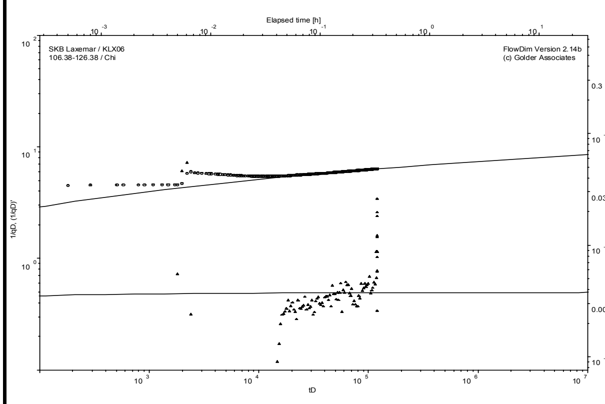
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050407 09:07
Test section from - to (m):	106.38-126.38 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

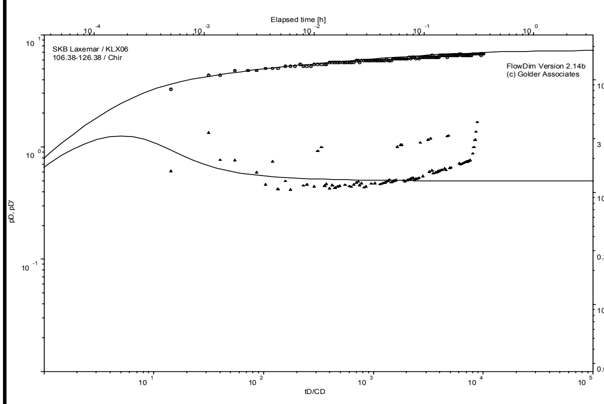
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1178		
p_i (kPa) =	1179		
p_p(kPa) =	1198	p_F (kPa) =	1180
Q_p (m^3/s)=	3,45E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9,4		
Derivative fact.=	0,03	Derivative fact.=	0,1
Results		**Results**	
Q/s (m^2/s)=	1,8E-04		
T_M (m^2/s)=	1,9E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	7,38	dt_1 (min) =	0,33
dt_2 (min) =	17,34	dt_2 (min) =	5,88
T (m^2/s) =	1,8E-04	T (m^2/s) =	2,3E-04
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	9,0E-06	K_s (m/s) =	1,1E-05
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,8E-08
C_D (-) =	NA	C_D (-) =	2,0E+00
ξ (-) =	-3,56	ξ (-) =	-2,64
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	7,38	C (m^3/Pa) =	1,8E-08
dt_2 (min) =	17,34	C_D (-) =	2,0E+00
T_T (m^2/s) =	1,8E-04	ξ (-) =	-3,56
S (-) =	1,0E-06		
K_s (m/s) =	9,0E-06		
S_s (1/m) =	5,0E-08		

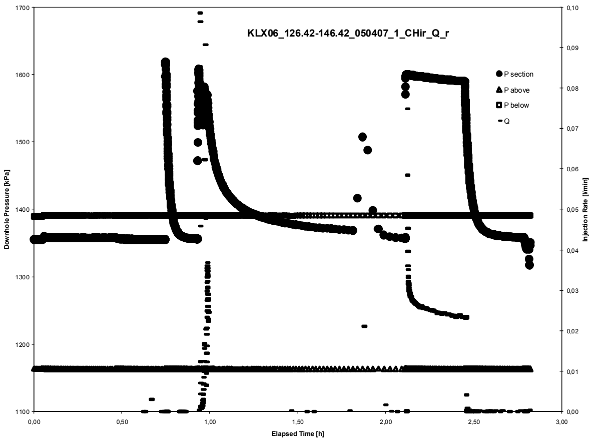
Comments:

The recommended transmissivity of 1.8E-4 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 8.0E-5 to 3.0E-4 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 1178.8 kPa.

Test Summary Sheet

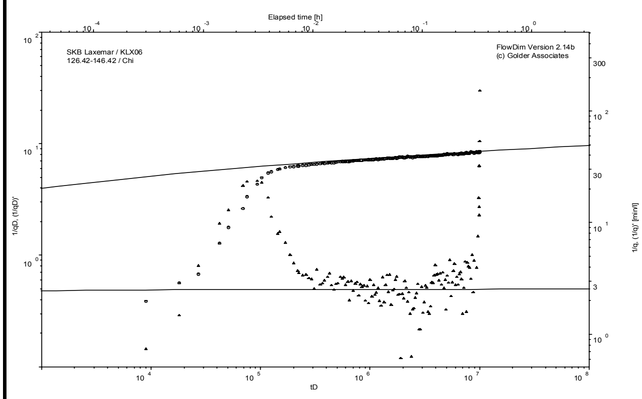
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050407 11:26
Test section from - to (m):	126.42-146.42 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

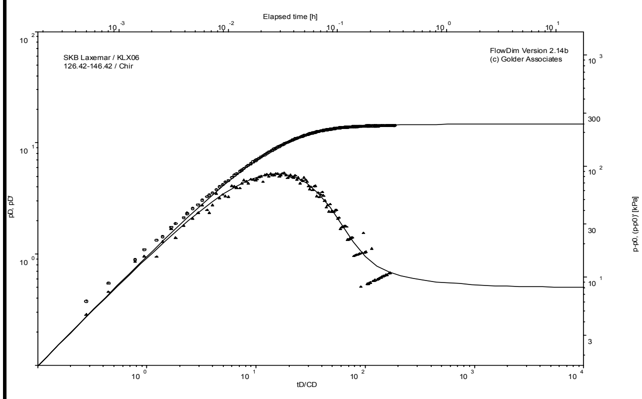


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1355		
p_i (kPa) =	1359		
p_p(kPa) =	1589	p_F (kPa) =	1358
Q_p (m^3/s)=	3,88E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9,6		
Derivative fact.=	0,1	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	1,7E-08		
T_M (m^2/s)=	1,7E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,94	dt_1 (min) =	*
dt_2 (min) =	6,60	dt_2 (min) =	*
T (m^2/s) =	2,2E-08	T (m^2/s) =	4,3E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,1E-09	K_s (m/s) =	2,2E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,8E-10
C_D (-) =	NA	C_D (-) =	2,0E-02
ξ (-) =	3,2	ξ (-) =	9,3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0,94	C (m^3/Pa) =	1,8E-10
dt_2 (min) =	6,60	C_D (-) =	2,0E-02
T_T (m^2/s) =	2,2E-08	ξ (-) =	3,2
S (-) =	1,0E-06		
K_s (m/s) =	1,1E-09		
S_s (1/m) =	5,0E-08		

Comments:

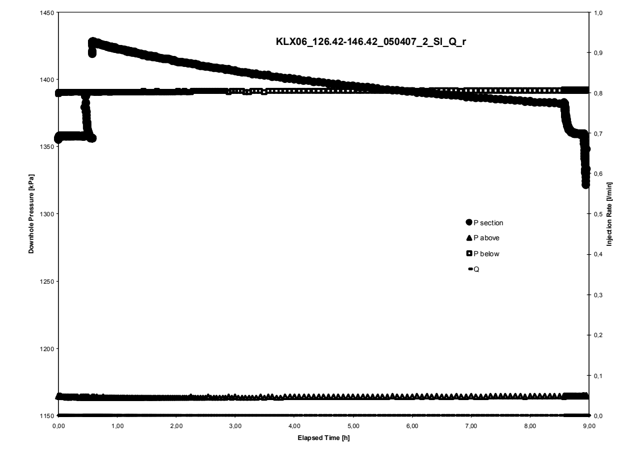
*: IARF not measured

The recommended transmissivity of 2.2E-8 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 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 1352.6 kPa.

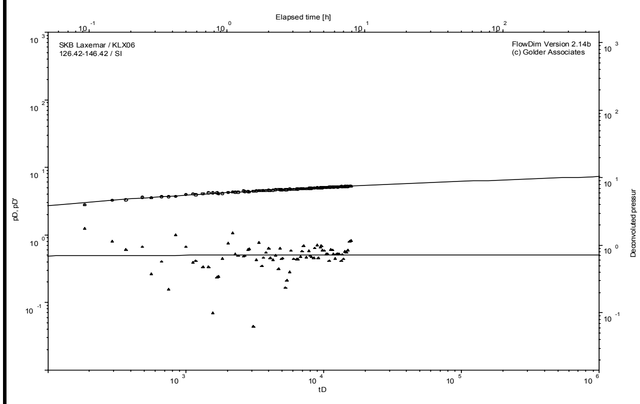
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	SI
Area:	Laxemar	Test no:	2
Borehole ID:	KLX06	Test start:	050407 19:24
Test section from - to (m):	126.42-146.42 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

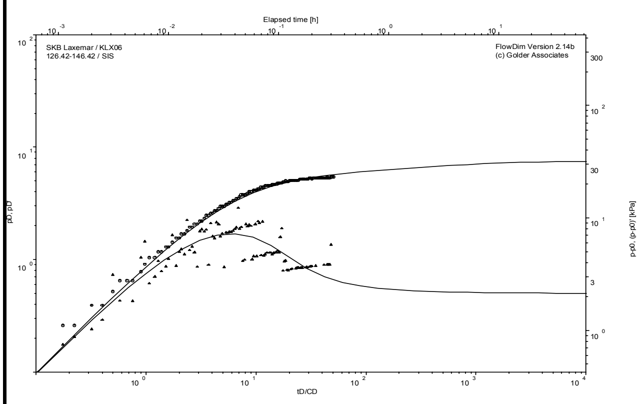
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1356		
p_i (kPa) =	1358		
p_p(kPa) =	1381	p_F (kPa) =	1359
Q_p (m^3/s)=	NA		
tp (s) =	28800	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9,8		
Derivative fact.=	0,07	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	44,34	dt_1 (min) =	NA
dt_2 (min) =	409,80	dt_2 (min) =	NA
T (m^2/s) =	1,4E-08	T (m^2/s) =	2,7E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	7,0E-10	K_s (m/s) =	1,3E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3,9E-10
C_D (-) =	NA	C_D (-) =	4,2E-02
ξ (-) =	-1,43	ξ (-) =	0,44
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

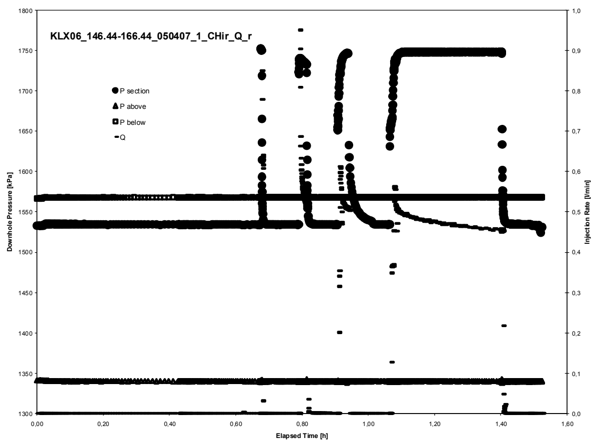
dt_1 (min) =	44,34	C (m^3/Pa) =	3,9E-10
dt_2 (min) =	409,8	C_D (-) =	4,2E-02
T_T (m^2/s) =	1,4E-08	ξ (-) =	-1,43
S (-) =	1,0E-06		
K_s (m/s) =	7,0E-10		
S_s (1/m) =	5,0E-08		

Comments:

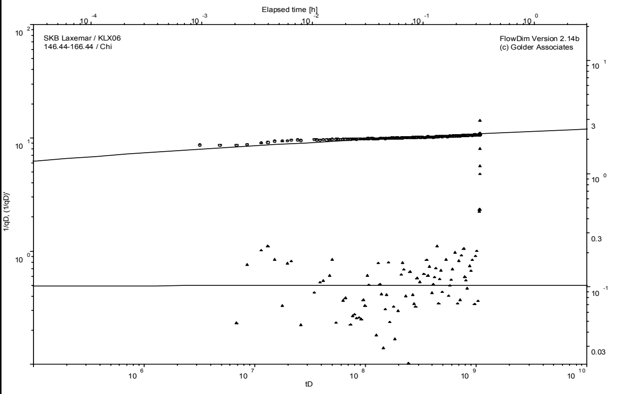
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050407 14:56
Test section from - to (m):	146.44-166.44 m	Responsible for test execution:	Stephan Rohs
Section diameter, 2·r_w (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

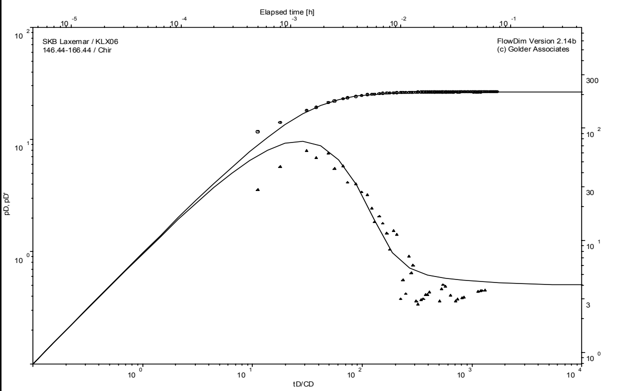
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1532		
p_i (kPa) =	1534		
p_p(kPa) =	1747	p_F (kPa) =	1533
Q_p (m^3/s)=	7,60E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9,8		
Derivative fact.=	0,02	Derivative fact.=	0,03
Results		**Results**	
Q/s (m^2/s)=	3,5E-07		
T_M (m^2/s)=	3,7E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,94	dt_1 (min) =	0,67
dt_2 (min) =	14,64	dt_2 (min) =	3,32
T (m^2/s) =	5,9E-07	T (m^2/s) =	1,6E-06
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	3,0E-08	K_s (m/s) =	8,0E-08
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,6E-10
C_D (-) =	NA	C_D (-) =	1,8E-02
ξ (-) =	3,86	ξ (-) =	20,45
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1,94	C (m^3/Pa) =	1,60E-10
dt_2 (min) =	14,64	C_D (-) =	1,76E-02
T_T (m^2/s) =	5,9E-07	ξ (-) =	3,86
S (-) =	1,0E-06		
K_s (m/s) =	3,0E-08		
S_s (1/m) =	5,0E-08		

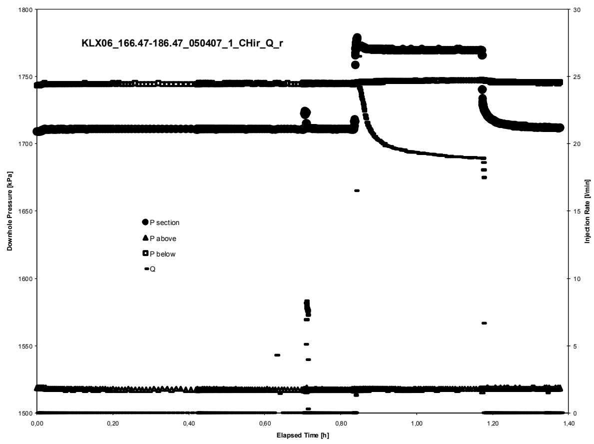
Comments:

The recommended transmissivity of 5.9E-7 m^2/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 3.5E-7 to 8.0E-7 m^2/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 1532.2 kPa.

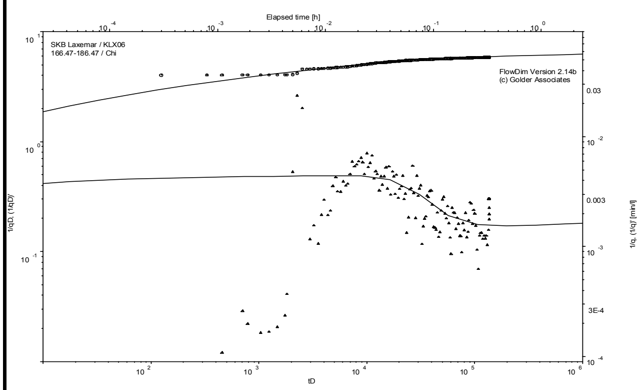
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050407 17:09
Test section from - to (m):	166.47-186.47	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

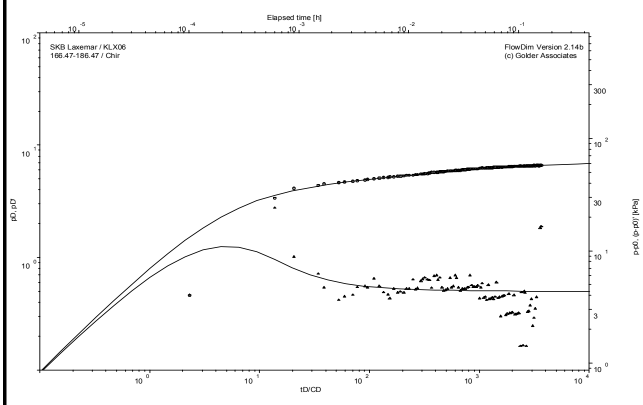
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1709		
p_i (kPa) =	1711		
p_p(kPa) =	1769	p_F (kPa) =	1711
Q_p (m^3/s)=	3,15E-04		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10,1		
Derivative fact.=	0,02	Derivative fact.=	0,1
Results		**Results**	
Q/s (m^2/s)=	5,3E-05		
T_M (m^2/s)=	5,6E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,01	dt_1 (min) =	0,32
dt_2 (min) =	1,82	dt_2 (min) =	3,77
T (m^2/s) =	5,0E-05	T (m^2/s) =	5,9E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,5E-06	K_s (m/s) =	3,0E-06
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6,0E-09
C_D (-) =	NA	C_D (-) =	6,6E-01
ξ (-) =	-2,85	ξ (-) =	-2,09
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0,32	C (m^3/Pa) =	6,0E-09
dt_2 (min) =	3,77	C_D (-) =	6,6E-01
T_T (m^2/s) =	5,9E-05	ξ (-) =	-2,09
S (-) =	1,0E-06		
K_s (m/s) =	3,0E-06		
S_s (1/m) =	5,0E-08		

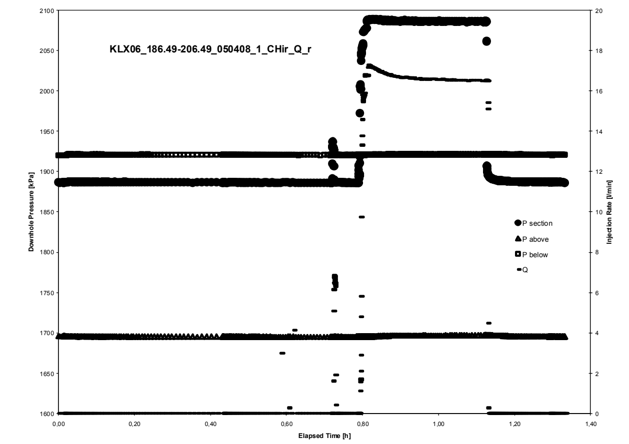
Comments:

The recommended transmissivity of 5.9E-5 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 3.0E-5 to 8.0E-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 1708.9 kPa.

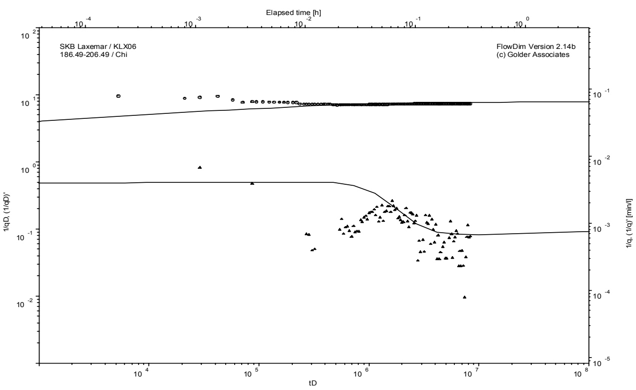
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050408 08:44
Test section from - to (m):	186.49-206.49 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

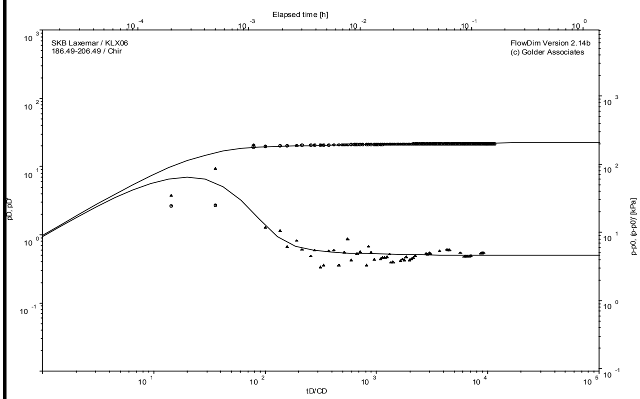
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1886		
p_i (kPa) =	1886		
p_p(kPa) =	2085	p_F (kPa) =	1886
Q_p (m^3/s)=	2,75E-04		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10,2		
Derivative fact.=	0,03	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	1,4E-05		
T_M (m^2/s)=	1,4E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	9,68	dt_1 (min) =	2,45
dt_2 (min) =	19,03	dt_2 (min) =	18,56
T (m^2/s) =	8,4E-05	T (m^2/s) =	4,7E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	4,2E-06	K_s (m/s) =	2,3E-06
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,5E-09
C_D (-) =	NA	C_D (-) =	1,7E-01
ξ (-) =	-0,2	ξ (-) =	13,5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	2,45	C (m^3/Pa) =	1,5E-09
dt_2 (min) =	18,56	C_D (-) =	1,7E-01
T_T (m^2/s) =	4,7E-05	ξ (-) =	13,5
S (-) =	1,0E-06		
K_s (m/s) =	2,3E-06		
S_s (1/m) =	5,0E-08		

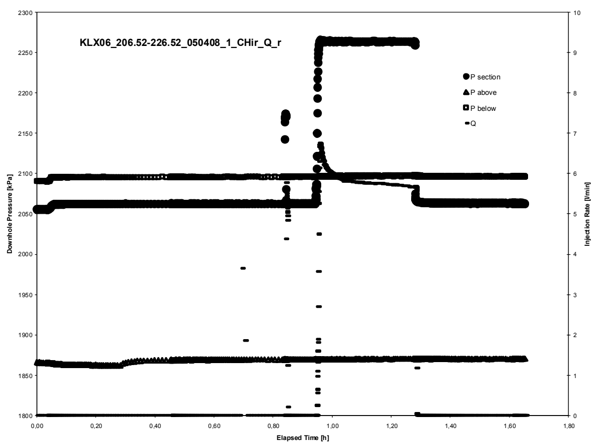
Comments:

The recommended transmissivity of 4.7E-5 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 3.0E-5 to 8.0E-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 1884.4 kPa

Test Summary Sheet

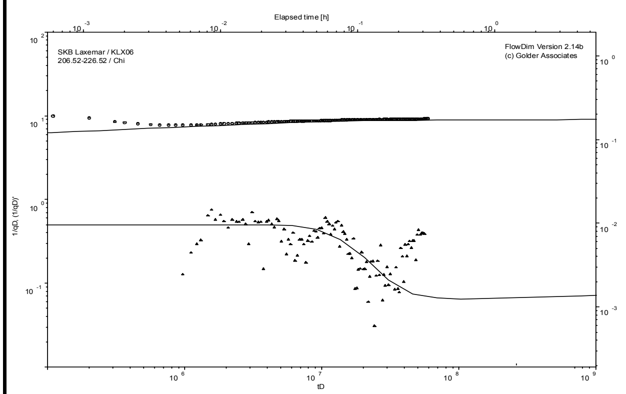
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050408 11:19
Test section from - to (m):	206.52-226.52 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

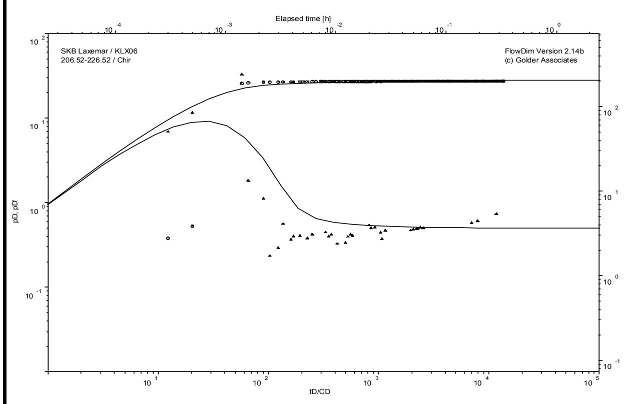


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2055		
p_i (kPa) =	2062		
p_p(kPa) =	2263	p_F (kPa) =	2062
Q_p (m^3/s)=	9,45E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10,3		
Derivative fact.=	0,04	Derivative fact.=	0,04
Results		**Results**	
Q/s (m^2/s)=	4,6E-06		
T_M (m^2/s)=	4,8E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,64	dt_1 (min) =	0,48
dt_2 (min) =	1,60	dt_2 (min) =	1,52
T (m^2/s) =	6,8E-06	T (m^2/s) =	2,1E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	3,4E-07	K_s (m/s) =	1,0E-06
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,2E-09
C_D (-) =	NA	C_D (-) =	1,3E-01
ξ (-) =	1,2	ξ (-) =	19,5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0,64	C (m^3/Pa) =	1,2E-09
dt_2 (min) =	1,60	C_D (-) =	1,3E-01
T_T (m^2/s) =	6,8E-06	ξ (-) =	1,2
S (-) =	1,0E-06		
K_s (m/s) =	3,4E-07		
S_s (1/m) =	5,0E-08		

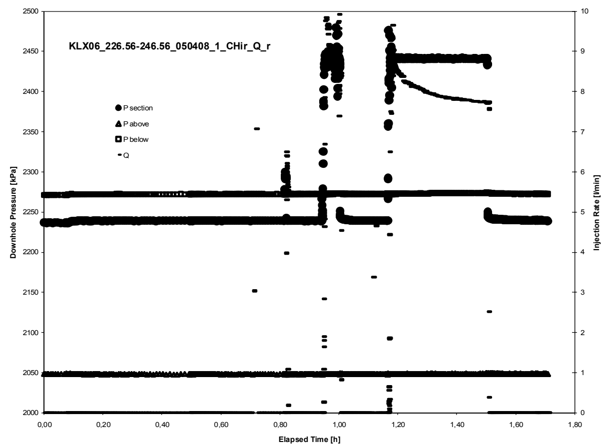
Comments:

The recommended transmissivity of 6.8E-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 3.0E-6 to 1.0E-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 2062.8 kPa.

