P-05-273

Oskarshamn site investigation

Hydraulic injection tests in borehole KLX07A, 2005

Laxemar

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December 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 KLX07A at the Laxemar area, Oskarshamn. The tests are part of the general program for site investigations and specifically for the Laxemar sub-area. The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties of the fractured zones and rock mass between them. Data is subsequently delivered for the site descriptive model.

This report describes the results and primary data evaluation of the hydraulic injection tests in borehole KLX07A performed between 20th of August and 1th of September 2005.

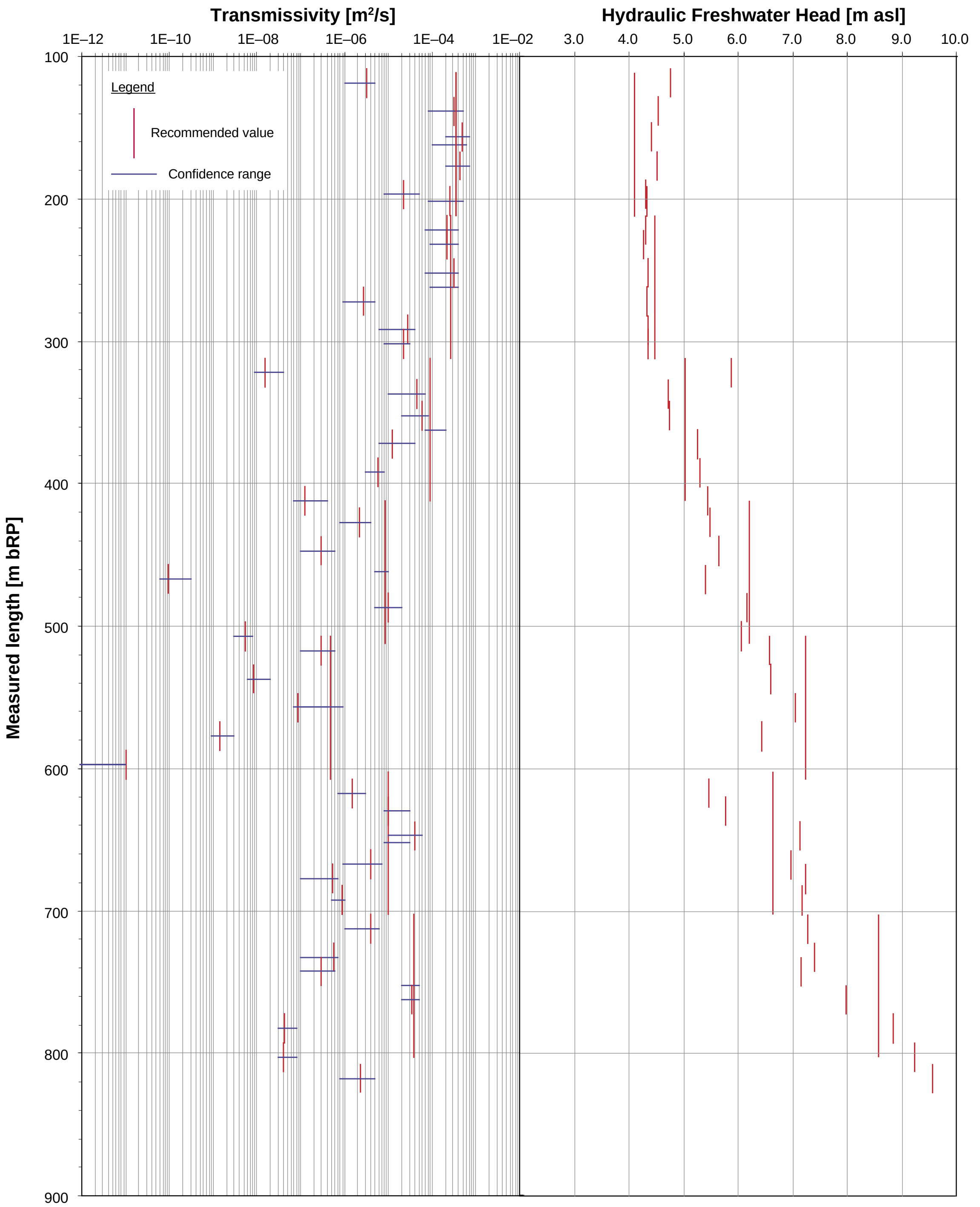
The objective of the hydrotests was to describe the rock around the borehole with respect of hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K) at different measurement scales of 100 m and 20 m sections. Transient evaluation during flow and recovery period provided additional information such as flow regimes, hydraulic boundaries and cross-over flows. Constant pressure injection tests were conducted between 108.50–827.56 m below ToC. The results of the test interpretation are presented as transmissivity, hydraulic conductivity and hydraulic freshwater head.

Sammanfattning

Injektionstester har utförts i borrhål KLX07A i delområde Laxemar, Oskarshamn. Testerna är en del av SKB:s platsundersökningar. Hydraultestprogrammet där injektionstesterna ingår har som mål att karakterisera berget med avseende på dess hydrauliska egenskaper av sprickzoner och mellanliggande bergmassa. Data från testerna används vid den platsbeskrivande modelleringen av området.

Denna rapport redovisar resultaten och utvärderingar av primärdata de hydrauliska injektionstesterna i borrhål KLX07A. Testerna utfördes mellan den 20 augusti till den 1 september 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 108,50–827,56 m borrhålslängd. Resultaten av testutvärderingen presenteras som transmissivitet, hydraulisk konduktivitet och grundvattennivå uttryckt i ekvivalent sötvattenpelare (freshwater head).



Borehole KLX07A – Summary of results.

Contents

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 Oskarshamn area /SKB 2001b/. The hydraulic injection tests form part of the site characterization program under item 1.1.5.8 in the work breakdown structure of the execution programme, /SKB 2002/.

Measurements were carried out in borehole KLX07A during 20th of August and 1th of September 2005 following the methodology described in SKB MD 323.001 and in the activity plan AP PS 400-05-045 (SKB controlling documents). Data and results were delivered to the SKB site characterization database SICADA.

The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties of the fractured zones and rock mass between them. This report describes the results and primary data evaluation of the hydraulic injection tests in borehole KLX07A. The commission was conducted by Golder Associates AB and Golder Associates GmbH.

Borehole KLX07A is situated in the Laxemar area approximately 2 km north-west of the nuclear power plant of Simpevarp, Figure 1-1. The borehole was drilled from November 2004 to May 2005 at 844.73 m length with an inner diameter of 76 mm and an inclination of –60.04°. The upper 11.80 m is cased with large diameter telescopic casing ranging from diameter (outer diameter) 208 mm–323 mm.

The work was carried out in accordance with activity plan AP PS 400-05-045. In Table 1-1 controlling documents for performing this activity are listed. Both activity plan and method descriptions are SKB's internal controlling documents. Measurements were conducted utilising SKB's custom made testing equipment PSS2.

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

Activity plan	Number	Version
Test pumping and hydraulic injection tests in borehole KLX03.	AP PS 400-05-045	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

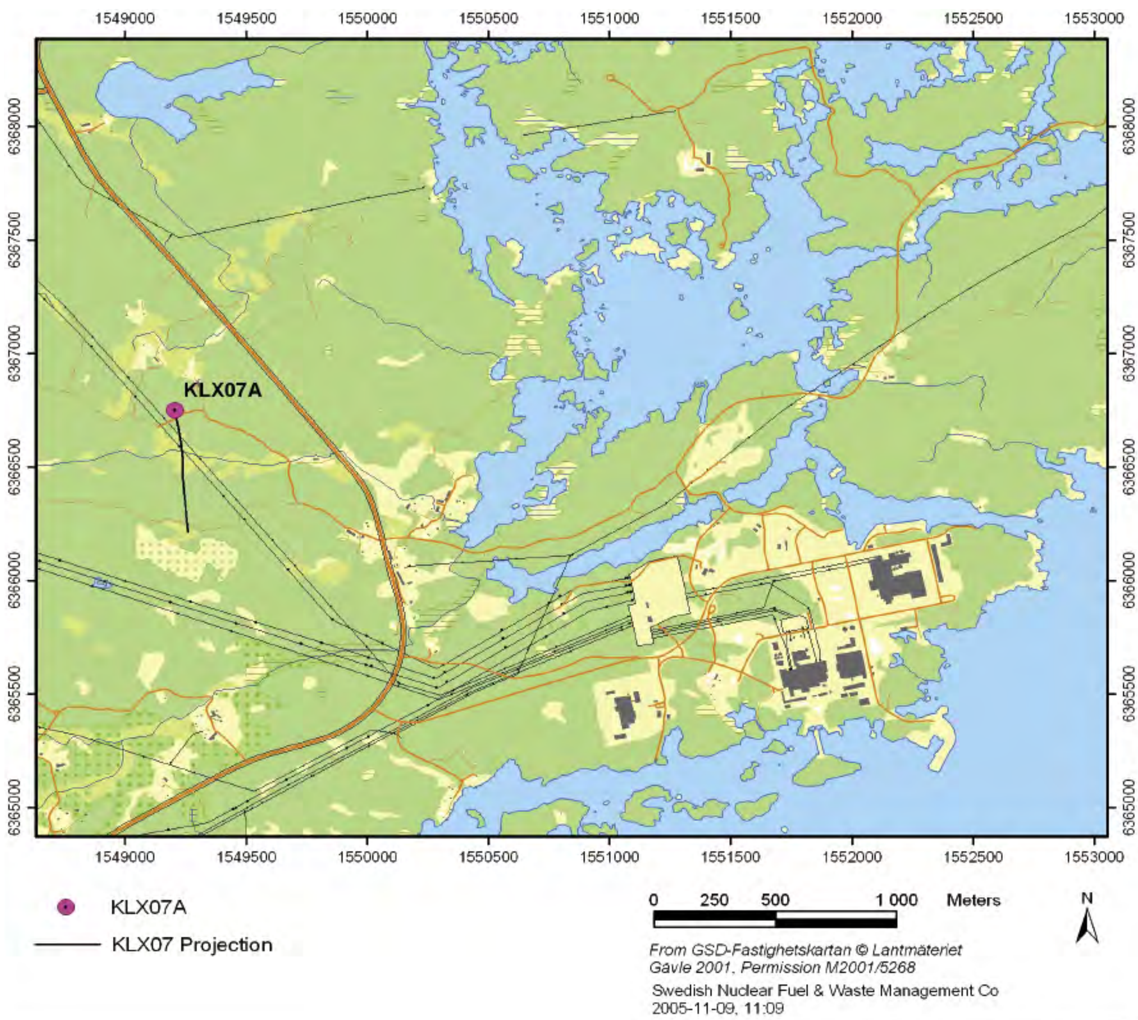


Figure 1-1. *The investigation area Laxemar, Oskarshamn with location of borehole KLX07A.*

2 Objective

The objective of the hydrotests in borehole KLX07A 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. Transient evaluation during the flow and recovery period provides additional information such as flow regimes, hydraulic boundaries and cross-over flows.

A further subactivity of pumping for interference tests is planned according to the activity plan AP PS 400-05-045. A separate report for this activity will be done.

3 Scope of work

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

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

The following hydraulic injection tests were performed between 20th August and 1th September 2005.

Table 3-1. Performed injection tests at borehole KLX07A.

No of injection tests	Interval	Positions	Time/test	Total test time
7	100 m	111.80–802.45 m	125 min	14.6 hrs
41	20 m	108.50–827.56 m	90 min	61.5 hrs
Total				76.1 hrs

3.1 Borehole

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

Table 3-2. Information about KLX07A (from SICADA 2005-11-07 15:39:46).

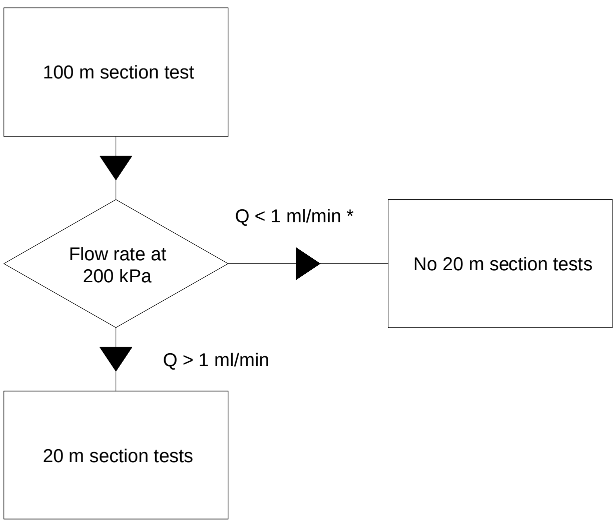
Title	Value				
Old idcode name(s)	KLX07				
Comment	No comment exists				
Borehole length (m)	844.73				
Reference level	TOC				
Drilling period(s)	**From date**	**To date**	**Secup (m)**	**Seclow (m)**	**Drilling type**
	2004-11-23	2004-12-07	0.000	100.460	Percussion drilling
	2005-01-06	2005-05-04	100.460	844.730	Core drilling
Starting point coordinate	**Length (m)**	**Northing (m)**	**Easting (m)**	**Elevation (masl)**	**Coord system**
(centerpoint of TOC)	0.000	6366752.094	1549206.855	18.470	RT90-RHB70 Measured
Angles	**Length (m)**	**Bearing**	**Inclination (– = down)**		
	0.000	174.179	–60.038		RT90-RHB70 Measured
Borehole diameter	**Secup (m)**	**Seclow (m)**	**Hole diam (m)**		
	0.000	8.900	0.343		
	8.900	11.800	0.252		
	11.800	100.300	0.198		
	100.300	100.400	0.165		
	100.400	100.460	0.165		
	100.460	101.980	0.086		
	101.980	844.730	0.076		
Core diameter	**Secup (m)**	**Seclow (m)**	**Core diam (m)**		
	100.460	204.670	0.050		
	204.670	210.020	0.045		
	210.020	212.060	0.050		
	212.060	217.650	0.045		
	217.650	226.850	0.050		
	226.850	232.450	0.045		
	232.450	238.570	0.050		
	238.570	241.090	0.045		
	241.090	407.060	0.050		
	407.060	413.150	0.045		
	413.150	416.050	0.050		
	416.050	426.850	0.045		
	426.850	431.060	0.050		
	431.060	432.550	0.045		
	432.550	447.700	0.050		
	447.700	468.370	0.045		
	468.370	486.040	0.050		
	469.040	552.630	0.045		
	552.630	844.730	0.050		
Casing diameter	**Secup (m)**	**Seclow (m)**	**Case in (m)**	**Case out (m)**	
	0.000	11.800	0.200	0.208	
	0.000	8.900	0.310	0.323	

Grove milling	Length (m)	Trace detectable
	110.000	YES
	150.000	YES
	200.000	YES
	250.000	YES
	300.000	YES
	349.000	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

3.2 Injection tests

Injection tests were conducted according to the Activity Plan AP PS 400-05-045 and the method description for hydraulic injection tests, SKB MD 323.001 (SKB internal documents). Tests were done in 100 m test sections between 111.80–802.45 m below ToC and in 20 m test sections between 108.50–827.56 m below ToC (see Table 3-3). The initial criteria for performing injection tests in 20 m test sections was a measurable flow of Q > 0.001 L/min in the previous measured 100 m tests covering the smaller 20 m sections (see Figure 3-1). The measurements were performed with SKBs custom made equipment for hydraulic testing called PSS2.

No other additional measurements except the actual hydraulic tests and related measurements of packer position and water level in annulus of borehole KLX07A were conducted.



* eventually tests performed after specific discussion with SKB

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

Table 3-3. Tests performed.

Bh ID	Test section (m bToC)	Test type[1]	Test no	Test start Date, time	Test stop Date, time
KLX07A	111.80–211.80	3	1	050820 16:35	050820 18:59
KLX07A	211.92–311.92	3	1	050821 15:28	050821 17:22
KLX07A	312.00–412.00	3	1	050821 18:57	050821 20:52
KLX07A	412.07–512.07	3	1	050822 09:58	050822 11:58
KLX07A	507.16–607.16	3	1	050822 13:45	050822 15:37
KLX07A	602.32–702.32	3	1	050822 17:07	050822 20:46
KLX07A	702.45–802.45	3	1	050823 09:33	050822 11:31
KLX07A	108.50–128.50	3	1	050824 16:10	050824 17:37
KLX07A	128.50–148.50	3	1	050824 18:21	050824 20:21
KLX07A	146.50–166.50	3	1	050825 08:15	050825 10:27
KLX07A	166.84–186.84	3	1	050825 11:10	050825 12:33
KLX07A	186.88–206.88	3	1	050825 13:32	050825 14:48
KLX07A	191.89–211.89	3	1	050825 15:22	050825 16:56
KLX07A	211.92–231.92	3	1	050825 17:38	050825 19:06
KLX07A	221.93–241.93	3	1	050826 08:21	050826 09:49
KLX07A	241.93–261.93	3	1	050826 10:33	050826 12:15
KLX07A	261.95–281.95	3	1	050826 13:17	050826 14:46
KLX07A	281.98–301.98	3	1	050826 15:36	050826 16:54
KLX07A	291.99–311.99	3	1	050826 17:29	050826 20:01
KLX07A	312.00–332.00	3	2	050827 11:12	050827 13:17
KLX07A	326.99–346.99	3	1	050827 14:01	050827 15:30
KLX07A	341.99–361.99	3	1	050827 16:09	050827 17:49
KLX07A	362.07–382.07	3	1	050827 18:31	050827 20:04
KLX07A	382.08–402.08	3	1	050828 08:24	050828 11:08
KLX07A	402.06–422.06	3	1	050828 10:31	050828 11:57
KLX07A	417.07–437.07	3	1	050828 13:21	050828 14:43
KLX07A	437.08–457.08	3	1	050828 15:25	050828 16:32
KLX07A	457.08–477.08	3	1	050828 17:32	050829 00:57
KLX07A	477.12–497.12	3	1	050829 08:35	050829 10:03
KLX07A	497.14–517.14	3	1	050829 10:40	050829 12:56
KLX07A	507.16–527.16	3	1	050829 14:23	050829 15:53
KLX07A	527.20–547.20	3	1	050829 16:35	050829 18:09
KLX07A	547.23–567.23	3	1	050829 18:49	050829 20:18
KLX07A	567.26–587.26	3	1	050830 09:08	050830 10:50
KLX07A	587.30–607.30	3	1	050830 11:38	050830 12:37
KLX07A	607.32–627.32	3	1	050830 14:27	050830 15:54
KLX07A	620.00–640.00	3	1	050830 16:32	050830 17:56
KLX07A	637.36–657.36	3	1	050830 18:37	050830 20:53
KLX07A	657.41–677.41	3	1	050831 09:19	050831 10:51
KLX07A	667.42–687.42	3	1	050831 14:40	050831 16:00
KLX07A	682.43–702.43	3	1	050831 16:52	050831 18:20
KLX07A	702.45–722.45	3	1	050831 19:04	050831 20:24
KLX07A	722.46–742.46	3	1	050901 08:07	050901 09:29
KLX07A	732.48–752.48	3	1	050901 10:12	050901 11:37

Bh ID	Test section (m bToC)	Test type[1]	Test no	Test start Date, time	Test stop Date, time
KLX07A	752.51–772.51	3	1	050901 12:30	050901 14:04
KLX07A	772.53–792.53	3	1	050901 15:01	050901 16:33
KLX07A	792.55–812.55	3	1	050901 17:21	050901 18:43
KLX07A	807.56–827.56	3	1	050901 19:41	050901 22:40

3: Injection test

3.3 Control of equipment

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

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

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

4 Equipment

4.1 Description of equipment

The equipment called PSS2 (Pipe String System 2) is a highly integrated tool for testing boreholes at great depth (see conceptual drawing in the next figure). The system is built inside a container suitable for testing at any weather. Briefly, the components consists of a hydraulic rig, down-hole equipment including packers, pressure gauges, shut-in tool and level indicator, racks for pump, gauge carriers, breakpins, etc shelfs and drawers for tools and spare parts. Additionally, a high-resolution memory gauge (SPARTEK) was used to provide a better data-quality. This memory gauge was placed on the same position as the (PSS's) own pressure transducer to produce comparable data sets.

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

PSS2 is documented in photographs 1–6.

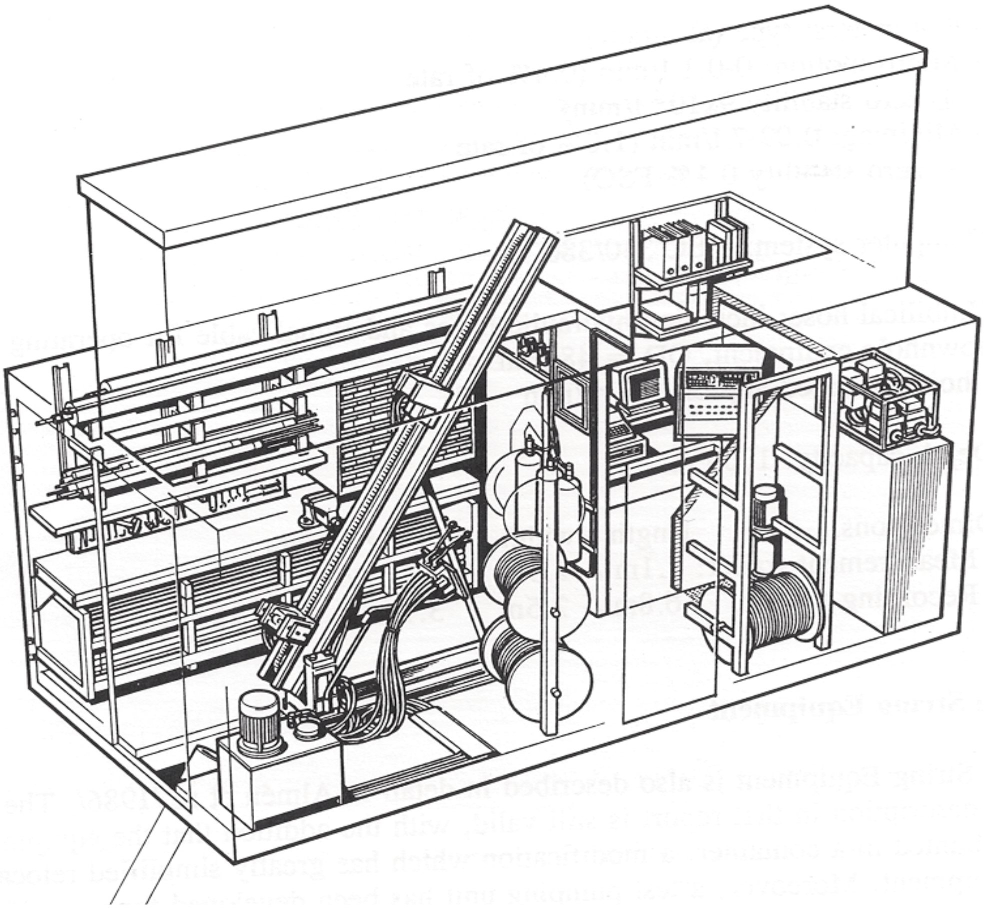


Figure 4-1. *A view of the layout and equipment of PSS2.*

Photo 1. *Hydraulic rig.*

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

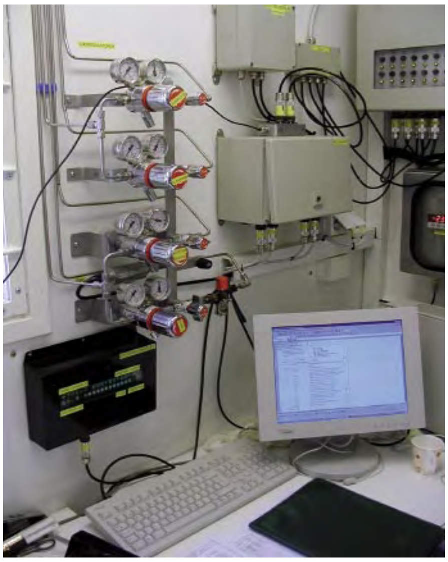


Photo 3. *Computer room, displays and gas regulators.*

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.*

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

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

The tool scheme is presented in Figure 4-2.

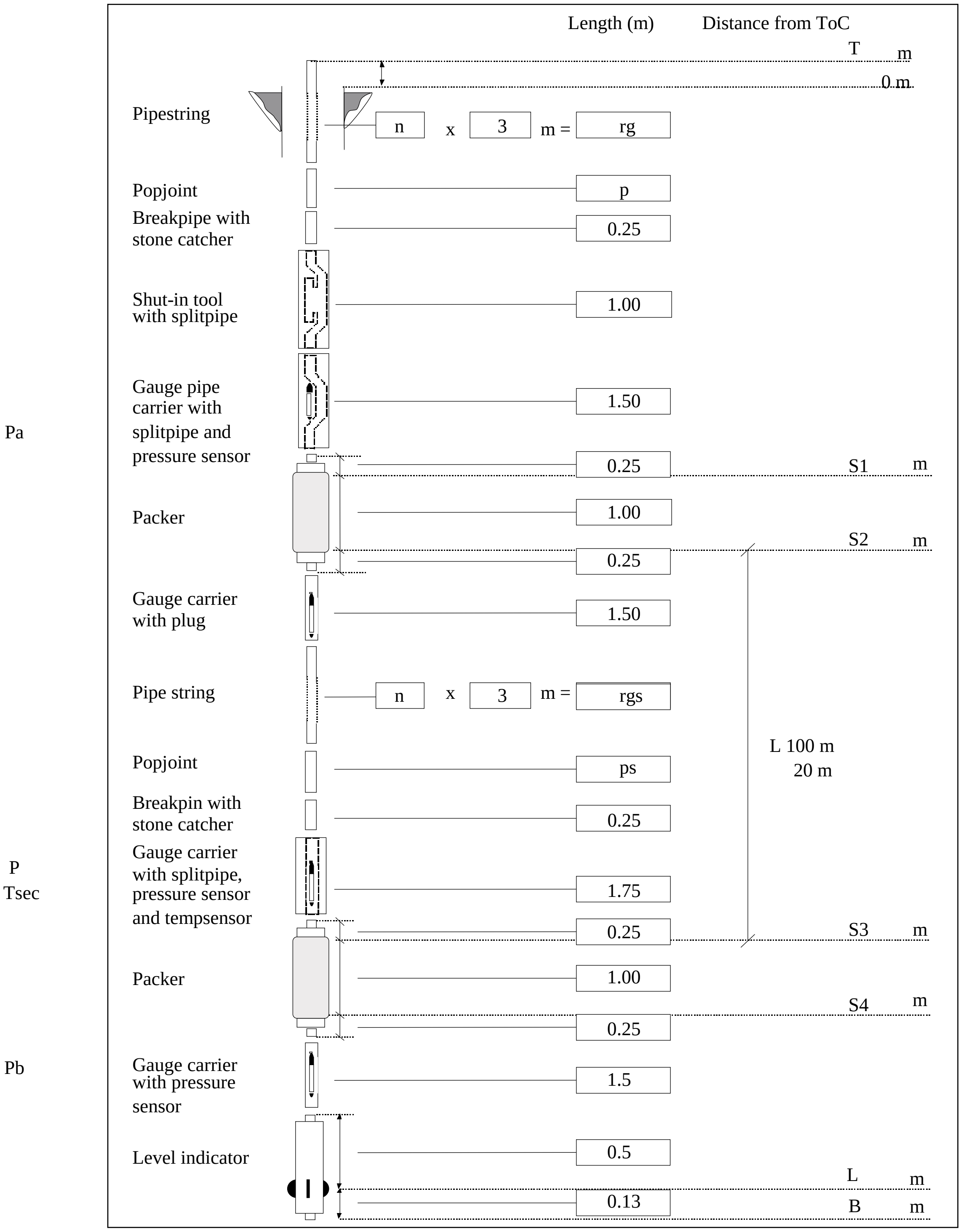


Figure 4-2. *Schematic drawing of the down-hole equipment in the PSS2 system.*

4.2 Sensors

Table 4-1. Technical specifications of sensors.

Keyword	Sensor	Name	Value/Range	Unit	Comments
$P_{sec,a,b}$	Pressure	Druck PTX 162-1464abs	9–30 4–20 0–13.5 ±0.1	VDC mA MPa % of FS	
P_{sec}	Pressure	Spartek SS2500 #3890	0–2.1 1,000,000 ±0.022	MPa Sample Points % of FS	High-resolution memory gauge
$T_{sec,surf,air}$	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 ±0.15	VDC mA MPa % of FS	
L	Level Indicator				Length correction

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

Borehole information			Sensors		Equipment affecting WBS coefficient		
ID	Test section (m)	Test no	Type	Position (m fr ToC)	Position	Function	Outer diameter (mm)
KLX07A	111.80–211.80	1	p_a p T p_b L	109.91 211.17 211.00 213.81 215.05	Test section	Signal cable Pump string Packer line	9.1 33 6
KLX07A	108.50–128.50	1	p_a p T p_b L	106.61 127.87 127.70 130.51 131.75	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.

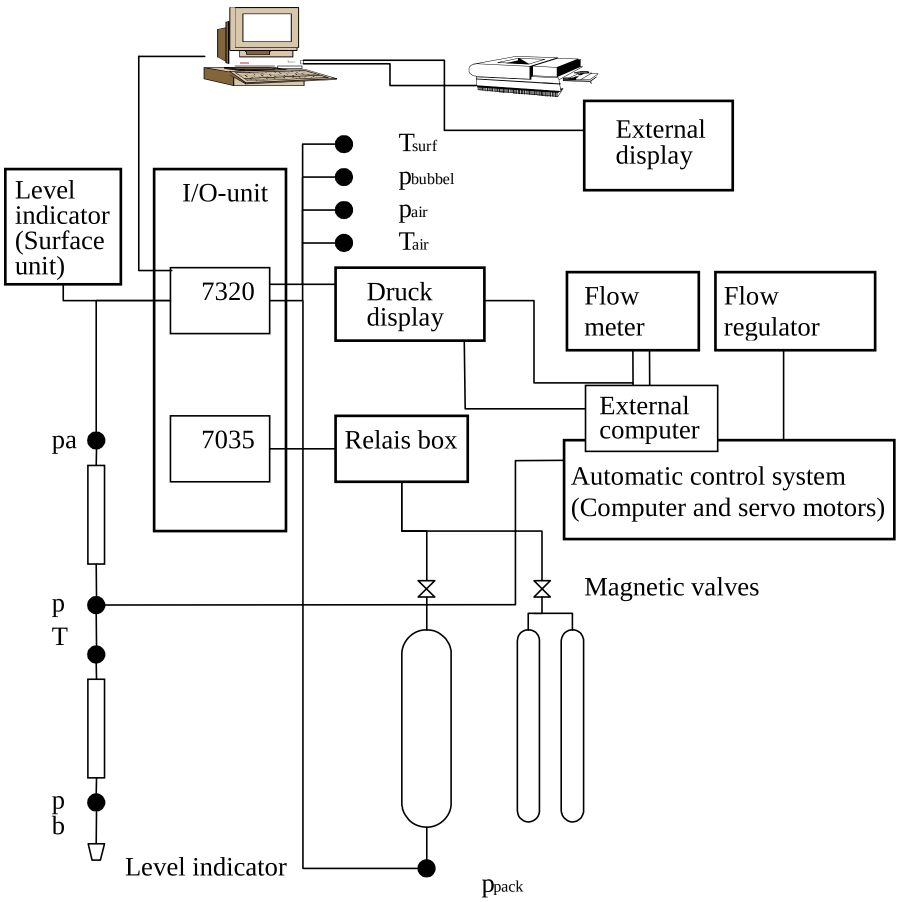


Figure 4-3. *Schematic drawing of the data acquisition system and the flow regulation control system in PSS2.*

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 HLX10.
- Filling buffer tank with water and tracer it with Uranin; take water sample.
- Filling vessels.
- Filling the hoses for test valve and packer.
- Entering calibration constants to system and regulation unit.
- Synchronize clocks on all computers.
- Function check of shut-in tool both ends, overpressure by 900 kPa for 5 min (OK).
- Check pressure gauges against atmospheric pressure and than on test depth against column of water.
- Translate all protocols into English (where necessary).
- Filling packers with water and de-air.
- Measure and assemble test tool.

5.2 Length correction

By running in with the test tool, a level indicator is incorporated at the bottom of the tool. The level indicator is able to record groves milled into the borehole wall. The depths of this groves are given by SKB in the activity plan (see Table 3-2) and the measured depth is counter checked against the number/length of the tubes build in. The achieved correction value, based on linear interpolation between the reference marks, is used to adjust the location of the packers for the testsections to avoid wrong placements and minimize elongation effects of the test string.

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.

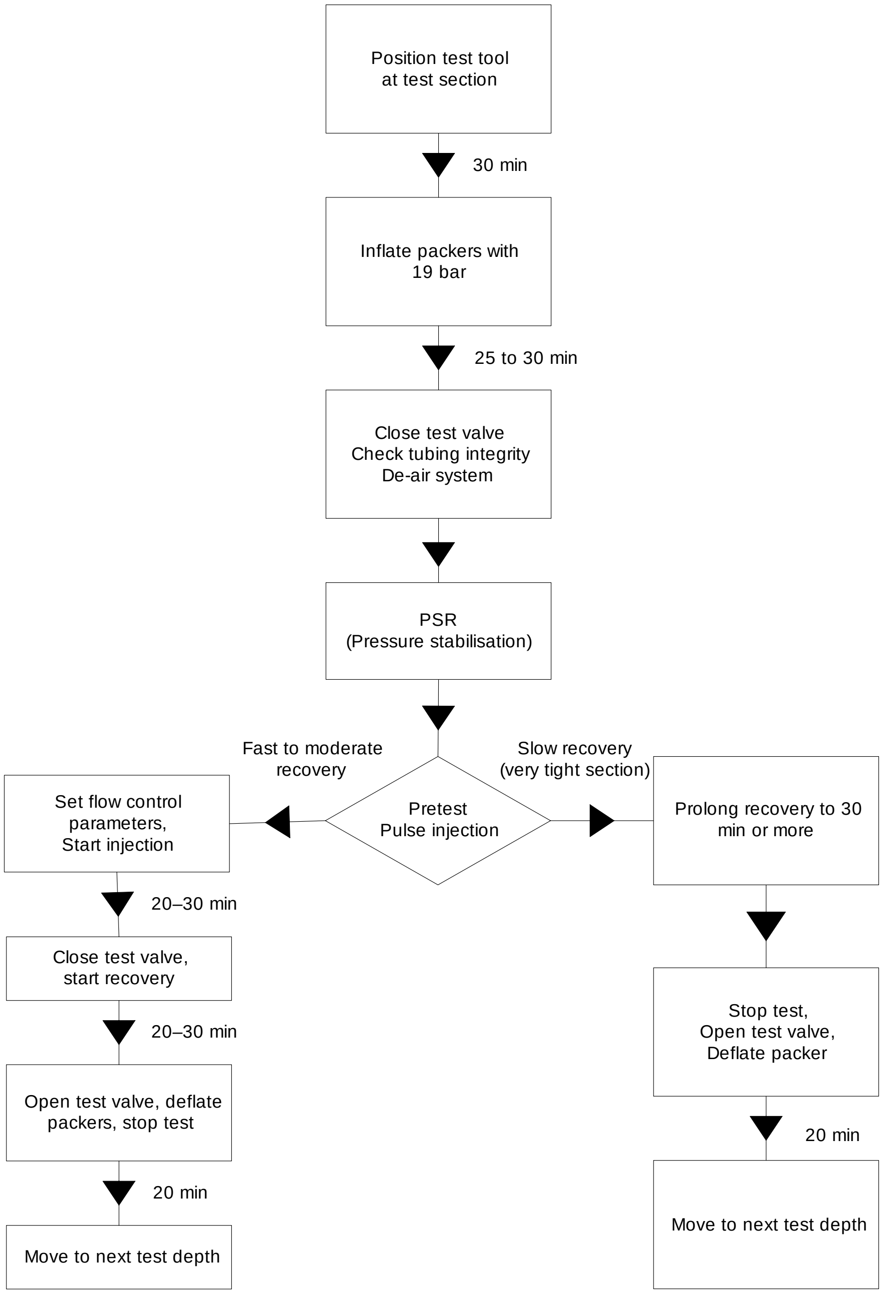


Figure 5-1. *Flow chart for test performance.*

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 KLX07A has been carried out by applying a constant injection pressure of approx 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 KLX07A.

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

5.4 Data handling

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

After run out the tool (e.g. for rebuild to another section length), the data sample by the memory-gauge (SPARTEK) was read out and converted into a ASCII file. For every test section a single *.xls file was produced and used for the analysis of recovery phase (CHir). The synthesised *.xls files were delivered to SKB after the field campaign.

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.

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/.

- Pre-test for the Injection Tests.

A test cycle always started with a pulse injection test whose goal it was to derive a first estimation of the formation transmissivity. If the pressure recovery of this brief injection was very slow, it indicated a very tight section. It is then decided to extend the recovery time and measure the pressure recovery (PI). During the brief injection phase a small volume is injected (derived from the flowmeter measurements and/or replacement in injection vessel). This injected volume produces the pressure increase of dp. Using a dV/dp approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated.

No very tight sections were identified in the Borehole KLX07A and after a relatively short pulse recovery time (from 5 min up to 30 min) an injection test was conducted even if a small flow was expected.

5.5.4 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.

5.5.5 Calculation of the static formation pressure and equivalent freshwater head

The static formation pressure (p*) measured at transducer depth, was derived from the pressure recovery (CHir) following the constant pressure injection phase by using:

(1) straight line extrapolation in cases infinite acting radial flow (IARF) occurred,

(2) type curve extrapolation in cases infinite acting radial flow (IARF) is unclear or was not reached.

The equivalent freshwater head (expressed in metres above sea level) was calculated from the extrapolated static formation pressure (p*), corrected for athmospheric pressure measured by the surface gauge and corrected for the vertical depth considering the inclination of the drillhole, by assuming a water density of 1,000 kg/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 5-2 shows the methodology schematically.

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

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

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

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

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

5.5.6 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.

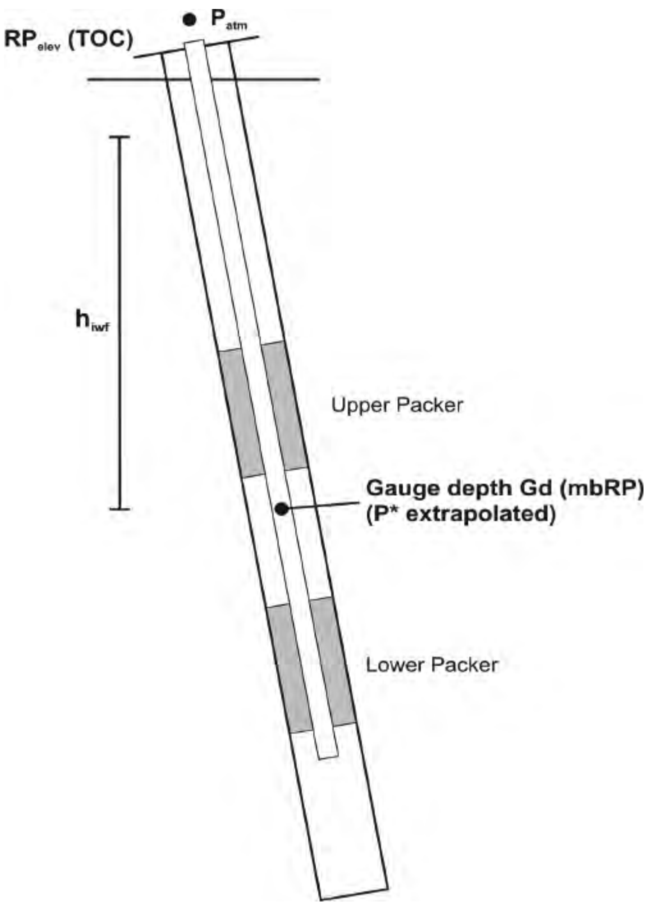


Figure 5-2. *Schematic methodologies for calculation of the freshwater head.*

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 100 m tests and 6.2 the 20 m tests. The results are given as general comments to test performance, the identified flow regimes and calculated parameters 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 KLX07A are presented and analysed.

6.1.1 Section 111.80–211.80 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 21 kPa. A slight reaction between the test interval and the bottom zone was observed The injection rate decreased from 37.6 L/min at start of the CHi phase to 28.2 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy in early times, due to the fact that it took a while to get stable pressure conditions. In middle and late times the derivative is flat and shows radial flow (flow dimension of 2). The response of the CHir phase is consistent to the response of the CHi phase. An infinite acting radial flow model was used for the analyses of both phases. The analysis is presented in Appendix 2-1.

Selected representative parameters

The recommended transmissivity of $3.6 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-4}$ to $6.0 \cdot 10^{-4}$ 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 1,594.0 kPa.

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

6.1.2 Section 211.92–311.92 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 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 66 kPa. A slight reaction between the test interval and the zone above was observed (the pressure in the upper zone rose by 3 kPa). The injection rate decreased from 34.8 L/min at start of the CHi phase to 30.5 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a flat derivative at middle and late times, indicating a flow dimension of 2 (radial flow). The derivative of the CHir phase shows a horizontal stabilisation at early and middle times, followed by a downward trend and a second stabilisation at a lower level. This is indicative for a transition to a zone of higher transmissivity away from the borehole. A two shell radial composite flow model was chosen for the analysis of the CHir phase. The Chi phase was analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2-2.

Selected representative parameters

The recommended transmissivity of $2.7 \cdot 10^{-4}$ 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 $9.0 \cdot 10^{-5}$ to $4.0 \cdot 10^{-4}$ 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 2,342.3 kPa.

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

6.1.3 Section 312.00–412.00 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 120 kPa. No connection between the test interval and the adjacent zones was observed The injection rate decreased from 21.2 L/min at start of the CHi phase to 14.2 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows horizontal stabilization at middle times, followed by a downward trend and a second stabilization at late times, which is indicative for a transition from a zone of lower transmissivity to a zone of higher transmissivity at some distance from the borehole. The response of the CHir phase is consistent to the response of the CHi phase. A two shell radial composite flow model was chosen for the analysis of the CHi and CHir phase. The analysis is presented in Appendix 2-3.

Selected representative parameters

The recommended transmissivity of $8.9 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $7.0 \cdot 10^{-5}$ to $2.0 \cdot 10^{-4}$ 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 3,053.9 kPa.

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

6.1.4 Section 412.07–512.07 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 decreased from 6.37 L/min at start of the CHi phase to 4.59 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is flat at middle and late times, indicating a flow dimension of 2 (radial flow). The response of the CHir phase shows a flat derivative at late times, too. The Chi phase was analysed using an infinite acting radial flow model. Due to the high skin value of the CHir phase, a two shell radial composite flow model was chosen for the analysis of this phase. The analysis is presented in Appendix 2-4.

Selected representative parameters

The recommended transmissivity of $8.3 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHi, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-6}$ to $1.0 \cdot 10^{-5}$ 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 3,772.6 kPa.

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

6.1.5 Section 507.16–607.16 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 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 208 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 0.77 L/min at start of the CHi phase to 0.55 L/min at the end, indicating a moderate interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a slight indication of horizontal stabilization at early times and a downward trend at middle times, followed by a new stabilization at late times, which is indicative for a transition to a zone of higher transmissivity at some distance from the borehole. The derivative of the CHir phase shows a continuous downward trend at middle times. At the end it shows a noisy stabilisation. A radial two shell composite flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-5.

Selected representative parameters

The recommended transmissivity of $4.8 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-7}$ to $9.0 \cdot 10^{-7}$ 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 4,515.4 kPa.

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

6.1.6 Section 602.32–702.32 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 100 kPa. No hydraulic connection to the adjacent zones was observed. The system needed more than one minute to get stable pressure conditions, so only the second part of the Chi phase is analysable. The injection rate decreased from 13.7 L/min at start of the CHi phase to 9.0 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Ignoring the first part of the Chi phase, both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is flat and horizontal at late times, which is indicative for a flow dimension of 2 (radial flow). The CHir phase derivative shows a flat derivative at middle times and an upward trend at late times. This upward trend is representing either a change in flow dimension or a transition to zone of lower transmissivity further away from the borehole. A two shell radial composite flow model was chosen for the analysis of the CHir phase. The Chi phase was analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2-6.

Selected representative parameters

The recommended transmissivity of $9.8 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-6}$ to $3.0 \cdot 10^{-5}$ 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 5,240.6 kPa.

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

6.1.7 Section 702.45–802.45 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 111 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 27.3 L/min at start of the CHi phase to 20.5 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is flat and horizontal at middle and late times, which is indicative for a flow dimension of 2 (radial flow). The CHir phase derivative shows a flat derivative at middle times and an upward trend at late times. This upward trend is representing either a change in flow dimension or a transition to zone of lower transmissivity further away from the borehole. A two shell radial composite flow model was chosen for the analysis of the CHir phase. The Chi phase was analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2-7.

Selected representative parameters

The recommended transmissivity of $3.8 \cdot 10^{-5}$ 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 $2.0 \cdot 10^{-5}$ to $5.0 \cdot 10^{-5}$ 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 6,022.8 kPa.

The analyses of the CHi and CHir phases show 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 KLX07A are presented and analysed.

6.2.1 Section 108.50–128.50 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 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 201 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 4.2 L/min at start of the CHi phase to 3.1 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a slight downward trend at middle times, followed by a stabilization at late times. The response of the CHir phase is consistent to the response of the CHi phase, although the first stabilization before the downward trend is not visible. A radial two shell composite flow model was chosen for the analyses of both phases. The analysis is presented in Appendix 2-8.

Selected representative parameters

The recommended transmissivity of $3.2 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHi phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-6}$ to $5.0 \cdot 10^{-6}$ 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 986.4 kPa.

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

6.2.2 Section 128.50–148.50 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 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 171 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 11.9 L/min at start of the CHi phase to 11.6 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The system needed a few minutes to get stable pressure conditions, so that the results of the perturbation phase should be regarded carefully. The CHir phase shows very 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 derivative of the CHi phase is very noisy in early time data. In middle and late times, the derivative shows a downward trend. The derivative of the CHir phase is noisy, too. In middle and late times it shows a horizontal stabilization. A radial two shell composite flow model was used for the analyses of both phases. The analysis is presented in Appendix 2-9.

Selected representative parameters

The recommended transmissivity of $3.1 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-5}$ to $5.0 \cdot 10^{-4}$ 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 1,133.7 kPa.

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

6.2.3 Section 146.50–166.50 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 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 due to hydraulic connection to the interval by 13 kPa. The system needed more than one minute to get stable pressure conditions. The injection rate decreased from 26.2 L/min at start of the CHi phase to 25.8 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Only the second part of the Chi phase is analysable. The recovery shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy in early times. At late times the derivative is flat and shows radial flow (flow dimension of 2). The response of the CHir phase is consistent to the response of the CHi phase. An infinite acting radial flow model was used for the analyses of the CHir phase. The Chi phase was analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-10.

Selected representative parameters

The recommended transmissivity of $4.7 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-4}$ to $7.0 \cdot 10^{-4}$ 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 1,265.8 kPa.

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

6.2.4 Section 166.84–186.84 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 80 kPa. The pressure in each of the adjacent zones rose by 3 to 4 kPa due to hydraulic connection to the interval. The injection rate decreased from 33.7 L/min at start of the CHi phase to 32.2 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy in early times. In middle and late times the derivative is flat and shows radial flow (flow dimension of 2). The response of the CHir phase is consistent to the response of the CHi phase. An infinite acting radial flow model was used for the analyses of the CHir phase and a radial two shell composite flow model was used for the Chi phase. The analysis is presented in Appendix 2-11.

Selected representative parameters

The recommended transmissivity of $4.3 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-4}$ to $7.0 \cdot 10^{-4}$ 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 1,416.3 kPa.

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

6.2.5 Section 186.88–206.88 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 201 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from 0.97 L/min at start of the CHi phase to 0.85 L/min at the end, indicating a moderate to high interval transmissivity (consistent with the pulse recovery). The data of the Chi phase are noisy an the CHir phase shows fast recovery, but both phases are still adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy, but a horizontal arrangement of the data, which indicates radial flow, can be assumed. The derivative of the CHir phase shows a downward trend and at late times a horizontal stabilization. An infinite acting radial flow model was used for the analysis of the Chi phase and a radial two shell composite flow model was used to analyse the CHir data. The analysis is presented in Appendix 2-12.

Selected representative parameters

The recommended transmissivity of $2.2 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-6}$ to $5.0 \cdot 10^{-5}$ 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 1,560.3 kPa.

The analyses of the CHi and CHir phases show some inconsistencies. This is mainly caused by the quality of the Chi data and the fast recovery of the CHir phase. In case, further analysis is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects. No further analysis is recommended.

6.2.6 Section 191.89–211.89 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 decreased from 16.9 L/min at start of the CHi phase to 16.2 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy in early times. In middle times the derivative shows a downward trend followed by a horizontal stabilization at late times. This is indicative for the transition to a zone of higher transmissivity at some distance to the borehole. The derivative of the CHir phase shows a noisy but flat part during middle and late time. A radial two shell composite flow model was used for the analyses of both phases. The analysis is presented in Appendix 2-13.

Selected representative parameters

The recommended transmissivity of $2.5 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-5}$ to $5.0 \cdot 10^{-4}$ 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 1,596.6 kPa.

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

6.2.7 Section 211.92–231.92 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 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 201 kPa. A very slight reaction between the test interval and the bottom zone was observed The injection rate decreased from 16.6 L/min at start of the CHi phase to 15.3 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 derivative of the CHi phase is at middle and late times flat and horizontal. This is indicative for a flow dimension of 2 (radial flow). The response of the CHir phase shows a downward trend of the derivative at middle times and a horizontal stabilization at late times. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-14.

Selected representative parameters

The recommended transmissivity of $2.2 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $7.0 \cdot 10^{-5}$ to $4.0 \cdot 10^{-4}$ 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 1,745.2 kPa.

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

6.2.8 Section 221.93–241.93 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. A very slight reaction between the test interval and the bottom zone was observed The injection rate decreased from 16.1 L/min at start of the CHi phase to 15.4 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is flat at late times, indicating radial flow (flow dimension of 2). The response of the CHir phase shows a downward trend of the derivative at middle times and a horizontal stabilization at late times. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-15.

Selected representative parameters

The recommended transmissivity of $2.1 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-5}$ to $4.0 \cdot 10^{-4}$ 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 1,820.1 kPa.

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

6.2.9 Section 241.93–261.93 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 106 kPa. A slight reaction between the test interval and the zone above was observed The injection rate decreased from 32.2 L/min at start of the CHi phase to 30.9 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy, but shows a flat part at middle and late times. The response of the CHir phase is similar and shows a flat and horizontal part at late times, too. Both phases were analysed using an infinite acting homogenous flow model. The analysis is presented in Appendix 2-16.

Selected representative parameters

The recommended transmissivity of $3.2 \cdot 10^{-4}$ m^2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $7.0 \cdot 10^{-5}$ to $4.0 \cdot 10^{-4}$ 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 1,971.2 kPa.

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

6.2.10 Section 261.95–281.95 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 188 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 1.35 L/min at start of the CHi phase to 1.16 L/min at the end, indicating a relatively moderate to high interval transmissivity (consistent with the pulse recovery). 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 derivative of the CHi phase is a little noisy but it shows at middle and late times a horizontal stabilization. The derivative of the CHir phase shows a downward trend at middle times and at late times a stabilization, indicating the transition to a zone of higher transmissivity at some distance to the borehole. The Chi phase was analysed using an infinte acting homogeneous flow model and the Chir phase was analysed with a radial two shell composite flow model. The analysis is presented in Appendix 2-17.

Selected representative parameters

The recommended transmissivity of $2.7 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-7}$ to $5.0 \cdot 10^{-6}$ 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 2,120.2 kPa.

The analyses of the CHi and CHir phases show some minor inconsistencies. 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.

6.2.11 Section 281.98–301.98 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 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 203 kPa. No hydraulic connection to the adjacent intervals was observed. The injection rate decreased from 2.68 L/min at start of the CHi phase to 2.20 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a downward trend followed by a flat part at late times. This is indicative for either a change in flow dimension or a transition to a zone of higher transmissivity at some distance to the borehole. The response of the CHir phase is similar. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-18.

Selected representative parameters

The recommended transmissivity of $2.8 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $6.0 \cdot 10^{-6}$ to $4.0 \cdot 10^{-5}$ 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 2,268.4 kPa.

The analyses of the CHi and CHir phases show some minor inconsistencies. No further analysis is recommended.

6.2.12 Section 291.99–311.99 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 zones above or below was observed. The injection rate decreased from 4.01 L/min at start of the CHi phase to 3.48 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal stabilization at early times. At middle times, the derivative shows a downward trend, indicating a transition to a zone of higher transmissivity. The response of the CHir is very similar. At late times, the second stabilization is visible. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-19.

Selected representative parameters

The recommended transmissivity of $2.2 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-6}$ to $3.0 \cdot 10^{-5}$ 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 2,341.4 kPa.

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

6.2.13 Section 312.00–332.00 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 219 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 234 mL/min at start of the CHi phase to 55 mL/min at the end, indicating a low to moderate interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows at middle times an upward trend followed by a stabilization, which is indicative for the change in flow dimension or transmissivity at some distance to the borehole. The response of the CHir phase is very similar. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-20.

Selected representative parameters

The recommended transmissivity of $1.5 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-9}$ to $4.0 \cdot 10^{-8}$ 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 2,502.0 kPa.

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

6.2.14 Section 326.99–346.99 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. A very slight reaction between the test interval and the bottom zone was observed The injection rate decreased from 7.43 L/min at start of the CHi phase to 6.90 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). 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 derivative of the CHi phase is noisy, but it shows a horizontal stabilization at middle and late times, which is indicative for radial flow (flow dimension of 2). The derivative of the CHir phase is flat at late times, too. The Chi phase was analysed using an infinite acting homogeneous flow model. The analysis of the CHir phase was performed with a radial two shell composite flow model. The analysis is presented in Appendix 2-21.

Selected representative parameters

The recommended transmissivity of $4.5 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $7.0 \cdot 10^{-5}$ 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 2,598.5 kPa.

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

6.2.15 Section 341.99–361.99 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 decreased from 8.01 L/min at start of the CHi phase to 7.51 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). The system needed more than one minute to get stable pressure conditions and the CHir phase shows fast recovery. Nevertheless, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy. A flow dimension of two was assumed. The response of the CHir phase shows a flat derivative at late times, indicating radial flow. The Chi phase was analysed using an infinite acting homogeneous flow model and a two shell composite flow model was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-22.

Selected representative parameters

The recommended transmissivity of $5.9 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-5}$ to $8.0 \cdot 10^{-5}$ 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 2,705.3 kPa.

Considering the noisy data and the fast recovery, the analyses of the CHi and CHir phases show consistency. No further analysis is recommended.

6.2.16 Section 362.07–382.07 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 between the interval and the adjacent zones was observed. The injection rate decreased from 6.73 L/min at start of the CHi phase to 5.95 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Although, the CHir phase shows fast recovery, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is at middle and late times horizontal, which is indicative for radial flow (flow dimension of 2). The CHir phase shows at middle times a downward trend and at late times a stabilization at a lower level. This is either an indication for a change in flow dimension or a change in transmissivity at some distance to the borehole. An infinite acting homogeneous flow model was used for the analysis of the Chi phase. The CHir phase was analysed using a two shell radial composite flow model. The analysis is presented in Appendix 2-23.

Selected representative parameters

The recommended transmissivity of $1.2 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $6.0 \cdot 10^{-6}$ to $4.0 \cdot 10^{-5}$ 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 2,851.3 kPa.

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

6.2.17 Section 382.08–402.08 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 201 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from 4.81 L/min at start of the CHi phase to 3.77 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is at middle and late times flat, which is indicative for radial flow (flow dimension of 2). The CHir phase isflat at late times as well. An infinite acting homogeneous flow model was used for the analysis of both phases. The analysis is presented in Appendix 2-24.

Selected representative parameters

The recommended transmissivity of $5.9 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-6}$ to $8.0 \cdot 10^{-6}$ 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 2,989.3 kPa.

The analyses of the CHi and CHir phases show some minor inconsistencies. In case, further analysis is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects. No further analysis is recommended.

6.2.18 Section 402.06–422.06 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The relatively low 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 201 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from 117 mL/min at start of the CHi phase to 97 mL/min at the end, indicating a relatively low to moderate interval transmissivity (consistent with the pulse recovery). The Chi phase shows no problems and is adequate for quantitative analysis. The CHir phase shows fast recovery and the results of the analysis should be regarded carefully.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is at middle and late times horizontal, which is indicative for radial flow (flow dimension of 2). The CHir phase shows a downward trend followed by a flat part. An radial infinite acting homogeneous flow model was used for the analysis of the Chi phase. The CHir phase was analysed using a two shell radial composite flow model. The analysis is presented in Appendix 2-25.

Selected representative parameters

The recommended transmissivity of $1.2·10^{–7}$ m^2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $7.0·10^{–8}$ to $4.0·10^{–7}$ 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 3,127.1 kPa.

The analyses of the CHi and CHir phases show some inconsistencies, mainly caused by the fast recovery of the CHir phase. In case, further analysis is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects.

6.2.19 Section 417.07–437.07 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 226 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from 2.86 L/min at start of the CHi phase to 2.19 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Although the CHir phase shows fast recovery, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is at middle and late times horizontal, which is indicative for radial flow (flow dimension of 2). The CHir phase shows a horizontal stabilization at late times. An infinite acting homogeneous flow model was used for the analysis of the Chi phase. The CHir phase was analysed using a two shell radial composite flow model. The analysis is presented in Appendix 2-26.

Selected representative parameters

The recommended transmissivity of $2.21 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-7}$ to $4.0 \cdot 10^{-6}$ 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 3,231.4 kPa.

The analyses of the CHi and CHir phases show some inconsistencies, mainly caused by the fast recovery of the CHir phase. In case, further analysis is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects.

6.2.20 Section 437.08–457.08 m, test no 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 225 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from 0.88 L/min at start of the CHi phase to 0.73 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Although, the CHi phase is noisy, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is a bit noisy, but the cloud of data points was interpreted as flat. The CHir phase derivative shows a downward trend at middle times, followed by a kind of stabilization at late times. This was interpreted as a change in transmissivity at some distance from the borehole. An infinite acting homogeneous flow model was used for the analysis of the CHi phase. The CHir phase was analysed using a two shell radial composite flow model. The analysis is presented in Appendix 2-27.

Selected representative parameters

The recommended transmissivity of $2.9 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHir phase (inner zone). The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-7}$ to $6.0 \cdot 10^{-7}$ 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 3,370.9 kPa.

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

6.2.21 Section 457.08–477.08 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 slow recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 204 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from about 7 mL/min at start of the CHi phase to less than1 mL/min. After 12 minutes the perturbation phase was stopped and the recovery was started, because the flow was below the measurement limit. The recovery was measured for 6 hours over night. Although, the CHi phase is due to the low flow rate very noisy, both phases are adequate for quantitative analysis, while the CHir data are more reliable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of both phases does not allow for a specific determination of the flow dimension. A flow dimension of two was assumed. The derivative of the CHir phase shows at middle and late times an upward trend. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-28.

Selected representative parameters

The recommended transmissivity of $9.6 \cdot 10^{-11}$ m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $6.0 \cdot 10^{-11}$ to $3.0 \cdot 10^{-10}$ m^2/s. A flow dimension of 2 was assumed. 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 3,508.2 kPa.

The analyses of the CHi and CHir phases show some inconsistencies, due to the low interval transmissivity. No further analysis is recommended.

6.2.22 Section 477.12–497.12 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a 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 200 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from 2.16 L/min at start of the CHi phase to 1.96 L/min at the end, indicating a medium to high interval transmissivity (consistent with the pulse recovery). Although, the CHi phase is noisy and the CHir phase shows fast recovery, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivatives of both phases are noisy and the determination of the flow dimension is not unambiguous. A flow dimension of two was assumed. For the analyses of both phases a radial infinite acting homogeneous flow model was chosen. The analysis is presented in Appendix 2-29.

Selected representative parameters

The recommended transmissivity of $9.9 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-6}$ to $2.0 \cdot 10^{-5}$ m^2/s. A flow dimension of two was used for the analyses. 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 3,661.7 kPa.

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

6.2.23 Section 497.14–517.14 m, test no 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 204 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from 18 mL/min at start of the CHi phase to 11 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal part at late times, indicating radial flow. The data of the CHir phase are dominated by wellbore effects. A flow dimension of 2 was assumed. Both phases were analysed using an infinite acting radial homogeneous flow model. The analysis is presented in Appendix 2-30.

Selected representative parameters

The recommended transmissivity of $5.4 \cdot 10^{-9}$ 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 $3.0 \cdot 10^{-9}$ to $8.0 \cdot 10^{-9}$ 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 3,810.1 kPa.

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

6.2.24 Section 507.16–527.16 m, test no 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 200 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from 0.54 L/min at start of the CHi phase to 0.39 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Although, the CHir phase shows fast recovery, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows at middle times a downward trend followed by a flat part at late times. At late times, the derivative of the CHir phase is flat, too. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-31.

Selected representative parameters

The recommended transmissivity of $3.0 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHir phase (inner zone). The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-7}$ to $6.0 \cdot 10^{-7}$ 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 3,891.4 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.

6.2.25 Section 527.20–547.20 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 219 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The injection rate decreased from 24 mL/min at start of the CHi phase to 14 mL/min at the end, indicating a relatively low interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows adownward trend at middle times, followed by a flat part at late times. This is indicative for a change in flow dimension or for a transition to a zone of higher transmissivity at some distance to the borehole. The CHir derivative shows a downward trend during middle and late time data. A flow dimension of 2 was assumed and this downward trend was interpreted as a change in transmissivity at some distance to the borehole. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-32.

Selected representative parameters

The recommended transmissivity of $8.1 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $6.0 \cdot 10^{-9}$ to $2.0 \cdot 10^{-8}$ 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 4,045.7 kPa.

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

6.2.26 Section 547.23–567.23 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 between the interval and the adjacent zones was observed. The injection rate decreased from 0.29 L/min at start of the CHi phase to 0.20 L/min at the end, indicating a low to moderate interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of both phases show a downward trend at middle times and the beginning of stabilization at late times. This is indicative for transition from a zone of lower transmissivity to a zone of higher transmissivity at some distance to the borehole. Both phases were analysed using a two shell radial composite flow model. The analysis is presented in Appendix 2-33.

Selected representative parameters

The recommended transmissivity of $8.6 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $7.0 \cdot 10^{-8}$ to $4.0 \cdot 10^{-7}$ 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 4,205.0 kPa.

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

6.2.27 Section 567.26–587.26 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 slow recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 200 kPa. No hydraulic connection between the interval and the adjacent zones was observed. The pressure transducer for the bottom zone failed. After discussion with the Activity Leader, it was decided to continue with testing the last sections and to abandon the measurements of the bottom zone. The injection rate decreased from 4.5 mL/min at start of the CHi phase to 2.5 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Although, the CHi phase is very noisy, 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 derivatives of both phases do not clearly allow the specific determination of the flow dimension. The radial flow phase was not reached and the data were still influenced by wellbore effects like WBS and skin. A flow dimension of two was assumed. For the analyses of the Chi and the CHir phase, homogeneous infinite acting flow models were used. The analysis is presented in Appendix 2-34.

Selected representative parameters

The recommended transmissivity of $1.4 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-10}$ to $3.0 \cdot 10^{-9}$ m^2/s. The flow dimension used for the analyses 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 4,353.9 kPa.

In spite of the low transmissivity and the low flow rate, the analyses of the CHi and CHir phases show good consistency. No further analysis is recommended.

6.2.28 Section 587.30–607.30 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 54Pa 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 $1 \cdot 10^{-11}$ m^2/s.

No further analysis recommended.

6.2.29 Section 607.32–627.32 m, test no 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 205 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 1.07 L/min at start of the CHi phase to 0.83 L/min at the end, indicating a moderate interval transmissivity (consistent with the pulse recovery). Although, the CHi phase is noisy, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows at middle times a downward trend and the beginning of a flat part at late times. This was interpreted as the transition to a zone of higher transmissivity at some distance to the borehole. The response of the CHir phase is very similar. Both phase were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-36.

Selected representative parameters

The recommended transmissivity of $1.5 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $7.0 \cdot 10^{-7}$ to $3.0 \cdot 10^{-6}$ 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 4,653.6 kPa.

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

6.2.30 Section 620.00–640.00 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 189 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 21.7 L/min at start of the CHi phase to 15.4 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The regulation unit had problems during the first five minutes of the perturbation phase to get and to hold constant pressure conditions. Nevertheless, the second part of this phase is adequate for quantitative analysis. The CHir phase is of good quality and adequate for quantitative analysis, too.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is very noisy at the beginning. The second part of the derivative is flat, which is indicative for a flow dimension of 2 (radial flow). The CHir derivative is flat at late times. The CHi phase was analysed using a homogeneous flow model. A radial two shell composite flow model was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-37.

Selected representative parameters

The recommended transmissivity of $1.0 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-6}$ to $3.0 \cdot 10^{-5}$ 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 4,754.0 kPa.

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

6.2.31 Section 637.36–657.36 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. The pressure in the zone above rose by 4Pa, indicating a hydraulic connection between the interval and this zone. The transducer of the bottom zone failed. The injection rate decreased from 18.9 L/min at start of the CHi phase to 16.5 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows at middle and late times a downward trend, which is interpreted as transition to a zone of higher transmissivity. The derivative of the CHir phase shows a downward trend at middle times and a horizontal stabilization at late times, indicating a change in transmissivity at some distance to the borehole. Both phases were analysed with a radial two shell composite flow model. The analysis is presented in Appendix 2-38.

Selected representative parameters

The recommended transmissivity of $4.0 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-5}$ to $6.0 \cdot 10^{-5}$ 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 4,900.8 kPa.

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

6.2.32 Section 657.41–677.41 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 201 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 1.23 L/min at start of the CHi phase to 1.12 L/min at the end, indicating a moderate interval transmissivity (consistent with the pulse recovery). Although, the CHi phase is noisy, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase does not allow for a specific determination of the flow dimension due to the data quality. A flow dimension of 2 was assumed. The CHir phase shows a flat part at early middle time data, followed by a downward trend. At late times, the downward trend continues. This is indicative for a change either in flow dimension or in transmissivity. The Chi phase was analysed using a homogeneous infinite acting flow model and for the analysis of the CHir phase a radial two shell composite flow model was used. The analysis is presented in Appendix 2-39.

Selected representative parameters

The recommended transmissivity of $3.9 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-7}$ to $7.0 \cdot 10^{-6}$ 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 5,053.0 kPa.

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

6.2.33 Section 667.42–687.42 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 201 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 178 mL/min at start of the CHi phase to 131 mL/min at the end, indicating a moderate interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivatives of the CHi phase and of the CHir phase show at middle times a downward trend and following the beginning of a flat part at late times. This is interpreted as the transition to a zone of higher transmissivity at some distance to the borehole. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-40.

Selected representative parameters

The recommended transmissivity of $5.2 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-7}$ to $7.0 \cdot 10^{-7}$ 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 5,132.4 kPa.

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

6.2.34 Section 682.43–702.43 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 206 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 230 mL/min at start of the CHi phase to 200 mL/min at the end, indicating a moderate to low interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the first part of the derivative of the CHi phase is very noisy. The second part is flat, indicating radial flow (flow dimension of 2). The CHir phase shows a downward trend at middle times and a horizontal stabilization at late times, which is indicative for a transition to a zone of higher transmissivity. The CHi phase was analysed using an infinite acting homogeneous flow model. A radial two shell composite flow model was used to analyse the CHir phase. The analysis is presented in Appendix 2-41.

Selected representative parameters

The recommended transmissivity of $8.9 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-7}$ to $1.0 \cdot 10^{-6}$ 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 5,246.7 kPa.

Considering the noisy Chi data, the analyses of the CHi and CHir phases show consistency. No further analysis is recommended.

6.2.35 Section 702.45–727.45 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 199 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 1.27 L/min at start of the CHi phase to 1.11 L/min at the end, indicating a moderate interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is flat at late times, indicating a flow dimension of 2. The response of the CHir phase is similar. Both phases were analysed using an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-42.

Selected representative parameters

The recommended transmissivity of $4.0 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-6}$ to $6.0 \cdot 10^{-6}$ 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 5,400.7 kPa.

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

6.2.36 Section 722.46–742.46 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 214 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 0.54 L/min at start of the CHi phase to 0.42 L/min at the end, indicating a moderate interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows at middle times a downward trend and the beginning of a flat part at late times. This was interpreted as the transition to a zone of higher transmissivity at some distance to the borehole. The response of the CHir phase is very similar. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-43.

Selected representative parameters

The recommended transmissivity of $5.8 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-7}$ to $7.0 \cdot 10^{-7}$ 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 5,554.6 kPa.

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

6.2.37 Section 732.48–752.48 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 196 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 0.55 L/min at start of the CHi phase to 0.35 L/min at the end, indicating a moderate interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is flat at early times and shows at middle and late times a downward trend. This is interpreted as the transition to a zone of higher transmissivity at some distance to the borehole. The response of the CHir phase is similar, although the flat part of the early part is missing. Both phases were analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2-44.

Selected representative parameters

The recommended transmissivity of $2.9\cdot10^{-7}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0\cdot10^{-7}$ to $6.0\cdot10^{-6}$ m^2/s. A flow dimension of 2 was assumed. 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 5,628.6 kPa.

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

6.2.38 Section 752.51–772.51 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 121 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 27.7 L/min at start of the CHi phase to 21.7 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The recovery was prolonged to 30 minutes. Both phases are of good quality and as such adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is flat at middle and late times, indicating a flow dimension of two. The CHir phase is flat at late times, too. For the analysis of both tests an infinite acting radial homogeneous flow model was used. The analysis is presented in Appendix 2-45.

Selected representative parameters

The recommended transmissivity of $3.5 \cdot 10^{-5}$ 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 $2.0 \cdot 10^{-5}$ to $5.0 \cdot 10^{-5}$ 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 5,789.2 kPa.

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

6.2.39 Section 772.53–792.53 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 199 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 119 mL/min at start of the CHi phase to 80 mL/min at the end, indicating a relatively low interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a downward trend at middle times and the beginning of a flat part at late times. This is indicative for either a change in flow dimension or in transmissivity. It was interpreted as the transition to a zone of higher transmissivity at some distance to the borehole. The response of the CHir phase is similar and was interpreted in the same way. For the analyses of both phases, a two shell composite flow model was chosen. The analysis is presented in Appendix 2-46.

Selected representative parameters

The recommended transmissivity of $4.1 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-8}$ to $8.0 \cdot 10^{-8}$ 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 5,950.0 kPa.

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

6.2.40 Section 792.55–812.55 m, test no 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The recovery of the pulse test indicated a low to 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 228 kPa. No hydraulic connection between the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 48 mL/min at start of the CHi phase to 34 mL/min at the end, indicating a low to moderate interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is flat at early times and shows at middle times a downward trend and the beginning of a flat part at late times. This is indicative for a change in transmissivity. The derivative of the CHir phase shows a downward trend at middle times. At late times, the derivative seems to start to stabilize. This phenomenon was interpreted as a transition from a zone of lower to a zone of higher transmissivity. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2-47.

Selected representative parameters

The recommended transmissivity of $4.0 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-8}$ to $8.0 \cdot 10^{-8}$ 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 6,105.9 kPa.

The analyses of the CHi and CHir phases show some minor inconsistencies. In case, further analysis is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects. No further analysis is recommended.

6.2.41 Section 807.56–827.56 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 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 the interval and the zone above was observed. The transducer of the bottom zone failed. The injection rate decreased from 1.18 L/min at start of the CHi phase to 0.90 L/min at the end, indicating a moderate interval transmissivity (consistent with the pulse recovery). Although, the CHi phase is noisy, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a downward trend at middle times. This was interpreted as the transition to a zone of higher transmissivity at some distance to the borehole. The derivative of the CHir phase shows a downward trend at middle times, too. At late times, the derivative is flat, indicating a flow dimension of 2. For the analyses of both phases, a radial two shell composite flow model was used. The analysis is presented in Appendix 2-48.

Selected representative parameters

The recommended transmissivity of $2.3 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-7}$ to $5.0 \cdot 10^{-6}$ 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 6,223.0 kPa.

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

7 Synthesis

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

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

7.1 Summary of results

Table 7-1. General test data from constant head injection tests in KLX07A (for nomenclature see Appendix 4).

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)	t_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
111.80	211.80	050820 16:35	050820 18:59	2.33E–04	5.02E–04	1,800	1,800	1,615	1,613	1,634	1,614	9.1	**CHi/CHir**
211.92	311.92	050821 15:28	050821 17:22	5.08E–04	5.23E–04	1,800	1,800	2,363	2,361	2,427	2,362	10.3	**CHi/Chir**
312.00	412.00	050821 18:57	050821 20:52	2.33E–04	2.45E–04	1,800	1,800	3,070	3,073	3,193	3,071	11.4	**CHi/Chir**
412.07	512.07	050822 09:58	050822 11:58	7.62E–05	8.00E–05	1,800	1,800	3,785	3,791	3,991	3,792	12.4	**CHi/Chir**
507.16	607.16	050822 13:45	050822 15:37	9.00E–06	9.33E–06	1,800	1,800	4,530	4,538	4,746	4,539	13.5	**CHi/Chir**
602.32	702.32	050822 17:07	050822 20:46	1.50E–04	1.70E–04	1,800	7,200	5,274	5,267	5,367	5,264	14.7	**CHi/Chir**
702.45	802.45	050823 09:33	050822 11:31	3.42E–04	3.67E–04	1,800	1,800	6,048	6,043	6,154	6,049	16.2	**CHi/Chir**
108.50	128.50	050824 16:10	050824 17:37	5.17E–05	5.50E–05	1,200	1,200	1,008	1,008	1,209	1,008	8.5	**CHi/Chir**
128.50	148.50	050824 18:21	050824 20:21	1.93E–04	1.95E–04	1,200	1,200	1,156	1,153	1,324	1,153	8.8	**CHi/Chir**
146.50	166.50	050825 08:15	050825 10:27	4.30E–04	4.35E–04	1,200	1,200	1,285	1,282	1,341	1,283	8.7	**CHi/Chir**
166.84	186.84	050825 11:10	050825 12:33	5.37E–04	5.47E–04	1,200	1,200	1,433	1,433	1,513	1,434	9.0	**CHi/CHir**
186.88	206.88	050825 13:32	050825 14:48	1.33E–05	1.45E–05	1,200	600	1,581	1,580	1,781	1,580	9.2	**CHi/Chir**
191.89	211.89	050825 15:22	050825 16:56	2.72E–04	2.75E–04	1,800	600	1,617	1,615	1,815	1,616	9.2	**CHi/CHir**
211.92	231.92	050825 17:38	050825 19:06	2.55E–04	2.57E–04	1,200	1,200	1,765	1,764	1,965	1,764	9.4	**CHi/CHir**
221.93	241.93	050826 08:21	050826 09:49	2.57E–04	2.58E–04	1,200	1,200	1,838	1,836	2,036	1,836	9.5	**CHi/CHir**
241.93	261.93	050826 10:33	050826 12:15	5.17E–04	5.23E–04	1,200	1,200	1,987	1,986	2,092	1,988	9.8	**CHi/CHir**
261.95	281.95	050826 13:17	050826 14:46	2.00E–05	2.00E–05	1,200	1,200	2,139	2,138	2,326	2,139	10.1	**CHi/CHir**
281.98	301.98	050826 15:36	050826 16:54	3.67E–05	3.83E–05	1,200	600	2,289	2,288	2,491	2,288	10.3	**CHi/CHir**
291.99	311.99	050826 17:29	050826 20:01	5.83E–05	6.00E–05	1,200	3,600	2,363	2,364	2,564	2,362	10.5	**CHi/CHir**
312.00	332.00	050827 11:12	050827 13:17	8.33E–07	1.33E–06	1,200	2,400	2,507	2,512	2,731	2,536	10.7	**CHi/CHir**
326.99	346.99	050827 14:01	050827 15:30	1.17E–04	1.18E–04	1,200	1,200	2,616	2,618	2,818	2,618	10.8	**CHi/CHir**
341.99	361.99	050827 16:09	050827 17:49	1.25E–04	1.28E–04	1,200	1,200	2,724	2,726	2,926	2,726	11.0	**CHi/CHir**
362.07	382.07	050827 18:31	050827 20:04	9.83E–05	1.02E–04	1,200	1,200	2,865	2,871	3,071	2,871	11.2	**CHi/CHir**
382.08	402.08	050828 08:24	050828 11:08	6.33E–05	6.67E–05	1,200	900	2,999	3,006	3,207	3,006	11.4	**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)	t_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
402.06	422.06	050828 10:31	050828 11:57	1.50E–06	1.67E–06	1,200	1,200	3,138	3,145	3,346	3,145	11.6	**CHi/CHir**
417.07	437.07	050828 13:21	050828 14:43	3.67E–05	3.83E–05	1,200	600	3,243	3,251	3,477	3,251	11.7	**CHi/CHir**
437.08	457.08	050828 15:25	050828 16:32	1.23E–05	1.25E–05	1,200	1,200	3,384	3,391	3,616	3,390	11.9	**CHi/CHir**
457.08	477.08	050828 17:32	050829 00:57	1.67E–08	5.00E–08	720	21,600	3,526	3,555	3,759	3,544	12.1	**CHi/CHir**
477.12	497.12	050829 08:35	050829 10:03	3.33E–05	3.33E–05	1,200	1,200	3,671	3,680	3,880	3,680	12.2	**CHi/CHir**
497.14	517.14	050829 10:40	050829 12:56	1.67E–07	2.83E–07	1,200	2,400	3,823	3,845	4,049	3,857	12.5	**CHi/CHir**
507.16	527.16	050829 14:23	050829 15:53	6.67E–06	6.67E–06	1,200	1,200	3,904	3,914	4,114	3,914	12.5	**CHi/CHir**
527.20	547.20	050829 16:35	050829 18:09	2.33E–07	2.67E–07	1,200	1,200	4,063	4,073	4,292	4,074	12.8	**CHi/CHir**
547.23	567.23	050829 18:49	050829 20:18	3.33E–06	3.67E–06	1,200	1,200	4,220	4,230	4,425	4,230	13.1	**CHi/CHir**
567.26	587.26	050830 09:08	050830 10:50	5.00E–08	5.00E–08	1,200	1,200	4,371	4,389	4,589	4,403	13.2	**CHi/CHir**
587.30	607.30	050830 11:38	050830 12:37	0.00E+00	0.00E+00	0	0	4,531	#NV	#NV	#NV	13.5	#NV
607.32	627.32	050830 14:27	050830 15:54	1.40E–05	1.47E–05	1,200	1,200	4,690	4,681	4,886	4,681	13.7	**CHi/CHir**
620.00	640.00	050830 16:32	050830 17:56	2.57E–04	2.85E–04	1,200	1,200	4,790	4,781	4,970	4,794	13.5	**CHi/CHir**
637.36	657.36	050830 18:37	050830 20:53	2.75E–04	2.87E–04	1,200	3,600	4,927	4,926	5,126	4,925	14.1	**CHi/CHir**
657.41	677.41	050831 09:19	050831 10:51	1.83E–05	1.83E–05	1,200	1,200	5,075	5,073	5,274	5,074	14.4	**CHi/CHir**
667.42	687.42	050831 14:40	050831 16:00	2.17E–06	2.33E–06	1,200	1,200	5,161	5,158	5,359	5,158	14.5	**CHi/CHir**
682.43	702.43	050831 16:52	050831 18:20	3.33E–06	3.50E–06	1,200	1,200	5,278	5,272	5,478	5,272	14.7	**CHi/CHir**
702.45	722.45	050831 19:04	050831 20:24	1.83E–05	1.83E–05	1,200	1,200	5,433	5,426	5,625	5,426	15.0	**CHi/CHir**
722.46	742.46	050901 08:07	050901 09:29	6.67E–06	7.33E–06	1,200	1,200	5,582	5,580	5,794	5,579	15.2	**CHi/CHir**
732.48	752.48	050901 10:12	050901 11:37	5.83E–06	6.33E–06	1,200	1,200	5,664	5,660	5,856	5,661	15.3	**CHi/CHir**
752.51	772.51	050901 12:30	050901 14:04	3.65E–04	3.92E–04	1,200	1,800	5,821	5,814	5,935	5,819	15.7	**CHi/CHir**
772.53	792.53	050901 15:01	050901 16:33	1.33E–06	1.47E–06	1,200	1,200	5,983	5,980	6,179	5,978	16.1	**CHi/CHir**
792.55	812.55	050901 17:21	050901 18:43	5.00E–07	6.67E–07	1,200	1,200	6,136	6,133	6,361	6,132	16.3	**CHi/CHir**
807.56	827.56	050901 19:41	050901 22:40	1.43E–05	1.63E–05	1,200	7,200	6,251	6,248	6,448	6,246	16.5	**CHi/CHir**

#NV not analysed.

CHi: Constant Head injection phase.

CHir: Recovery phase following the constant head injection phase.

Table 7-2. Results from analysis of constant head tests in KLX07A (for nomenclature see Appendix 4).

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
111.80	211.80	2.20E–04	2.86E–04	2	WBS2	3.6E–04	#NV	3.3E–04	#NV	3.6E–04	1.0E–04	6.0E–04	2.0E–07	–0.2	5.2	25.4	1,594.0	4.11
211.92	311.92	7.56E–05	9.84E–05	2	WBS22	2.0E–04	#NV	1.4E–04	2.7E–04	2.7E–04	9.0E–05	4.0E–04	2.7E–08	1.8	3.8	25.3	2,342.3	4.48
312.00	412.00	1.91E–05	2.48E–05	22	WBS22	3.2E–05	5.4E–05	8.9E–05	1.8E–04	8.9E–05	7.0E–05	2.0E–04	8.1E–09	18.5	1.0	6.9	3,053.9	5.02
412.07	512.07	3.74E–06	4.87E–06	2	WBS22	8.3E–06	#NV	1.7E–05	3.0E–05	8.3E–06	5.0E–06	1.0E–05	1.7E–09	5.2	1.0	25.4	3,772.6	6.20
507.16	607.16	4.24E–07	5.53E–07	22	WBS22	4.3E–07	8.3E–07	4.8E–07	4.1E–06	4.8E–07	1.0E–07	9.0E–07	9.7E–10	1.1	#NV	#NV	4,515.4	7.24
602.32	702.32	1.47E–05	1.92E–05	2	WBS22	1.1E–05	#NV	9.8E–06	7.1E–06	9.8E–06	8.0E–06	3.0E–05	3.9E–08	–4.7	3.3	28.9	5,240.6	6.64
702.45	802.45	3.02E–05	3.93E–05	2	WBS22	4.0E–05	#NV	3.8E–05	2.7E–05	3.8E–05	2.0E–05	5.0E–05	6.5E–08	–2.1	1.2	3.4	6,022.8	8.59
108.50	128.50	2.52E–06	2.64E–06	22	WBS22	3.2E–06	3.8E–06	6.4E–06	1.3E–05	3.2E–06	1.0E–06	5.0E–06	1.0E–09	0.4	0.0	1.5	986.4	4.76
128.50	148.50	1.11E–05	1.16E–05	22	WBS22	2.7E–05	2.7E–04	7.0E–05	3.1E–04	3.1E–04	8.0E–05	5.0E–04	1.9E–09	30.7	1.4	15.8	1,133.7	4.53
146.50	166.50	7.15E–05	7.48E–05	2	WBS2	9.4E–05	4.7E–04	4.7E–04	#NV	4.7E–04	2.0E–04	7.0E–04	4.2E–08	29.2	2.1	21.0	1,265.8	4.41
166.84	186.84	6.58E–05	6.88E–05	2	WBS2	8.1E–05	3.4E–04	4.3E–04	#NV	4.3E–04	2.0E–04	7.0E–04	1.8E–08	29.6	0.8	18.3	1,416.3	4.51
186.88	206.88	6.51E–07	6.81E–07	2	WBS22	1.3E–06	#NV	4.5E–06	2.2E–05	2.2E–05	8.0E–06	5.0E–05	1.1E–10	32.2	2.1	7.1	1,560.3	4.32
191.89	211.89	1.33E–05	1.39E–05	22	WBS22	2.4E–05	1.1E–04	1.3E–05	2.5E–04	2.5E–04	8.0E–05	5.0E–04	2.4E–09	–0.5	1.1	10.0	1,596.6	4.34
211.92	231.92	1.24E–05	1.30E–05	22	WBS22	2.4E–05	8.0E–05	7.7E–05	2.2E–04	2.2E–04	7.0E–05	4.0E–04	3.2E–09	30.5	5.1	16.6	1,745.2	4.31
221.93	241.93	1.26E–05	1.32E–05	22	WBS22	1.3E–05	1.3E–04	8.0E–05	2.1E–04	2.1E–04	9.0E–05	4.0E–04	4.5E–09	30.3	4.2	19.2	1,820.1	4.27
241.93	261.93	4.79E–05	5.01E–05	2	WBS2	1.5E–04	#NV	3.2E–04	#NV	3.2E–04	7.0E–05	4.0E–04	2.1E–08	29.5	1.5	17.0	1,971.2	4.34
261.95	281.95	1.04E–06	1.09E–06	2	WBS22	2.7E–06	#NV	6.5E–06	3.5E–05	2.7E–06	9.0E–07	5.0E–06	3.7E–10	8.9	0.7	15.7	2,120.2	4.33
281.98	301.98	1.77E–06	1.85E–06	22	WBS22	2.3E–06	6.4E–06	8.1E–06	2.8E–05	2.8E–05	6.0E–06	4.0E–05	7.4E–10	19.7	4.4	9.3	2,268.4	4.36
291.99	311.99	2.86E–06	2.99E–06	22	WBS22	2.7E–06	9.4E–06	2.3E–06	2.2E–05	2.2E–05	8.0E–06	3.0E–05	3.3E–09	–1.8	13.1	54.6	2,341.4	4.34
312.00	332.00	3.73E–08	3.90E–08	22	WBS22	2.4E–08	1.3E–08	6.4E–08	1.5E–08	1.5E–08	9.0E–09	4.0E–08	6.9E–12	–2.8	29.4	38.8	2,502.0	5.87
326.99	346.99	5.72E–06	5.99E–06	2	WBS22	1.5E–05	#NV	3.7E–05	4.5E–05	4.5E–05	1.0E–05	7.0E–05	1.5E–09	30.8	1.2	16.6	2,598.5	4.73
341.99	361.99	6.13E–06	6.41E–06	2	WBS22	2.0E–05	#NV	3.9E–05	5.9E–05	5.9E–05	2.0E–05	8.0E–05	1.4E–09	30.9	1.1	16.4	2,705.3	4.74
362.07	382.07	4.82E–06	5.05E–06	2	WBS22	1.2E–05	#NV	3.1E–05	9.6E–05	1.2E–05	6.0E–06	4.0E–05	1.6E–09	7.0	1.2	17.2	2,851.3	5.27
382.08	402.08	3.09E–06	3.23E–06	2	WBS22	5.9E–06	#NV	2.0E–05	3.3E–05	5.9E–06	3.0E–06	8.0E–06	1.8E–09	3.8	0.8	17.5	2,989.3	5.31
402.06	422.06	7.32E–08	7.66E–08	2	WBS22	1.2E–07	#NV	4.8E–07	8.9E–07	1.2E–07	7.0E–08	4.0E–07	5.2E–11	3.3	1.9	8.3	3,127.1	5.45
417.07	437.07	1.59E–06	1.66E–06	2	WBS22	2.2E–06	#NV	1.0E–05	1.4E–05	2.2E–06	8.0E–07	4.0E–06	4.4E–10	1.1	0.4	14.2	3,231.4	5.49
437.08	457.08	5.38E–07	5.63E–07	2	WBS22	5.6E–07	#NV	2.9E–07	6.5E–06	2.9E–07	1.0E–07	6.0E–07	2.6E–10	–1.7	0.3	0.5	3,370.9	5.66

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
457.08	477.08	8.01E–10	8.38E–10	22	WBS22	1.3E–09	1.3E–10	9.6E–11	6.9E–11	9.6E–11	6.0E–11	3.0E–10	5.1E–11	–3.2	#NV	#NV	3,508.2	5.41
477.12	497.12	1.62E–06	1.69E–06	2	WBS2	2.7E–06	#NV	9.9E–06	#NV	9.9E–06	5.0E–06	2.0E–05	4.6E–10	31.4	3.6	19.6	3,661.7	6.17
497.14	517.14	8.01E–09	8.38E–09	2	WBS2	3.9E–09	#NV	5.4E–09	#NV	5.4E–09	3.0E–09	8.0E–09	5.4E–09	2.5	#NV	#NV	3,810.1	6.06
507.16	527.16	3.18E–07	3.33E–07	22	WBS22	3.9E–07	1.0E–06	3.0E–07	3.9E–06	3.0E–07	1.0E–07	6.0E–07	4.1E–10	1.6	#NV	#NV	3,891.4	6.57
527.20	547.20	1.05E–08	1.09E–08	22	WBS22	8.1E–09	1.6E–08	1.8E–08	6.0E–08	8.1E–09	6.0E–09	2.0E–08	5.8E–11	0.4	0.2	1.0	4,045.7	6.59
547.23	567.23	1.68E–07	1.75E–07	22	WBS22	9.0E–08	2.4E–07	8.6E–08	5.0E–07	8.6E–08	7.0E–08	4.0E–07	9.9E–11	–2.3	0.2	1.5	4,205.0	7.05
567.26	587.26	2.45E–09	2.57E–09	2	WBS2	1.2E–09	#NV	1.4E–09	#NV	1.4E–09	9.0E–10	3.0E–09	3.6E–11	0.0	#NV	#NV	4,353.9	6.44
587.30	607.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
607.32	627.32	6.70E–07	7.01E–07	22	WBS22	3.7E–07	1.1E–06	2.6E–07	1.5E–06	1.5E–06	7.0E–07	3.0E–06	2.1E–09	–3.3	16.8	19.2	4,653.3	5.46
620.00	640.00	1.33E–05	1.39E–05	2	WBS22	1.1E–05	#NV	6.9E–06	1.0E–05	1.0E–05	8.0E–06	3.0E–05	7.7E–08	–4.9	10.1	20.0	4,754.0	5.78
637.36	657.36	1.35E–05	1.41E–05	22	WBS22	1.8E–05	3.8E–05	1.7E–05	4.0E–05	4.0E–05	1.0E–05	6.0E–05	1.2E–08	–0.1	9.1	57.2	4,900.8	7.14
657.41	677.41	8.95E–07	9.36E–07	2	WBS22	1.9E–06	#NV	3.9E–06	6.6E–06	3.9E–06	9.0E–07	7.0E–06	4.9E–10	19.9	0.9	2.9	5,053.0	6.96
667.42	687.42	1.06E–07	1.11E–07	22	WBS22	1.16E–07	2.1E–07	1.1E–07	5.2E–07	5.2E–07	1.0E–07	7.0E–07	8.3E–11	1.2	8.3	17.0	5,132.4	7.23
682.43	702.43	1.59E–07	1.66E–07	2	WBS22	4.28E–07	#NV	2.0E–07	8.9E–07	8.9E–07	5.0E–07	1.0E–06	1.0E–10	2.3	4.8	19.2	5,246.7	7.17
702.45	722.45	9.04E–07	9.45E–07	2	WBS2	1.43–6	#NV	4.0E–06	#NV	4.0E–06	1.0E–06	6.0E–06	6.9E–10	19.7	2.4	20.3	5,400.7	7.28
722.46	742.46	3.06E–07	3.20E–07	22	WBS22	2.4E–07	1.1E–06	1.2E–07	5.8E–07	5.8E–07	1.0E–07	7.0E–07	3.8E–10	–3.0	12.6	17.4	5,554.6	7.40
732.48	752.48	2.92E–07	3.05E–07	22	WBS22	2.2E–07	4.9E–07	1.2E–07	2.9E–07	2.9E–07	1.0E–07	6.0E–07	5.2E–10	–3.2	13.2	20.0	5,628.6	7.15
752.51	772.51	2.96E–05	3.10E–05	2	WBS2	3.9E–05	#NV	3.5E–05	#NV	3.5E–05	2.0E–05	5.0E–05	5.7E–08	–2.1	4.5	27.6	5,789.2	7.98
772.53	792.53	6.57E–08	6.88E–08	22	WBS22	6.1E–08	1.0E–07	4.1E–08	2.4E–07	4.1E–08	3.0E–08	8.0E–08	8.6E–11	–1.1	0.3	1.8	5,950.0	8.85
792.55	812.55	2.15E–08	2.25E–08	22	WBS22	2.5E–08	5.5E–08	4.0E–08	1.3E–07	4.0E–08	3.0E–08	8.0E–08	6.0E–11	4.8	#NV	#NV	6,105.9	9.24
807.56	827.56	7.03E–07	7.35E–07	22	WBS22	6.0E–07	1.3E–06	2.8E–07	2.3E–06	2.3E–06	8.0E–07	5.0E–06	1.3E–09	–3.6	17.0	72.0	6,223.0	9.58

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 TT 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.

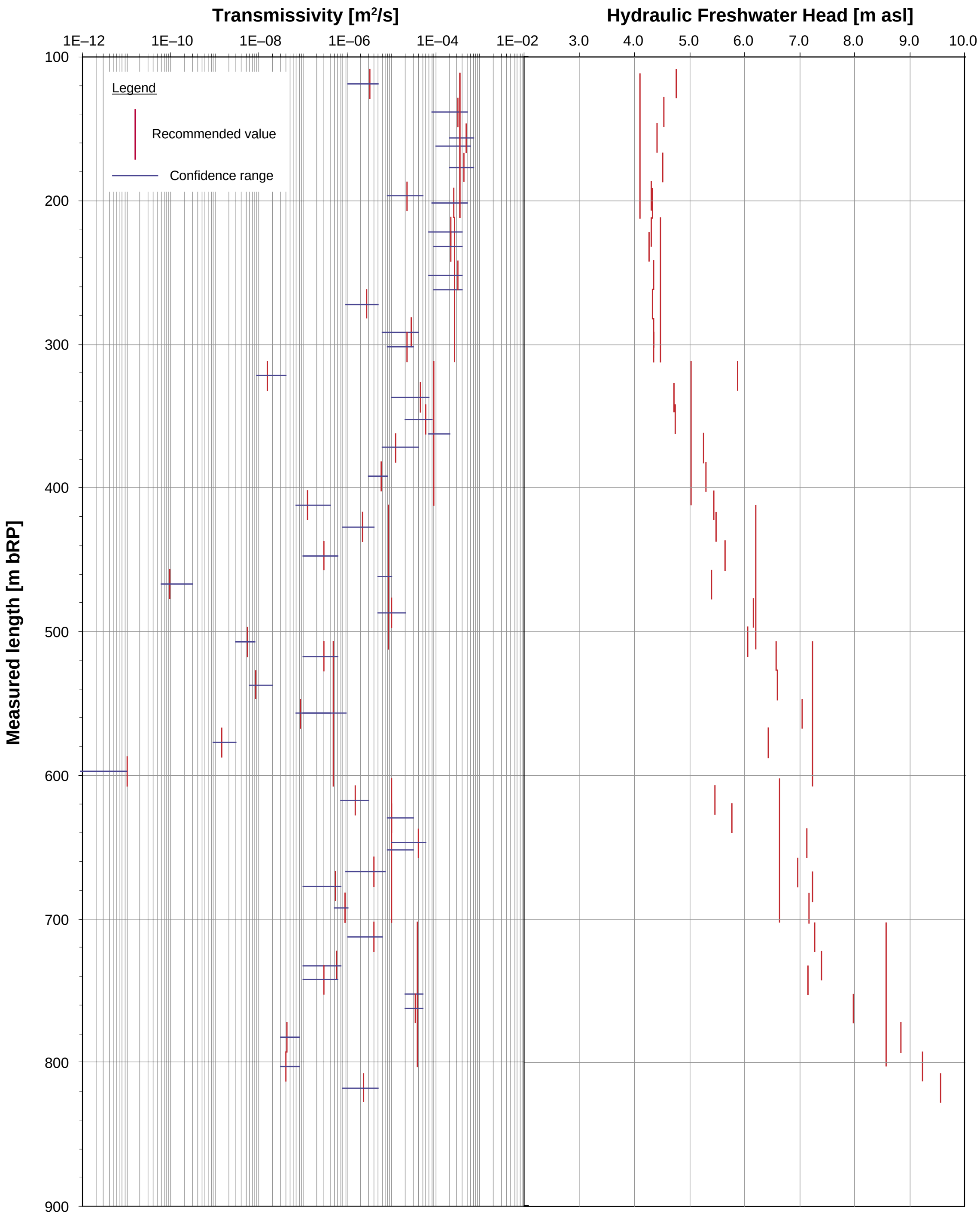


Figure 7-1. *Results summary – profiles of transmissivity and equivalent freshwater head, transmissivities derived from injectiontests, freshwater head extrapolated.*

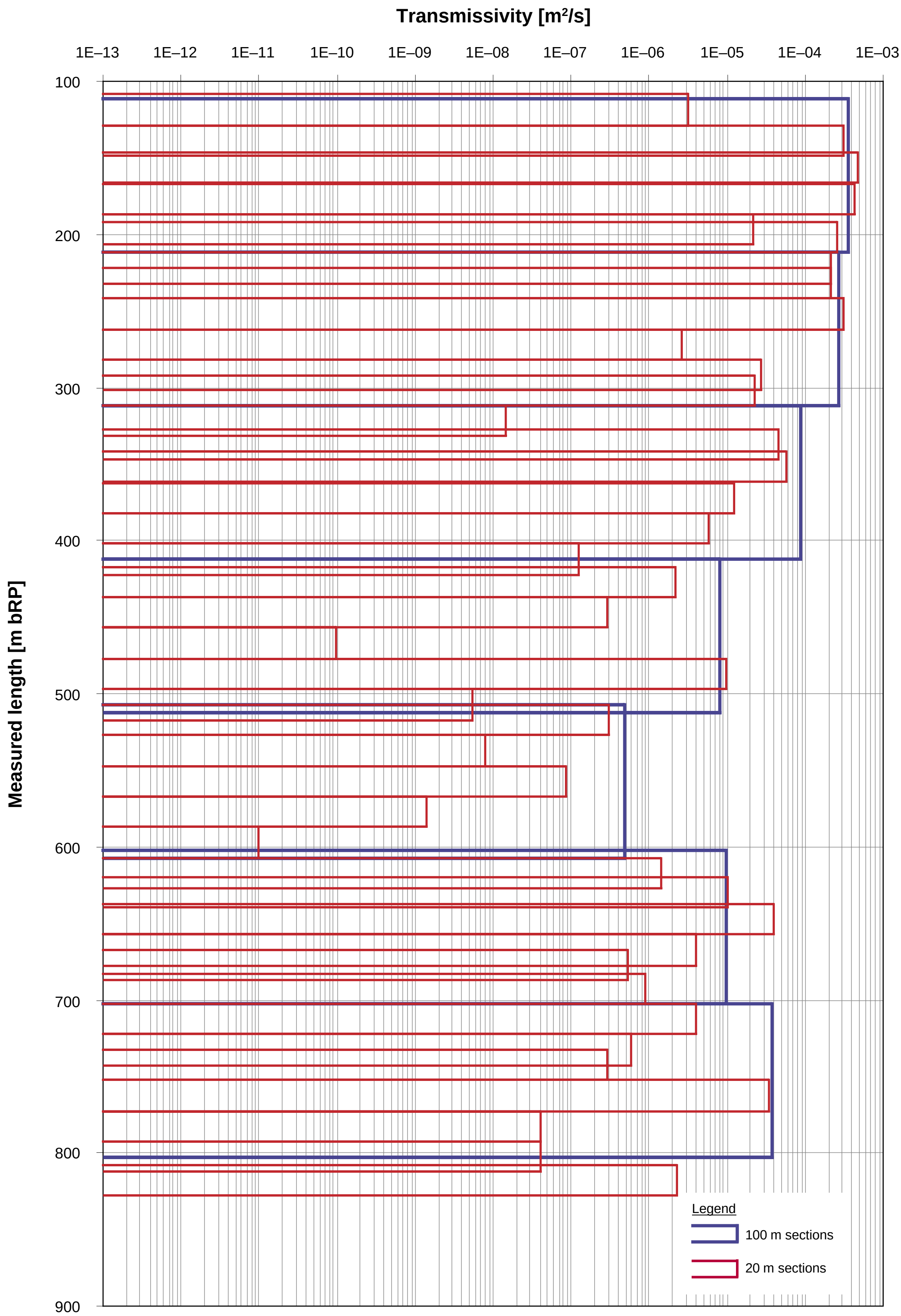


Figure 7-2. *Results summary – profile of transmissivity.*

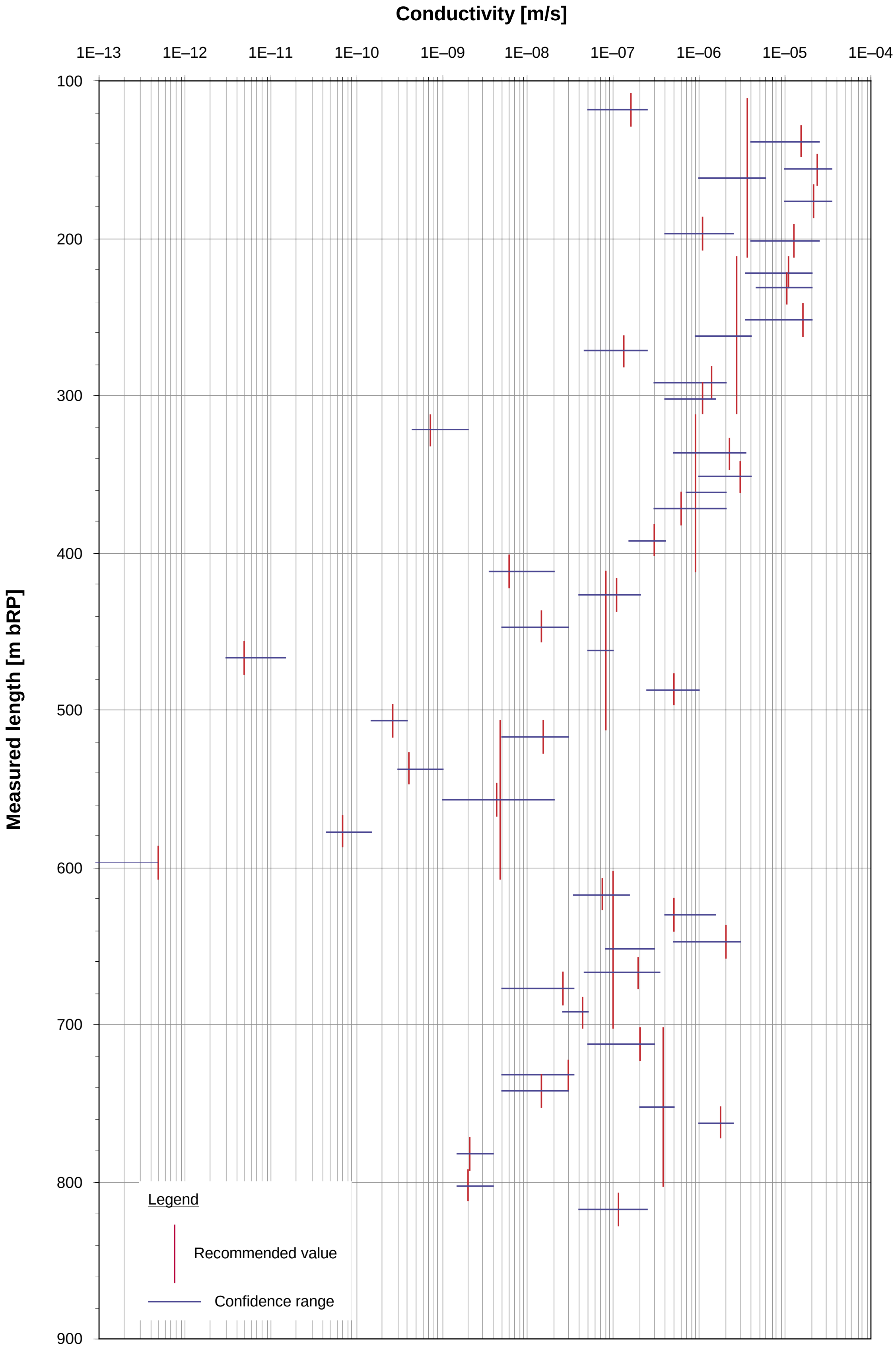


Figure 7-3. *Results summary – profile of hydraulic conductivity.*

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 most of the steady state derived transmissivities differ by less than one order of magnitude from the transmissivities derived from the transient analysis. For five sections the transmissivity derived using the steady state method is more than one order of magnitude lower than the transmissivity derived from the analysis. In general, the values of the steady state analysis are in the most cases slightly lower than the recommended values. For transmissivities lower than $1.0 \cdot 10^{-8}$ m/s^2, the steady state values are a bit higher than the values from the analysis..

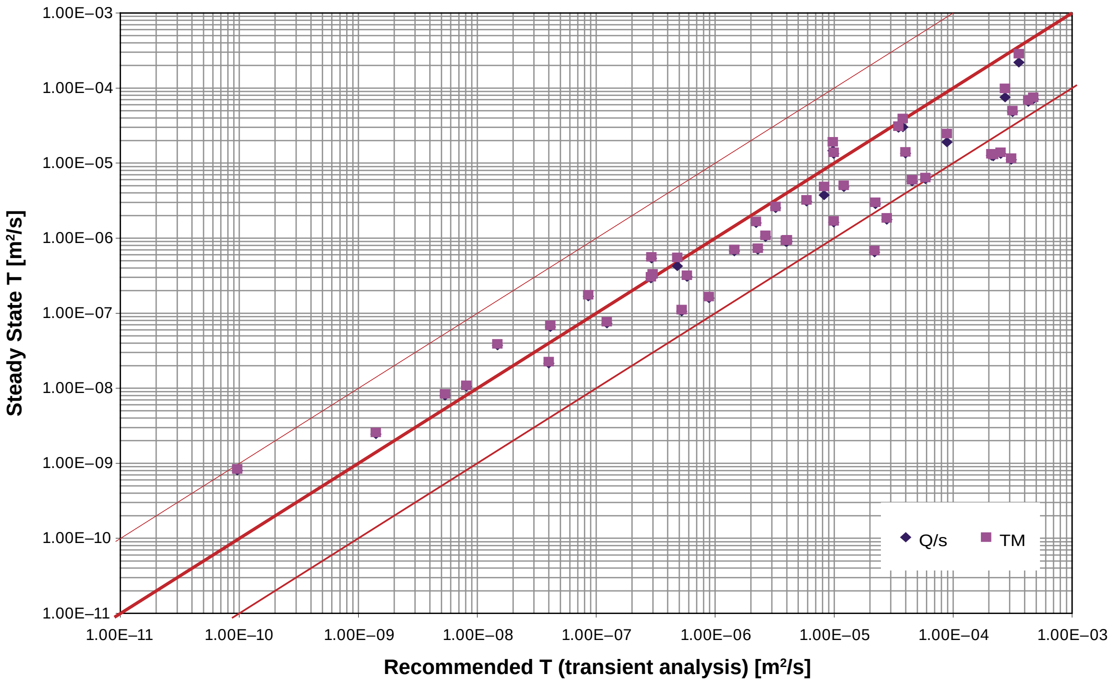


Figure 7-4. Correlation analysis of transmissivities derived by steady state and transient methods.

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 $5 \cdot 10^{-10}$ 1/Pa. For the calculation of the theoretical wellbore storage coefficient a test zone compressibility of $7 \cdot 10^{-10}$ 1/Pa was used. The matched wellbore storage coefficient is derived from the transient type curve analysis by matching the unit slope early times derivative plotted in log-log coordinates.

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

It can be seen that the matched wellbore storage coefficients are up to two orders of magnitude larger than the theoretical values for the 100 m Tests and up to three orders of magnitude larger for the 20 m tests. This phenomenon was already observed at the previous boreholes. A two or three orders of magnitude increase is difficult to explain by volume uncertainty. Even if large fractures are connected to the interval, a volume increase by three orders of magnitude does not seem probable. The discrepancy can be more likely explained by increased compressibility of the packer system. In order to better understand this phenomenon, a series of tool compressibility tests should be conducted in order to measure the tool compressibility and to assess to what extent the system behaves elastically.

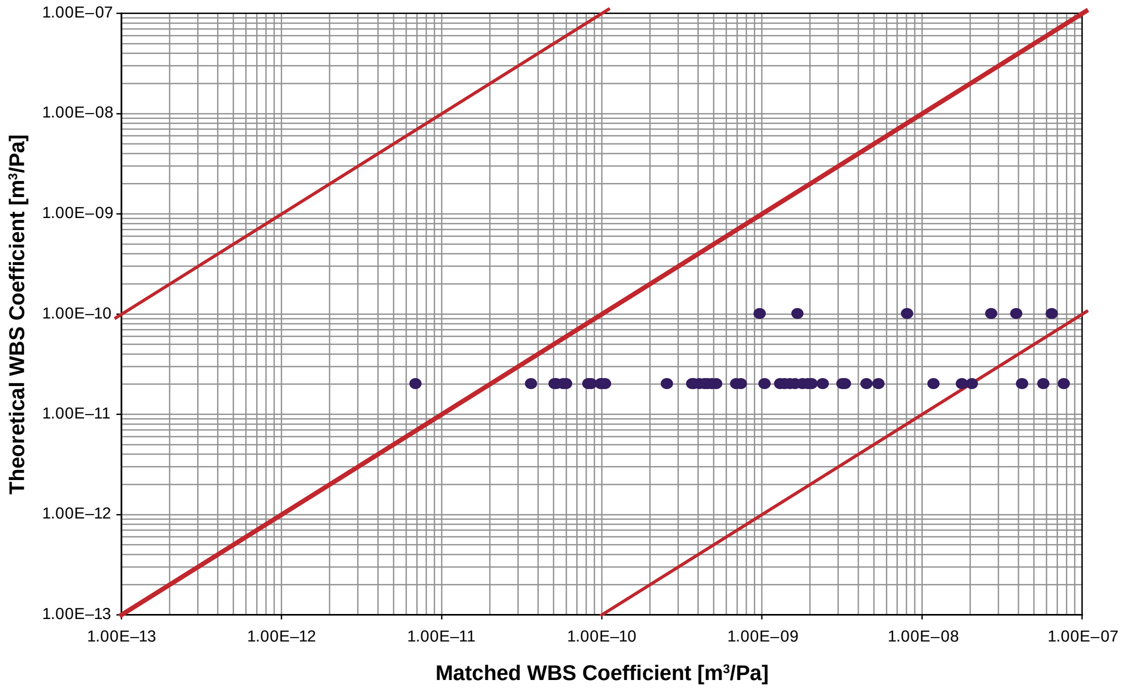


Figure 7-5. *Correlation analysis of theoretical and matched wellbore storage coefficients.*

8 Conclusions

8.1 Transmissivity

Figure 7-1 presents a profile of transmissivity, including the confidence ranges derived from the transient analysis. The method used for deriving the recommended transmissivity and its confidence range is described in Section 5.5.6.

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 nearly all cases, injection tests were performed due to the fact that the preliminary pulses show a recovery indicating a transmissivity which is high enough for a sufficient flow. Just in one case (test section 457.08–477.08 m) the injection was cancelled after 12 min, because the flow dropped below the measurement limit One test section (587.30–607.30 m) was skipped due to the very low transmissivity.

The transmissivity profiles in Figures 7-1 and 7-2 show transmissivities that ranges between $4.8 \cdot 10^{-7}$ m²/s and $3.6 \cdot 10^{-4}$ m²/s for the 100 m test sections. From 112 m to 607 m the transmissivities of the 100 m test sections show a slight decrease with an increase of depth. For the last two sections an increase of transmissivity can be observed. For the 20 m sections, the transmissivities range from $9.6 \cdot 10^{-11}$ m²/s to $4.7 \cdot 10^{-4}$ m²/s (excluding the skipped test).

Five 20 m sections show larger transmissivities than the appropriate longer interval. The differences are relatively small and are covered by the confidence range. This can be explained with crossflow and connections to the adjacent zones.

8.2 Equivalent freshwater head

Figure 7-1 presents a profile of the derived equivalent freshwater head expressed in metres above sea level. The method used for deriving the equivalent freshwater head is described in Section 5.5.5.

The head profile shows a freshwater head increasing with depth. The freshwater head ranges from 4.1 m to 9.6 m. This increase can be explained by higher salinity of the water down in the borehole.

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

8.3 Flow regimes encountered

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

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

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

In some 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 $1 \cdot 10^{-8}$ 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.

9 References

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APPENDIX 1

File Description Table

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX07A				
TEST- AND FILEPROTOCOL					**Testorder dated : 2005-08-20**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2005-08-20	16:34	111.80	211.80	__KLX07A_0111.80_200508201634.ht2	KLX07A_111.80-211.80_050820_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-21	
2005-08-21	15:28	211.92	311.92	__KLX07A_0211.92_200508211528.ht2	KLX07A_211.92-311.92_050821_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-21	
2005-08-21	18:57	312.00	412.00	__KLX07A_0312.00_200508211857.ht2	KLX07A_312.00-412.00_050821_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-22	
2005-08-22	09:58	412.07	512.07	__KLX07A_0412.07_200508220958.ht2	KLX07A_412.07-512.07_050822_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-22	
2005-08-22	13:45	507.16	607.16	__KLX07A_0507.16_200508221345.ht2	KLX07A_507.16-607.16_050822_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-22	
2005-08-22	17:07	602.32	702.32	__KLX07A_0602.32_200508221707.ht2	KLX07A_602.32-702.32_050822_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-23	
2005-08-23	09:33	702.45	802.45	__KLX07A_0702.45_200508230933.ht2	KLX07A_702.45-802.45_050823_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-24	
2005-08-24	16:10	108.50	128.50	__KLX07A_0108.50_200508241610.ht2	KLX07A_108.50-128.50_050824_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-24	
2005-08-24	18:21	128.50	148.50	__KLX07A_0128.50_200508241821.ht2	KLX07A_128.50-148.50_050824_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-25	
2005-08-25	08:15	146.50	166.50	__KLX07A_0146.50_200508250815.ht2	KLX07A_146.50-166.50_050825_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-25	
2005-08-25	11:10	166.84	186.84	__KLX07A_0166.84_200508251110.ht2	KLX07A_166.84-186.84_050825_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-25	
2005-08-25	13:32	186.88	206.88	__KLX07A_0186.88_200508251332.ht2	KLX07A_186.88-206.88_050825_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-25	
2005-08-25	15:22	191.89	211.89	__KLX07A_0191.89_200508251522.ht2	KLX07A_191.89-211.89_050825_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-25	
2005-08-25	17:38	211.92	231.92	__KLX07A_0211.92_200508251738.ht2	KLX07A_211.92-231.92_050825_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-26	
2005-08-26	08:21	221.93	241.93	__KLX07A_0221.93_200508260821.ht2	KLX07A_221.93-241.93_050826_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-26	
2005-08-26	10:33	241.93	261.93	__KLX07A_0241.93_200508261033.ht2	KLX07A_241.93-261.93_050826_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-26	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX07A				
TEST- AND FILEPROTOCOL					**Testorder dated : 2005-08-20**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2005-08-26	13:17	261.95	281.95	__KLX07A_0261.95_200508261317.ht2	KLX07A_261.95-281.95_050826_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-26	
2005-08-26	15:36	281.98	301.98	__KLX07A_0281.98_200508261536.ht2	KLX07A_281.98-301.98_050826_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-26	
2005-08-26	17:29	291.99	311.99	__KLX07A_0291.99_200508261729.ht2	KLX07A_291.99-311.99_050826_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-27	
2005-08-27	09:24	312.00	332.00	__KLX07A_0312.00_200508270924.ht2	KLX07A_312.00-332.00_050827_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-27	
2005-08-27	11:12	312.00	332.00	__KLX07A_0312.00_200508271112.ht2	KLX07A_312.00-332.00_050827_2_CHir_Q_r.csv	Chir	2005-09-02	2005-08-27	
2005-08-27	14:01	326.99	346.99	__KLX07A_0326.99_200508271401.ht2	KLX07A_326.99-346.99_050827_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-27	
2005-08-27	16:09	341.99	361.99	__KLX07A_0341.99_200508271609.ht2	KLX07A_341.99-361.99_050827_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-27	
2005-08-27	18:31	362.07	382.07	__KLX07A_0362.07_200508271831.ht2	KLX07A_362.07-382.07_050827_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-28	
2005-08-28	08:24	382.08	402.08	__KLX07A_0382.08_200508280824.ht2	KLX07A_382.08-402.08_050828_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-28	
2005-08-28	10:31	402.06	422.06	__KLX07A_0402.06_200508281031.ht2	KLX07A_402.06-422.06_050828_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-28	
2005-08-28	13:21	417.07	437.07	__KLX07A_0417.07_200508281321.ht2	KLX07A_417.07-437.07_050828_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-28	
2005-08-28	15:25	437.08	457.08	__KLX07A_0437.08_200508281525.ht2	KLX07A_437.08-457.08_050828_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-28	
2005-08-28	17:32	457.08	477.08	__KLX07A_0457.08_200508281732.ht2	KLX07A_457.08-477.08_050828_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-29	
2005-08-29	08:35	477.12	497.12	__KLX07A_0477.12_200508290835.ht2	KLX07A_477.12-497.12_050829_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-29	
2005-08-29	10:40	497.14	517.14	__KLX07A_0497.14_200508291040.ht2	KLX07A_497.14-517.14_050829_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-29	
2005-08-29	14:23	507.16	527.16	__KLX07A_0507.16_200508291423.ht2	KLX07A_507.16-527.16_050829_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-29	

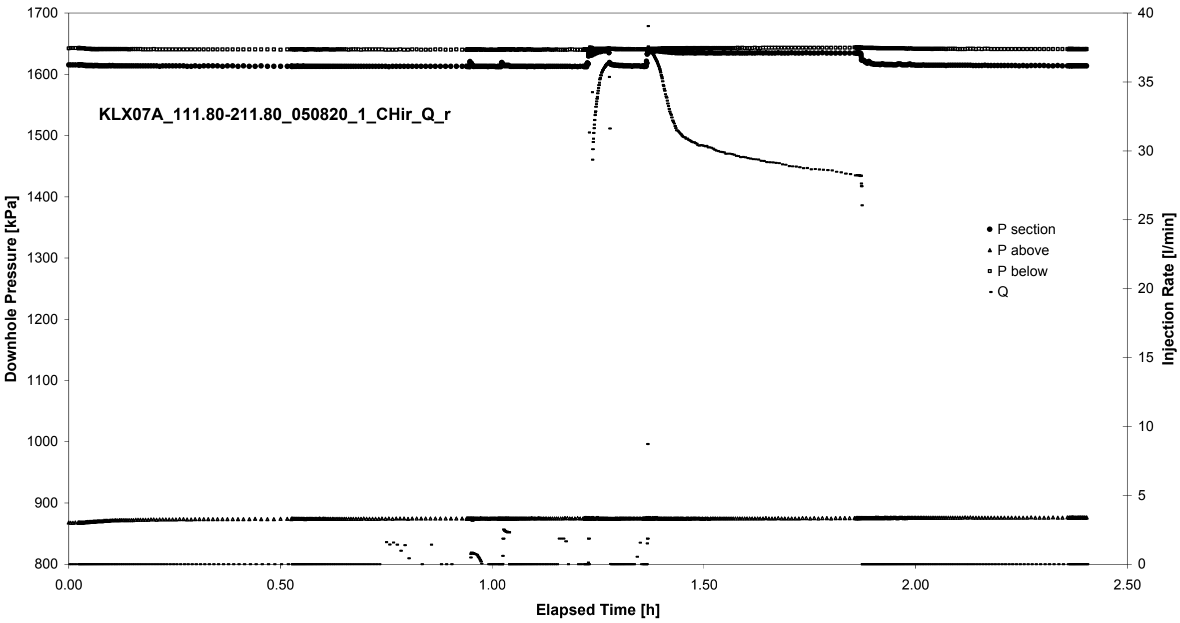
HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX07A				
TEST- AND FILEPROTOCOL					**Testorder dated : 2005-08-20**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2005-08-29	16:35	527.20	547.20	__KLX07A_0527.20_200508291635.ht2	KLX07A_527.20-547.20_050829_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-29	
2005-08-29	18:49	547.23	567.23	__KLX07A_0547.23_200508291849.ht2	KLX07A_547.23-567.23_050829_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-30	
2005-08-30	09:08	567.26	587.26	__KLX07A_0567.26_200508300908.ht2	KLX07A_567.26-587.26_050830_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-30	
2005-08-30	11:38	587.30	607.30	__KLX07A_0587.30_200508301138.ht2	KLX07A_587.30-607.30_050830_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-30	
2005-08-30	14:27	607.32	627.32	__KLX07A_0607.32_200508301427.ht2	KLX07A_607.32-627.32_050830_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-30	
2005-08-30	16:32	620.00	640.00	__KLX07A_0620.00_200508301632.ht2	KLX07A_620.00-640.00_050830_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-30	
2005-08-30	18:37	637.36	657.36	__KLX07A_0637.36_200508301837.ht2	KLX07A_637.36-657.36_050830_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-31	
2005-08-31	09:19	657.41	677.41	__KLX07A_0657.41_200508310919.ht2	KLX07A_657.41-677.51_050831_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-31	
2005-08-31	14:40	667.42	687.42	__KLX07A_0667.42_200508311440.ht2	KLX07A_667.42-687.42_050831_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-31	
2005-08-31	16:52	682.43	702.43	__KLX07A_0682.43_200508311652.ht2	KLX07A_682.43-702.43_050831_1_CHir_Q_r.csv	Chir	2005-09-02	2005-08-31	
2005-08-31	19:04	702.45	722.45	__KLX07A_0702.45_200508311904.ht2	KLX07A_702.45-722.45_050831_1_CHir_Q_r.csv	Chir	2005-09-02	2005-09-01	
2005-09-01	08:07	722.46	742.46	__KLX07A_0722.46_200509010807.ht2	KLX07A_722.46-742.46_050901_1_CHir_Q_r.csv	Chir	2005-09-02	2005-09-01	
2005-09-01	10:12	732.48	752.48	__KLX07A_0732.48_200509011012.ht2	KLX07A_732.48-752.48_050901_1_CHir_Q_r.csv	Chir	2005-09-02	2005-09-01	
2005-09-01	12:30	752.51	772.51	__KLX07A_0752.51_200509011230.ht2	KLX07A_752.51-772.51_050901_1_CHir_Q_r.csv	Chir	2005-09-02	2005-09-01	
2005-09-01	15:01	772.53	792.53	__KLX07A_0772.53_200509011501.ht2	KLX07A_772.53-792.53_050901_1_CHir_Q_r.csv	Chir	2005-09-02	2005-09-01	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX07A				
TEST- AND FILEPROTOCOL					**Testorder dated : 2005-08-20**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2005-09-01	17:21	792.55	812.55	__KLX07A_0792.55_200509011721.ht2	KLX07A_792.55-812.55_050901_1_CHir_Q_r.csv	Chir	2005-09-02	2005-09-01	

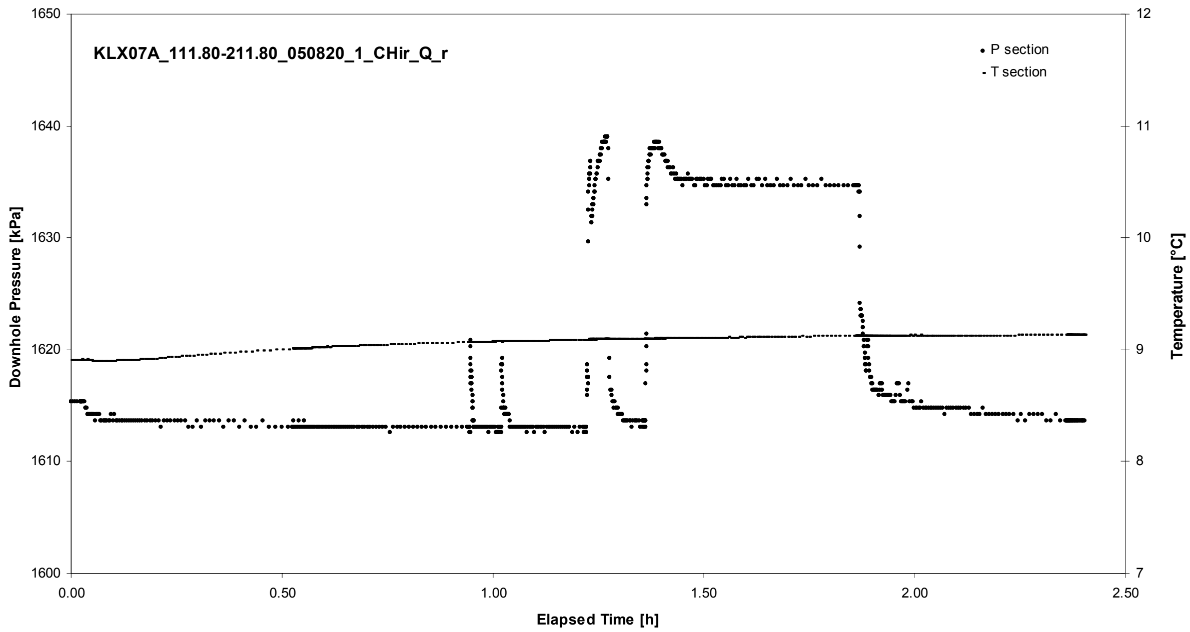
APPENDIX 2-1

Test 111.80-211.80 m

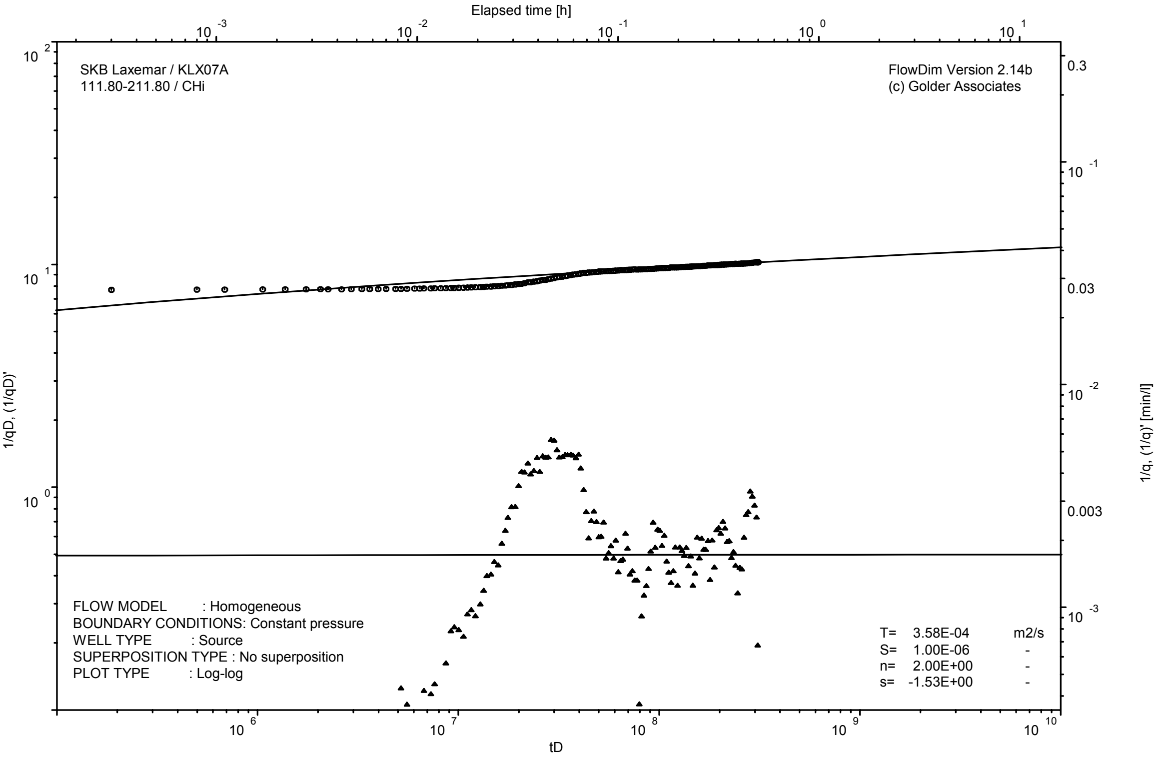
Analysis diagrams



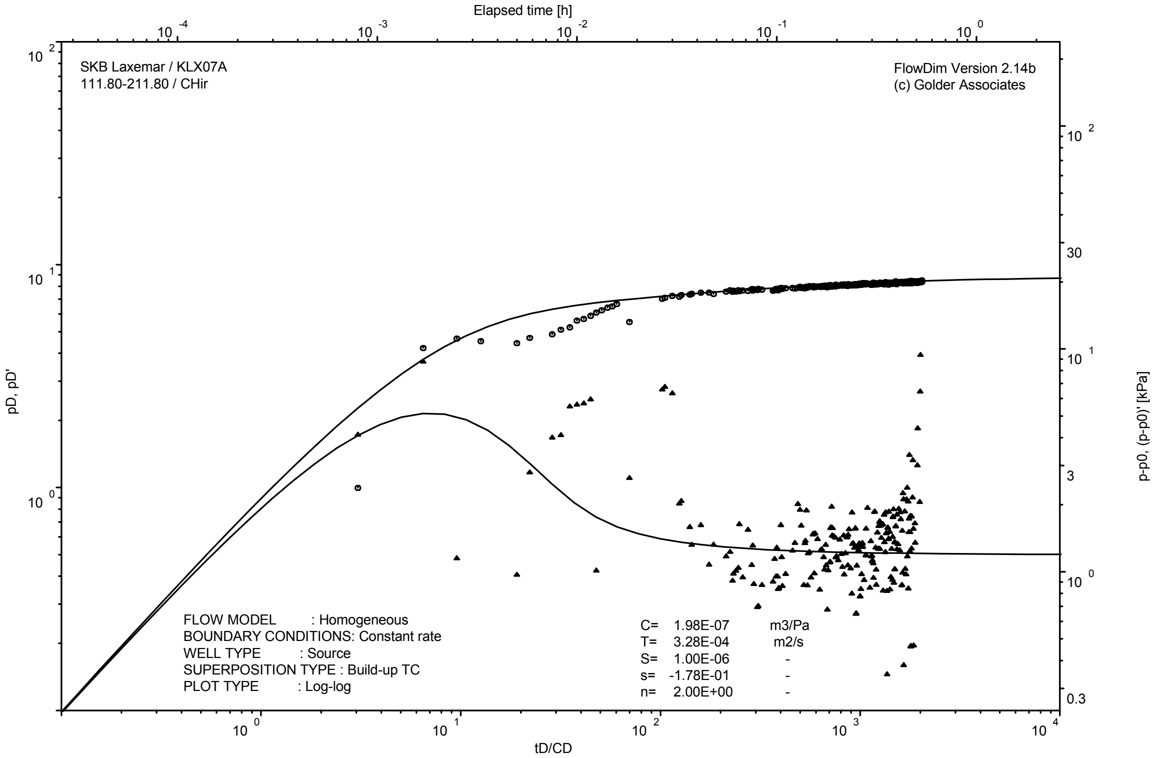
Pressure and flow rate vs. time; cartesian plot



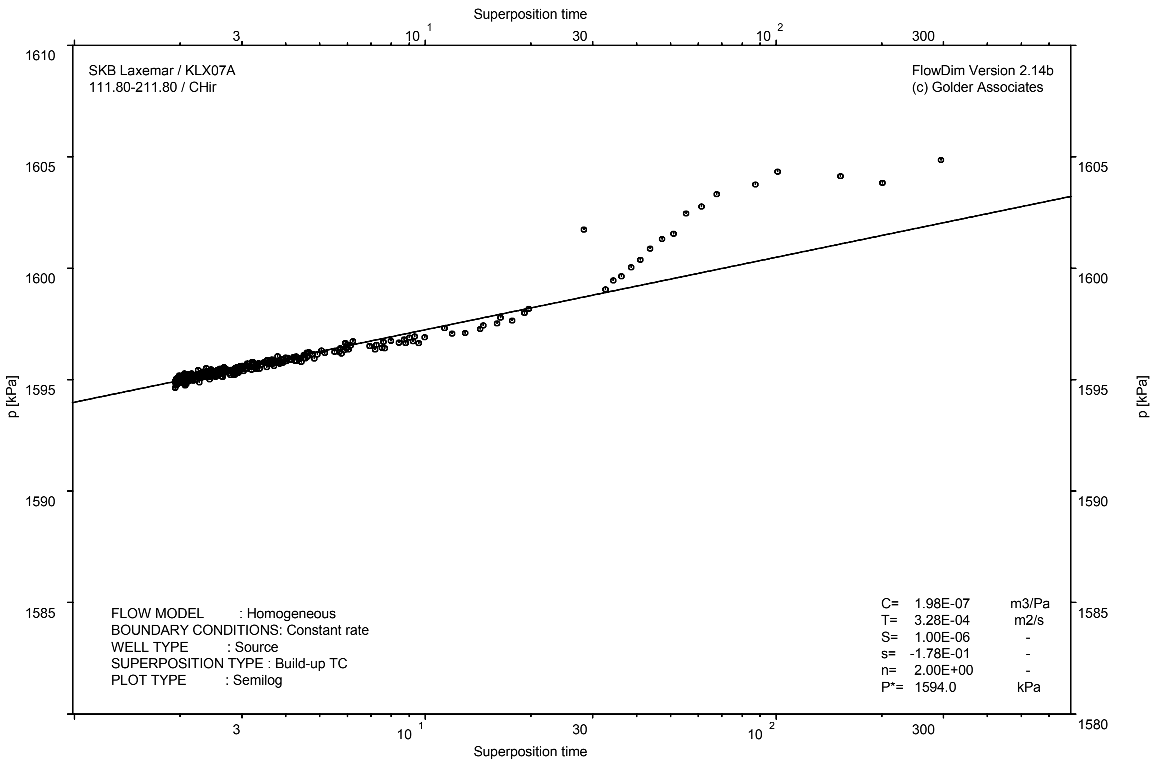
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

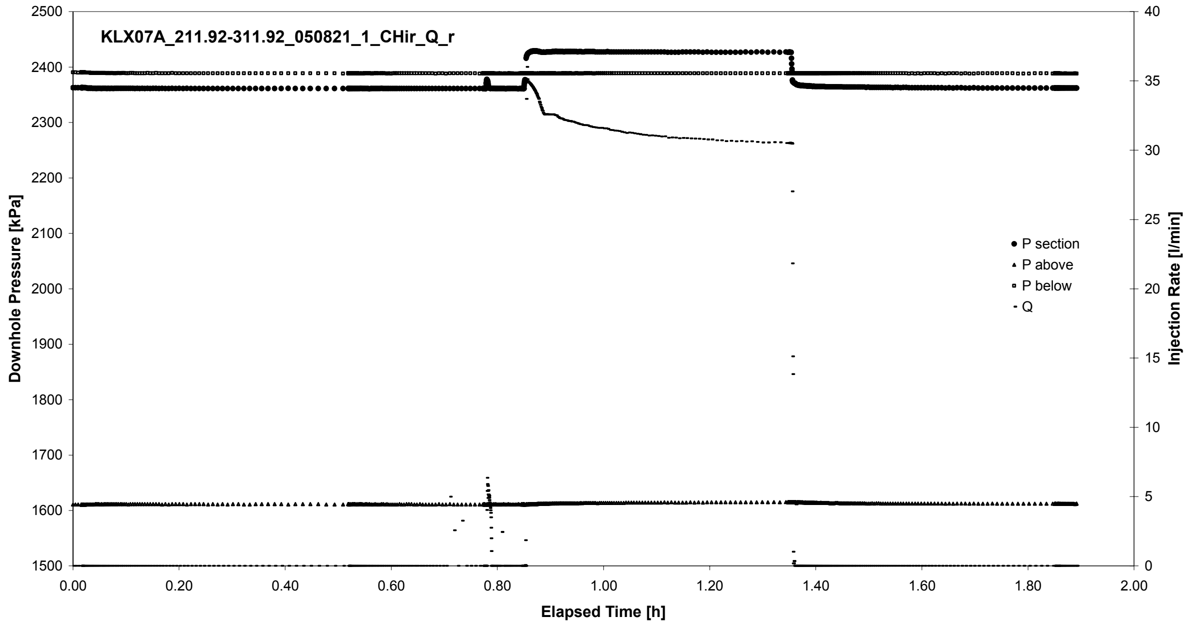


CHIR phase; HORNER match

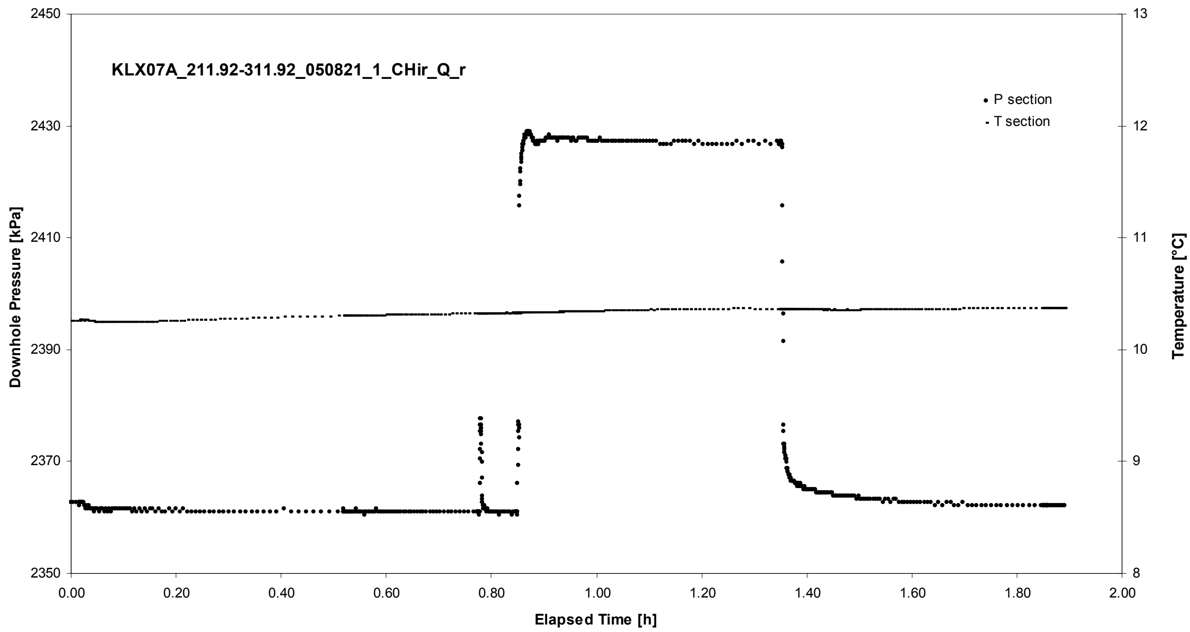
APPENDIX 2-2

Test 211.92-311.92 m

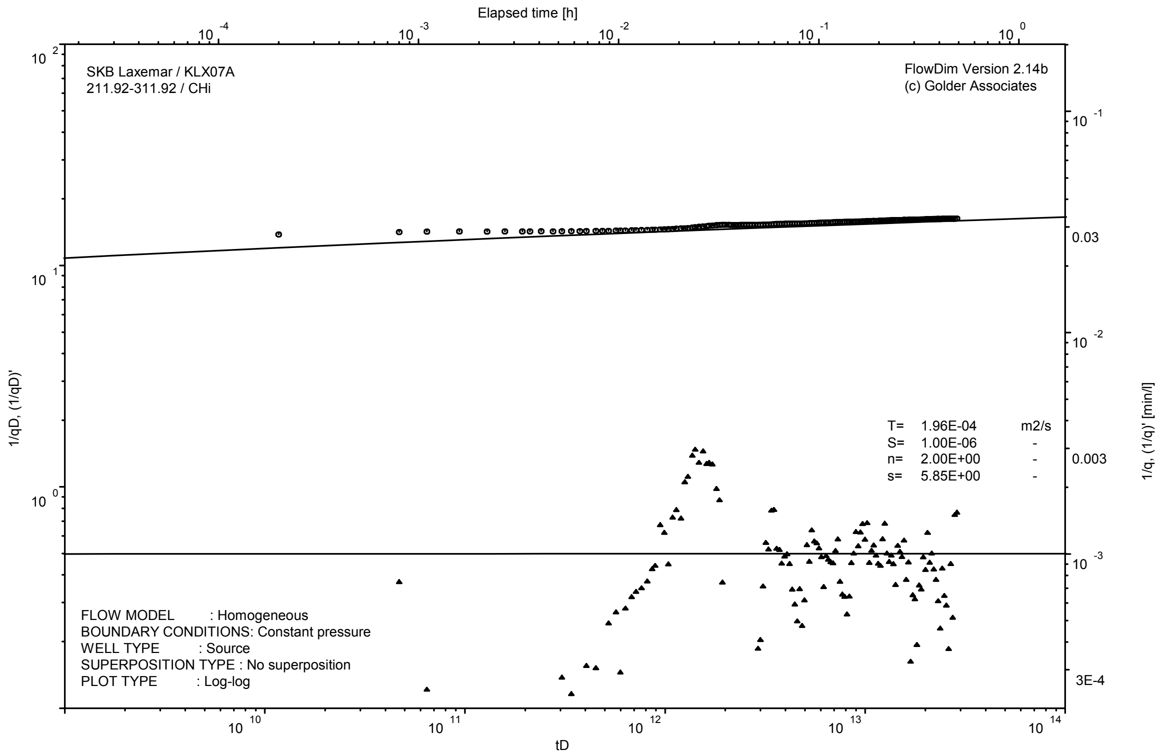
Analysis diagrams



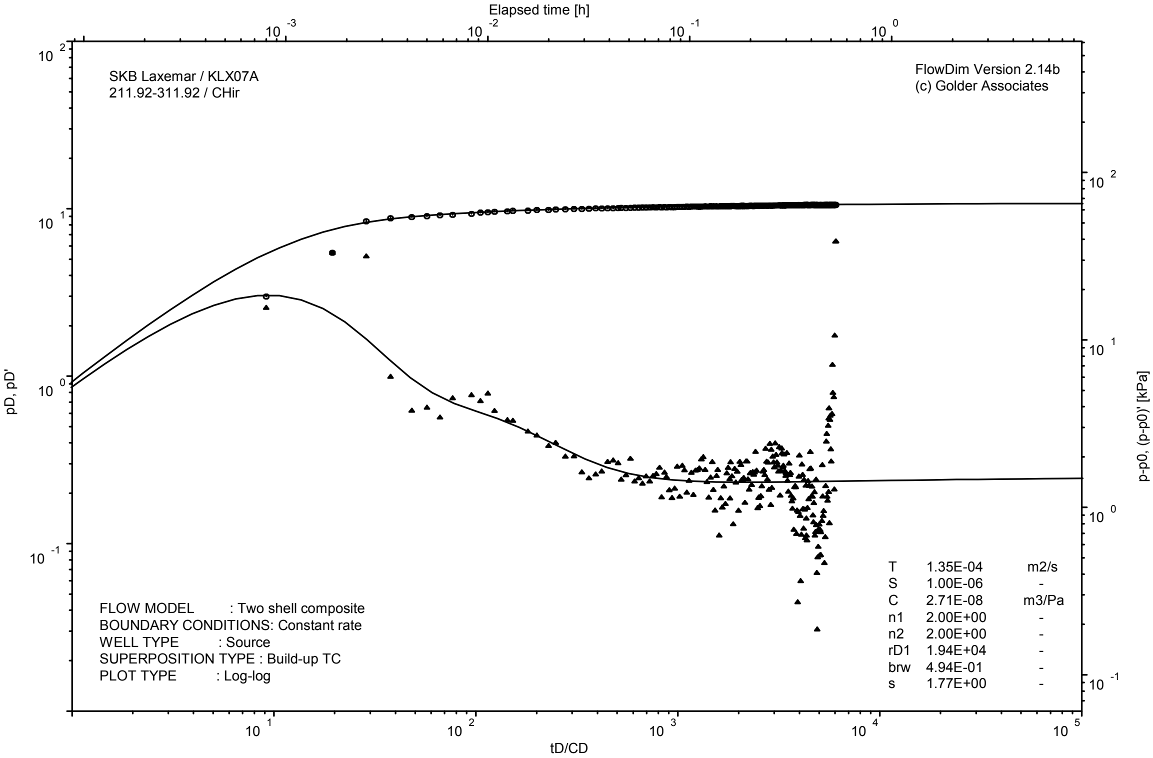
Pressure and flow rate vs. time; cartesian plot



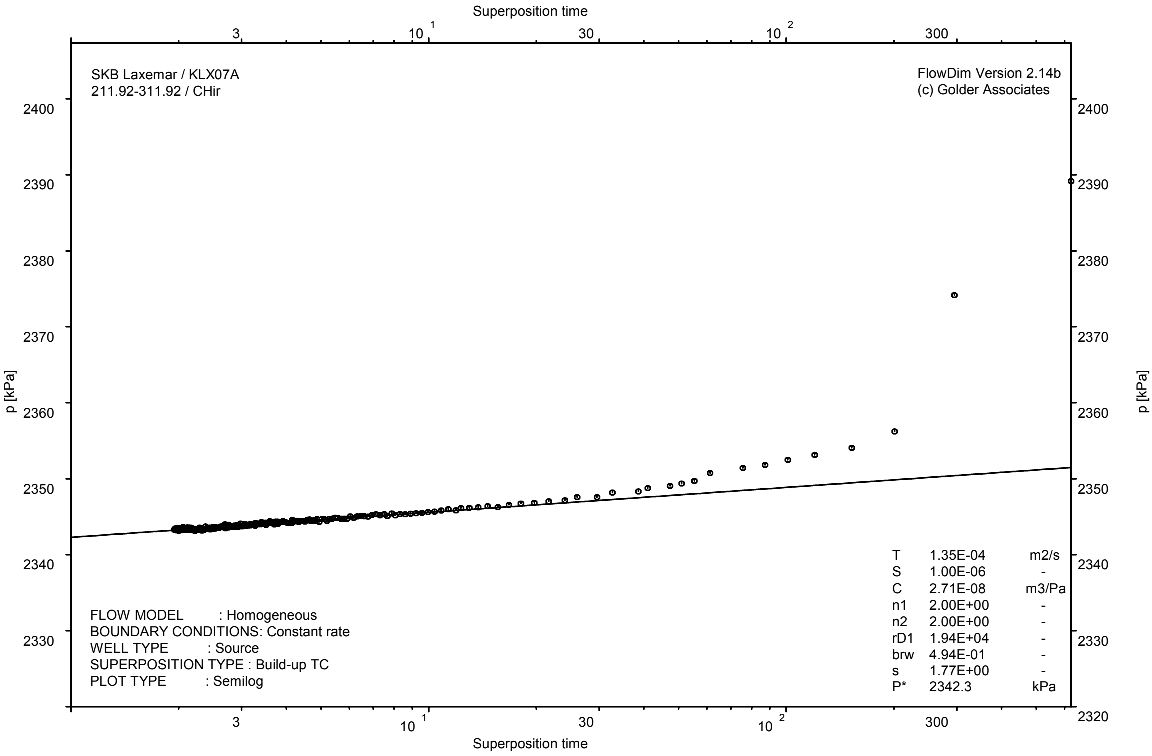
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