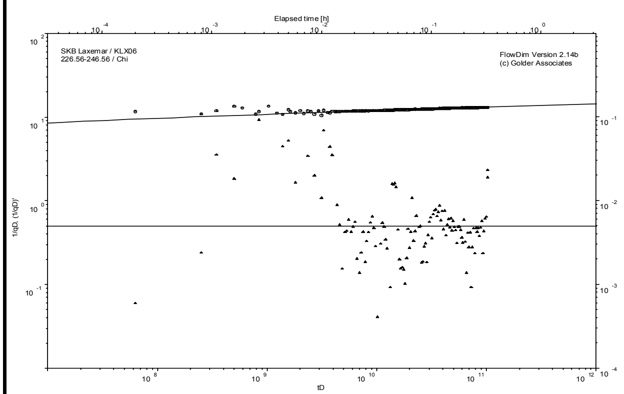
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050408 13:53
Test section from - to (m):	226.56-246.56 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

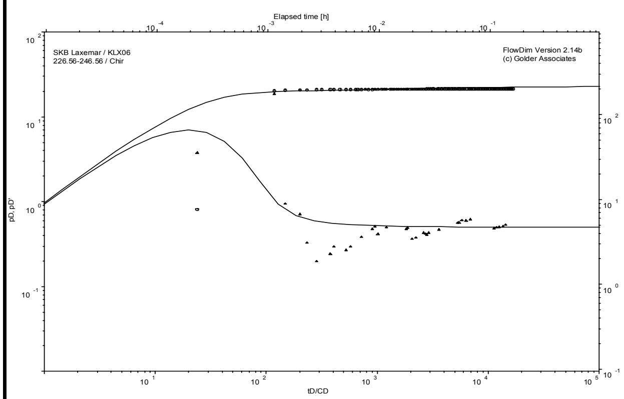
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2237		
p_i (kPa) =	2240		
p_p(kPa) =	2441	p_F (kPa) =	2240
Q_p (m^3/s)=	1,29E-04		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10,7		
Derivative fact.=	0,02	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	6,3E-06		
T_M (m^2/s)=	6,6E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	4,78	dt_1 (min) =	0,55
dt_2 (min) =	16,92	dt_2 (min) =	2,08
T (m^2/s) =	1,3E-05	T (m^2/s) =	2,2E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	6,5E-07	K_s (m/s) =	1,1E-06
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4,9E-10
C_D (-) =	NA	C_D (-) =	5,4E-02
ξ (-) =	4,6	ξ (-) =	14,1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	4,78	C (m^3/Pa) =	4,9E-10
dt_2 (min) =	16,92	C_D (-) =	5,4E-02
T_T (m^2/s) =	1,3E-05	ξ (-) =	4,6
S (-) =	1,0E-06		
K_s (m/s) =	6,5E-07		
S_s (1/m) =	5,0E-08		

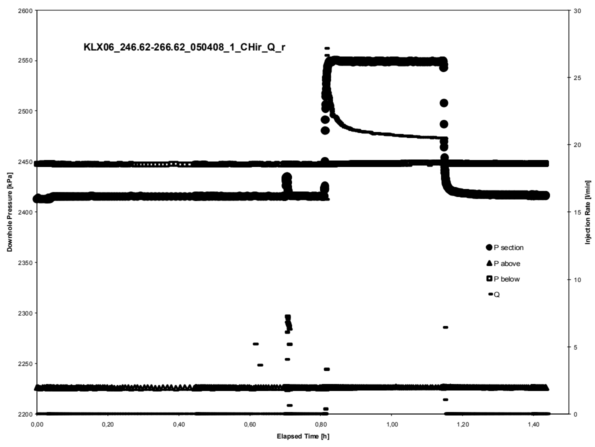
Comments:

The recommended transmissivity of 1.3E-5 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 8.0E-6 to 4.0E-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 2238.5 kPa

Test Summary Sheet

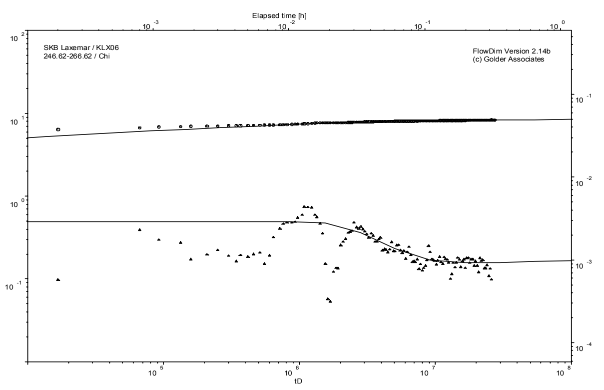
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050408 16:26
Test section from - to (m):	246.62-266.62 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

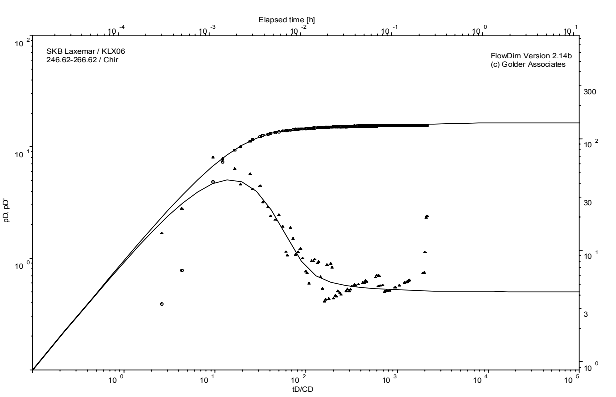


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2413		
p_i (kPa) =	2417		
p_p(kPa) =	2549	p_F (kPa) =	2416
Q_p (m^3/s)=	3,42E-04		
tp (s) =	1200	t_F (s) =	900
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11,0		
Derivative fact.=	0,07	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	2,5E-05		
T_M (m^2/s)=	2,7E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,55	dt_1 (min) =	2,20
dt_2 (min) =	1,01	dt_2 (min) =	5,75
T (m^2/s) =	3,6E-05	T (m^2/s) =	6,4E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,8E-06	K_s (m/s) =	3,2E-06
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,7E-08
C_D (-) =	NA	C_D (-) =	1,9E+00
ξ (-) =	0	ξ (-) =	7,2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0,55	C (m^3/Pa) =	1,7E-08
dt_2 (min) =	1,01	C_D (-) =	1,9E+00
T_T (m^2/s) =	6,4E-05	ξ (-) =	7,2
S (-) =	1,0E-06		
K_s (m/s) =	3,2E-06		
S_s (1/m) =	5,0E-08		

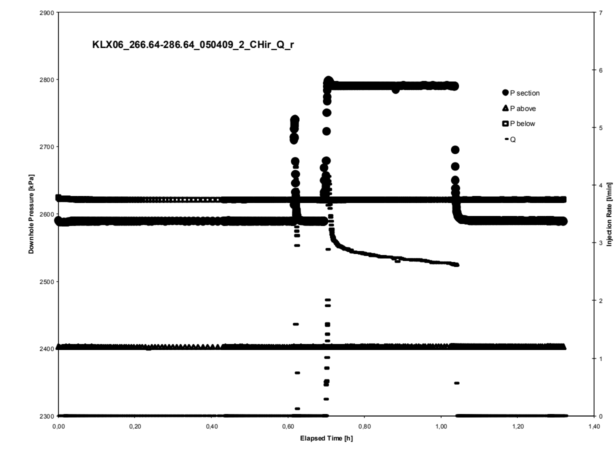
Comments:

The recommended transmissivity of 6.4E-5 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 4.0E-5 to 1.0E-4 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 2415.2 kPa

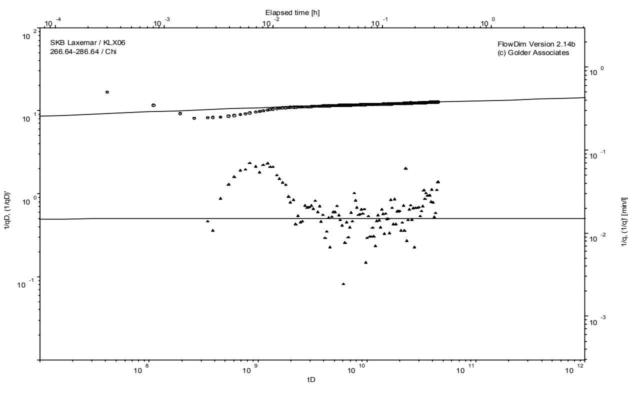
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX06	Test start:	050409 10:01
Test section from - to (m):	266.64-286.64 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

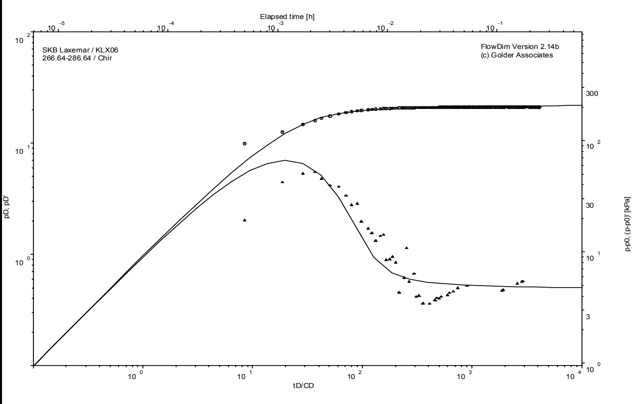
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2588		
p_i (kPa) =	2589		
p_p(kPa) =	2790	p_F (kPa) =	2589
Q_p (m^3/s)=	4,38E-05		
tp (s) =	1200	t_F (s) =	900
S el S* (-)=	1,00E-06	S el S* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11,2		
Derivative fact.=	0,04	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	2,1E-06		
T_M (m^2/s)=	2,2E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,07	dt_1 (min) =	2,63
dt_2 (min) =	18,07	dt_2 (min) =	9,13
T (m^2/s) =	4,4E-06	T (m^2/s) =	7,7E-06
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,2E-07	K_s (m/s) =	3,85E-07
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,00E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,0E-09
C_D (-) =	NA	C_D (-) =	1,1E-01
ξ (-) =	4,7	ξ (-) =	13,7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1,07	C (m^3/Pa) =	1,0E-09
dt_2 (min) =	18,07	C_D (-) =	1,1E-01
T_T (m^2/s) =	4,4E-06	ξ (-) =	4,7
S (-) =	1,0E-06		
K_s (m/s) =	2,2E-07		
S_s (1/m) =	5,0E-08		

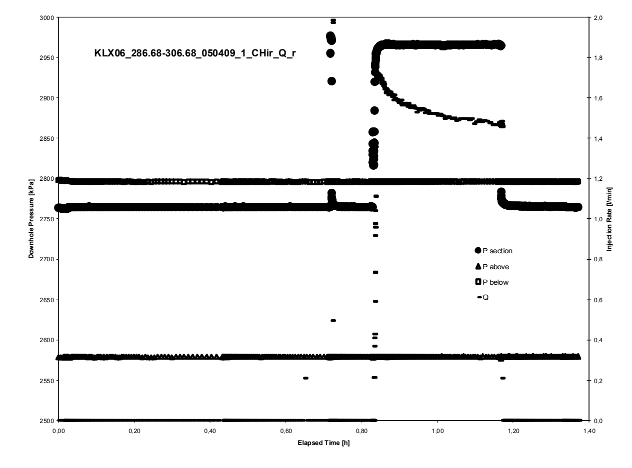
Comments:

The recommended transmissivity of 4.4E-6 m^2/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 2.0E-6 to 8.0E-6 m^2/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 2590.1 kPa.

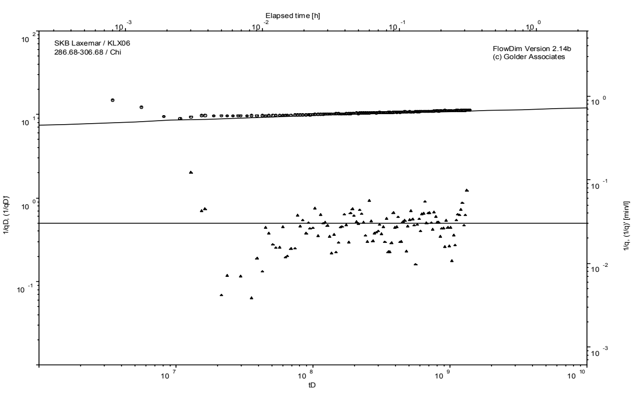
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050409 12:09
Test section from - to (m):	286.68-306.68 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

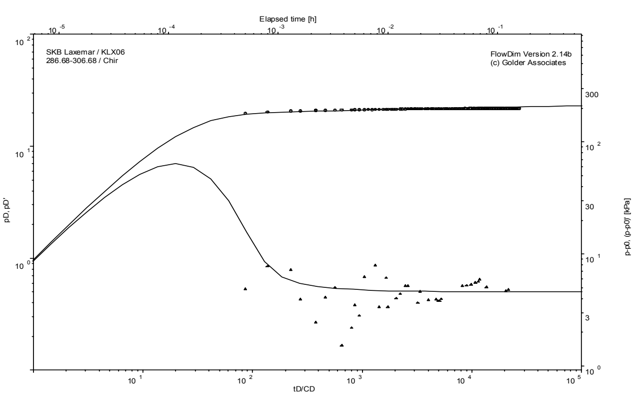
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2763		
p_i (kPa) =	2765		
p_p(kPa) =	2966	p_F (kPa) =	2765
Q_p (m^3/s)=	2,44E-05		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11,4		
Derivative fact.=	0,07	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	1,2E-06		
T_M (m^2/s)=	1,2E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,13	dt_1 (min) =	0,20
dt_2 (min) =	17,70	dt_2 (min) =	7,53
T (m^2/s) =	2,2E-06	T (m^2/s) =	4,4E-06
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,1E-07	K_s (m/s) =	2,20E-07
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,00E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5,9E-11
C_D (-) =	NA	C_D (-) =	6,5E-03
ξ (-) =	3,3	ξ (-) =	18,8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	
Selected representative parameters.			
dt_1 (min) =	1,13	C (m^3/Pa) =	5,9E-11
dt_2 (min) =	17,7	C_D (-) =	6,5E-03
T_T (m^2/s) =	2,2E-06	ξ (-) =	3,3
S (-) =	1,0E-06		
K_s (m/s) =	1,1E-07		
S_s (1/m) =	5,0E-08		

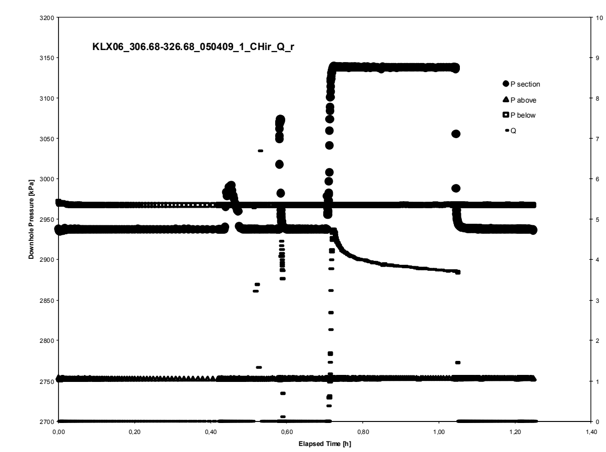
Comments:

The recommended transmissivity of 2.2E-6 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 9.0E-5 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 2765.8 kPa.

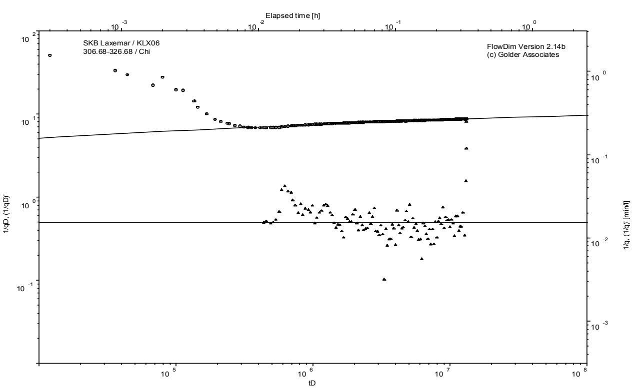
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050409 14:16
Test section from - to (m):	306.68-326.68 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

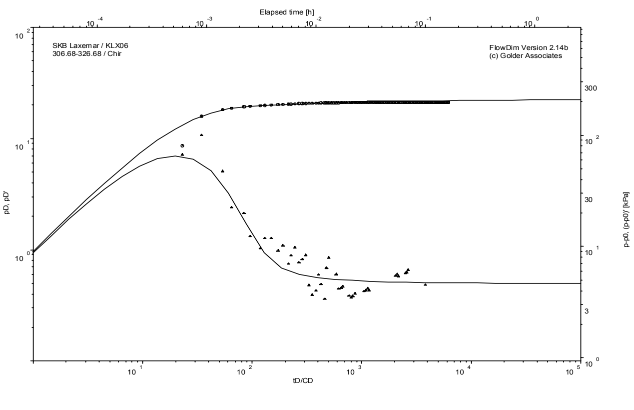
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2936		
p_i (kPa) =	2937		
p_p(kPa) =	3138	p_F (kPa) =	2938
Q_p (m^3/s)=	6,20E-05		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11,7		
Derivative fact.=	0,03	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	3,0E-06		
T_M (m^2/s)=	3,2E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3,14	dt_1 (min) =	0,64
dt_2 (min) =	18,27	dt_2 (min) =	5,82
T (m^2/s) =	4,2E-06	T (m^2/s) =	1,1E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,1E-07	K_s (m/s) =	5,5E-07
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6,5E-10
C_D (-) =	NA	C_D (-) =	7,2E-02
ξ (-) =	0,7	ξ (-) =	14,0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	3,14	C (m^3/Pa) =	6,5E-10
dt_2 (min) =	18,27	C_D (-) =	7,2E-02
T_T (m^2/s) =	4,2E-06	ξ (-) =	0,7
S (-) =	1,0E-06		
K_s (m/s) =	2,1E-07		
S_s (1/m) =	5,0E-08		

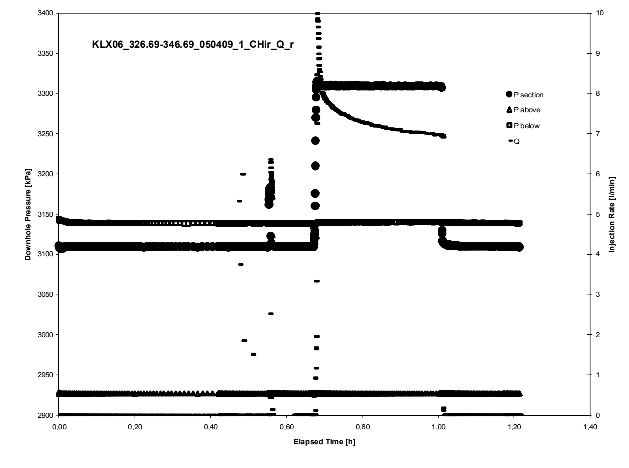
Comments:

The recommended transmissivity of 4.2E-6 m^2/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 1.5E-6 to 7.0E-6 m^2/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 2937.8 kPa.

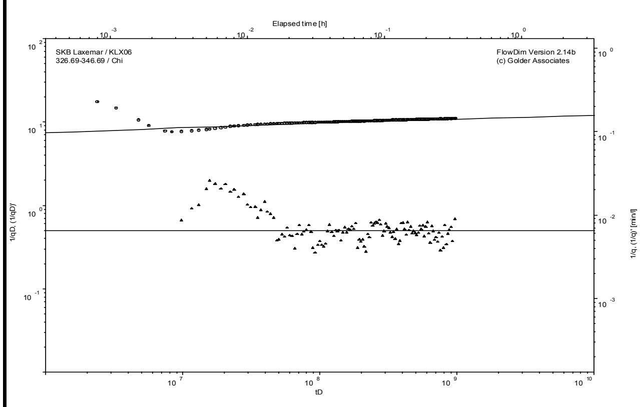
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050409 16:16
Test section from - to (m):	326.69-346.69 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

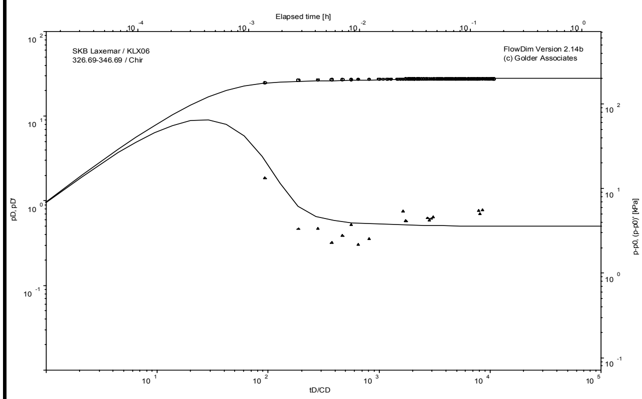
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3108		
p_i (kPa) =	3110		
p_p(kPa) =	3310	p_F (kPa) =	3110
Q_p (m³/s)=	1,16E-04		
tp (s) =	1200	t_F (s) =	600
S el S* (-)=	1,00E-06	S el S* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11,9		
Derivative fact.=	0,04	Derivative fact.=	0,02
Results		**Results**	
Q/s (m²/s)=	5,7E-06		
T_M (m²/s)=	6,0E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,07	dt_1 (min) =	*
dt_2 (min) =	17,35	dt_2 (min) =	*
T (m²/s) =	1,0E-05	T (m²/s) =	2,7E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	5,0E-07	K_s (m/s) =	1,4E-06
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m³/Pa) =	NA	C (m³/Pa) =	9,2E-10
C_D (-) =	NA	C_D (-) =	1,0E-01
ξ (-) =	2,4	ξ (-) =	19,6
T_{GRF}(m²/s) =		T_{GRF}(m²/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1,07	C (m³/Pa) =	9,2E-10
dt_2 (min) =	17,35	C_D (-) =	1,0E-01
T_T (m²/s) =	1,0E-05	ξ (-) =	2,4
S (-) =	1,0E-06		
K_s (m/s) =	5,0E-07		
S_s (1/m) =	5,0E-08		

Comments:

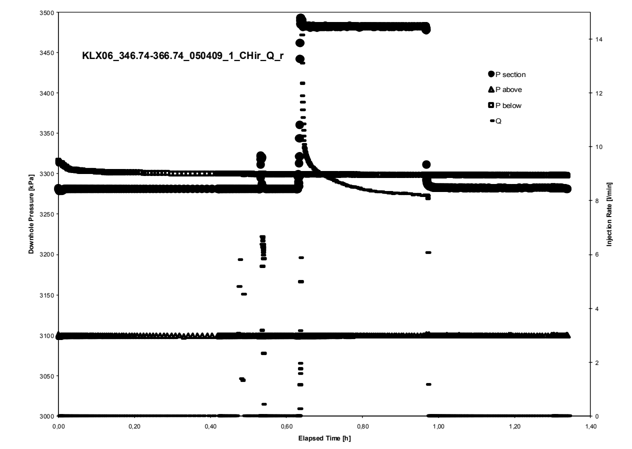
*: IARF not measured

The recommended transmissivity of 1.0E-5 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 7.0E-6 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 3109.7 kPa.

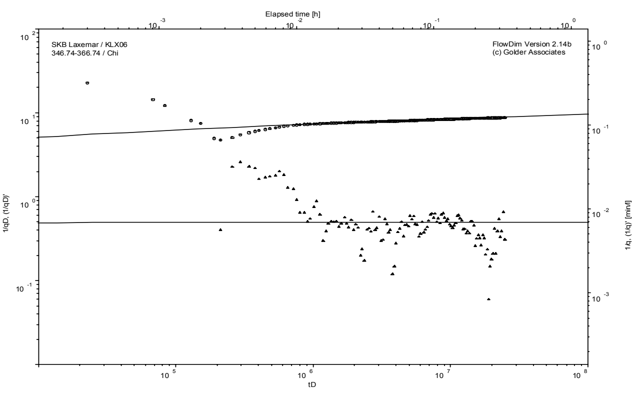
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050409 18:11
Test section from - to (m):	346.74-366.74 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

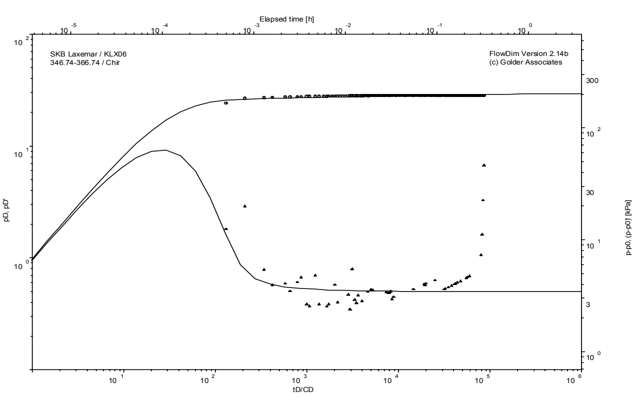
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3281		
p_i (kPa) =	3281		
p_p(kPa) =	3482	p_F (kPa) =	3282
Q_p (m^3/s)=	1,37E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12,1		
Derivative fact.=	0,02	Derivative fact.=	0,03
Results		**Results**	
Q/s (m^2/s)=	6,7E-06		
T_M (m^2/s)=	7,0E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,02	dt_1 (min) =	0,65
dt_2 (min) =	11,69	dt_2 (min) =	7,45
T (m^2/s) =	9,3E-06	T (m^2/s) =	3,3E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	4,7E-07	K_s (m/s) =	1,7E-06
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2,9E-10
C_D (-) =	NA	C_D (-) =	3,2E-02
ξ (-) =	0,6	ξ (-) =	20,4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	1,02	C (m^3/Pa) =	2,9E-10
dt_2 (min) =	11,69	C_D (-) =	3,2E-02
T_T (m^2/s) =	9,3E-06	ξ (-) =	0,6
S (-) =	1,0E-06		
K_s (m/s) =	4,7E-07		
S_s (1/m) =	5,0E-08		

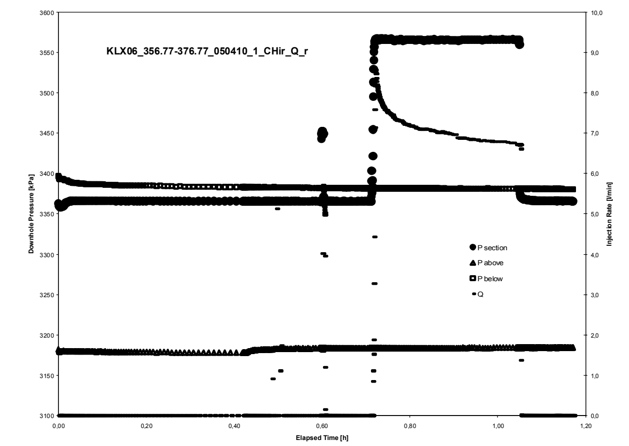
Comments:

The recommended transmissivity of 9.3E-6 m^2/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-6 to 3.0E-5 m^2/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 3282.7 kPa.

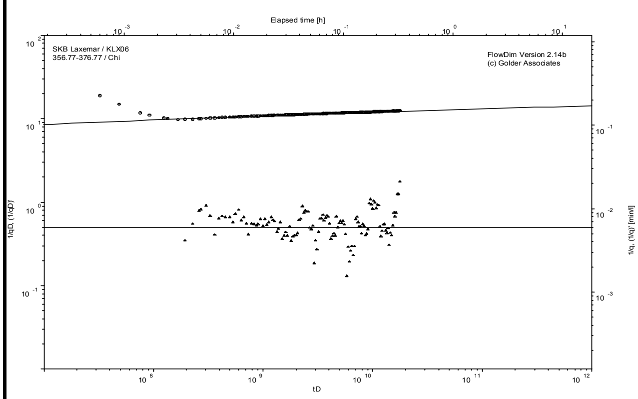
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050410 08:40
Test section from - to (m):	356.77-376.77 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

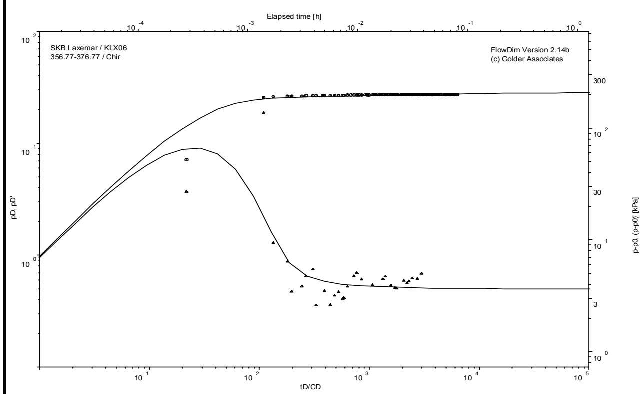
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3362		
p_i (kPa) =	3365		
p_p(kPa) =	3566	p_F (kPa) =	3366
Q_p (m^3/s)=	1,12E-04		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12,2		
Derivative fact.=	0,04	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	5,5E-06		
T_M (m^2/s)=	5,7E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,54	dt_1 (min) =	0,82
dt_2 (min) =	15,34	dt_2 (min) =	1,35
T (m^2/s) =	1,1E-05	T (m^2/s) =	2,5E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	5,5E-07	K_s (m/s) =	1,3E-06
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7,4E-10
C_D (-) =	NA	C_D (-) =	8,2E-02
ξ (-) =	3,8	ξ (-) =	19,7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1,54	C (m^3/Pa) =	7,4E-10
dt_2 (min) =	15.34	C_D (-) =	8,2E-02
T_T (m^2/s) =	1,1E-05	ξ (-) =	3,8
S (-) =	1,0E-06		
K_s (m/s) =	5,5E-07		
S_s (1/m) =	5,0E-08		

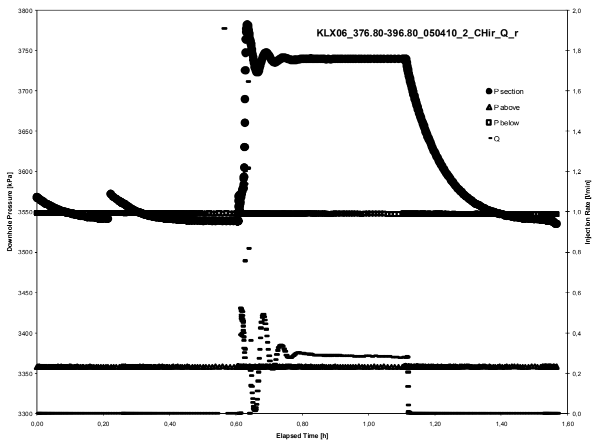
Comments:

The recommended transmissivity of 1.1E-5 m^2/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 7.0E-6 to 4.0E-5 m^2/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 3366.2 kPa

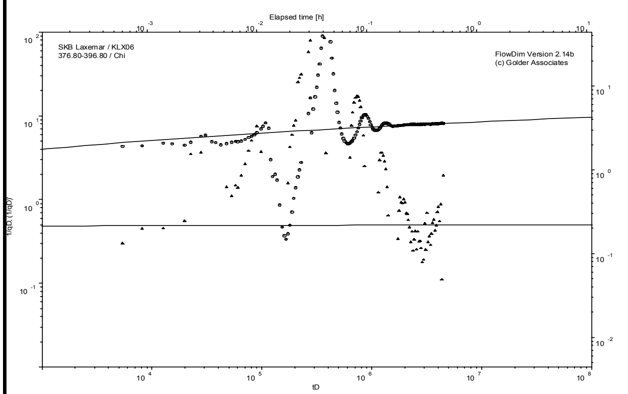
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX06	Test start:	050410 13:14
Test section from - to (m):	376.80-396.80 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

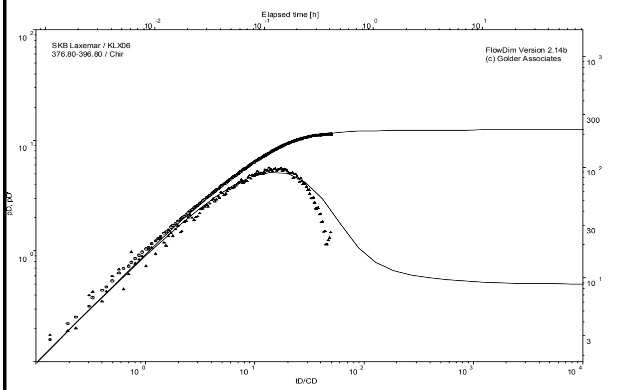
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3538		
p_i (kPa) =	3538		
p_p(kPa) =	3739	p_F (kPa) =	3540
Q_p (m^3/s)=	4,65E-06		
tp (s) =	1800	t_F (s) =	1500
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12,5		
Derivative fact.=	0,06	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	2,3E-07		
T_M (m^2/s)=	2,4E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	14,70	dt_1 (min) =	*
dt_2 (min) =	25,63	dt_2 (min) =	*
T (m^2/s) =	3,0E-07	T (m^2/s) =	4,6E-07
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,5E-08	K_s (m/s) =	2,3E-08
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8,7E-09
C_D (-) =	NA	C_D (-) =	9,6E-01
ξ (-) =	1,3	ξ (-) =	5,8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	14,7	C (m^3/Pa) =	8,7E-09
dt_2 (min) =	25,63	C_D (-) =	9,6E-01
T_T (m^2/s) =	3,0E-07	ξ (-) =	1,3
S (-) =	1,0E-06		
K_s (m/s) =	1,5E-08		
S_s (1/m) =	5,0E-08		

Comments:

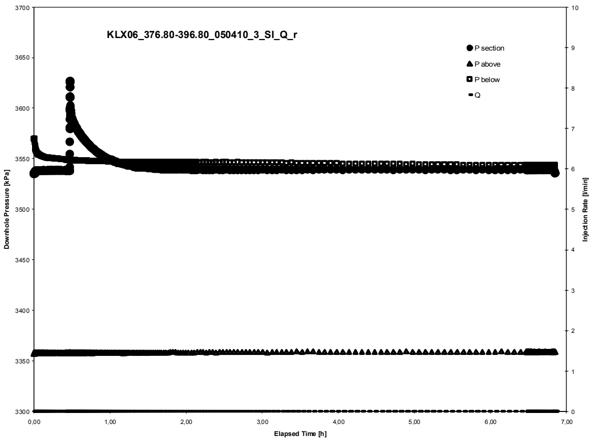
*: IARF not measured

The recommended transmissivity of 3.0E-7 m^2/s was derived from the analysis of the CHi phase, which shows at late times the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to 6.0E-7 m^2/s. The analysis was conducted using a flow dimension of 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 3523.8 kPa.

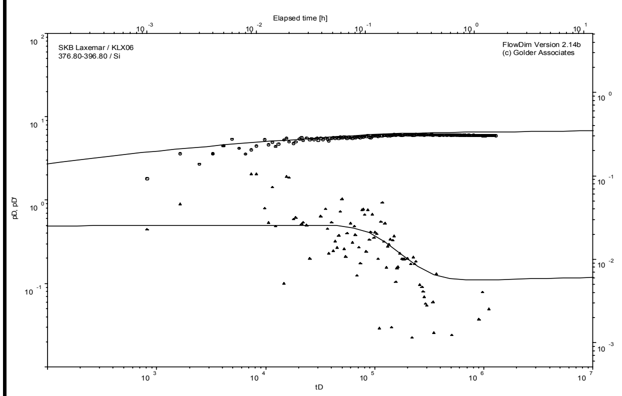
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	SI
Area:	Laxemar	Test no:	3
Borehole ID:	KLX06	Test start:	050410 18:30
Test section from - to (m):	376.80-396.80 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period

Not Analysed

Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3535		
p_i (kPa) =	3538		
p_p(kPa) =	NA	p_F (kPa) =	NA
Q_p (m^3/s)=	NA		
tp (s) =	21600	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12,4		
Derivative fact.=	0,1	Derivative fact.=	
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,90	dt_1 (min) =	NA
dt_2 (min) =	4,74	dt_2 (min) =	NA
T (m^2/s) =	3,9E-07	T (m^2/s) =	NA
S (-) =	1,0E-06	S (-) =	NA
K_s (m/s) =	2,0E-08	K_s (m/s) =	NA
S_s (1/m) =	5,0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	4,6E-08	C (m^3/Pa) =	NA
C_D (-) =	5,1E+00	C_D (-) =	NA
ξ (-) =	-0,1	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

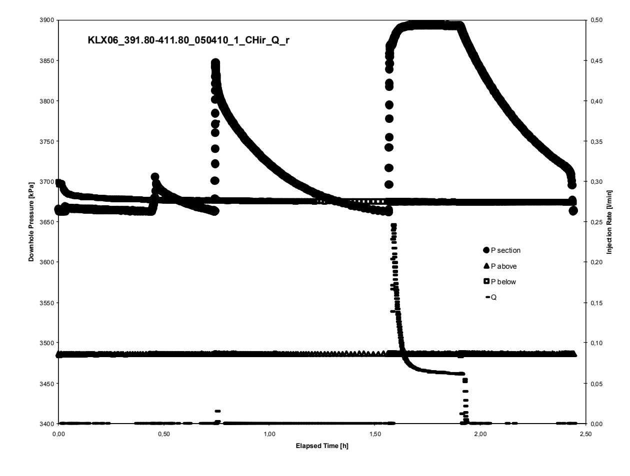
Selected representative parameters.			
dt_1 (min) =	0,90	C (m^3/Pa) =	4,6E-08
dt_2 (min) =	4,74	C_D (-) =	5,1E+00
T_T (m^2/s) =	3,9E-07	ξ (-) =	-0,1
S (-) =	1,0E-06		
K_s (m/s) =	2,0E-08		
S_s (1/m) =	5,0E-08		

Comments:

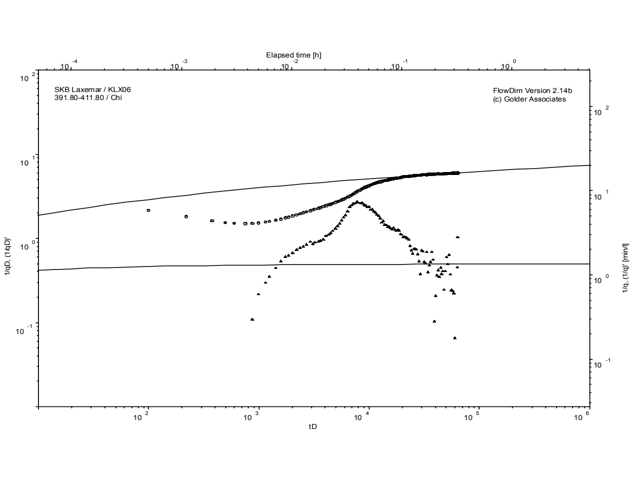
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050410 15:31
Test section from - to (m):	391.80-411.80 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

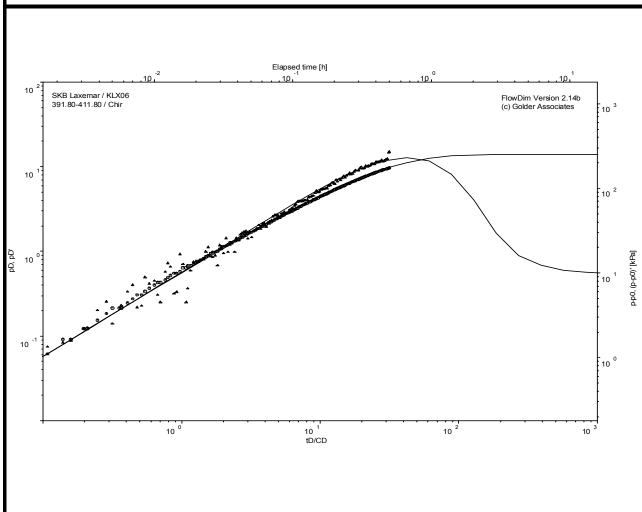
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3664		
p_i (kPa) =	3662		
p_p(kPa) =	3893	p_F (kPa) =	3718
Q_p (m^3/s)=	1,02E-06		
tp (s) =	1200	t_F (s) =	1800
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12,6		
Derivative fact.=	0,05	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	4,3E-08		
T_M (m^2/s)=	4,5E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	9,85	dt_1 (min) =	*
dt_2 (min) =	19,15	dt_2 (min) =	*
T (m^2/s) =	4,2E-08	T (m^2/s) =	1,1E-07
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,1E-09	K_s (m/s) =	5,5E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4,2E-09
C_D (-) =	NA	C_D (-) =	4,6E-01
ξ (-) =	0,3	ξ (-) =	18,8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	9,85	C (m^3/Pa) =	4,2E-09
dt_2 (min) =	19,15	C_D (-) =	4,6E-01
T_T (m^2/s) =	4,2E-08	ξ (-) =	0,3
S (-) =	1,0E-06		
K_s (m/s) =	2,1E-09		
S_s (1/m) =	5,0E-08		

Comments:

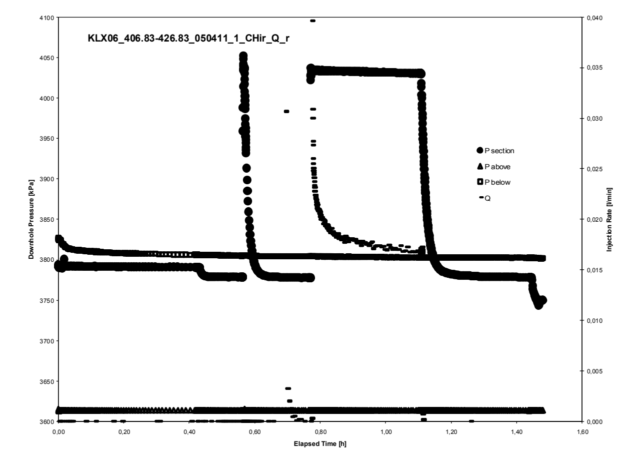
*: IARF not measured

The recommended transmissivity of 4.2E-8 m^2/s was derived from the analysis of the CHi phase, which shows at late times the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-8 to 8.0E-8 m^2/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 3606.7 kPa.

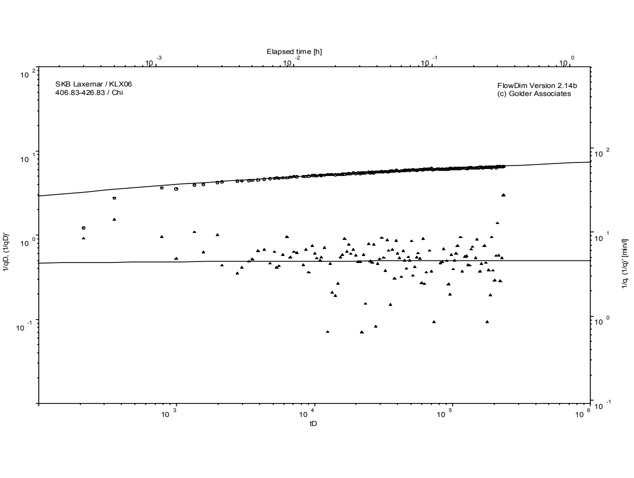
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050411 08:32
Test section from - to (m):	406.83-426.83 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

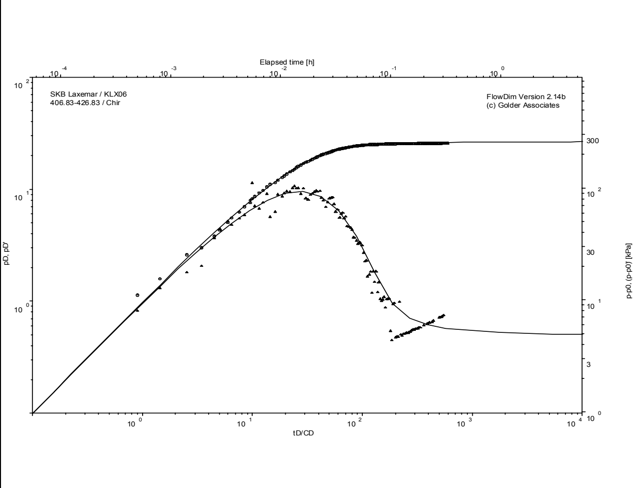
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3792		
p_i (kPa) =	3777		
p_p(kPa) =	4029	p_F (kPa) =	3777
Q_p (m^3/s)=	2,67E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12,8		
Derivative fact.=	0,05	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	1,0E-08		
T_M (m^2/s)=	1,1E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,93	dt_1 (min) =	*
dt_2 (min) =	19,25	dt_2 (min) =	*
T (m^2/s) =	1,1E-08	T (m^2/s) =	4,9E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	5,5E-10	K_s (m/s) =	2,5E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6,2E-11
C_D (-) =	NA	C_D (-) =	6,8E-03
ξ (-) =	1,6	ξ (-) =	20,9
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0,93	C (m^3/Pa) =	6,2E-11
dt_2 (min) =	19,25	C_D (-) =	6,8E-03
T_T (m^2/s) =	1,1E-08	ξ (-) =	1,6
S (-) =	1,0E-06		
K_s (m/s) =	5,5E-10		
S_s (1/m) =	5,0E-08		

Comments:

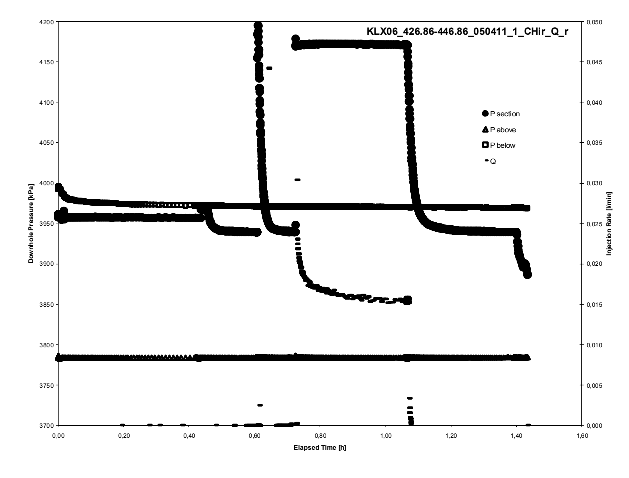
*: IARF not measured

The recommended transmissivity of 1.1E-8 m^2/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 7.0E-9 to 3.0E-8 m^2/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 3775.5 kPa.

Test Summary Sheet

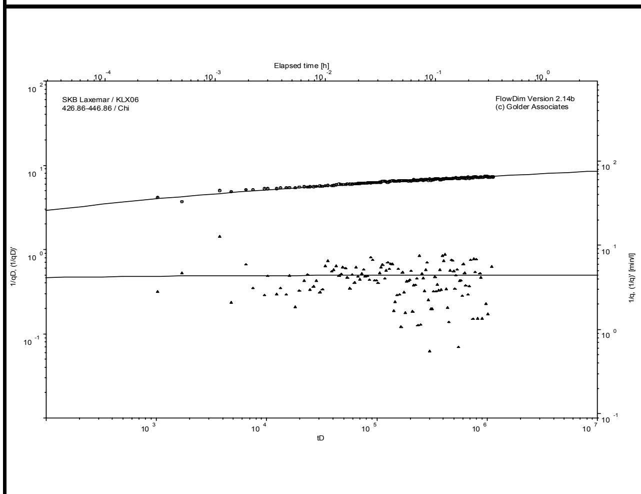
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050411 10:48
Test section from - to (m):	426.86-446.86 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

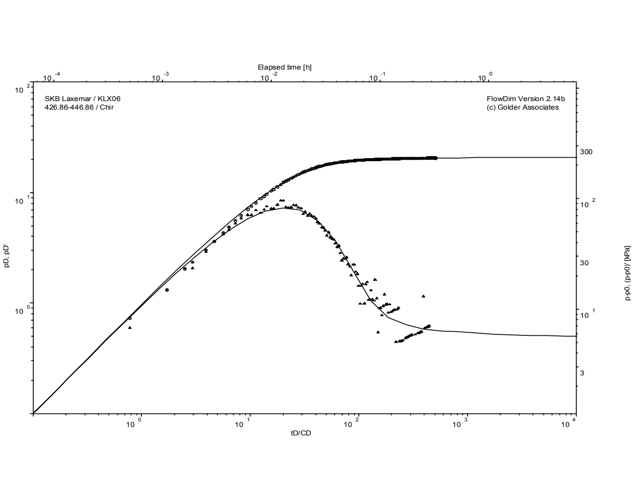


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3961		
p_i (kPa) =	3940		
p_p(kPa) =	4172	p_F (kPa) =	3939
Q_p (m^3/s)=	2,56E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13,0		
Derivative fact.=	0,09	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	1,1E-08		
T_M (m^2/s)=	1,1E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,80	dt_1 (min) =	NA
dt_2 (min) =	15,47	dt_2 (min) =	NA
T (m^2/s) =	1,3E-08	T (m^2/s) =	3,8E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	6,5E-10	K_s (m/s) =	1,9E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5,6E-11
C_D (-) =	NA	C_D (-) =	6,2E-03
ξ (-) =	2,3	ξ (-) =	15,4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0,80	C (m^3/Pa) =	5,6E-11
dt_2 (min) =	15,47	C_D (-) =	6,2E-03
T_T (m^2/s) =	1,3E-08	ξ (-) =	2,3
S (-) =	1,0E-06		
K_s (m/s) =	6,5E-10		
S_s (1/m) =	5,0E-08		

Comments:

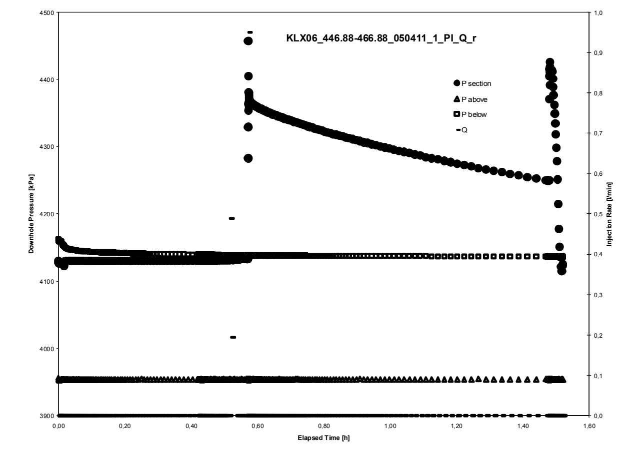
*: IARF not measured

The recommended transmissivity of 1.3E-8 m^2/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 7.0E-9 to 3.0E-8 m^2/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 3935.8 kPa.

Test Summary Sheet

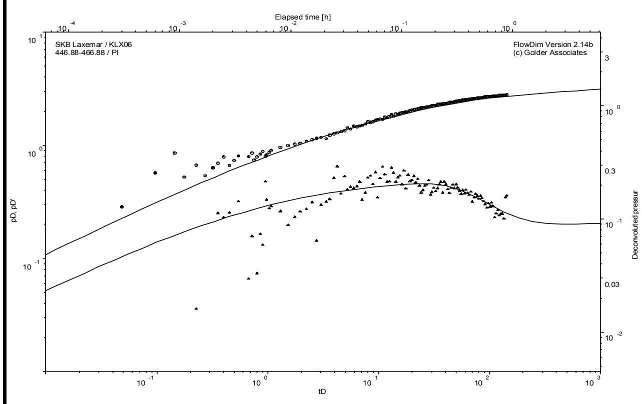
Project:	Oskarshamn site investigation	Test type:[1]	PI
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050411 13:03
Test section from - to (m):	446.88-466.88 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4130		
p_i (kPa) =	4132		
p_p(kPa) =	NA	p_F (kPa) =	NA
Q_p (m^3/s)=	NA		
tp (s) =	NA	t_F (s) =	3240
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13,2		
Derivative fact.=	NA	Derivative fact.=	0,08
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	2,22
dt_2 (min) =	NA	dt_2 (min) =	13,10
T (m^2/s) =	NA	T (m^2/s) =	7,8E-11
S (-) =	NA	S (-) =	1,0E-06
K_s (m/s) =	NA	K_s (m/s) =	3,9E-12
S_s (1/m) =	NA	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8,1E-11
C_D (-) =	NA	C_D (-) =	8,9E-03
ξ (-) =	NA	ξ (-) =	-0,1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	2,22	C (m^3/Pa) =	8,1E-11
dt_2 (min) =	13,10	C_D (-) =	8,9E-03
T_T (m^2/s) =	7,8E-11	ξ (-) =	-0,1
S (-) =	1,0E-06		
K_s (m/s) =	3,9E-12		
S_s (1/m) =	5,0E-08		

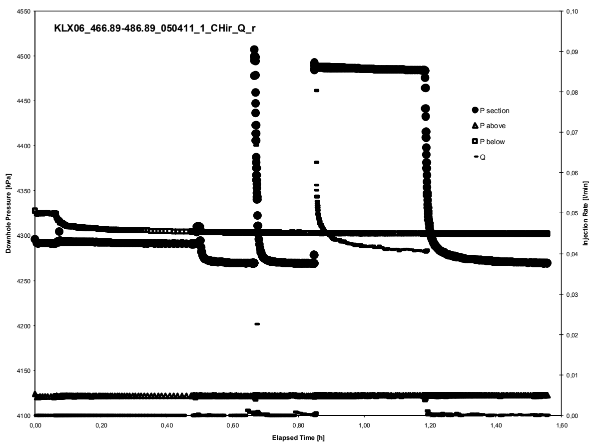
Comments:

The recommended transmissivity of 7.8E-11 m^2/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 3E-11 to 3E-10 m^2/s (the outer zone transmissivity is considered as most representative).The flow dimension displayed during the test is 2. No static pressure could be derived.

Test Summary Sheet

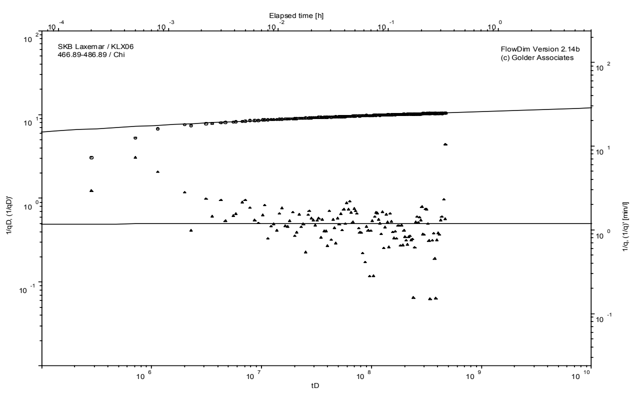
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050411 15:15
Test section from - to (m):	466.89-486.89 m	Responsible for test execution:	Jörg Böhner
Section diameter, 2·r_w (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

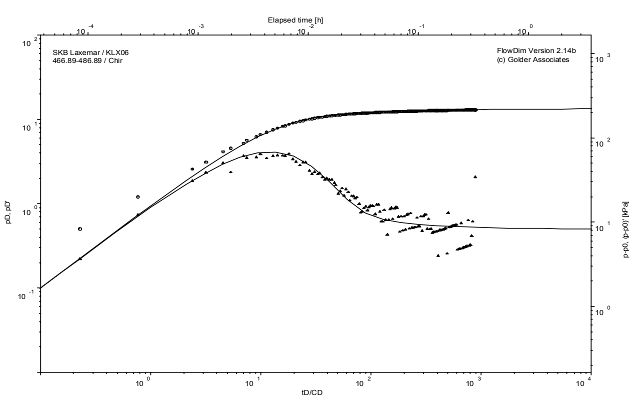


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4291		
p_i (kPa) =	4268		
p_p(kPa) =	4483	p_F (kPa) =	4269
Q_p (m^3/s)=	6,83E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13,6		
Derivative fact.=	0,05	Derivative fact.=	0,03
Results		**Results**	
Q/s (m^2/s)=	3,1E-08		
T_M (m^2/s)=	3,3E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,55	dt_1 (min) =	5,69
dt_2 (min) =	13,70	dt_2 (min) =	13,29
T (m^2/s) =	5,1E-08	T (m^2/s) =	6,7E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,6E-09	K_s (m/s) =	3,4E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5,7E-11
C_D (-) =	NA	C_D (-) =	6,3E-03
ξ (-) =	4,7	ξ (-) =	7,5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	5,69	C (m^3/Pa) =	5,7E-11
dt_2 (min) =	13,29	C_D (-) =	6,3E-03
T_T (m^2/s) =	6,7E-08	ξ (-) =	7,5
S (-) =	1,0E-06		
K_s (m/s) =	3,4E-09		
S_s (1/m) =	5,0E-08		

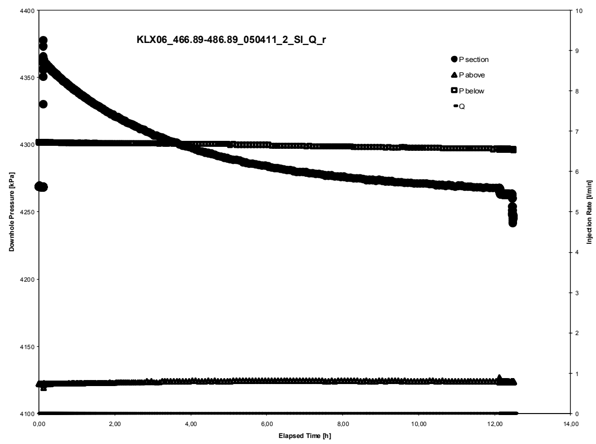
Comments:

The recommended transmissivity of 6.7E-8 m^2/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 3.0E-8 to 9.0E-8 m^2/s. The flow dimension displayed during the test was 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 4264.7 kPa. The derived transmissivity of the Si phase is 6.9E-8 m^2/s.

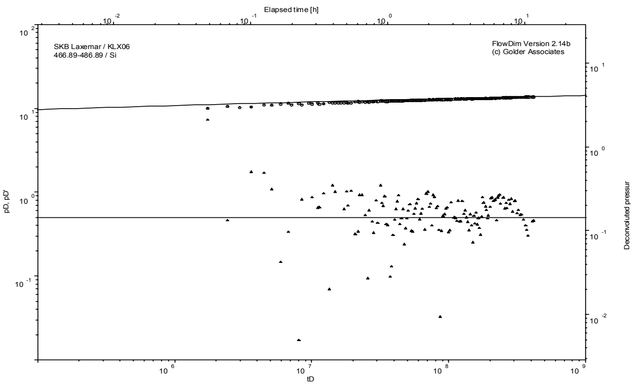
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	SI
Area:	Laxemar	Test no:	2
Borehole ID:	KLX06	Test start:	050411 16:58
Test section from - to (m):	466.89-486.89 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period

Not Analysed

Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4292		
p_i (kPa) =	4268		
p_p(kPa) =	4268	p_F (kPa) =	4263
Q_p (m^3/s)=	1,67E-04		
tp (s) =	43200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	8,9		
Derivative fact.=	0,07	Derivative fact.=	NA
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	28,72	dt_1 (min) =	NA
dt_2 (min) =	97,66	dt_2 (min) =	NA
T (m^2/s) =	7,7E-08	T (m^2/s) =	NA
S (-) =	1,0E-06	S (-) =	NA
K_s (m/s) =	3,9E-09	K_s (m/s) =	NA
S_s (1/m) =	5,0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	2,6	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

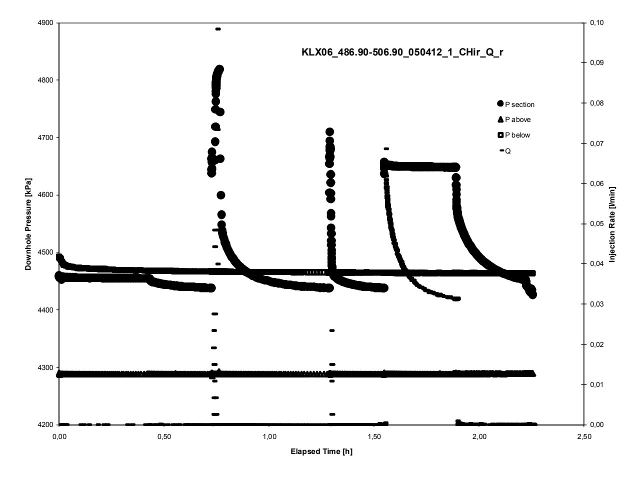
Selected representative parameters.			
dt_1 (min) =	28,72	C (m^3/Pa) =	NA
dt_2 (min) =	97,66	C_D (-) =	NA
T_T (m^2/s) =	7,7E-08	ξ (-) =	2,6
S (-) =	1,0E-06		
K_s (m/s) =	3,9E-09		
S_s (1/m) =	5,0E-08		

Comments:

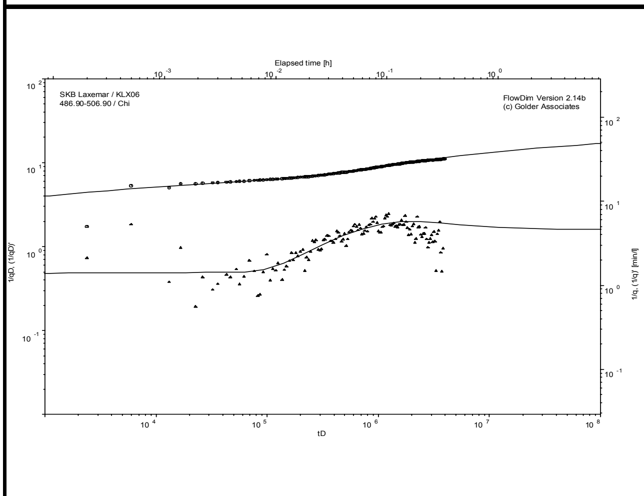
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050412 08:44
Test section from - to (m):	486.90-506.90 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

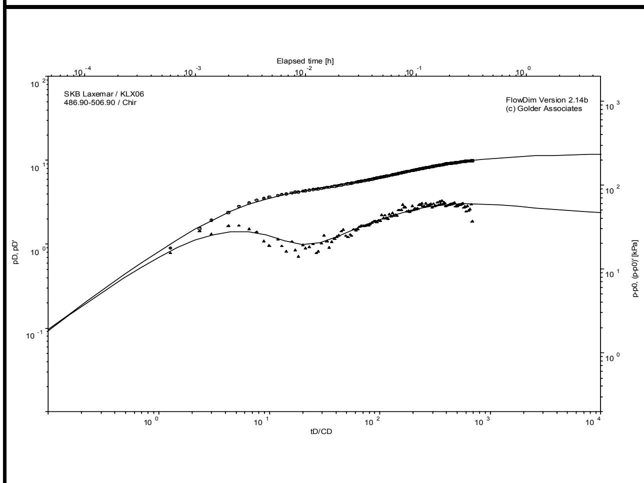
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4456		
p_i (kPa) =	4438		
p_p(kPa) =	4648	p_F (kPa) =	4452
Q_p (m^3/s)=	5,25E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13,7		
Derivative fact.=	0,03	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	2,5E-08		
T_M (m^2/s)=	2,6E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,22	dt_1 (min) =	7,13
dt_2 (min) =	0,46	dt_2 (min) =	18,90
T (m^2/s) =	1,3E-08	T (m^2/s) =	1,1E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	6,5E-10	K_s (m/s) =	5,5E-10
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5,3E-11
C_D (-) =	NA	C_D (-) =	5,8E-03
ξ (-) =	2,4	ξ (-) =	0,7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	7,13	C (m^3/Pa) =	5,3E-11
dt_2 (min) =	18,9	C_D (-) =	5,8E-03
T_T (m^2/s) =	1,1E-08	ξ (-) =	0,7
S (-) =	1,0E-06		
K_s (m/s) =	5,5E-10		
S_s (1/m) =	5,0E-08		

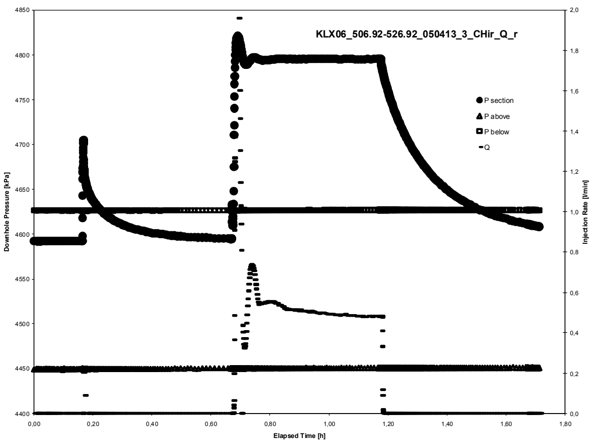
Comments:

The recommended transmissivity of 1.1E-8 m^2/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 7.0E-9 to 3.0E-8 m^2/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 4415.2 kPa.