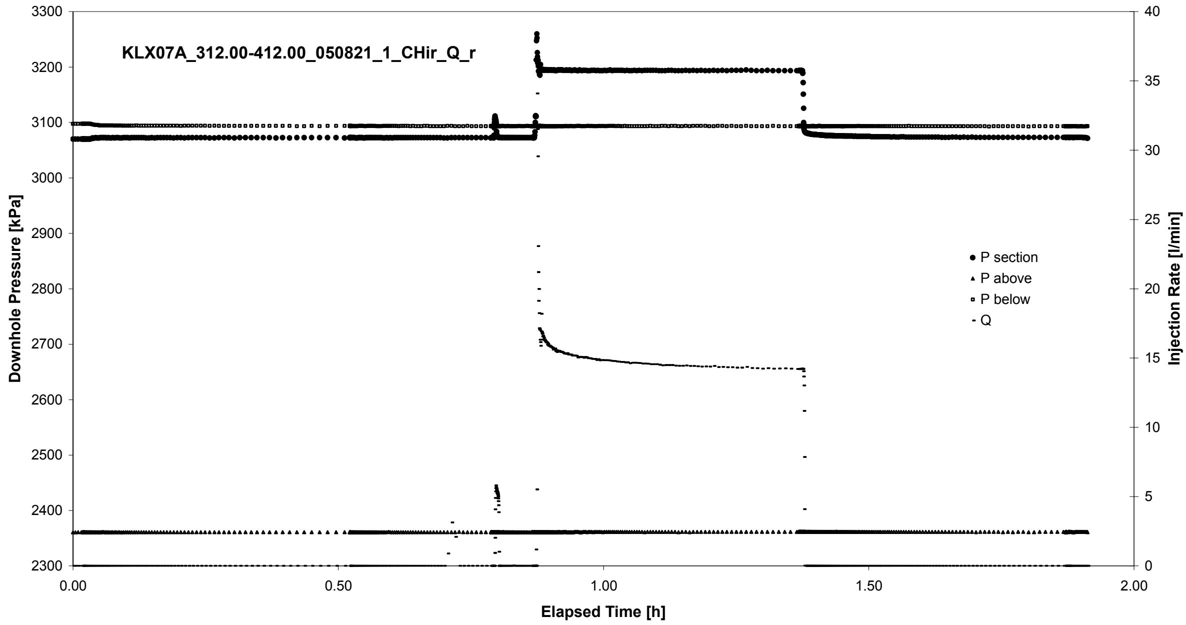


CHIR phase; HORNER match

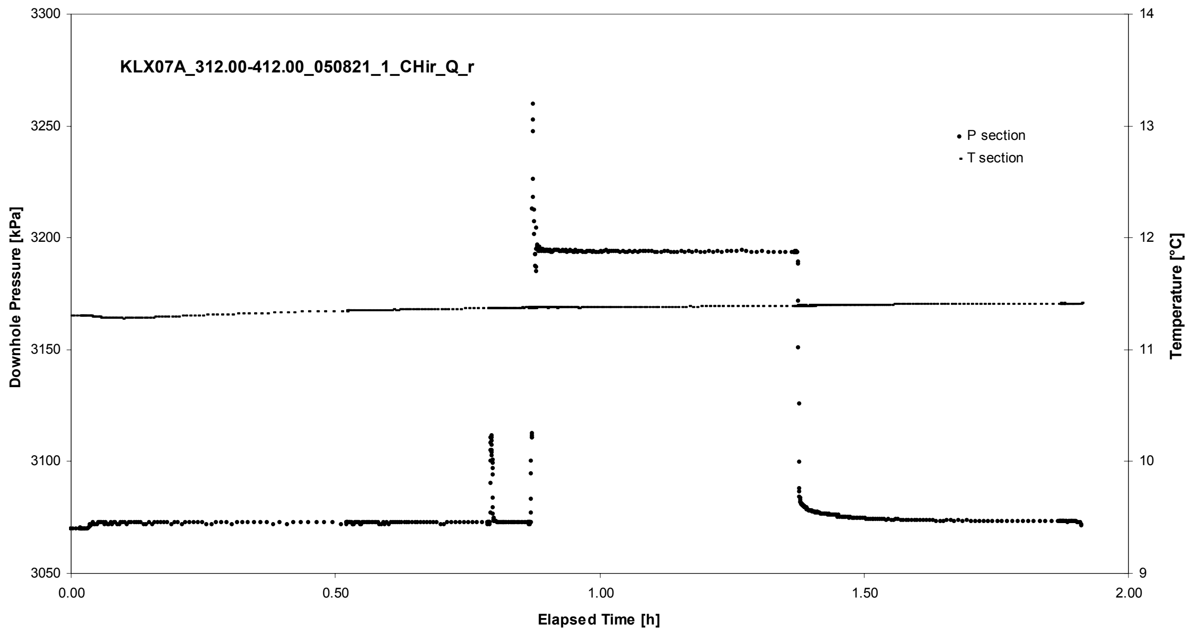
APPENDIX 2-3

Test 312.00-412.00 m

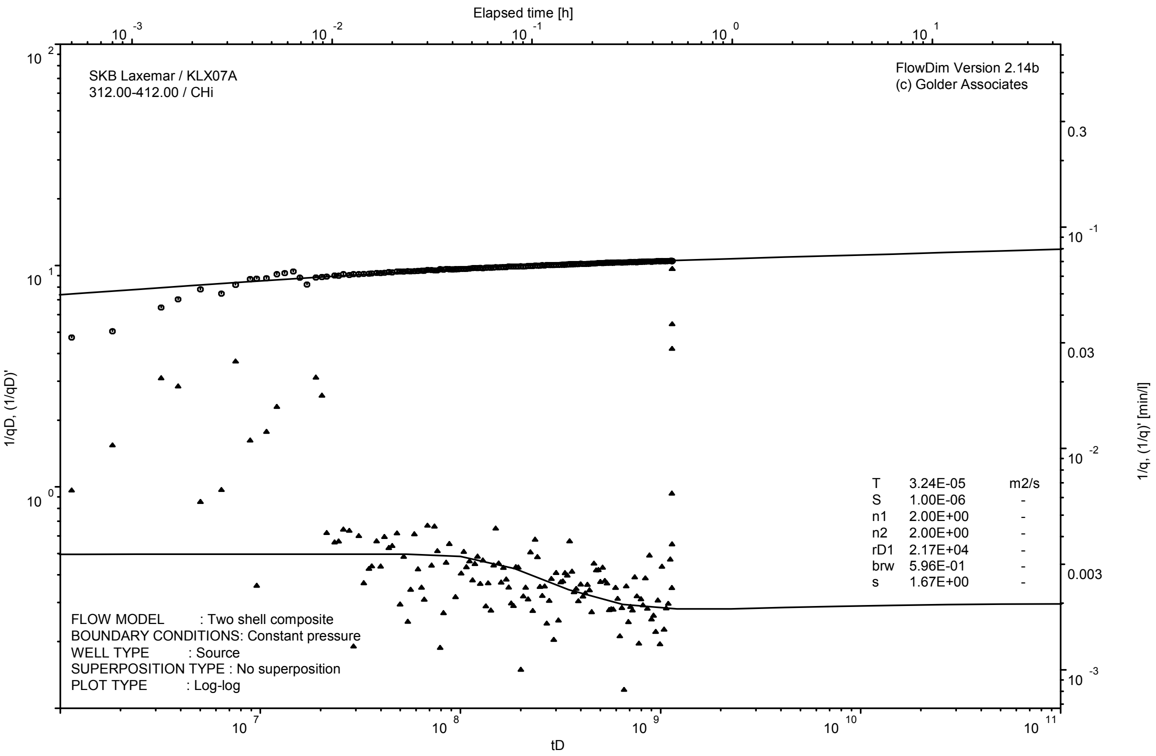
Analysis diagrams



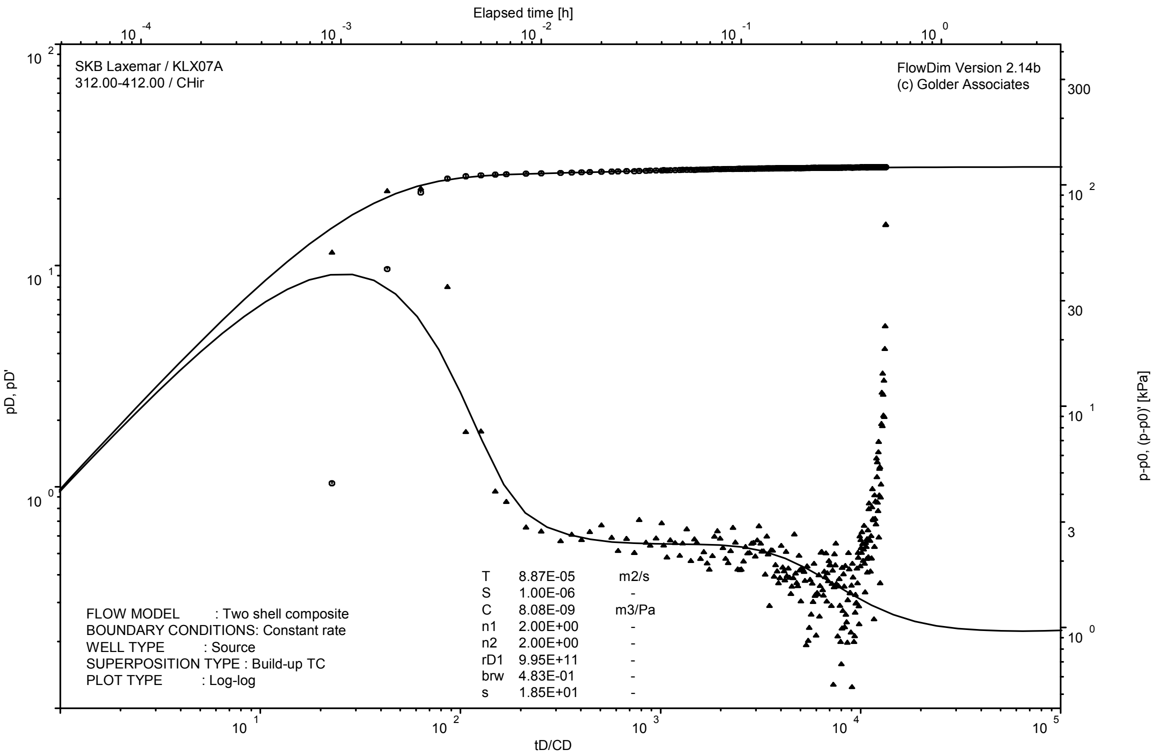
Pressure and flow rate vs. time; cartesian plot



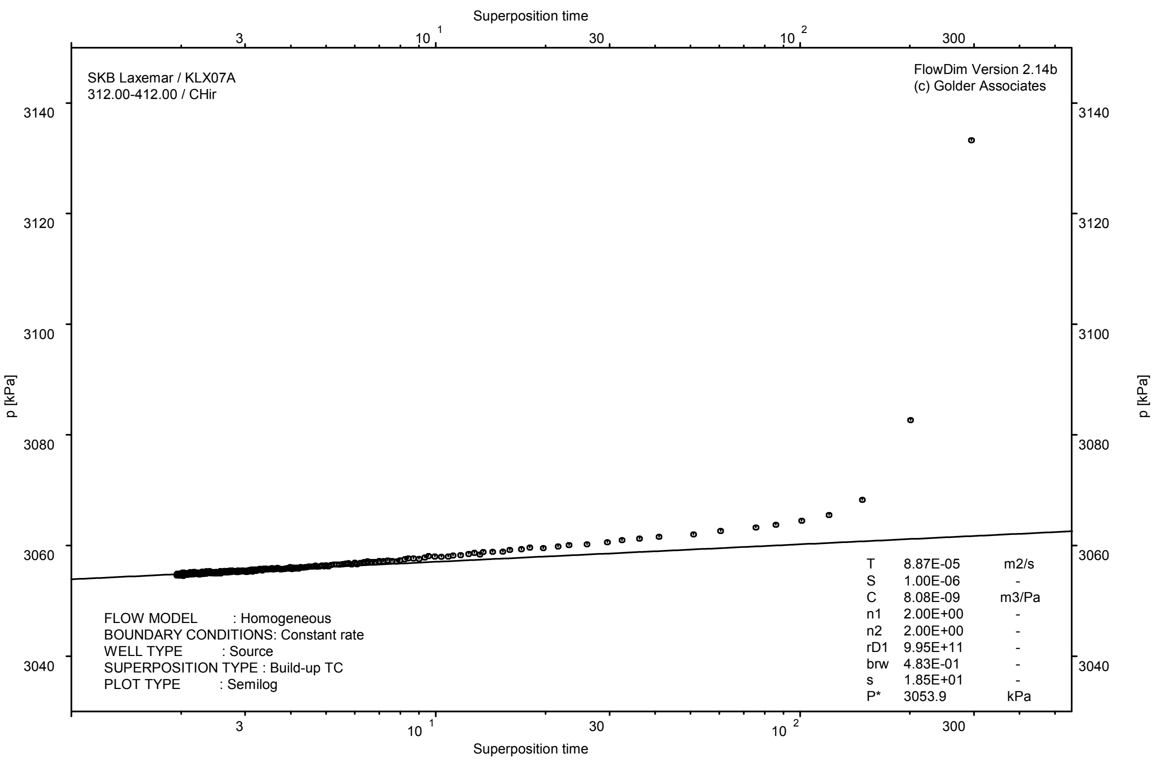
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

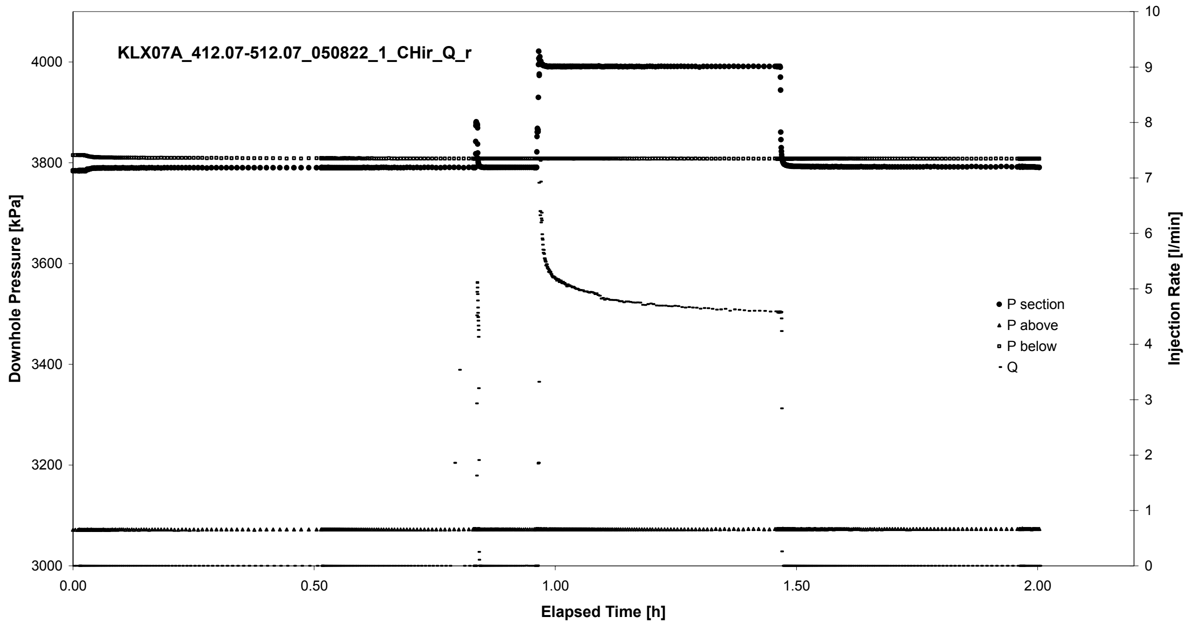


CHIR phase; HORNER match

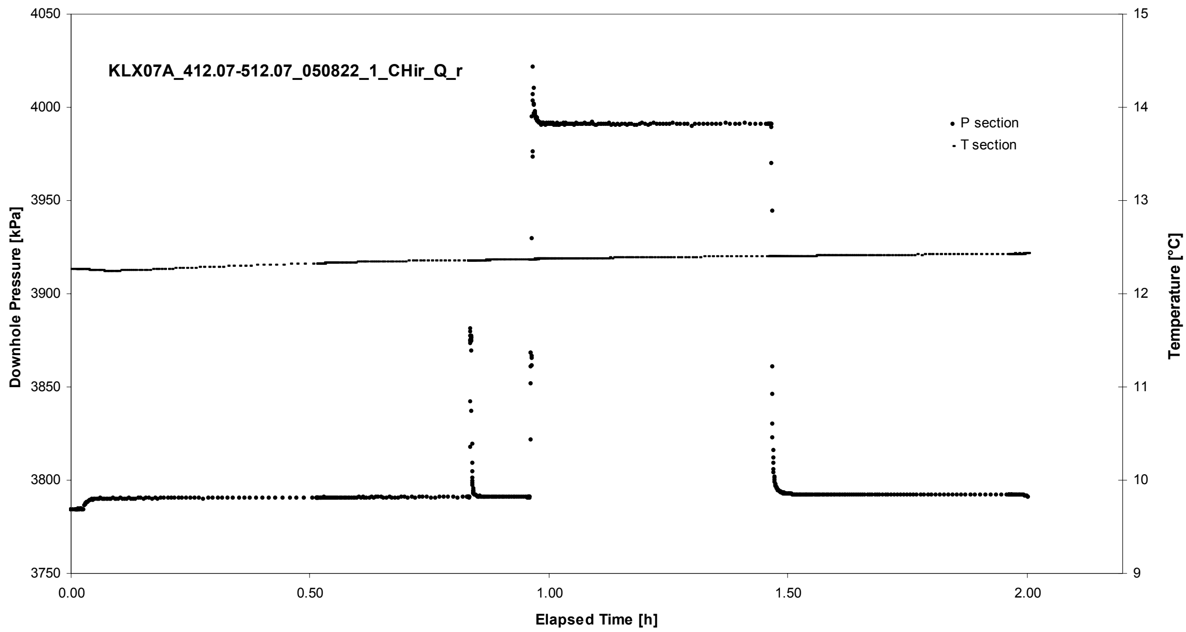
APPENDIX 2-4

Test 412.07-512.07 m

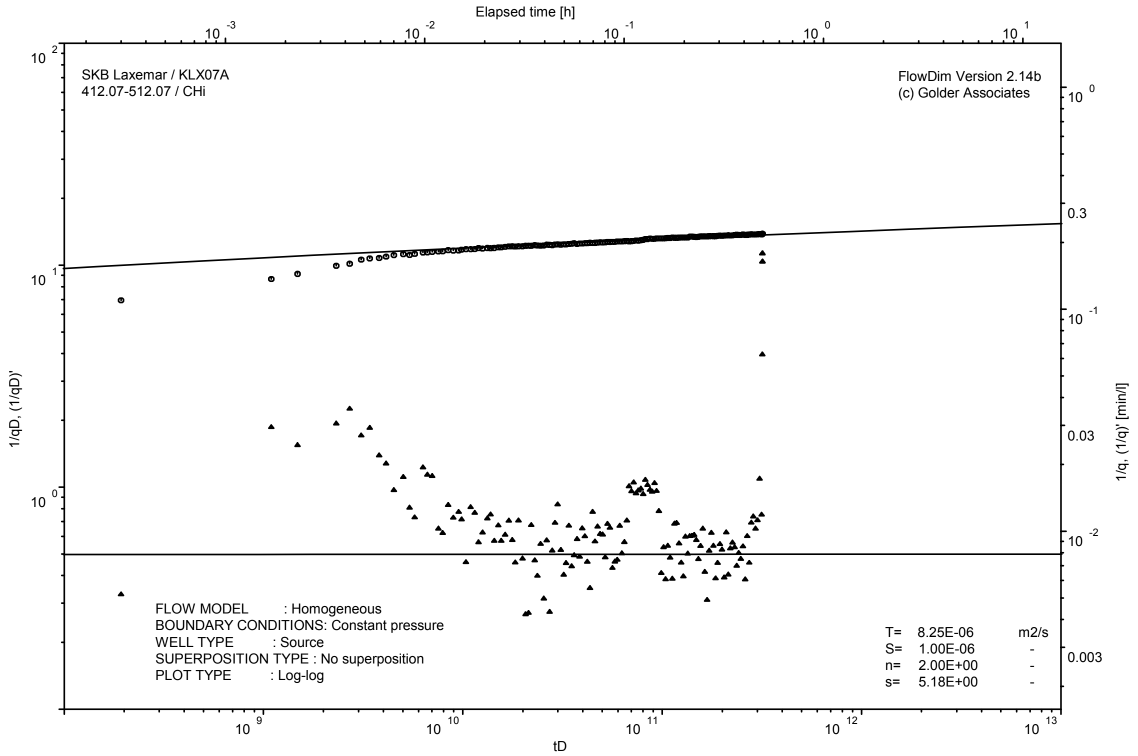
Analysis diagrams



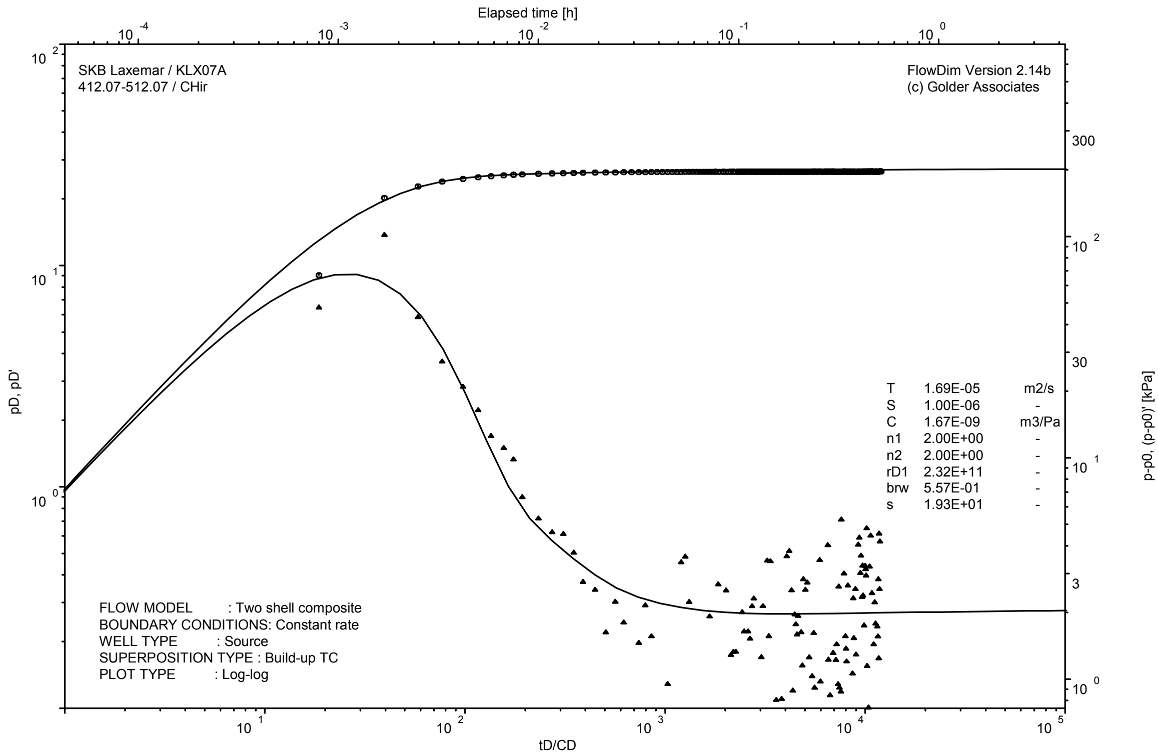
Pressure and flow rate vs. time; cartesian plot



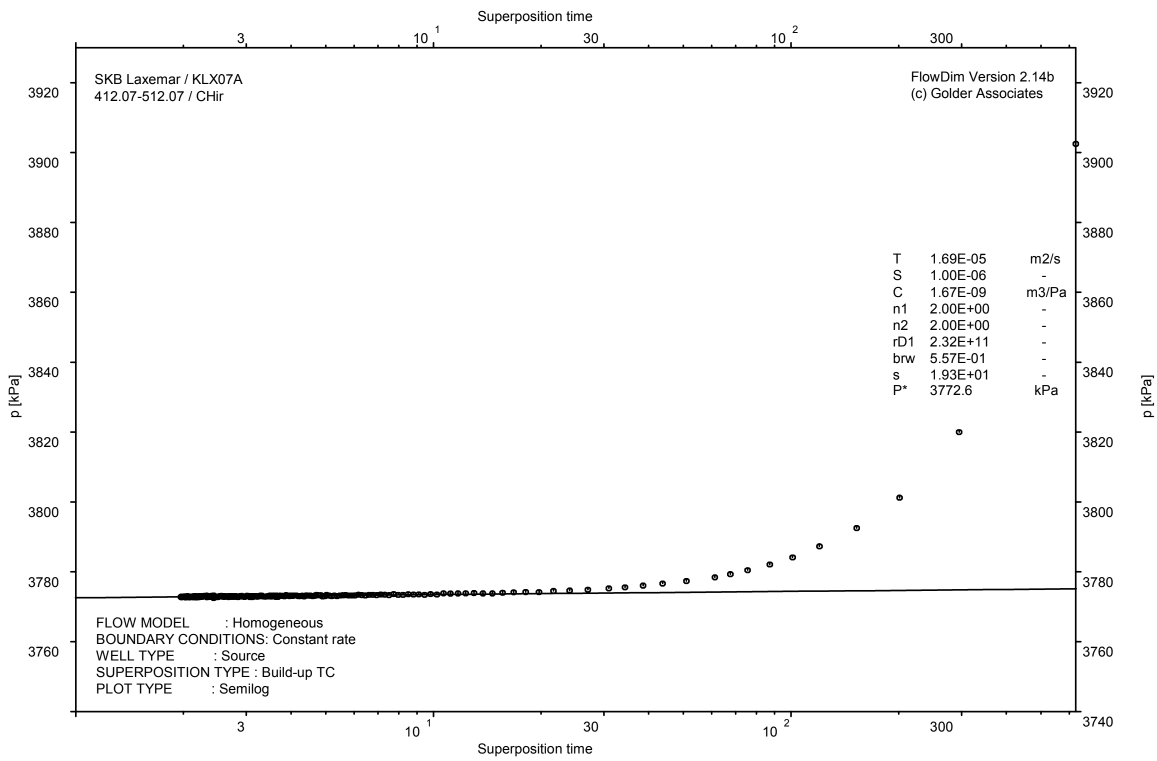
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

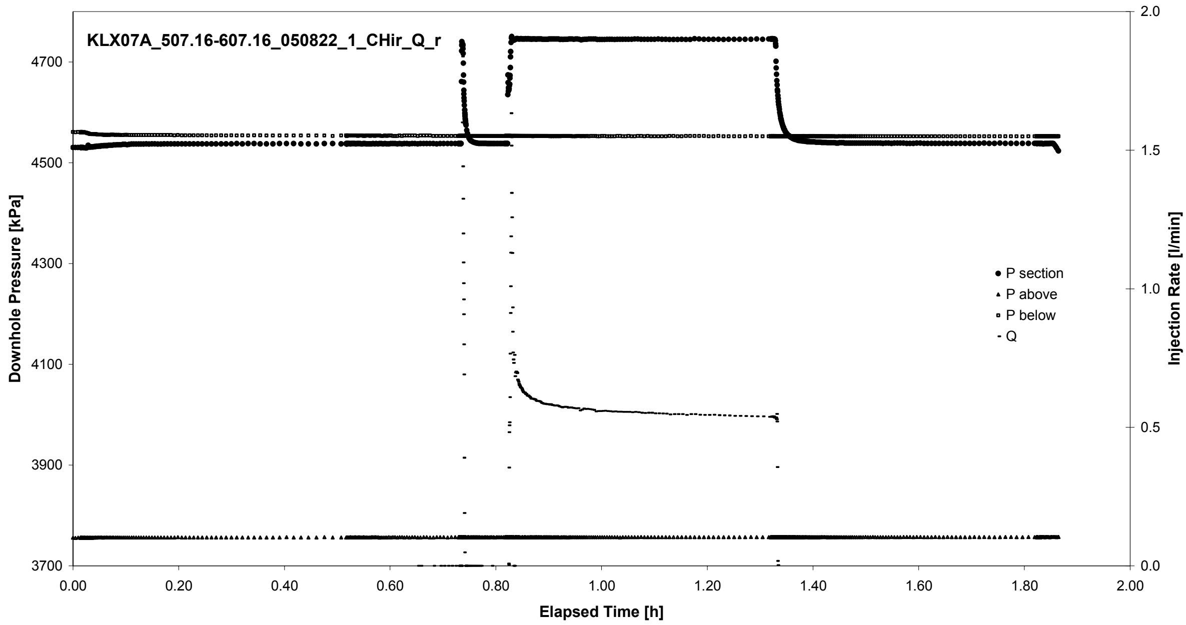


CHIR phase; HORNER match

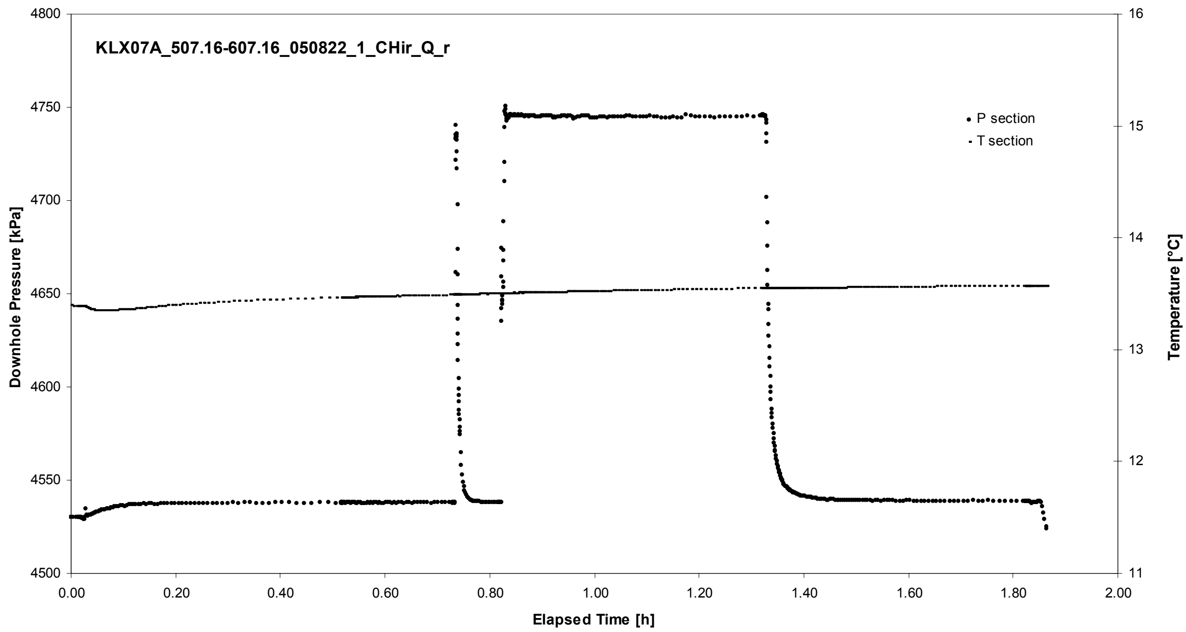
APPENDIX 2-5

Test 507.16-607.16 m

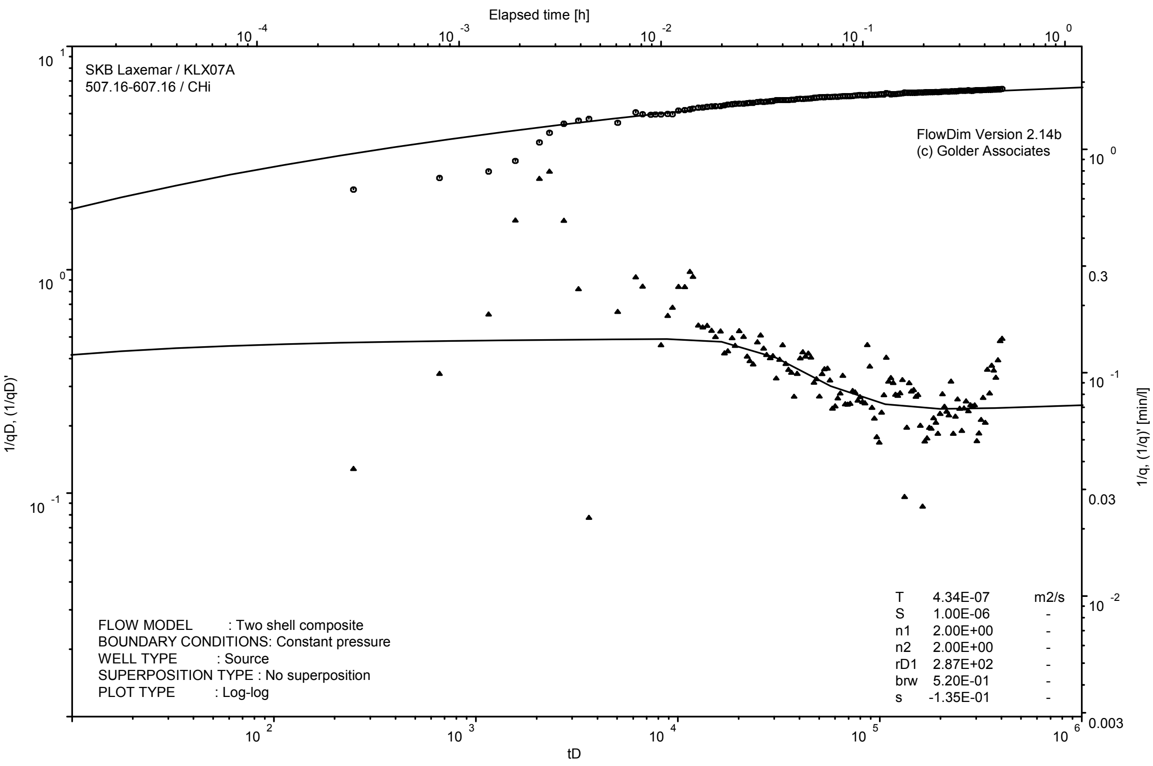
Analysis diagrams



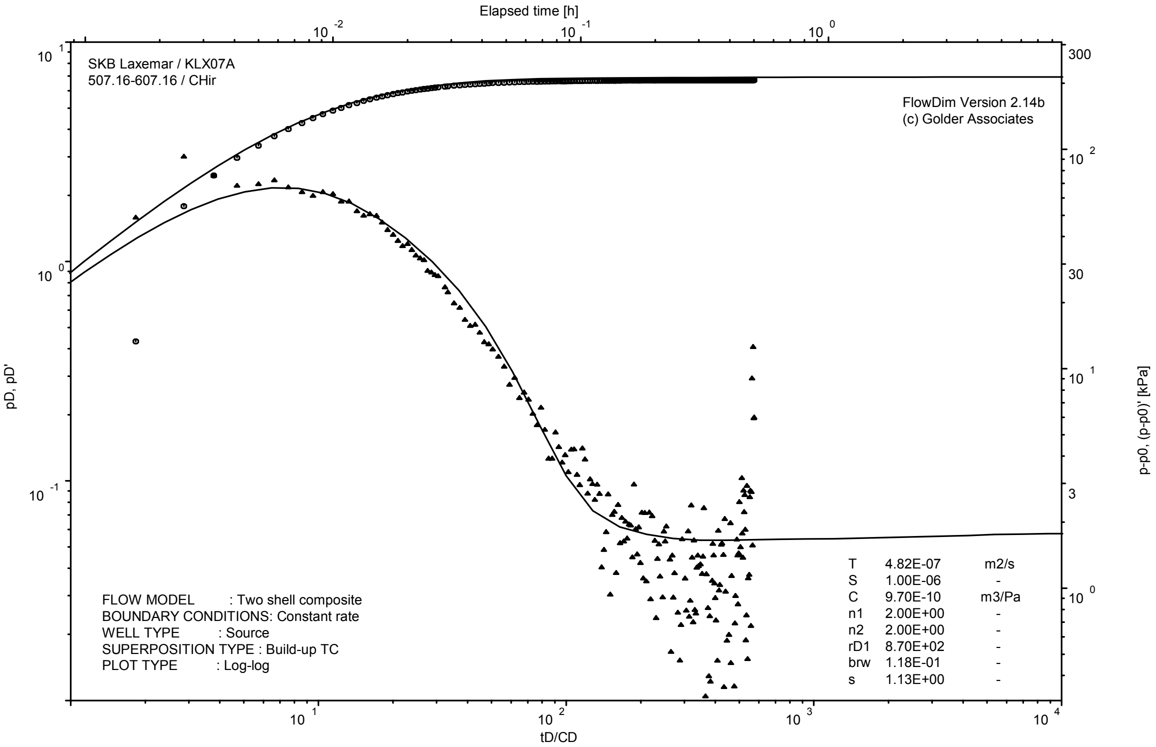
Pressure and flow rate vs. time; cartesian plot



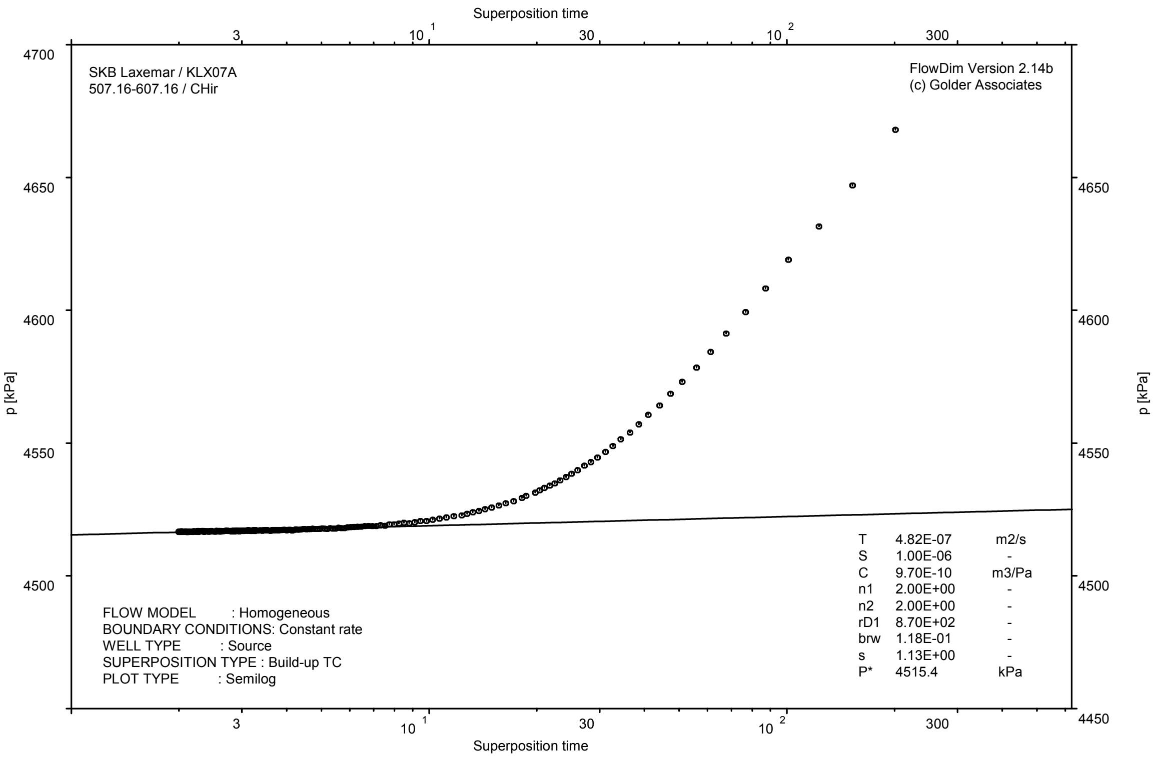
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

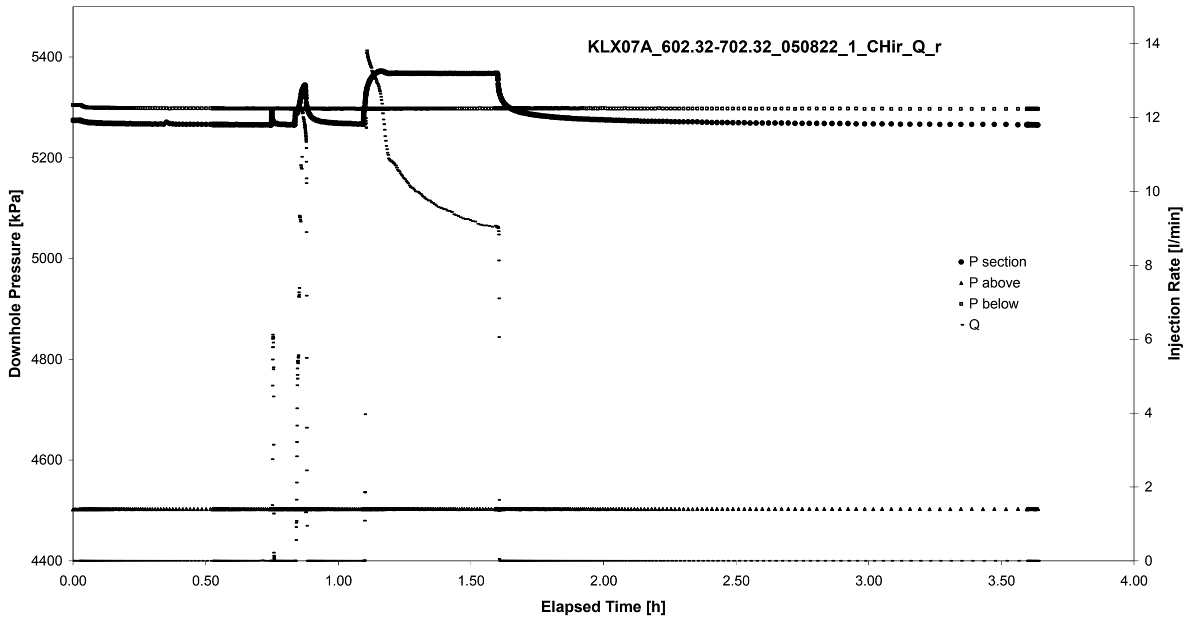


CHIR phase; HORNER match

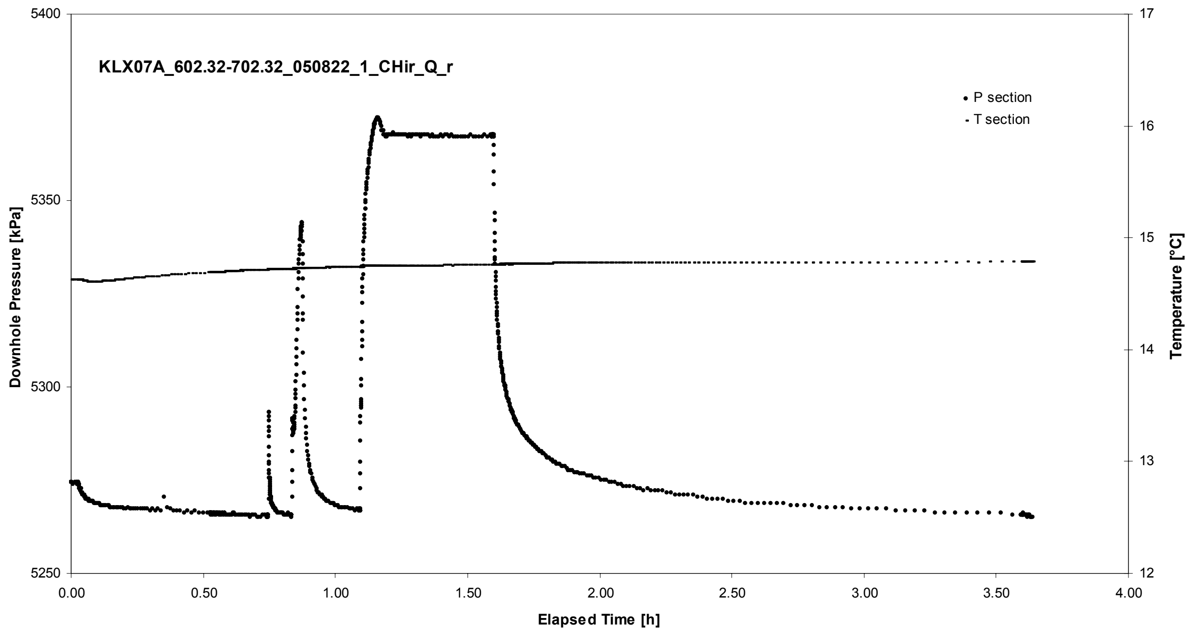
APPENDIX 2-6

Test 602.32-702.32 m

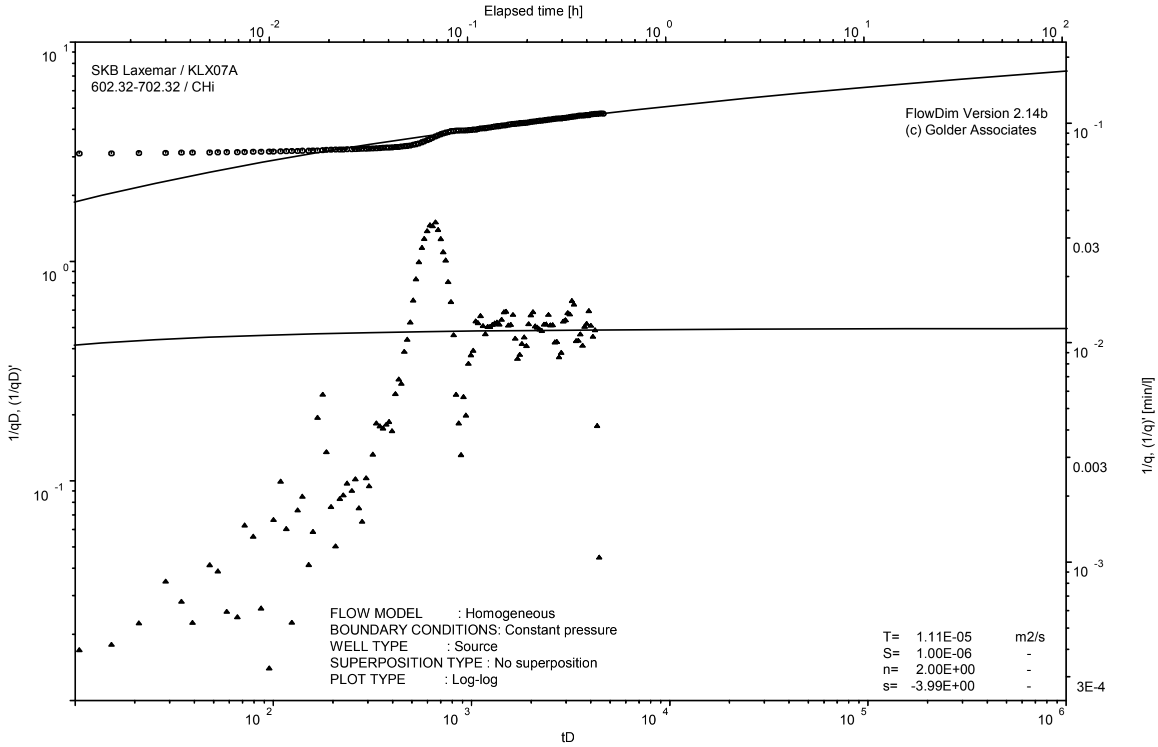
Analysis diagrams



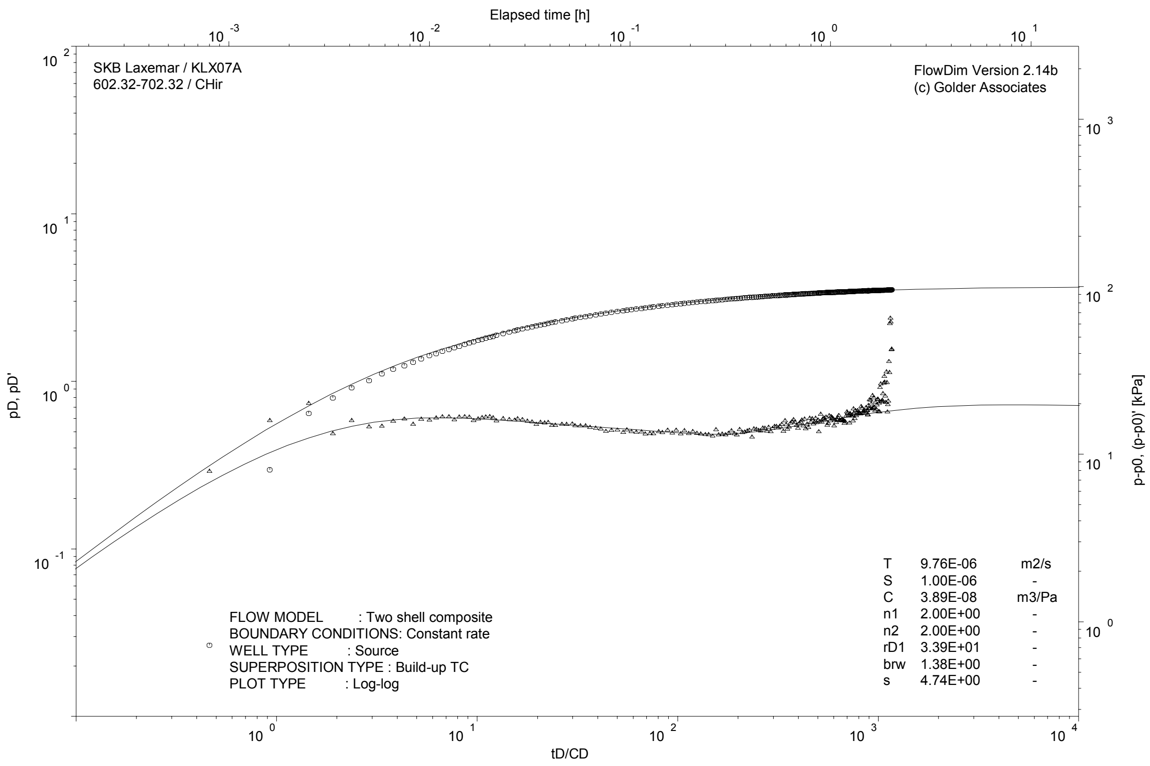
Pressure and flow rate vs. time; cartesian plot



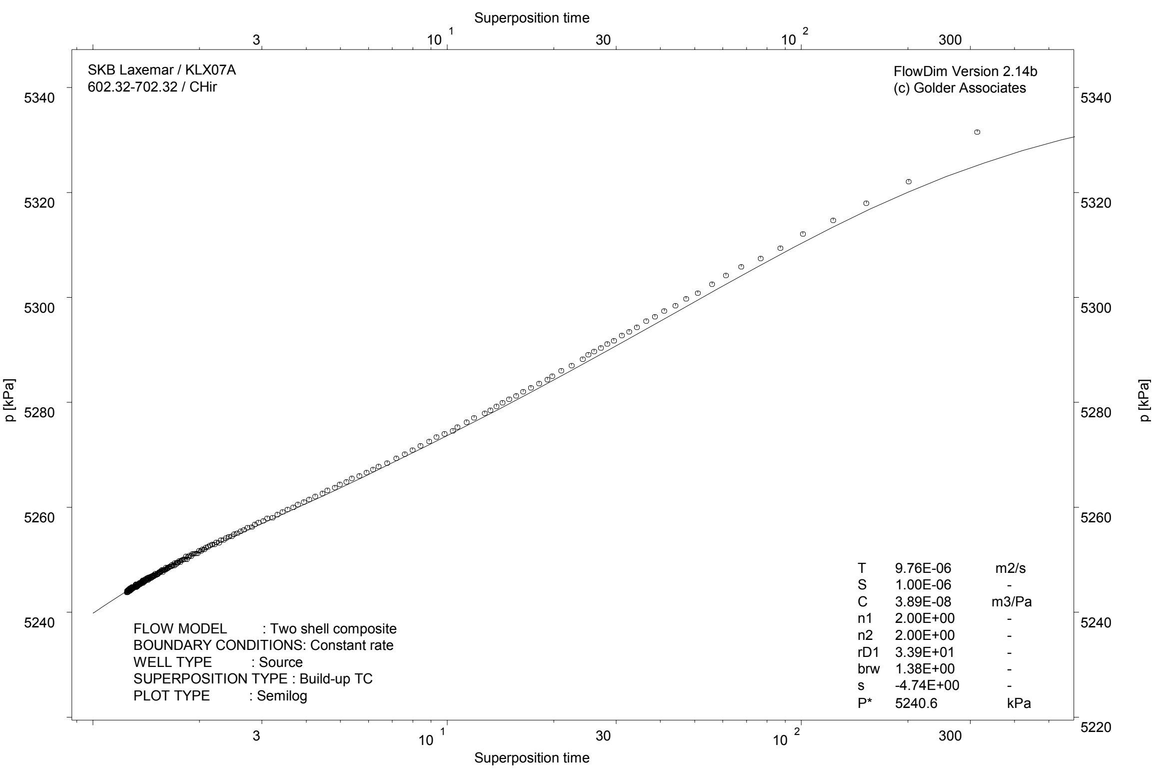
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

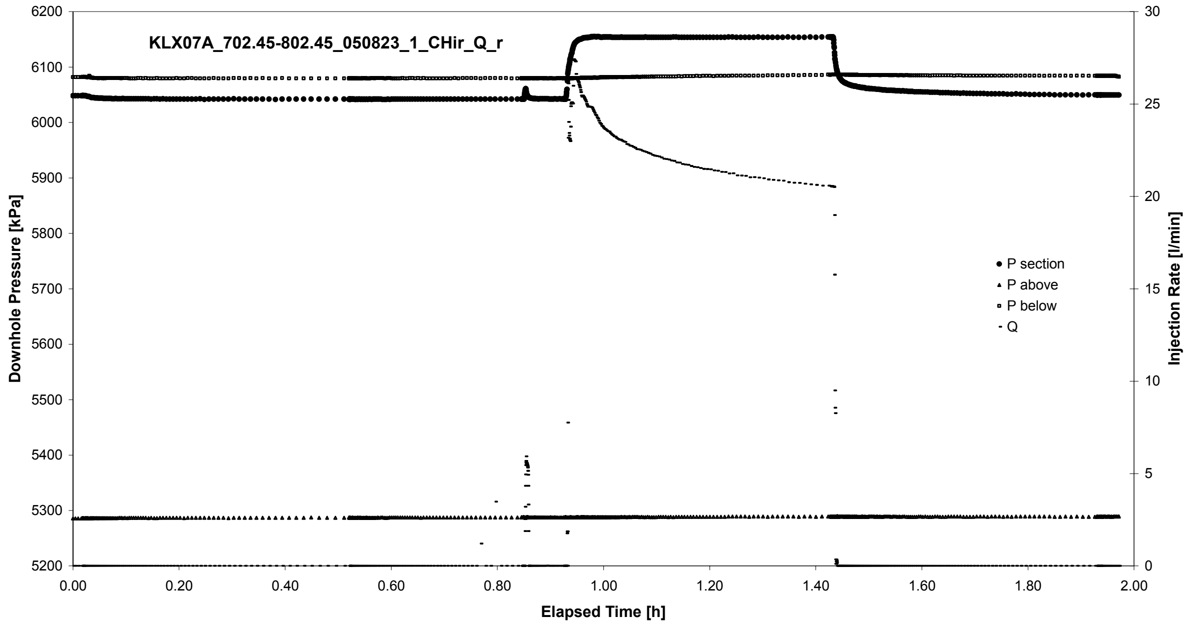


CHIR phase; HORNER match

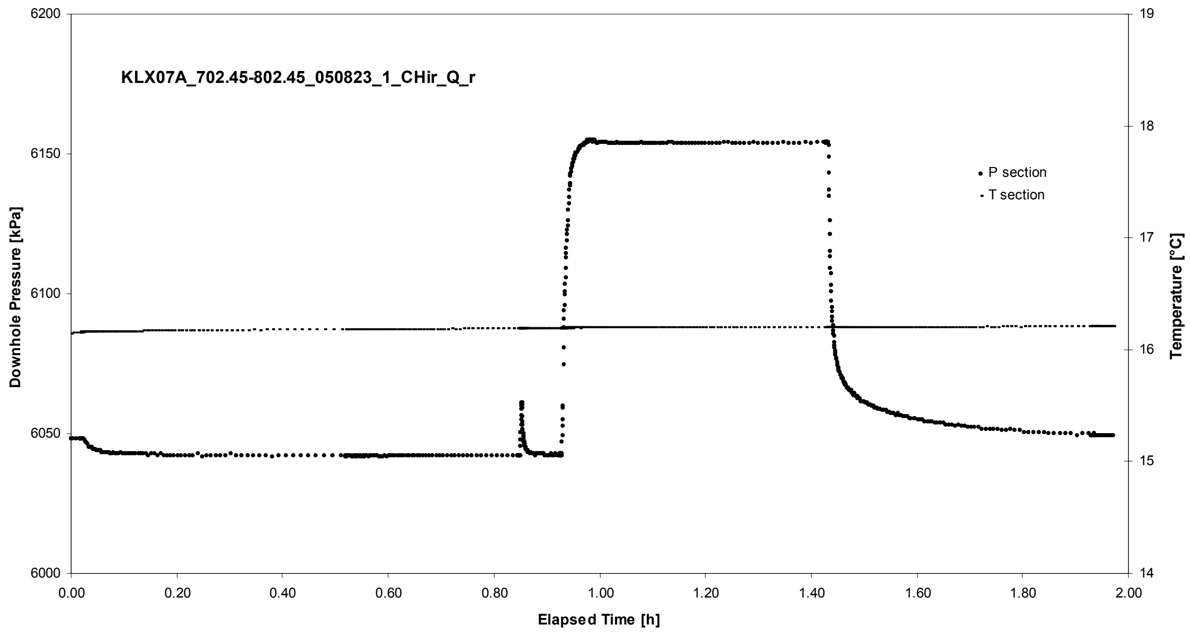
APPENDIX 2-7

Test 702.45-802.45 m

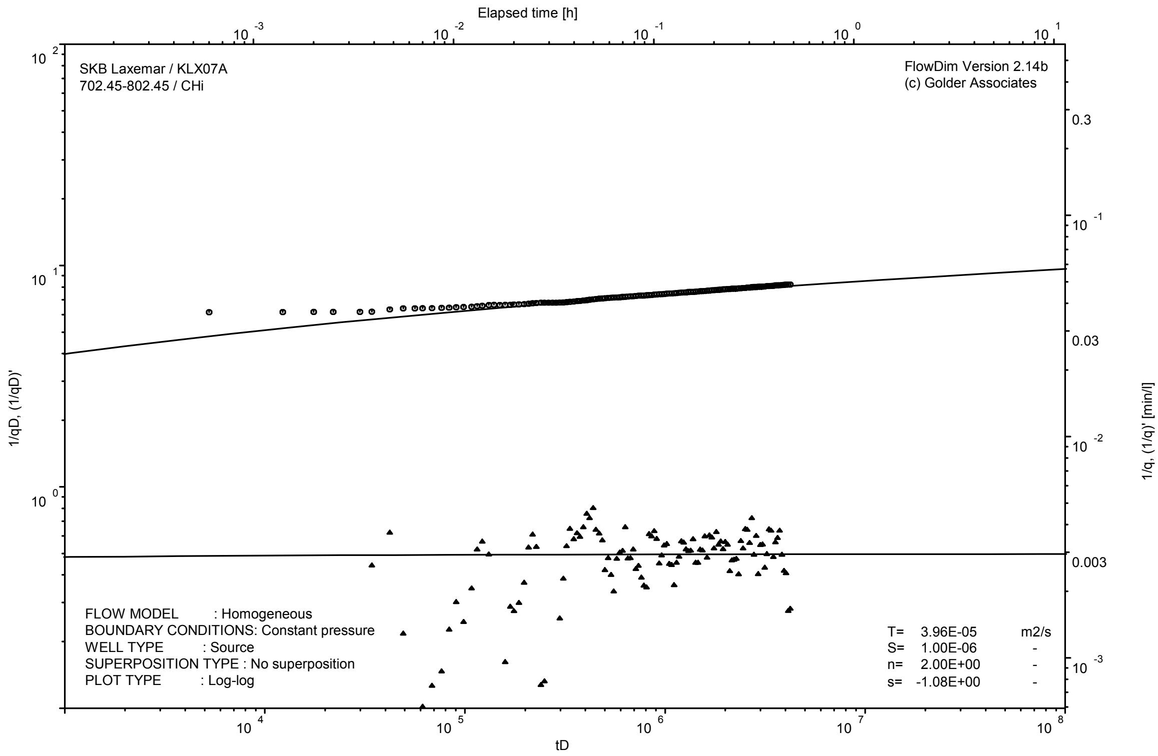
Analysis diagrams



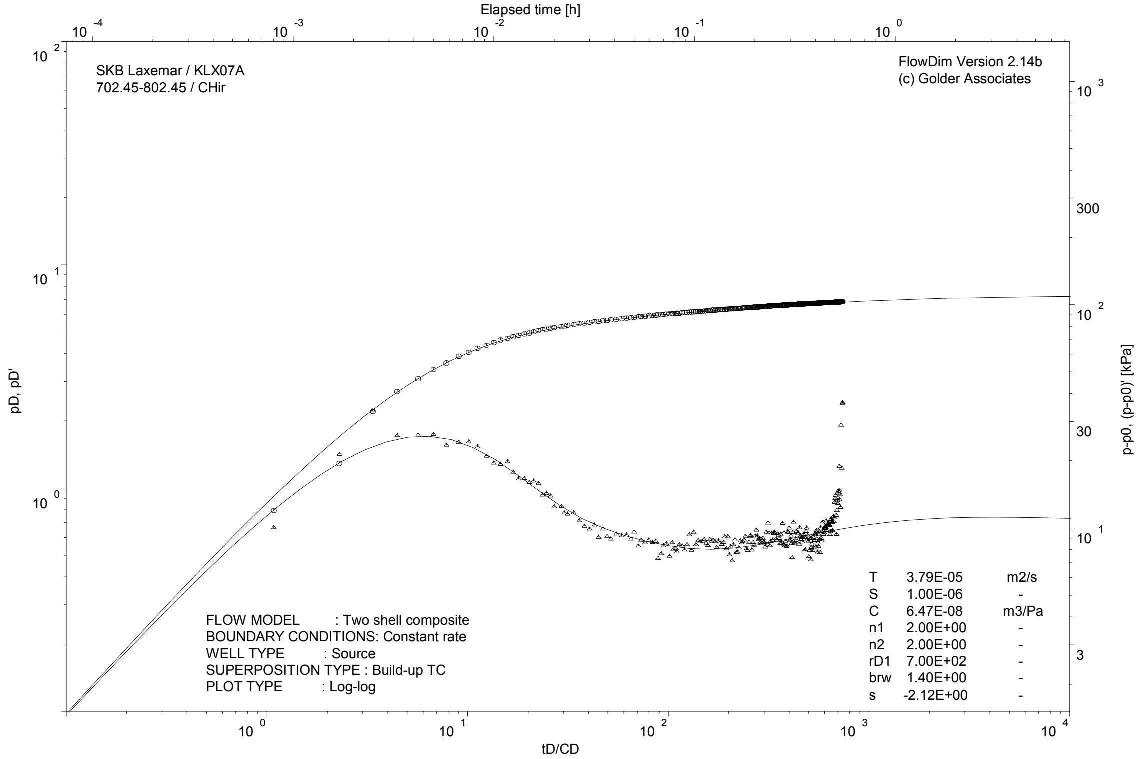
Pressure and flow rate vs. time; cartesian plot



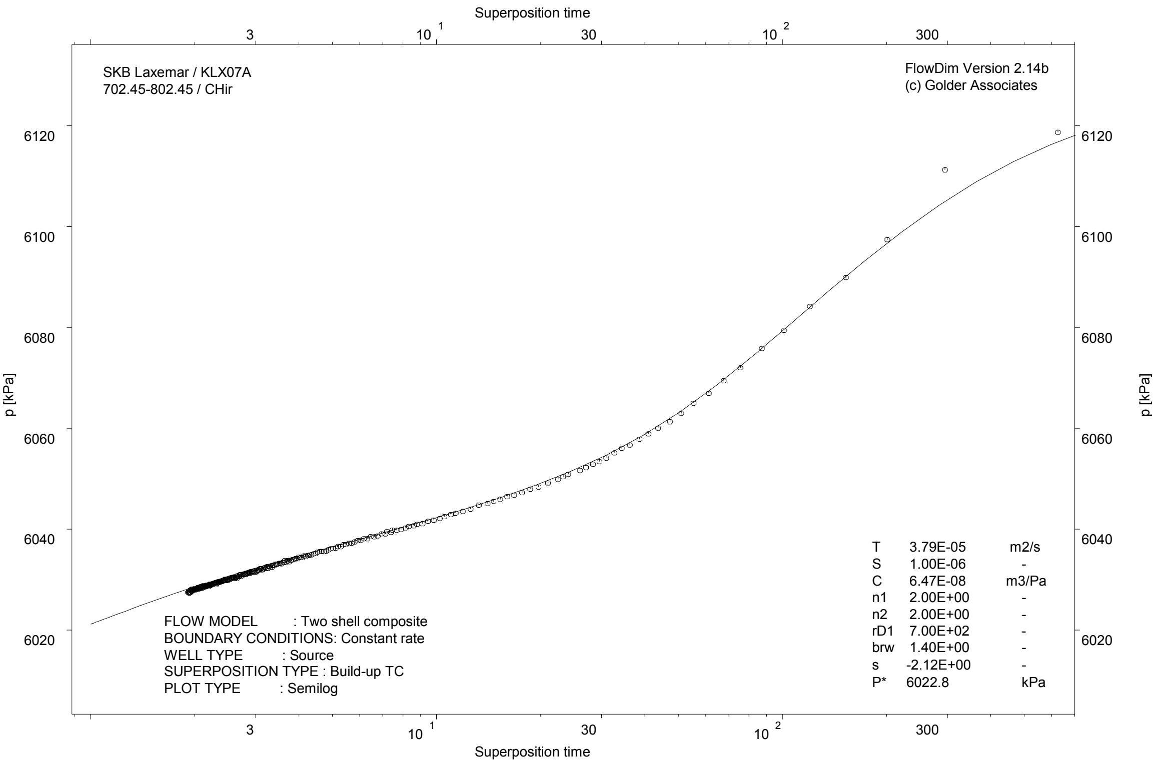
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

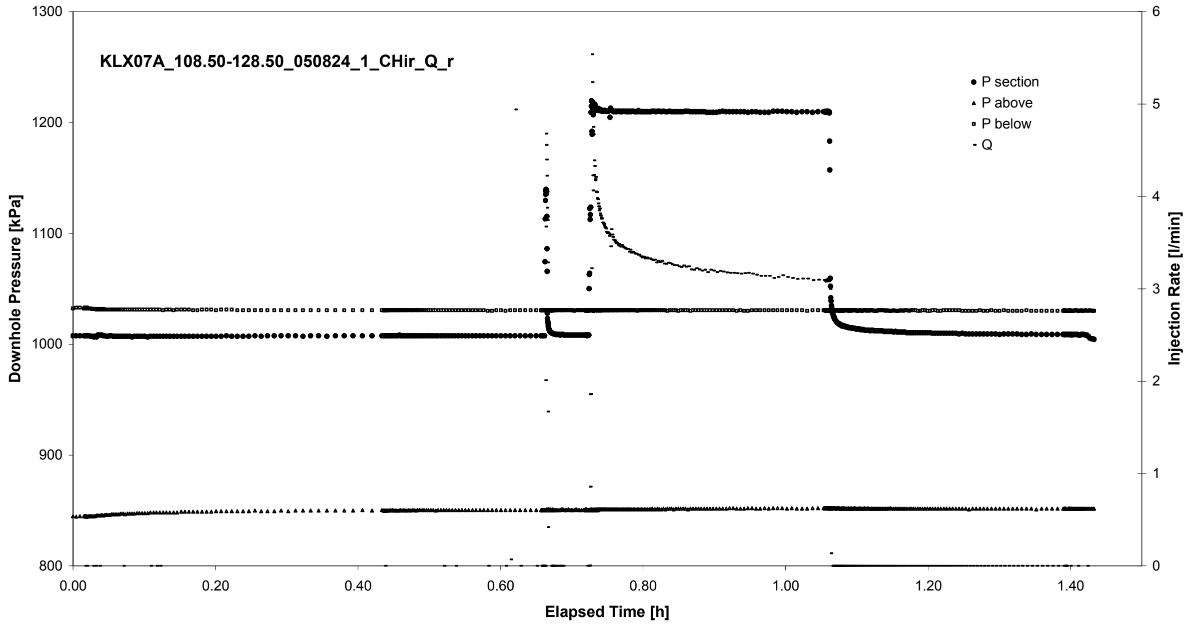


CHIR phase; HORNER match

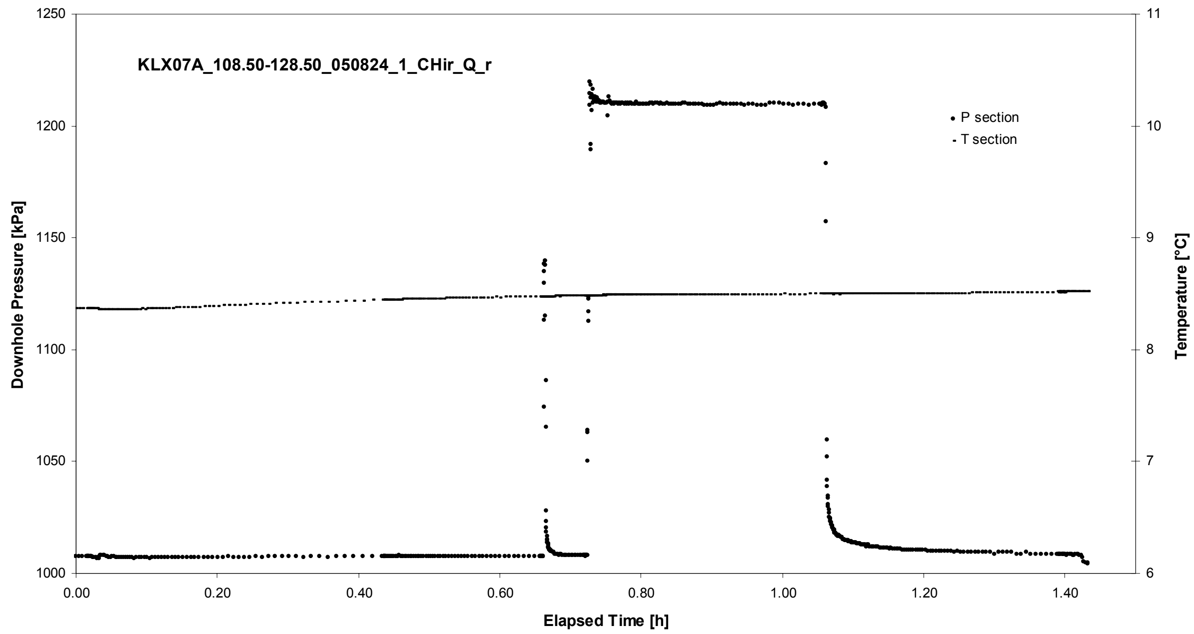
APPENDIX 2-8

Test 108.50-128.50 m

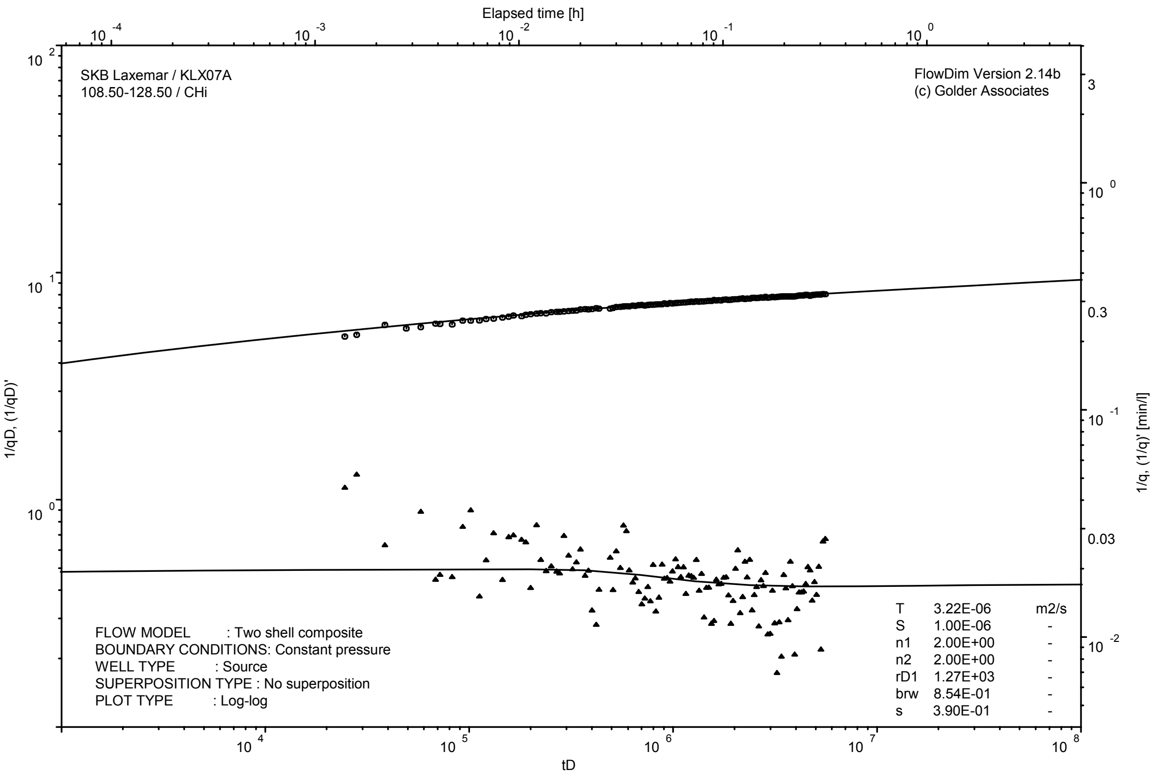
Analysis diagrams



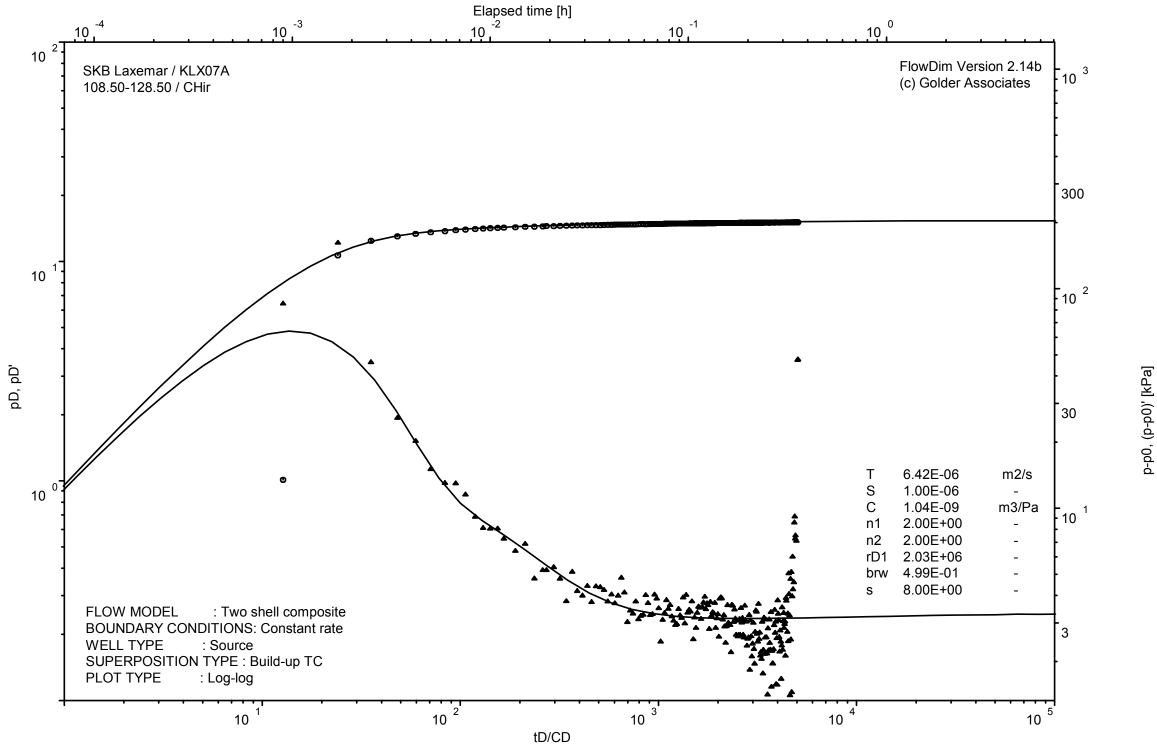
Pressure and flow rate vs. time; cartesian plot



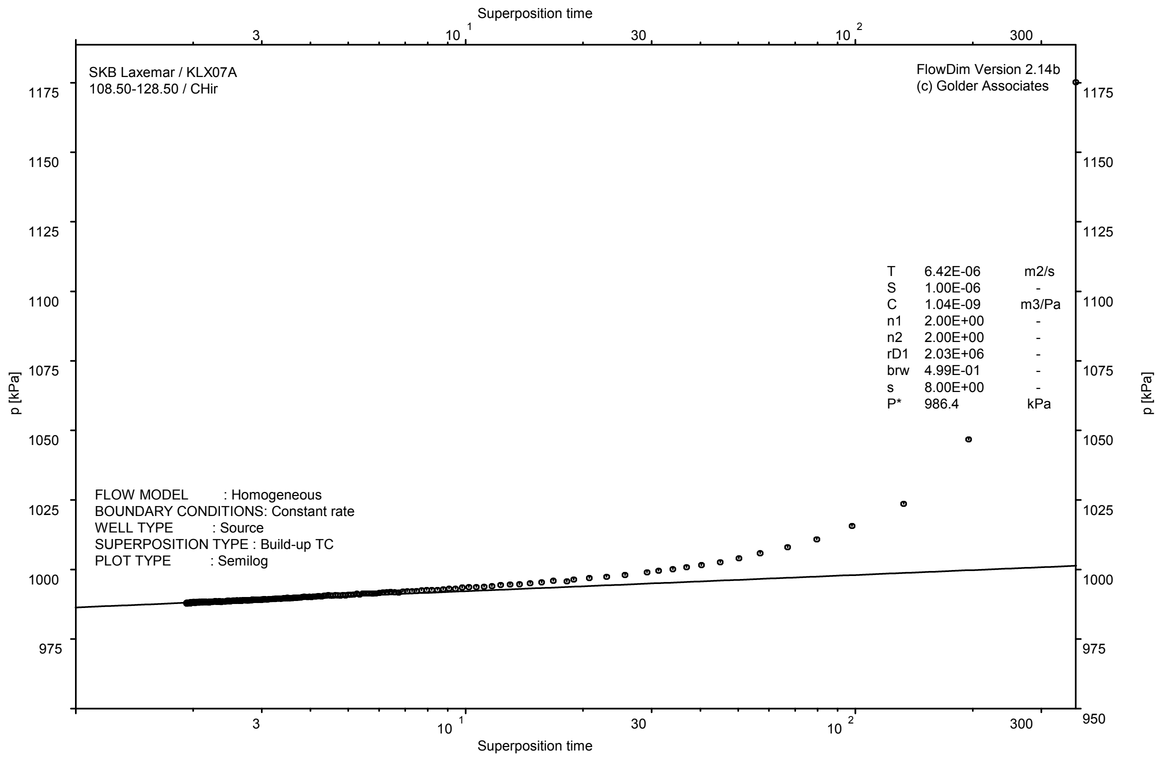
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

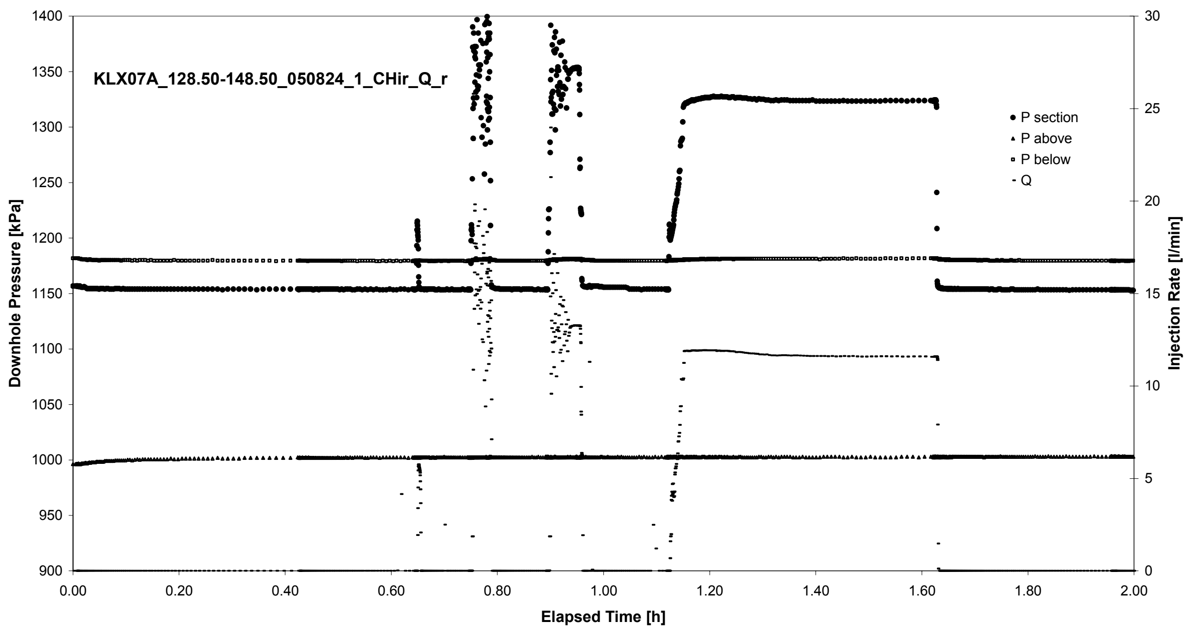


CHIR phase; HORNER match

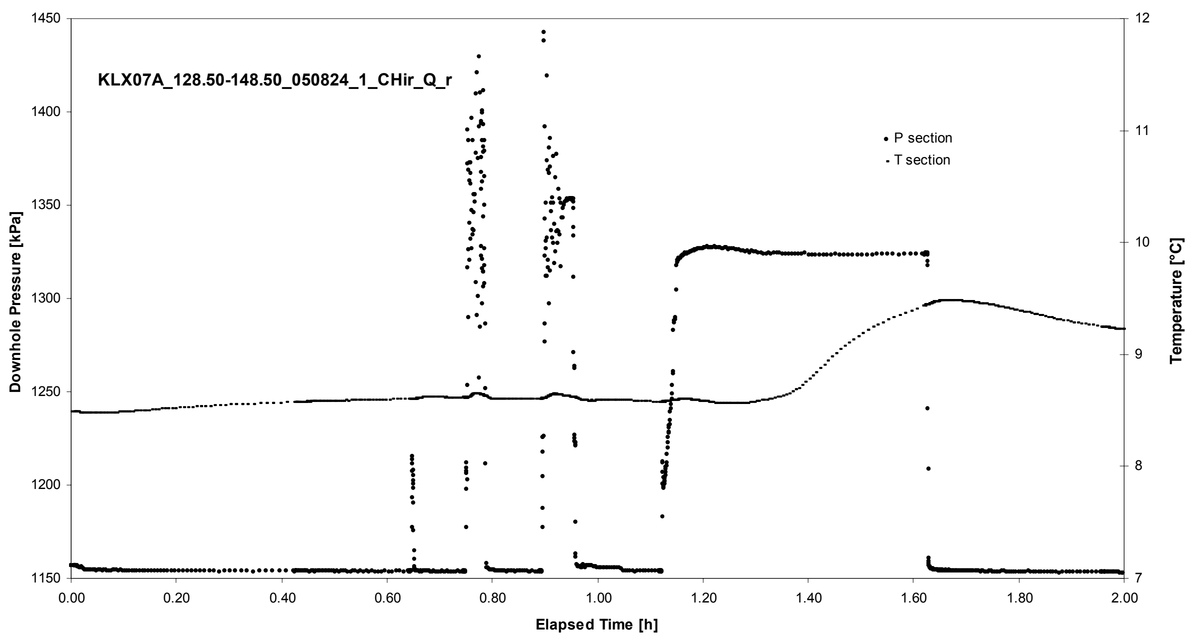
APPENDIX 2-9

Test 128.50-148.50 m

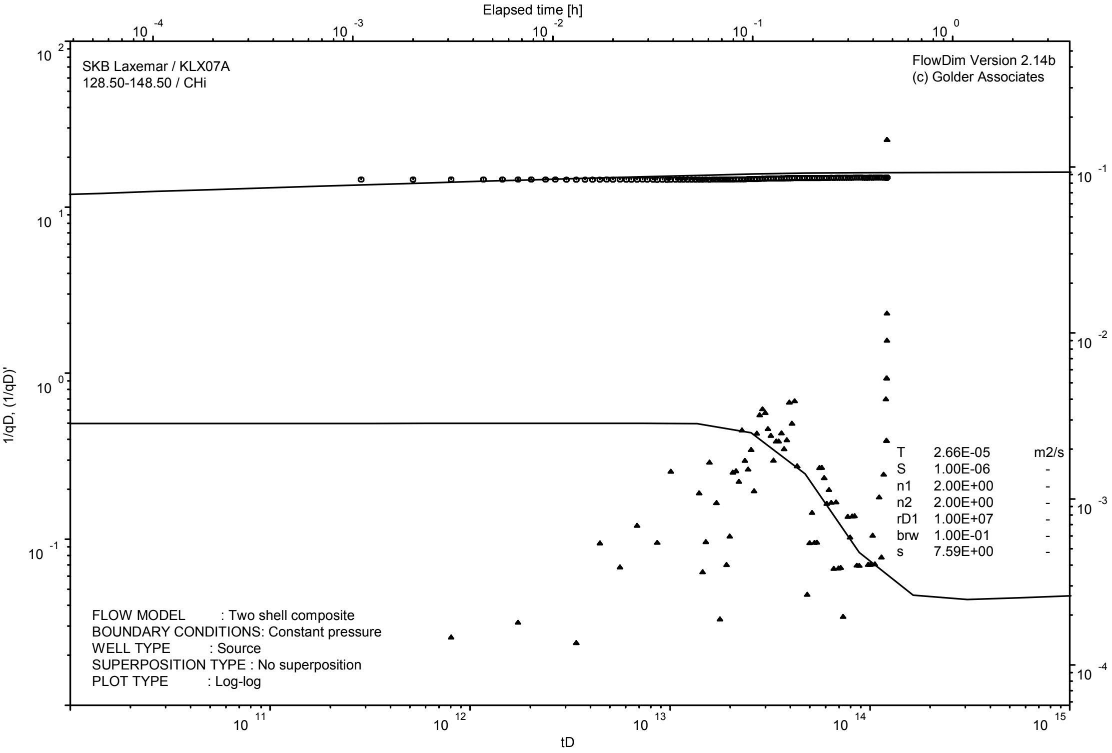
Analysis diagrams



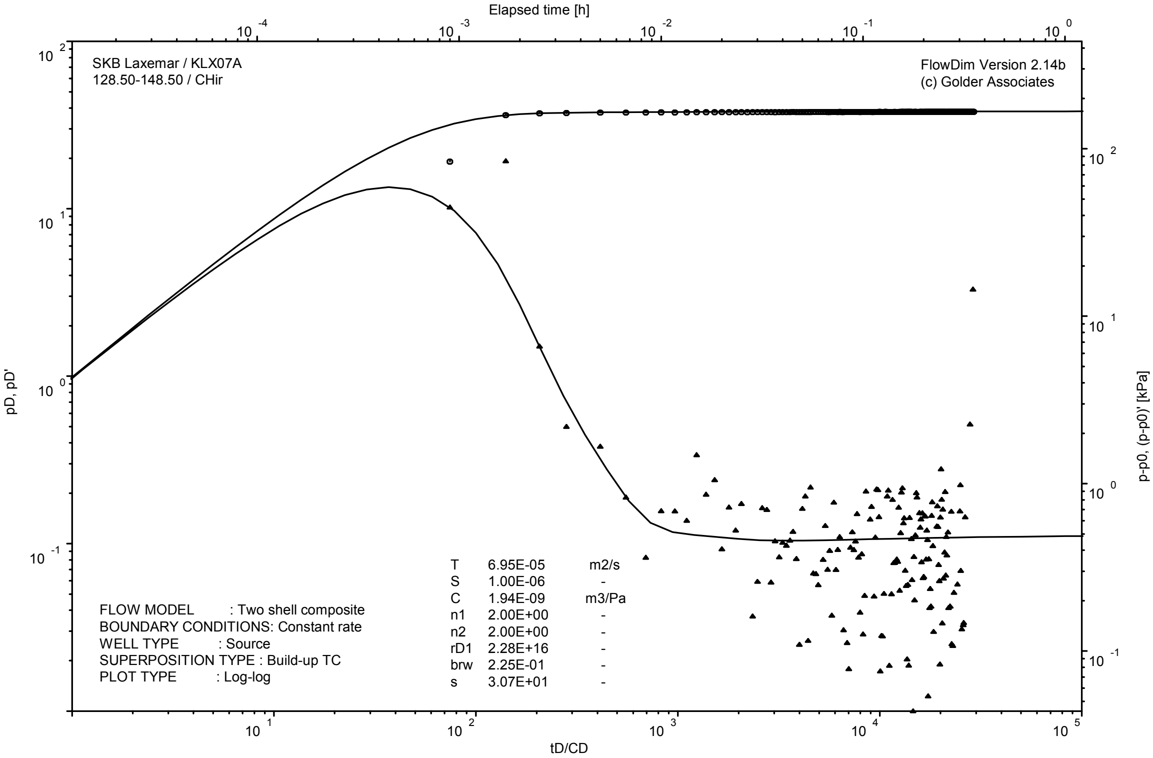
Pressure and flow rate vs. time; cartesian plot



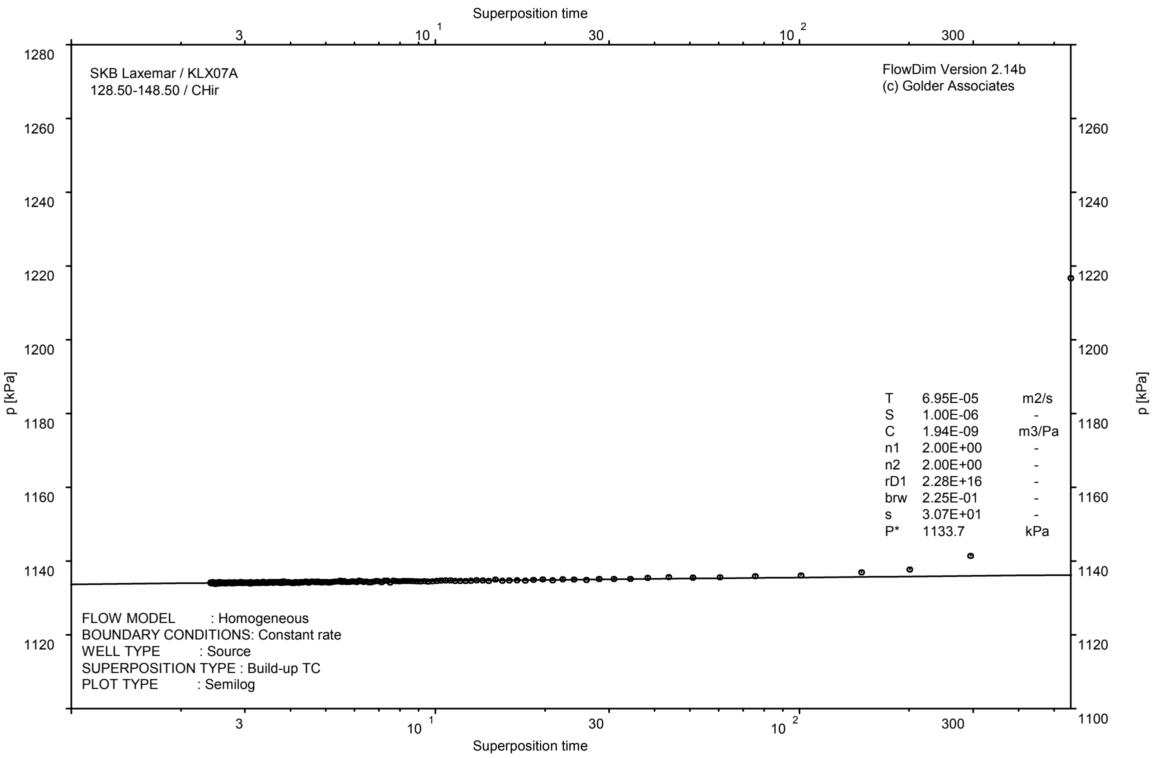
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

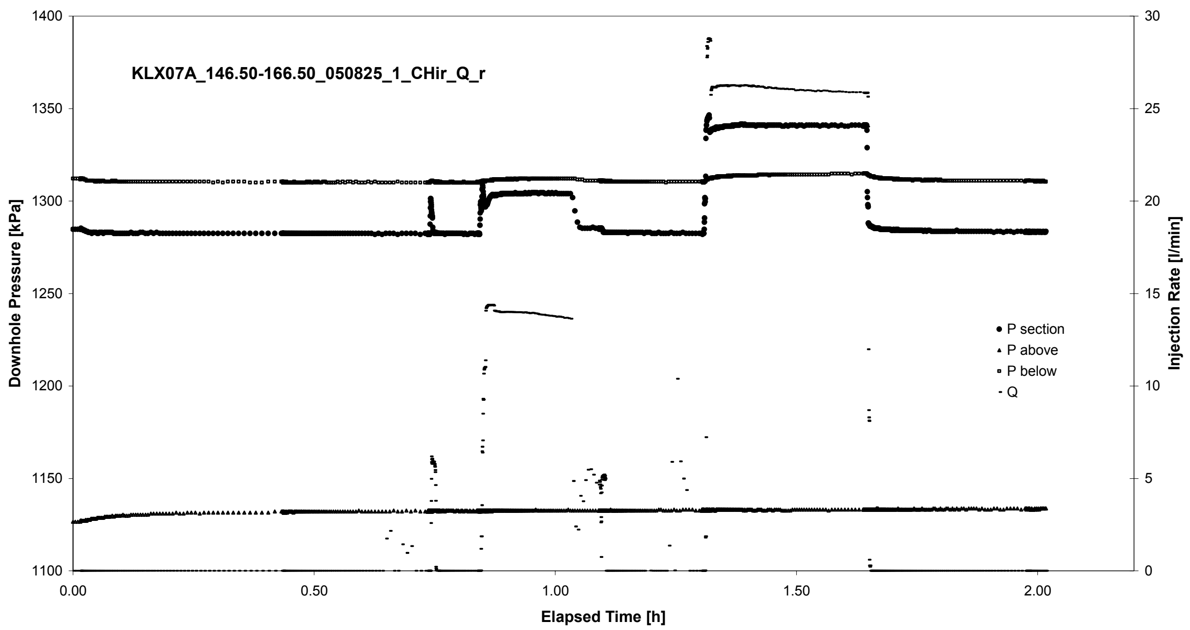


CHIR phase; HORNER match

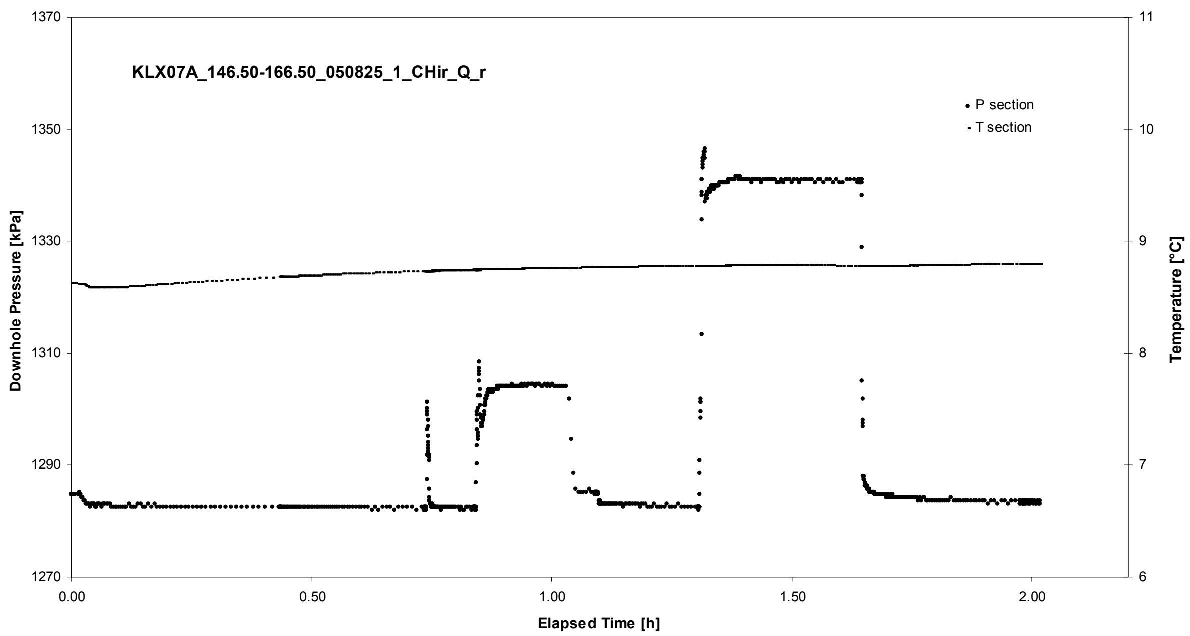
APPENDIX 2-10

Test 146.50-166.50 m

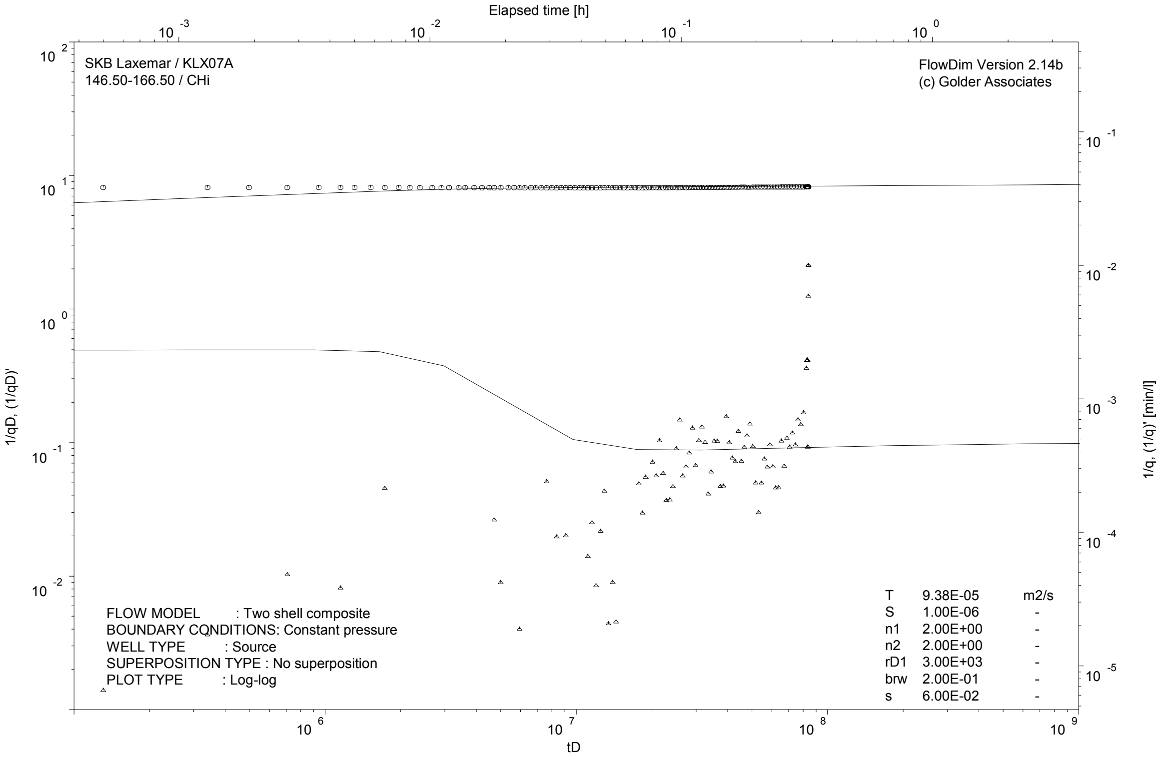
Analysis diagrams



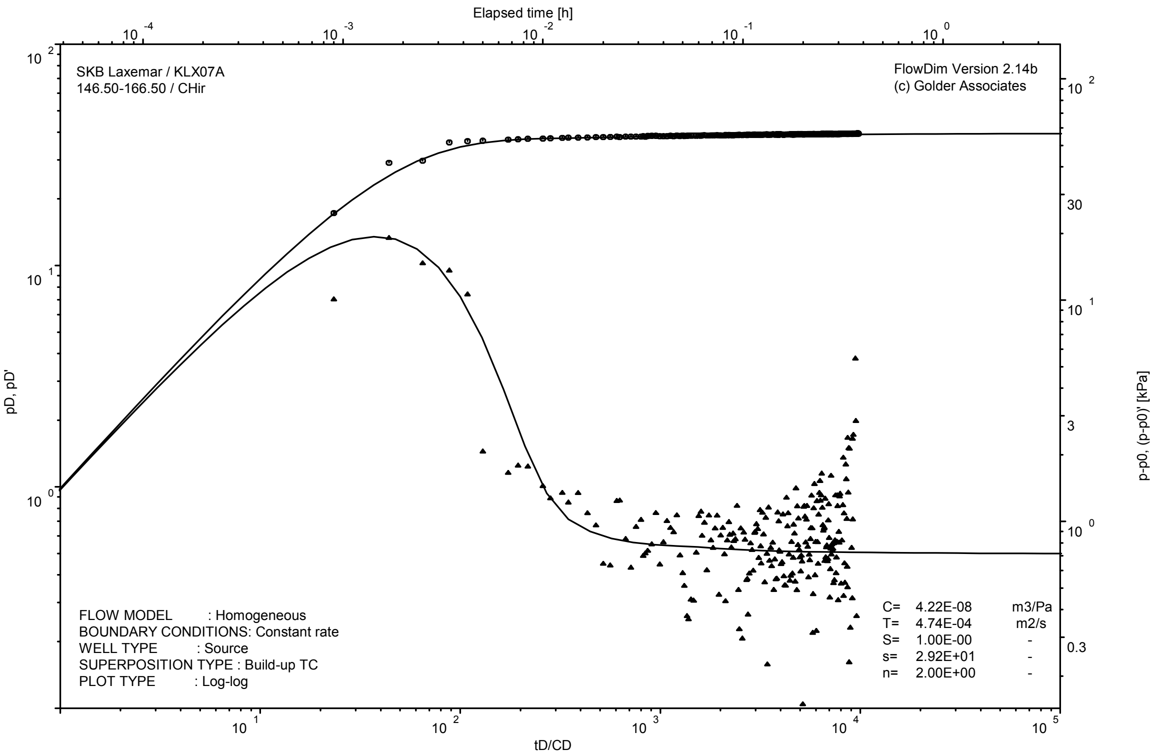
Pressure and flow rate vs. time; cartesian plot



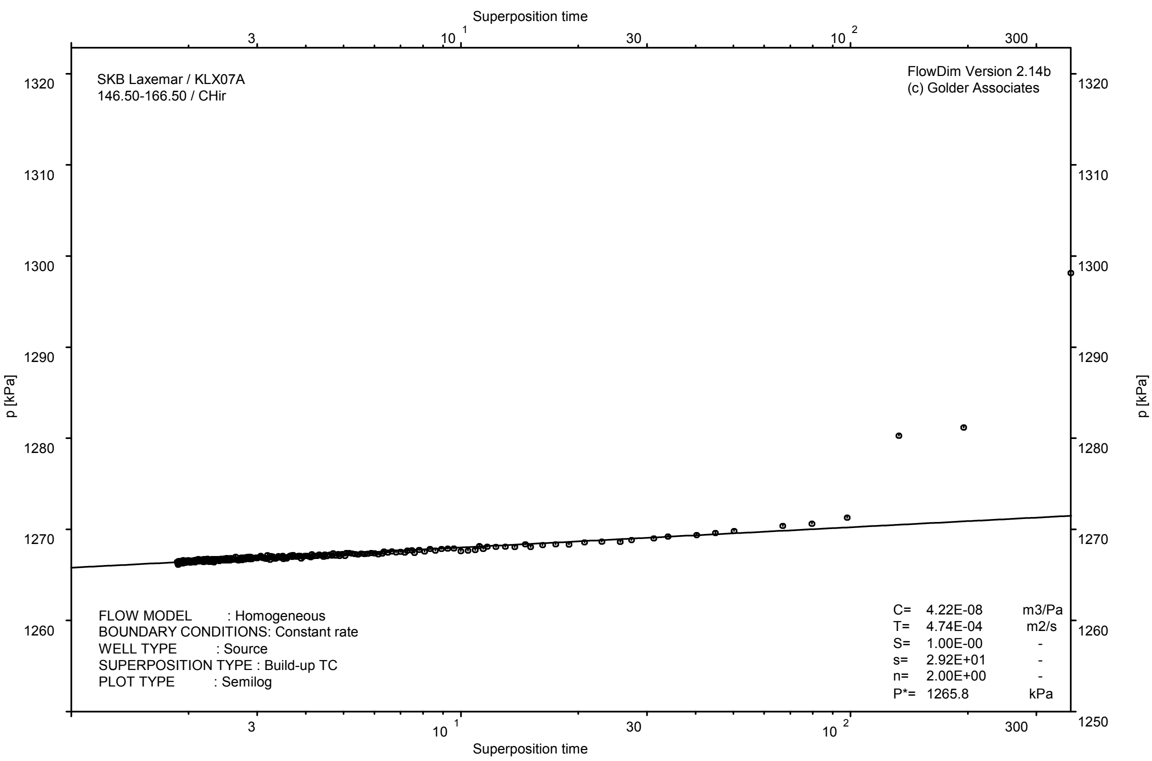
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

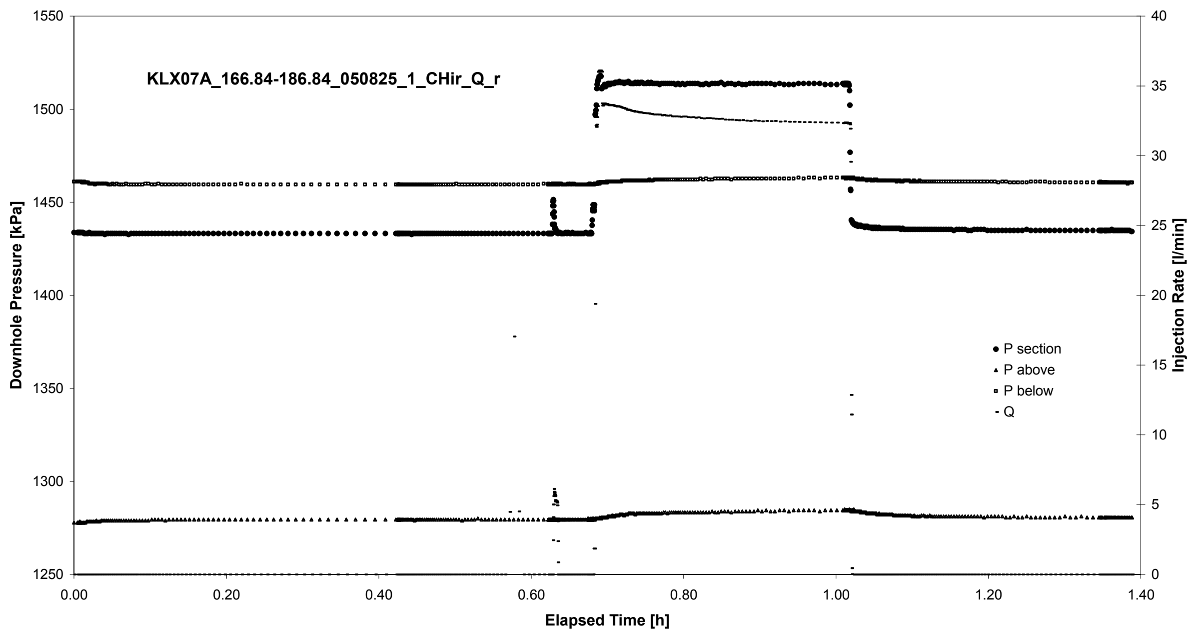


CHIR phase; HORNER match

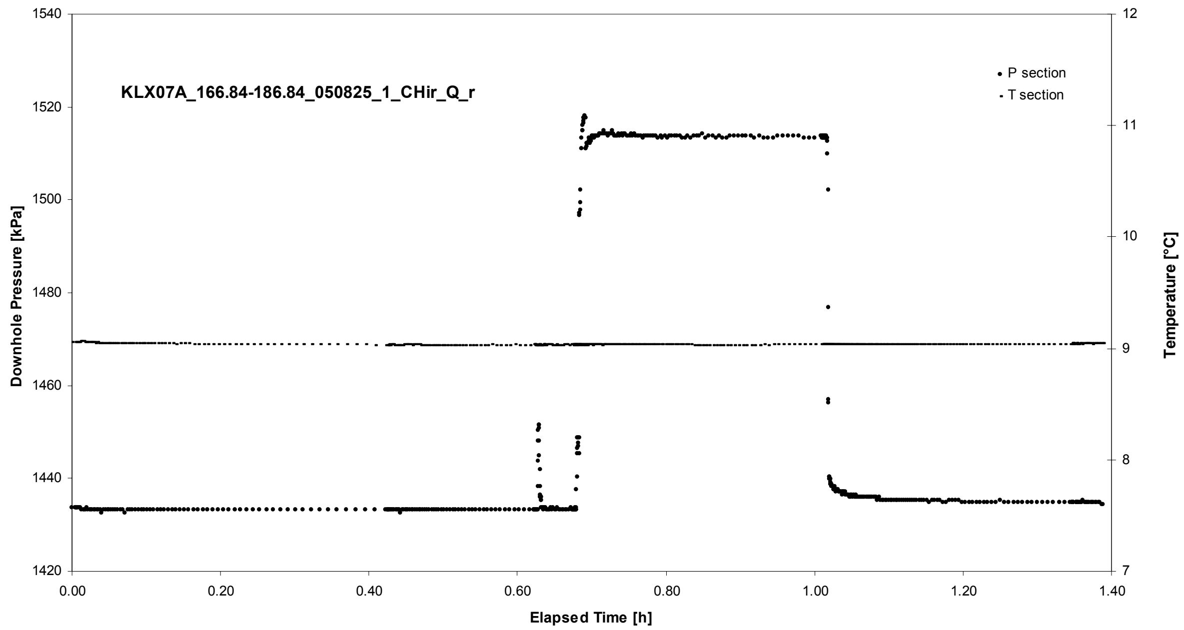
APPENDIX 2-11

Test 166.84-186.84 m

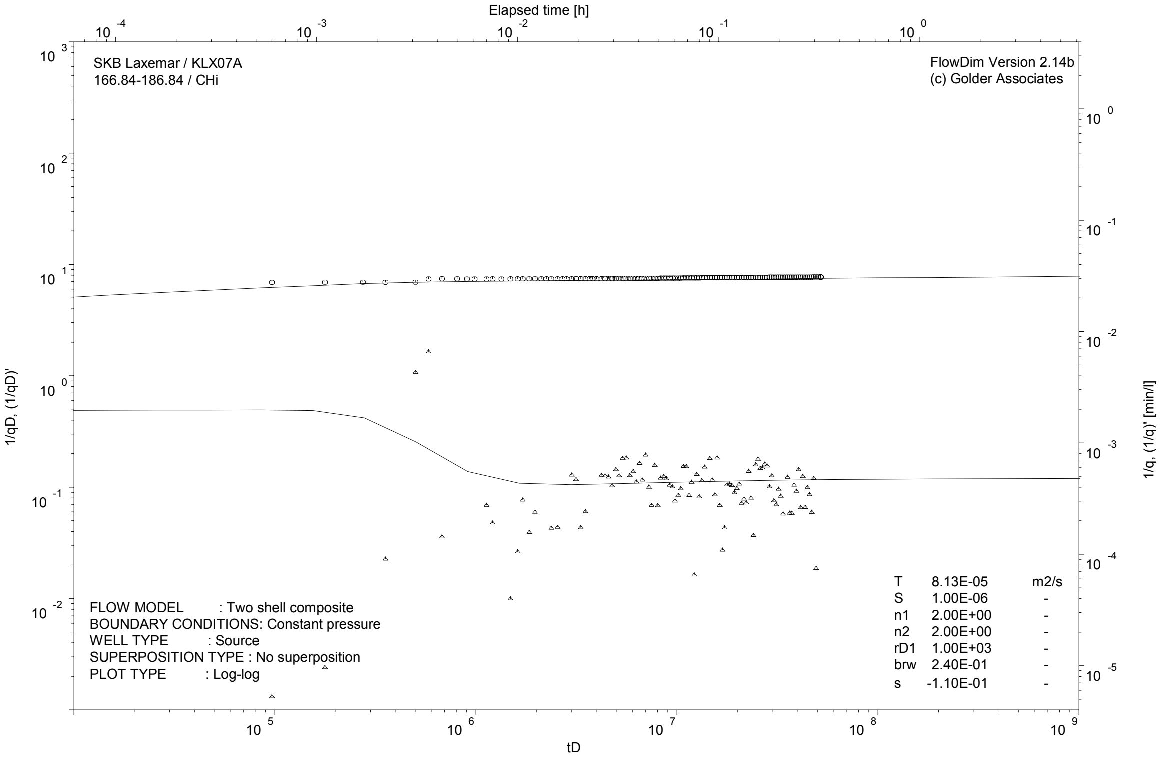
Analysis diagrams



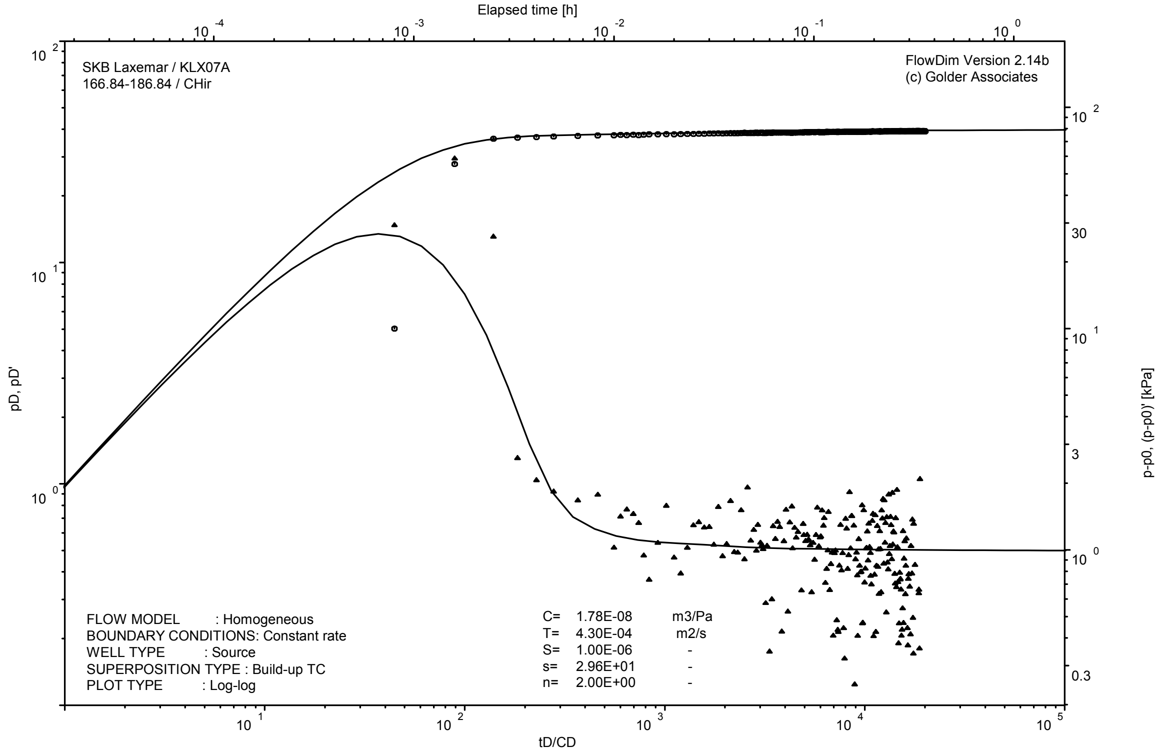
Pressure and flow rate vs. time; cartesian plot



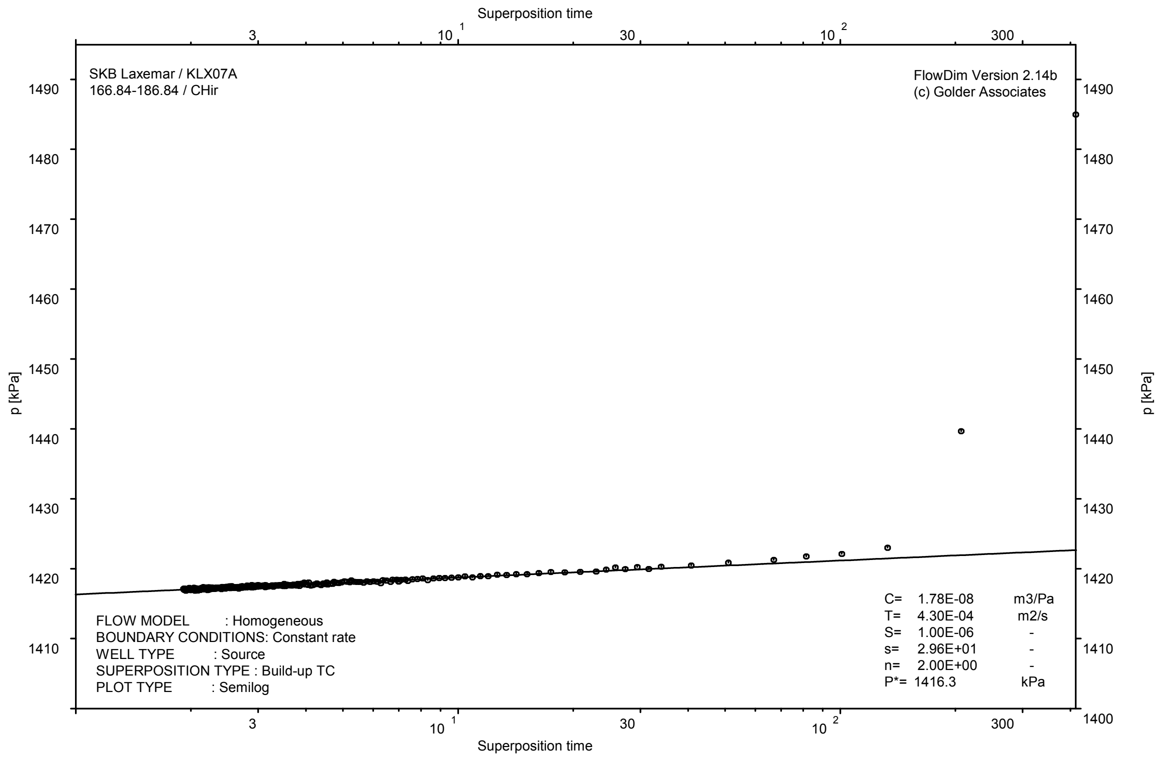
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

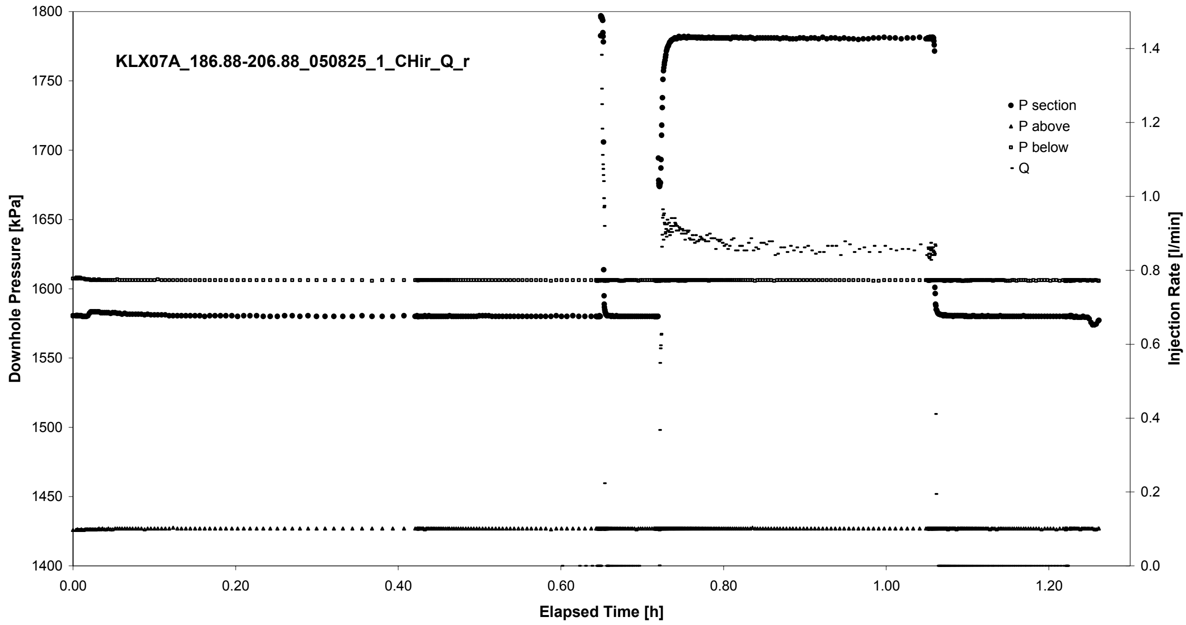


CHIR phase; HORNER match

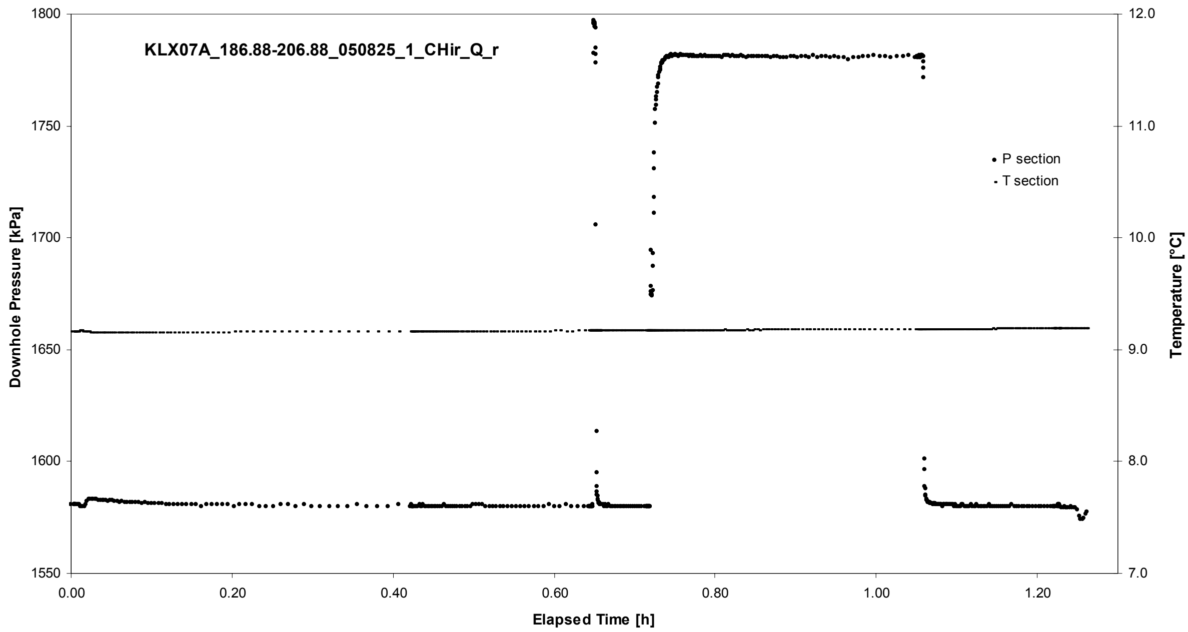
APPENDIX 2-12

Test 186.88-206.88 m

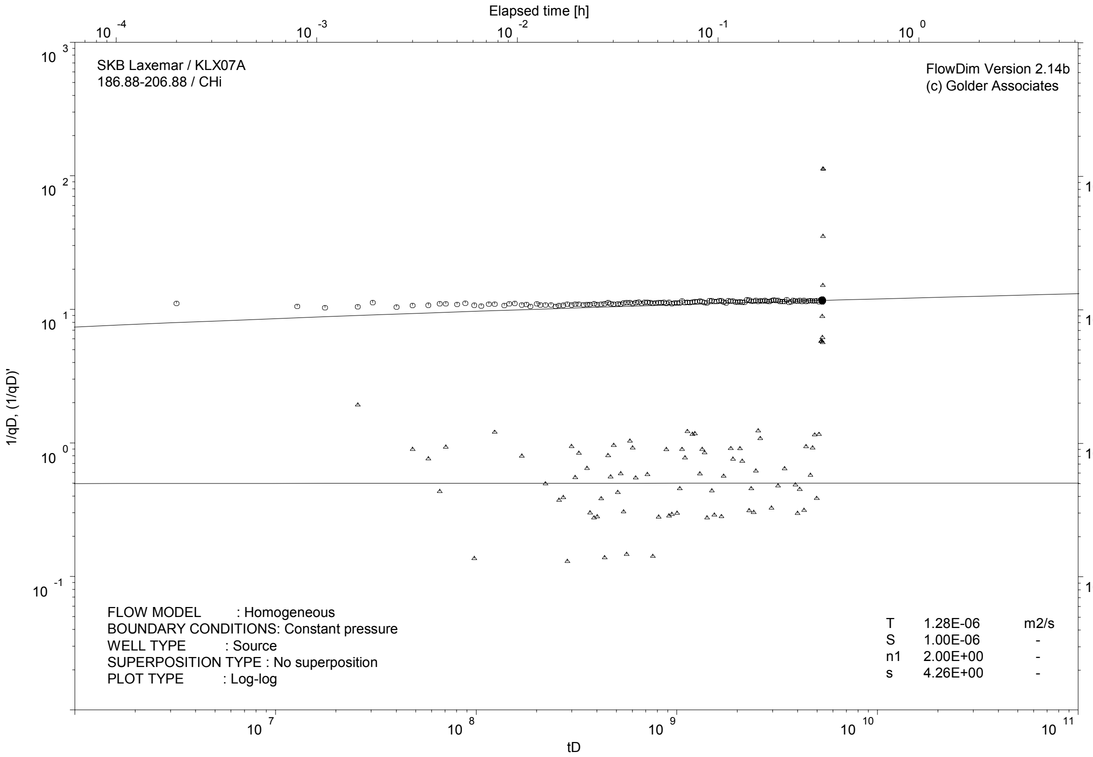
Analysis diagrams



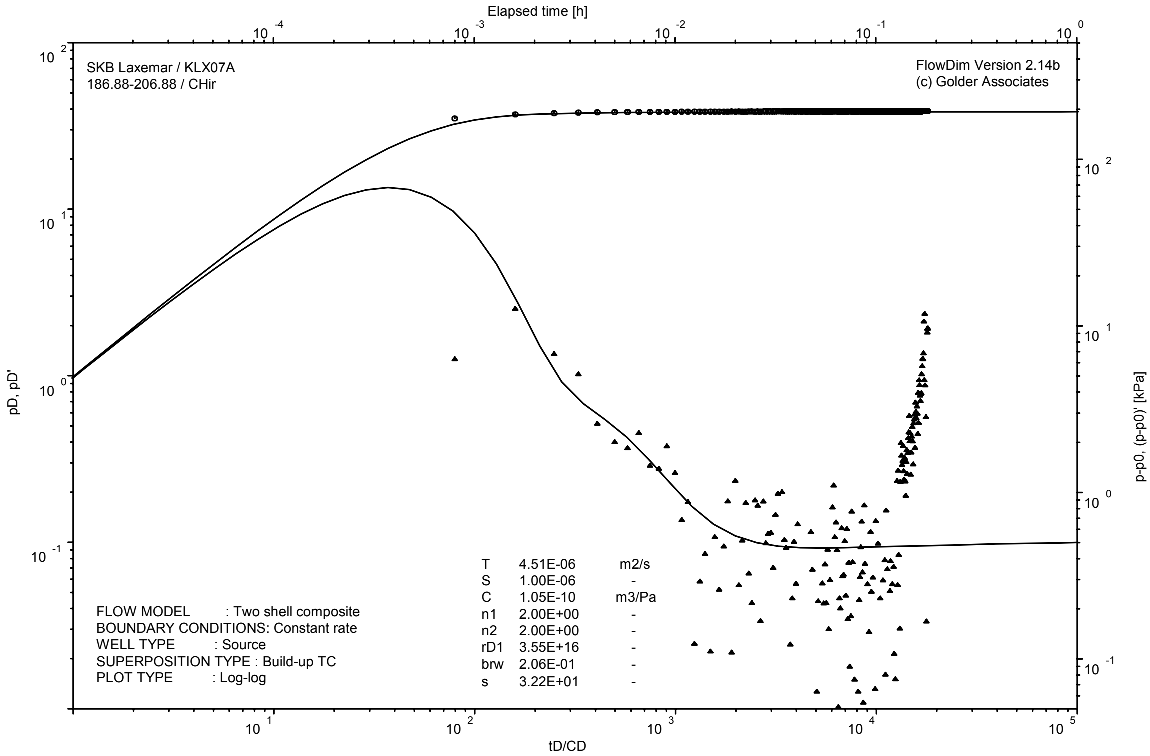
Pressure and flow rate vs. time; cartesian plot



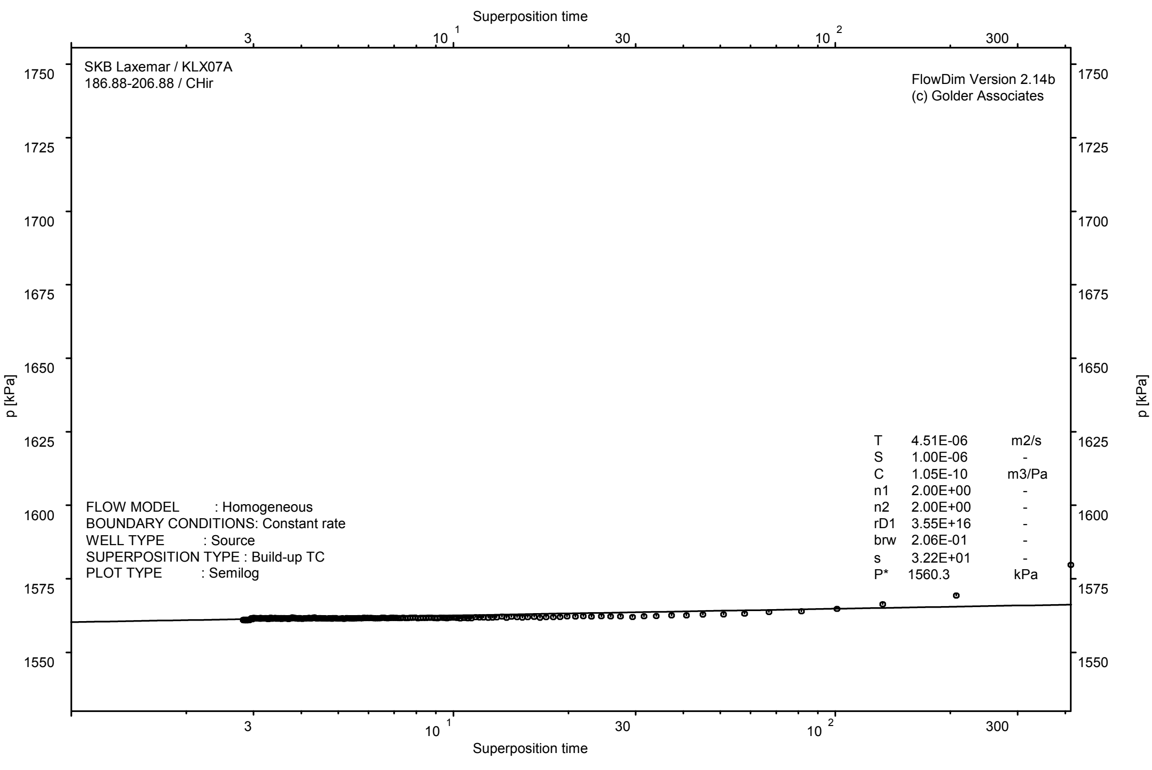
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

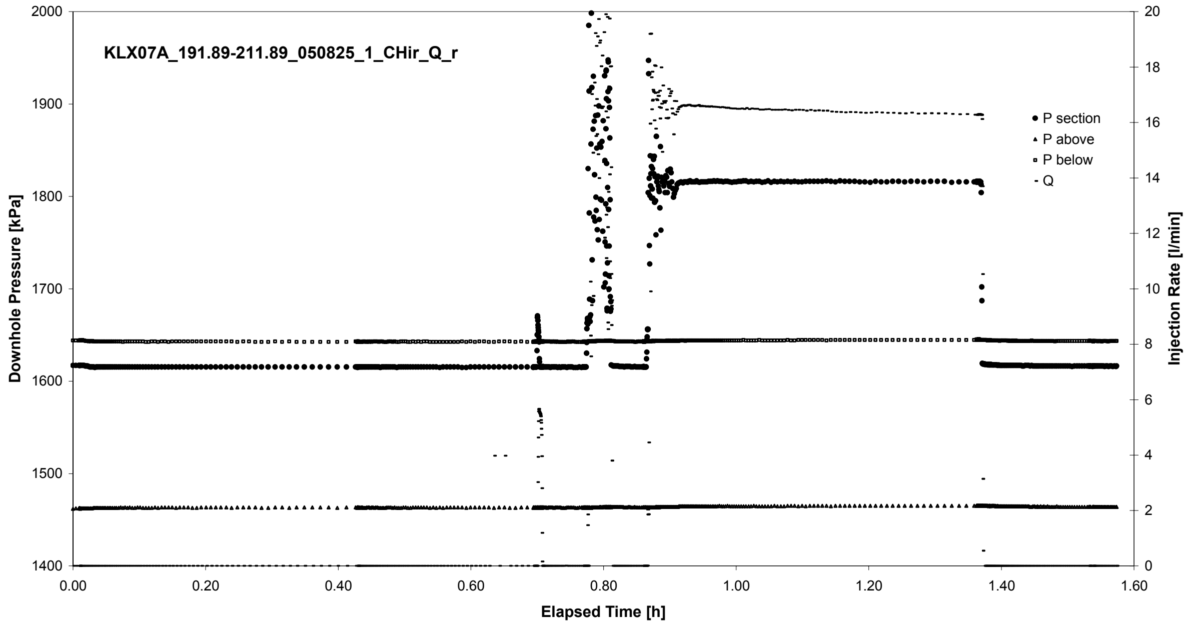


CHIR phase; HORNER match

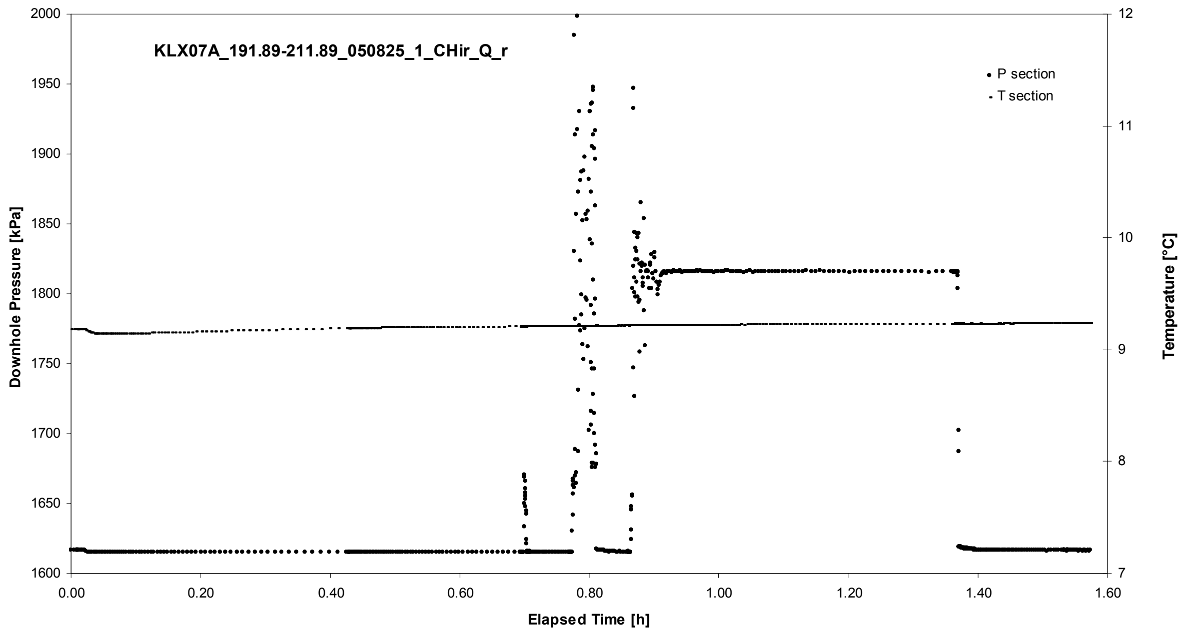
APPENDIX 2-13

Test 191.89-211.89 m

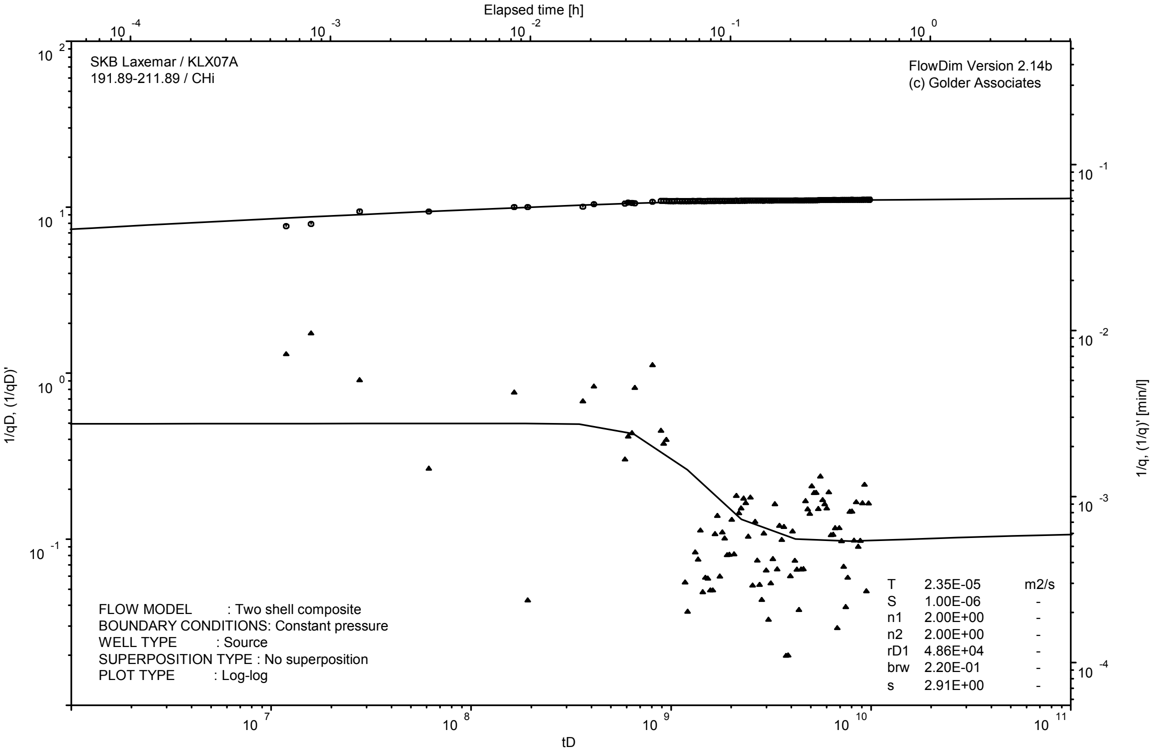
Analysis diagrams



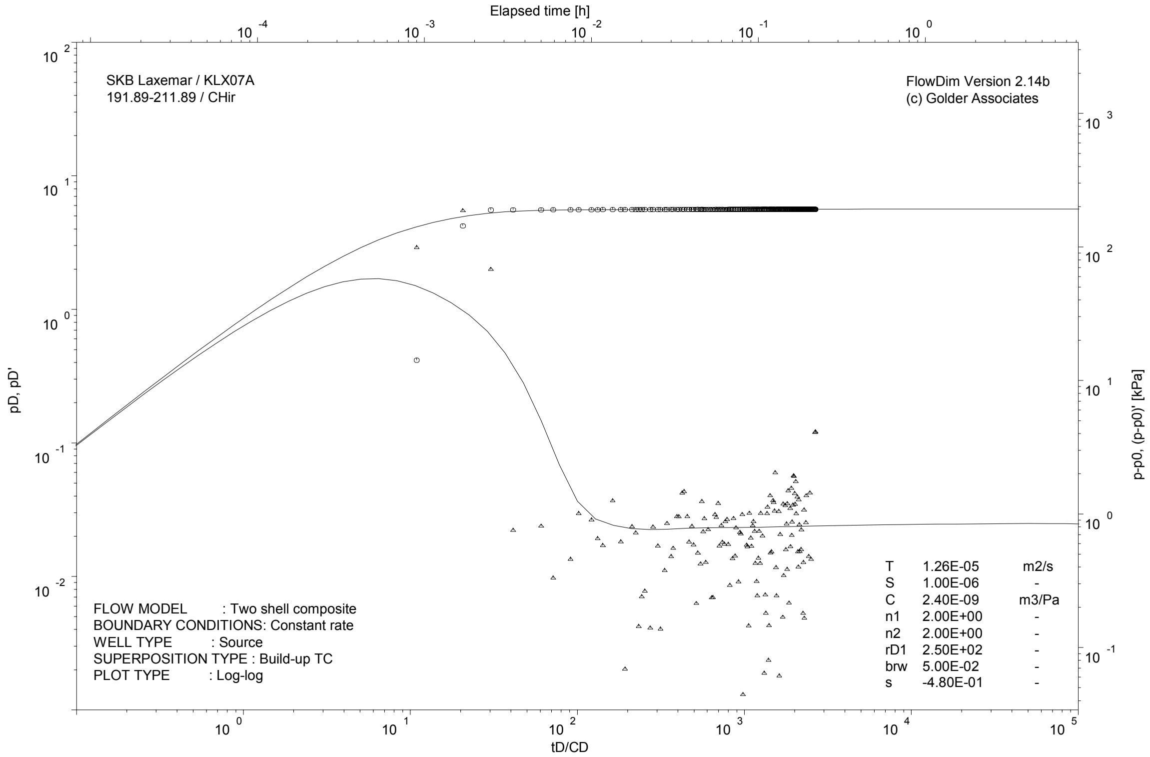
Pressure and flow rate vs. time; cartesian plot



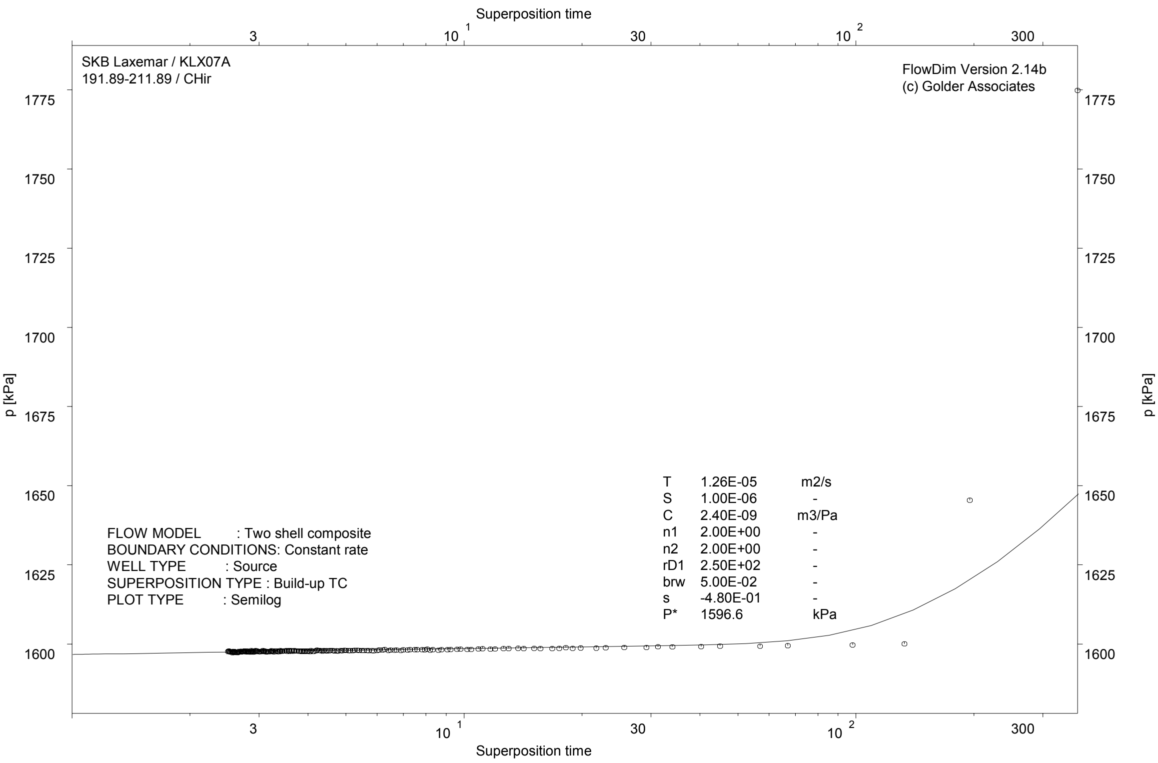
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

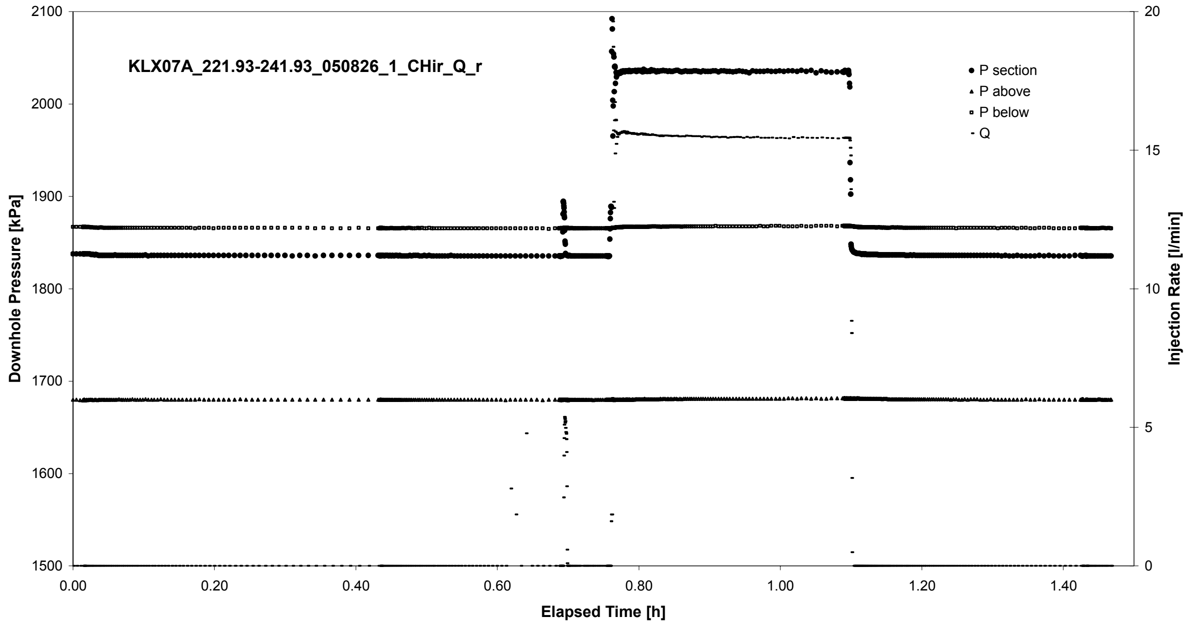


CHIR phase; HORNER match

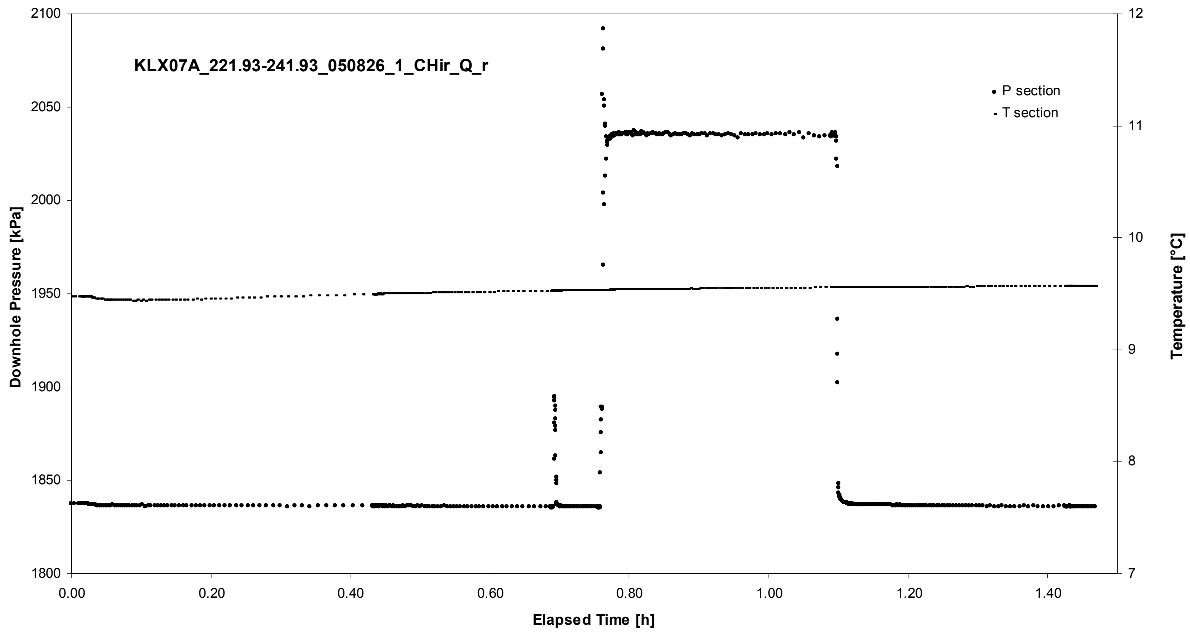
APPENDIX 2-15

Test 221.93-241.93 m

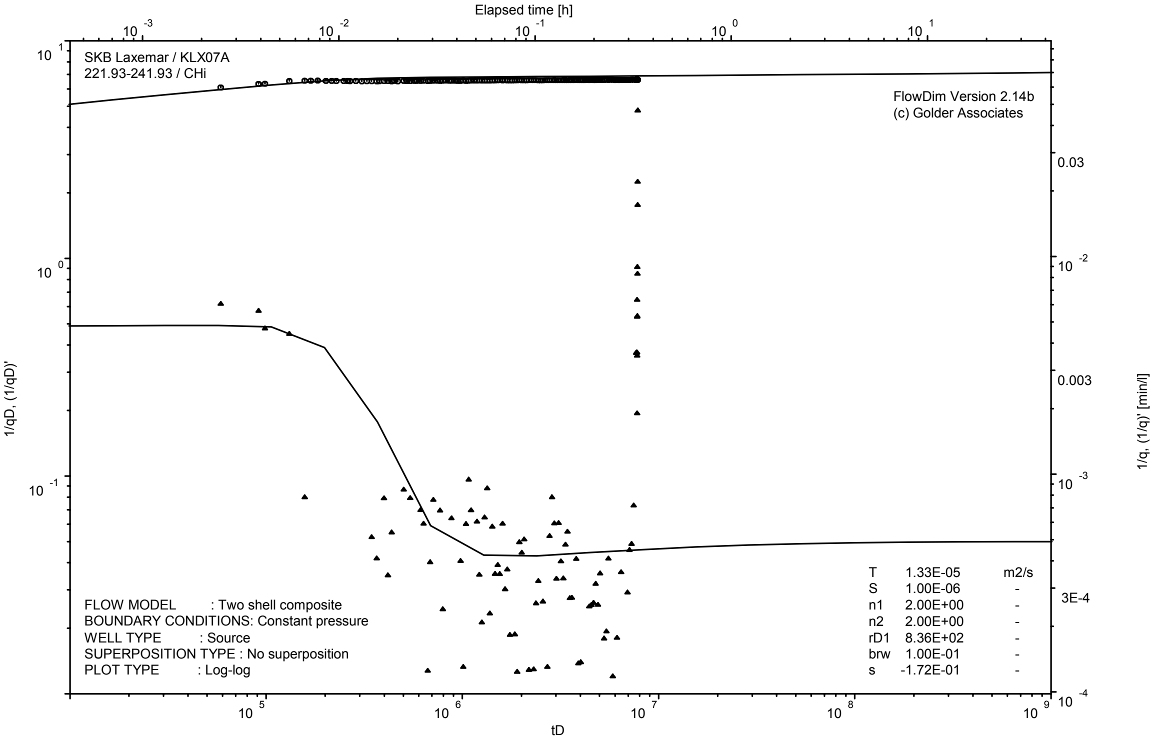
Analysis diagrams



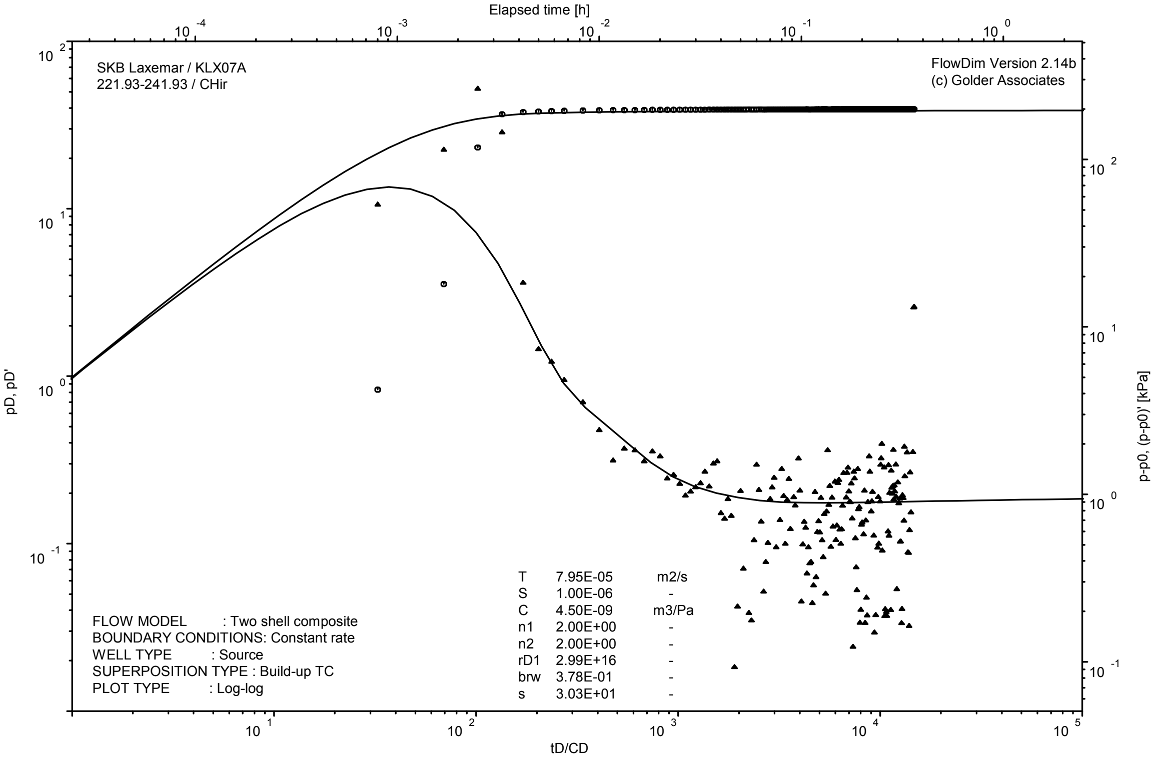
Pressure and flow rate vs. time; cartesian plot