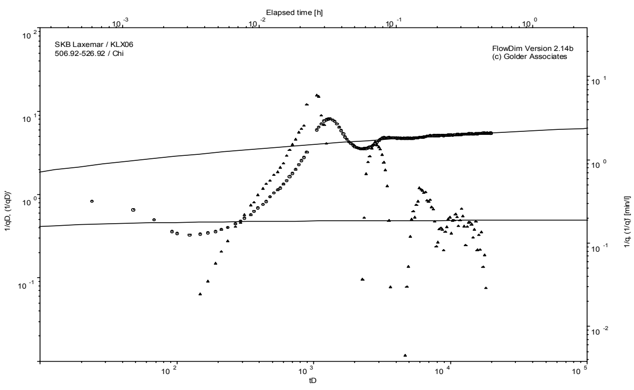
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	3
Borehole ID:	KLX06	Test start:	050413 15:39
Test section from - to (m):	506.92-526.92 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

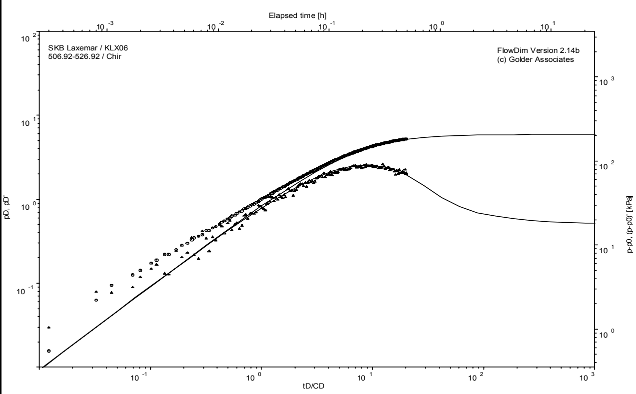
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4592		
p_i (kPa) =	4594		
p_p(kPa) =	4795	p_F (kPa) =	4609
Q_p (m^3/s)=	8,02E-06		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14,1		
Derivative fact.=	0,05	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	3,9E-07		
T_M (m^2/s)=	4,1E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	7,80	dt_1 (min) =	*
dt_2 (min) =	23,03	dt_2 (min) =	*
T (m^2/s) =	3,4E-07	T (m^2/s) =	4,8E-07
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,7E-08	K_s (m/s) =	2,4E-08
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2,8E-08
C_D (-) =	NA	C_D (-) =	3,1E+00
ξ (-) =	-1,5	ξ (-) =	-0,6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	7,8	C (m^3/Pa) =	2,8E-08
dt_2 (min) =	23,03	C_D (-) =	3,1E+00
T_T (m^2/s) =	3,4E-07	ξ (-) =	-1,5
S (-) =	1,0E-06		
K_s (m/s) =	1,7E-08		
S_s (1/m) =	5,0E-08		

Comments:

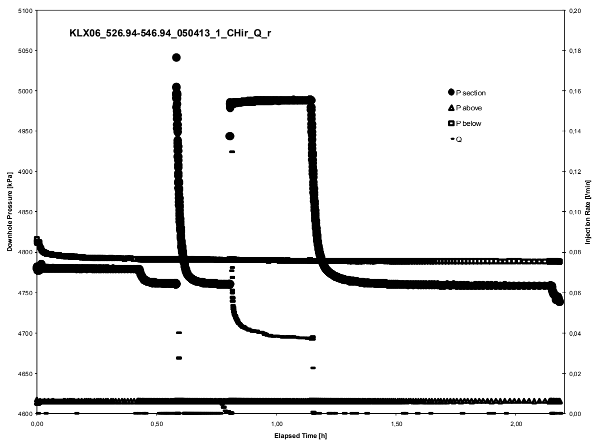
*: IARF not measured

The recommended transmissivity of 3.4E-7 m^2/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 7.0E-7 m^2/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 4586.5 kPa

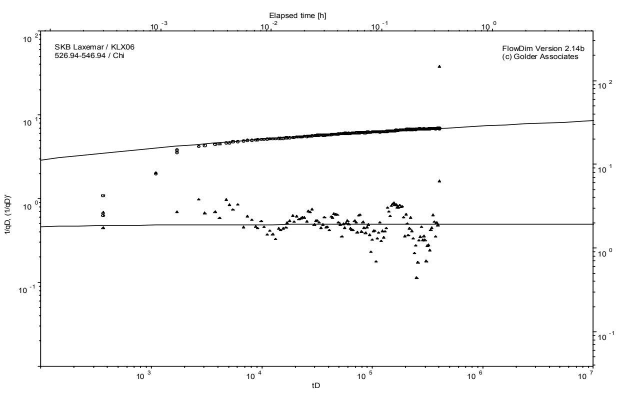
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050413 18:08
Test section from - to (m):	526.92-546.92 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

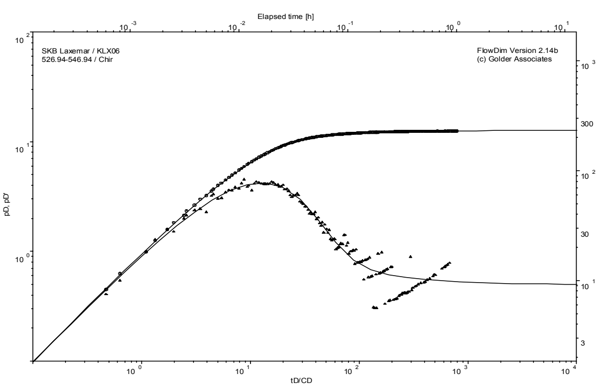
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4779		
p_i (kPa) =	4760		
p_p(kPa) =	4988	p_F (kPa) =	4758
Q_p (m^3/s)=	6,27E-07		
tp (s) =	1200	t_F (s) =	3600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14,4		
Derivative fact.=	0,07	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	2,7E-08		
T_M (m^2/s)=	2,8E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,47	dt_1 (min) =	NA
dt_2 (min) =	6,57	dt_2 (min) =	NA
T (m^2/s) =	3,0E-08	T (m^2/s) =	5,8E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,5E-09	K_s (m/s) =	2,9E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,7E-10
C_D (-) =	NA	C_D (-) =	1,9E-02
ξ (-) =	1,4	ξ (-) =	7,0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	1,47	C (m^3/Pa) =	1,7E-10
dt_2 (min) =	6,57	C_D (-) =	1,9E-02
T_T (m^2/s) =	3,0E-08	ξ (-) =	1,4
S (-) =	1,0E-06		
K_s (m/s) =	1,5E-09		
S_s (1/m) =	5,0E-08		

Comments:

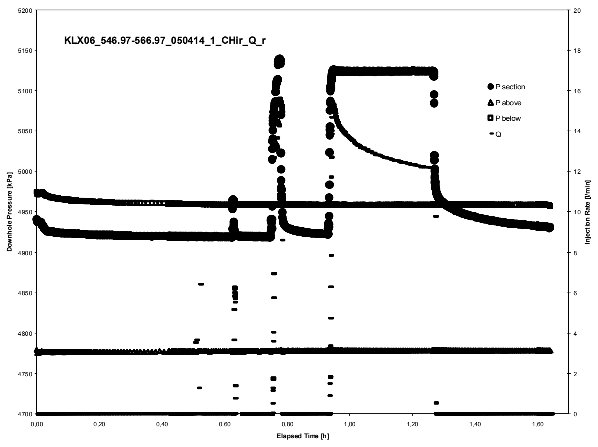
*: IARF not measured

The recommended transmissivity of 3.0E-8 m^2/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-8 to 6.0E-8 m^2/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 4756.6 kPa.

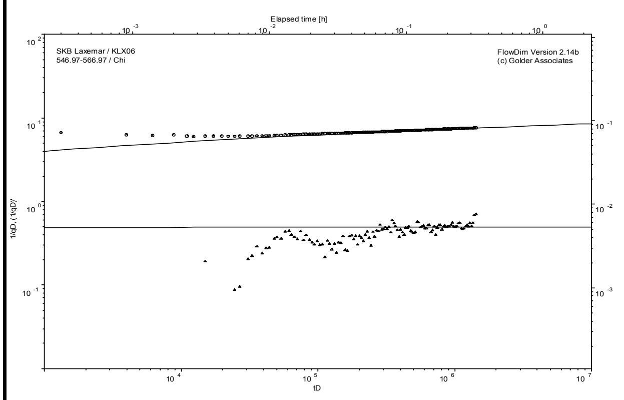
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050414 08:24
Test section from - to (m):	546.97-566.97 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

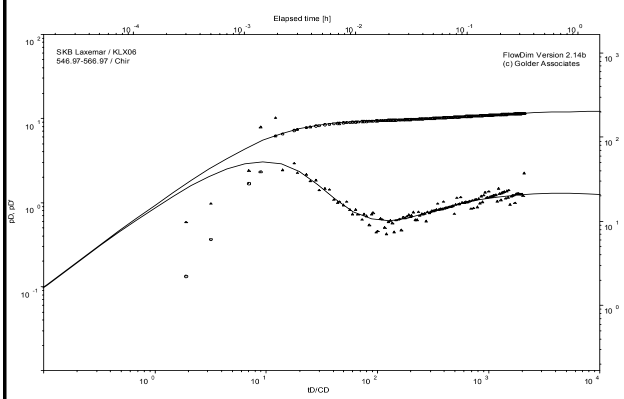
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4937		
p_i (kPa) =	4922		
p_p(kPa) =	5124	p_F (kPa) =	4932
Q_p (m^3/s)=	2,02E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14,8		
Derivative fact.=	0,06	Derivative fact.=	0,04
Results		**Results**	
Q/s (m^2/s)=	9,8E-06		
T_M (m^2/s)=	1,0E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	4,02	dt_1 (min) =	10,95
dt_2 (min) =	17,20	dt_2 (min) =	18,78
T (m^2/s) =	1,2E-05	T (m^2/s) =	9,1E-06
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	6,0E-07	K_s (m/s) =	4,6E-07
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7,3E-09
C_D (-) =	NA	C_D (-) =	8,0E-01
ξ (-) =	-1,0	ξ (-) =	2,4
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	4,02	C (m^3/Pa) =	7,3E-09
dt_2 (min) =	17,2	C_D (-) =	8,0E-01
T_T (m^2/s) =	1,2E-05	ξ (-) =	-1,0
S (-) =	1,0E-06		
K_s (m/s) =	6,0E-07		
S_s (1/m) =	5,0E-08		

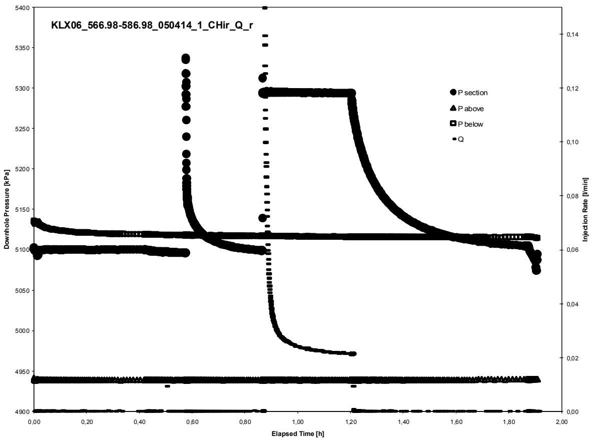
Comments:

The recommended transmissivity of 1.2E-5 m^2/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 9.0E-6 to 3.0E-5 m^2/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 4917.8 kPa.

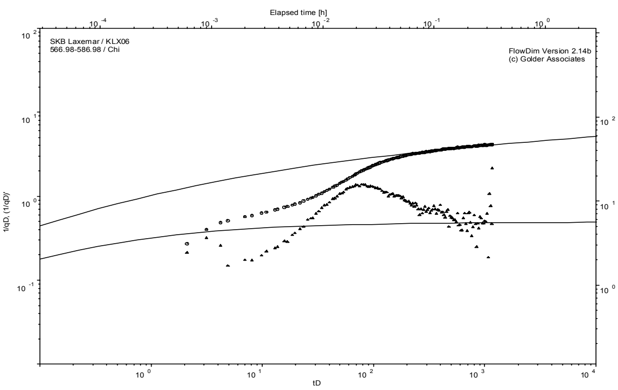
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050414 10:42
Test section from - to (m):	566.98-586.98 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

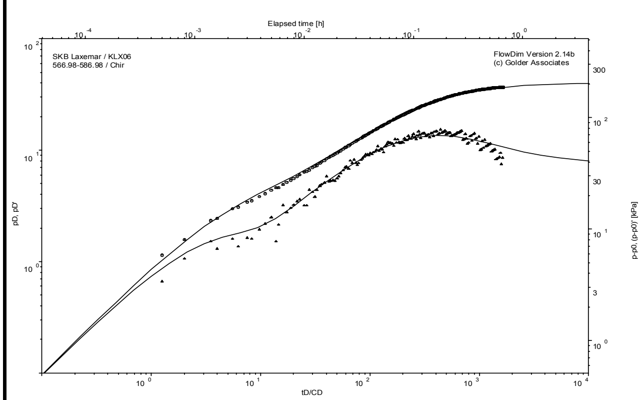
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5101		
p_i (kPa) =	5099		
p_p(kPa) =	5294	p_F (kPa) =	5104
Q_p (m^3/s)=	3,50E-07		
tp (s) =	1200	t_F (s) =	2400
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15,1		
Derivative fact.=	0,08	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	1,8E-08		
T_M (m^2/s)=	1,8E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	9,47	dt_1 (min) =	6,48
dt_2 (min) =	19,77	dt_2 (min) =	18,25
T (m^2/s) =	1,2E-08	T (m^2/s) =	1,0E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	6,0E-10	K_s (m/s) =	5,0E-10
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,4E-10
C_D (-) =	NA	C_D (-) =	1,5E-02
ξ (-) =	-1,1	ξ (-) =	1,0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	9,47	C (m^3/Pa) =	1,4E-10
dt_2 (min) =	19,77	C_D (-) =	1,5E-02
T_T (m^2/s) =	1,2E-08	ξ (-) =	-1,1
S (-) =	1,0E-06		
K_s (m/s) =	6,0E-10		
S_s (1/m) =	5,0E-08		

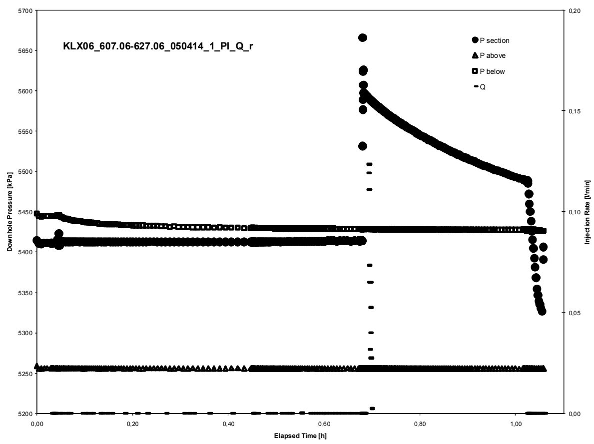
Comments:

The recommended transmissivity of 1.2E-8 m^2/s was derived from the analysis of the CHi phase, which shows the clearest radial flow. The confidence range for the interval transmissivity is estimated to be 8.0E-9 to 3.0E-8 m^2/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 5083.0 kPa.

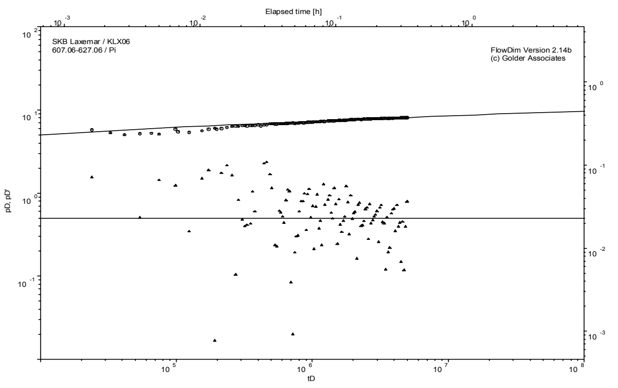
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	PI
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050414 15:07
Test section from - to (m):	607.06-627.06 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period

Not Analysed

Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5414		
p_i (kPa) =	NA		
p_p(kPa) =	NA	p_F (kPa) =	NA
Q_p (m^3/s)=	NA		
tp (s) =	NA	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15,7		
Derivative fact.=		Derivative fact.=	
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	2,43
dt_2 (min) =	NA	dt_2 (min) =	14,27
T (m^2/s) =	NA	T (m^2/s) =	9,3E-11
S (-) =	NA	S (-) =	1,0E-06
K_s (m/s) =	NA	K_s (m/s) =	4,7E-12
S_s (1/m) =	NA	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9,9E-12
C_D (-) =	NA	C_D (-) =	1,1E-03
ξ (-) =	NA	ξ (-) =	5,5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	2,43	C (m^3/Pa) =	9,9E-12
dt_2 (min) =	14,27	C_D (-) =	1,1E-03
T_T (m^2/s) =	9,3E-11	ξ (-) =	5,5
S (-) =	1,0E-06		
K_s (m/s) =	4,7E-12		
S_s (1/m) =	5,0E-08		

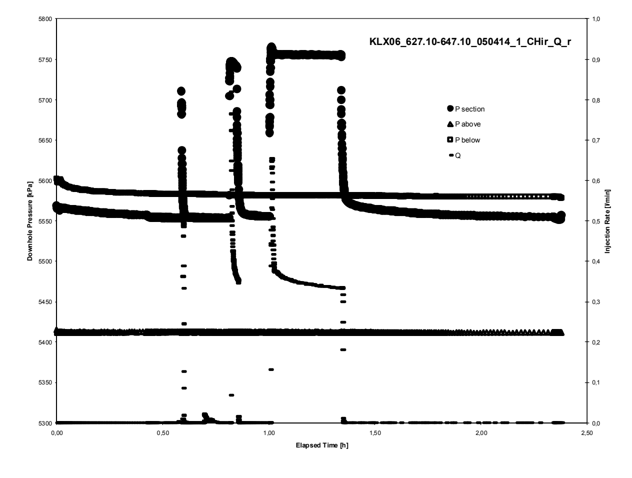
Comments:

The recommended transmissivity of 9.3E-11 m^2/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 5E-11 to 4E-10 m^2/s (the outer zone transmissivity is considered as most representative).The flow dimension displayed during the test is 2. No static pressure could be derived.

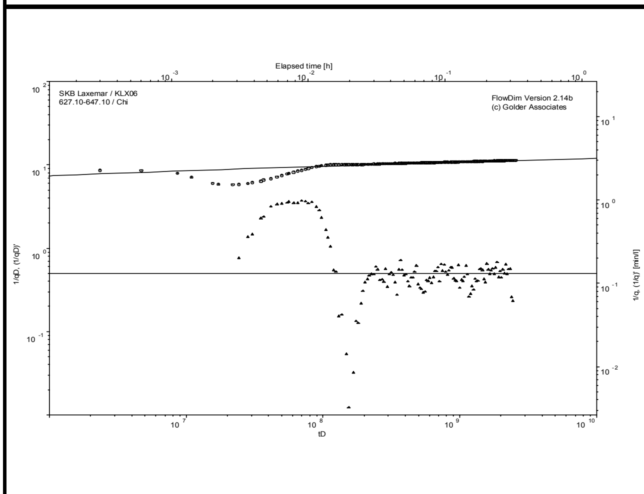
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050414 17:04
Test section from - to (m):	627.10 - 647.10 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

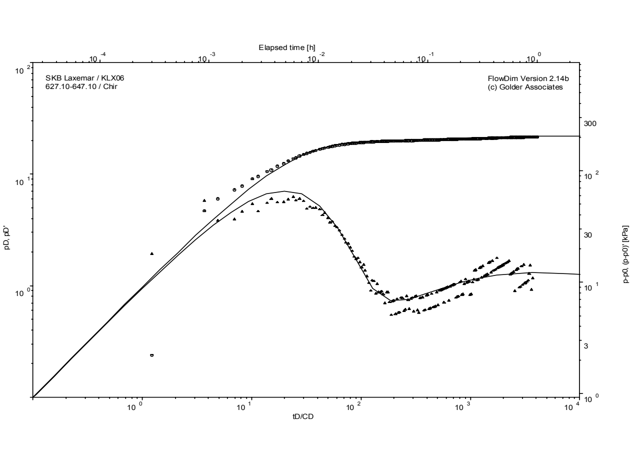
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5568		
p_i (kPa) =	5555		
p_p(kPa) =	5755	p_F (kPa) =	5554
Q_p (m^3/s)=	5,50E-06		
tp (s) =	1200	t_F (s) =	3600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15,9		
Derivative fact.=	0,06	Derivative fact.=	0,07
Results		**Results**	
Q/s (m^2/s)=	2,7E-07		
T_M (m^2/s)=	2,8E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,73	dt_1 (min) =	20,15
dt_2 (min) =	13,69	dt_2 (min) =	50,87
T (m^2/s) =	4,9E-07	T (m^2/s) =	4,4E-07
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,5E-08	K_s (m/s) =	2,2E-08
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5,6E-10
C_D (-) =	NA	C_D (-) =	6,2E-02
ξ (-) =	4,4	ξ (-) =	14,1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1,73	C (m^3/Pa) =	5,6E-10
dt_2 (min) =	13,69	C_D (-) =	6,2E-02
T_T (m^2/s) =	4,9E-07	ξ (-) =	4,4
S (-) =	1,0E-06		
K_s (m/s) =	2,5E-08		
S_s (1/m) =	5,0E-08		

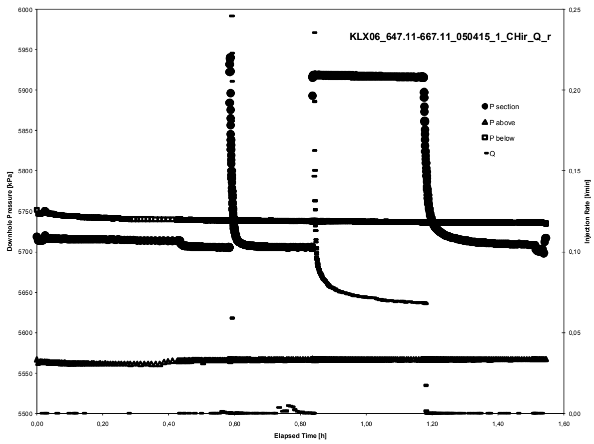
Comments:

The recommended transmissivity of 4.9E-7 m^2/s was derived from the analysis of the CHi phase, which shows the clearest radial flow and best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-7 to 6.0E-7 m^2/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 5551.2 kPa.

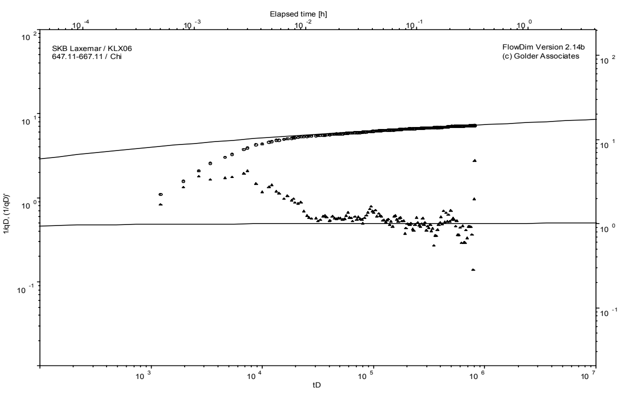
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050415 08:32
Test section from - to (m):	647.11-667.11 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

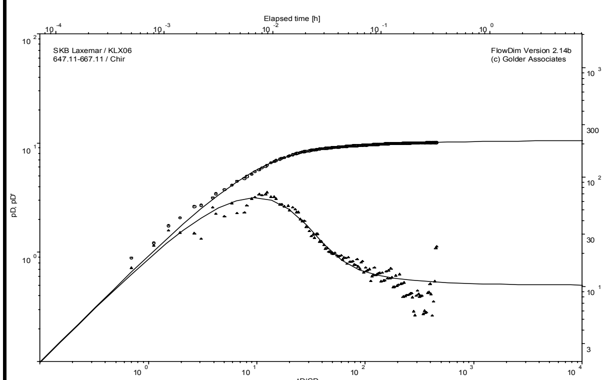
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5713		
p_i (kPa) =	5705		
p_p(kPa) =	5915	p_F (kPa) =	5708
Q_p (m^3/s)=	1,14E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16,2		
Derivative fact.=	0,07	Derivative fact.=	0,06
Results		**Results**	
Q/s (m^2/s)=	5,3E-08		
T_M (m^2/s)=	5,6E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3,43	dt_1 (min) =	4,95
dt_2 (min) =	15,52	dt_2 (min) =	9,82
T (m^2/s) =	6,0E-08	T (m^2/s) =	9,5E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	3,0E-09	K_s (m/s) =	4,8E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,6E-10
C_D (-) =	NA	C_D (-) =	1,8E-02
ξ (-) =	1,4	ξ (-) =	4,5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	3,43	C (m^3/Pa) =	1,6E-10
dt_2 (min) =	15,52	C_D (-) =	1,8E-02
T_T (m^2/s) =	6,0E-08	ξ (-) =	1,4
S (-) =	1,0E-06		
K_s (m/s) =	3,0E-09		
S_s (1/m) =	5,0E-08		

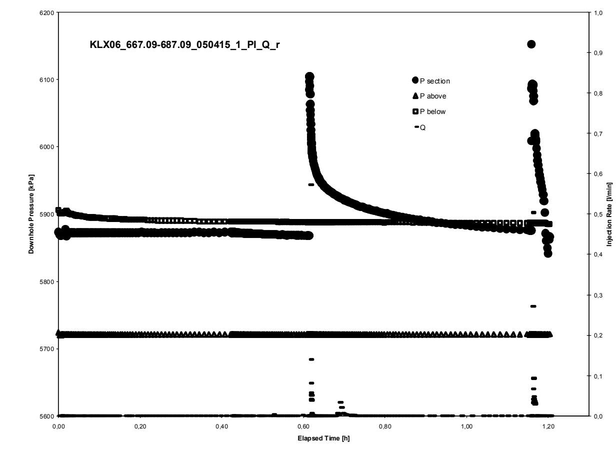
Comments:

The recommended transmissivity of 6.0E-8 m^2/s was derived from the analysis of the CHi phase, which shows the clearest radial flow and best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E-8 to 9.0E-8 m^2/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 5702.8 kPa.