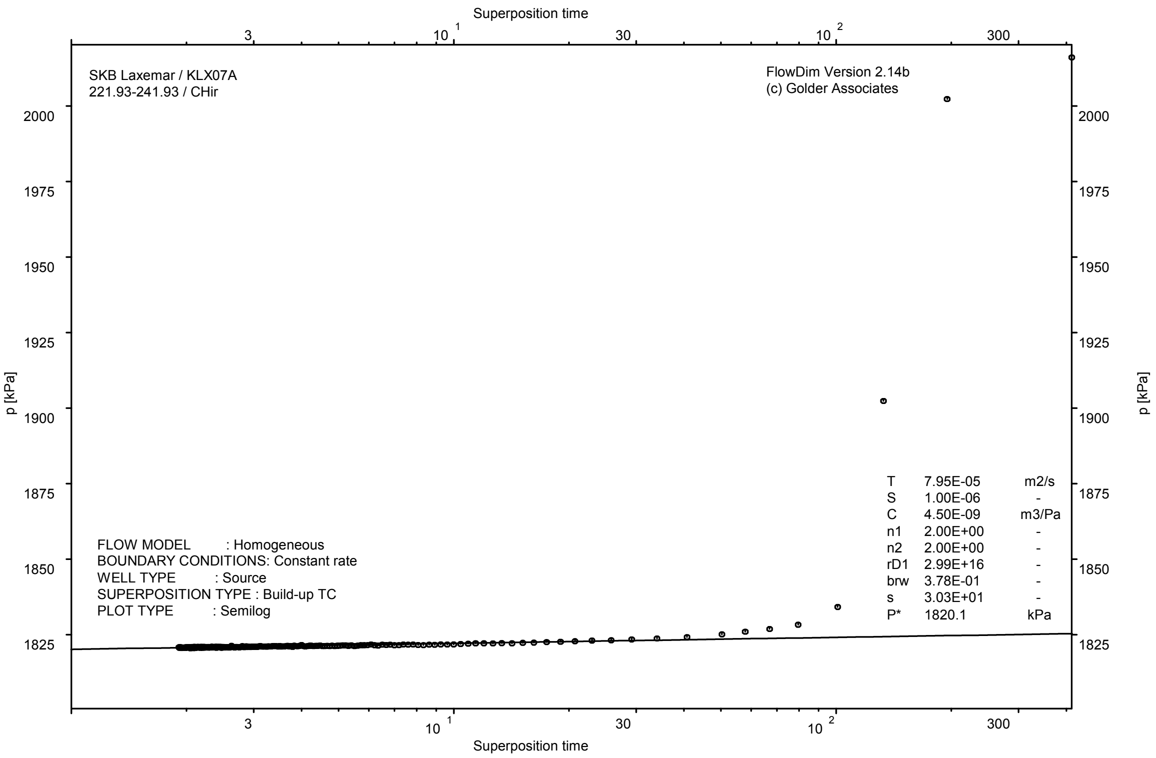
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

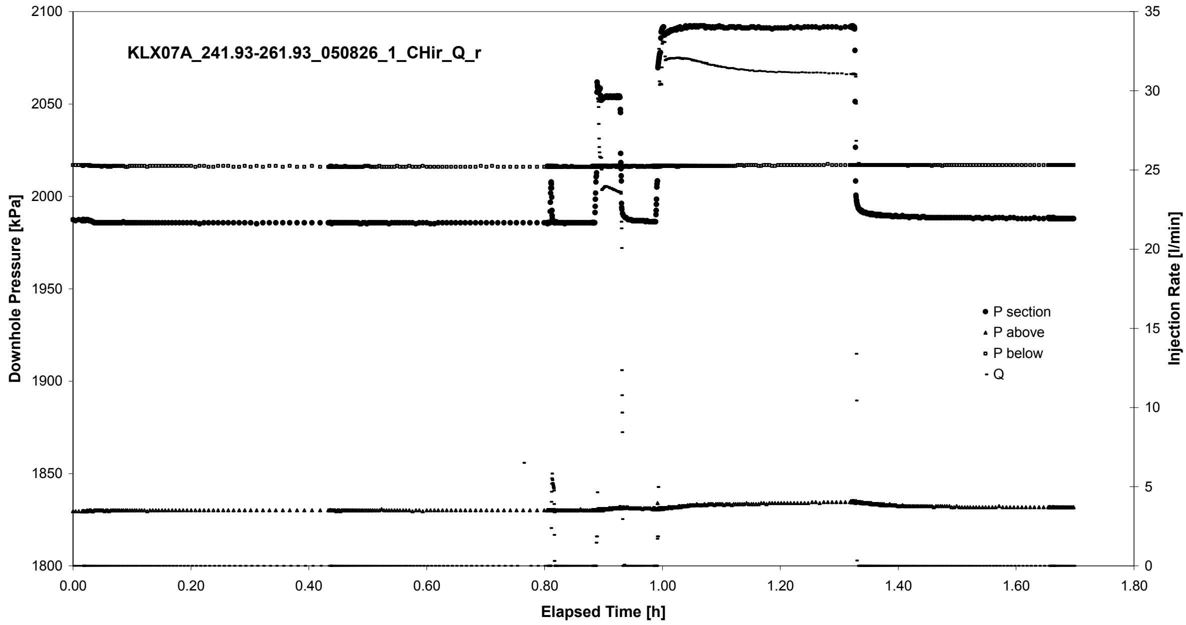


CHIR phase; HORNER match

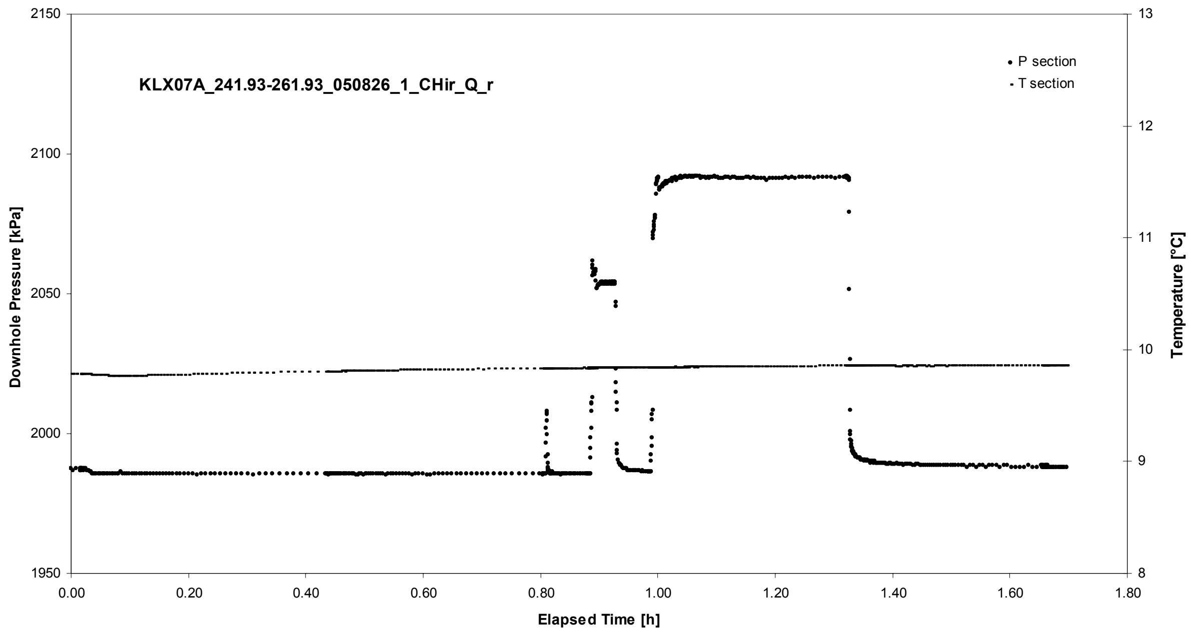
APPENDIX 2-16

Test 241.93-261.93 m

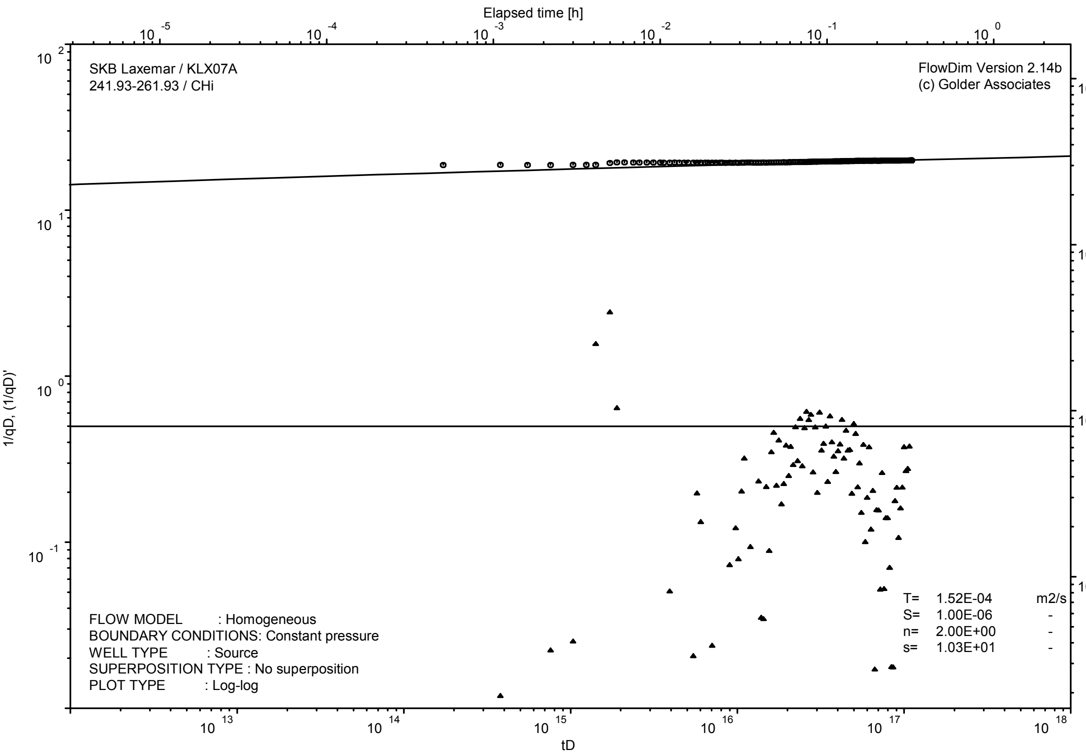
Analysis diagrams



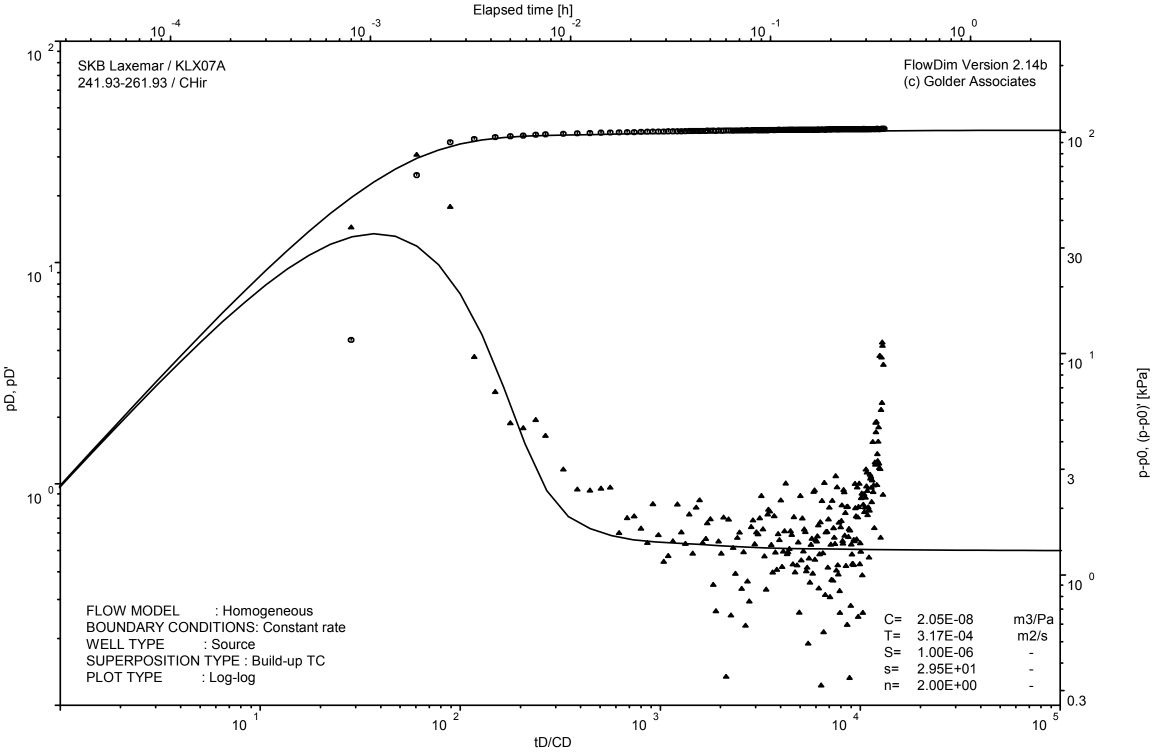
Pressure and flow rate vs. time; cartesian plot



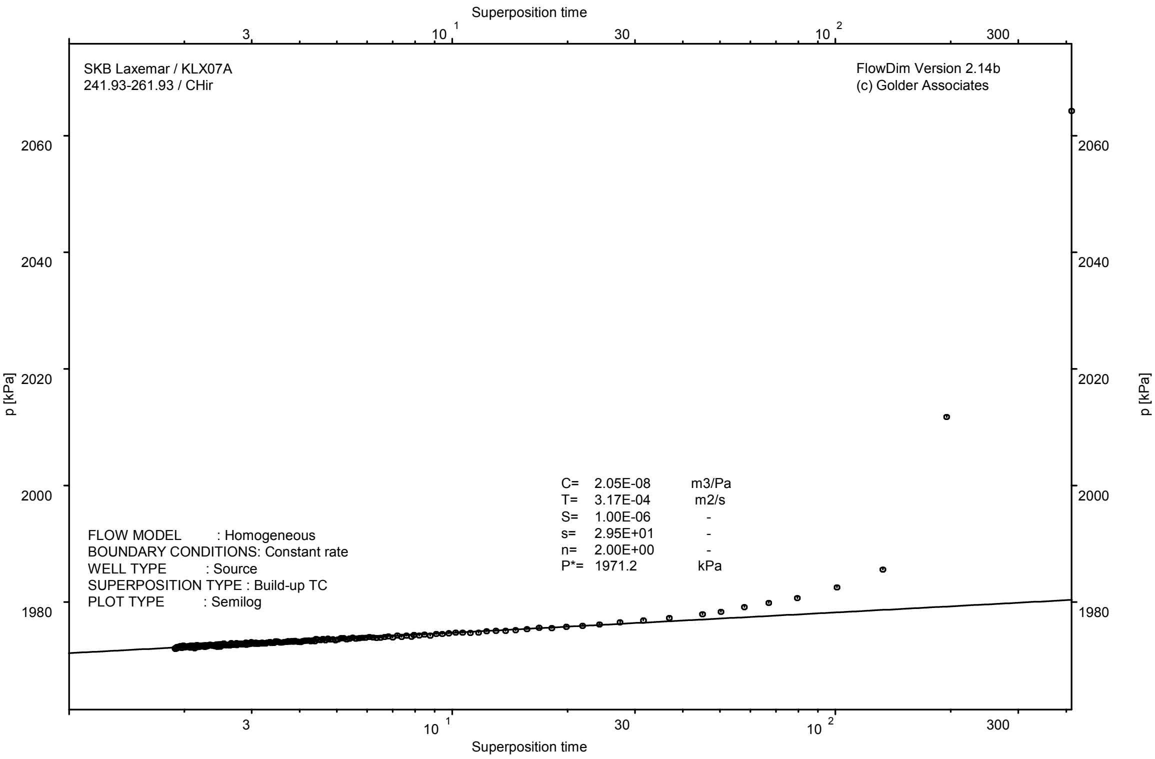
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

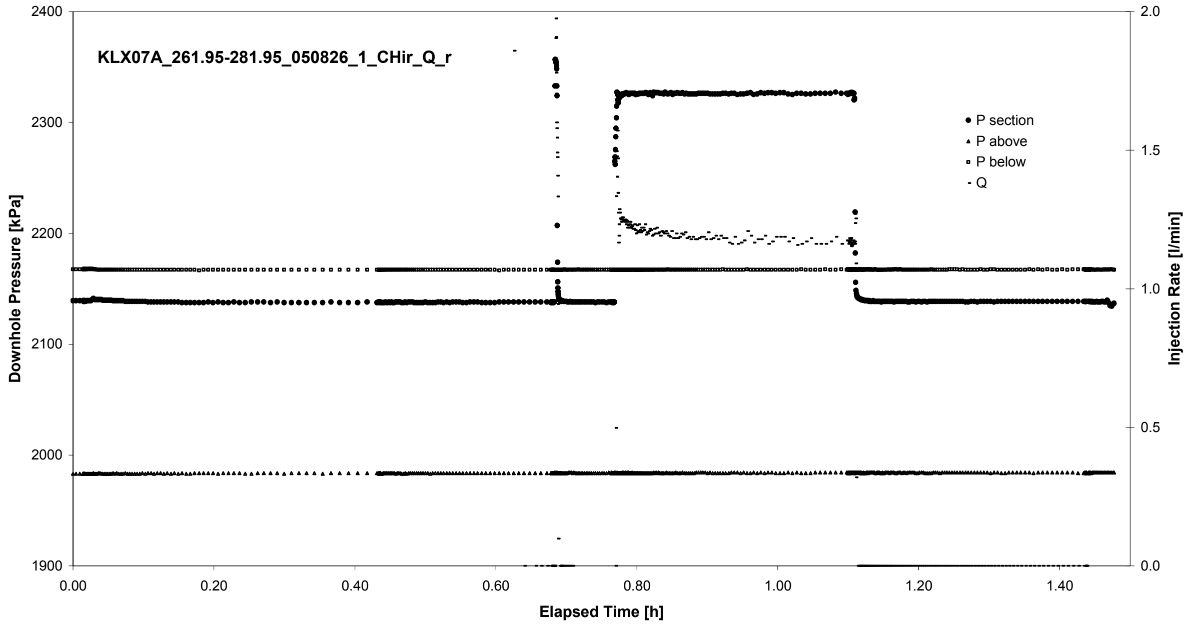


CHIR phase; HORNER match

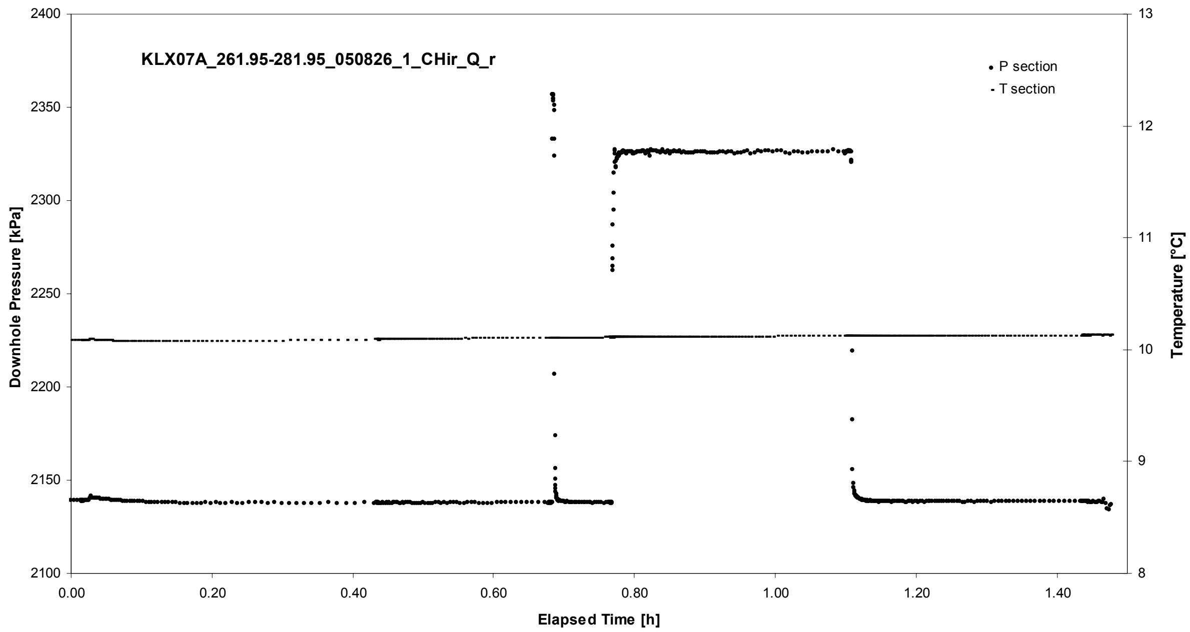
APPENDIX 2-17

Test 261.95-281.95 m

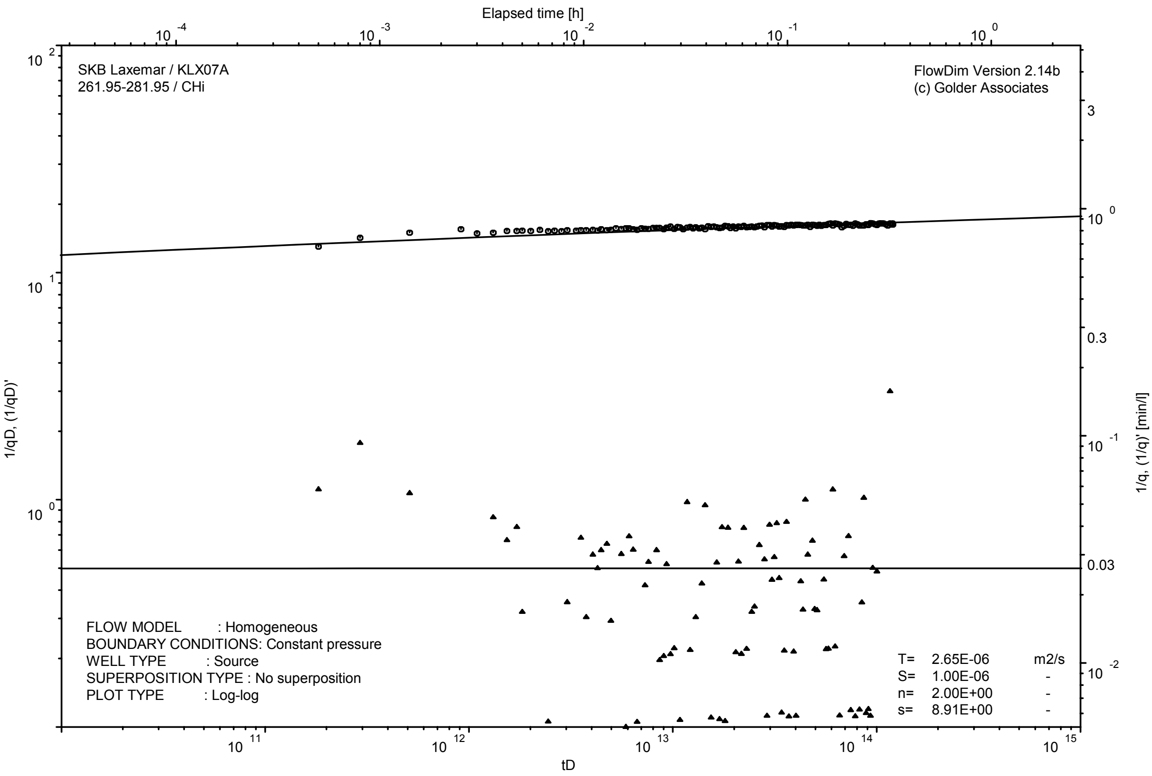
Analysis diagrams



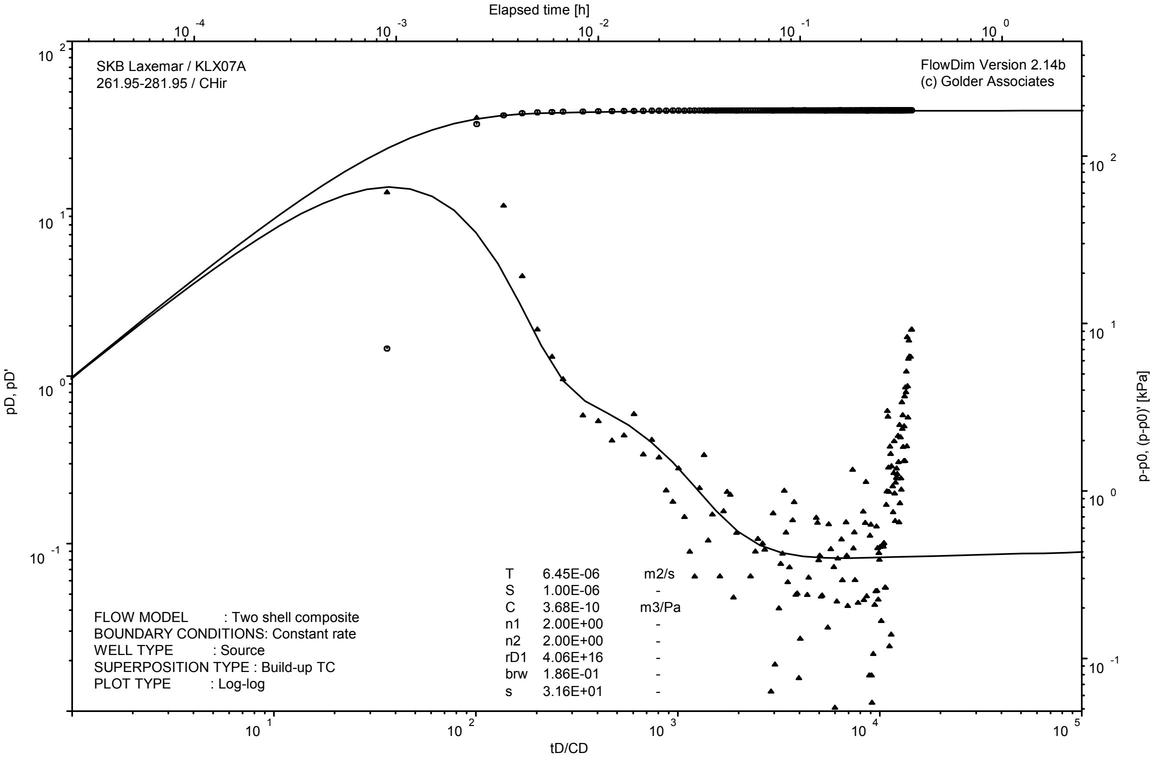
Pressure and flow rate vs. time; cartesian plot



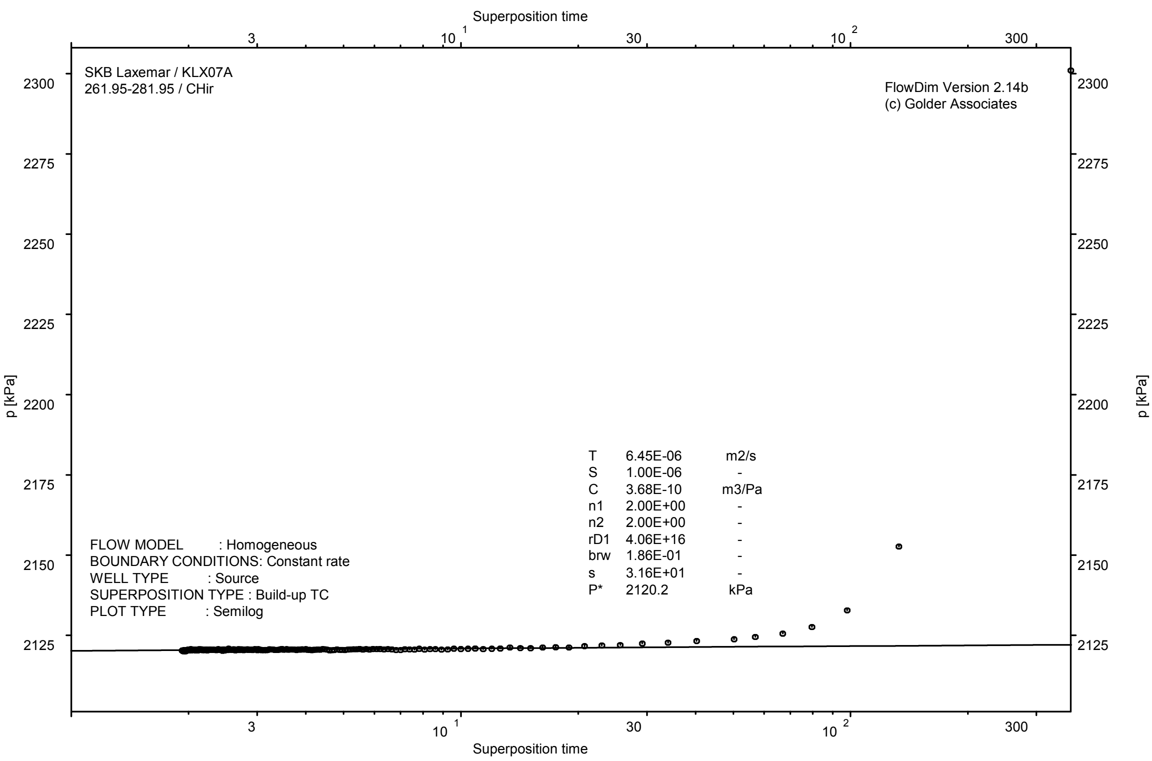
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

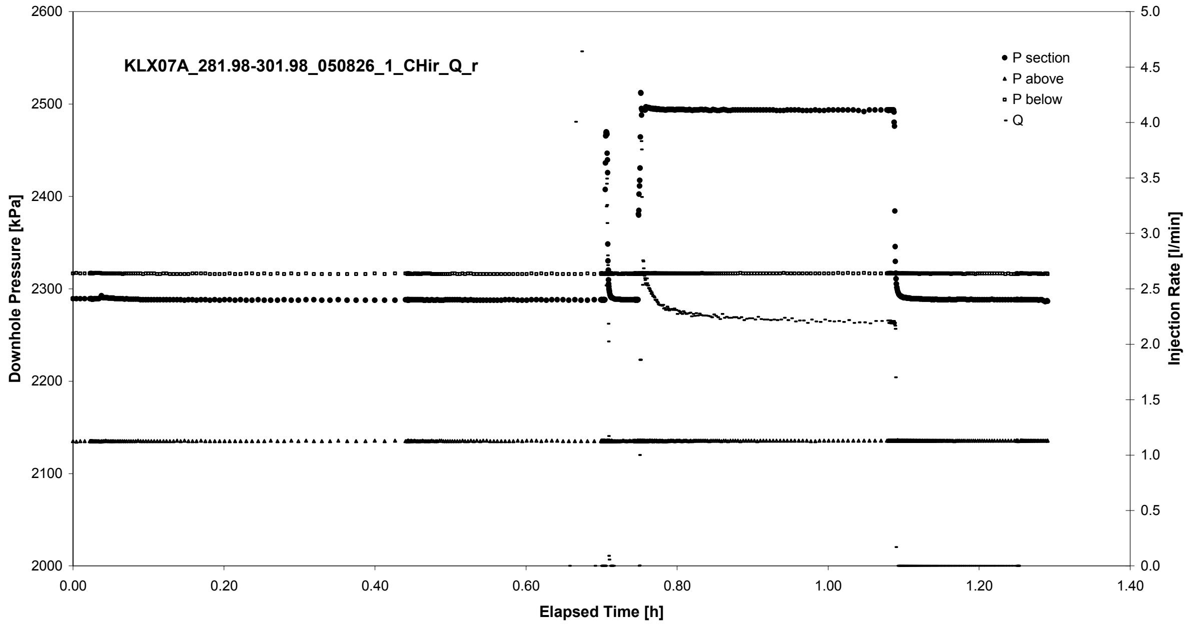


CHIR phase; HORNER match

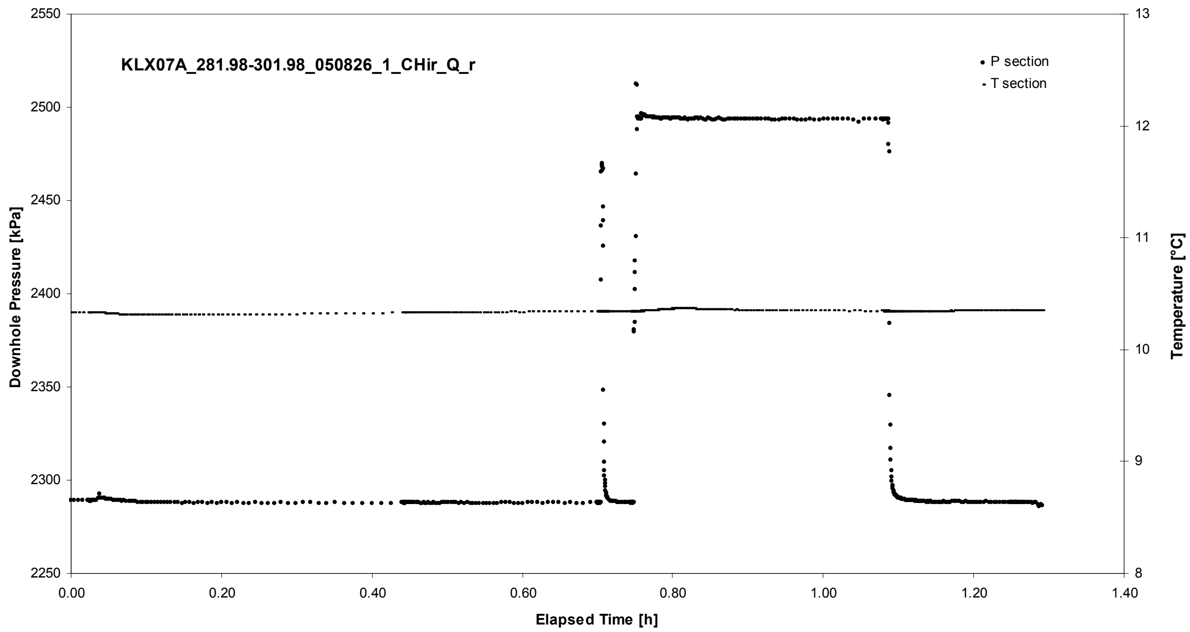
APPENDIX 2-18

Test 281.98-301.98 m

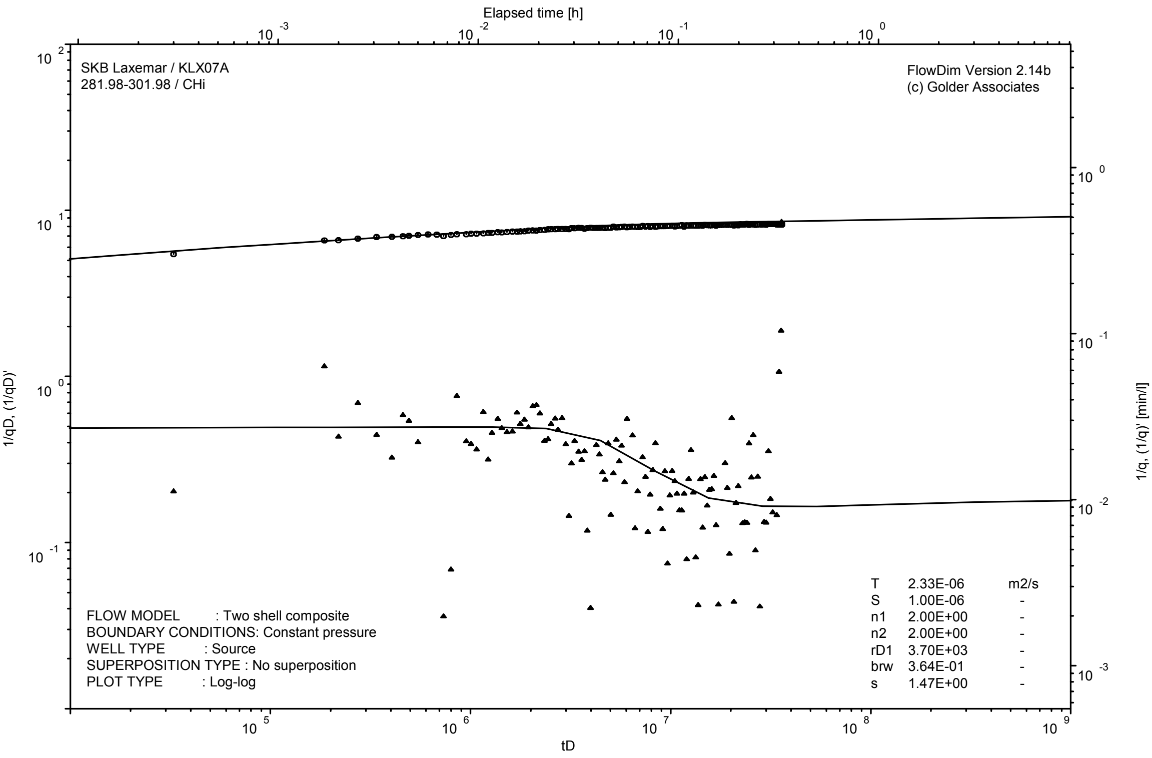
Analysis diagrams



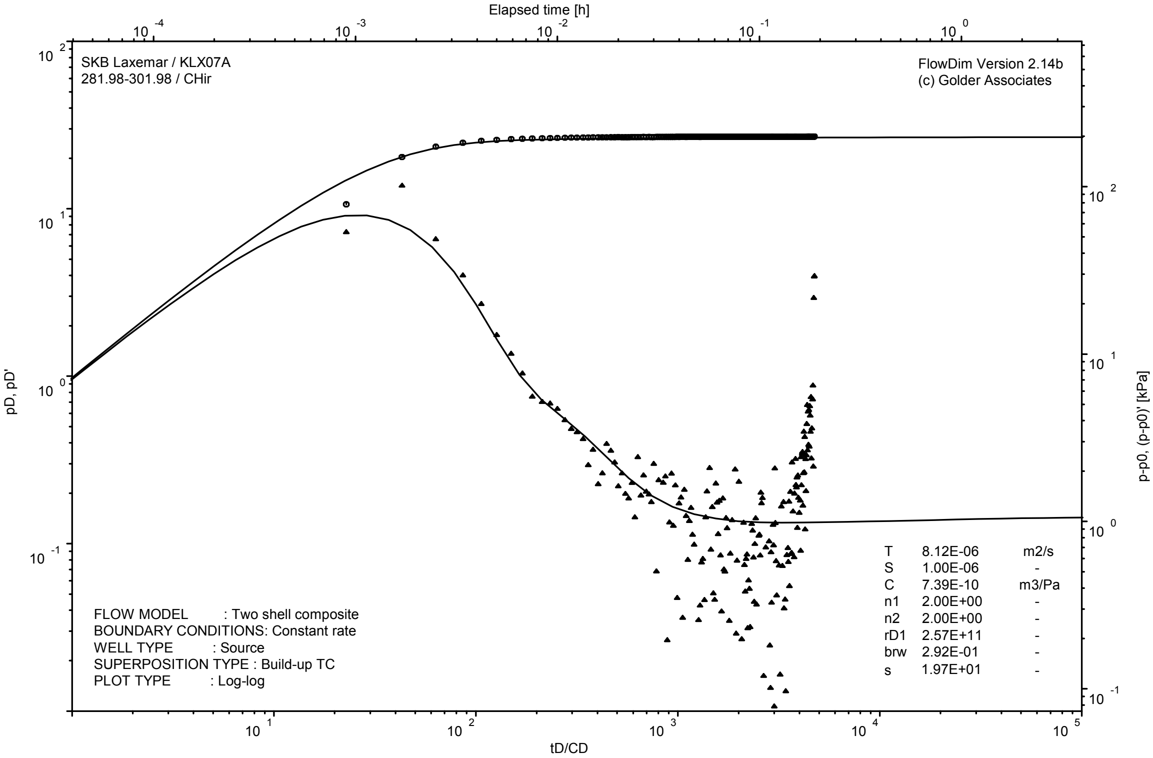
Pressure and flow rate vs. time; cartesian plot



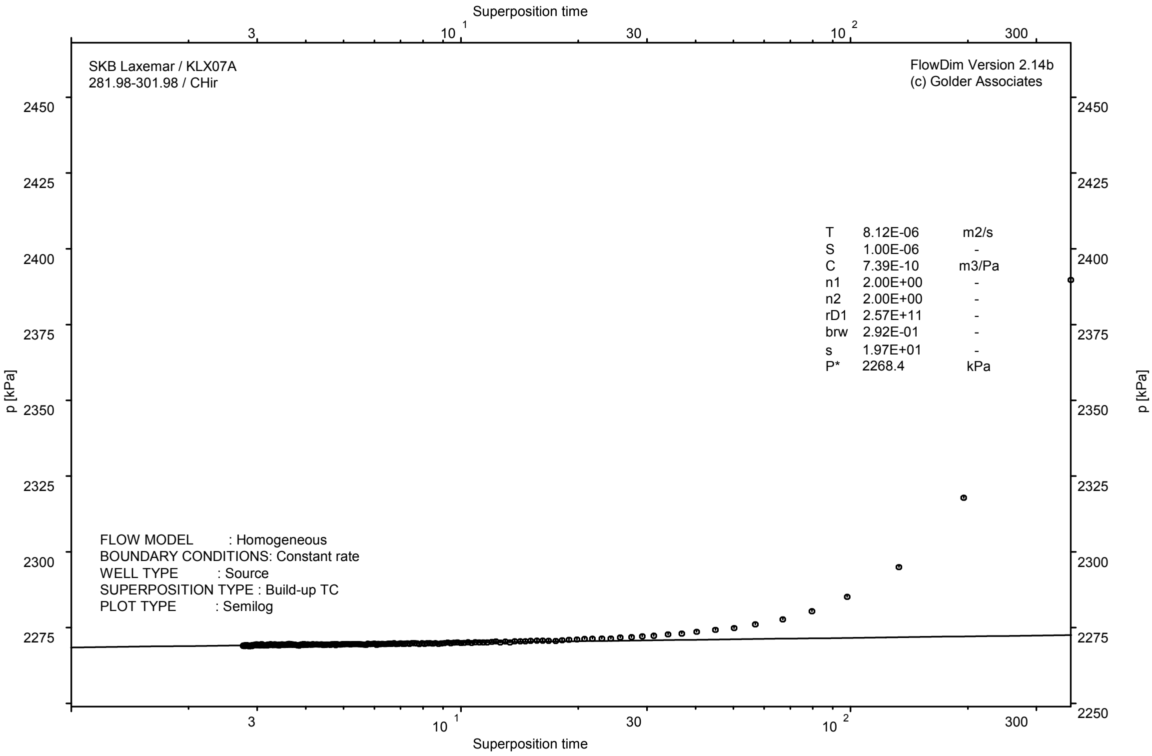
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

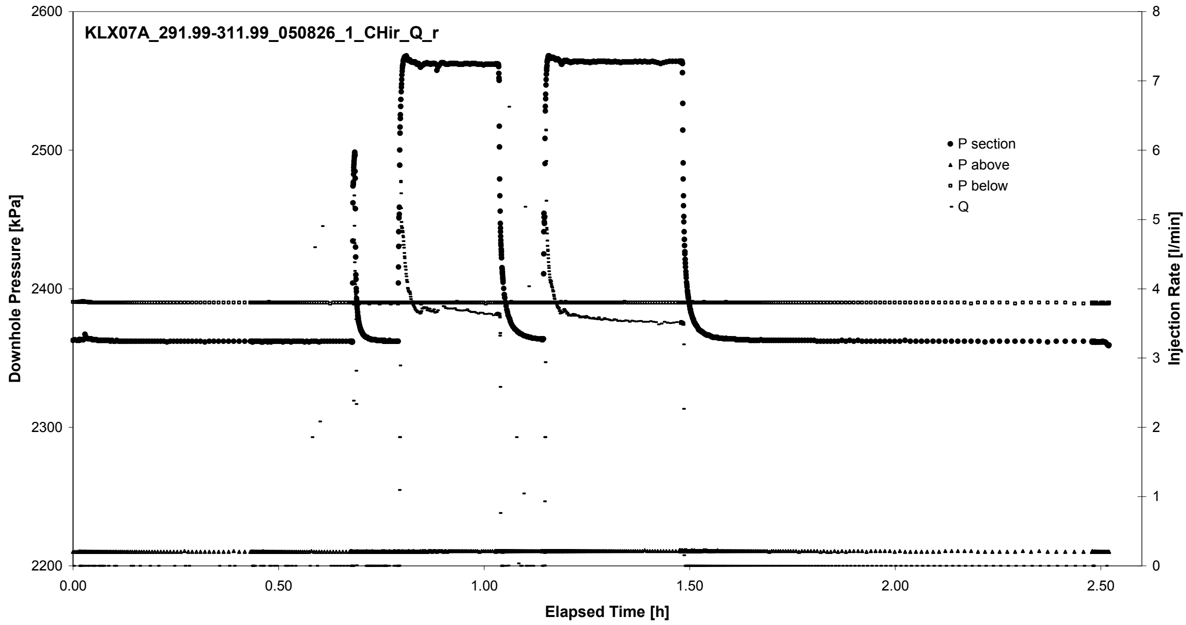


CHIR phase; HORNER match

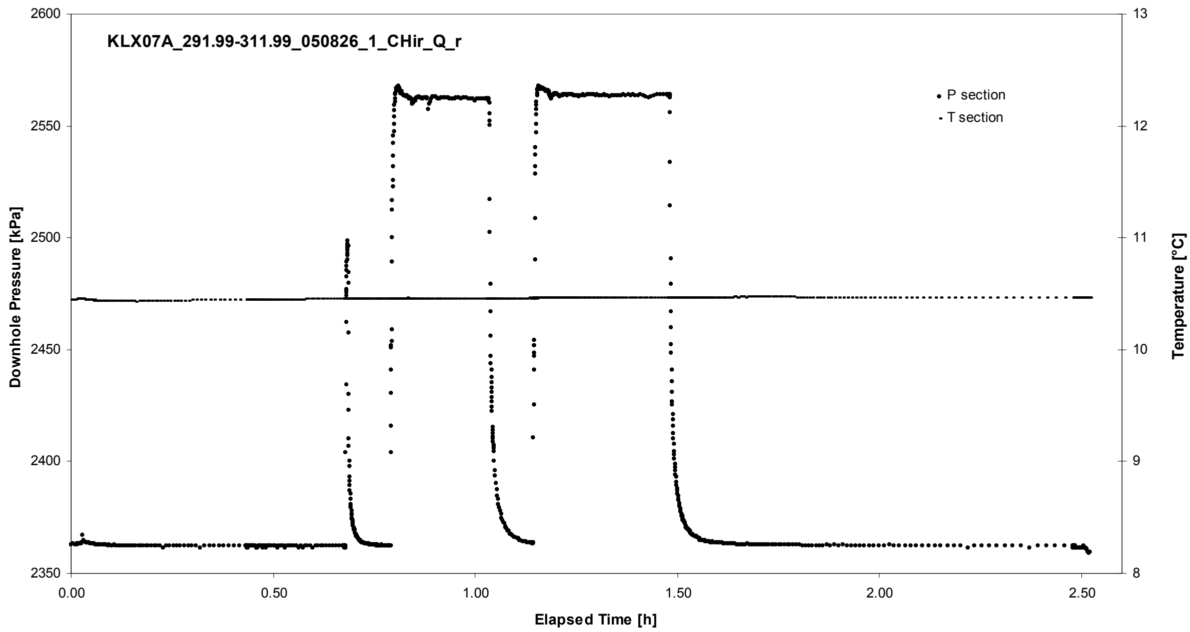
APPENDIX 2-19

Test 291.99-311.99 m

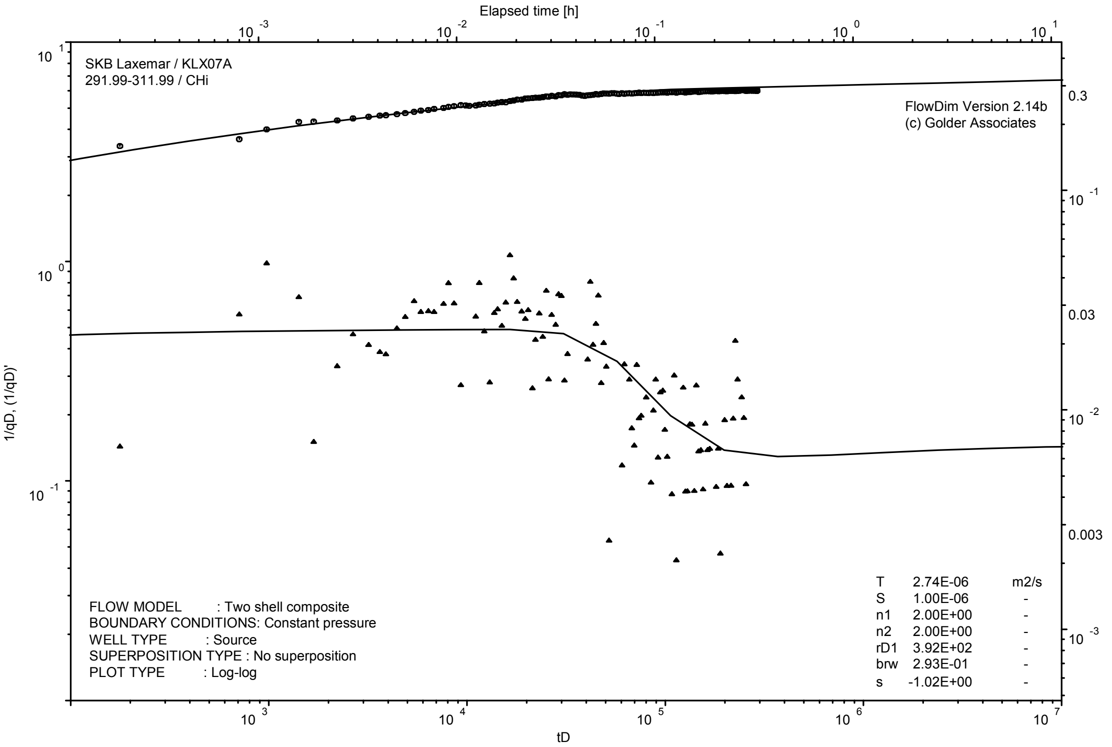
Analysis diagrams



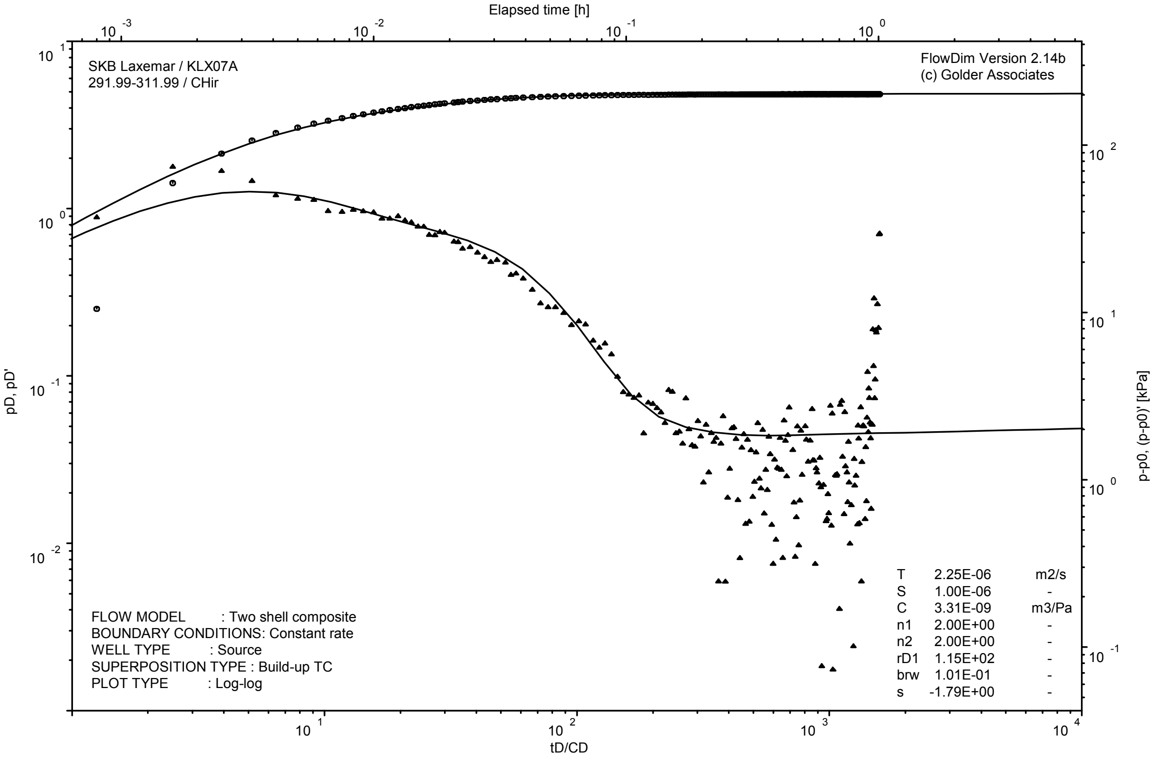
Pressure and flow rate vs. time; cartesian plot



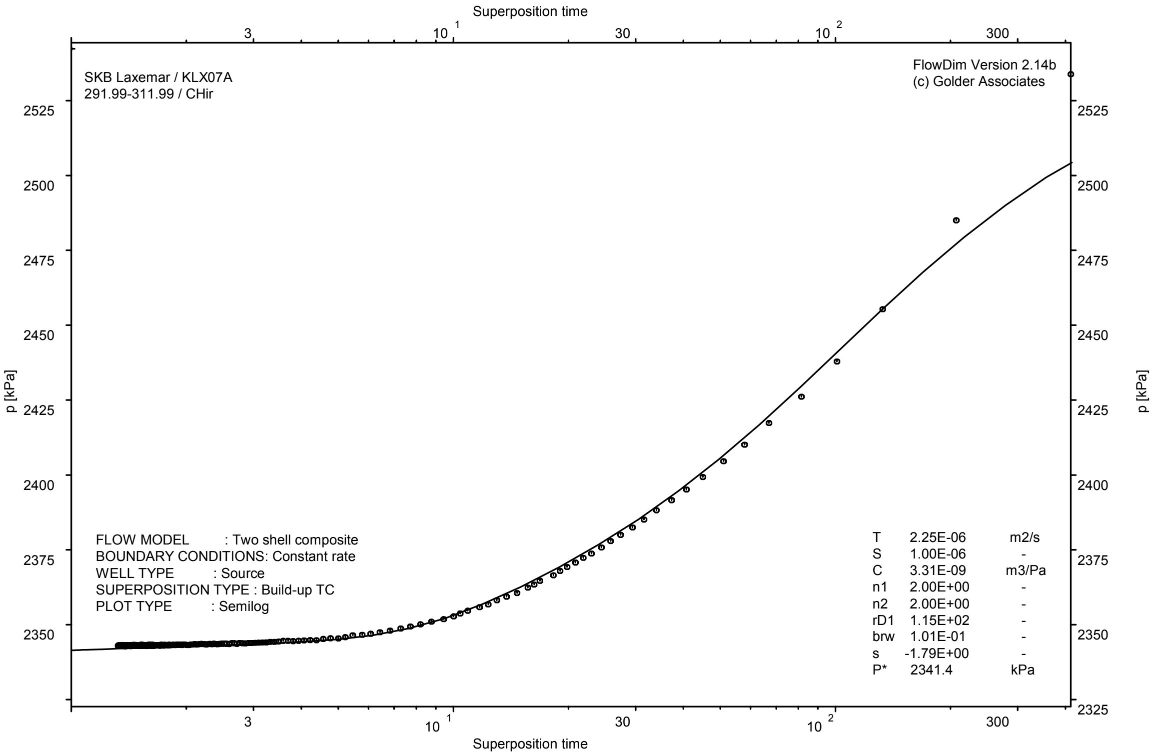
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

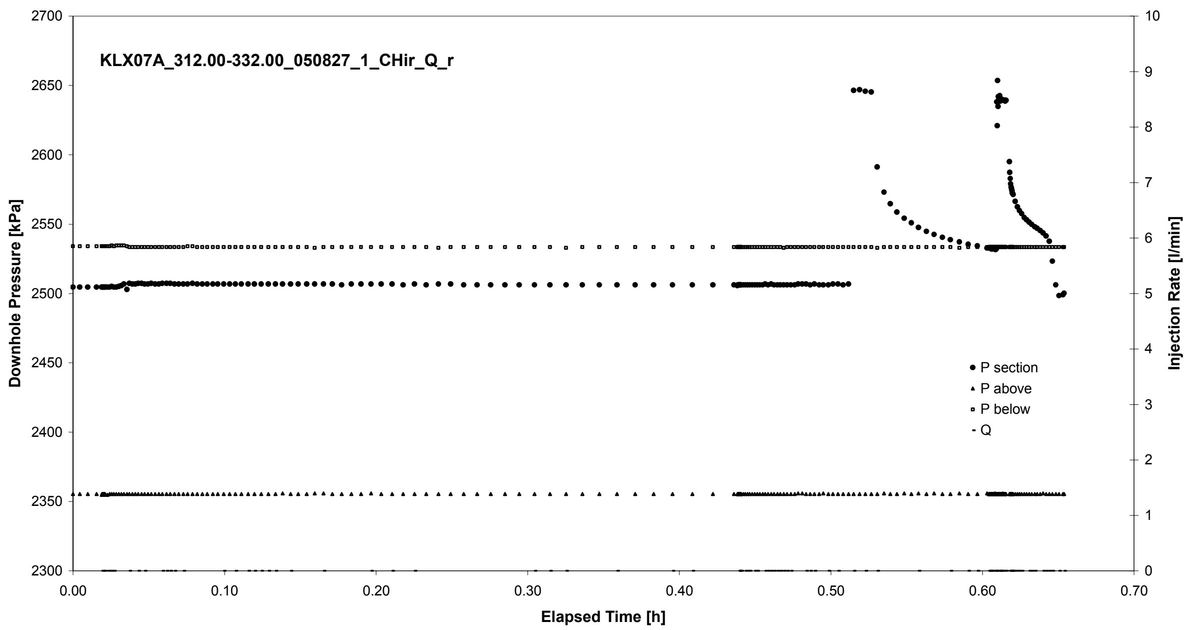


CHIR phase; HORNER match

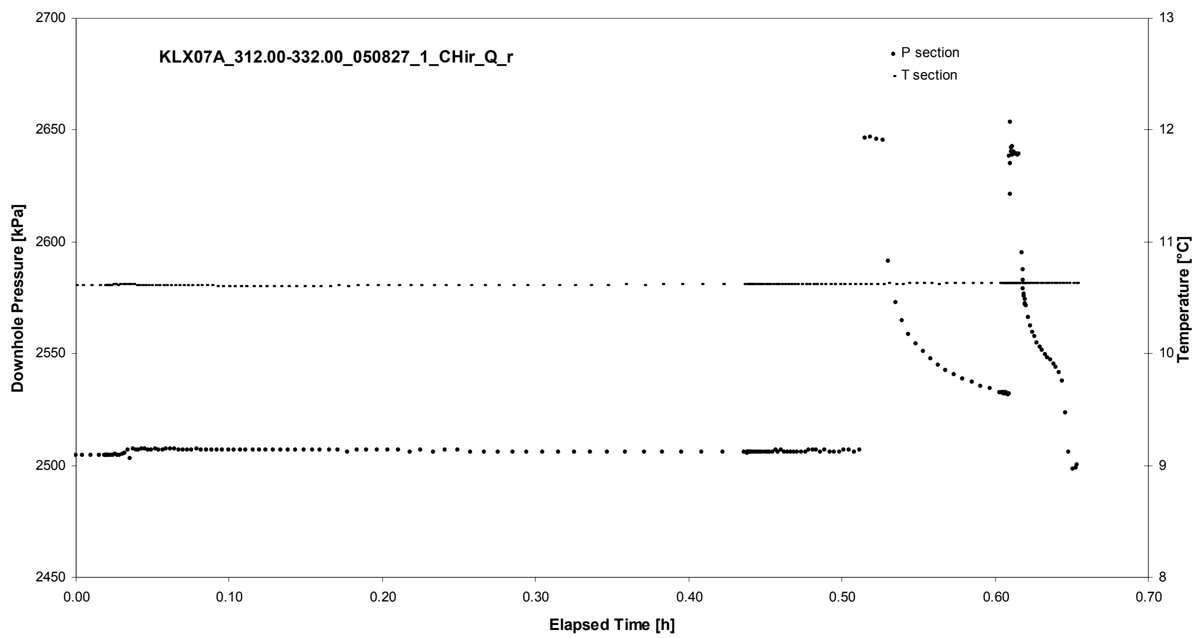
APPENDIX 2-20

Test 312.00 – 332.00 m

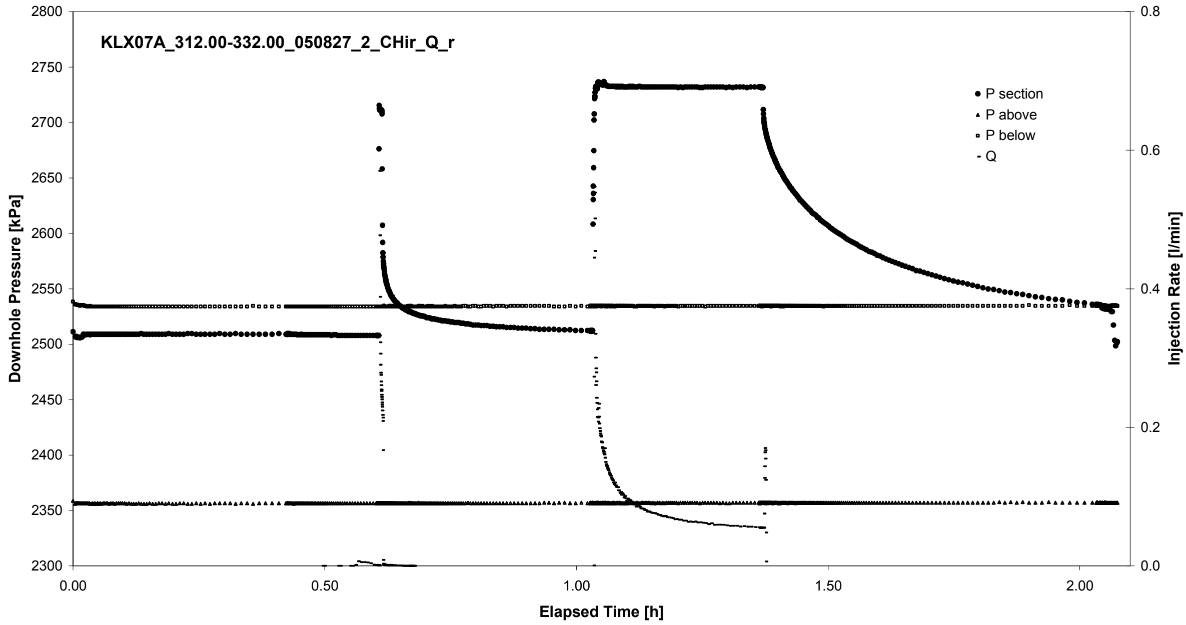
Analysis diagrams



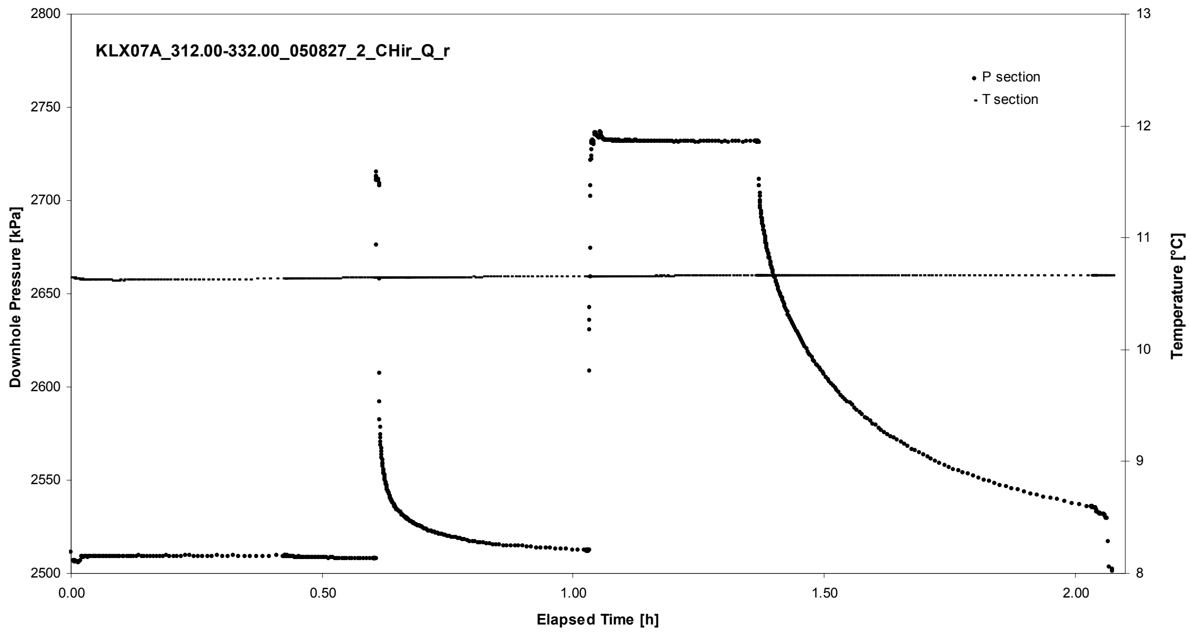
Pressure and flow rate vs. time; cartesian plot (test repeated)



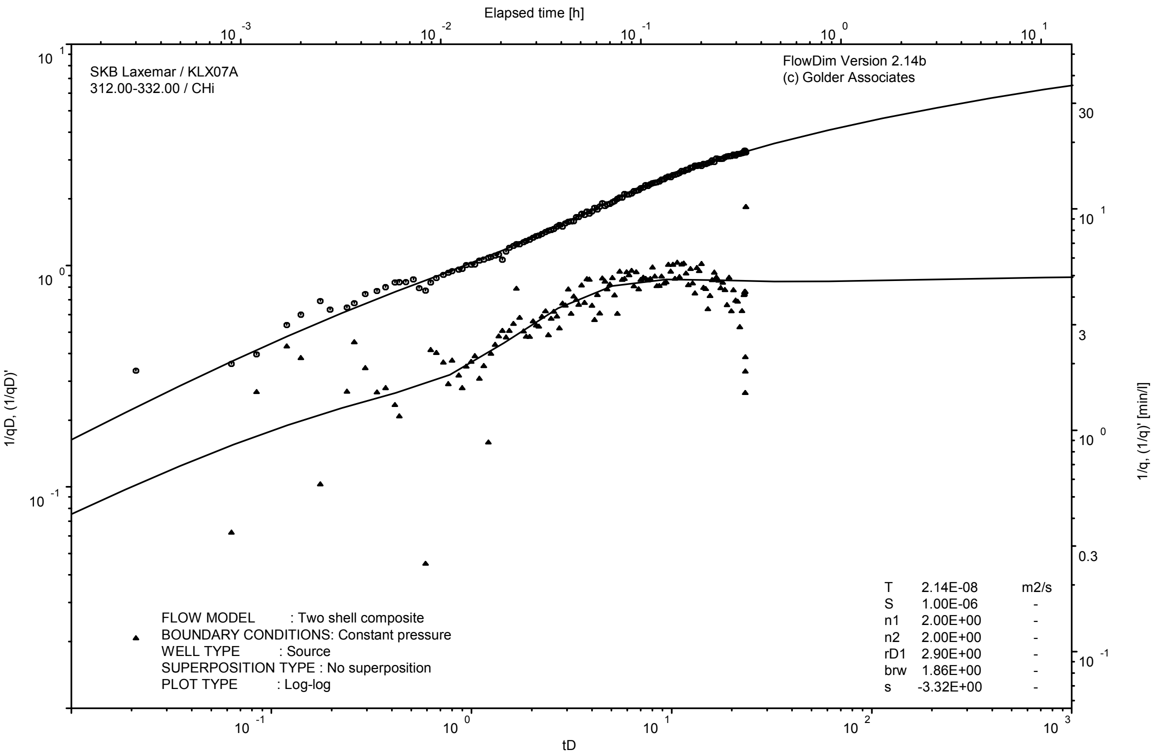
Interval pressure and temperature vs. time; cartesian plot (test repeated)



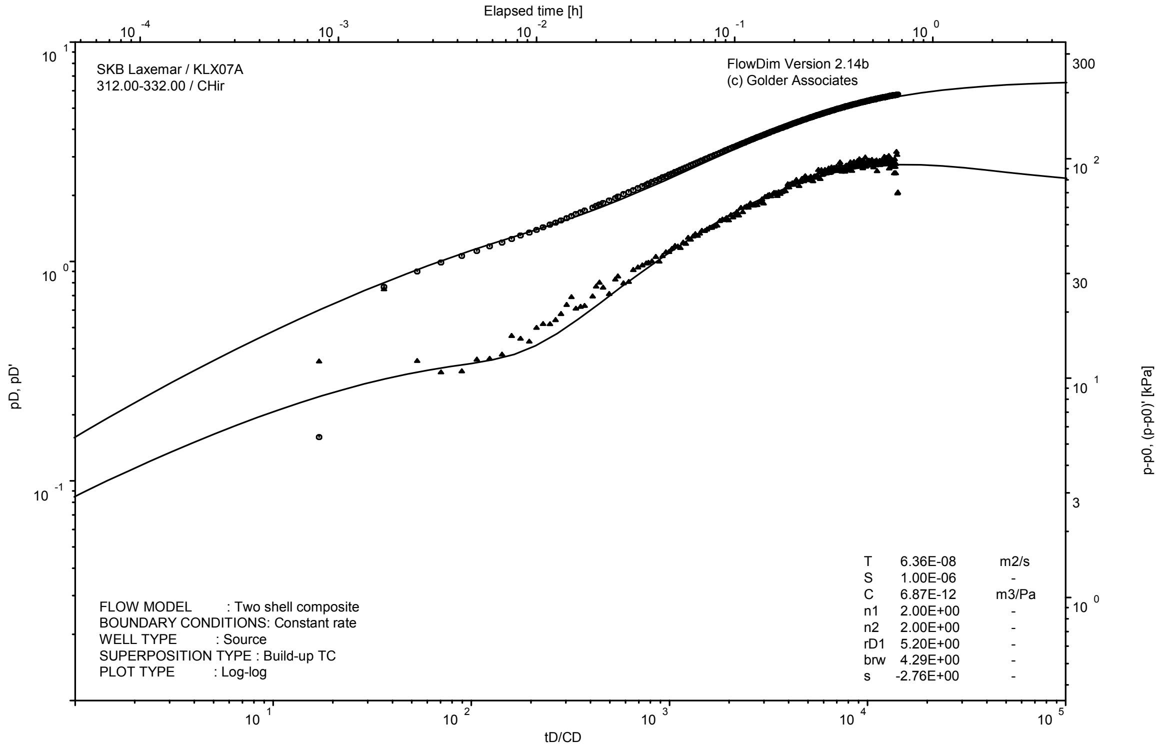
Pressure and flow rate vs. time; cartesian plot (analysed)



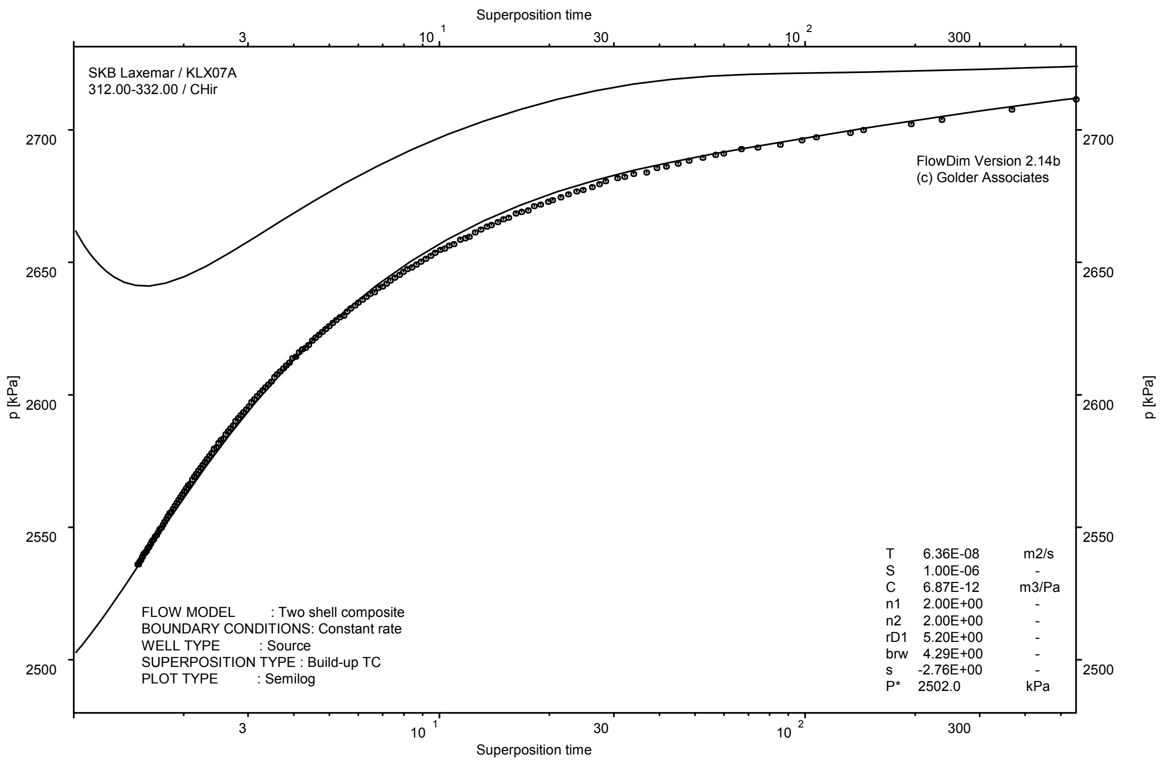
Interval pressure and temperature vs. time; cartesian plot (analysed)



CHI phase; log-log match



CHIR phase; log-log match

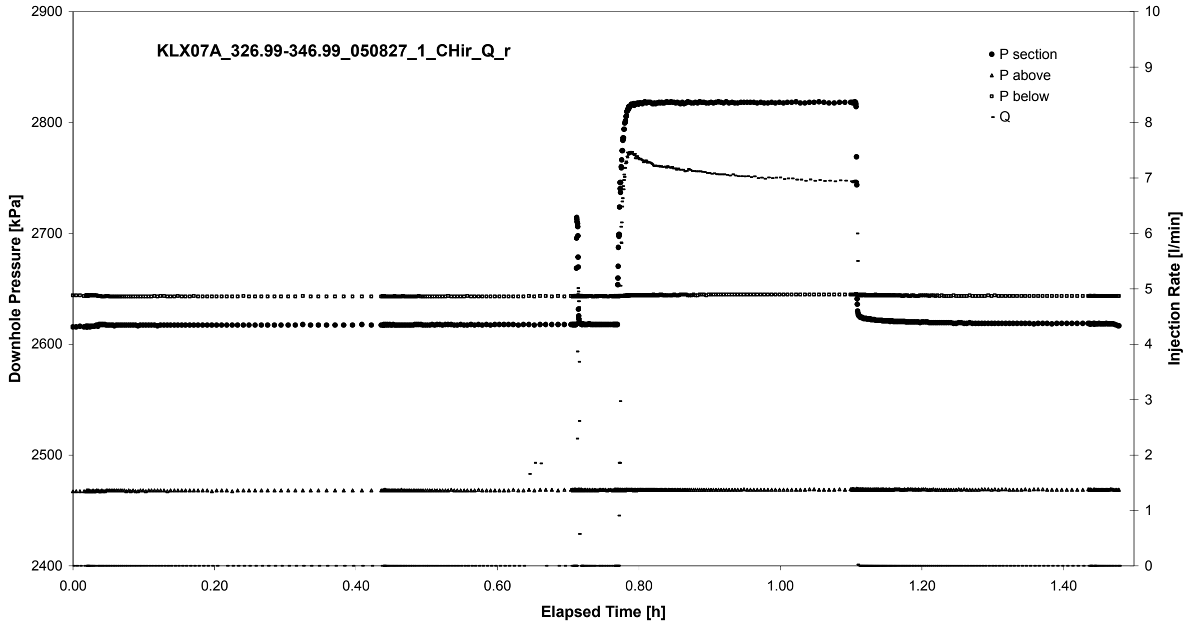


CHIR phase; HORNER match

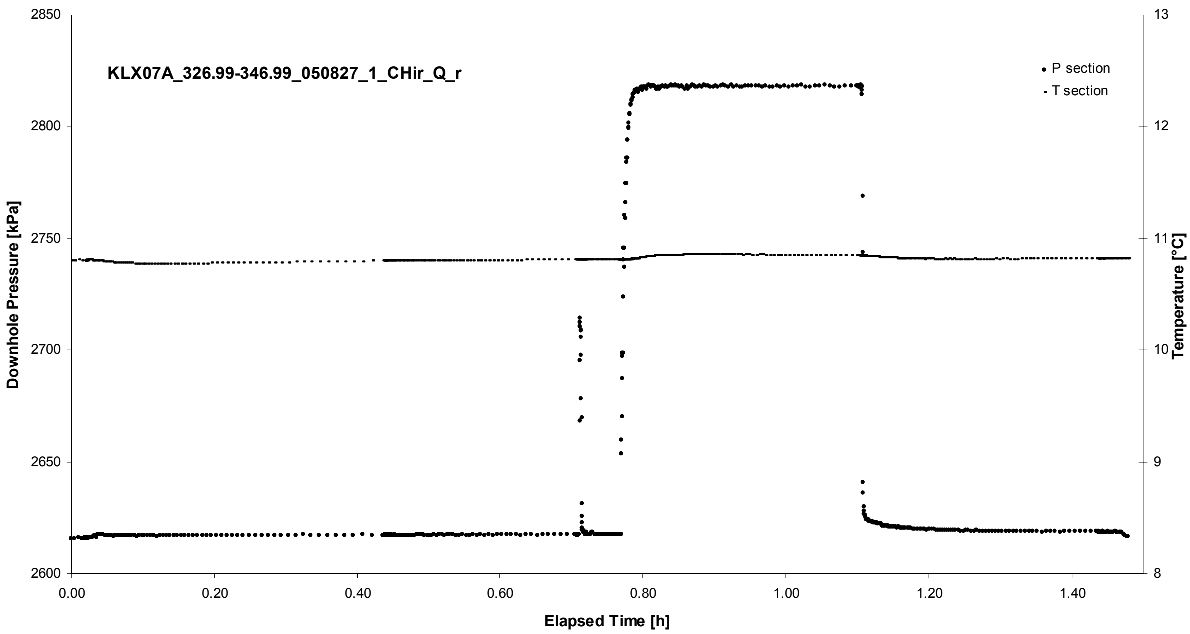
APPENDIX 2-21

Test 326.99-346.99 m

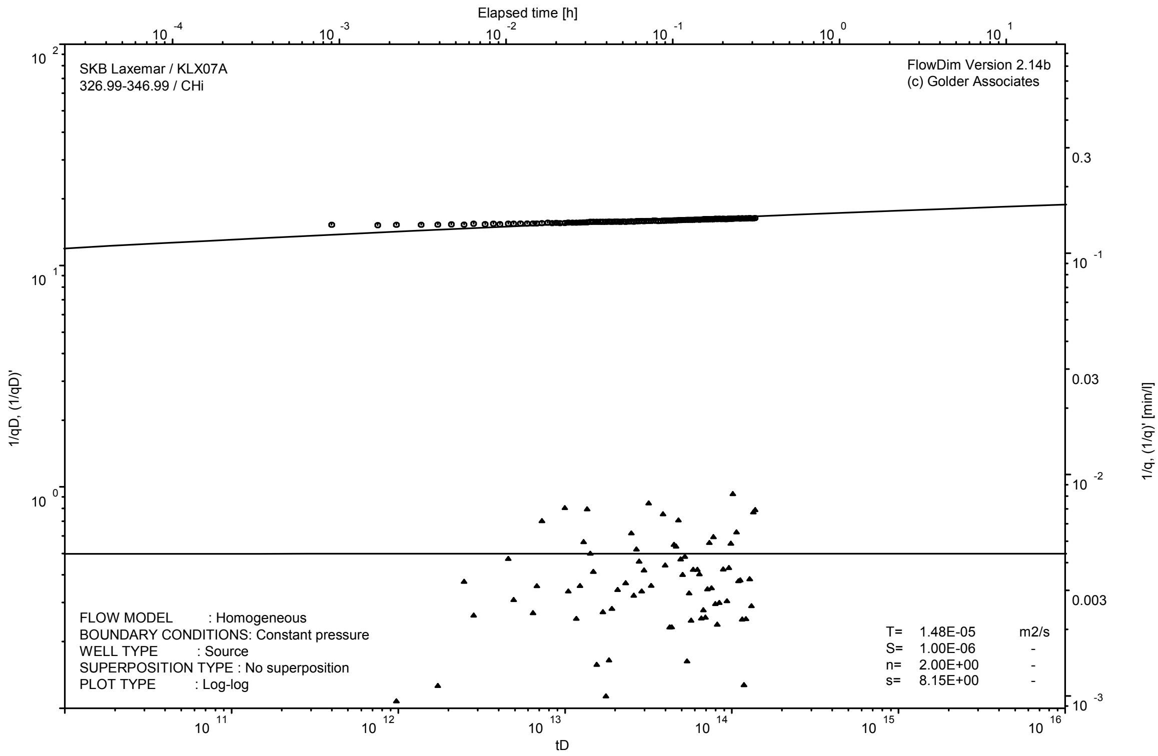
Analysis diagrams



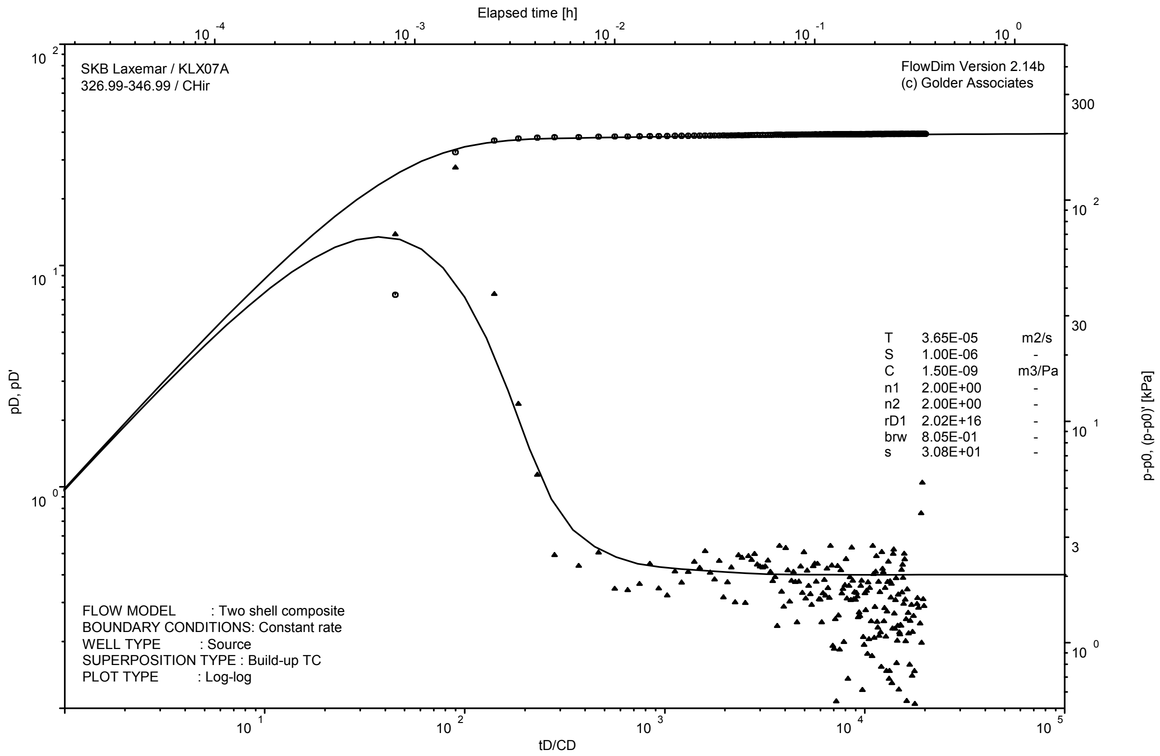
Pressure and flow rate vs. time; cartesian plot



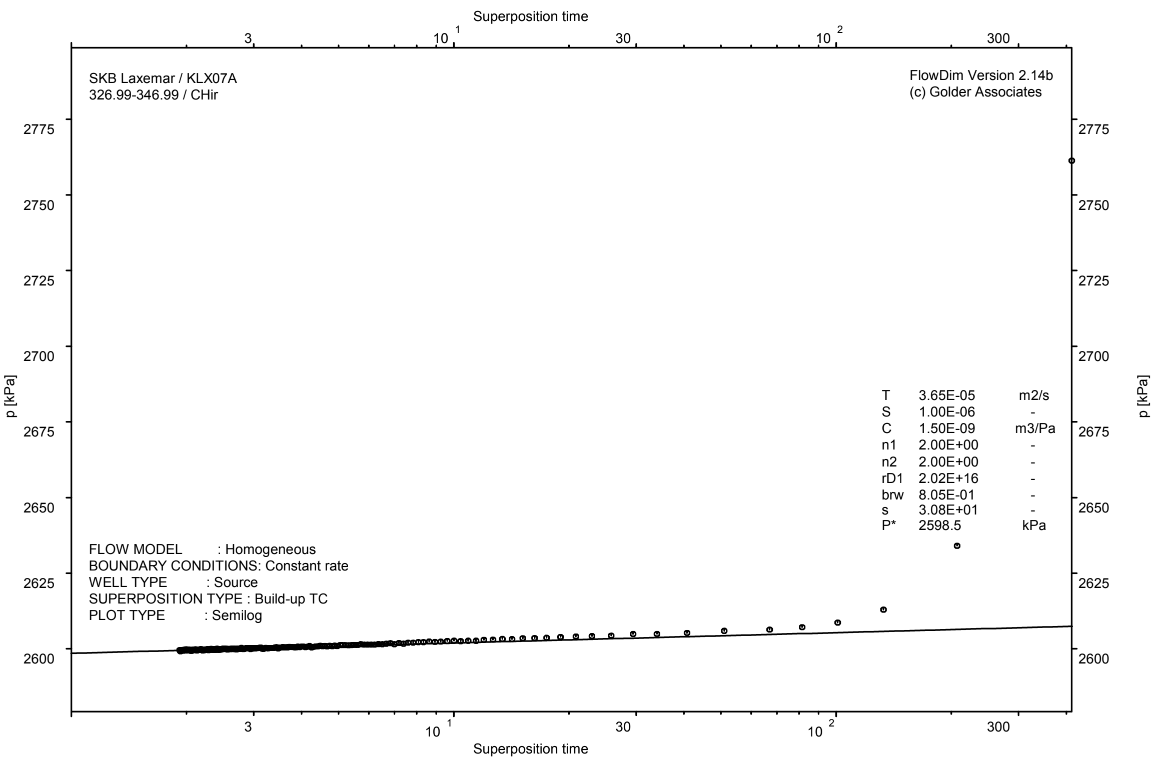
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

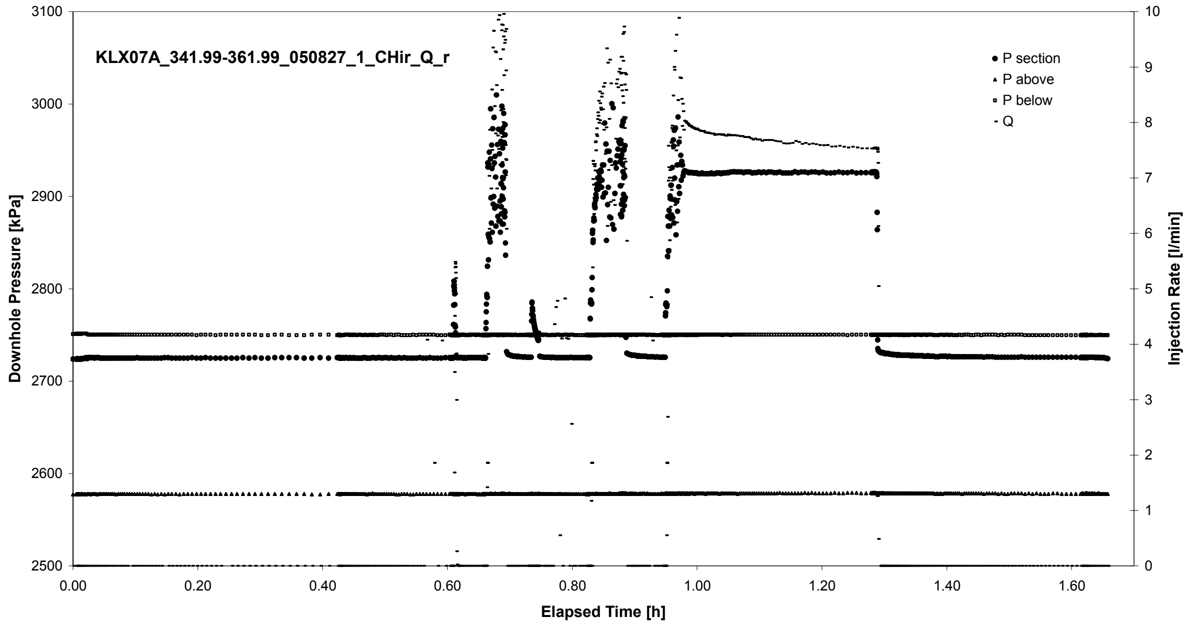


CHIR phase; HORNER match

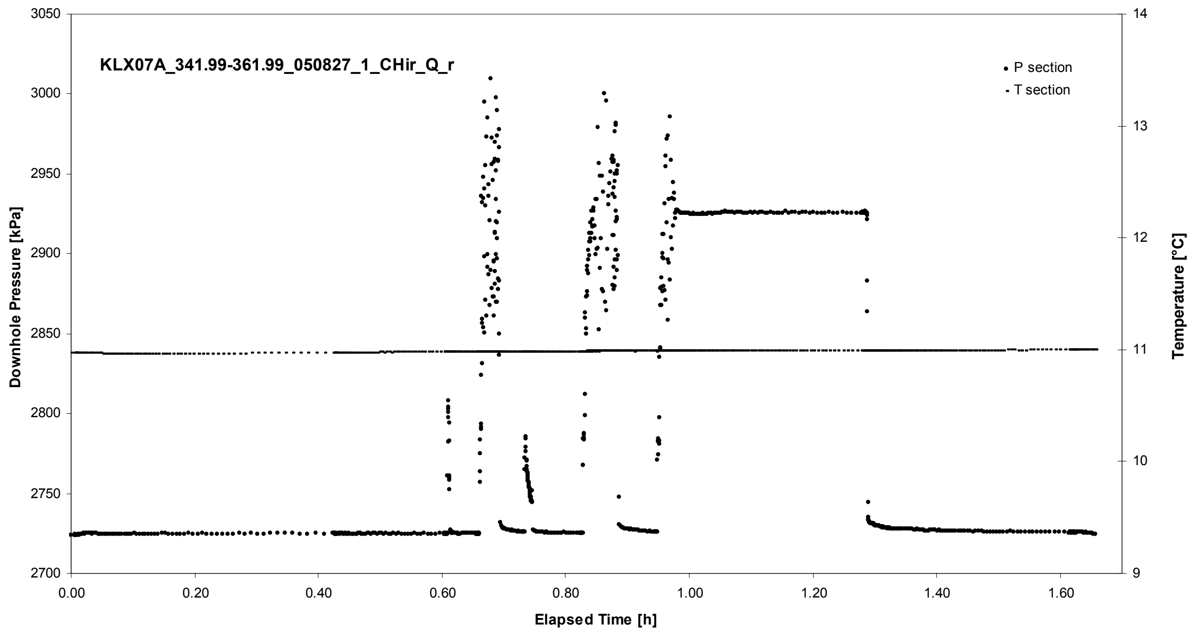
APPENDIX 2-22

Test 341.99-361.99 m

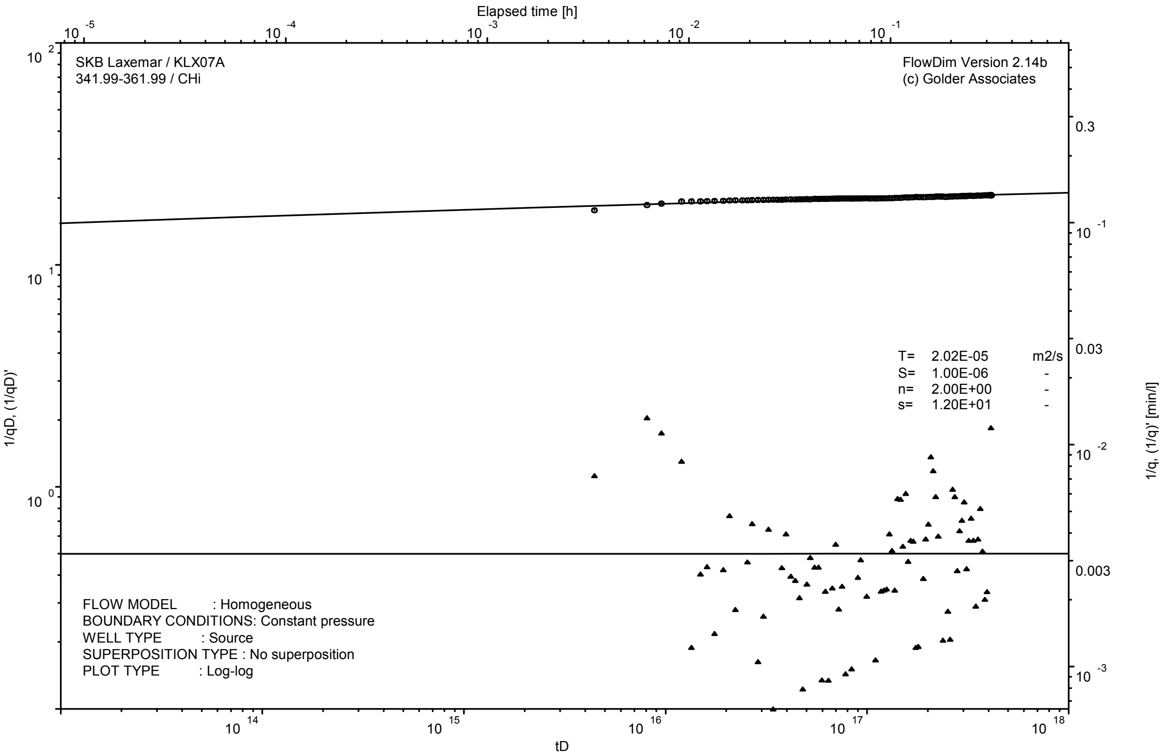
Analysis diagrams



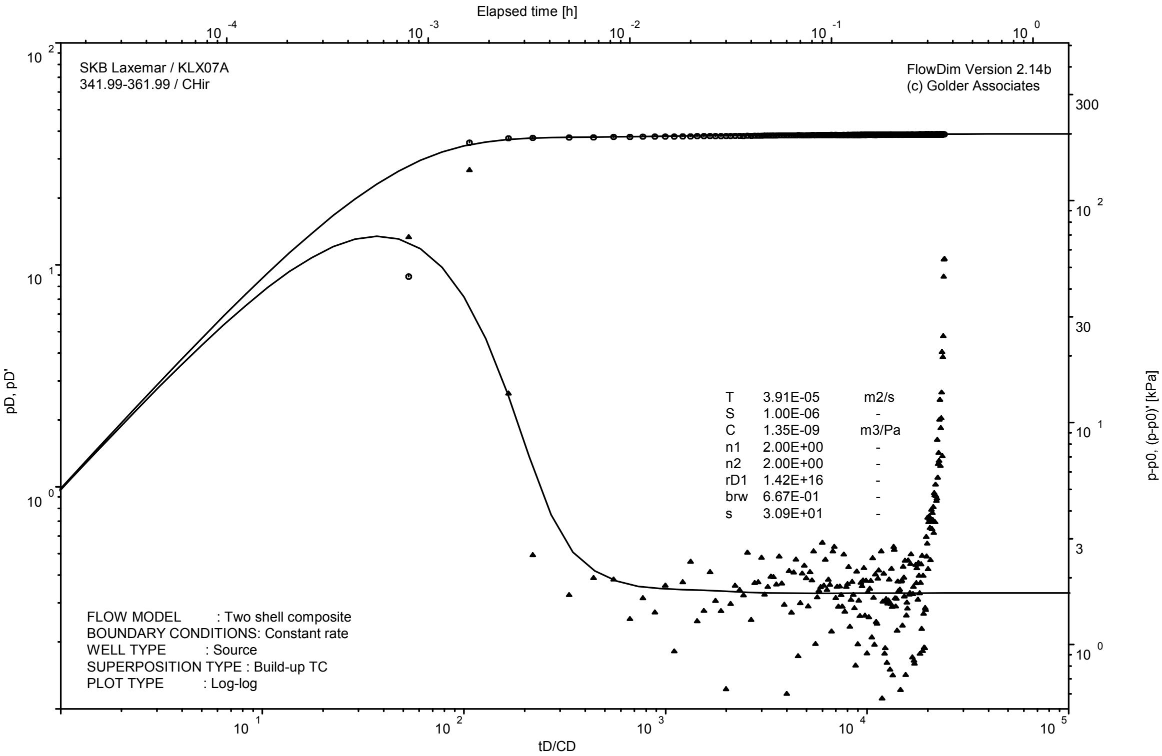
Pressure and flow rate vs. time; cartesian plot



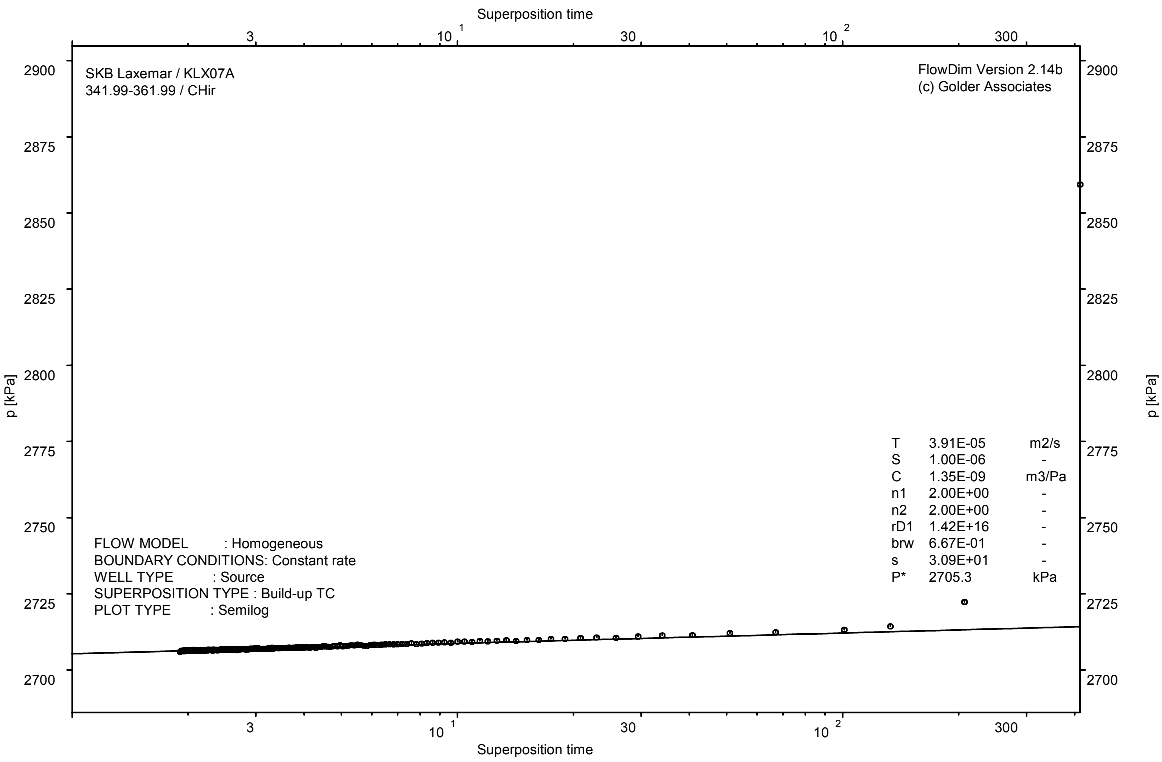
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

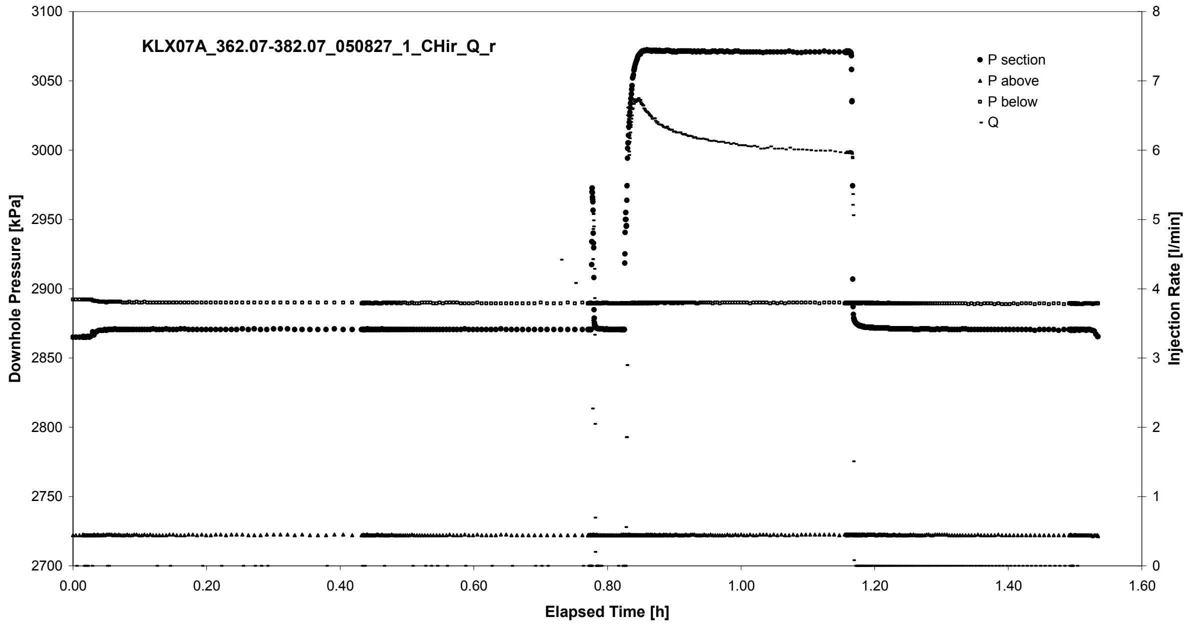


CHIR phase; HORNER match

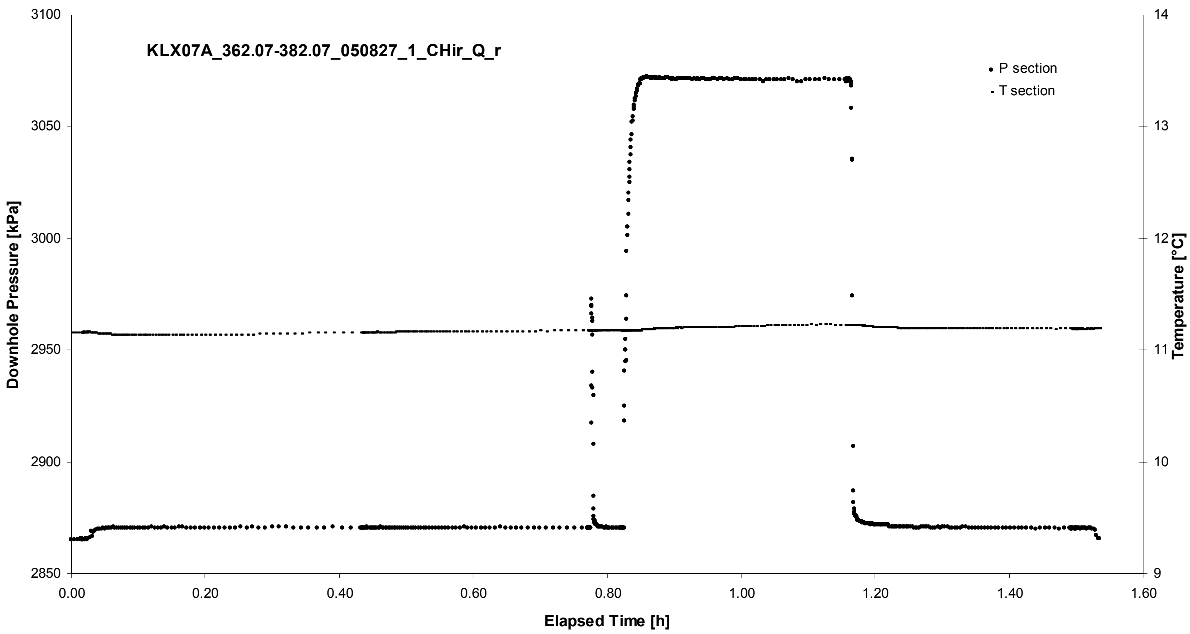
APPENDIX 2-23

Test 362.07-382.07 m

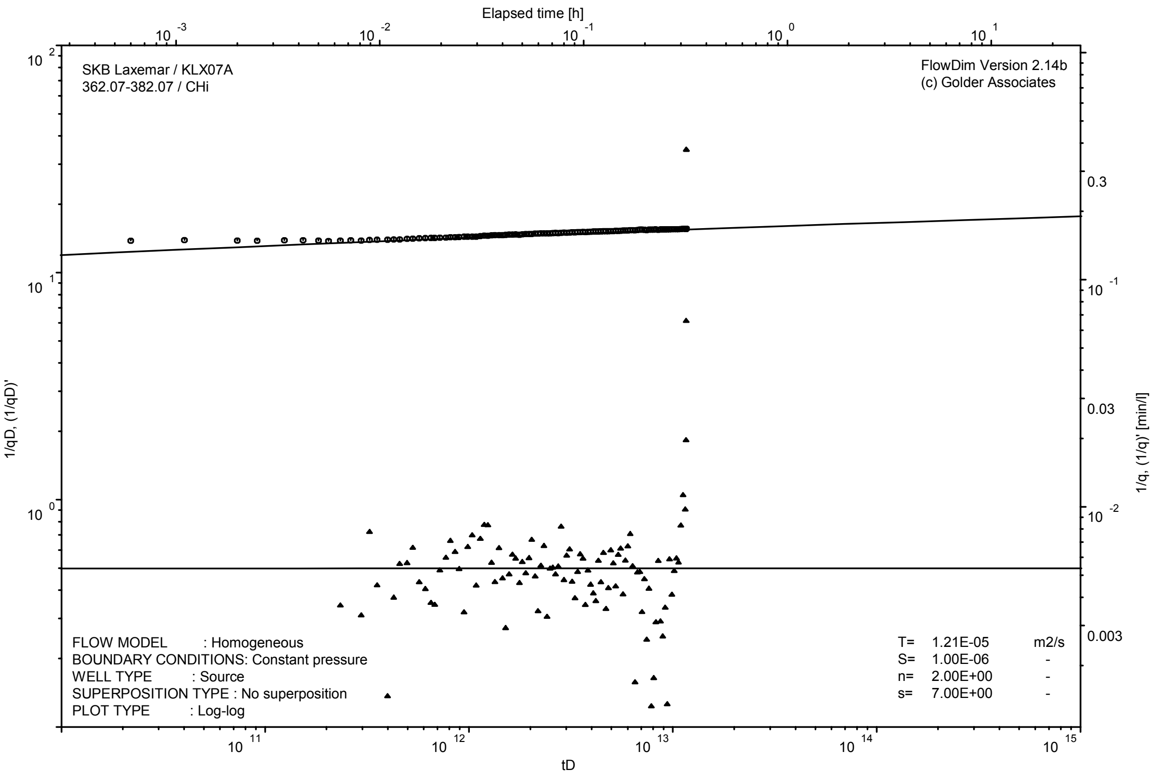
Analysis diagrams



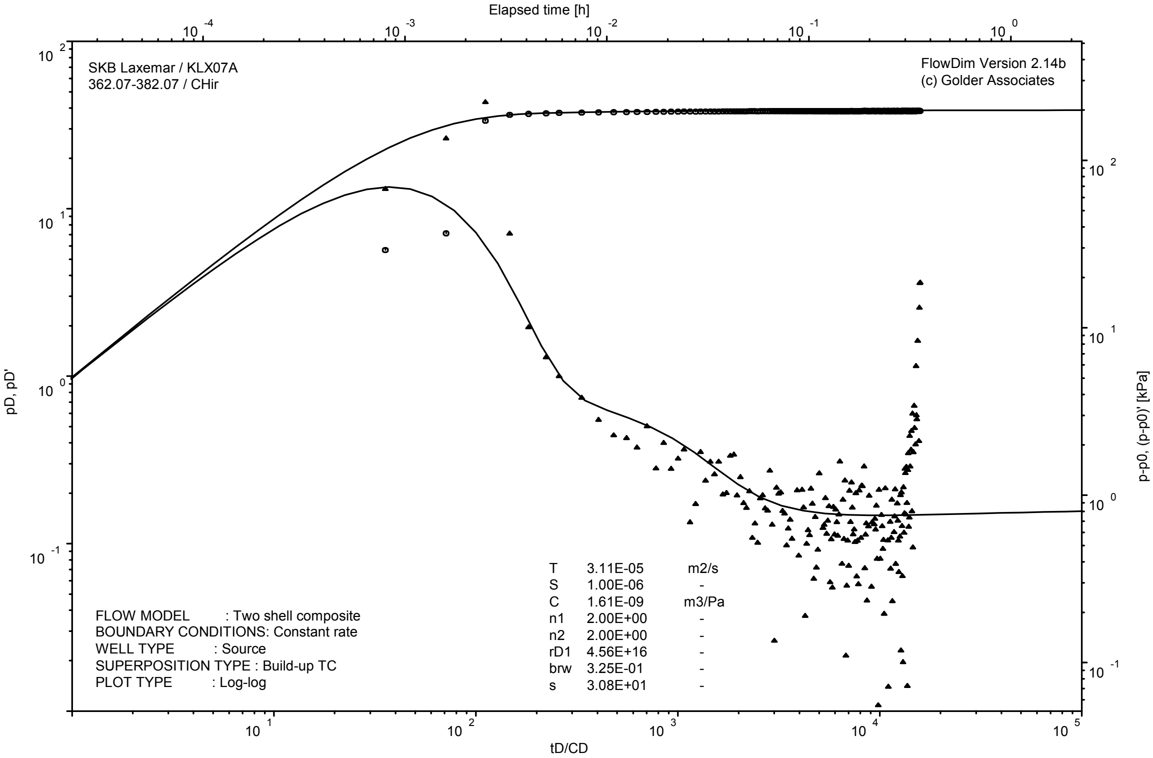
Pressure and flow rate vs. time; cartesian plot



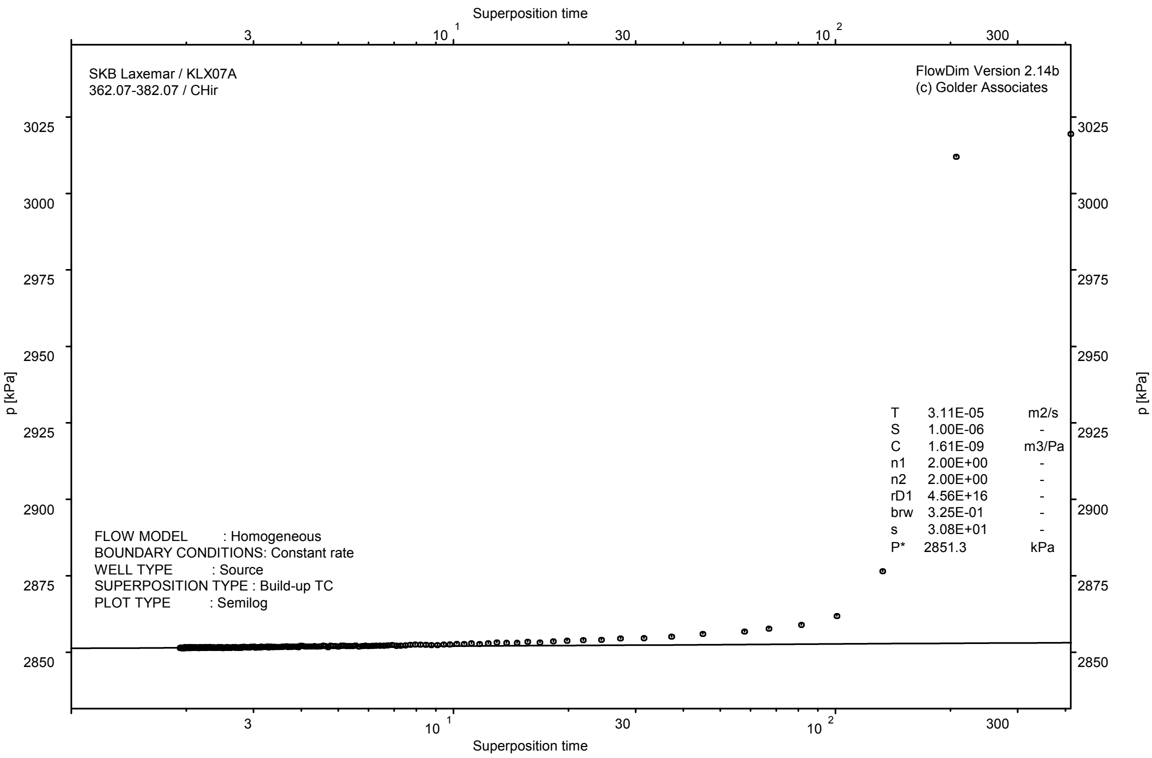
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

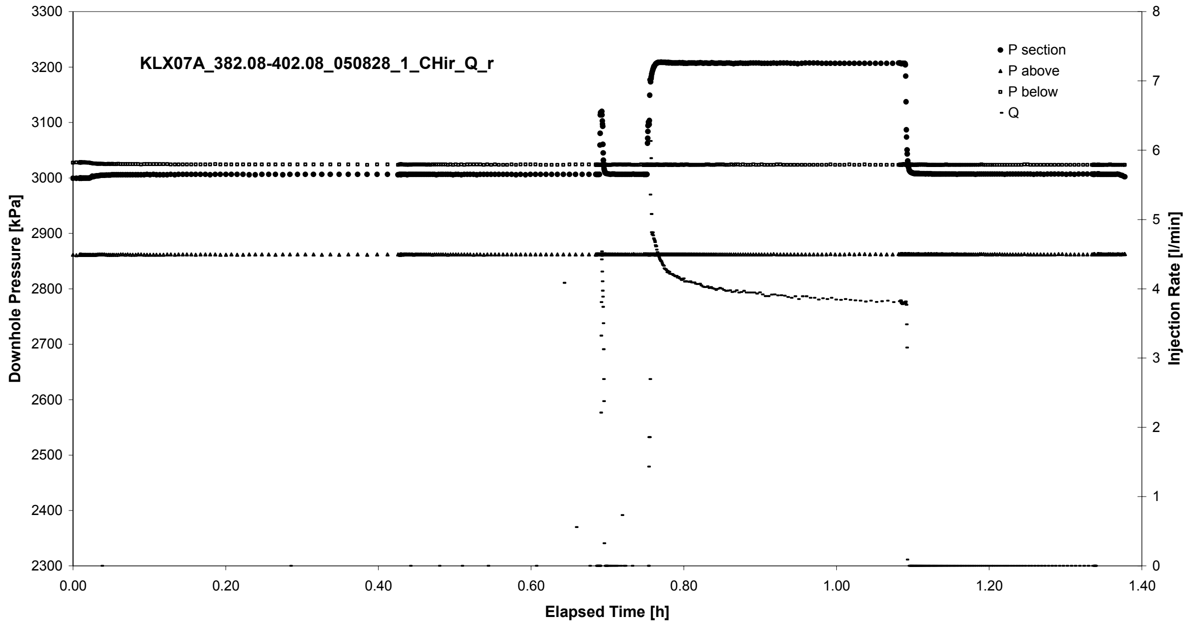


CHIR phase; HORNER match

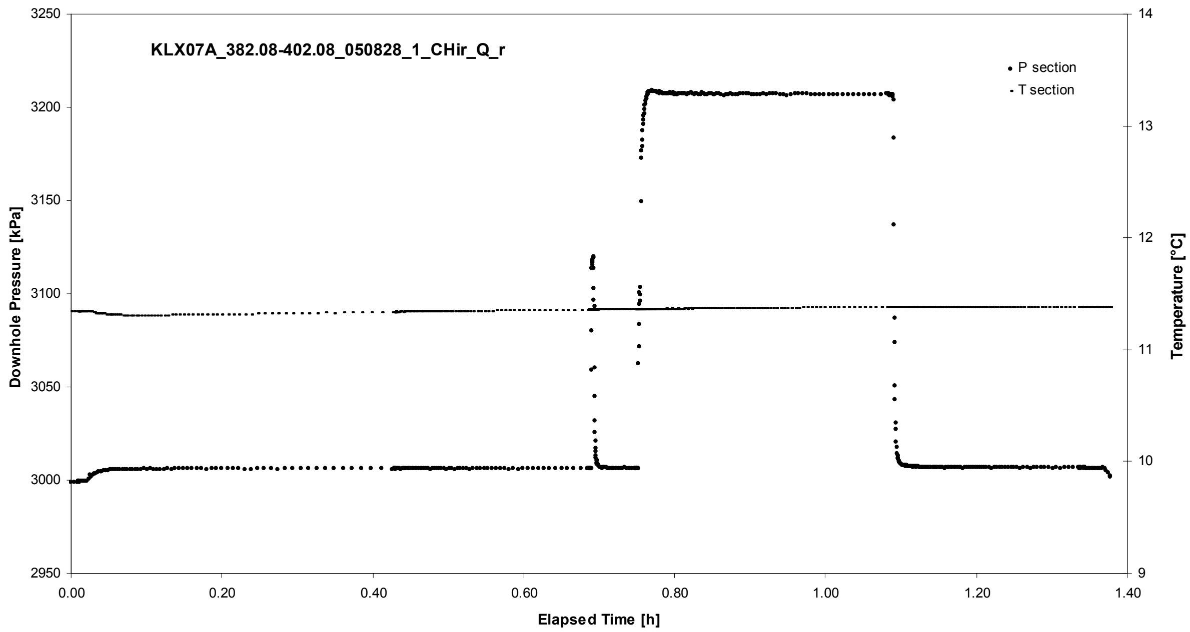
APPENDIX 2-24

Test 382.08-402.08 m

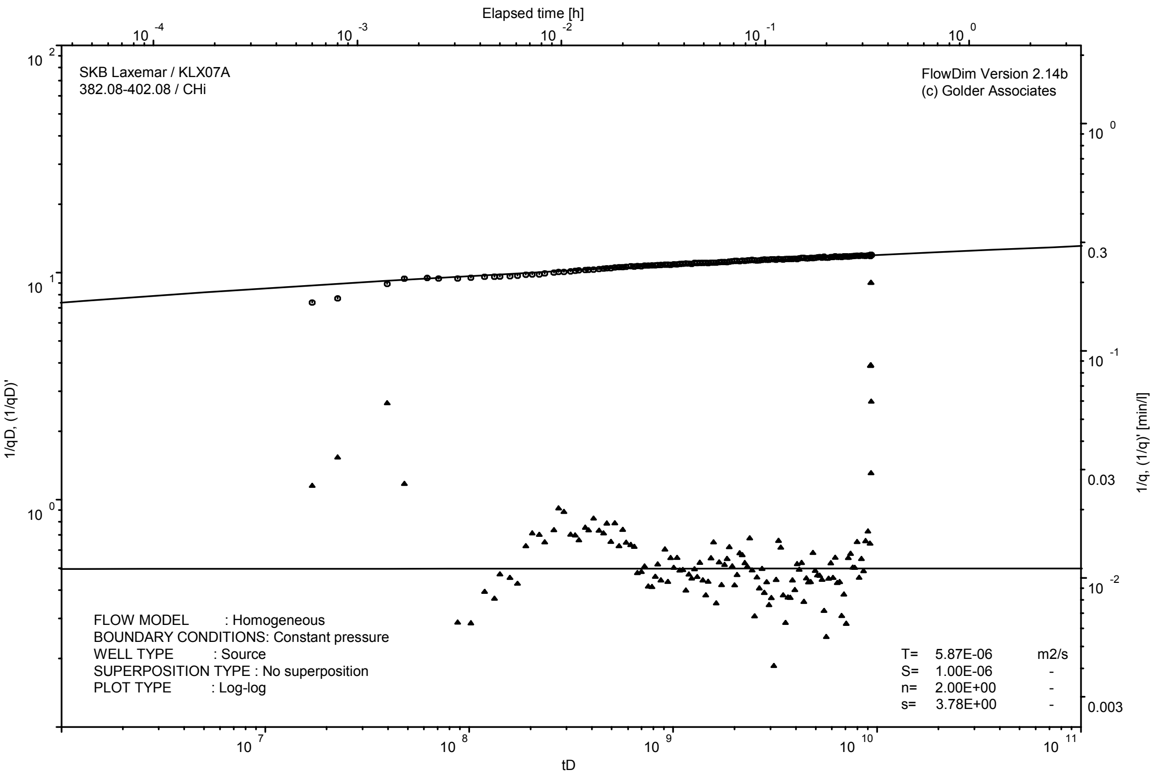
Analysis diagrams



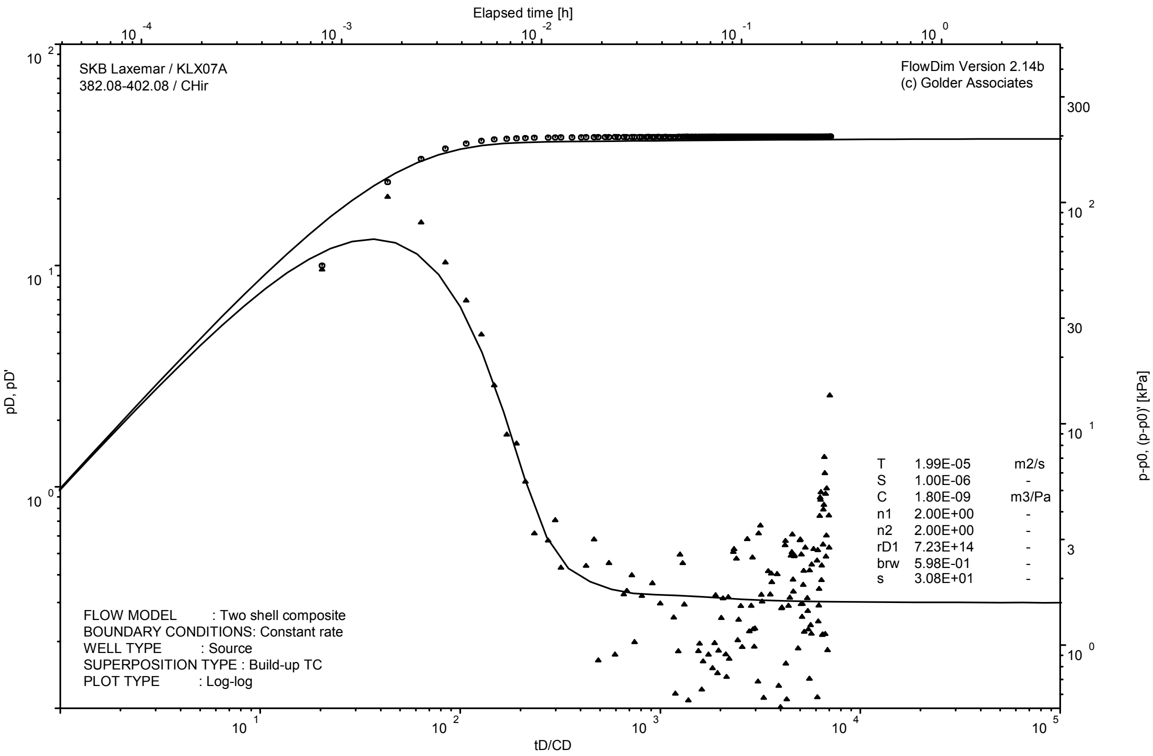
Pressure and flow rate vs. time; cartesian plot



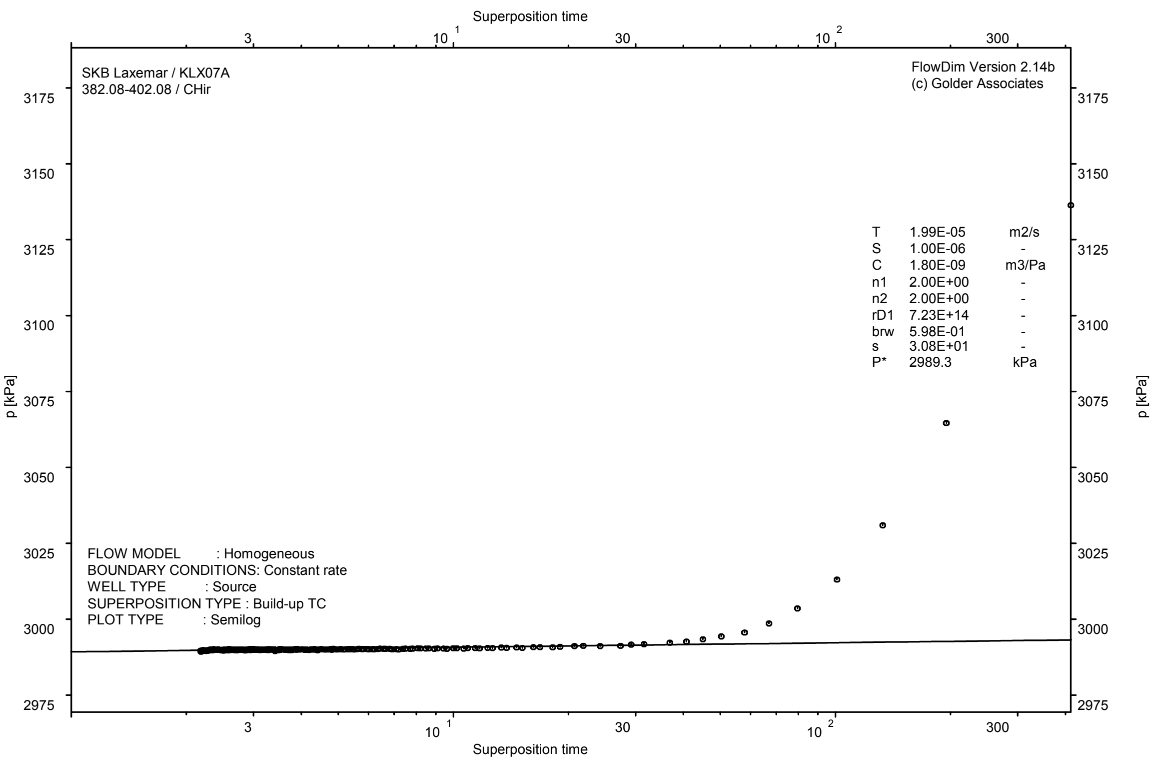
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

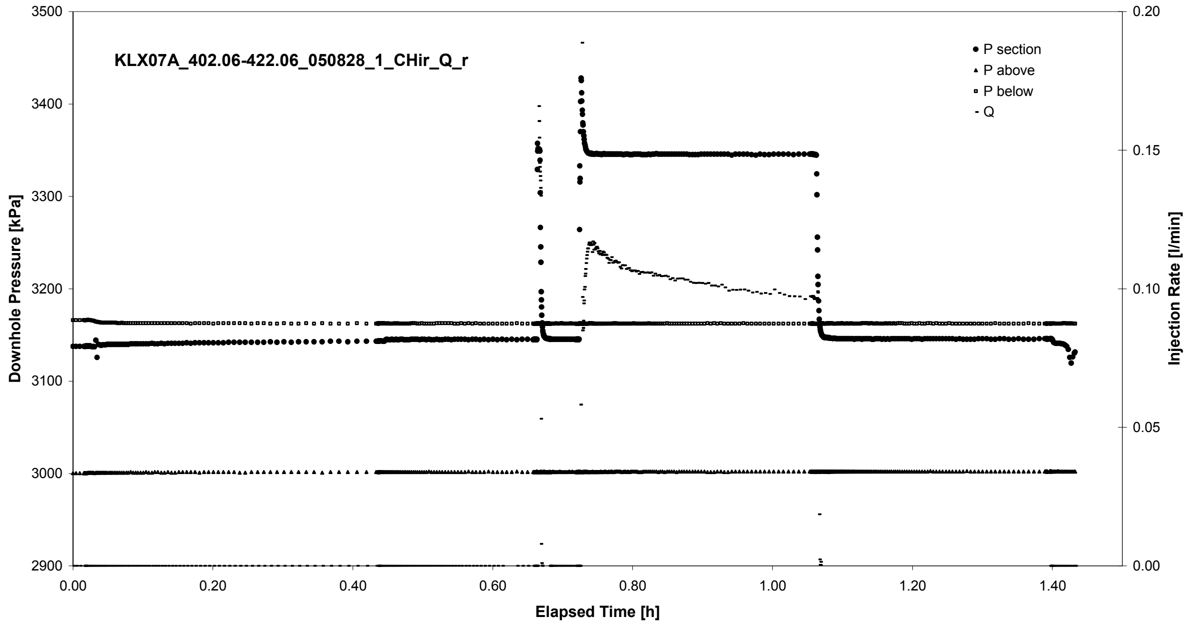


CHIR phase; HORNER match

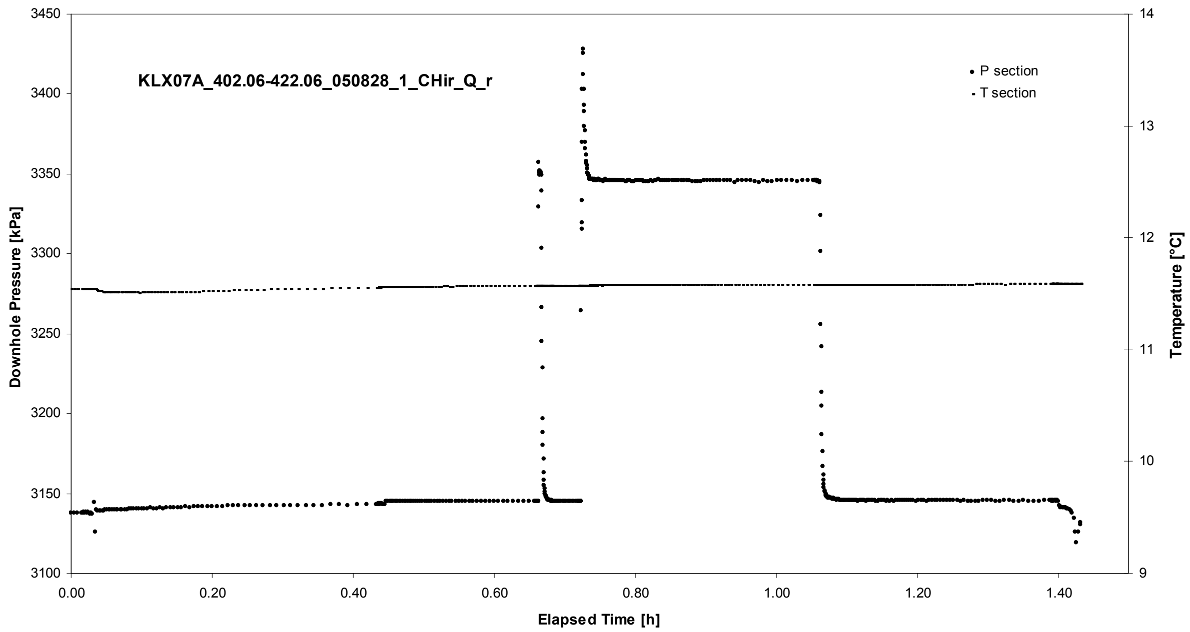
APPENDIX 2-25

Test 402.06-422.06 m

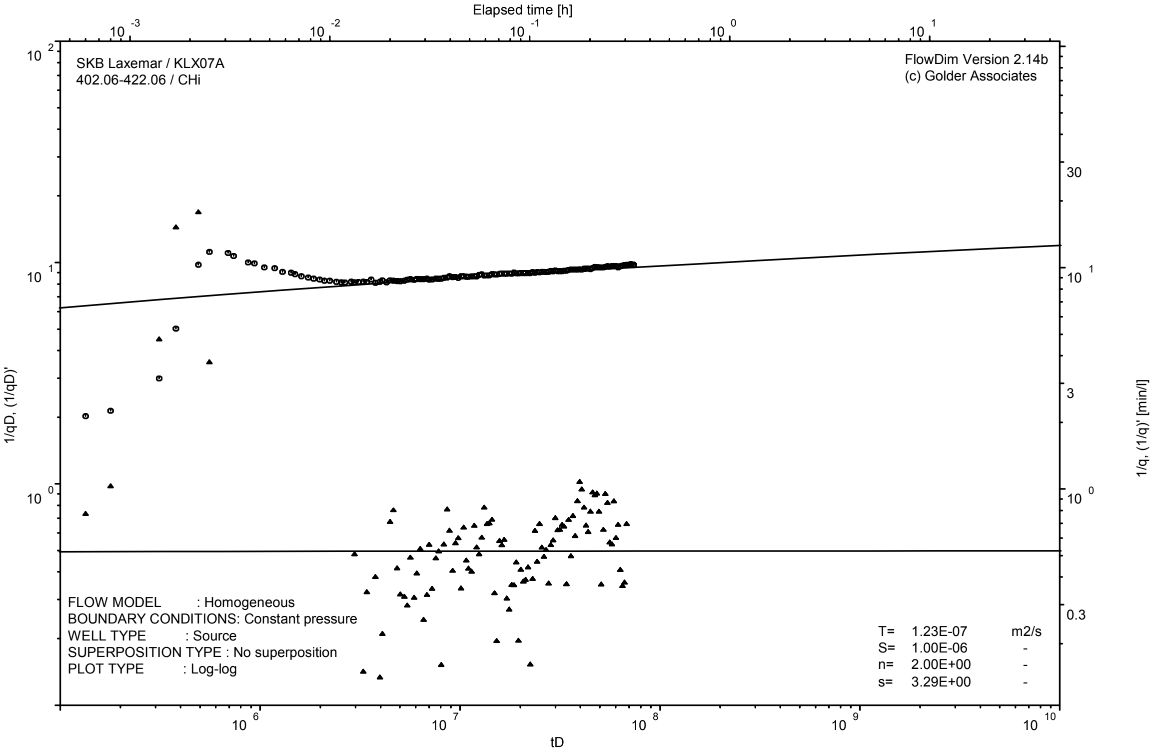
Analysis diagrams



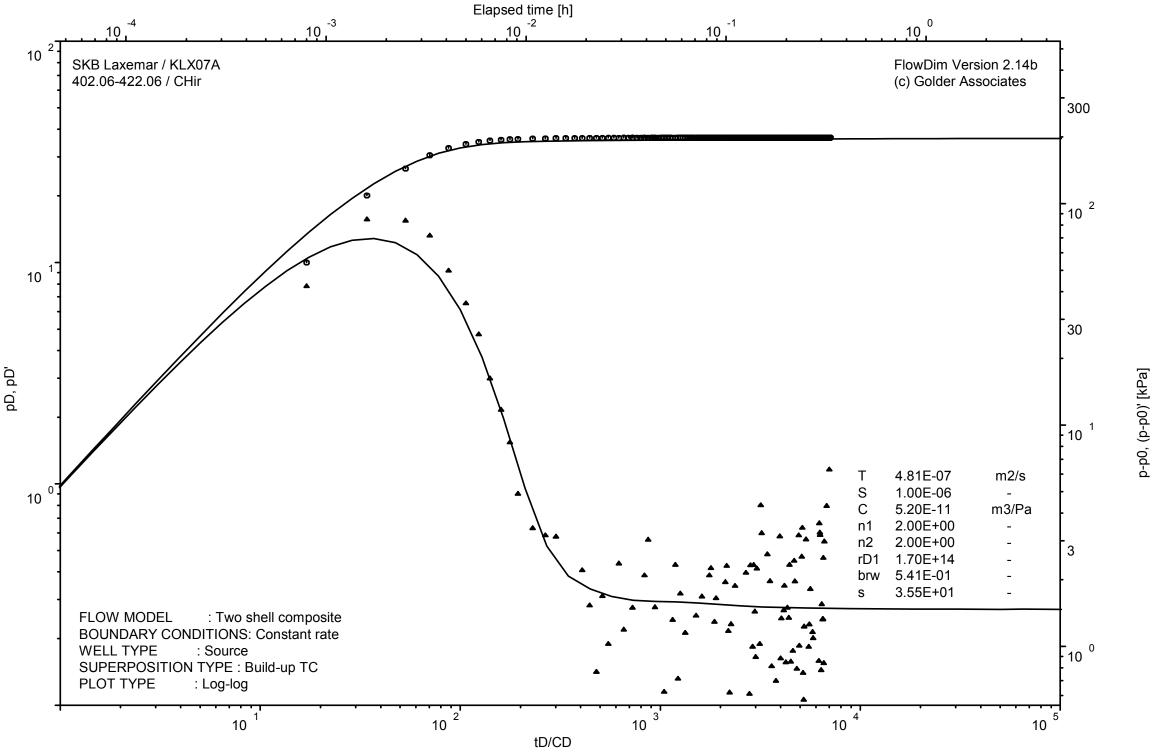
Pressure and flow rate vs. time; cartesian plot



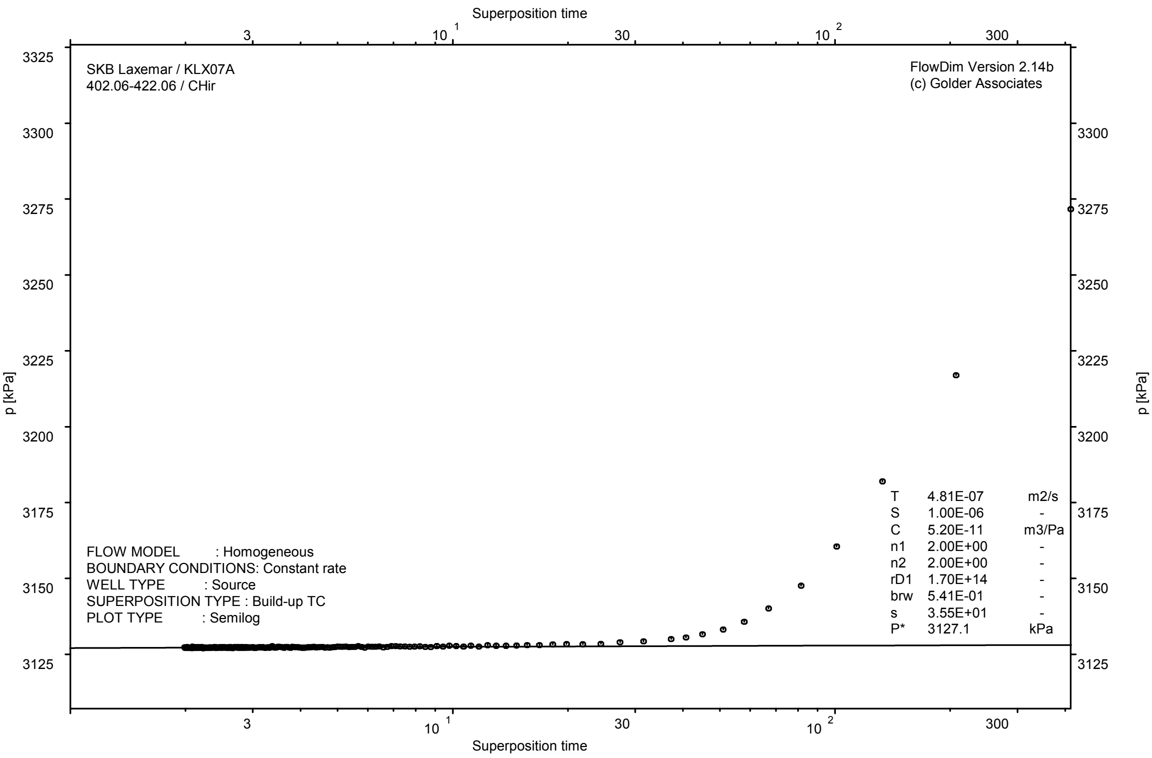
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

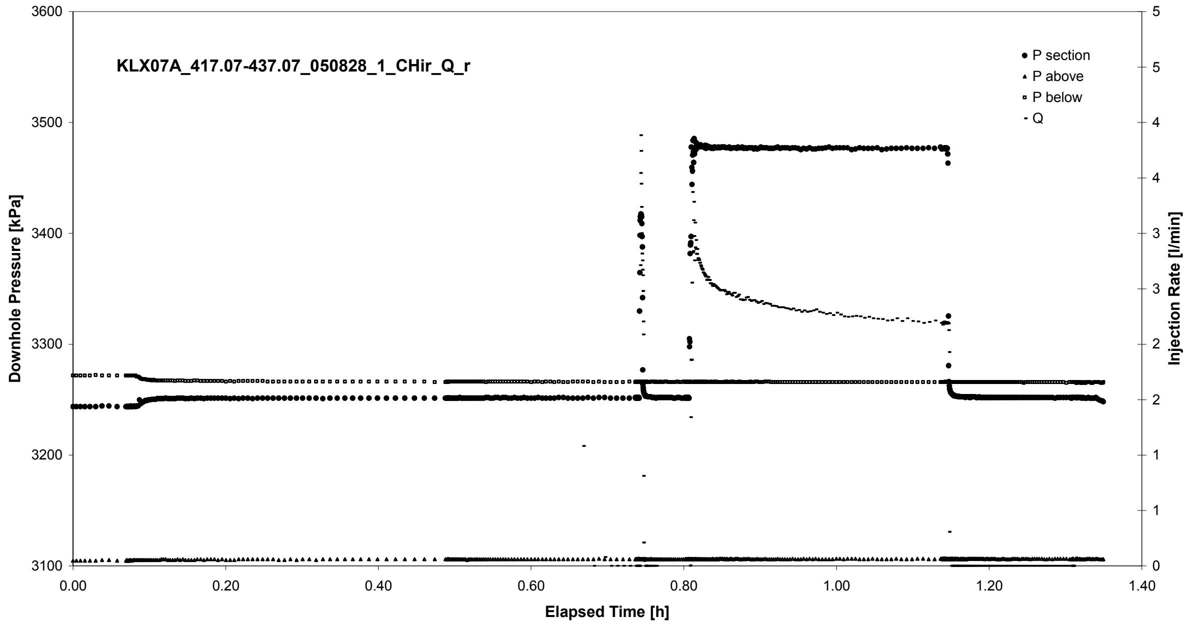


CHIR phase; HORNER match

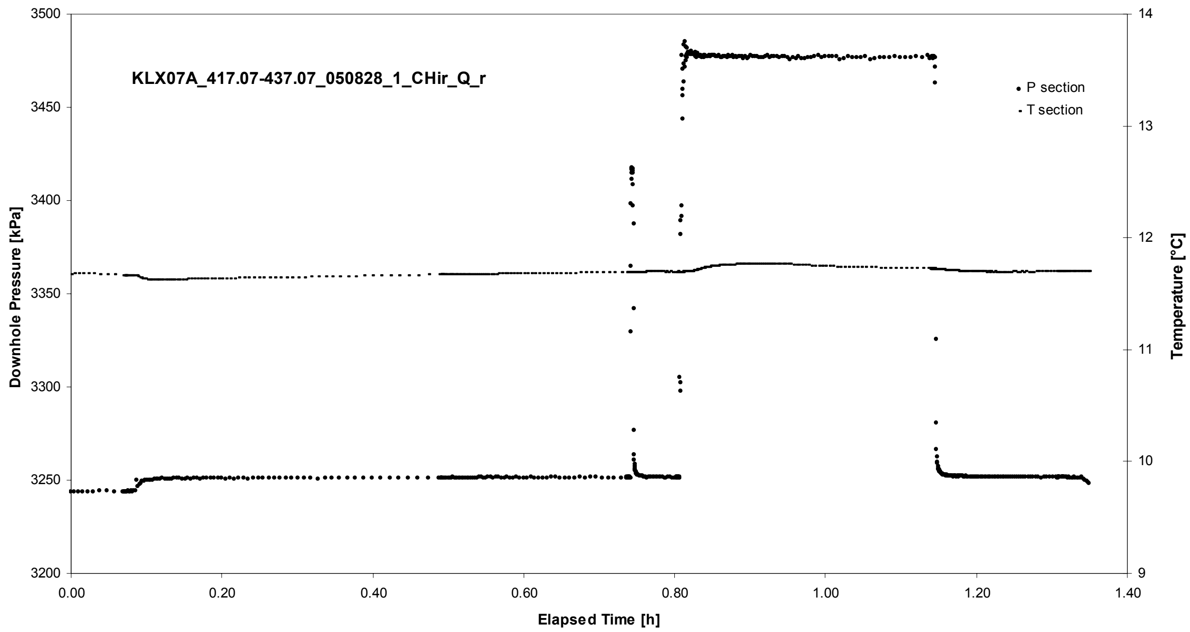
APPENDIX 2-26

Test 417.07-437.07 m

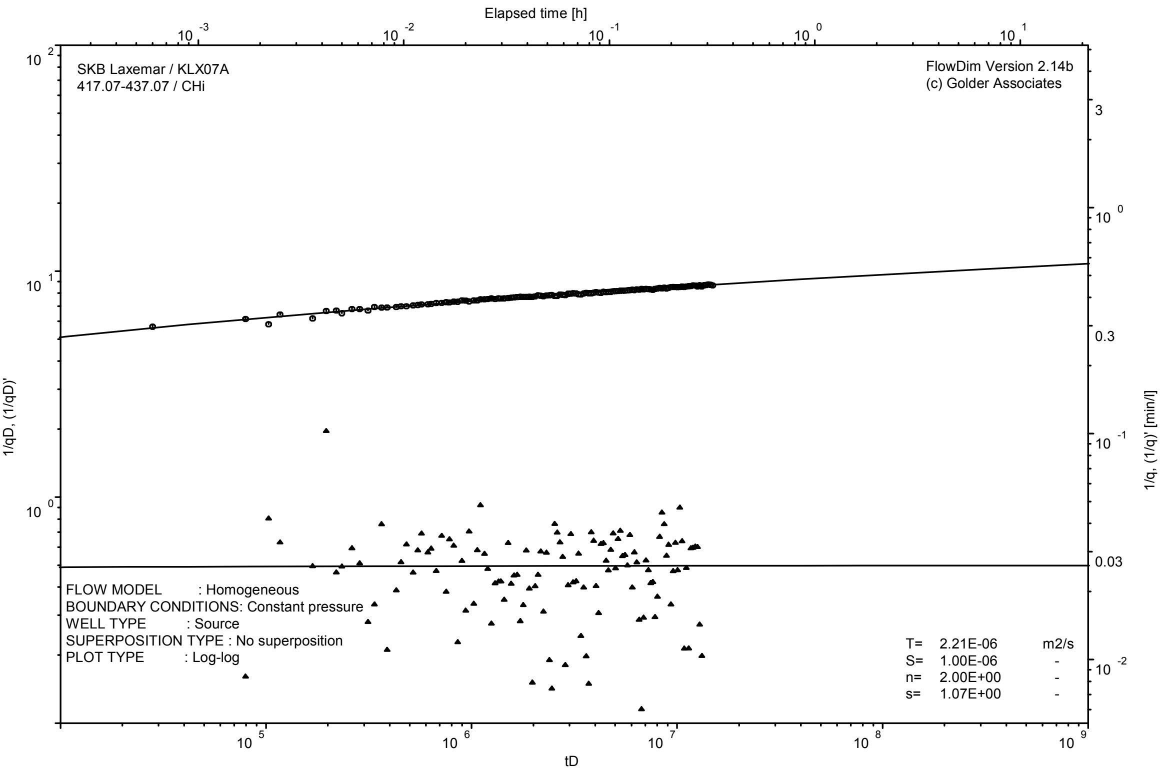
Analysis diagrams



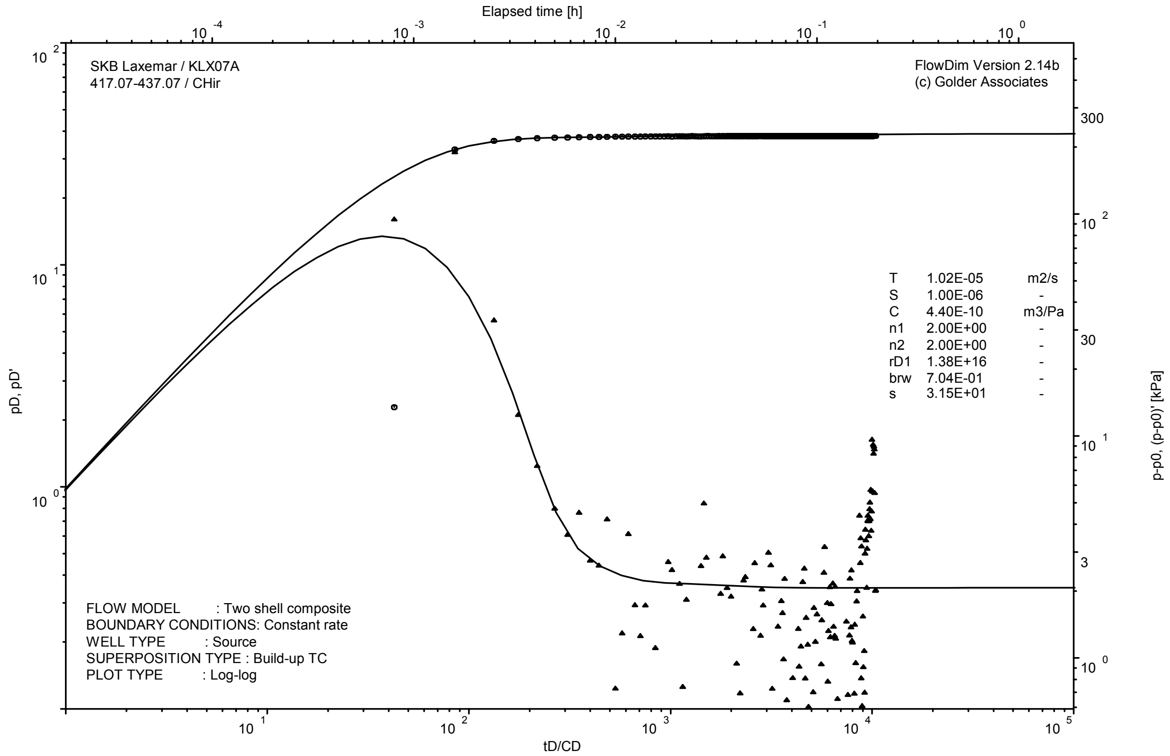
Pressure and flow rate vs. time; cartesian plot