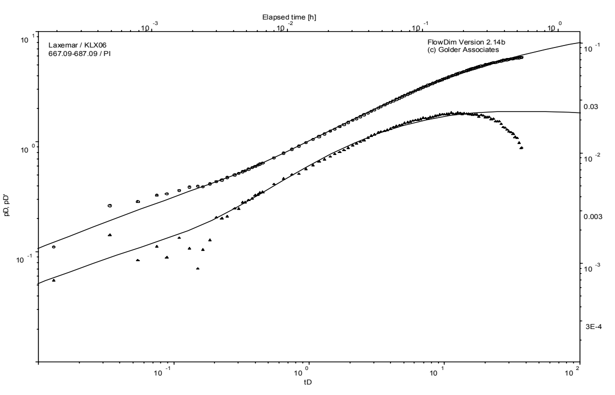
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	PI
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050415 10:40
Test section from - to (m):	667.09-687.09 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period

Not Analysed

Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5868		
p_i (kPa) =	NA		
p_p(kPa) =	NA	p_F (kPa) =	NA
Q_p (m^3/s)=	NA		
tp (s) =	NA	t_F (s) =	1800
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16,4		
Derivative fact.=	NA	Derivative fact.=	0,07
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	19,28
dt_2 (min) =	NA	dt_2 (min) =	32,26
T (m^2/s) =	NA	T (m^2/s) =	5,6E-10
S (-) =	NA	S (-) =	1,0E-06
K_s (m/s) =	NA	K_s (m/s) =	2,8E-11
S_s (1/m) =	NA	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8,1E-11
C_D (-) =	NA	C_D (-) =	8,9E-03
ξ (-) =	NA	ξ (-) =	-2,7
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	8,1E-11
dt_2 (min) =	NA	C_D (-) =	8,9E-03
T_T (m^2/s) =	5,6E-10	ξ (-) =	-2,7
S (-) =	1,0E-06		
K_s (m/s) =	2,8E-11		
S_s (1/m) =	5,0E-08		

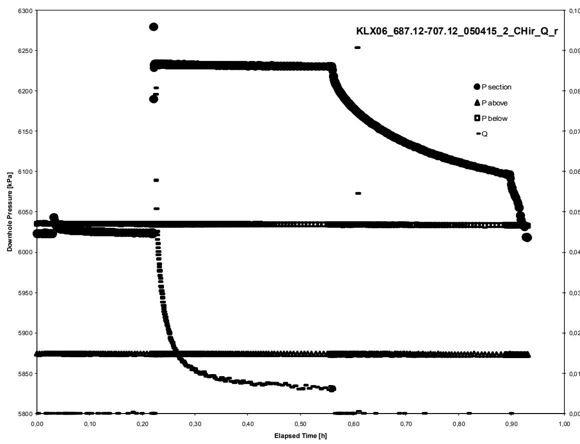
Comments:

The recommended transmissivity of 5.6E-10 m^2/s was derived from the analysis of the Pi phase (outer zone). 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-10 to 1E-9 m^2/s.The flow dimension displayed during the test is 2. No static pressure could be derived

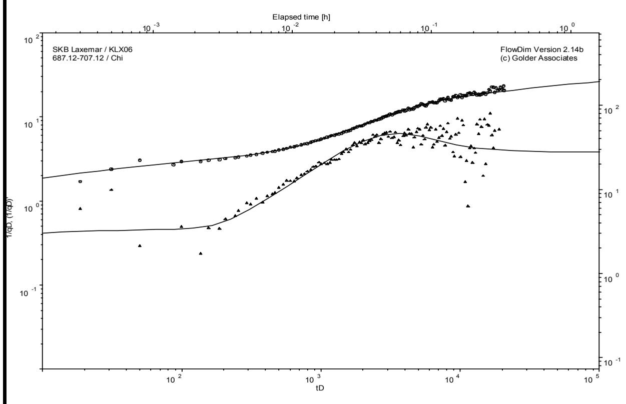
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX06	Test start:	050415 13:52
Test section from - to (m):	687.12-707.12 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

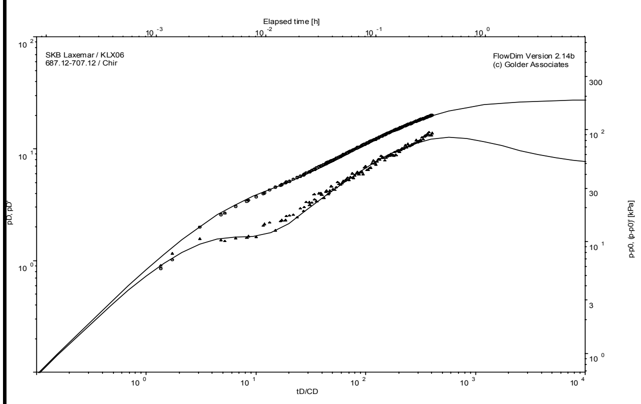
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6023		
p_i (kPa) =	6023		
p_p(kPa) =	6230	p_F (kPa) =	6097
Q_p (m^3/s)=	1,02E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16,7		
Derivative fact.=	0,08	Derivative fact.=	0,04
Results		**Results**	
Q/s (m^2/s)=	4,8E-09		
T_M (m^2/s)=	5,0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	7,50	dt_1 (min) =	*
dt_2 (min) =	16,68	dt_2 (min) =	*
T (m^2/s) =	2,2E-09	T (m^2/s) =	4,0E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,1E-10	K_s (m/s) =	2,0E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7,4E-11
C_D (-) =	NA	C_D (-) =	8,2E-03
ξ (-) =	0,2	ξ (-) =	1,3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	7,5	C (m^3/Pa) =	7,4E-11
dt_2 (min) =	16,68	C_D (-) =	8,2E-03
T_T (m^2/s) =	2,2E-09	ξ (-) =	0,2
S (-) =	1,0E-06		
K_s (m/s) =	1,1E-10		
S_s (1/m) =	5,0E-08		

Comments:

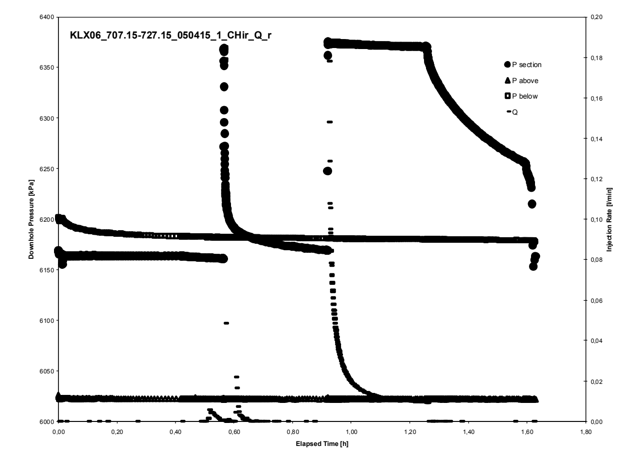
*: IARF not measured

The recommended transmissivity of 2.2E-9 m2/s was derived from the analysis of the CHi 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 6.0E-9 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.

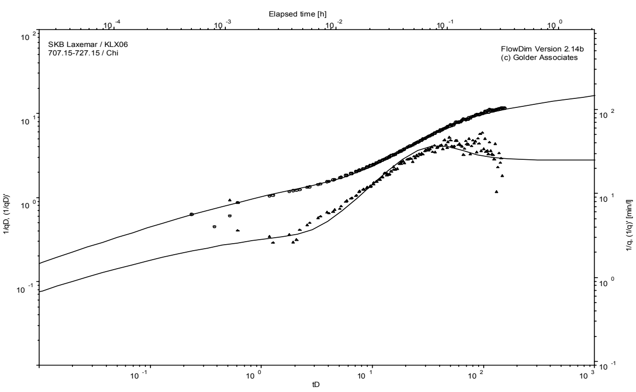
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050415 15:22
Test section from - to (m):	707.15-727.15 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

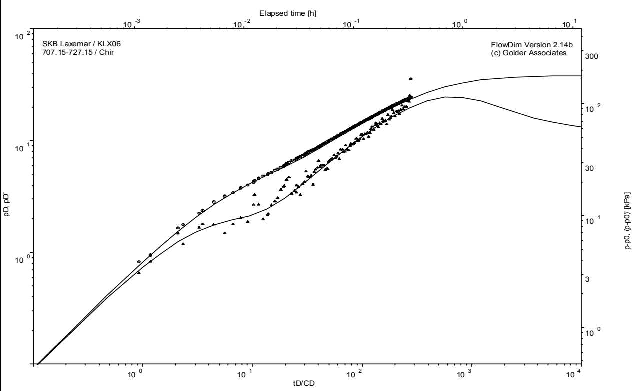
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6169		
p_i (kPa) =	6169		
p_p(kPa) =	6370	p_F (kPa) =	6255
Q_p (m^3/s)=	1,62E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16,9		
Derivative fact.=	0,05	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	7,9E-09		
T_M (m^2/s)=	8,3E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	6,97	dt_1 (min) =	*
dt_2 (min) =	14,83	dt_2 (min) =	*
T (m^2/s) =	2,4E-09	T (m^2/s) =	4,5E-09
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,2E-10	K_s (m/s) =	2,3E-10
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2,9E-10
C_D (-) =	NA	C_D (-) =	3,2E-02
ξ (-) =	2,2	ξ (-) =	1,8
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	6,97	C (m^3/Pa) =	2,9E-10
dt_2 (min) =	14,83	C_D (-) =	3,2E-02
T_T (m^2/s) =	2,4E-09	ξ (-) =	2,2
S (-) =	1,0E-06		
K_s (m/s) =	1,2E-10		
S_s (1/m) =	5,0E-08		

Comments:

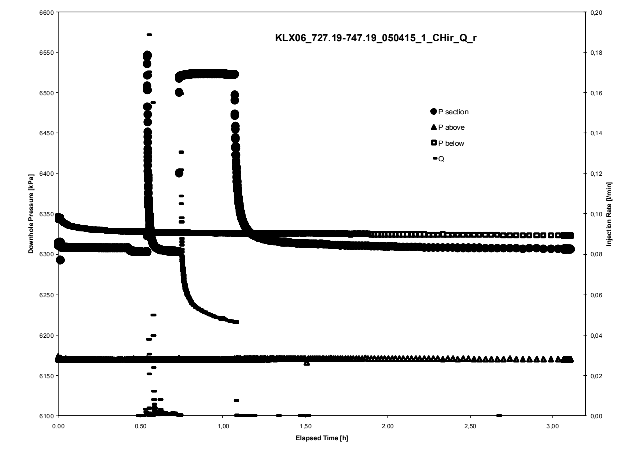
*: IARF not measured

The recommended transmissivity of 2.4E-9 m^2/s was derived from the analysis of the CHi phase (outer zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-9 to 7.0E-9 m^2/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.

Test Summary Sheet

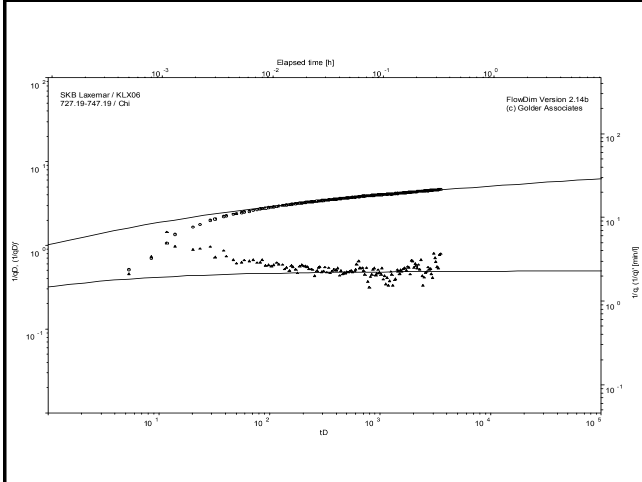
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050415 17:48
Test section from - to (m):	727.19-747.19 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

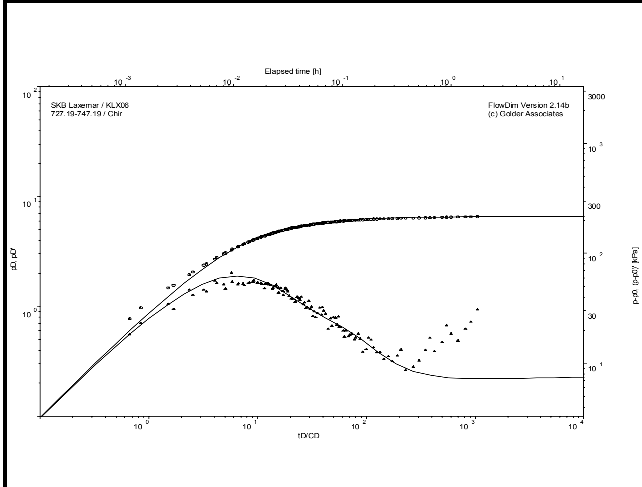


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6312		
p_i (kPa) =	6303		
p_p(kPa) =	6522	p_F (kPa) =	6306
Q_p (m^3/s)=	7,67E-07		
tp (s) =	1200	t_F (s) =	7200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17,2		
Derivative fact.=	0,04	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	3,4E-08		
T_M (m^2/s)=	3,6E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,50	dt_1 (min) =	*
dt_2 (min) =	15,93	dt_2 (min) =	*
T (m^2/s) =	2,6E-08	T (m^2/s) =	4,3E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,3E-09	K_s (m/s) =	2,2E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1,6E-10
C_D (-) =	NA	C_D (-) =	1,8E-02
ξ (-) =	-0,9	ξ (-) =	1,2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	1,5	C (m^3/Pa) =	1,6E-10
dt_2 (min) =	15,93	C_D (-) =	1,8E-02
T_T (m^2/s) =	2,6E-08	ξ (-) =	-0,9
S (-) =	1,0E-06		
K_s (m/s) =	1,3E-09		
S_s (1/m) =	5,0E-08		

Comments:

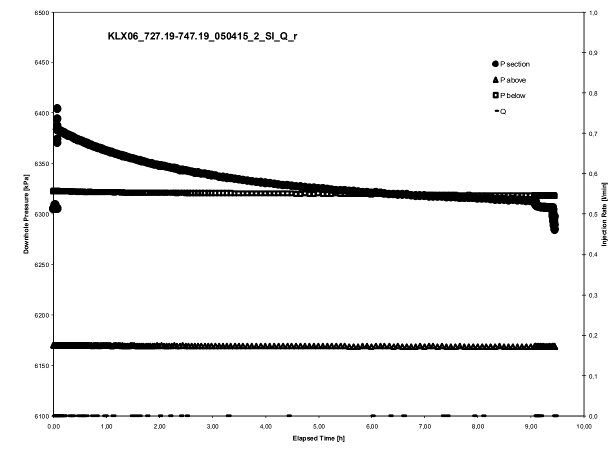
*: IARF not measured

The recommended transmissivity of 2.6E-8 m^2/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-8 to 5.0E-8 m^2/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 6304.2 kPa.

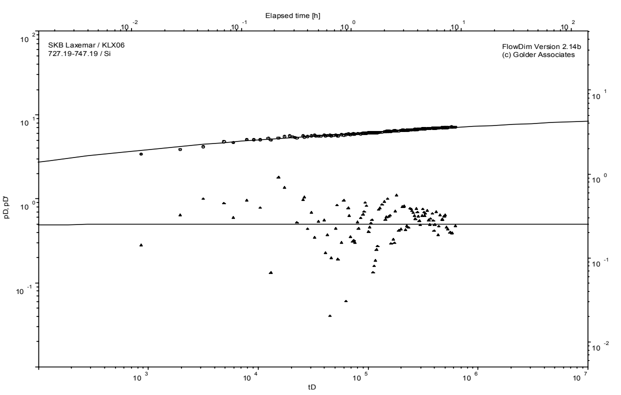
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	SI
Area:	Laxemar	Test no:	2
Borehole ID:	KLX06	Test start:	050415 21:45
Test section from - to (m):	727.19-747.19 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period

Not Analysed

Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	6313		
p_i (kPa) =	6305		
p_p(kPa) =	6313	p_F (kPa) =	6306
Q_p (m^3/s)=	NA		
tp (s) =	32400	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17,2		
Derivative fact.=	0,04	Derivative fact.=	NA
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	33,93	dt_1 (min) =	NA
dt_2 (min) =	344,16	dt_2 (min) =	NA
T (m^2/s) =	4,0E-08	T (m^2/s) =	NA
S (-) =	1,0E-06	S (-) =	NA
K_s (m/s) =	2,0E-09	K_s (m/s) =	NA
S_s (1/m) =	5,0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	4,6E-08	C (m^3/Pa) =	NA
C_D (-) =	5,1E+00	C_D (-) =	NA
ξ (-) =	-0,2	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

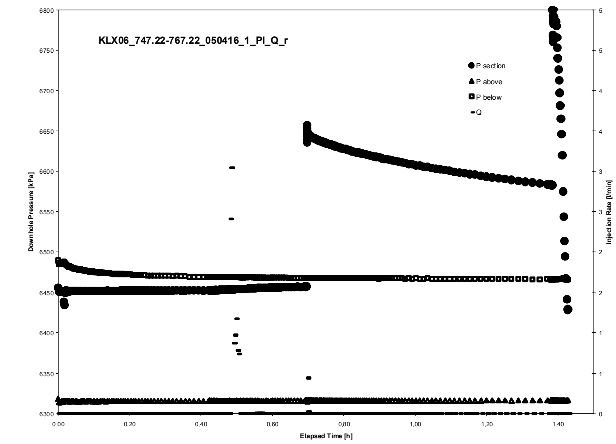
Selected representative parameters.			
dt_1 (min) =	33,93	C (m^3/Pa) =	4,6E-08
dt_2 (min) =	344,16	C_D (-) =	5,1E+00
T_T (m^2/s) =	4,0E-08	ξ (-) =	-0,2
S (-) =	1,0E-06		
K_s (m/s) =	2,0E-09		
S_s (1/m) =	5,0E-08		

Comments:

Test Summary Sheet

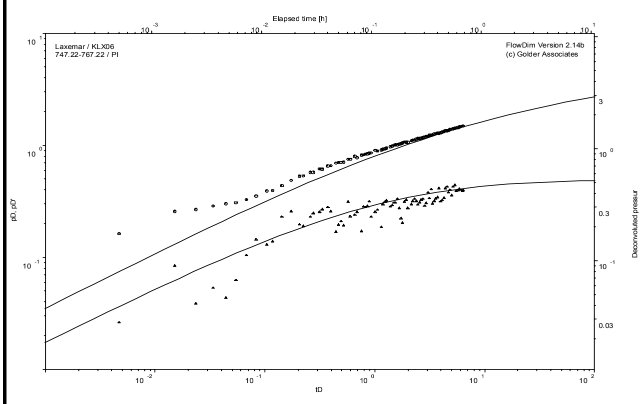
Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050416 08:51
Test section from - to (m):	747.22-767.22 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6456		
p_i (kPa) =	6457		
p_p(kPa) =	NA	p_F (kPa) =	NA
Q_p (m^3/s)=	NA		
tp (s) =	NA	t_F (s) =	2460
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=	0		
$Temp_w$(gr C)=	17,4		
Derivative fact.=	0	Derivative fact.=	0,05
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	*
dt_2 (min) =	NA	dt_2 (min) =	*
T (m^2/s) =	NA	T (m^2/s) =	1,2E-10
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	NA	K_s (m/s) =	6,1E-12
S_s (1/m) =	NA	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3,0E-10
C_D (-) =	NA	C_D (-) =	3,3E-02
ξ (-) =	NA	ξ (-) =	-2,2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.			
dt_1 (min) =	12,37	C (m^3/Pa) =	3,0E-10
dt_2 (min) =	40,81	C_D (-) =	3,3E-02
T_T (m^2/s) =	1,2E-10	ξ (-) =	-2,2
S (-) =	1,0E-06		
K_s (m/s) =	6,1E-12		
S_s (1/m) =	5,0E-08		

Comments:

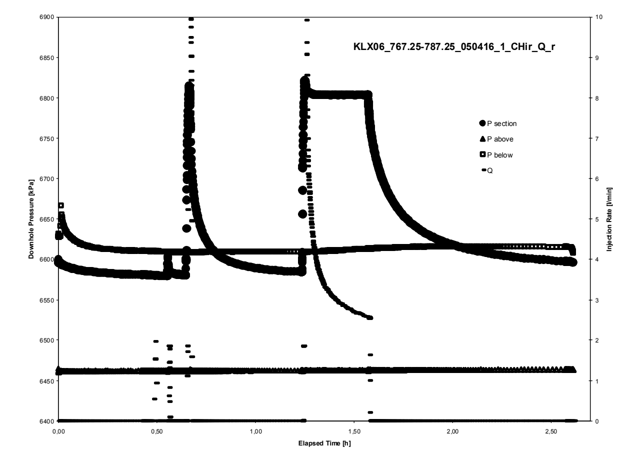
*: IARF not measured

The recommended transmissivity of 1.2E-10 m^2/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 3E-10 m^2/s. A flow dimension of 2 was assumed. No static pressure could be derived.

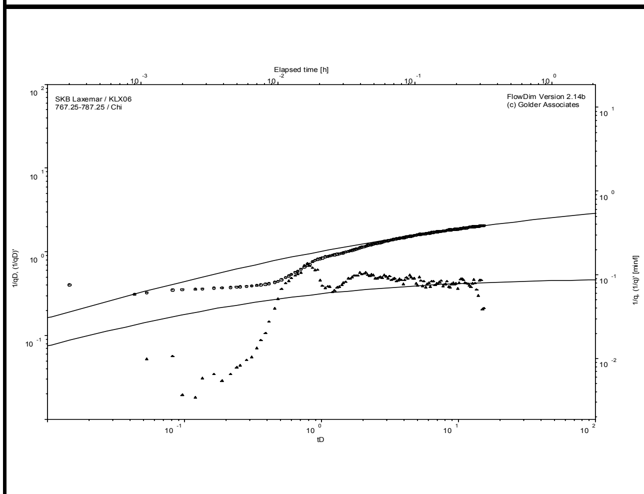
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050416 10:54
Test section from - to (m):	767.25-787.25 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

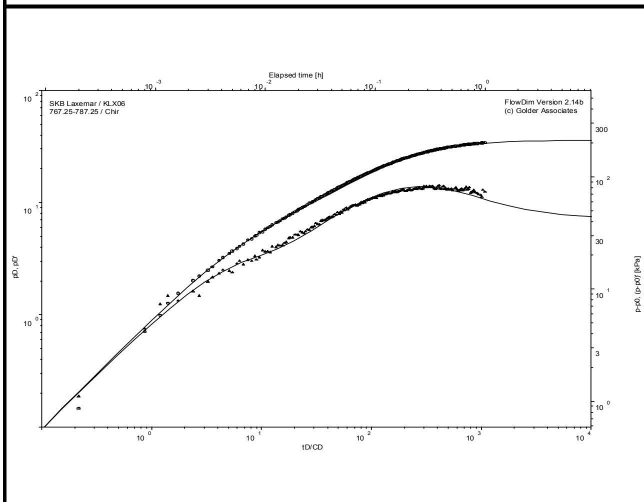
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6600		
p_i (kPa) =	6584		
p_p(kPa) =	6803	p_F (kPa) =	6597
Q_p (m^3/s)=	4,25E-05		
tp (s) =	1200	t_F (s) =	3600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17,7		
Derivative fact.=	0,05	Derivative fact.=	0,08
Results		**Results**	
Q/s (m^2/s)=	1,9E-06		
T_M (m^2/s)=	2,0E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	7,57	dt_1 (min) =	*
dt_2 (min) =	16,52	dt_2 (min) =	*
T (m^2/s) =	6,4E-07	T (m^2/s) =	1,2E-06
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	3,2E-08	K_s (m/s) =	5,9E-08
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3,5E-08
C_D (-) =	NA	C_D (-) =	3,9E+00
ξ (-) =	-5,2	ξ (-) =	1,6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	7,57	C (m^3/Pa) =	3,5E-08
dt_2 (min) =	16,52	C_D (-) =	3,9E+00
T_T (m^2/s) =	6,4E-07	ξ (-) =	-5,2
S (-) =	1,0E-06		
K_s (m/s) =	3,2E-08		
S_s (1/m) =	5,0E-08		

Comments:

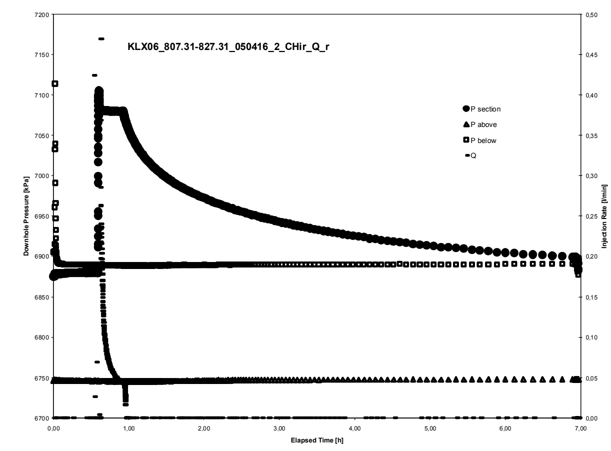
*: IARF not measured

The recommended transmissivity of 6.4E-7 m^2/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 5.0E-7 to 2.0E-6 m^2/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 6577.8 kPa.

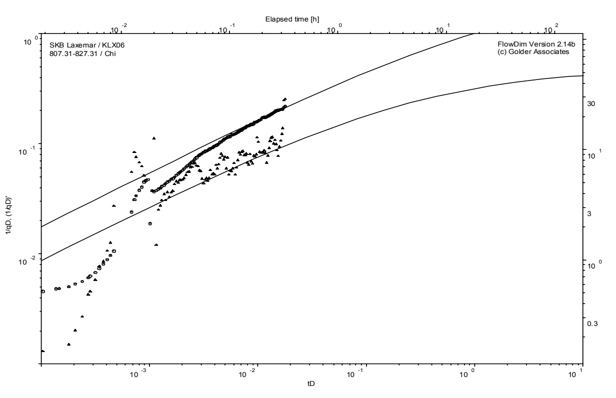
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX06	Test start:	050416 17:33
Test section from - to (m):	807.31-827.31 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

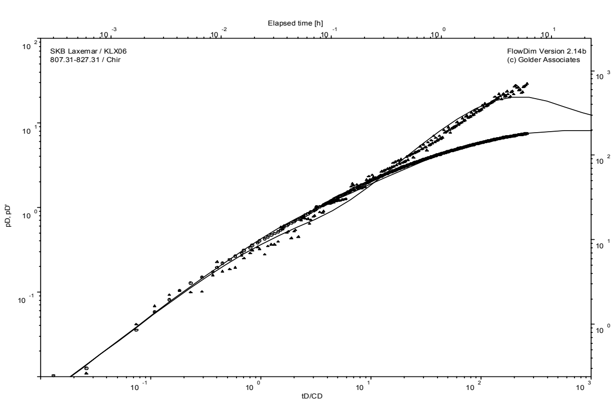
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	6876		
p_i (kPa) =	6880		
p_p(kPa) =	7079	p_F (kPa) =	6899
Q_p (m^3/s)=	6,33E-07		
tp (s) =	1200	t_F (s) =	21600
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	18,2		
Derivative fact.=	0,03	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	3,1E-08		
T_M (m^2/s)=	3,3E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	*
dt_2 (min) =	*	dt_2 (min) =	*
T (m^2/s) =	1,2E-09	T (m^2/s) =	7,7E-09
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	5,8E-11	K_s (m/s) =	3,8E-10
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6,9E-09
C_D (-) =	NA	C_D (-) =	7,6E-01
ξ (-) =	-5,4	ξ (-) =	-0,2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	*	C (m^3/Pa) =	6,9E-09
dt_2 (min) =	*	C_D (-) =	7,6E-01
T_T (m^2/s) =	7,7E-09	ξ (-) =	-0,2
S (-) =	1,0E-06		
K_s (m/s) =	3,8E-10		
S_s (1/m) =	5,0E-08		

Comments:

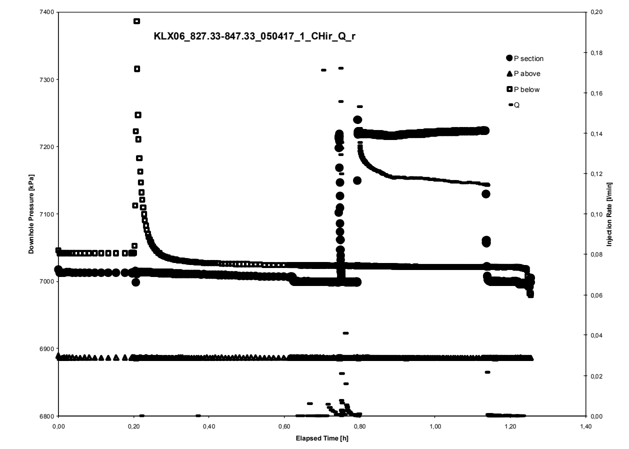
*: IARF not measured

The recommended transmissivity of 7.7E-9 m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the smoothest data and derivative quality. Due to the fact that none of the phases reached radial flow, the confidence range for the interval transmissivity is estimated to be 4.0E-9 to 3.0E-8 m^2/s. The flow dimension assumed for this 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 6866.7 kPa.