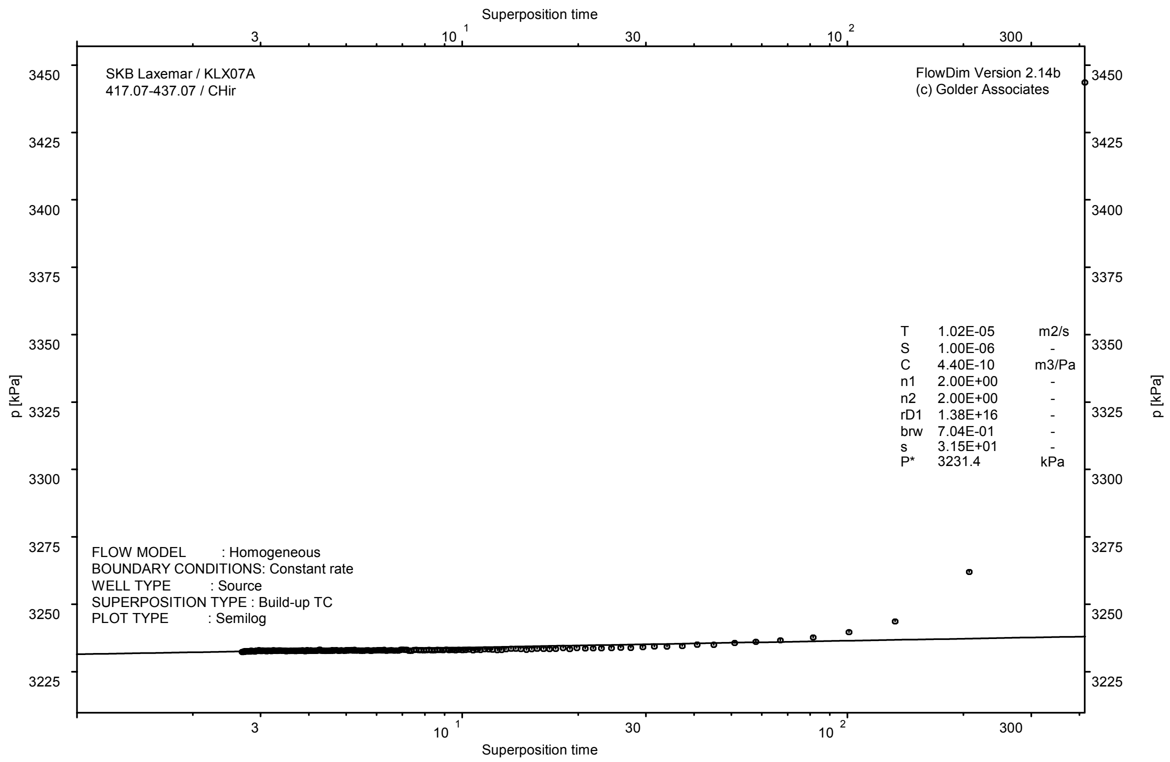
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

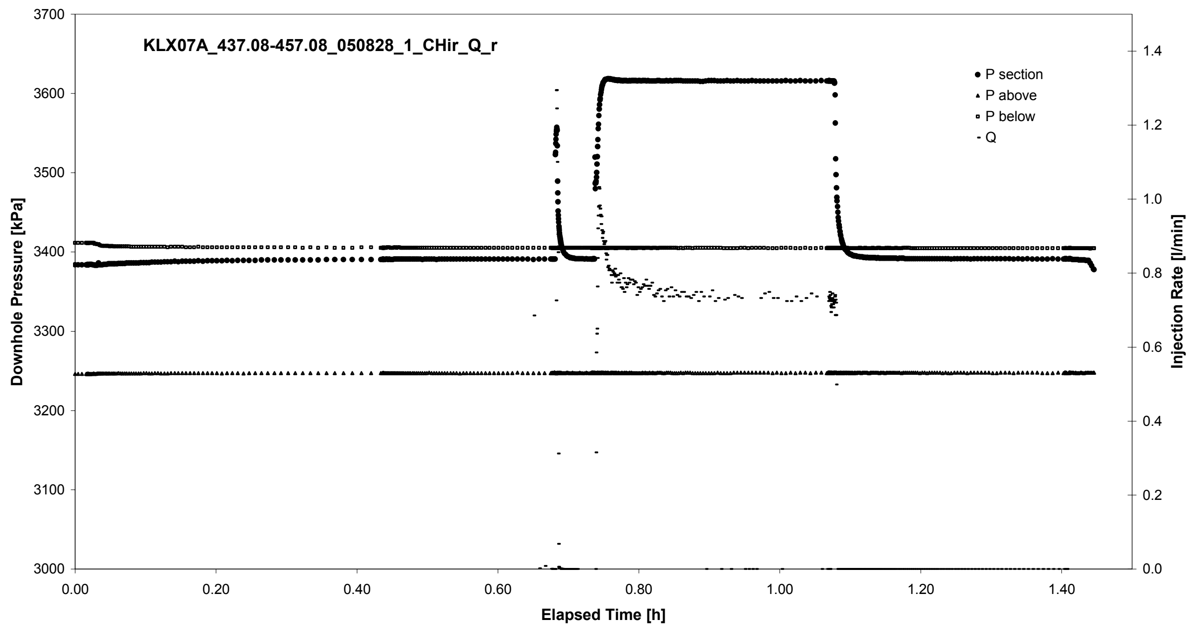


CHIR phase; HORNER match

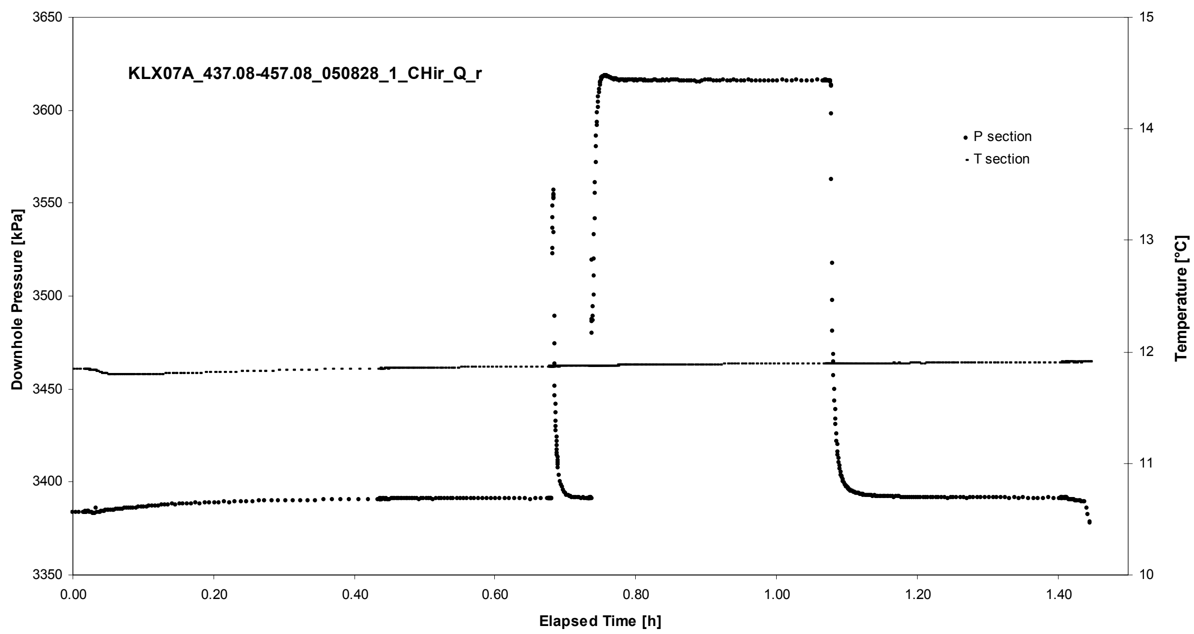
APPENDIX 2-27

Test 437.08-457.08 m

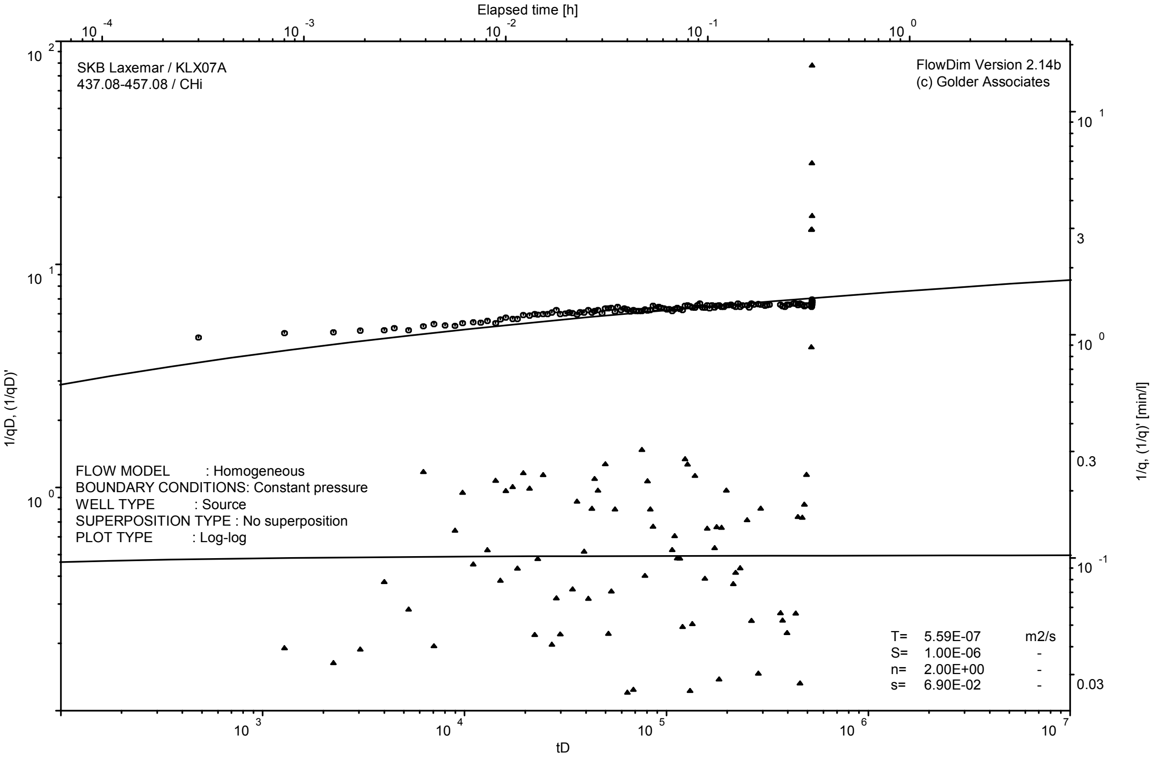
Analysis diagrams



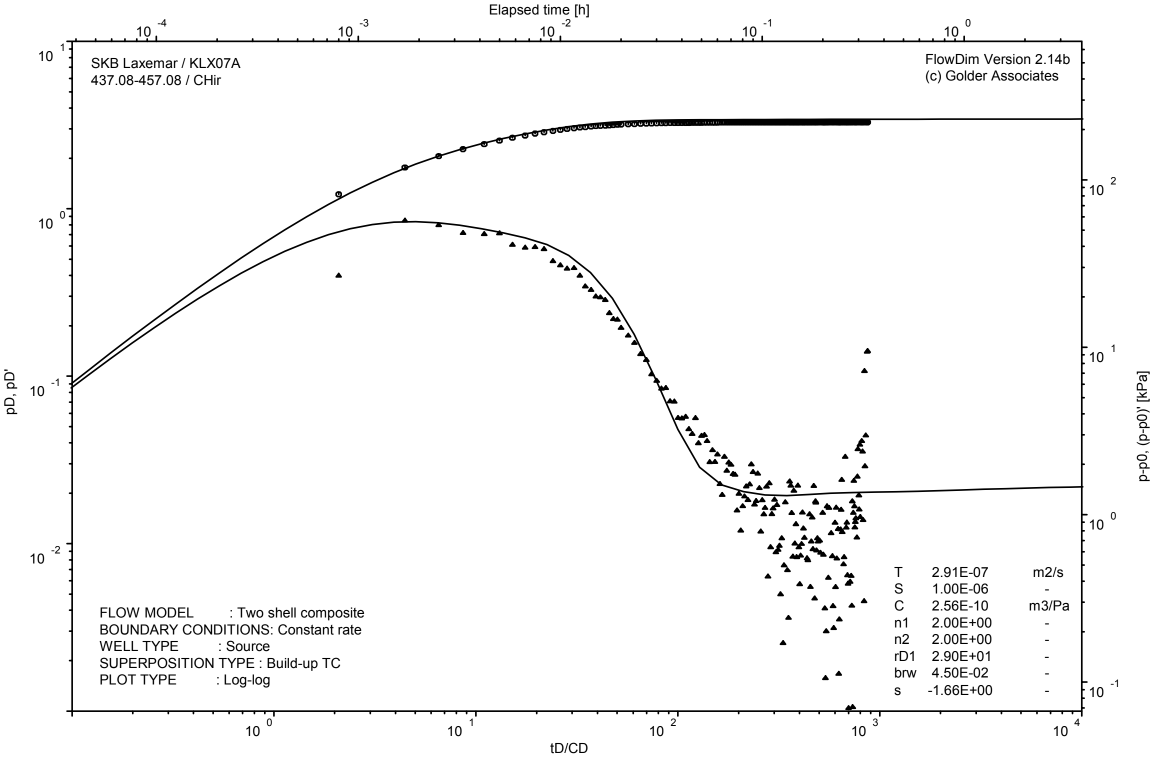
Pressure and flow rate vs. time; cartesian plot



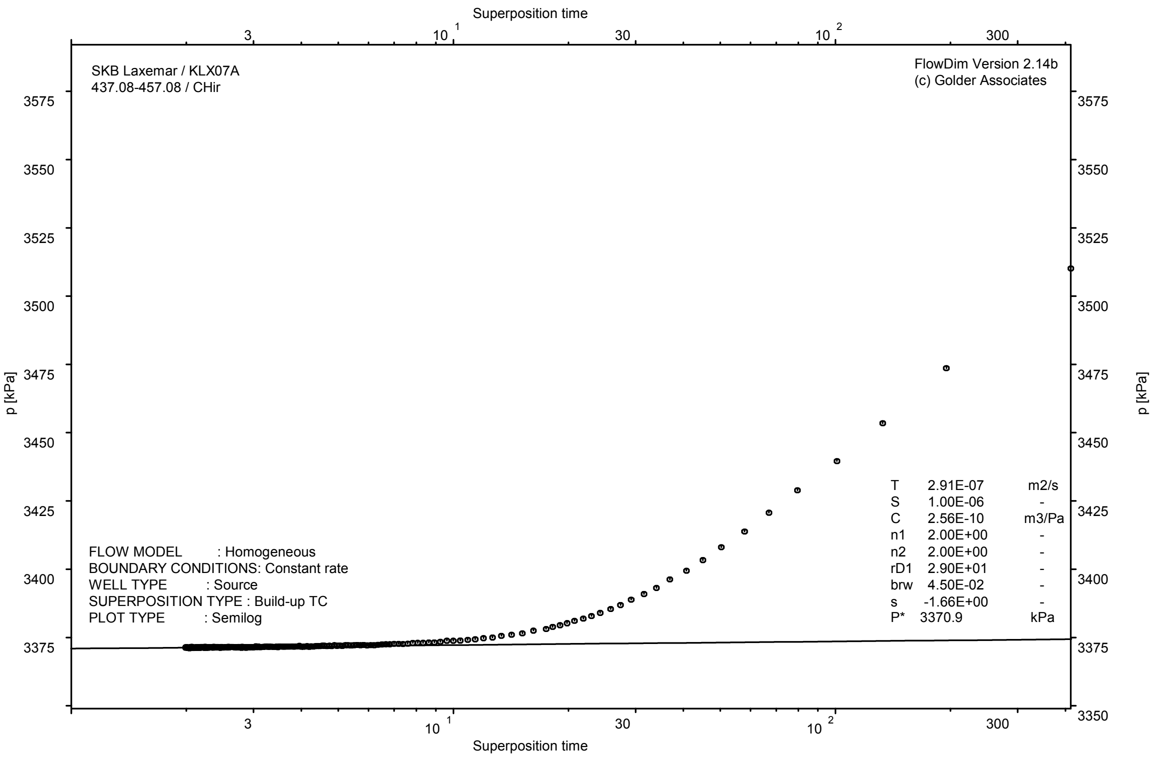
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

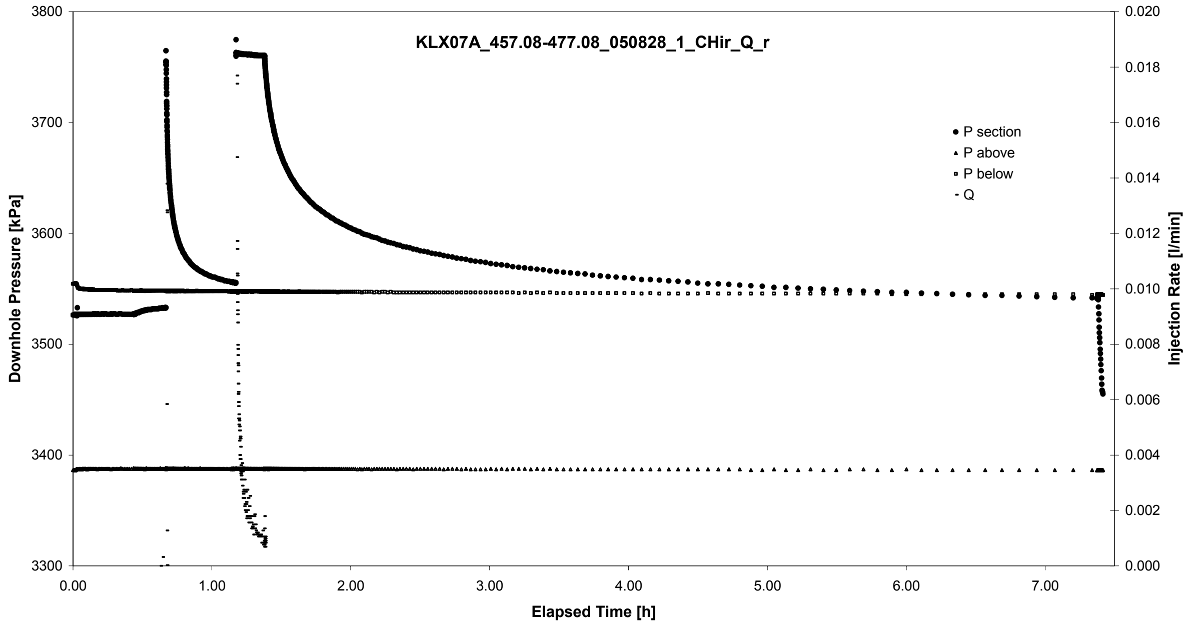


CHIR phase; HORNER match

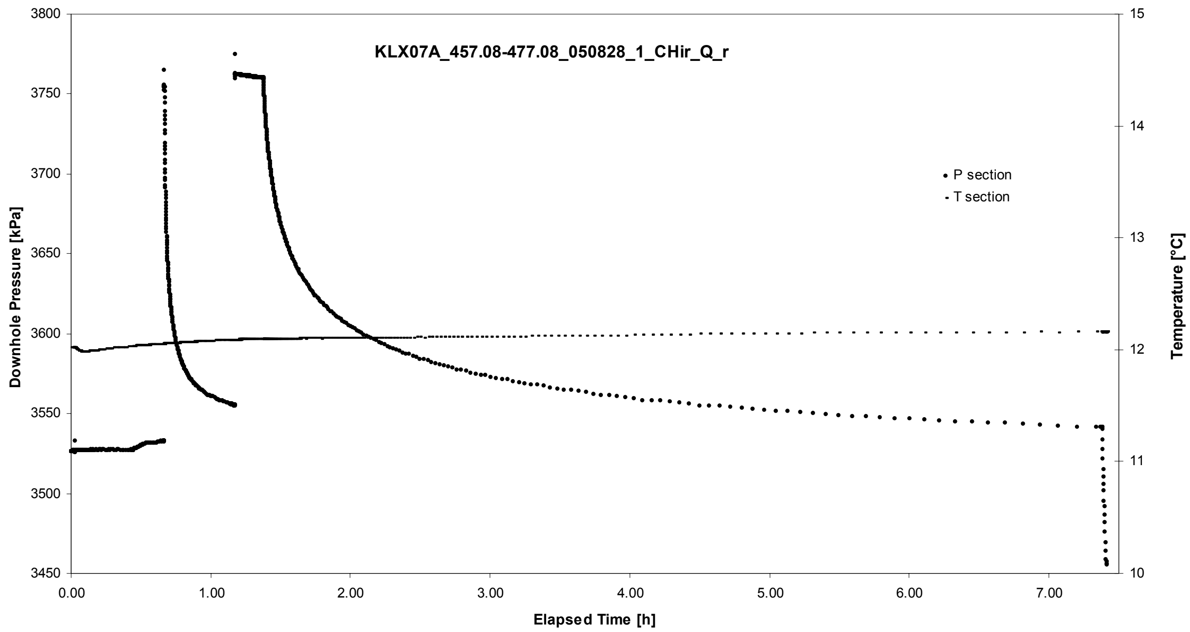
APPENDIX 2-28

Test 457.08-477.08 m

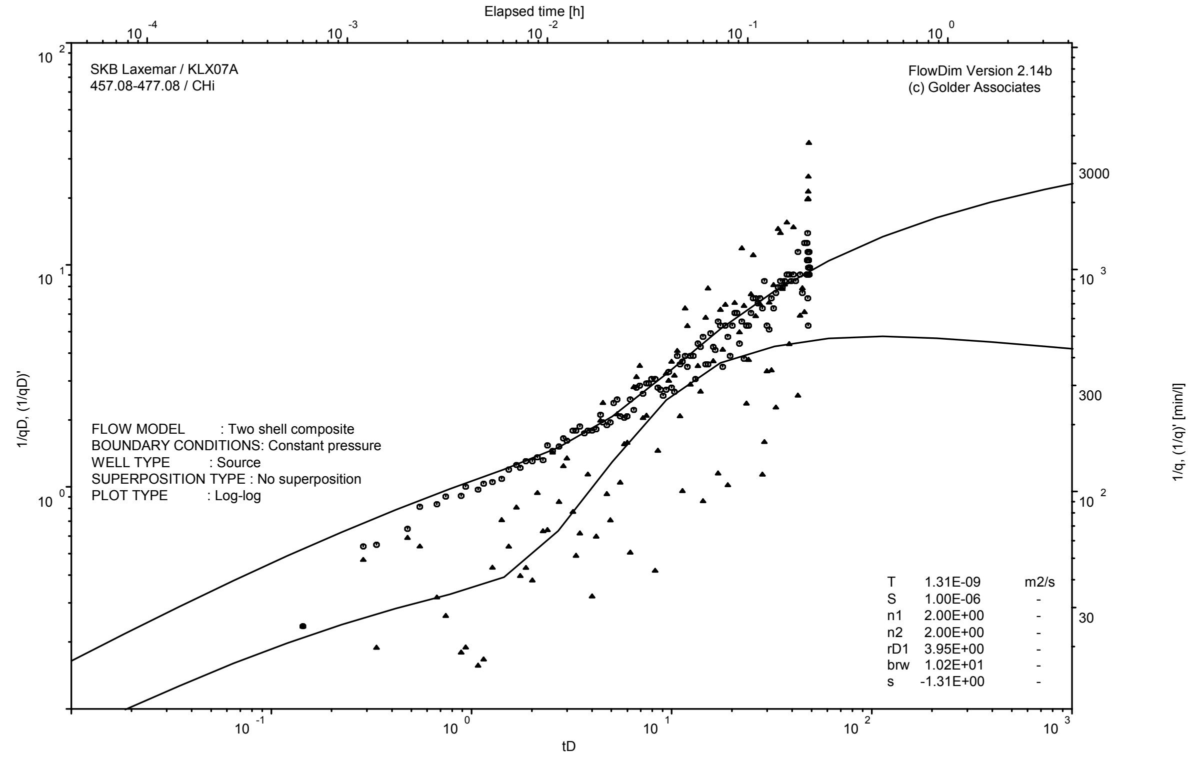
Analysis diagrams



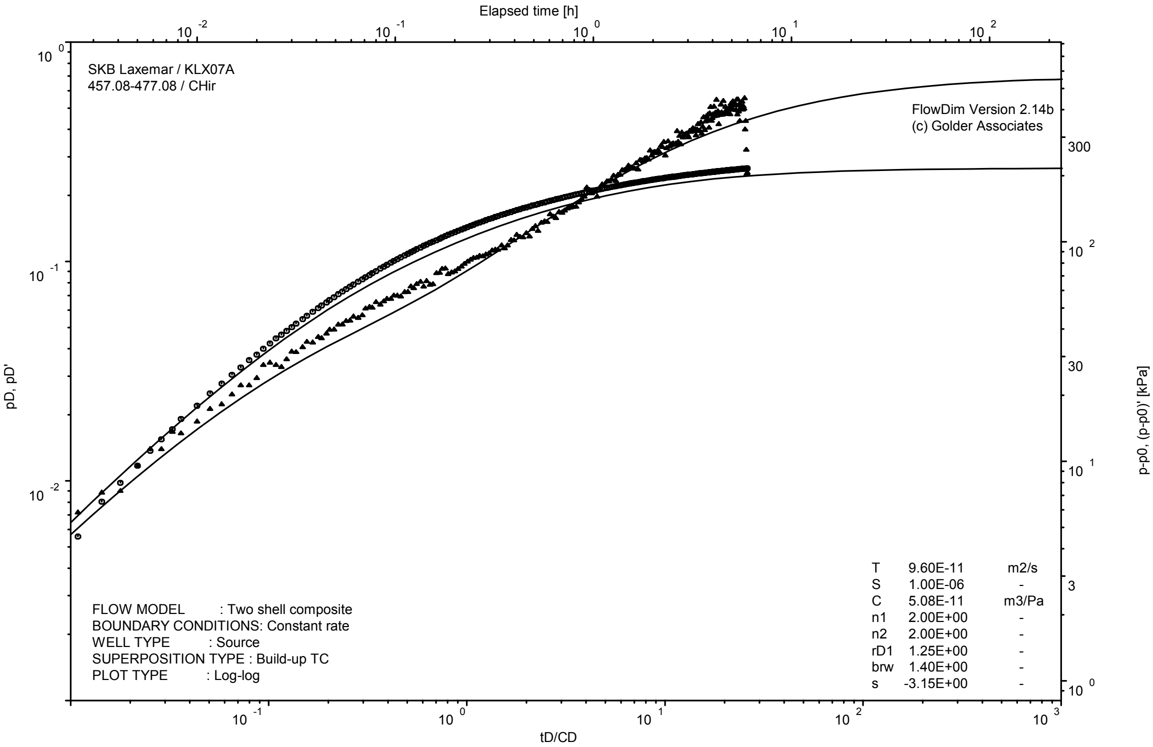
Pressure and flow rate vs. time; cartesian plot



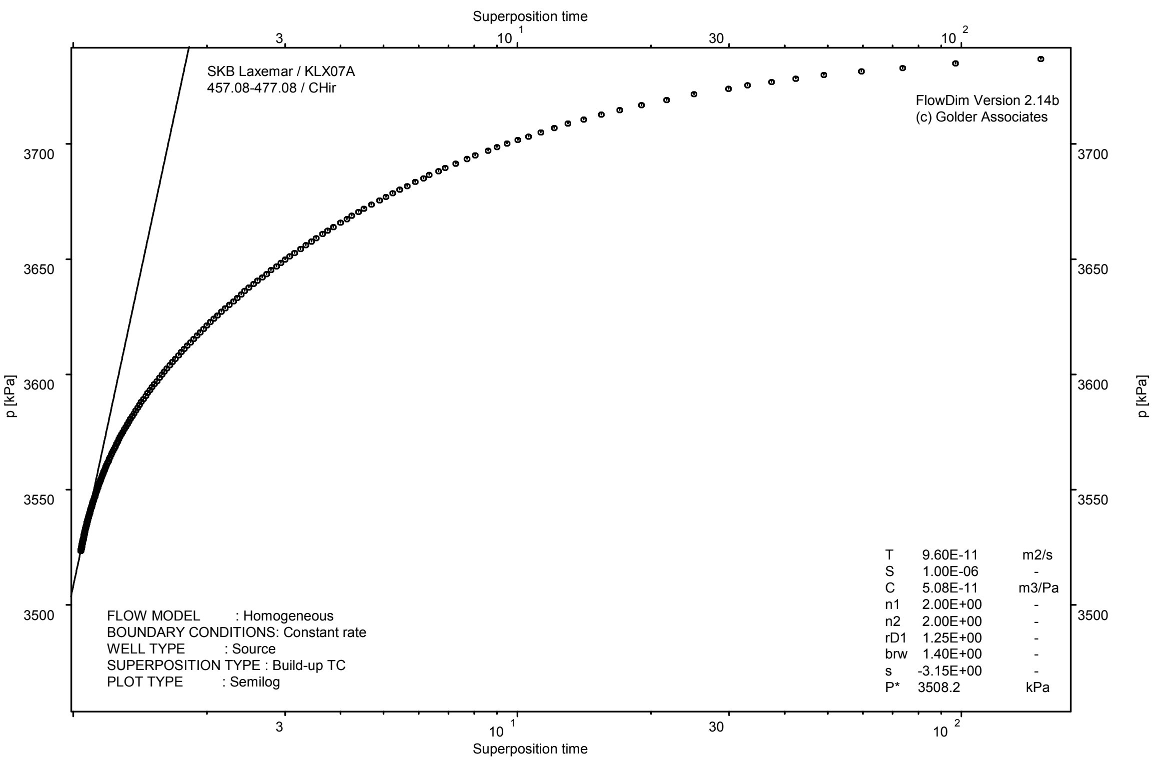
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

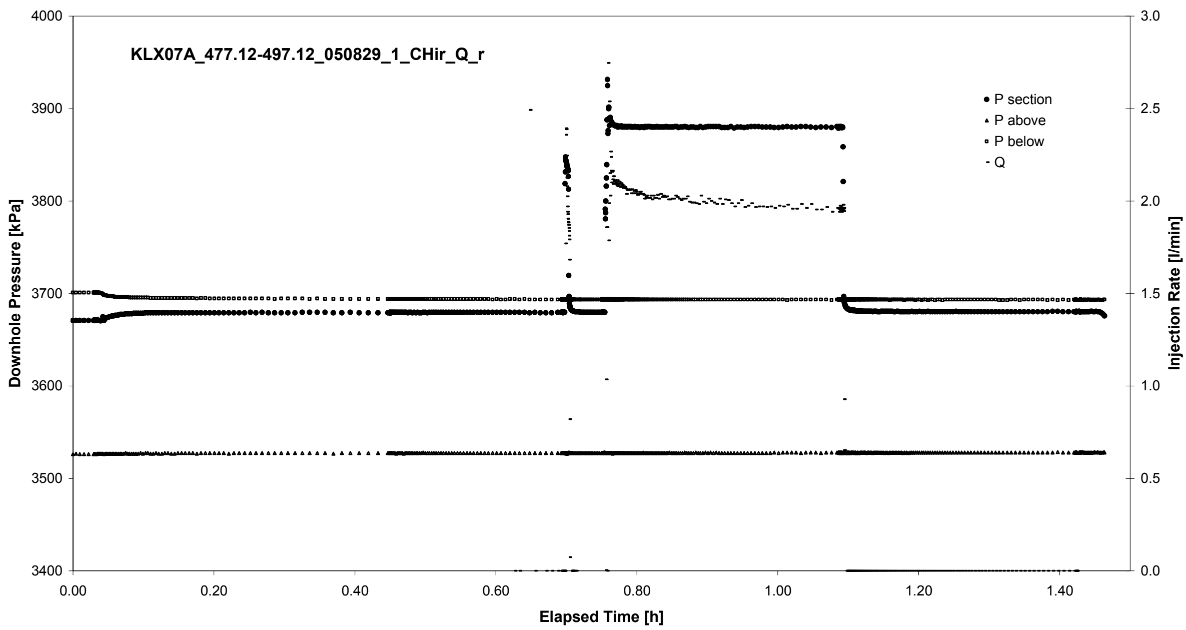


CHIR phase; HORNER match

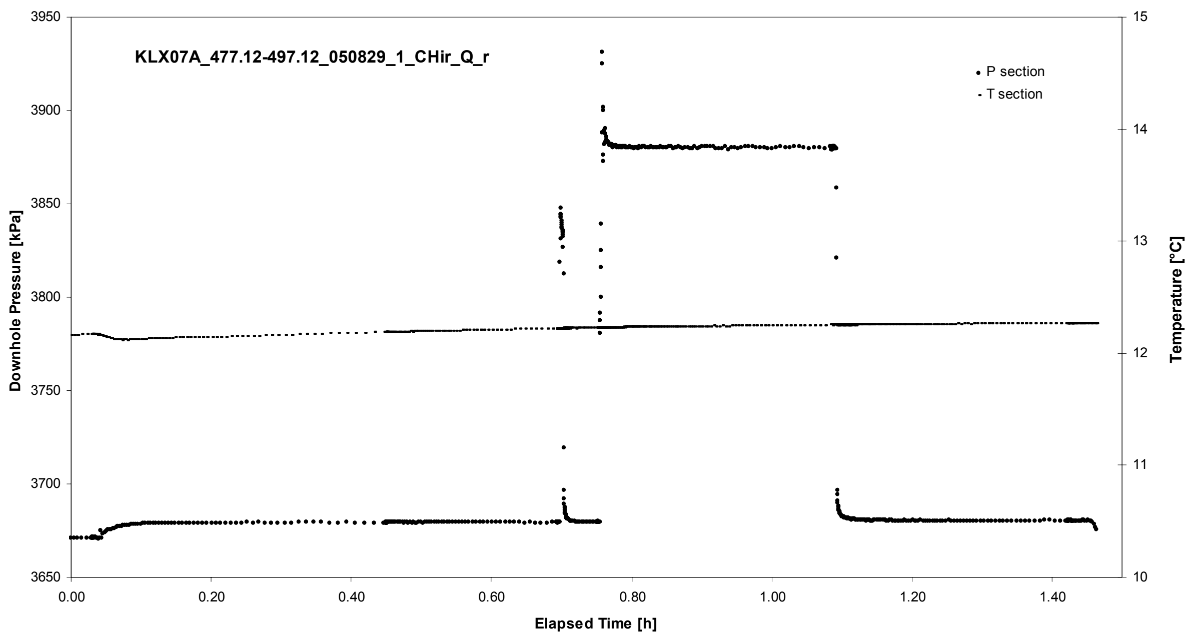
APPENDIX 2-29

Test 477.12-497.12 m

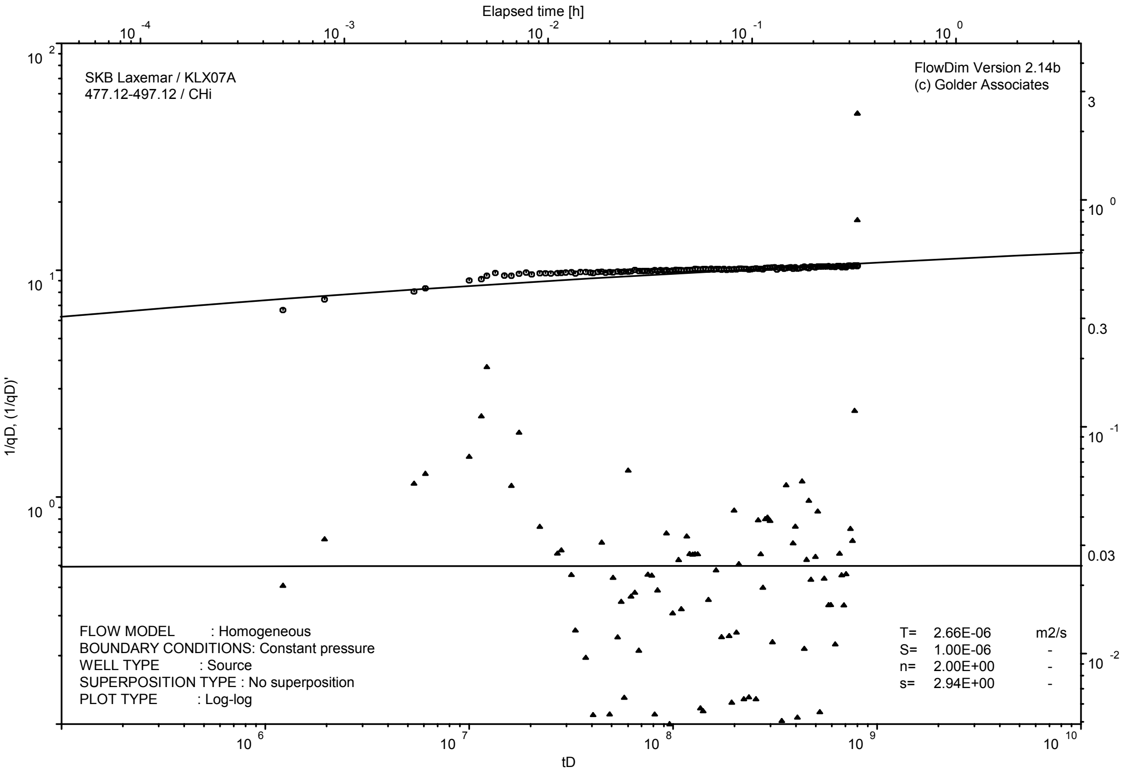
Analysis diagrams



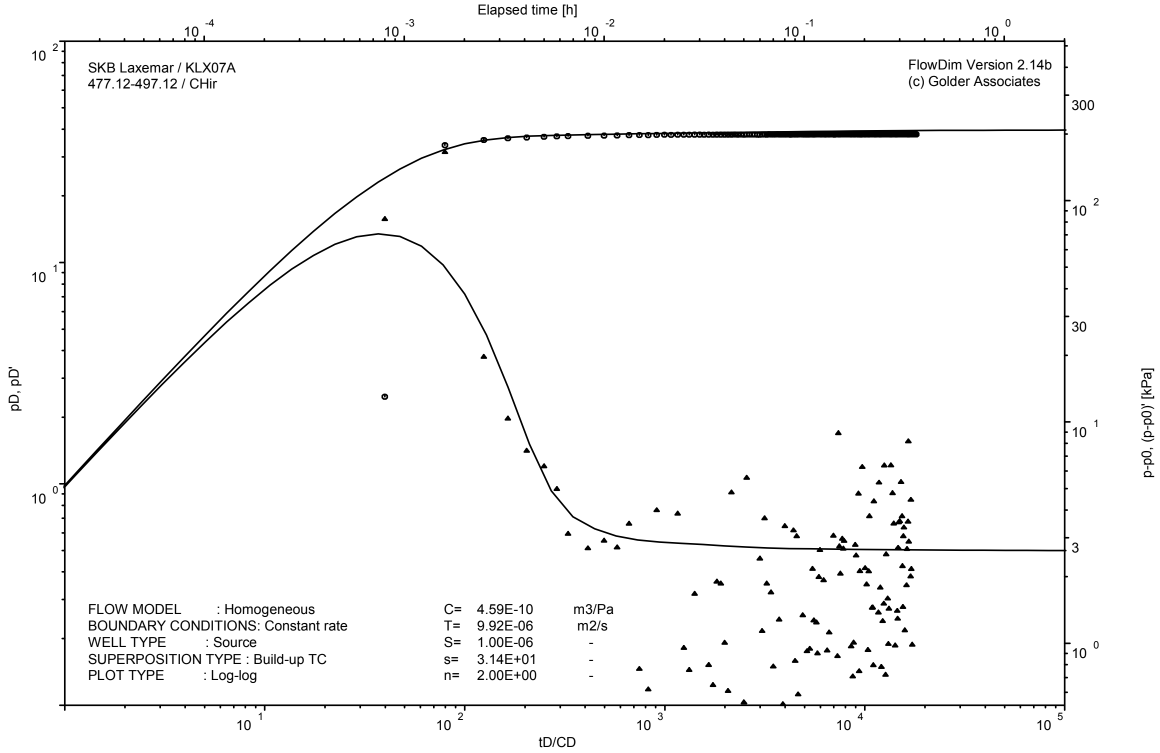
Pressure and flow rate vs. time; cartesian plot



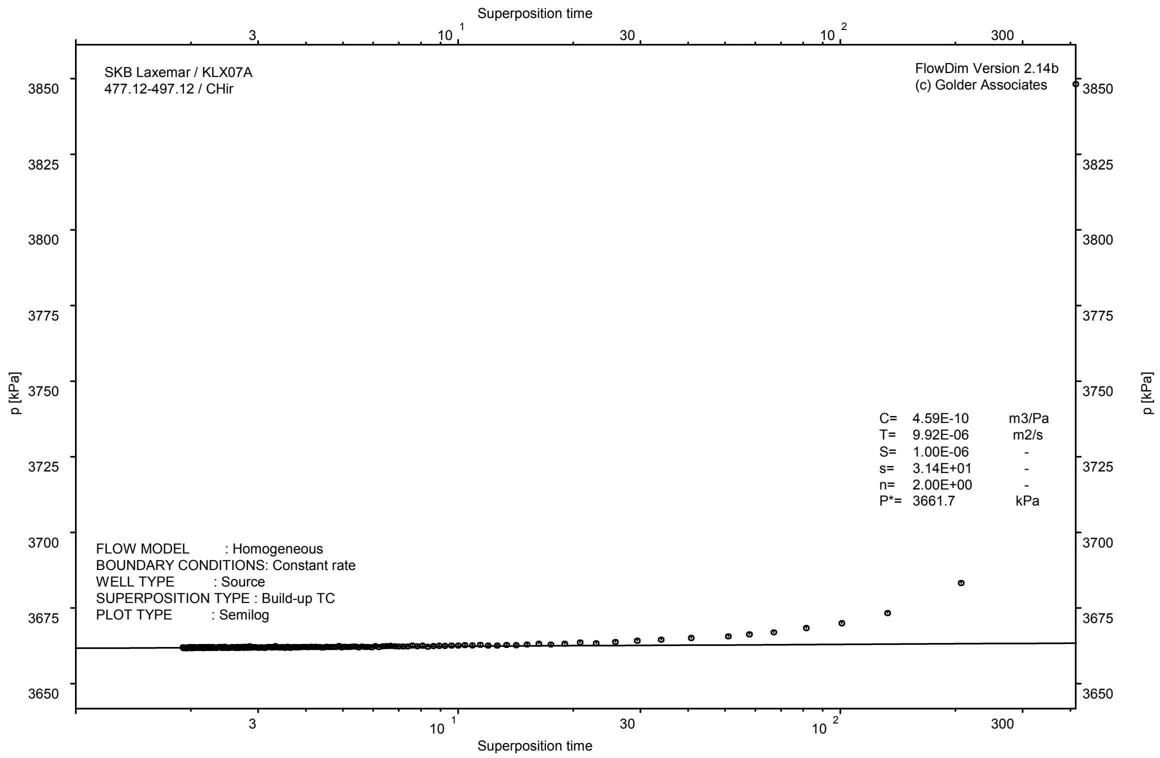
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

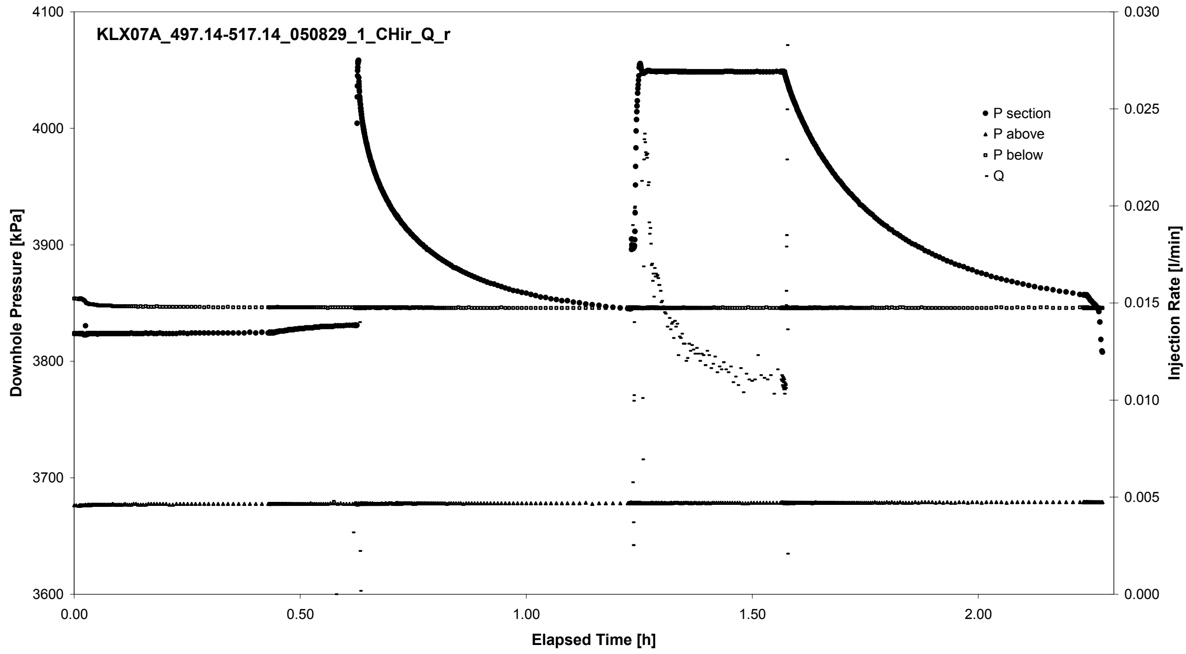


CHIR phase; HORNER match

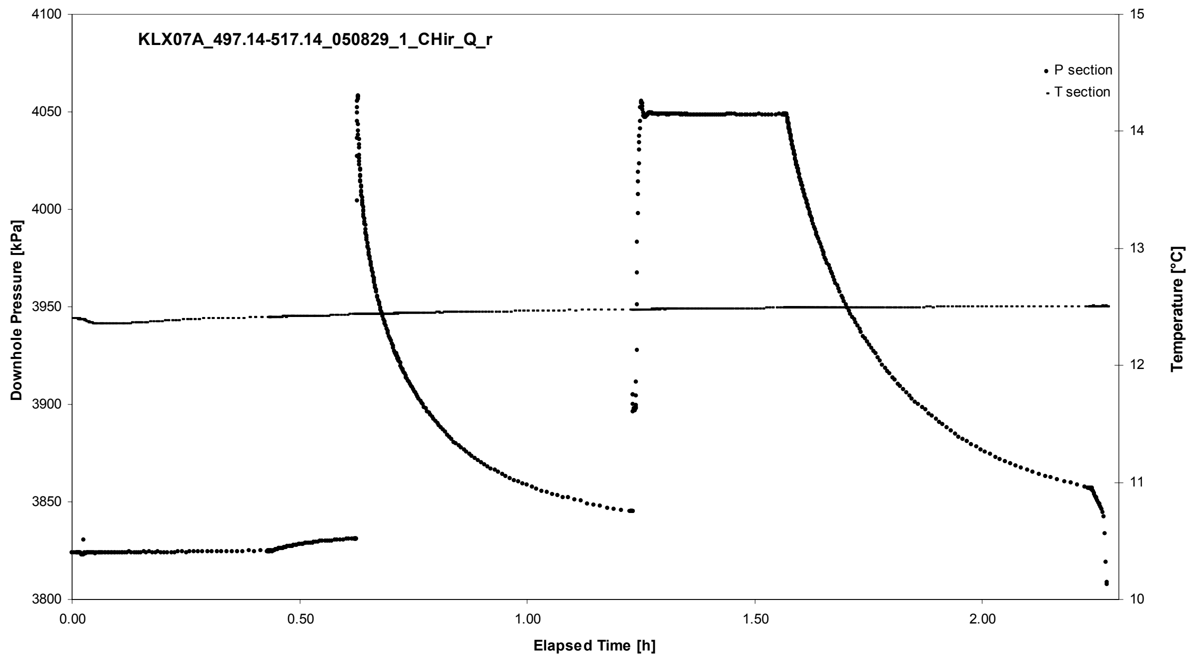
APPENDIX 2-30

Test 497.14-517.14 m

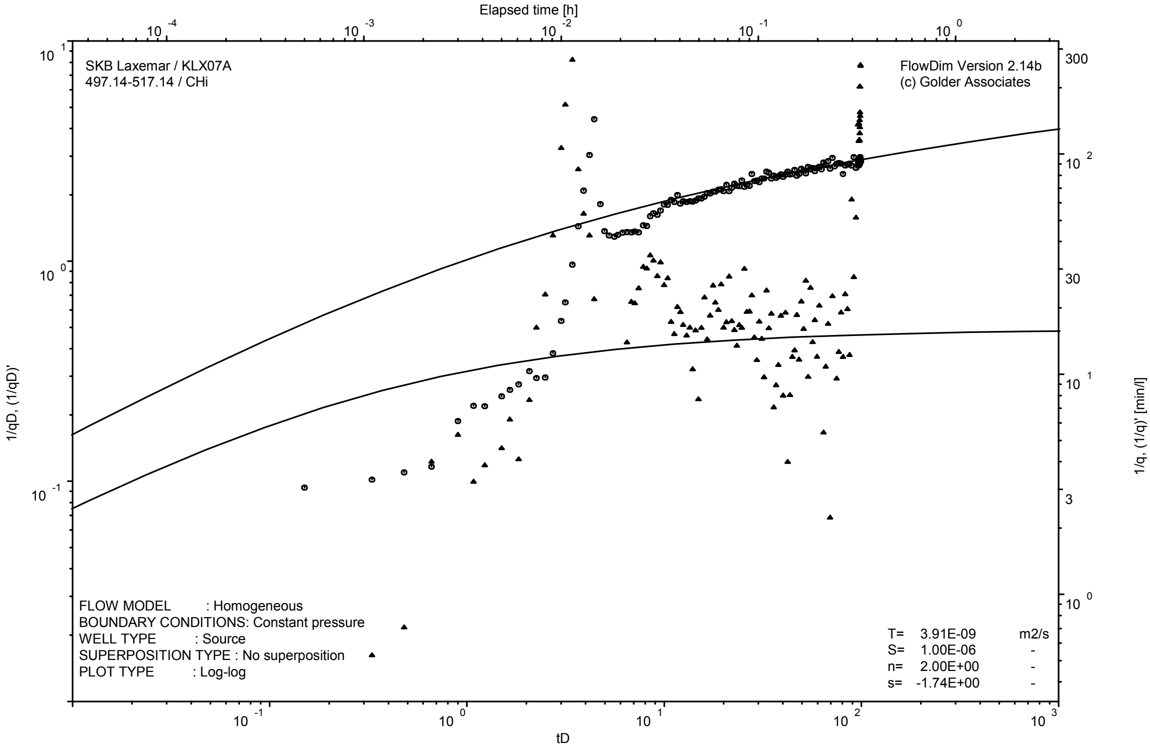
Analysis diagrams



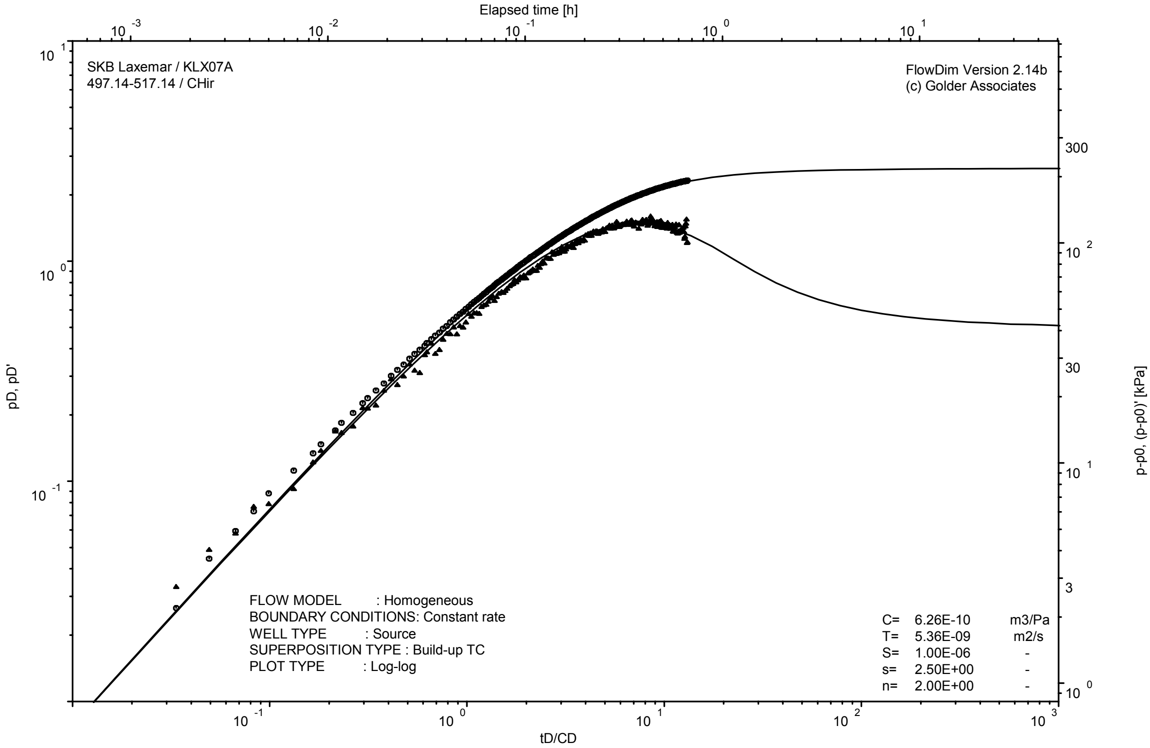
Pressure and flow rate vs. time; cartesian plot



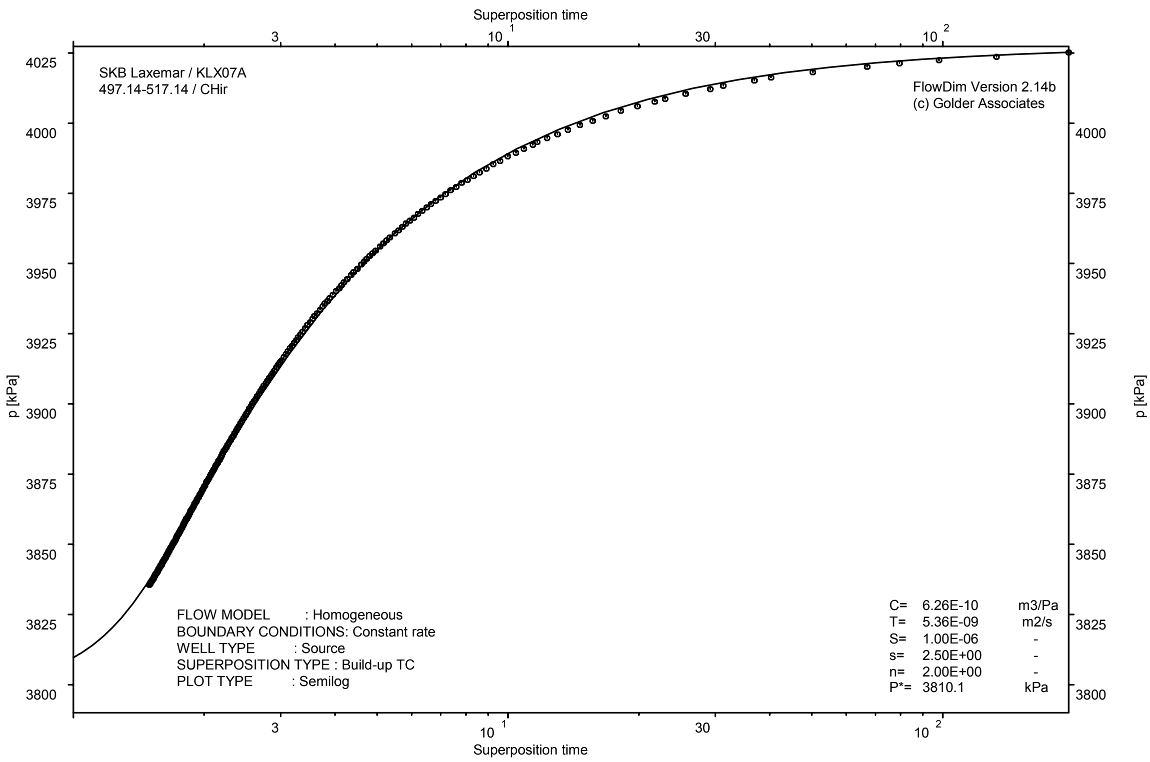
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

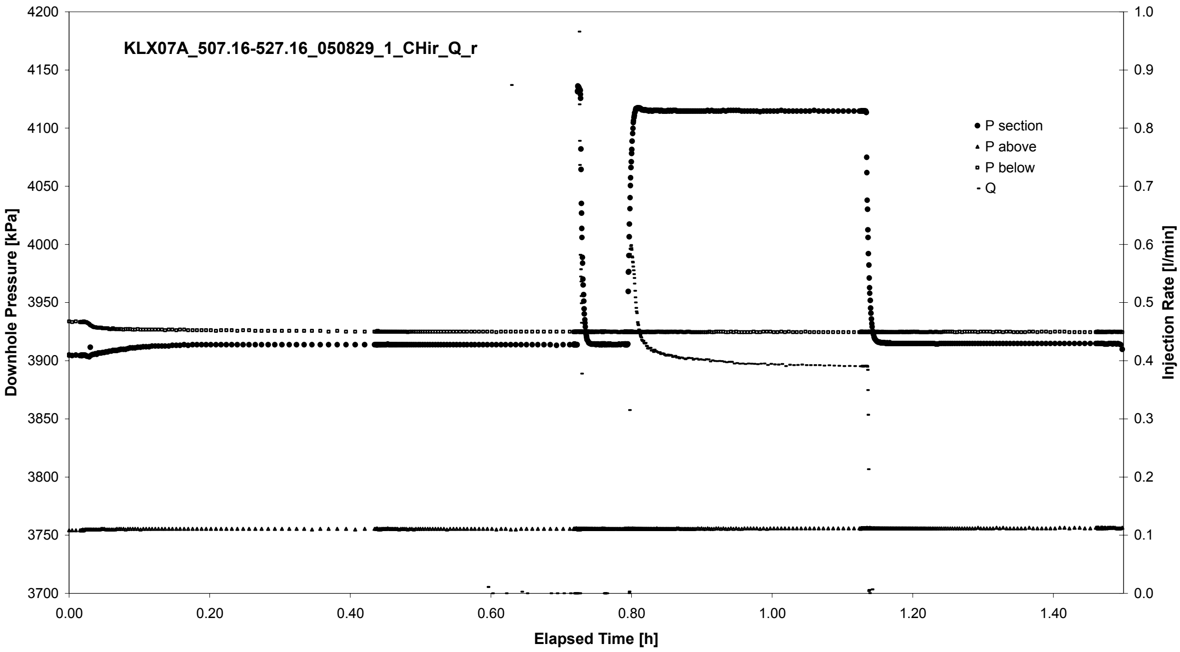


CHIR phase; HORNER match

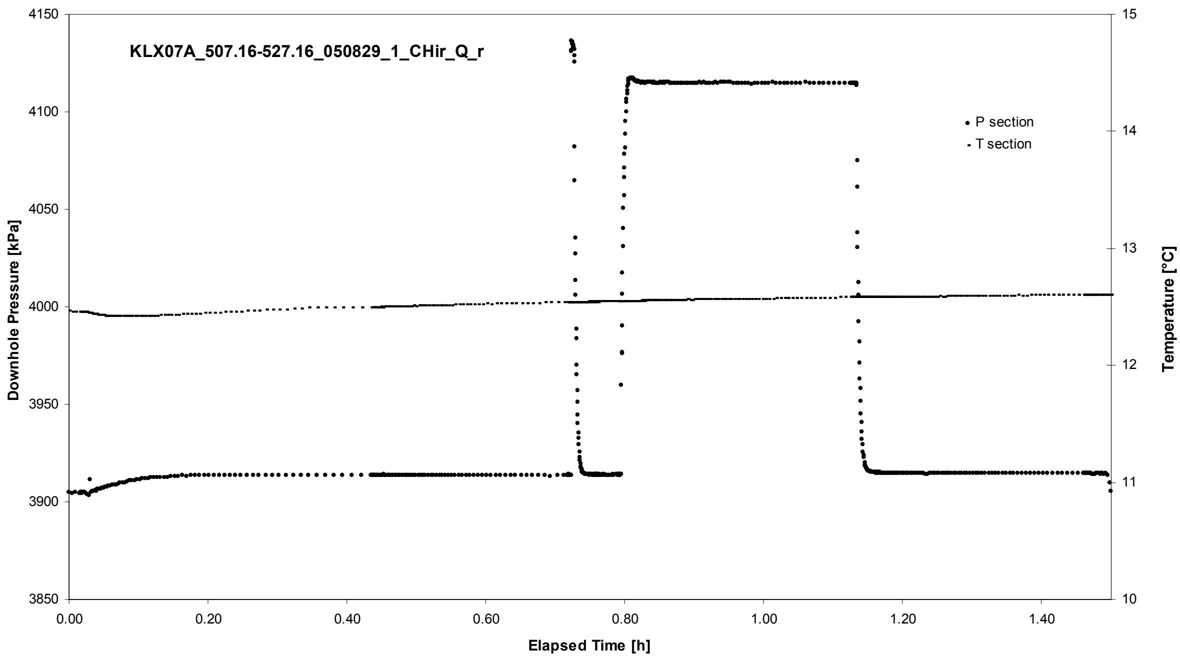
APPENDIX 2-31

Test 507.16-527.16 m

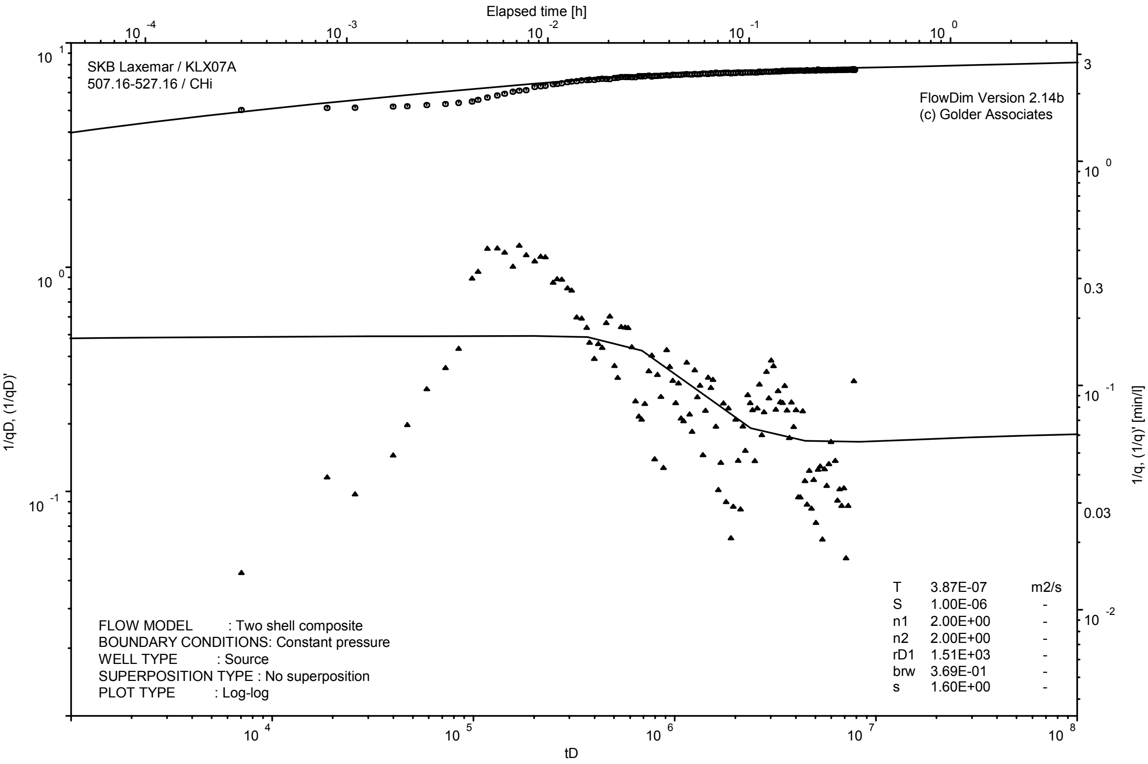
Analysis diagrams



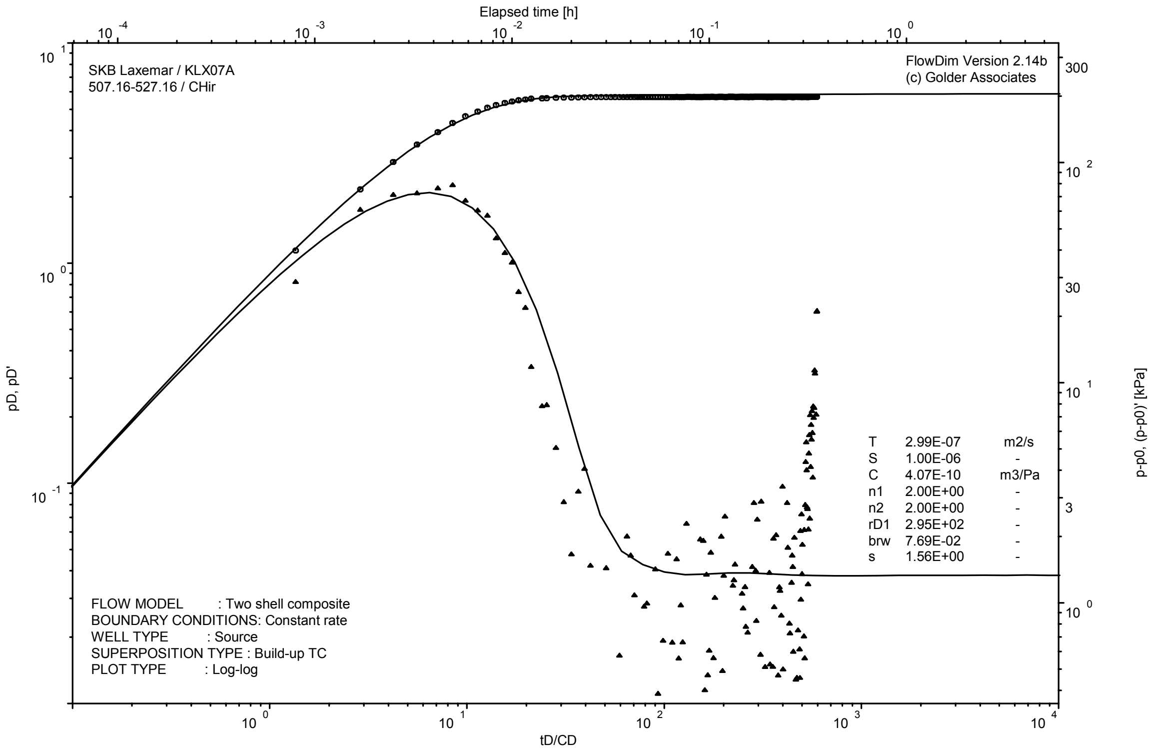
Pressure and flow rate vs. time; cartesian plot



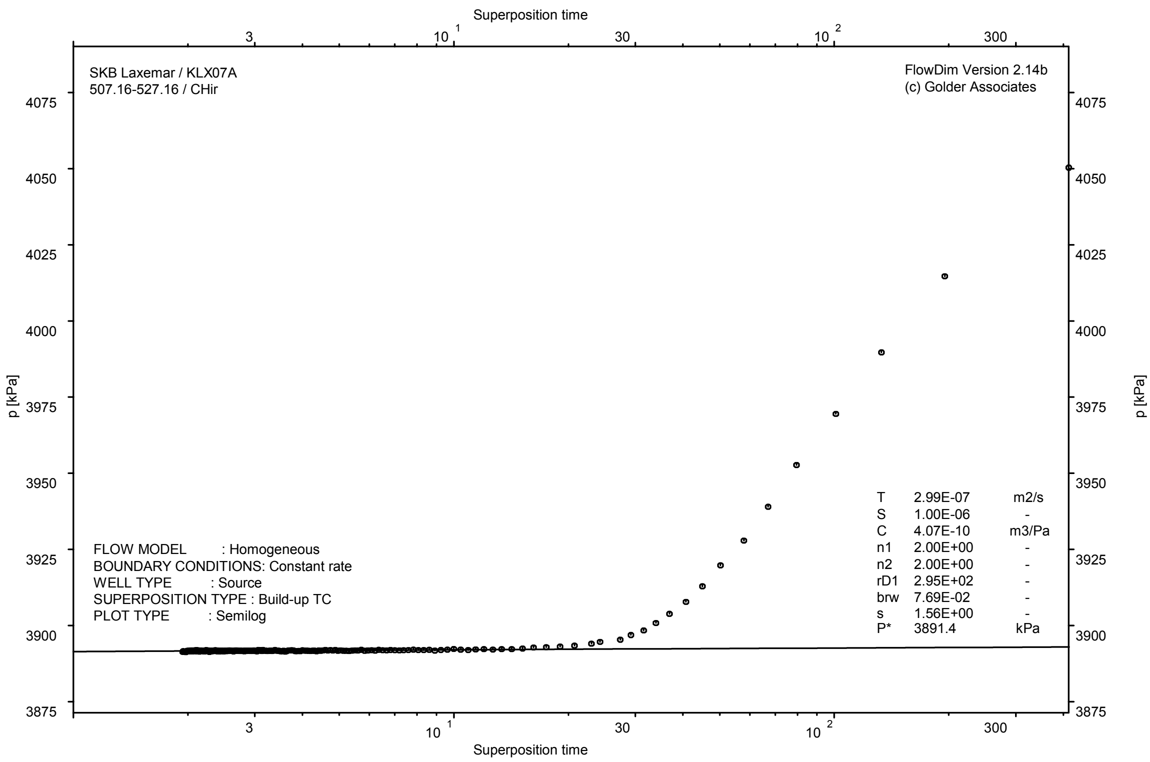
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

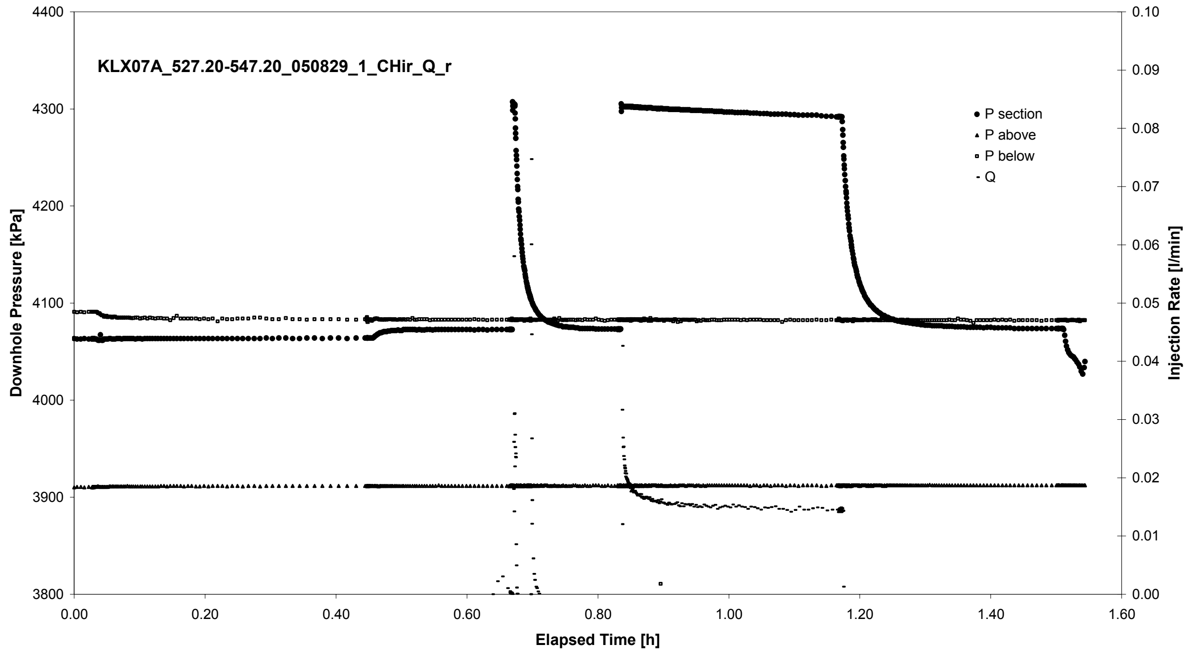


CHIR phase; HORNER match

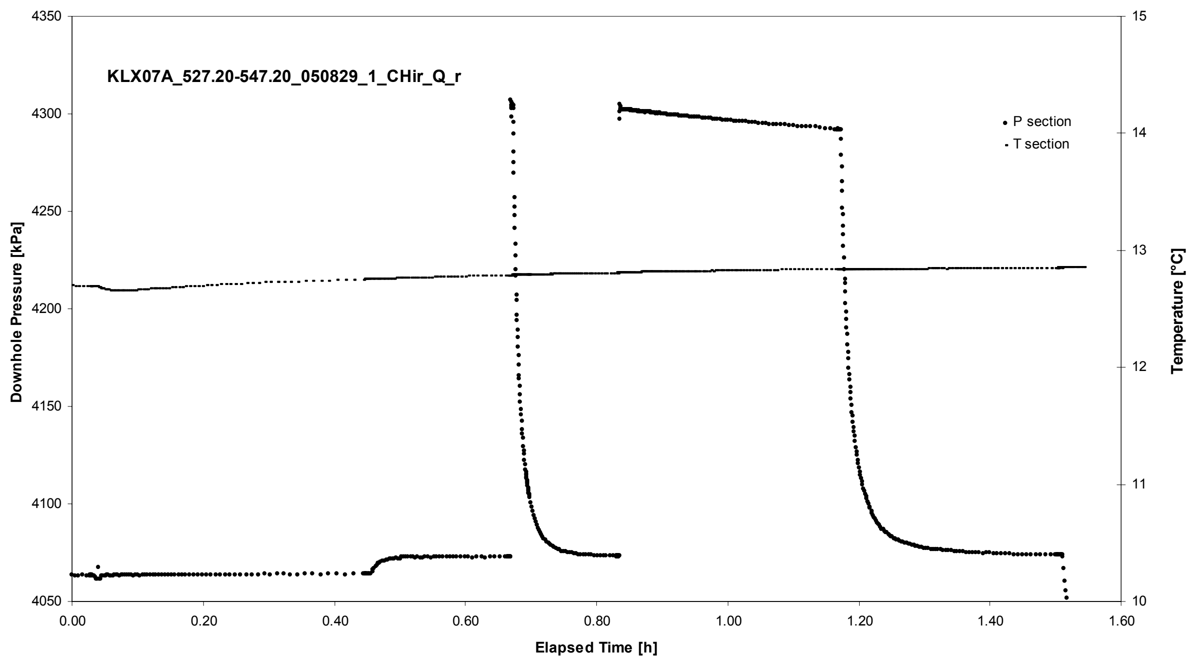
APPENDIX 2-32

Test 527.20-547.20 m

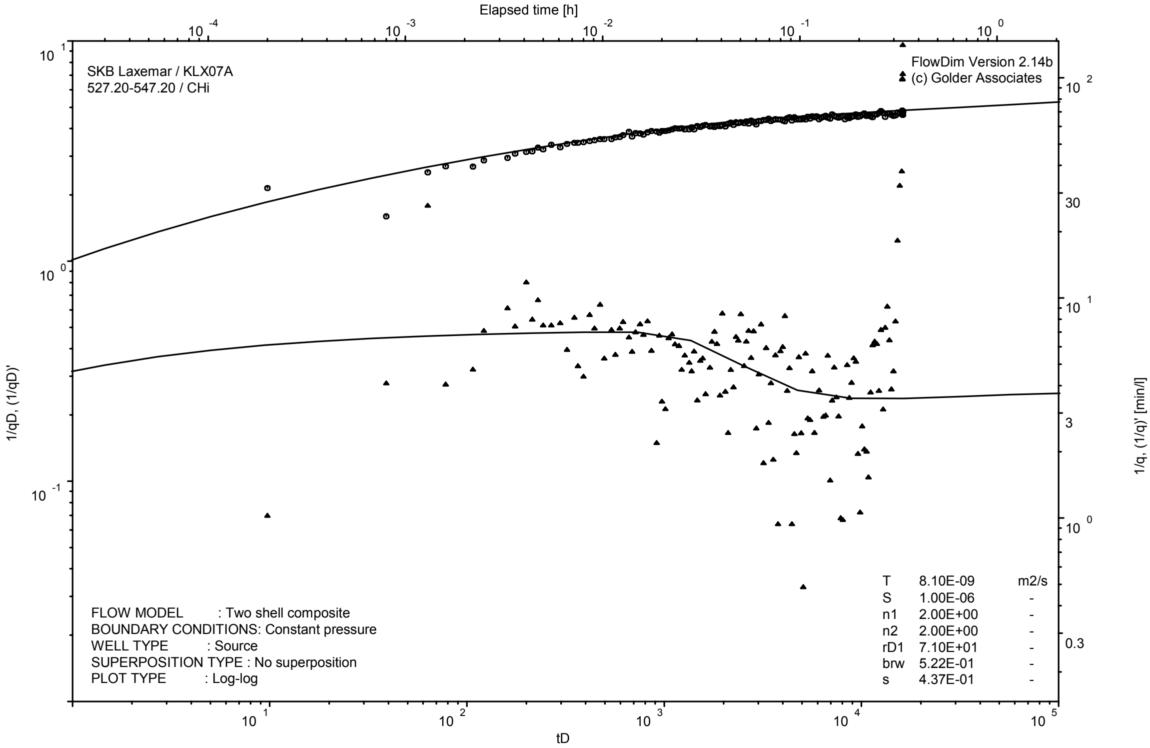
Analysis diagrams



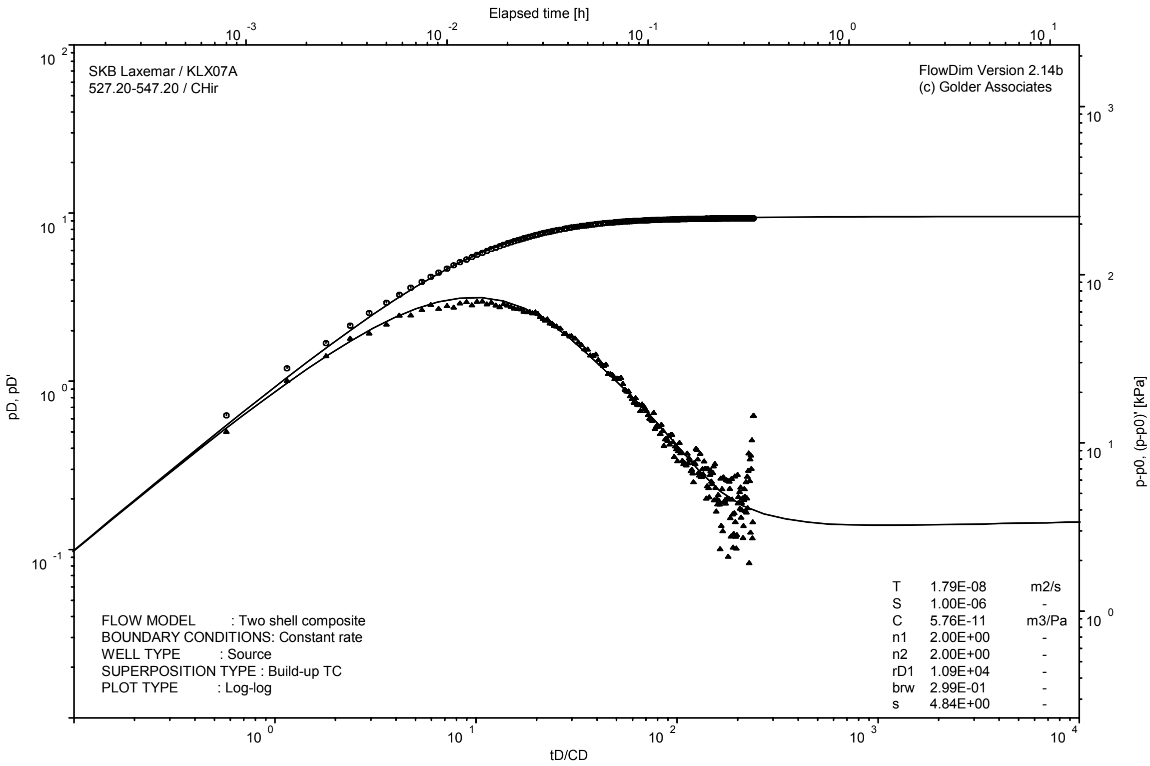
Pressure and flow rate vs. time; cartesian plot