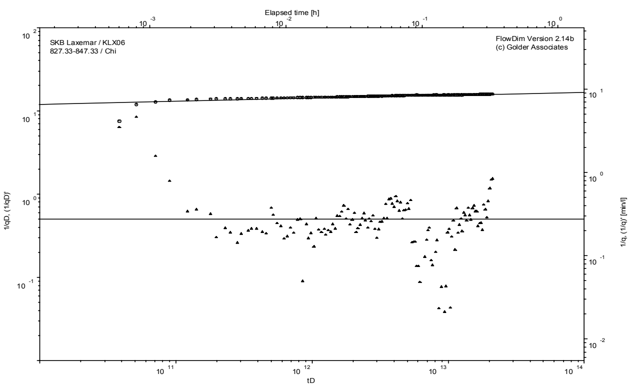
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050417 08:42
Test section from - to (m):	827.33-847.33 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

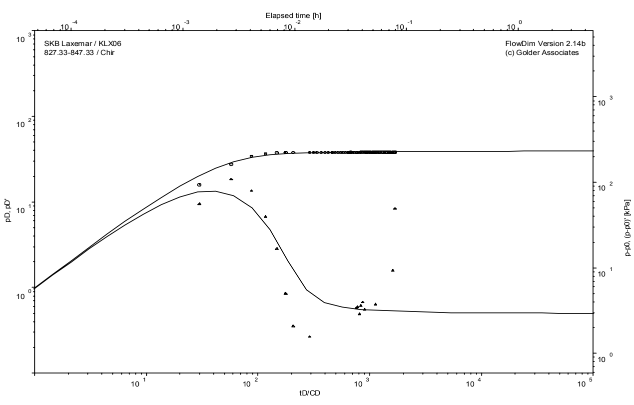
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	7013		
p_i (kPa) =	6999		
p_p(kPa) =	7223	p_F (kPa) =	7000
Q_p (m^3/s)=	1,92E-06		
tp (s) =	1200	t_F (s) =	300
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	18,4		
Derivative fact.=	0,04	Derivative fact.=	0,03
Results		**Results**	
Q/s (m^2/s)=	8,4E-08		
T_M (m^2/s)=	8,8E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1,67	dt_1 (min) =	*
dt_2 (min) =	13,76	dt_2 (min) =	*
T (m^2/s) =	2,1E-07	T (m^2/s) =	5,3E-06
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,1E-08	K_s (m/s) =	2,6E-07
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5,7E-11
C_D (-) =	NA	C_D (-) =	6,3E-03
ξ (-) =	9,3	ξ (-) =	32,5
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	1,67	C (m^3/Pa) =	5,7E-11
dt_2 (min) =	13,76	C_D (-) =	6,3E-03
T_T (m^2/s) =	2,1E-07	ξ (-) =	9,3
S (-) =	1,0E-06		
K_s (m/s) =	1,1E-08		
S_s (1/m) =	5,0E-08		

Comments:

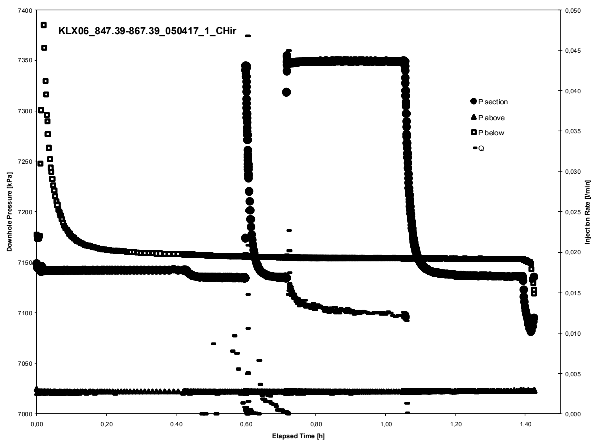
*: IARF not measured

The recommended transmissivity of 2.1E-7 m^2/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 9.0E-8 to 5.0E-7 m^2/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 6998.4 kPa.

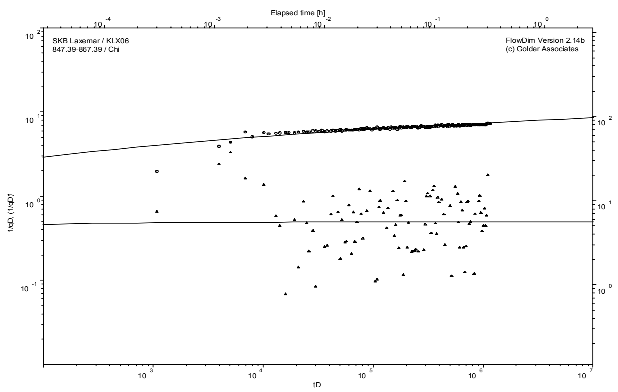
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050417 10:29
Test section from - to (m):	847.39-867.39 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

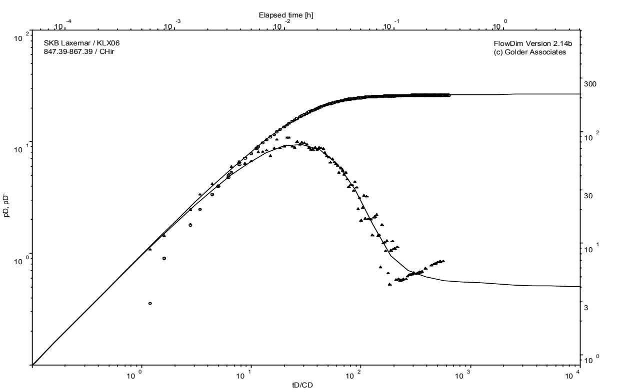
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	7148		
p_i (kPa) =	7135		
p_p(kPa) =	7349	p_F (kPa) =	7135
Q_p (m^3/s)=	2,00E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	18,6		
Derivative fact.=	0,06	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	9,2E-09		
T_M (m^2/s)=	9,6E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0,86	dt_1 (min) =	NA
dt_2 (min) =	17,47	dt_2 (min) =	NA
T (m^2/s) =	1,1E-08	T (m^2/s) =	4,8E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	5,4E-10	K_s (m/s) =	2,4E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4,8E-11
C_D (-) =	NA	C_D (-) =	5,3E-03
ξ (-) =	2,5	ξ (-) =	32,6
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0,864	C (m^3/Pa) =	4,83E-11
dt_2 (min) =	17,466	C_D (-) =	5,32E-03
T_T (m^2/s) =	1,1E-08	ξ (-) =	2,5
S (-) =	1,0E-06		
K_s (m/s) =	5,4E-10		
S_s (1/m) =	5,0E-08		

Comments:

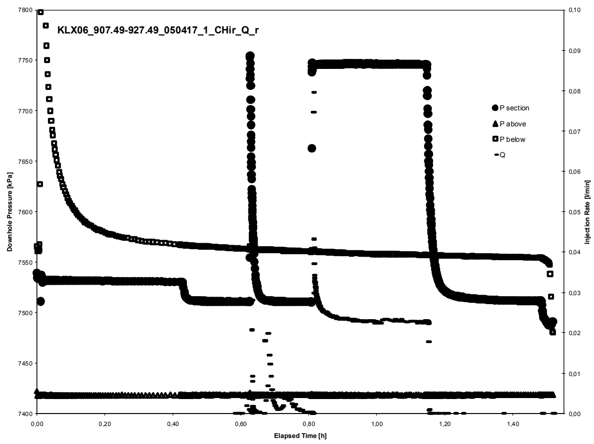
*: IARF not measured

The recommended transmissivity of 1.1E-8 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality and radial flow. The confidence range for the interval transmissivity is estimated to be 8.0E-9 to 4.0E-8 m^2/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 7133.9 kPa.

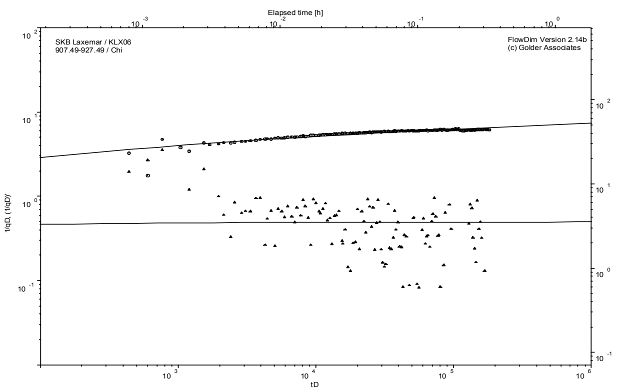
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050417 16:15
Test section from - to (m):	907.49-927.49 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

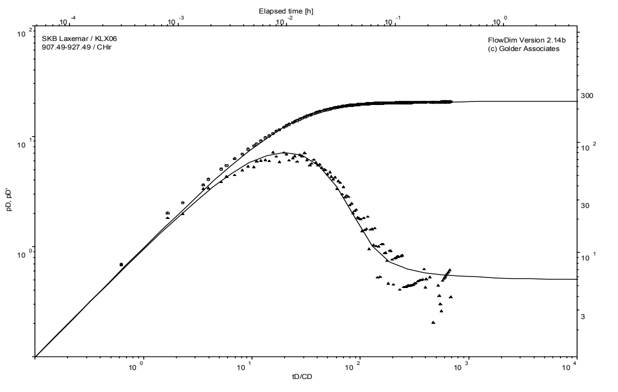
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	7565		
p_i (kPa) =	7510		
p_p(kPa) =	7745	p_F (kPa) =	7511
Q_p (m^3/s)=	3,67E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	19,3		
Derivative fact.=	0,04	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	1,5E-08		
T_M (m^2/s)=	1,6E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2,44	dt_1 (min) =	*
dt_2 (min) =	17,10	dt_2 (min) =	*
T (m^2/s) =	1,6E-08	T (m^2/s) =	5,5E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	7,8E-10	K_s (m/s) =	2,7E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6,0E-11
C_D (-) =	NA	C_D (-) =	6,6E-03
ξ (-) =	1,3	ξ (-) =	15,2
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	2,44	C (m^3/Pa) =	6,0E-11
dt_2 (min) =	17,10	C_D (-) =	6,6E-03
T_T (m^2/s) =	1,6E-08	ξ (-) =	1,3
S (-) =	1,0E-06		
K_s (m/s) =	7,8E-10		
S_s (1/m) =	5,0E-08		

Comments:

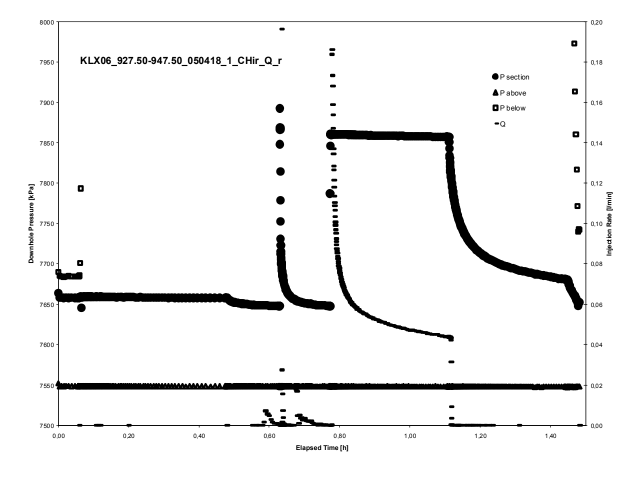
*: IARF not measured

The recommended transmissivity of 1.6E-8 m^2/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 8.0E-9 to 4.0E-8 m^2/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 7508.7 kPa

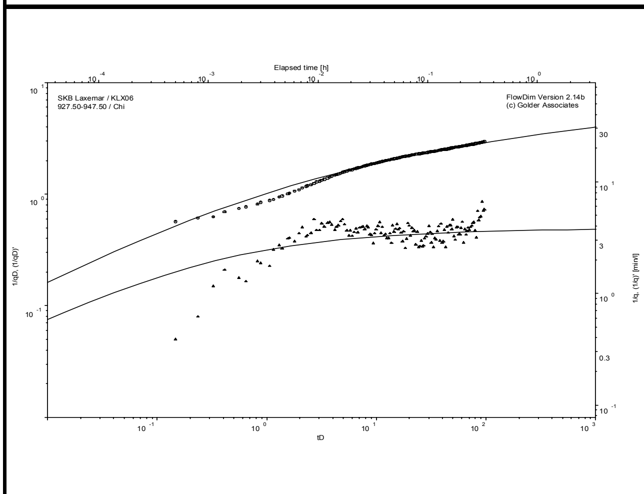
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050418 08:42
Test section from - to (m):	927.50-947.50 m	Responsible for test execution:	Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

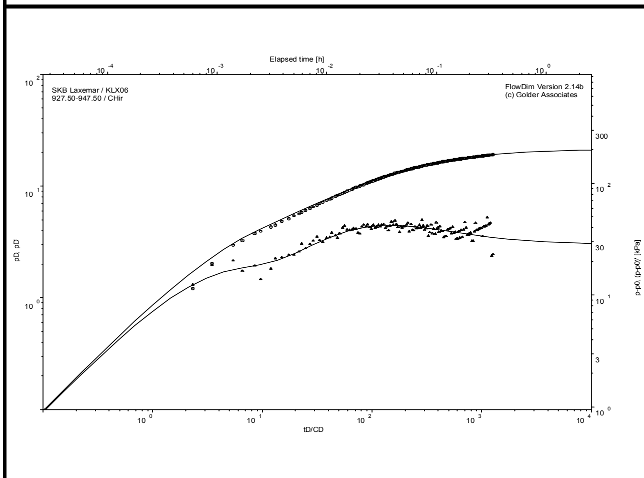
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	7658		
p_i (kPa) =	7647		
p_p(kPa) =	7857	p_F (kPa) =	7680
Q_p (m^3/s)=	7,22E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	19,5		
Derivative fact.=	0,02	Derivative fact.=	0,02
Results		**Results**	
Q/s (m^2/s)=	3,4E-08		
T_M (m^2/s)=	3,5E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3,63	dt_1 (min) =	6,83
dt_2 (min) =	16,26	dt_2 (min) =	13,27
T (m^2/s) =	1,6E-08	T (m^2/s) =	2,6E-08
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	8,0E-10	K_s (m/s) =	1,3E-09
S_s (1/m) =	5,0E-08	S_s (1/m) =	5,0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9,1E-11
C_D (-) =	NA	C_D (-) =	1,0E-02
ξ (-) =	-2,5	ξ (-) =	1,3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	6,83	C (m^3/Pa) =	9,1E-11
dt_2 (min) =	13,27	C_D (-) =	1,0E-02
T_T (m^2/s) =	2,6E-08	ξ (-) =	1,3
S (-) =	1,0E-06		
K_s (m/s) =	1,3E-09		
S_s (1/m) =	5,0E-08		

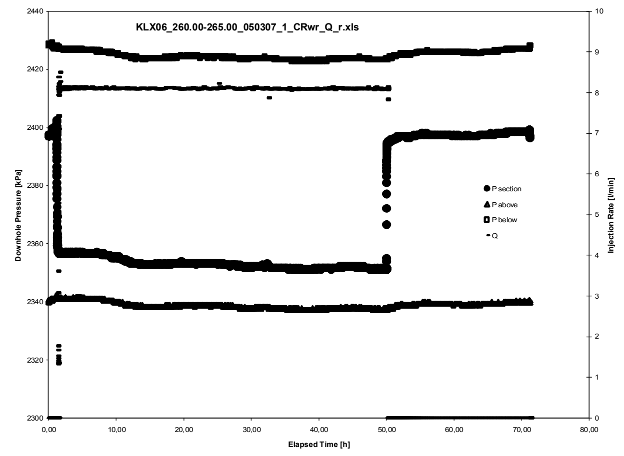
Comments:

The recommended transmissivity of 2.6E-8 m^2/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-9 to 4.0E-8 m^2/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 7652.2 kPa.

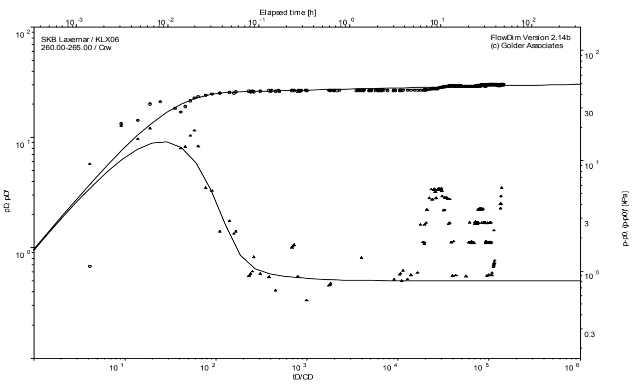
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050307 08:59
Test section from - to (m):	260.00-265.00	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

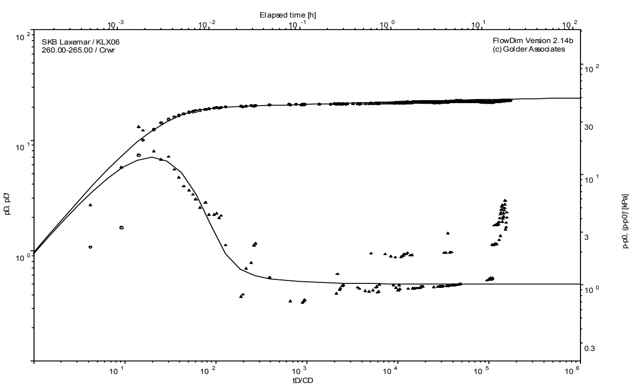
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2397		
p_i (kPa) =	2400		
p_p(kPa) =	2351	p_F (kPa) =	2398
Q_p (m^3/s)=	1,35E-04		
tp (s) =	175392	t_F (s) =	79800
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11		
Derivative fact.=	0,12	Derivative fact.=	0,12
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	7,74	dt_1 (min) =	2,78
dt_2 (min) =	256,80	dt_2 (min) =	678,00
T (m^2/s) =	1,3E-05	T (m^2/s) =	1,0E-04
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,6E-06	K_s (m/s) =	2,1E-05
S_s (1/m) =	2,0E-07	S_s (1/m) =	2,0E-07
C (m^3/Pa) =	1,0E-07	C (m^3/Pa) =	2,9E-08
C_D (-) =	1,1E+01	C_D (-) =	3,1E+00
ξ (-) =	17,2	ξ (-) =	12,1
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	2,78	C (m^3/Pa) =	2,9E-08
dt_2 (min) =	678,00	C_D (-) =	3,1E+00
T_T (m^2/s) =	1,0E-04	ξ (-) =	12,1
S (-) =	1,0E-06		
K_s (m/s) =	2,1E-05		
S_s (1/m) =	2,0E-07		

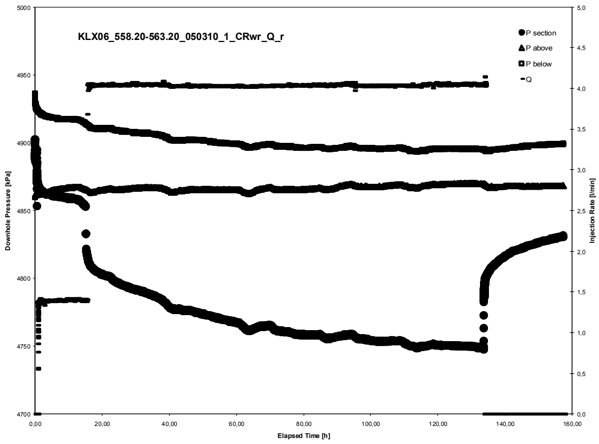
Comments:

The recommended transmissivity of 1.0E-4 m2/s was derived from the analysis of the CRwr phase, which shows the best data and derivative quality. The confidence range for the transmissivity is estimated to be 8.0E-5 to 3.0E-4 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHwr phase using straight line extrapolation in the Horner plot to a value of 2399.4 kPa.

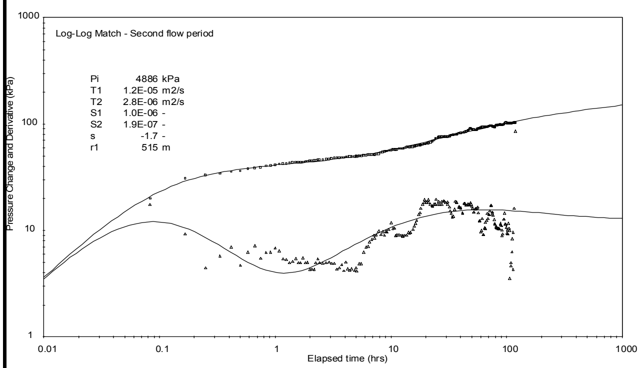
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050310 18:56
Test section from - to (m):	558.20-563.20 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

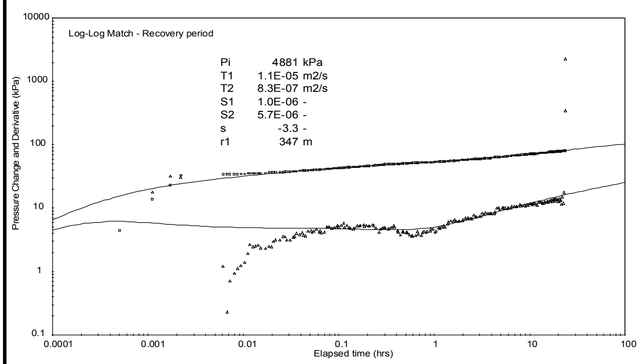
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4901		
p_i (kPa) =	4884		
p_p(kPa) =	4748	p_F (kPa) =	4831
Q_p (m^3/s)=	6,68E-05		
tp (s) =	479400	t_F (s) =	85020
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14,5		
Derivative fact.=	0,05	Derivative fact.=	0,05
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2,4	dt_1 (min) =	1,2
dt_2 (min) =	300,0	dt_2 (min) =	48,0
T (m^2/s) =	1,2E-05	T (m^2/s) =	1,1E-05
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	2,4E-06	K_s (m/s) =	2,2E-06
S_s (1/m) =	2,0E-07	S_s (1/m) =	2,0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2,2E-09
C_D (-) =	NA	C_D (-) =	2,4E-01
ξ (-) =	-1,7	ξ (-) =	-3,3
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1,20	C (m^3/Pa) =	2,2E-09
dt_2 (min) =	48,00	C_D (-) =	2,4E-01
T_T (m^2/s) =	1,1E-05	ξ (-) =	-3,3
S (-) =	1,0E-06		
K_s (m/s) =	2,2E-06		
S_s (1/m) =	2,0E-07		

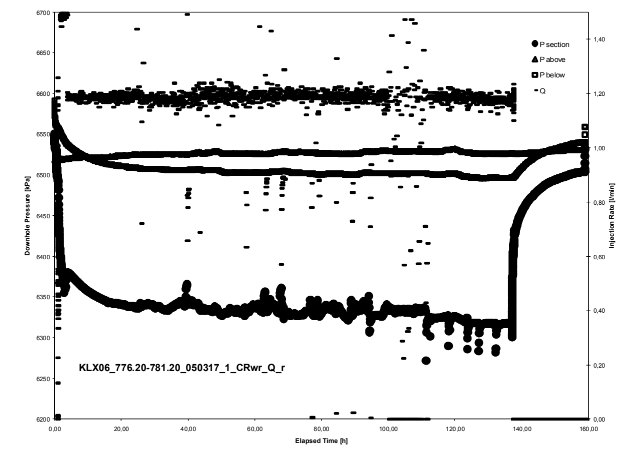
Comments:

The recommended transmissivity of 1.1E-5 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows good data and derivative quality. The confidence range for the transmissivity is estimated to be 6.0E-6 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 CHwr phase using straight line extrapolation in the Horner plot to a value of 4881.0 kPa.

Test Summary Sheet

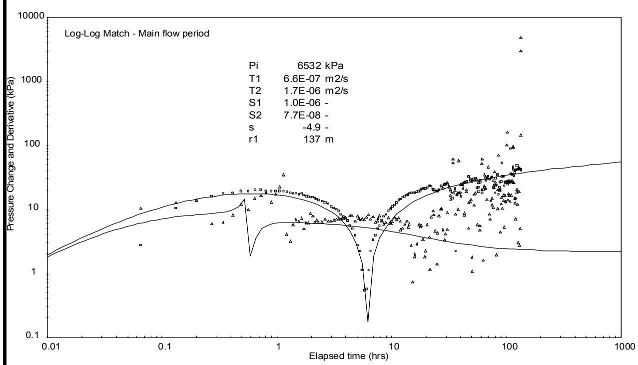
Project:	Oskarshamn site investigation	Test type:[1]	CRwr
Area:	Laxemar	Test no:	1
Borehole ID:	KLX06	Test start:	050317 16:07
Test section from - to (m):	776.20-781.20 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0,076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

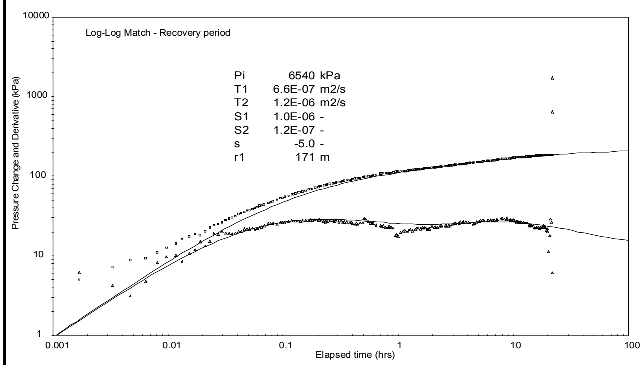


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	6549		
p_i (kPa) =	6529		
p_p(kPa) =	6317	p_F (kPa) =	6506
Q_p (m^3/s)=	1,97E-05		
tp (s) =	491820	t_F (s) =	77400
S el S^* (-)=	1,00E-06	S el S^* (-)=	1,00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	17,6		
Derivative fact.=	0,05	Derivative fact.=	0,05
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	60,0
dt_2 (min) =	NA	dt_2 (min) =	480,0
T (m^2/s) =	6,6E-07	T (m^2/s) =	6,6E-07
S (-) =	1,0E-06	S (-) =	1,0E-06
K_s (m/s) =	1,3E-07	K_s (m/s) =	1,3E-07
S_s (1/m) =	2,0E-07	S_s (1/m) =	2,0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	7,0E-08
C_D (-) =	NA	C_D (-) =	7,7E+00
ξ (-) =	-4,9	ξ (-) =	-5,0
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	60,00	C (m^3/Pa) =	7,0E-08
dt_2 (min) =	480,00	C_D (-) =	7,7E+00
T_T (m^2/s) =	6,6E-07	ξ (-) =	-5,0
S (-) =	1,0E-06		
K_s (m/s) =	1,3E-07		
S_s (1/m) =	2,0E-07		

Comments:

The recommended transmissivity of 6.6E-7 m2/s was derived from the analysis of the CRwr phase (inner zone), which shows the best data and derivative quality. The confidence range for the transmissivity is estimated to be 6.0E-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 CHwr phase using straight line extrapolation in the Horner plot to a value of 6540.0 kPa.

Character	SICADA designation	Explanation	Dimension	Unit
Variables, constants				
A_w		Horizontal area of water surface in open borehole, not including area of signal cables, etc.	[L^2]	m^2
b		Aquifer thickness (Thickness of 2D formation)	[L]	m
B		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 centre point or centre of gravity for distribution of transmissivity in the measuring section.	[L]	m
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: hydrological budget:	[$L^3/(T L^2)$] [L^3/T]	mm/y, mm/d, m^3/s
ET		Evapotranspiration hydrological budget:	[$L^3/(T L^2)$] [L^3/T]	mm/y, mm/d, m^3/s
P		Precipitation hydrological budget:	[$L^3/(T L^2)$] [L^3/T]	mm/y, mm/d, m^3/s
R		Groundwater recharge hydrological budget:	[$L^3/(T L^2)$] [L^3/T]	mm/y, mm/d, m^3/s
D		Groundwater discharge hydrological budget:	[$L^3/(T L^2)$] [L^3/T]	mm/y, mm/d, m^3/s
Q_R		Run-off rate	[L^3/T]	m^3/s
Q_p		Pumping rate	[L^3/T]	m^3/s
Q_I		Infiltration rate	[L^3/T]	m^3/s
Q		Volumetric flow. Corrected flow in flow logging ($Q_1 – Q_0$) (Flow rate)	[L^3/T]	m^3/s
Q_0		Flow in test section during undisturbed conditions (flow logging).	[L^3/T]	m^3/s

Q_p		Flow in test section immediately before stop of flow. Stabilised pump flow in flow logging.	$[L^3/T]$	m^3/s
Q_m		Arithmetical mean flow during perturbation phase.	$[L^3/T]$	m^3/s
Q_1		Flow in test section during pumping with pump flow Q_{p1}, (flow logging).	$[L^3/T]$	m^3/s
Q_2		Flow in test section during pumping with pump flow Q_{p1}, (flow logging).	$[L^3/T]$	m^3/s
ΣQ	SumQ	Cumulative volumetric flow along borehole	$[L^3/T]$	m^3/s
ΣQ_0	SumQ0	Cumulative volumetric flow along borehole, undisturbed conditions (ie, not pumped)	$[L^3/T]$	m^3/s
ΣQ_1	SumQ1	Cumulative volumetric flow along borehole, with pump flow Q_{p1}	$[L^3/T]$	m^3/s
ΣQ_2	SumQ2	Cumulative volumetric flow along borehole, with pump flow Q_{p2}	$[L^3/T]$	m^3/s
ΣQ_{C1}	SumQC1	Corrected cumulative volumetric flow along borehole, ΣQ_1-ΣQ_0	$[L^3/T]$	m^3/s
ΣQ_{C2}	SumQC2	Corrected cumulative volumetric flow along borehole, ΣQ_2-ΣQ_0	$[L^3/T]$	m^3/s
q		Volumetric flow per flow passage area (Specific discharge (Darcy velocity, Darcy flux, Filtration velocity)).	$([L^3/T*L^2]$	m/s
V		Volume	$[L^3]$	m^3
V_w		Water volume in test section.	$[L^3]$	m^3
V_p		Total water volume injected/pumped during perturbation phase.	$[L^3]$	m^3
v		Velocity	$([L^3/T*L^2]$	m/s
v_a		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,min,s
t_0		Duration of rest phase before perturbation phase.	[T]	s
t_p		Duration of perturbation phase. (from flow start as far as p_p).	[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,min,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	-	-
p		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
p_D		$p_D=2\pi \cdot T \cdot p/(Q \cdot \rho_w g)$, Dimensionless pressure	-	-

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
dp_s		$dp_s = p_s - p_p$ 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
dp_p		$dp_p = p_i - p_p$ 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
dp_F		$dp_F = p_p - p_F$ 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
H		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
s_p		Drawdown in measuring section before flow stop.	[L]	m
			[L]	
h_0		Initial above reference level before test begins, prior to packer expansion.	[L]	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		$dh_s = h_s - h_p$ or $= h_p - h_s$, 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 conditions (taken from temperature logging). Temperature		^oC
Te_o		Temperature in the observation section (taken from temperature logging). Temperature		^oC
EC_w		Electrical conductivity of water in test section.		mS/m
EC_{w0}		Electrical conductivity of water in test section during undisturbed conditions.		mS/m
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 undisturbed conditions.	$[M/L^3]$	mg/L
TDS_o		Total salinity of water in the observation section.	$[M/L^3]$	mg/L
g		Constant of gravitation (9.81 $m*s^{-2}$) (Acceleration due to gravity)	$[L/T^2]$	m/s^2
π	pi	Constant (approx 3.1416).	[-]	
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		Mean error in residuals. $ME = \frac{1}{n}\sum_{i=1}^{n} r_i$		
NME		Normalized ME. NME=ME/(x_{MAX}-x_{MIN}), x: measured variable considered.		
MAE		Mean absolute error. $MAE = \frac{1}{n}\sum_{i=1}^{n} \lvert r_i \rvert$		
NMAE		Normalized MAE. NMAE=MAE/(x_{MAX}-x_{MIN}), x: measured variable considered.		
RMS		Root mean squared error. $RMS = \left(\frac{1}{n}\sum_{i=1}^{n} r_i^2\right)^{0.5}$		
NRMS		Normalized RMR. NRMR=RMR/(x_{MAX}-x_{MIN}), x: measured variable considered.		
SDR		Standard deviation of residual. $SDR = \left(\frac{1}{n-1}\sum_{i=1}^{n} (r_i - ME)^2\right)^{0.5}$		
SEMR		Standard error of mean residual. $SEMR = \left(\frac{1}{n(n-1)}\sum_{i=1}^{n} (r_i - ME)^2\right)^{0.5}$		
Parameters				
Q/s		Specific capacity s=dp_p or s=s_p=h_0-h_p (open borehole)	$[L^2/T]$	m^2/s
D		Interpreted flow dimension according to Barker, 1988.	[-]	-
dt_1		Time of starting for semi-log or log-log evaluated characteristic counted from start of flow phase and recovery phase respectively.	[T]	s
dt_2		End of time for semi-log or log-log evaluated characteristic counted from start of flow phase and recovery phase respectively.	[T]	s

dt_L		Response time to obtain 0.1 m (or 1 kPa) drawdown in observation section counted from start of recovery phase.	[T]	s
TB		Flow capacity in a one-dimensional structure of width B and transmissivity T. Transient evaluation of one-dimensional structure	$[L^3/T]$	m^3/s
T		Transmissivity	$[L^2/T]$	m^2/s
T_M		Transmissivity according to Moye (1967)	$[L^2/T]$	m^2/s
T_Q		Evaluation based on Q/s and regression curve between Q/s and T, as example see Rhén et al (1997) p. 190.	$[L^2/T]$	m^2/s
T_S		Transmissivity evaluated from slug test	$[L^2/T]$	m^2/s
T_D		Transmissivity evaluated from PFL-Difference Flow Meter	$[L^2/T]$	m^2/s
T_I		Transmissivity evaluated from Impeller flow log	$[L^2/T]$	m^2/s
T_{Sf}, T_{Lf}		Transient evaluation based on semi-log or log-log diagram for perturbation phase in injection or pumping.	$[L^2/T]$	m^2/s
T_{Ss}, T_{Ls}		Transient evaluation based on semi-log or log-log diagram for recovery phase in injection or pumping.	$[L^2/T]$	m^2/s
T_T		Transient evaluation (log-log or lin-log). Judged best evaluation of T_{Sf}, T_{Lf}, T_{Ss}, T_{Ls}	$[L^2/T]$	m^2/s
T_{NLR}		Evaluation based on non-linear regression.	$[L^2/T]$	m^2/s
T_{Tot}		Judged most representative transmissivity for particular test section and (in certain cases) evaluation time with respect to available data (made by SKB at a later stage).	$[L^2/T]$	m^2/s
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	[L/T]	m/s
k		Intrinsic permeability	$[L^2]$	m^2
kb		Permeability-thickness product: kb=k·b	$[L^3]$	m^3
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		Storage coefficient, (Storativity)	[-]	-
S*		Assumed storage coefficient	[-]	-
S_y		Theoretical specific yield of water (Specific yield; 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_m		Matrix storage coefficient	[-]	-
S_{NLR}		Storage coefficient, evaluation based on non-linear regression	[-]	-
S_{Tot}		Judged most representative storage coefficient for particular test section and (in certain cases) evaluation	[-]	-

		time with respect to available data (made by SKB at a later stage).		
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 aquitard 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.	[T]	s
L_f		Leakage factor: $L_f = (K \cdot b \cdot c_f)^{0.5}$ where K represents characteristics of the aquifer.	[L]	m
ξ	Skin	Skin factor	[-]	-
ξ*	Skin	Assumed skin factor	[-]	-
C		Wellbore storage coefficient	$[(LT^2)\cdot M^2]$	m^3/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.	[-]	-
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	$[L^2/T]$	m^2/s
S_{GRF}		Storage coefficient interpreted using the GRF method	[1/L]	1/m
D_{GRF}		Flow dimension interpreted using the GRF method	[-]	-
c_w		Water compressibility; corresponding to β in hydrogeological literature.	$[(LT^2)/M]$	1/Pa
c_r		Pore-volume compressibility, (rock compressibility); Corresponding to α/n in hydrogeological literature.	$[(LT^2)/M]$	1/Pa
c_t		$c_t = c_r + c_w$, total compressibility; compressibility per volumetric unit of rock obtained through multiplying by the total porosity, n. (Presence of gas or other fluids can be included in c_t if the degree of saturation (volume of respective fluid divided by n) of the pore system of respective fluid is also included)	$[(LT^2)/M]$	1/Pa
nc_t		Porosity-compressibility factor: $nc_t = n \cdot c_t$	$[(LT^2)/M]$	1/Pa
nc_tb		Porosity-compressibility-thickness product: $nc_tb = n \cdot c_t \cdot b$	$[(L^2T^2)/M]$	m/Pa
n		Total porosity	-	-
n_e		Kinematic porosity, (Effective porosity)	-	-
e		Transport aperture. $e = n_e \cdot b$	[L]	m
ρ	Density	Density	$[M/L^3]$	kg/(m^3)
ρ_w	Density-w	Fluid density in measurement section during pumping/injection	$[M/L^3]$	kg/(m^3)
ρ_o	Density-o	Fluid density in observation section	$[M/L^3]$	kg/(m^3)
ρ_{sp}	Density-sp	Fluid density in standpipes from measurement section	$[M/L^3]$	kg/(m^3)
μ	my	Dynamic viscosity	[M/LT]	Pa s
μ_w	my	Dynamic viscosity (Fluid density in measurement section during pumping/injection)	[M/LT]	Pa s
FC_T		Fluid coefficient for intrinsic permeability, transference of k to K; $K = FC_T \cdot k$; $FC_T = \rho_w \cdot g / \mu_w$	[1/LT]	1/(ms)
FC_S		Fluid coefficient for porosity-compressibility, transference	$[M/T^2L^2]$	Pa/m

		of c_t to S_s ; S_s=FC_S·n·c_t ; FC_S=ρ_w ·g		
Index on K, T and S				
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		
M		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)		
T		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		
e		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		
c		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 miscellaneous 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”)		
o		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 h_{opf}; the first index shows “where” and the second index shows “what” and the last one “recalculation”)		

APPENDIX 5

SICADA data tables

(Simplified version v1.2)

SICADA/Data Import Template

SKB & Ergodata AB 2004

File Identity	
Created By	Jörg Böhner
Created	2005.05.30

Activity Type	KLX06 KLX06 - Injection test	**Project**	AP PS 400-04-118

Activity Information						Additional Activity Data						
						C10	P20	P200	P220	R110	R25	R90
Idcode	**Start Date**	**Stop Date**	**Secup (m)**	**Seclow (m)**	**Section No**	**Company**	**Field crew manager**	**Field crew**	**Person evaluating data**	**Field Notes ID**	**Report**	**Quality plan**
KLX06	2005.03.03 08:00	2005.04.21 09:00	106,38	987,50		Golder	Jörg Böhner, Stephan Rohs	Jörg Böhner, Stephan Rohs, Mesgena Gebrezghi, Philipp Wolf	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)
mean_flow_rate_qm	FLOAT	m**3/s	Arithmetic mean flow rate of the pumping/injection
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
q_measl__l	FLOAT	m**3/s	Estimated lower measurement limit of flow rate
q_measl__u	FLOAT	m**3/s	Estimated upper measurement limit of flow rate
tot_volume_vp	FLOAT	m**3	Total volume of pumped(positive) or injected(negative) water
dur_flow_phase_tp	FLOAT	s	Time for the flowing phase of the test
dur_rec_phase_tf	FLOAT	s	Time for the recovery phase of the test
initial_head_hi	FLOAT	m	Initial formation head, see table description
head_at_flow_end_h	FLOAT	m	Hydraulic head at end of flow phase, see table description
final_head_hf	FLOAT	m	Hydraulic head at end of recovery phase,see table descript.
initial_press_pi	FLOAT	kPa	Initial formation pressure. Actual formation pressure
press_at_flow_end_p	FLOAT	kPa	Pressure at the end of flow phase, see table description.
final_press_pf	FLOAT	kPa	Final pressure at the end of the recovery, see table descr.
fluid_temp_tew	FLOAT	oC	Section fluid temperature, see table description
fluid_elcond_ecw	FLOAT	mS/m	Section fluid el. conduvtivity,see table description
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

idcode	start_date	stop_date	secup	seclow	section_no	test_type	formation_type	start_flow_period	stop_flow_period	mean_flow_rate_qm	flow_rate_end_qp	value_type_qp	q_measl__l	q_measl__u	tot_volume_vp
KLX06	2005.04.02 17:03:00	2005.04.02 19:34:00	106,38	206,38		3	1	2005.04.02 18:47:10	2005.04.02 19:17:10	3,64E-04	3,22E-04	0	1,6667E-08	8,3333E-04	6,56E-01
KLX06	2005.04.03 10:16:00	2005.04.03 12:37:00	206,52	306,52		3	1	2005.04.03 11:35:07	2005.04.03 12:05:17	3,54E-04	3,43E-04	0	1,6667E-08	8,3333E-04	6,37E-01
KLX06	2005.04.03 14:20:00	2005.04.03 16:03:00	306,68	406,68		3	1	2005.04.03 15:21:26	2005.04.03 14:51:36	2,68E-04	2,50E-04	0	1,6667E-08	8,3333E-04	4,83E-01
KLX06	2005.04.03 17:33:00	2005.04.03 23:08:00	406,83	506,83		3	1	2005.04.03 18:36:39	2005.04.03 19:06:49	2,00E-06	1,83E-06	0	1,6667E-08	8,3333E-04	3,60E-03
KLX06	2005.04.04 09:33:00	2005.04.04 12:08:00	506,92	606,92		3	1	2005.04.04 10:36:09	2005.04.04 11:06:19	2,22E-04	2,05E-04	0	1,6667E-08	8,3333E-04	4,00E-01
KLX06	2005.04.04 13:36:00	2005.04.04 15:37:00	607,06	707,06		3	1	2005.04.04 14:34:59	2005.04.04 15:05:09	6,67E-06	6,17E-06	0	1,6667E-08	8,3333E-04	1,20E-02
KLX06	2005.04.04 17:04:00	2005.04.05 01:08:00	707,15	807,15		3	1	2005.04.04 18:36:09	2005.04.04 19:36:19	5,45E-05	3,96E-05	0	1,6667E-08	8,3333E-04	9,81E-02
KLX06	2005.04.05 09:30:00	2005.04.05 13:01:00	807,31	907,31		3	1	2005.04.05 11:29:35	2005.04.05 11:59:45	2,88E-06	2,02E-06	0	1,6667E-08	8,3333E-04	5,19E-03
KLX06	2005.04.05 14:30:00	2005.04.05 16:36:00	887,48	987,48		3	1	2005.04.05 15:34:06	2005.04.05 16:04:16	1,42E-06	1,22E-06	0	1,6667E-08	8,3333E-04	2,55E-03
KLX06	2005.04.07 09:07:00	2005.04.07 10:43:00	106,38	126,38		3	1	2005.04.07 10:00:55	2005.04.07 10:21:05	3,70E-04	3,45E-04	0	1,6667E-08	8,3333E-04	4,44E-01
KLX06	2005.04.07 11:26:00	2005.04.07 14:17:00	126,42	146,42		3	1	2005.04.07 13:35:17	2005.04.07 13:55:27	4,47E-07	3,88E-07	0	1,6667E-08	8,3333E-04	5,36E-04
KLX06	2005.04.07 14:56:00	2005.04.07 16:28:00	146,44	166,44		3	1	2005.04.07 16:00:50	2005.04.07 16:21:00	7,88E-06	7,60E-06	0	1,6667E-08	8,3333E-04	9,46E-03
KLX06	2005.04.07 17:08:00	2005.04.07 18:34:00	166,47	186,47		3	1	2005.04.07 18:02:47	2005.04.07 18:52:57	3,30E-04	3,15E-04	0	1,6667E-08	8,3333E-04	3,96E-01
KLX06	2005.04.08 08:44:00	2005.04.08 10:05:00	186,49	206,49		3	1	2005.04.08 09:32:41	2005.04.08 09:52:51	2,77E-04	2,75E-04	0	1,6667E-08	8,3333E-04	3,32E-01
KLX06	2005.04.08 11:19:00	2005.04.08 12:58:00	206,52	226,52		3	1	2005.04.08 12:16:45	2005.04.08 12:36:55	9,72E-05	9,45E-05	0	1,6667E-08	8,3333E-04	1,17E-01
KLX06	2005.04.08 13:53:00	2005.04.08 15:36:00	226,56	246,56		3	1	2005.04.08 15:04:19	2005.04.08 15:24:29	1,33E-04	1,29E-04	0	1,6667E-08	8,3333E-04	1,60E-01
KLX06	2005.04.08 16:26:00	2005.04.08 17:53:00	246,62	266,62		3	1	2005.04.08 17:16:04	2005.04.08 17:36:14	3,50E-04	3,42E-04	0	1,6667E-08	8,3333E-04	4,20E-01
KLX06	2005.04.09 10:01:00	2005.04.09 11:22:00	266,64	286,64		3	1	2005.04.09 10:45:24	2005.04.09 11:05:34	4,65E-05	4,38E-05	0	1,6667E-08	8,3333E-04	5,58E-02
KLX06	2005.04.09 12:09:00	2005.04.09 13:32:00	286,68	306,68		3	1	2005.04.09 13:00:28	2005.04.09 13:20:38	2,56E-05	2,44E-05	0	1,6667E-08	8,3333E-04	3,70E+02
KLX06	2005.04.09 14:16:00	2005.04.09 15:35:00	306,68	326,68		3	1	2005.04.09 15:03:06	2005.04.09 15:23:16	6,48E-05	6,20E-05	0	1,6667E-08	8,3333E-04	7,78E-02
KLX06	2005.04.09 16:16:00	2005.04.09 17:36:00	326,69	346,69		3	1	2005.04.09 17:04:38	2005.04.09 17:24:48	1,22E-04	1,16E-04	0	1,6667E-08	8,3333E-04	1,46E-01
KLX06	2005.04.09 18:11:00	2005.04.09 19:37:00	346,74	366,74		3	1	2005.04.09 18:55:08	2005.04.09 19:15:18	1,44E-04	1,37E-04	0	1,6667E-08	8,3333E-04	1,72E-01
KLX06	2005.04.10 08:40:00	2005.04.10 09:52:00	356,77	376,77		3	1	2005.04.10 09:25:58	2005.04.10 09:46:08	1,18E-04	1,12E-04	0	1,6667E-08	8,3333E-04	1,41E+01
KLX06	2005.04.10 13:14:00	2005.04.10 14:50:00	376,80	396,80		3	1	2005.04.10 13:52:57	2005.04.10 14:23:07	5,13E-06	4,65E-06	0	1,6667E-08	8,3333E-04	9,24E-03
KLX06	2005.04.10 15:31:00	2005.04.10 17:58:00	391,80	411,80		3	1	2005.04.10 17:05:45	2005.04.10 17:25:55	1,67E-04	1,02E-06	0	1,6667E-08	8,3333E-04	2,00E-01
KLX06	2005.04.11 08:32:00	2005.04.11 10:02:00	406,83	426,83		3	1	2005.04.11 09:20:07	2005.04.11 09:40:17	3,03E-07	2,67E-07	0	1,6667E-08	8,3333E-04	3,64E-04
KLX06	2005.04.11 10:48:00	2005.04.11 12:18:00	426,86	446,86		3	1	2005.04.11 11:36:21	2005.04.11 11:56:31	2,73E-07	2,56E-07	0	1,6667E-08	8,3333E-04	3,28E-04
KLX06	2005.04.11 13:03:00	2005.04.11 14:40:00	446,88	466,88		4	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.04.11 15:15:00	2005.04.11 16:55:00	466,89	486,89		3	1	2005.04.11 16:13:04	3,85E+04	7,08E-07	6,83E-07	0	1,6667E-08	8,3333E-04	8,50E-04
KLX06	2005.04.12 08:44:00	2005.04.12 12:02:00	486,90	506,90		3	1	2005.04.12 11:20:18	2005.04.12 11:40:28	6,16E-07	5,25E-07	0	1,6667E-08	8,3333E-04	7,42E-04
KLX06	2005.04.13 15:39:00	2005.04.13 17:22:00	506,92	526,92		3	1	2005.04.13 16:20:44	2005.04.13 16:50:54	1,67E-04	8,02E-06	0	1,6667E-08	8,3333E-04	3,00E-01
KLX06	2005.04.13 18:08:00	2005.04.13 20:21:00	526,94	546,94		3	1	2005.04.13 18:59:01	2005.04.13 19:19:11	6,83E-07	6,27E-07	0	1,6667E-08	8,3333E-04	8,20E-04
KLX06	2005.04.14 08:24:00	2005.04.14 10:03:00	546,97	566,97		3	1	2005.04.14 09:21:28	2005.04.14 09:41:38	2,16E-04	2,02E-04	0	1,6667E-08	8,3333E-04	2,59E-01
KLX06	2005.04.14 10:42:00	2005.04.14 12:44:00	566,98	586,98		3	1	2005.04.14 11:42:31	2005.04.14 12:02:41	4,82E-07	3,50E-07	0	1,6667E-08	8,3333E-04	5,78E-04
KLX06	2005.04.14 13:25:00	2005.04.14 14:30:00	587,02	607,02		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.04.14 15:07:00	2005.04.14 16:17:00	607,06	627,06		4	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.04.14 17:04:00	2005.04.14 19:31:00	627,10	647,10		3	1	2005.04.14 18:04:50	2005.04.14 18:30:00	5,87E-06	5,50E-06	0	1,6667E-08	8,3333E-04	7,04E-03
KLX06	2005.04.15 08:32:00	2005.04.15 10:07:00	647,11	667,11		3	1	2005.04.15 09:25:50	2005.04.15 09:46:00	1,25E-06	1,14E-06	0	1,6667E-08	8,3333E-04	1,50E-03
KLX06	2005.04.15 10:40:00	2005.04.15 11:57:00	667,09	687,09		4	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.04.15 13:52:00	2005.04.15 14:50:00	687,12	707,12		3	1	3,85E+04	3,85E+04	1,72E-07	1,02E-07	0	1,6667E-08	8,3333E-04	2,06E-04
KLX06	2005.04.15 15:22:00	2005.04.15 17:07:00	707,15	727,15		3	1	2005.04.15 16:25:43	2005.04.15 16:45:53	3,15E-07	1,62E-07	0	1,6667E-08	8,3333E-04	3,78E-04
KLX06	2005.04.15 17:48:00	2005.04.15 21:00:00	727,19	747,19		3	1	3,85E+04	3,85E+04	9,00E-07	7,67E-07	0	1,6667E-08	8,3333E-04	1,08E-03
KLX06	2005.04.16 08:51:00	2005.04.16 10:17:00	747,22	767,22		4	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.04.16 10:54:00	2005.04.16 13:38:00	767,25	787,25		3	1	2005.04.16 12:16:30	2005.04.16 12:36:40	6,25E-05	4,25E-05	0	1,6667E-08	8,3333E-04	7,50E-02
KLX06	2005.04.16 14:19:00	2005.04.16 15:21:00	787,28	807,28		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.04.16 17:33:00	2005.04.17 00:32:00	807,31	827,31		3	1	2005.04.16 18:10:00	2005.04.16 18:30:10	2,02E-06	6,33E-07	0	1,6667E-08	8,3333E-04	2,42E-03
KLX06	2005.04.17 08:42:00	2005.04.17 09:59:00	827,33	847,33		3	1	2005.04.17 09:32:00	2005.04.17 09:52:10	1,98E-06	1,92E-06	0	1,6667E-08	8,3333E-04	2,38E-03
KLX06	2005.04.17 10:29:00	2005.04.17 12:05:00	847,39	867,39		3	1	2005.04.17 11:23:20	2005.04.17 11:43:30	2,17E-07	2,00E-07	0	1,6667E-08	8,3333E-04	2,60E-04
KLX06	2005.04.17 12:42:00	2005.04.17 13:42:00	867,46	887,46		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.04.17 14:29:00	2005.04.17 15:33:00	887,48	907,48		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.04.17 16:15:00	2005.04.17 17:58:00	907,49	927,49		3	1	2005.04.17 17:16:15	2005.04.17 17:36:25	3,95E-07	3,67E-07	0	1,6667E-08	8,3333E-04	4,74E-04
KLX06	2005.04.18 08:42:00	2005.04.18 10:12:00	927,50	947,50		3	1	2005.04.18 09:29:55	2005.04.18 09:50:05	9,23E-07	7,22E-07	0	1,6667E-08	8,3333E-04	1,11E-03
KLX06	2005.04.18 11:01:00	2005.04.18 12:09:00	947,50	967,50		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.04.18 13:29:00	2005.04.18 14:37:00	967,50	987,50		-	1	-	-	-	-	-1	1,6667E-08	8,3333E-04	-
KLX06	2005.03.07 08:59:00	2005.03.10 08:15:00	260.00	265.00		1	1	2005.03.07 10:17:00	2005.03.09 11:30:00	1.35E-04	1.35E-04	0	1,6667E-08	8,3333E-04	2.37E-01
KLX06	2005.03.10 18:56:00	2005.03.17 08:19:00	558.20	563.20		1	1	2005.03.10 19:28:00	2005.03.16 08:42:00	6.25E-05	6.28E-05	0	1,6667E-08	8,3333E-04	3.00E+01
KLX06	2005.03.17 16:07:00	2005.03.23 07:08:00	776.20	781.20		1	1	2005.03.17 16:41:00	2005.03.23 07:08:00	1.95E-05	1.97E-05	0	1,6667E-08	8,3333E-04	9.59E-00

idcode	secup	seclow	dur_flow_phase_tp	dur_rec_phase_tf	initial_head_hi	head_at_flow_end_hp	final_head_hf	initial_press_pi	press_at_flow_end_pp	final_press_pf	fluid_temp_tew	fluid_elcond_ecw	fluid_salinity_tdsw	fluid_salinity_tdswm	reference	comments	lp
KLX06	106,38	206,38	1800	900			13,06	1874	1886	1875	10,3						156,4
KLX06	206,52	306,52	1800	1800			14,88	2764	2823	2767	11,4						256,5
KLX06	306,68	406,68	1800	600			15,39	3625	3743	3625	12,6						356,7
KLX06	406,83	506,83	1800	14400			13,19	4442	4658	4436	13,8						456,8
KLX06	506,92	606,92	1800	3600			12,98	5236	5437	5241	15,4						556,9
KLX06	607,06	707,06	1800	1800			14,55	6010	6211	6015	16,7						657,1
KLX06	707,15	807,15	1800	21600			13,15	6728	6948	6717	17,9						757,2
KLX06	807,31	907,31	1800	3600			12,29	7398	7598	7403	19,1						857,3
KLX06	887,48	987,48	1800	1800			13,07	7886	8078	7893	19,9						937,5
KLX06	106,38	126,38	1200	1200			14,17	1179	1198	1180	9,4						116,38
KLX06	126,42	146,42	1200	1200			13,77	1359	1589	1358	9,6						136,42
KLX06	146,44	166,44	1200	300			14,06	1534	1747	1533	9,8						156,44
KLX06	166,47	186,47	1200	600			14,06	1711	1769	1711	10,1						176,47
KLX06	186,49	206,49	1200	600			14,00	1886	2085	1886	10,2						196,49
KLX06	206,52	226,52	1200	1200			14,22	2062	2263	2062	10,3						216,52
KLX06	226,56	246,56	1200	600			14,20	2240	2441	2240	10,7						236,56
KLX06	246,62	266,62	1200	900			14,34	2417	2549	2416	11,0						256,62
KLX06	266,64	286,64	1200	900			14,41	2589	2790	2589	11,2						276,64
KLX06	286,68	306,68	1200	600			14,55	2765	2966	2765	11,4						296,68
KLX06	306,68	326,68	1200	600			14,66	2937	3138	2938	11,7						316,68
KLX06	326,69	346,69	1200	600			14,69	3110	3310	3110	11,9						336,69
KLX06	346,74	366,74	1200	1200			14,90	3281	3482	3282	12,1						356,74
KLX06	356,77	376,77	1200	300			14,74	3365	3566	3366	12,2						366,77
KLX06	376,80	396,80	1800	1500			13,44	3538	3739	3540	12,5						386,8
KLX06	391,80	411,80	1200	1800			-	3662	3893	3718	12,6						401,8
KLX06	406,83	426,83	1200	1200			13,23	3777	4029	3777	12,8						416,83
KLX06	426,86	446,86	1200	1200			12,43	3940	4172	3939	13,0						436,68
KLX06	446,88	466,88	-	3240			-	4132	-	-	13,2						456,88
KLX06	466,89	486,89	1,20E+03	1,20E+03			12,19	4268	4483	4269	13,6						476,89
KLX06	486,90	506,90	1200	1200			10,87	4438	4648	4452	13,7						496,9
KLX06	506,92	526,92	1,80E+03	1,80E+03			11,81	4594	4795	4609	14,1						516,92
KLX06	526,94	546,94	1200	3600			12,75	4760	4988	4758	14,4						536,92
KLX06	546,97	566,97	1200	1200			12,91	4922	5124	4932	14,8						556,97
KLX06	566,98	586,98	1200	2400			13,60	5099	5294	5104	15,1						576,98
KLX06	587,02	607,02	-	-			-	-	-	-	15,4						597,02
KLX06	607,06	627,06	-	1200			-	-	-	-	15,7						617,06
KLX06	627,10	647,10	1200	3600			13,79	5555	5755	5554	15,9						637,1
KLX06	647,11	667,11	1200	1200			13,70	5705	5915	5708	16,2						657,11
KLX06	667,09	687,09	-	1800			-	-	-	-	16,4						677,09
KLX06	687,12	707,12	1,20E+03	1,20E+03			-	6023	6,23E+03	6,10E+03	16,7						697,12
KLX06	707,15	727,15	1200	1200			-	6169	6370	6253	16,9						717,15
KLX06	727,19	747,19	1,20E+03	7,20E+03			14,64	6303	6,52E+03	6,31E+03	17,2						737,19
KLX06	747,22	767,22	-	2460			-	6457	-	-	17,4						757,22
KLX06	767,25	787,25	1200	3600			13,40	6584	6803	6597	17,7						777,25
KLX06	787,28	807,28	-	-			-	-	-	-	17,9						792,28
KLX06	807,31	827,31	1200	21600			14,58	6880	7079	6899	18,2						817,31
KLX06	827,33	847,33	1200	300			14,21	6999	7223	7000	18,4						837,33
KLX06	847,39	867,39	1200	1600			14,43	7135	7349	7135	18,6						857,39
KLX06	867,46	887,46	-	-			-	-	-	-	18,9						877,46
KLX06	887,48	907,48	-	-			-	-	-	-	19,1						897,48
KLX06	907,49	927,49	1200	1200			13,31	7510	7745	7511	19,3						917,49
KLX06	927,50	947,50	1200	1200			15,41	7647	7857	7680	19,5						937,5
KLX06	947,50	967,50	-	-			-	-	-	-	19,7						957,5
KLX06	967,50	987,50	-	-			-	-	-	-	19,9						977,5
KLX06	260.00	265.00	175392	79800			14,16	2400	2351	2398	11,0						262.50
KLX06	558.20	563.20	479400	85020			12,20	4884	4748	4831	14,5						560.70
KLX06	776.20	781.20	490740	77400			13,89	6529	6317	6506	17,6						778.70

Table	plu_s_hole_test_ed1 PLU Single hole tests, pumping/injection. Basic evaluation

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		Formation type code. 1: Rock, 2: Soil (superficial deposits)
lp	FLOAT	m	Hydraulic point of application
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
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.
bc_tq	CHAR		Best choice code. 1 means TQ is best choice of T, else 0
transmissivity_moye	FLOAT	m**2/s	Transmissivity,TM, based on Moye (1967)
bc_tm	CHAR		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.
hydr_cond_moye	FLOAT	m**2/s	K_M: Hydraulic conductivity based on Moye (1967)
formation_width_b	FLOAT	m	b:Interpreted formation thickness repr. for evaluated T/TB
width_of_channel_b	FLOAT	m	B:Interpreted width of formation with evaluated TB
tb	FLOAT	m**3/s	TB:T=transmissivity,B=width of formation,see description
l_measl_tb	FLOAT	m**3/s	Estimated lower meas. limit for evaluated TB,see description
u_measl_tb	FLOAT	m**3/s	Estimated upper meas. limit of evaluated TB,see description
sb	FLOAT	m	SB:S=storativity,B=width of formation,1Dmodel,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	T=transmissivity, 2D model, see table description
value_type_tt	CHAR		0:true value,-1:TT<lower meas.limit,1:TT>upper meas.limit,
bc_tt	CHAR		Best choice code. 1 means TT is best choice of T, else 0
l_measl_q_s	FLOAT	m**2/s	Estimated lower meas. limit for evaluated T,see table descr.
u_measl_q_s	FLOAT	m**2/s	Estimated upper meas. limit for evaluated T,see description
storativity_s	FLOAT		2D model for evaluation of S=storativity,see table descript.
assumed_s	FLOAT		Assumed Storativity,2D model evaluation,see table descr.
leakage_koeff	FLOAT	1/s	K'/b':2Dmodel evaluation of leakage coefficient,see desc.
hydr_cond_ks	FLOAT	m**2/s	Ks:3D model evaluation of hydraulic conductivity,see desc.
value_type_ks	CHAR		0:true value,-1:Ks<lower meas.limit,1:Ks>upper meas.limit,
l_meas_limit_ks	FLOAT	m**2/s	Estimated lower meas.limit for evaluated Ks, see table desc.
u_meas_limit_ks	FLOAT	m**2/s	Estimated upper meas.limit for evaluated Ks,see table descr.
spec_storage_ss	FLOAT	1/m	Ss:Specific storage,3Dmodel evaluation,see table descr.
assumed_ss	FLOAT	1/m	Assumed Spec.storage,3D model evaluation,see table des.
c	FLOAT	m**3/pa	C: Wellbore storage coefficient
cd	FLOAT		CD: Dimensionless wellbore storage constant
skin	FLOAT		Skin factor
stor_ratio	FLOAT		Storativity ratio
interflow_coeff	FLOAT		Interporosity flow coefficient
dt1	FLOAT	s	Estimated start time of evaluation, see table description
dt2	FLOAT	s	Estimated stop time of evaluation. see table description
transmissivity_t_ilr	FLOAT	m**2/s	T_ILR Transmissivity based on None Linear Regression...
storativity_s_ilr	FLOAT		S_ILR=storativity based on None Linear Regression,see..
value_type_t_ilr	CHAR		0:true value,-1:T_ILR<lower meas.limit,1:>upper meas.limit
bc_t_ilr	CHAR		Best choice code. 1 means T_ILR is best choice of T, else 0
c_ilr	FLOAT	m**3/pa	Wellbore storage coefficient, based on ILR, see descr.
cd_ilr	FLOAT		Dimensionless wellbore storage constant, see table descrip.
skin_ilr	FLOAT		Skin factor based on Non Linear Regression,see desc.
stor_ratio_ilr	FLOAT		Storativity ratio based on Non Linear Regression, see descr.
interflow_coeff_ilr	FLOAT		Interporosity flow coefficient based on Non Linear Regr....
transmissivity_t_grf	FLOAT	m**2/s	T_GRF:Transmissivity based on Gen.Rad. Flow,see...
value_type_t_grf	CHAR		0:true value,-1:T_GRF<lower meas.limit,1:>upper meas.limit
bc_t_grf	CHAR		Best choice code. 1 means T_GRF is best choice of T, else 0
storativity_s_grf	FLOAT		S_GRF:Storativity basd on Gen. Rad.Flow, see table descri.
flow_dim_grf	FLOAT		Flow dimesion based on Gen. Rad.Flow. interpretation model
comment	VARCHAR	no_unit	Short comment to the evaluated parameters
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)

idcode	start_date	stop_date	secup	seclow	section_no	test_type	formation_type	lp	seclen_class	spec_capacity_q_s	value_type_q_s	transmissivity_tq	value_type_tq	bc_tq	transmissivity_moye	bc_tm	value_type_tm	hydr_cond_moye
KLX06	2005.04.02 17:03	2005.04.02 19:34	106,38	206,38		3	1	156,38	100	2,63E-04	0				3,42E-04	0	0	3,42E-06
KLX06	2005.04.03 10:16	2005.04.03 12:37	206,52	306,52		3	1	256,52	100	5,70E-05	0				7,43E-05	0	0	7,43E-07
KLX06	2005.04.03 14:20	2005.04.03 16:03	306,68	406,68		3	1	356,68	100	2,08E-05	0				2,70E-05	0	0	2,70E-07
KLX06	2005.04.03 17:33	2005.04.03 23:08	406,83	506,83		3	1	456,83	100	8,33E-08	0				1,08E-07	0	0	1,08E-09
KLX06	2005.04.04 09:33	2005.04.04 12:08	506,92	606,92		3	1	556,92	100	9,98E-06	0				1,30E-05	0	0	1,30E-07
KLX06	2005.04.04 13:36	2005.04.04 15:37	607,06	707,06		3	1	657,06	100	3,01E-07	0				3,92E-07	0	0	3,92E-09
KLX06	2005.04.04 17:04	2005.04.05 01:08	707,15	807,15		3	1	757,15	100	1,77E-06	0				2,30E-06	0	0	2,30E-08
KLX06	2005.04.05 09:30	2005.04.05 13:01	807,31	907,31		3	1	857,31	100	9,89E-08	0				1,29E-07	0	0	1,29E-09
KLX06	2005.04.05 14:30	2005.04.05 16:36	887,48	987,48		3	1	937,48	100	6,22E-08	0				8,10E-08	0	0	8,10E-10
KLX06	2005.04.07 09:07	2005.04.07 10:43	106,38	126,38		3	1	116,38	20	1,78E-04	0				1,86E-04	0	0	9,30E-06
KLX06	2005.04.07 11:26	2005.04.07 14:17	126,42	146,42		3	1	136,42	20	1,66E-08	0				1,73E-08	0	0	8,65E-10
KLX06	2005.04.07 14:56	2005.04.07 16:28	146,44	166,44		3	1	156,44	20	3,50E-07	0				3,66E-07	0	0	1,83E-08
KLX06	2005.04.07 17:08	2005.04.07 18:34	166,47	186,47		3	1	176,47	20	5,35E-05	0				5,58E-05	0	0	2,79E-06
KLX06	2005.04.08 08:44	2005.04.08 10:05	186,49	206,49		3	1	196,49	20	1,36E-05	0				1,42E-05	0	0	7,10E-07
KLX06	2005.04.08 11:19	2005.04.08 12:58	206,52	226,52		3	1	216,52	20	4,61E-06	0				4,82E-06	0	0	2,41E-07
KLX06	2005.04.08 13:53	2005.04.08 15:36	226,56	246,56		3	1	236,56	20	6,28E-06	0				6,57E-06	0	0	3,29E-07
KLX06	2005.04.08 16:26	2005.04.08 17:53	246,62	266,62		3	1	256,62	20	2,54E-05	0				2,65E-05	0	0	1,33E-06
KLX06	2005.04.09 10:01	2005.04.09 11:22	266,64	286,64		3	1	276,64	20	2,14E-06	0				2,24E-06	0	0	1,12E-07
KLX06	2005.04.09 12:09	2005.04.09 13:32	286,68	306,68		3	1	296,68	20	1,19E-06	0				1,25E-06	0	0	6,25E-08
KLX06	2005.04.09 14:16	2005.04.09 15:35	306,68	326,68		3	1	316,68	20	3,03E-06	0				3,17E-06	0	0	1,59E-07
KLX06	2005.04.09 16:16	2005.04.09 17:36	326,69	346,69		3	1	336,69	20	5,70E-06	0				5,96E-06	0	0	2,98E-07
KLX06	2005.04.09 18:11	2005.04.09 19:37	346,74	366,74		3	1	356,74	20	6,66E-06	0				6,97E-06	0	0	3,49E-07
KLX06	2005.04.10 08:40	2005.04.10 09:52	356,77	376,77		3	1	366,77	20	5,46E-06	0				5,71E-06	0	0	2,86E-07
KLX06	2005.04.10 13:14	2005.04.10 14:50	376,80	396,80		3	1	386,80	20	2,27E-07	0				2,37E-07	0	0	1,19E-08
KLX06	2005.04.10 15:31	2005.04.10 17:58	391,80	411,80		3	1	401,80	20	4,35E-08	0				4,55E-08	0	0	2,28E-09
KLX06	2005.04.11 08:32	2005.04.11 10:02	406,83	426,83		3	1	416,83	20	1,04E-08	0				1,09E-08	0	0	5,45E-10
KLX06	2005.04.11 10:48	2005.04.11 12:18	426,86	446,86		3	1	436,86	20	1,08E-08	0				1,13E-08	0	0	5,65E-10
KLX06	2005.04.11 13:03	2005.04.11 14:40	446,88	466,88		4	1	456,88	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.04.11 15:15	2005.04.11 16:55	466,89	486,89		3	1	476,89	20	3,12E-08	0				3,26E-08	0	0	1,63E-09
KLX06	2005.04.12 08:44	2005.04.12 12:02	486,90	506,90		3	1	496,90	20	2,45E-08	0				2,57E-08	0	0	1,29E-09
KLX06	2005.04.13 15:39	2005.04.13 17:22	506,92	526,92		3	1	516,92	20	3,91E-07	0				4,09E-07	0	0	2,05E-08
KLX06	2005.04.13 18:08	2005.04.13 20:21	526,94	546,94		3	1	536,94	20	2,70E-08	0				2,82E-08	0	0	1,41E-09
KLX06	2005.04.14 08:24	2005.04.14 10:03	546,97	566,97		3	1	556,97	20	9,86E-06	0				1,03E-05	0	0	5,15E-07
KLX06	2005.04.14 10:42	2005.04.14 12:44	566,98	586,98		3	1	576,98	20	1,76E-08	0				1,84E-08	0	0	9,20E-10
KLX06	2005.04.14 13:25	2005.04.14 14:30	587,02	607,02		-	1	597,02	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.04.14 15:07	2005.04.14 16:17	607,06	627,06		4	1	617,06	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.04.14 17:04	2005.04.14 19:31	627,10	647,10		3	1	637,10	20	2,70E-07	0				2,82E-07	0	0	1,41E-08
KLX06	2005.04.15 08:32	2005.04.15 10:07	647,11	667,11		3	1	657,11	20	5,33E-08	0				5,58E-08	0	0	2,79E-09
KLX06	2005.04.15 10:40	2005.04.15 11:57	667,09	687,09		4	1	677,09	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.04.15 13:52	2005.04.15 14:50	687,12	707,12		3	1	697,12	20	4,82E-09	0				5,04E-09	0	0	2,52E-10
KLX06	2005.04.15 15:22	2005.04.15 17:07	707,15	727,15		3	1	717,15	20	7,89E-09	0				8,25E-09	0	0	4,13E-10
KLX06	2005.04.15 17:48	2005.04.15 21:00	727,19	747,19		3	1	737,19	20	3,43E-08	0				3,59E-08	0	0	1,80E-09
KLX06	2005.04.16 08:51	2005.04.16 10:17	747,22	767,22		4	1	757,22	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.04.16 10:54	2005.04.16 13:38	767,25	787,25		3	1	777,25	20	1,90E-06	0				1,99E-06	0	0	9,95E-08
KLX06	2005.04.16 14:19	2005.04.16 15:21	787,28	807,28		-	1	797,28	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.04.16 17:33	2005.04.17 00:32	807,31	827,31		3	1	817,31	20	3,12E-08	0				3,27E-08	0	0	1,64E-09
KLX06	2005.04.17 08:42	2005.04.17 09:59	827,33	847,33		3	1	837,33	20	8,39E-08	0				8,78E-08	0	0	4,39E-09
KLX06	2005.04.17 10:29	2005.04.17 12:05	847,39	867,39		3	1	857,39	20	9,17E-09	0				9,59E-09	0	0	4,80E-10
KLX06	2005.04.17 12:42	2005.04.17 13:42	867,46	887,46		-	1	877,46	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.04.17 14:29	2005.04.17 15:33	887,48	907,48		-	1	897,48	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.04.17 16:15	2005.04.17 17:58	907,49	927,49		3	1	917,49	20	1,53E-08	0				1,60E-08	0	0	8,00E-10
KLX06	2005.04.18 08:42	2005.04.18 10:12	927,50	947,50		3	1	937,50	20	3,37E-08	0				3,53E-08	0	0	1,77E-09
KLX06	2005.04.18 11:01	2005.04.18 12:09	947,50	967,50		-	1	957,50	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.04.18 13:29	2005.04.18 14:37	967,50	987,50		-	1	977,50	20	#NV	-1				#NV	0	-1	#NV
KLX06	2005.03.07 08:59	2005.03.10 08:15	260.00	265.00		1	1	262,50	5	#NV	-1				#NV	0	-1	#NV
KLX06	2005.03.10 18:56	2005.03.17 08:19	558.20	563.20		1	1	560,70	5	#NV	-1				#NV	0	-1	#NV
KLX06	2005.03.17 16:07	2005.03.23 07:08	776.20	781.20		1	1	778,70	5	#NV	-1				#NV	0	-1	#NV

idcode	secup	seclow	formation_width_b	width_of_channel_b	tb	l_measl_tb	u_measl_tb	sb	assumed_sb	leakage_factor_lf	transmissivity_tt	value_type_tt	bc_tt	l_measl_q_s	u_measl_q_s	storativity_s	assumed_s	leakage_koeff	hydr_cond_ks
KLX06	106,38	206,38									2,13E-04	0	1	1,00E-04	4,00E-04	1,00E-06	1,00E-06		
KLX06	206,52	306,52									1,29E-04	0	1	6,00E-05	3,00E-04	1,00E-06	1,00E-06		
KLX06	306,68	406,68									2,86E-05	0	1	1,00E-05	8,00E-05	1,00E-06	1,00E-06		
KLX06	406,83	506,83									8,99E-08	0	1	6,00E-08	2,00E-07	1,00E-06	1,00E-06		
KLX06	506,92	606,92									1,12E-05	0	1	2,00E-05	8,00E-06	1,00E-06	1,00E-06		
KLX06	607,06	707,06									4,47E-07	0	1	3,00E-07	6,00E-07	1,00E-06	1,00E-06		
KLX06	707,15	807,15									6,51E-07	0	1	5,00E-07	1,00E-06	1,00E-06	1,00E-06		
KLX06	807,31	907,31									9,08E-08	0	1	5,00E-08	2,00E-07	1,00E-06	1,00E-06		
KLX06	887,48	987,48									5,73E-08	0	1	4,00E-08	8,00E-08	1,00E-06	1,00E-06		
KLX06	106,38	126,38									1,80E-04	0	1	8,00E-05	3,00E-04	1,00E-06	1,00E-06		
KLX06	126,42	146,42									2,17E-08	0	1	9,00E-09	4,00E-08	1,00E-06	1,00E-06		
KLX06	146,44	166,44									5,92E-07	0	1	3,50E-07	8,00E-07	1,00E-06	1,00E-06		
KLX06	166,47	186,47									5,91E-05	0	1	3,00E-05	8,00E-05	1,00E-06	1,00E-06		
KLX06	186,49	206,49									4,69E-05	0	1	3,00E-05	8,00E-05	1,00E-06	1,00E-06		
KLX06	206,52	226,52									6,78E-06	0	1	3,00E-06	1,00E-05	1,00E-06	1,00E-06		
KLX06	226,56	246,56									1,31E-05	0	1	8,00E-06	4,00E-05	1,00E-06	1,00E-06		
KLX06	246,62	266,62									3,55E-05	0	1	4,00E-05	1,00E-04	1,00E-06	1,00E-06		
KLX06	266,64	286,64									4,36E-06	0	1	2,00E-06	8,00E-06	1,00E-06	1,00E-06		
KLX06	286,68	306,68									2,15E-06	0	1	9,00E-05	4,00E-06	1,00E-06	1,00E-06		
KLX06	306,68	326,68									4,21E-06	0	1	1,50E-06	7,00E-06	1,00E-06	1,00E-06		
KLX06	326,69	346,69									9,99E-06	0	1	7,00E-06	3,00E-05	1,00E-06	1,00E-06		
KLX06	346,74	366,74									9,33E-06	0	1	6,00E-06	3,00E-05	1,00E-06	1,00E-06		
KLX06	356,77	376,77									1,09E-05	0	1	7,00E-06	4,00E-05	1,00E-06	1,00E-06		
KLX06	376,80	396,80									2,96E-07	0	1	8,00E-08	6,00E-07	1,00E-06	1,00E-06		
KLX06	391,80	411,80									4,15E-08	0	1	1,00E-08	8,00E-08	1,00E-06	1,00E-06		
KLX06	406,83	426,83									1,11E-08	0	1	7,00E-09	3,00E-08	1,00E-06	1,00E-06		
KLX06	426,86	446,86									1,27E-08	0	1	7,00E-09	3,00E-08	1,00E-06	1,00E-06		
KLX06	446,88	466,88									7,78E-11	0	1	3,00E-11	3,00E-10	1,00E-06	1,00E-06		
KLX06	466,89	486,89									5,05E-08	0	1	3,00E-08	9,00E-04	1,00E-06	1,00E-06		
KLX06	486,90	506,90									1,10E-08	0	1	7,00E-09	3,00E-08	1,00E-06	1,00E-06		
KLX06	506,92	526,92									3,40E-07	0	1	1,00E-07	7,00E-07	1,00E-06	1,00E-06		
KLX06	526,94	546,94									2,97E-08	0	1	1,00E-08	6,00E-08	1,00E-06	1,00E-06		
KLX06	546,97	566,97									1,20E-05	0	1	9,00E-06	3,00E-05	1,00E-06	1,00E-06		
KLX06	566,98	586,98									1,17E-08	0	1	8,00E-09	3,00E-08	1,00E-06	1,00E-06		
KLX06	587,02	607,02									#NV	0	1	1,00E-13	1,00E-11	#NV	#NV		
KLX06	607,06	627,06									9,30E-11	0	1	5,00E-11	4,00E-10	1,00E-06	1,00E-06		
KLX06	627,10	647,10									4,92E-07	0	1	2,00E-07	6,00E-07	1,00E-06	1,00E-06		
KLX06	647,11	667,11									5,99E-08	0	1	4,00E-08	9,00E-08	1,00E-06	1,00E-06		
KLX06	667,09	687,09									7,97E-10	0	1	2,00E-10	1,00E-09	1,00E-06	1,00E-06		
KLX06	687,12	707,12									2,19E-09	-1	1	1,00E-09	6,00E-09	1,00E-06	1,00E-06		
KLX06	707,15	727,15									1,42E-08	-1	1	2,00E-09	7,00E-09	1,00E-06	1,00E-06		
KLX06	727,19	747,19									2,57E-08	-1	1	1,00E-08	5,00E-08	1,00E-06	1,00E-06		
KLX06	747,22	767,22									1,22E-10	0	1	6,00E-11	3,00E-10	1,00E-06	1,00E-06		
KLX06	767,25	787,25									6,36E-07	0	1	5,00E-07	2,00E-06	1,00E-06	1,00E-06		
KLX06	787,28	807,28									#NV	0	1	1,00E-13	1,00E-11	1,00E-06	1,00E-06		
KLX06	807,31	827,31									1,16E-09	0	1	4,00E-09	3,00E-08	1,00E-06	1,00E-06		
KLX06	827,33	847,33									2,13E-07	0	1	9,00E-08	5,00E-07	1,00E-06	1,00E-06		
KLX06	847,39	867,39									1,07E-08	0	1	8,00E-09	4,00E-08	1,00E-06	1,00E-06		
KLX06	867,46	887,46									#NV	0	1	1,00E-13	1,00E-11	#NV	#NV		
KLX06	887,48	907,48									#NV	-1	1	1,00E-13	1,00E-11	#NV	#NV		
KLX06	907,49	927,49									5,48E-08	0	1	8,00E-09	4,00E-08	1,00E-06	1,00E-06		
KLX06	927,50	947,50									1,59E-08	0	1	9,00E-09	5,00E-08	1,00E-06	1,00E-06		
KLX06	947,50	967,50									#NV	0	1	1,00E-13	1,00E-11	1,00E-06	1,00E-06		
KLX06	967,50	987,50									#NV	0	1	1,00E-13	1,00E-11	1,00E-06	1,00E-06		
KLX06	260.00	265.00									1,03E-04	0	1	6,00E-05	3,00E-04	1,00E-06	1,00E-06		
KLX06	558.20	563.20									1,10E-05	0	1	6,00E-06	3,00E-05	1,00E-06	1,00E-06		
KLX06	776.20	781.20									6,60E-07	0	1	6,00E-07	1,00E-06	1,00E-06	1,00E-06		

idcode	secup	seclow	value_type_ks	l_meas_limit_ks	u_meas_limit_ks	spec_storage_ss	assumed_ss	c	cd	skin	stor_ratio	interflow_coeff	dt1	dt2	transmissivity_t_ilr	storativity_s_ilr	value_type_t_ilr	bc_t_ilr	c_ilr
KLX06	106,38	206,38						3,67E-08	4,05E-02	-5,29E+00			18	186					
KLX06	206,52	306,52						2,04E-08	2,25E-02	4,29E+00			48	1164					
KLX06	306,68	406,68						8,01E-09	8,83E-03	-4,12E-01			204	1794					
KLX06	406,83	506,83						1,84E-10	2,03E-04	8,30E-01			132	1542					
KLX06	506,92	606,92						1,97E-08	2,17E-02	-1,56E+00			324	1722					
KLX06	607,06	707,06						9,62E-10	1,06E-03	2,22E+00			516	1560					
KLX06	707,15	807,15						4,89E-08	5,39E-02	-5,40E+00			1314	2694					
KLX06	807,31	907,31						9,27E-09	1,02E-02	-1,15E+00			#NV	#NV					
KLX06	887,48	987,48						5,22E-10	5,75E-04	-8,66E-01			600	840					
KLX06	106,38	126,38						1,80E-08	1,98E-02	-3,56E+00			444	1038					
KLX06	126,42	146,42						1,95E-10	2,15E-04	3,16E+00			54	396					
KLX06	146,44	166,44						1,60E-10	1,76E-04	3,86E+00			114	876					
KLX06	166,47	186,47						5,99E-09	6,60E-03	-2,09E+00			18	228					
KLX06	186,49	206,49						1,51E-09	1,66E-03	1,35E+01			150	1116					
KLX06	206,52	226,52						1,17E-09	1,29E-03	1,19E+00			36	96					
KLX06	226,56	246,56						4,89E-10	5,39E-04	4,59E+00			288	1014					
KLX06	246,62	266,62						1,70E-08	1,87E-02	0,00E+00			36	60					
KLX06	266,64	286,64						1,04E-09	1,15E-03	4,72E+00			66	1086					
KLX06	286,68	306,68						5,87E-11	6,47E-05	3,34E+00			66	1062					
KLX06	306,68	326,68						6,53E-10	7,20E-04	6,70E-01			186	948					
KLX06	326,69	346,69						9,17E-10	1,01E-03	2,39E+00			66	1044					
KLX06	346,74	366,74						2,88E-10	3,17E-04	5,90E-01			60	702					
KLX06	356,77	376,77						7,41E-10	8,17E-04	3,80E+00			90	918					
KLX06	376,80	396,80						8,72E-09	9,61E-03	1,25E+00			882	1536					
KLX06	391,80	411,80						4,15E-09	4,57E-03	3,20E-01			594	1152					
KLX06	406,83	426,83						6,21E-11	6,84E-05	1,62E+00			54	1158					
KLX06	426,86	446,86						5,57E-11	6,14E-05	2,34E+00			48	930					
KLX06	446,88	466,88						8,03E-11	8,85E-05	-9,53E-02			132	786					
KLX06	466,89	486,89						5,72E-11	6,30E-05	4,67E+00			36	822					
KLX06	486,90	506,90						5,32E-11	5,86E-05	7,40E-01			426	1134					
KLX06	506,92	526,92						2,75E-08	3,03E-02	-1,53E+00			468	1380					
KLX06	526,94	546,94						1,70E-10	1,87E-04	1,40E+00			90	396					
KLX06	546,97	566,97						7,30E-09	8,05E-03	-9,60E-01			240	1032					
KLX06	566,98	586,98						1,36E-10	1,50E-04	-1,06E+00			570	1188					
KLX06	587,02	607,02						#NV	#NV	#NV			#NV	#NV					
KLX06	607,06	627,06						9,90E-12	1,09E-05	5,53E+00			144	858					
KLX06	627,10	647,10						5,56E-10	6,13E-04	4,38E+00			102	822					
KLX06	647,11	667,11						1,57E-10	1,73E-04	1,40E+00			204	930					
KLX06	667,09	687,09						8,07E-11	8,89E-05	-2,73E+00			#NV	#NV					
KLX06	687,12	707,12						7,42E-11	8,18E-05	1,90E-01			450	1002					
KLX06	707,15	727,15						2,90E-10	3,20E-04	2,16E+00			12	18					
KLX06	727,19	747,19						1,63E-10	1,80E-04	-8,90E-01			90	954					
KLX06	747,22	767,22						3,00E-10	3,31E-04	-2,17E+00			744	2448					
KLX06	767,25	787,25						3,52E-08	3,88E-02	-5,20E+00			456	990					
KLX06	787,28	807,28						#NV	#NV	#NV			#NV	#NV					
KLX06	807,31	827,31						6,89E-09	7,59E-03	-5,44E+00			618	990					
KLX06	827,33	847,33						5,68E-11	6,26E-05	9,30E+00			102	828					
KLX06	847,39	867,39						4,83E-11	5,32E-05	2,45E+00			54	1050					
KLX06	867,46	887,46						#NV	#NV	#NV			#NV	#NV					
KLX06	887,48	907,48						#NV	#NV	#NV			#NV	#NV					
KLX06	907,49	927,49						6,02E-11	6,64E-05	1,52E+01			#NV	#NV					
KLX06	927,50	947,50						9,80E-11	1,08E-04	-2,45E+00			408	798					
KLX06	947,50	967,50						#NV	#NV	#NV			#NV	#NV					
KLX06	967,50	987,50						#NV	#NV	#NV			#NV	#NV					
KLX06	260.00	265.00						2,58E-08	2,84E-02	1,21E+01			167	40680					
KLX06	558.20	563.20						2,20E-09	2,42E-03	-3,30E+00			72	2880					
KLX06	776.20	781.20						7,00E-08	7,72E-02	-5,00E+00			3600	28800					

idcode	secup	seclow	cd_ilr	skin_ilr	stor_ratio_ilr	interflow_coeff_ilr	transmissivity_t_grf	value_type_t_grf	bc_t_grf	storativity_s_grf	flow_dim_grf	comment	ri-index	ri-value
KLX06	106,38	206,38											0	258,8981456
KLX06	206,52	306,52											0	322,9954945
KLX06	306,68	406,68											0	221,6361232
KLX06	406,83	506,83											0	52,47941191
KLX06	506,92	606,92											0	175,3289138
KLX06	607,06	707,06											1	78,365682
KLX06	707,15	807,15											0	298,2187235
KLX06	807,31	907,31											-1	74,40215191
KLX06	887,48	987,48											0	46,89080539
KLX06	106,38	126,38											0	286,6299273
KLX06	126,42	146,42											0	30,03435714
KLX06	146,44	166,44											0	68,64103666
KLX06	166,47	186,47											0	153,4211662
KLX06	186,49	206,49											0	144,8043538
KLX06	206,52	226,52											-1	51,29237429
KLX06	226,56	246,56											0	105,2703903
KLX06	246,62	266,62											0	191,8305606
KLX06	266,64	286,64											0	113,0771957
KLX06	286,68	306,68											0	94,7573752
KLX06	306,68	326,68											0	112,0918227
KLX06	326,69	346,69											0	139,121669
KLX06	346,74	366,74											0	136,7646373
KLX06	356,77	376,77											0	142,187046
KLX06	376,80	396,80											0	70,69227602
KLX06	391,80	411,80											0	35,31957193
KLX06	406,83	426,83											0	25,40002546
KLX06	426,86	446,86											0	26,26965308
KLX06	446,88	466,88											-1	5,248478162
KLX06	466,89	486,89											0	39,78299936
KLX06	486,90	506,90											1	6,989160771
KLX06	506,92	526,92											0	73,18444202
KLX06	526,94	546,94											0	32,4857217
KLX06	546,97	566,97											0	145,6460526
KLX06	566,98	586,98											0	25,73652295
KLX06	587,02	607,02											-	-
KLX06	607,06	627,06											0	7,684650922
KLX06	627,10	647,10											0	65,53822619
KLX06	647,11	667,11											0	38,71329285
KLX06	667,09	687,09											1	1,704652505
KLX06	687,12	707,12											1	2,45423503
KLX06	707,15	727,15											1	3,207635783
KLX06	727,19	747,19											0	31,33189684
KLX06	747,22	767,22											1	11,77525431
KLX06	767,25	787,25											1	69,88237979
KLX06	787,28	807,28											-	-
KLX06	807,31	827,31											1	98,3227058
KLX06	827,33	847,33											0	53,1616324
KLX06	847,39	867,39											0	25,16803746
KLX06	867,46	887,46											-	-
KLX06	887,48	907,48											-	-
KLX06	907,49	927,49											0	27,61126675
KLX06	927,50	947,50											1	3,166295088
KLX06	947,50	967,50											-	-
KLX06	967,50	987,50											-	-
KLX06	260.00	265.00											0	3013,887106
KLX06	558.20	563.20											1	246,8381063
KLX06	776.20	781.20											-1	345,5373609