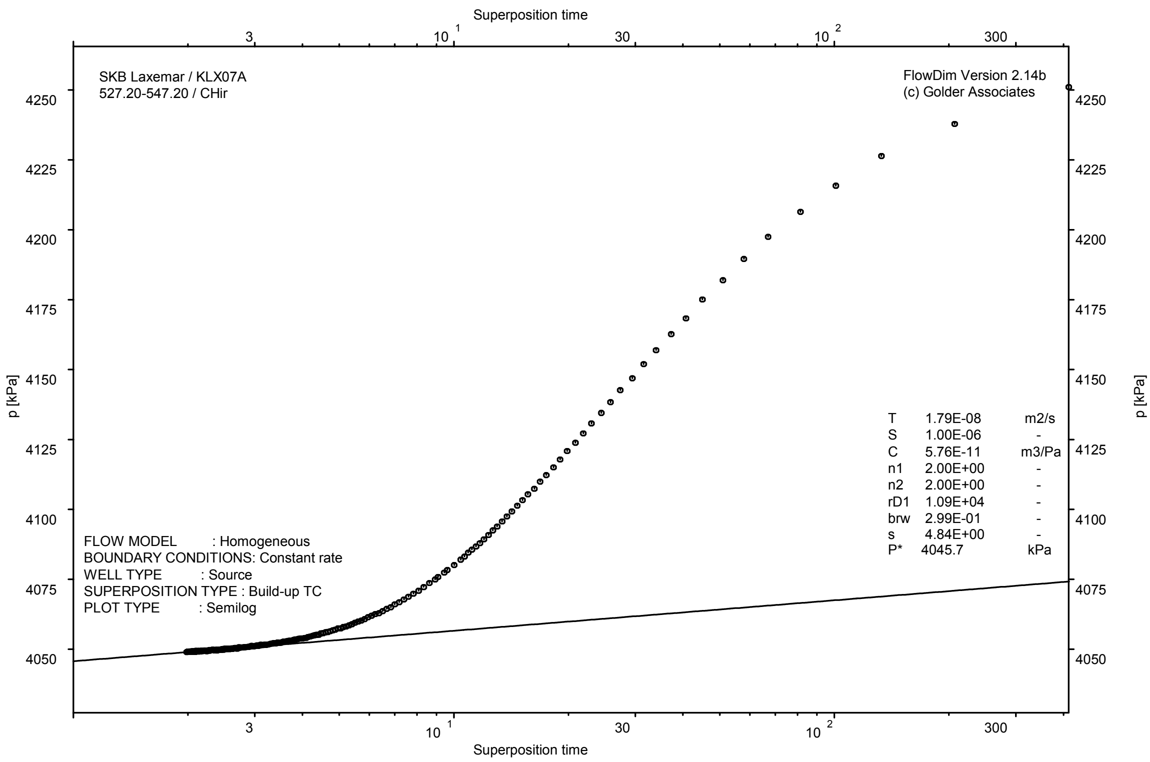
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

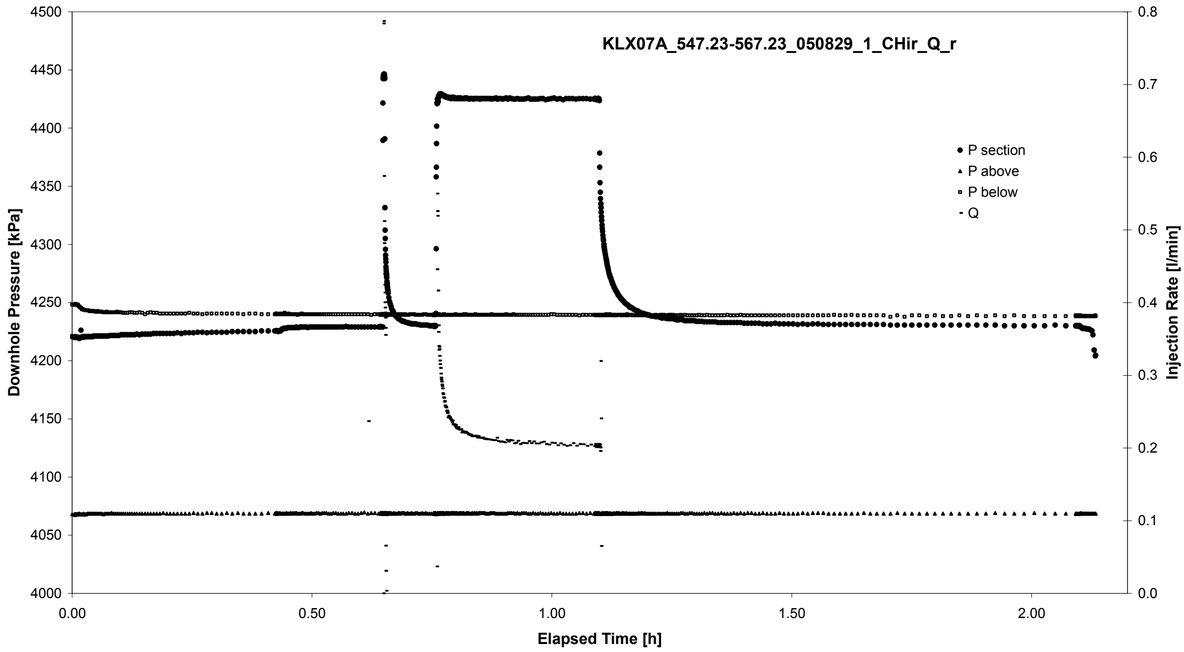


CHIR phase; HORNER match

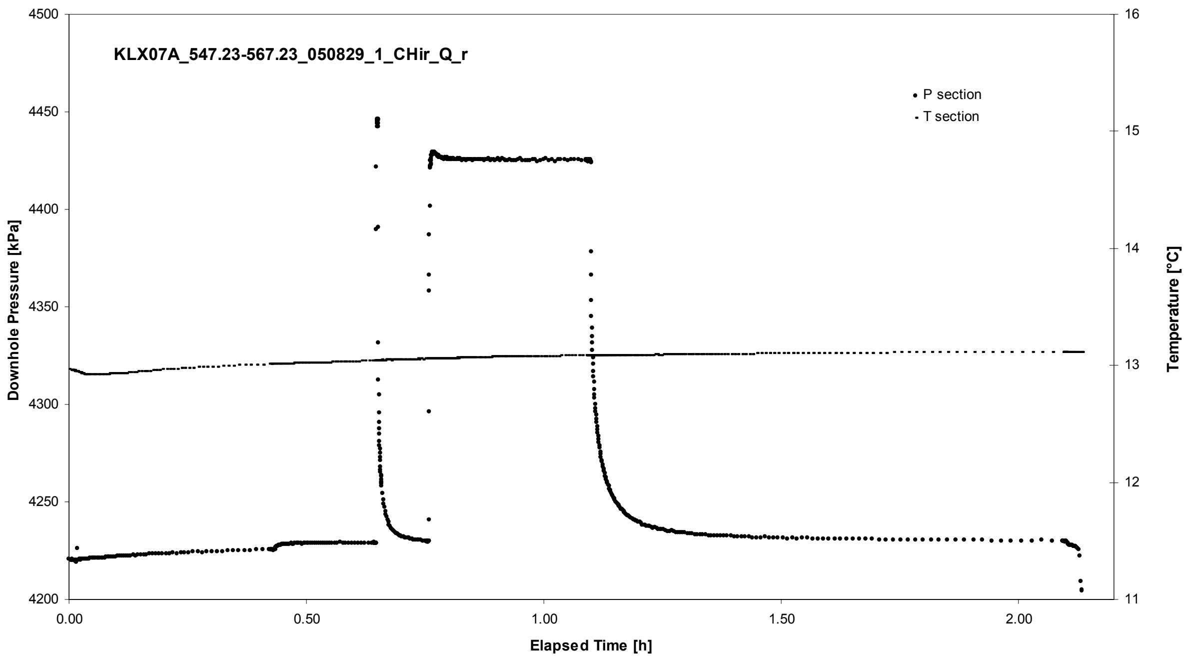
APPENDIX 2-33

Test 547.23-567.23 m

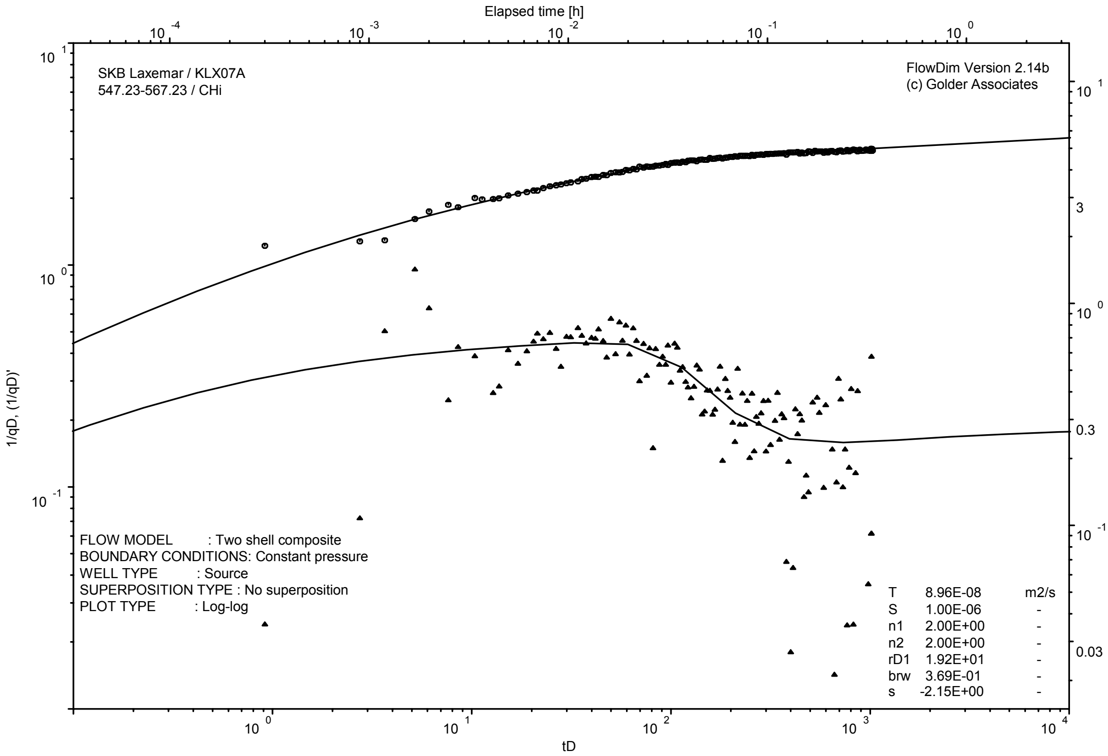
Analysis diagrams



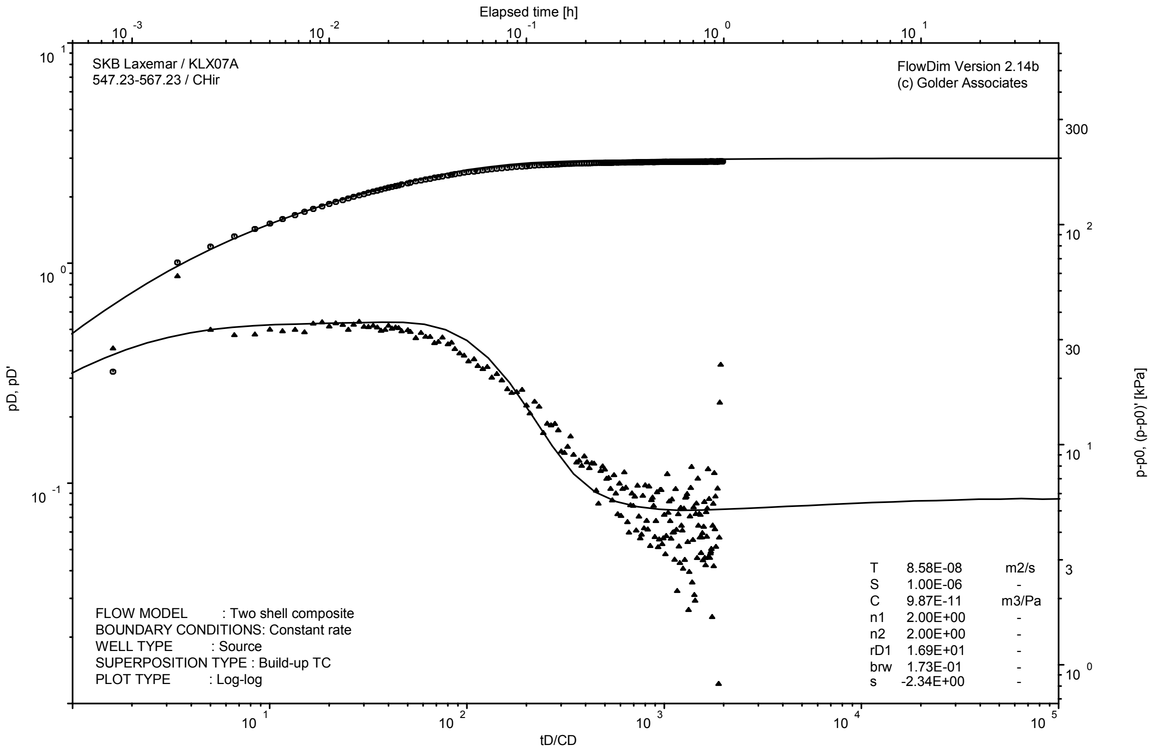
Pressure and flow rate vs. time; cartesian plot



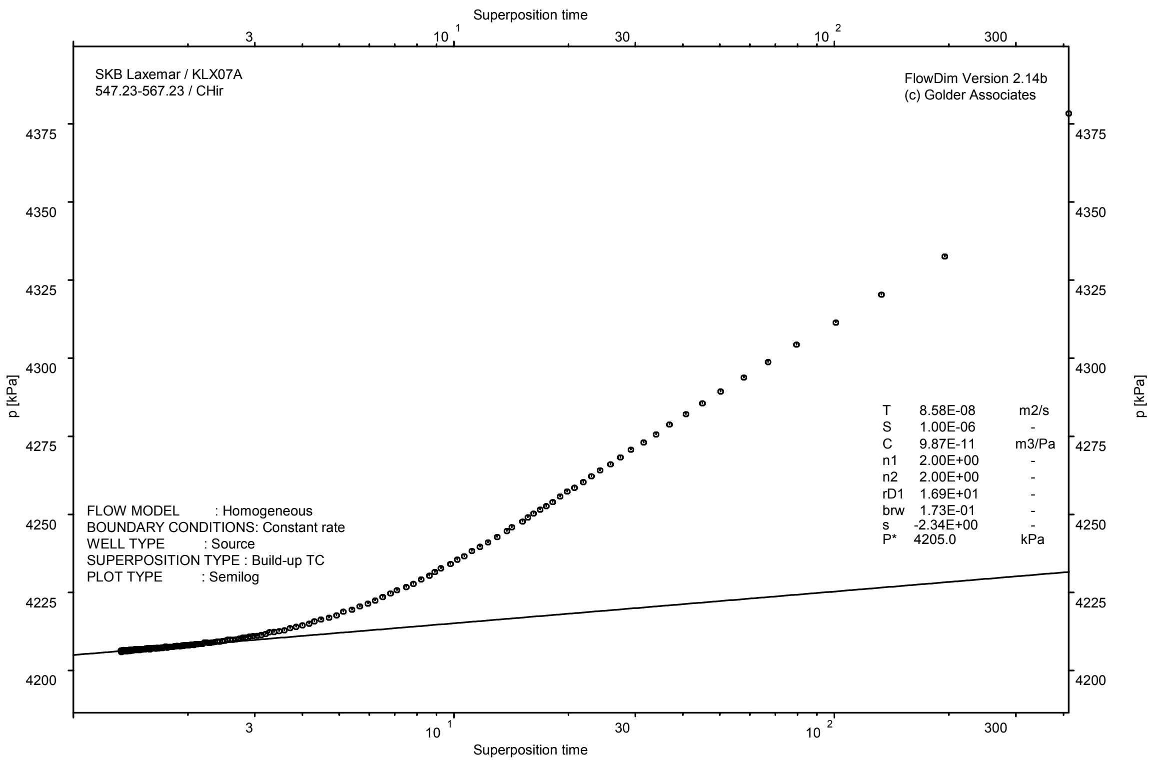
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

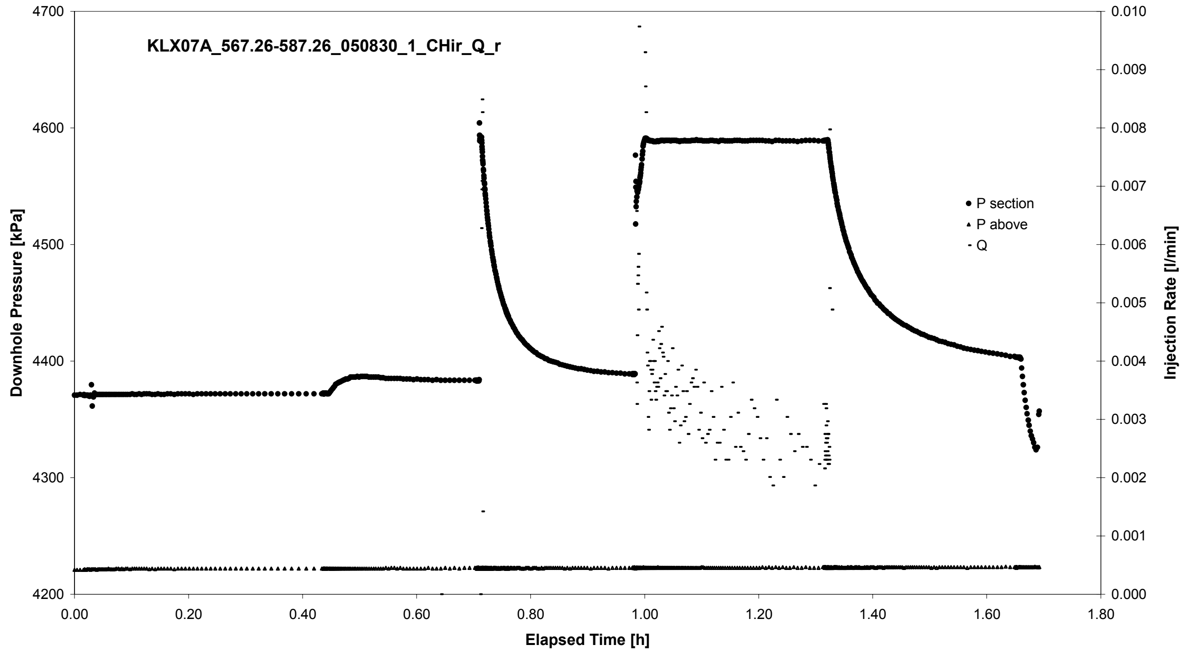


CHIR phase; HORNER match

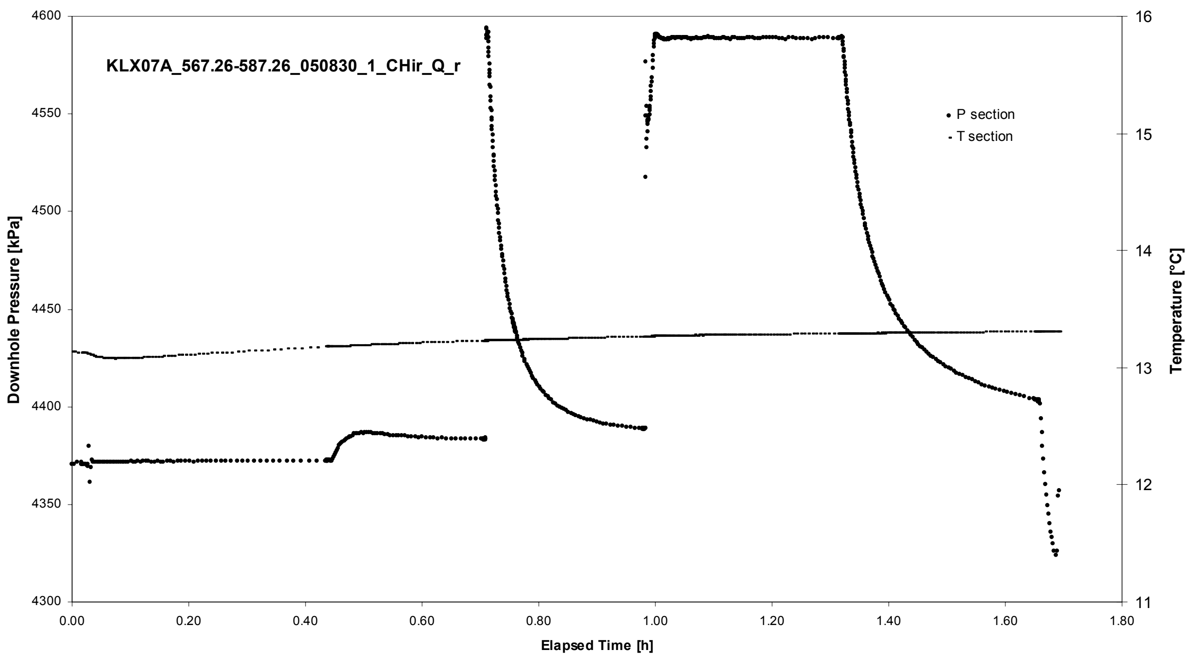
APPENDIX 2-34

Test 567.26-587.26 m

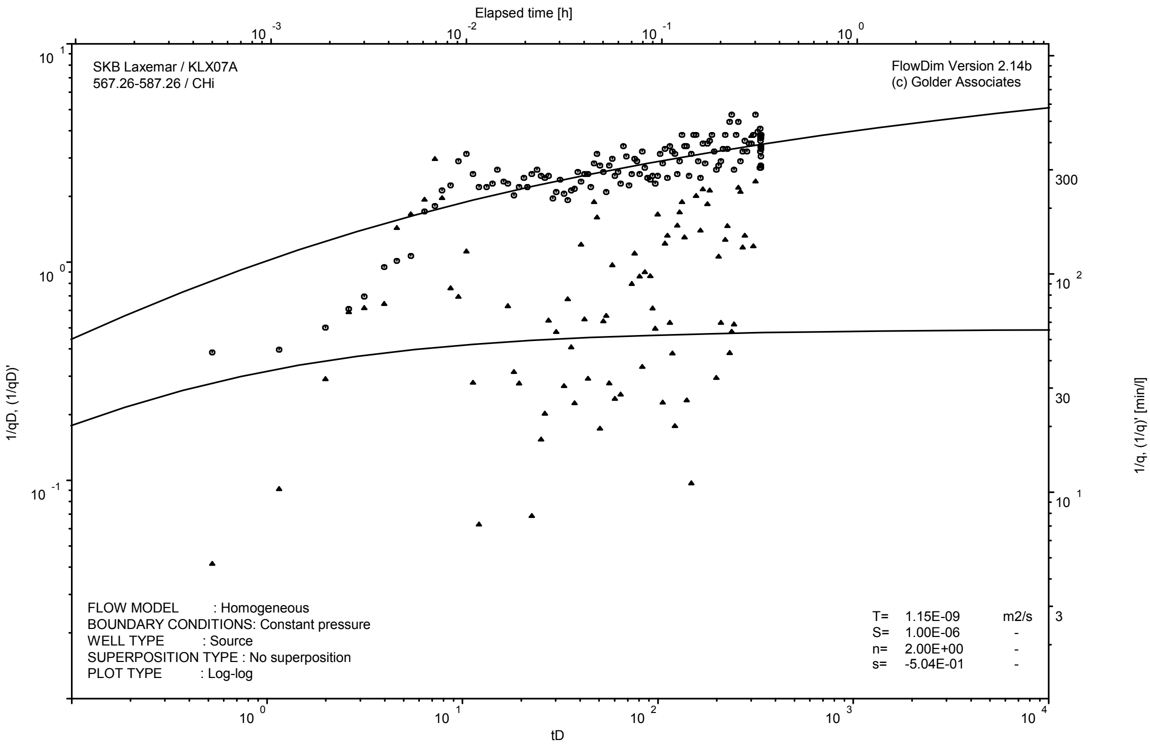
Analysis diagrams



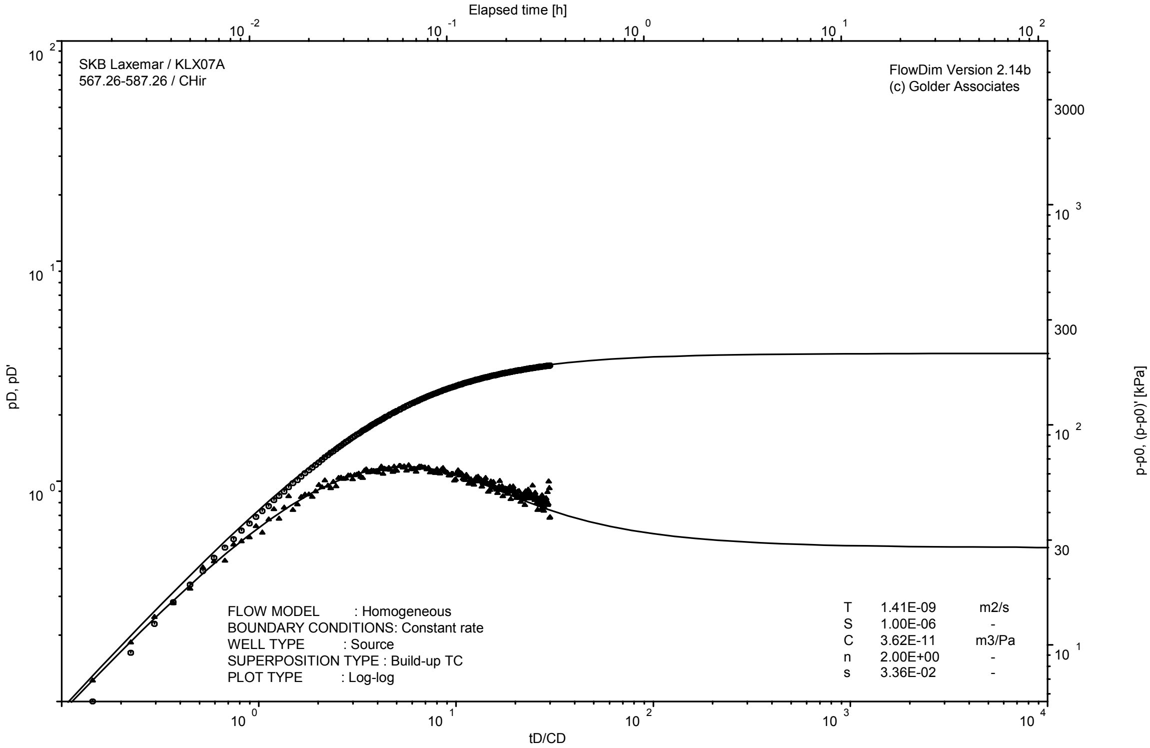
Pressure and flow rate vs. time; cartesian plot



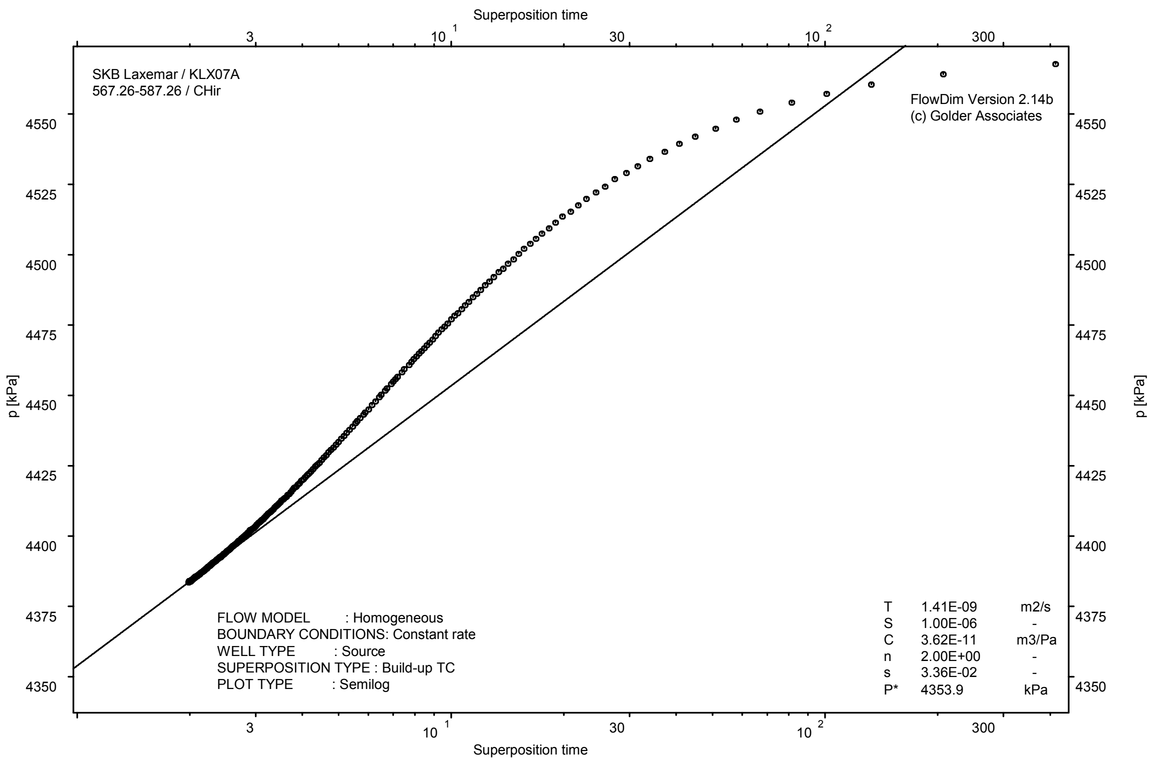
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

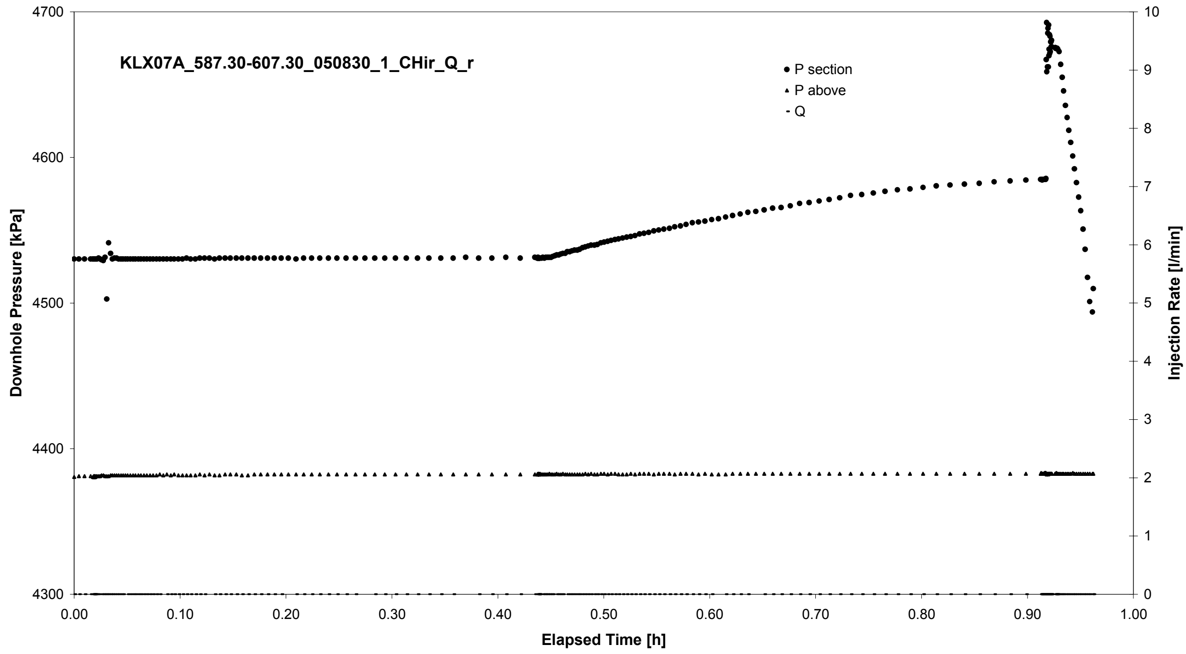


CHIR phase; HORNER match

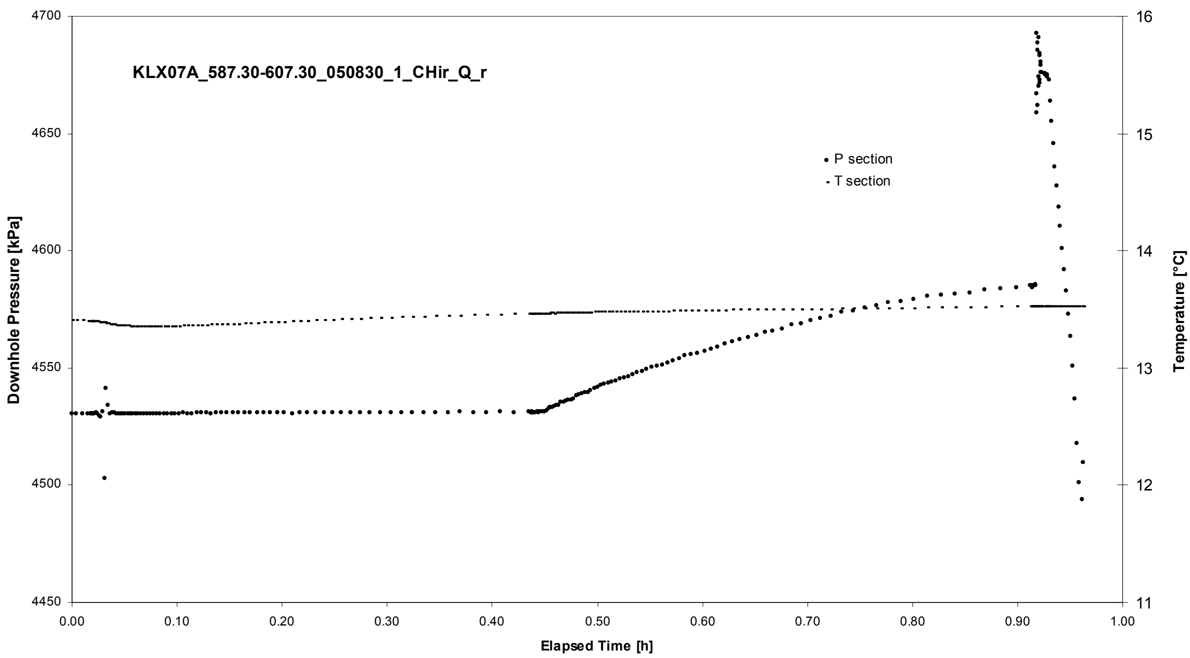
APPENDIX 2-35

Test 587.30-607.30 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

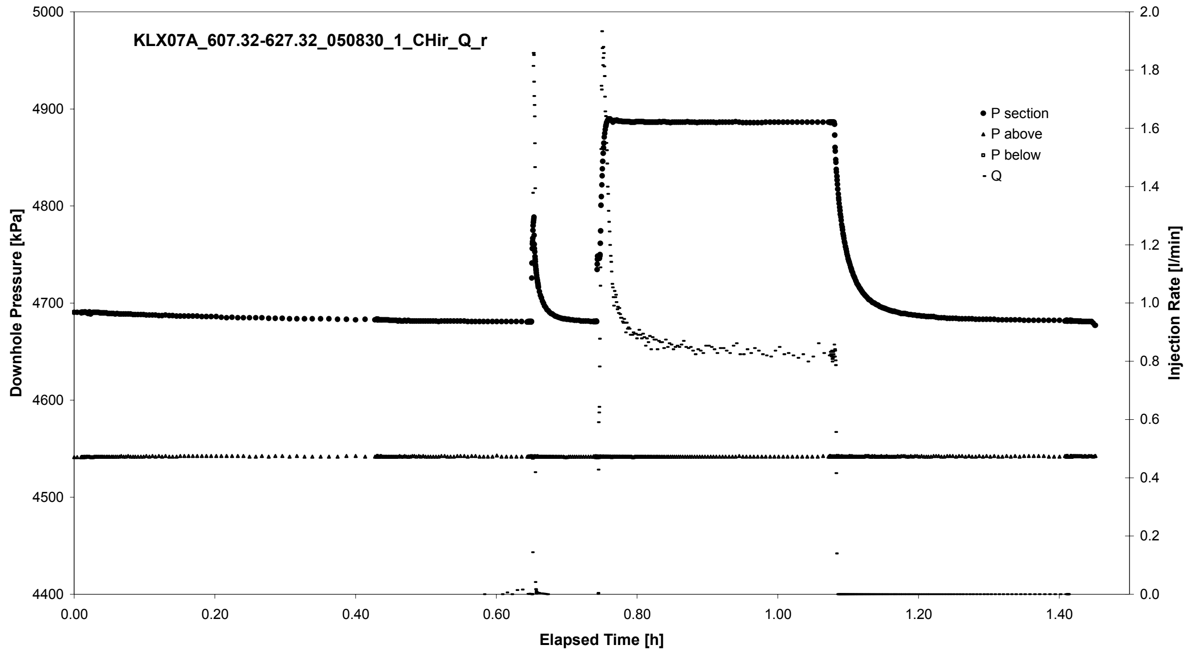
Not Analysed

CHIR phase; HORNER match

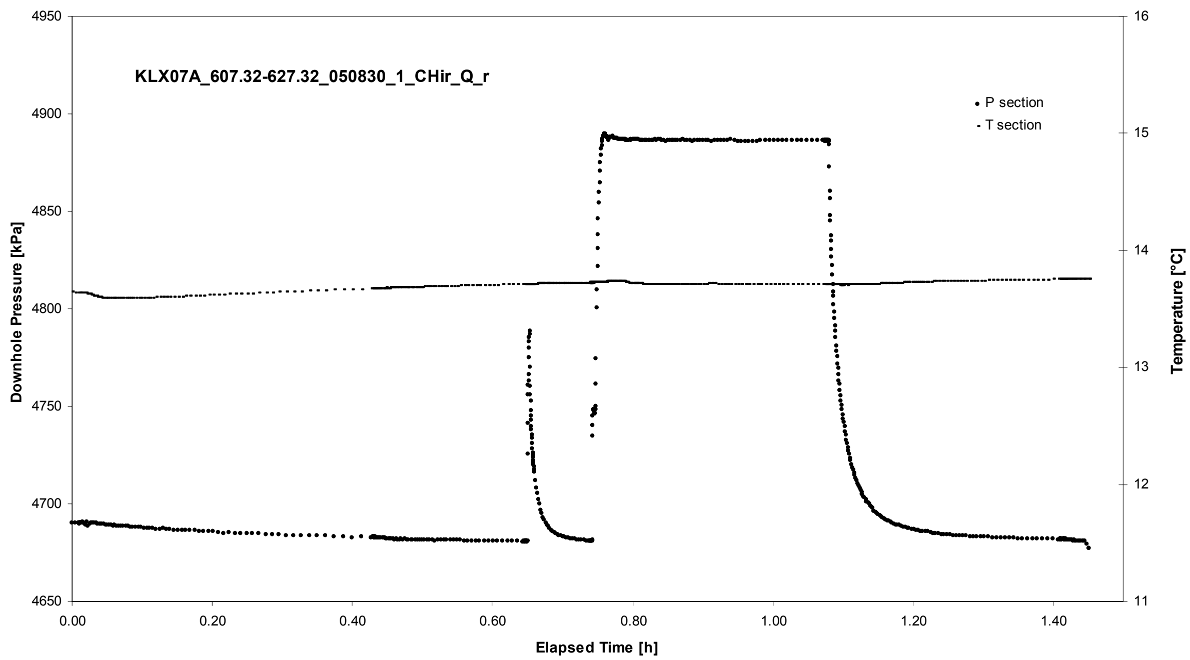
APPENDIX 2-36

Test 607.32-627.32 m

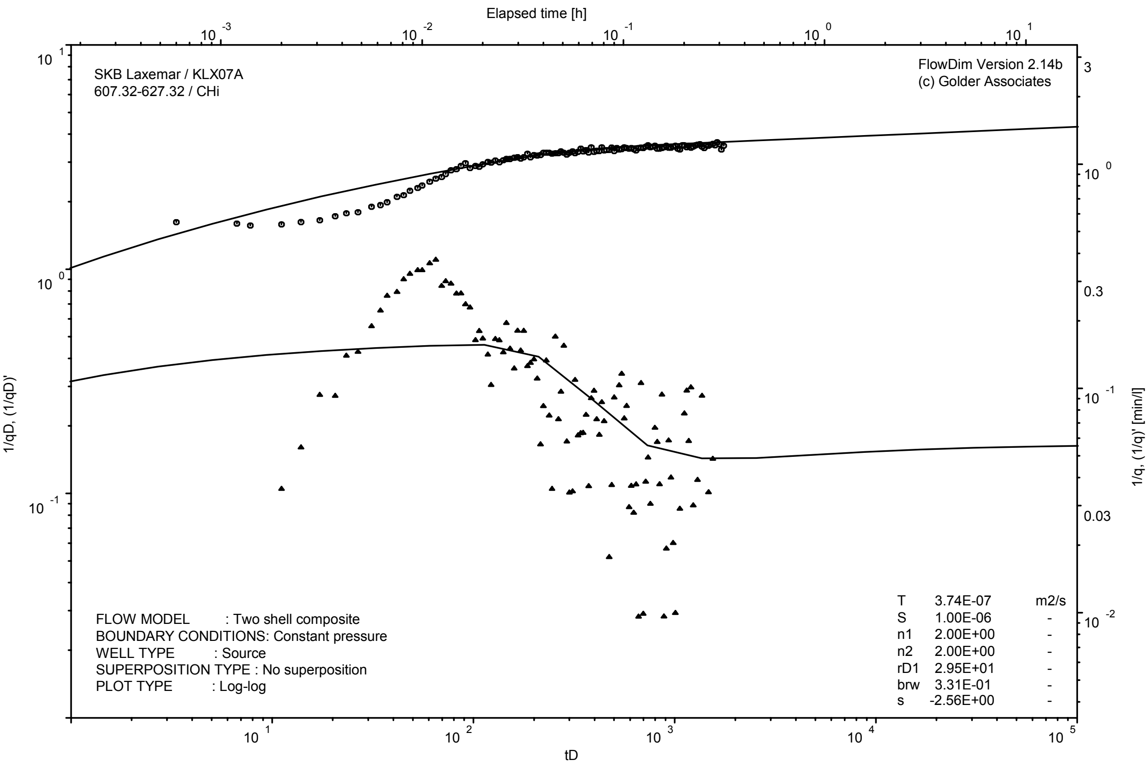
Analysis diagrams



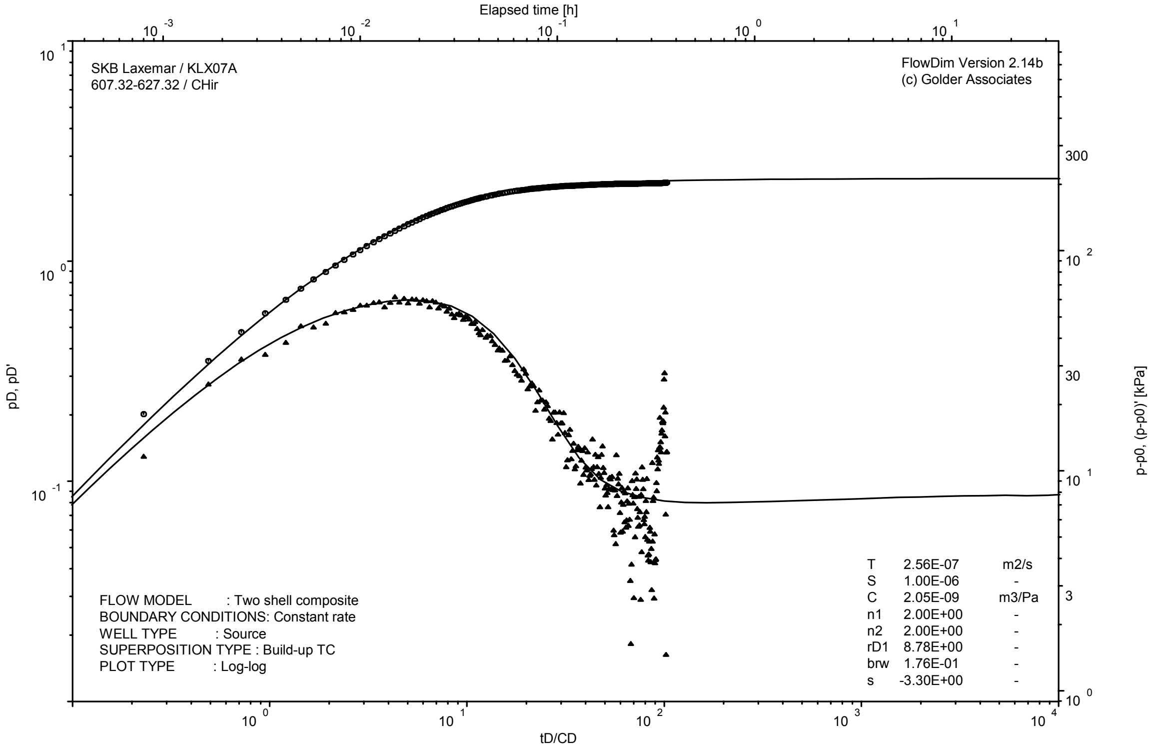
Pressure and flow rate vs. time; cartesian plot



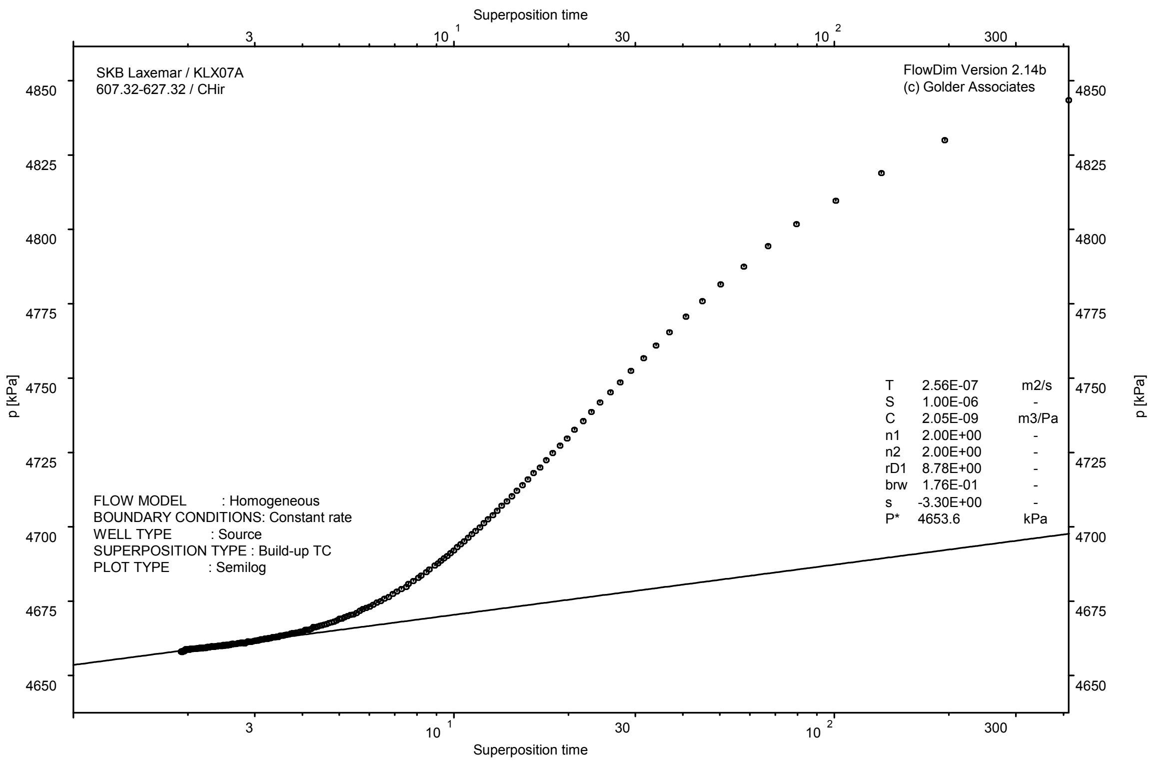
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

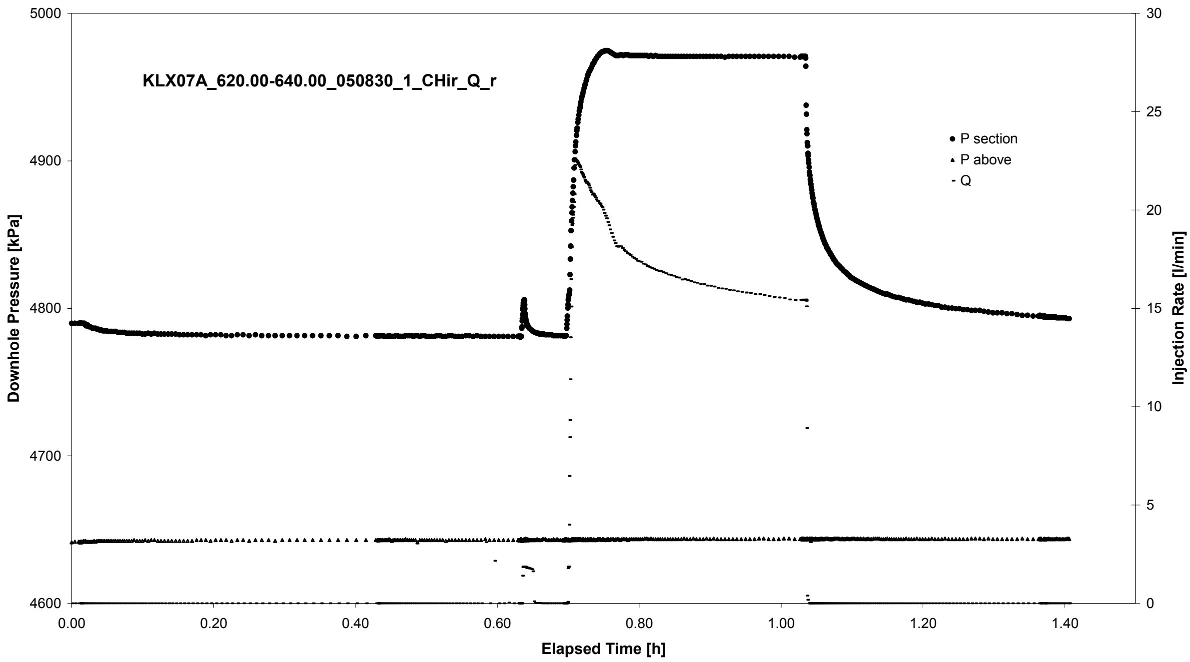


CHIR phase; HORNER match

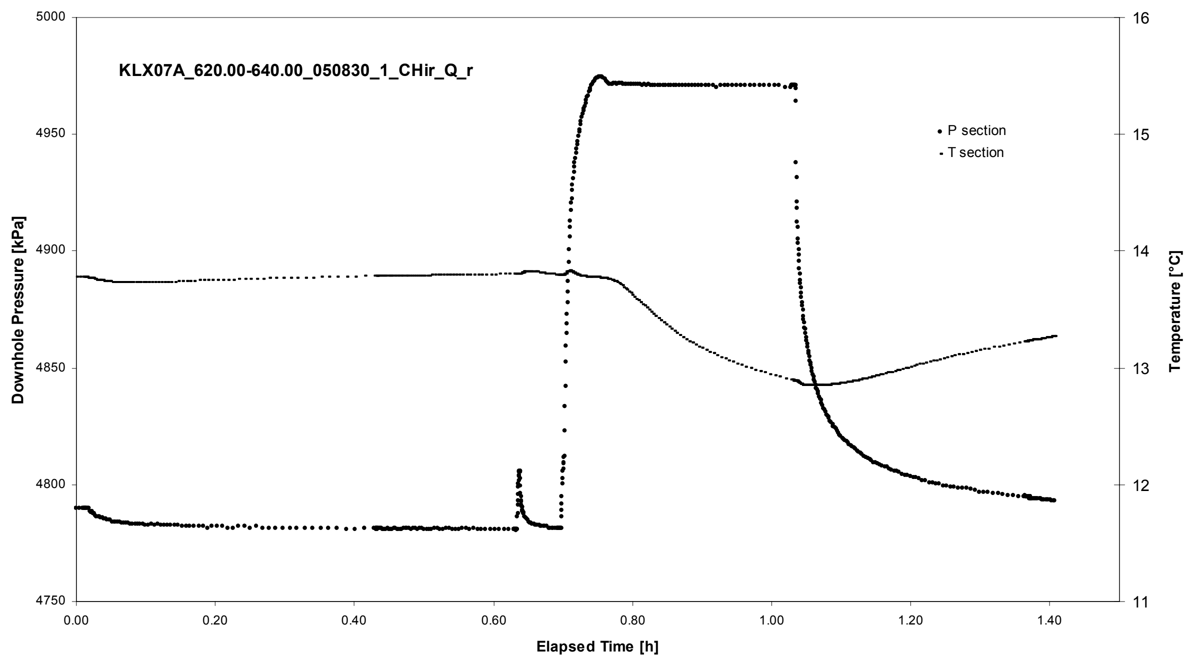
APPENDIX 2-37

Test 620.00-640.00 m

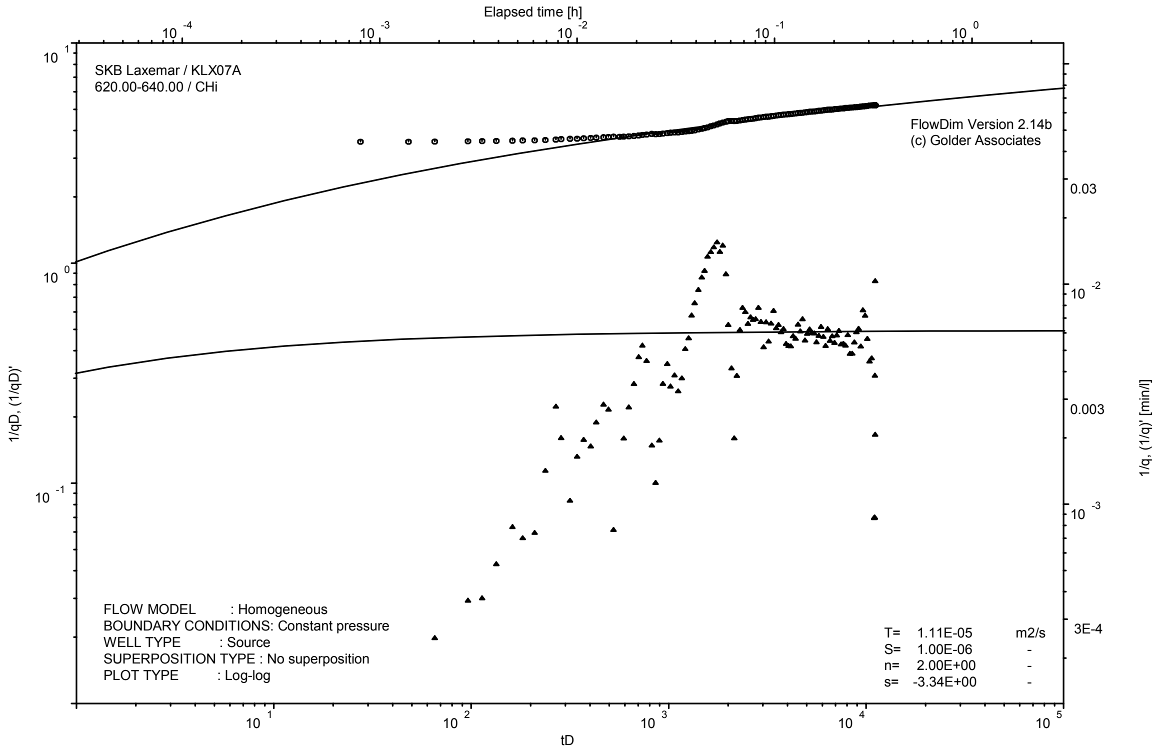
Analysis diagrams



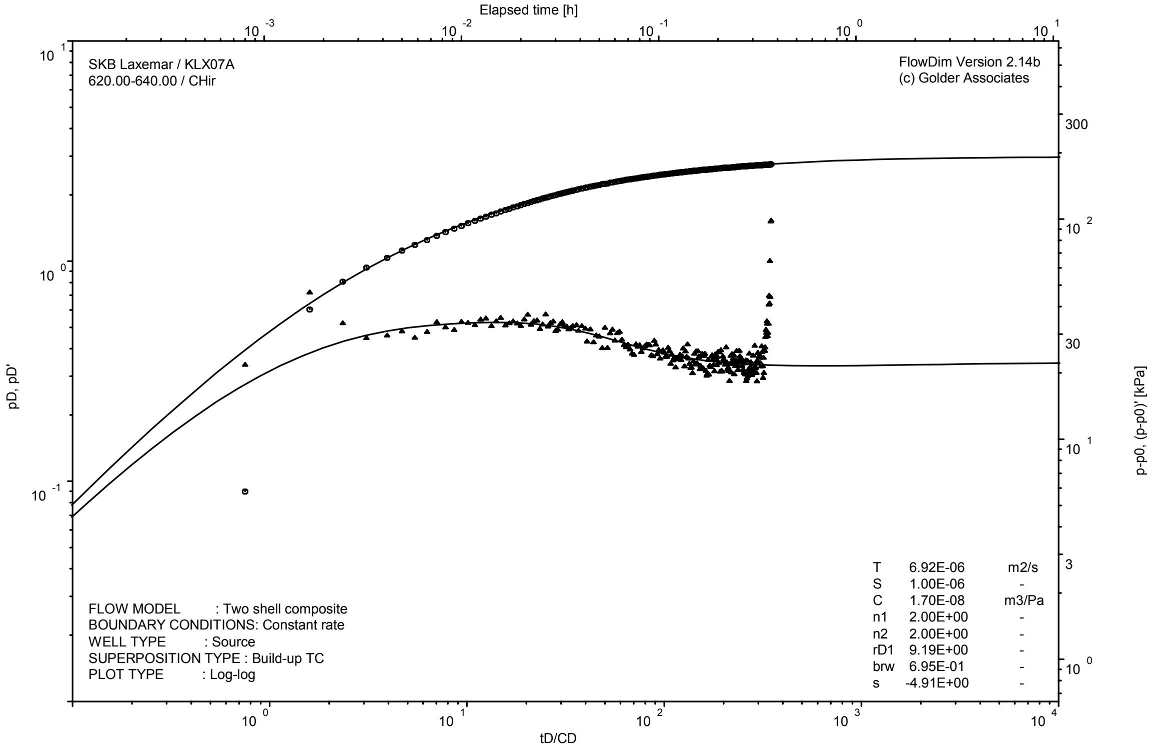
Pressure and flow rate vs. time; cartesian plot



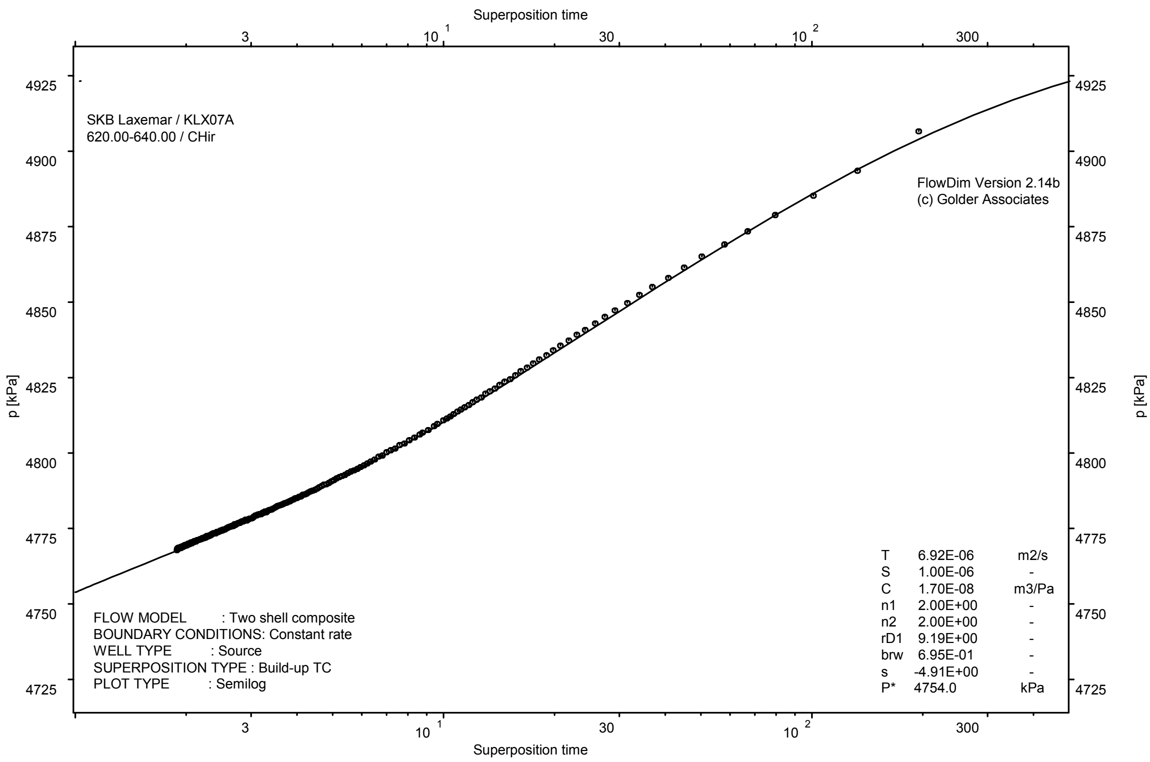
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

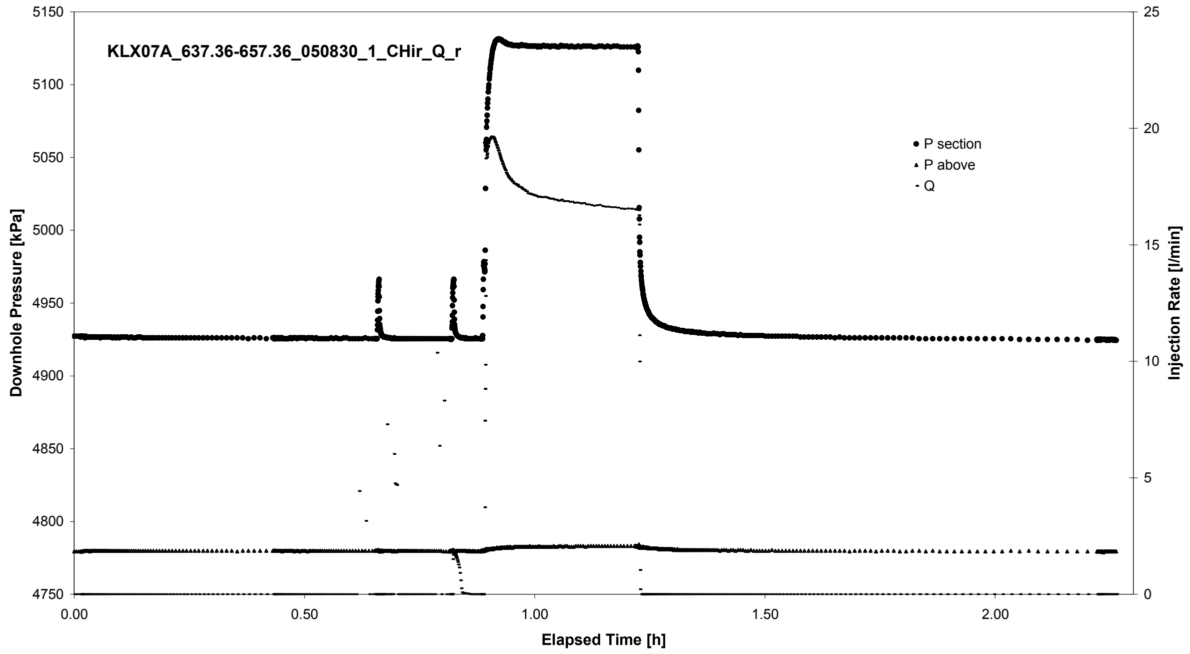


CHIR phase; HORNER match

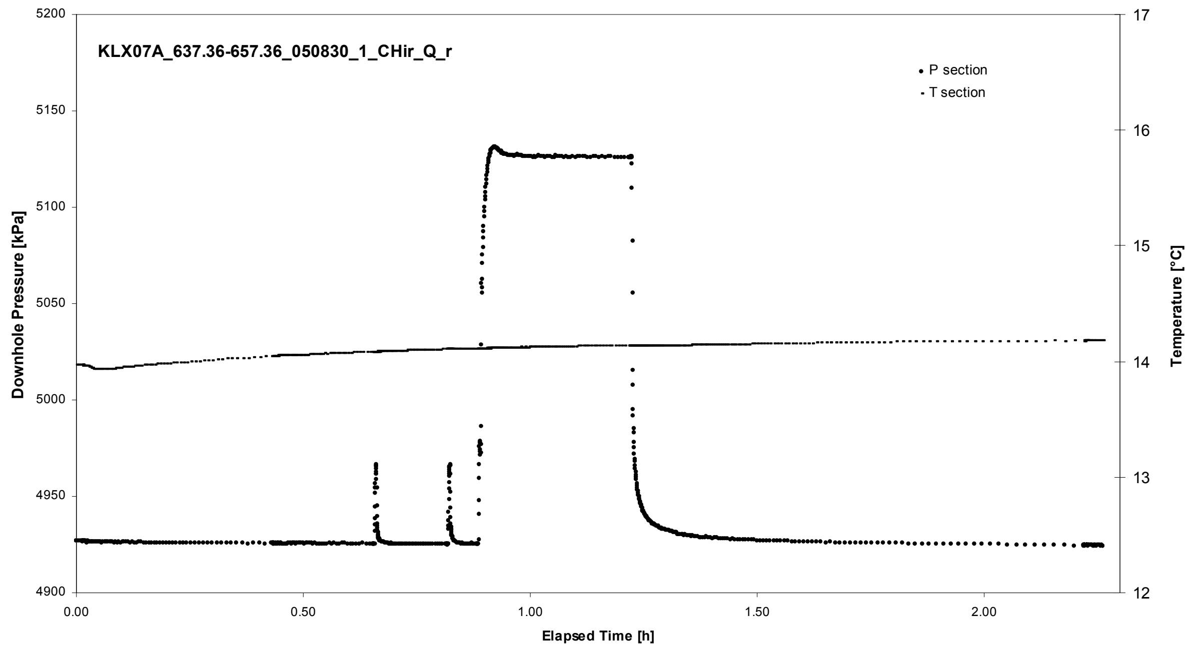
APPENDIX 2-38

Test 637.36-657.36 m

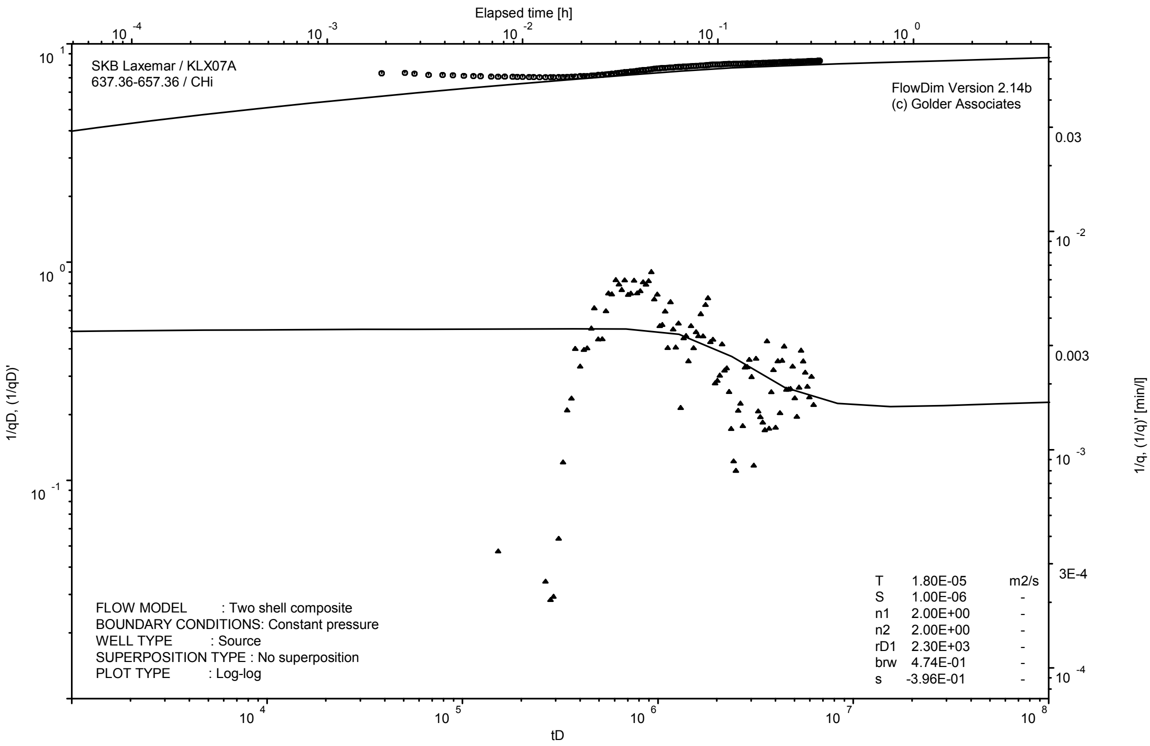
Analysis diagrams



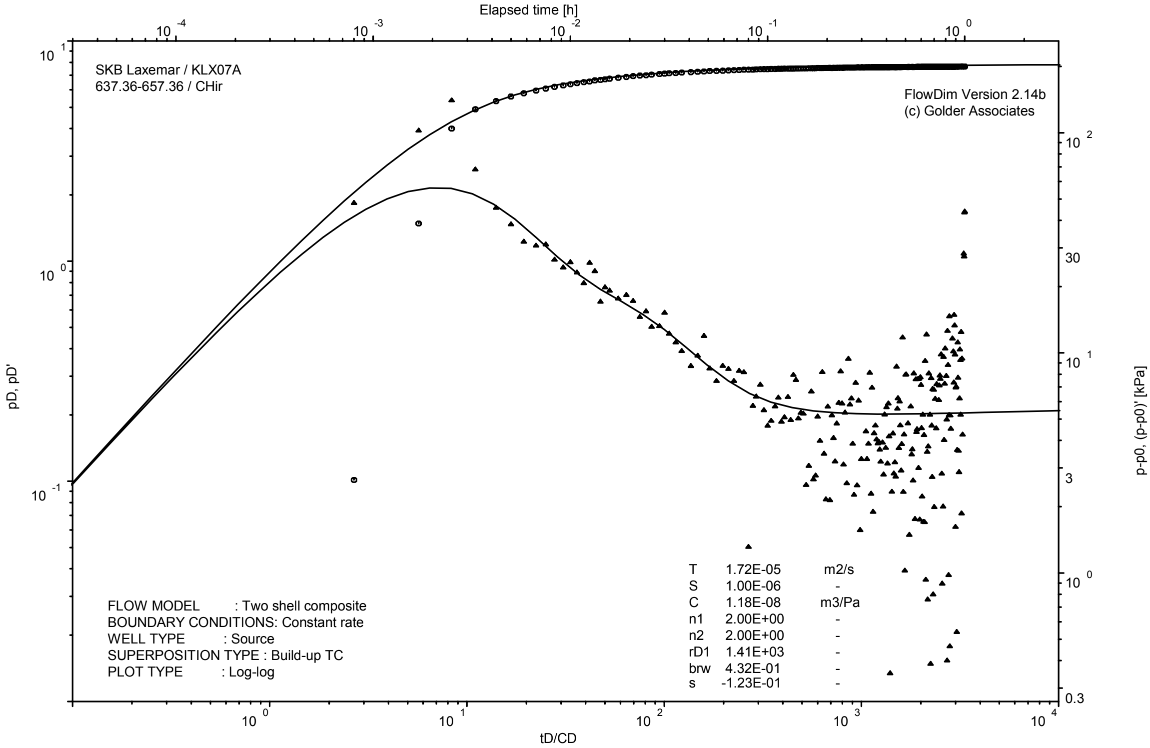
Pressure and flow rate vs. time; cartesian plot



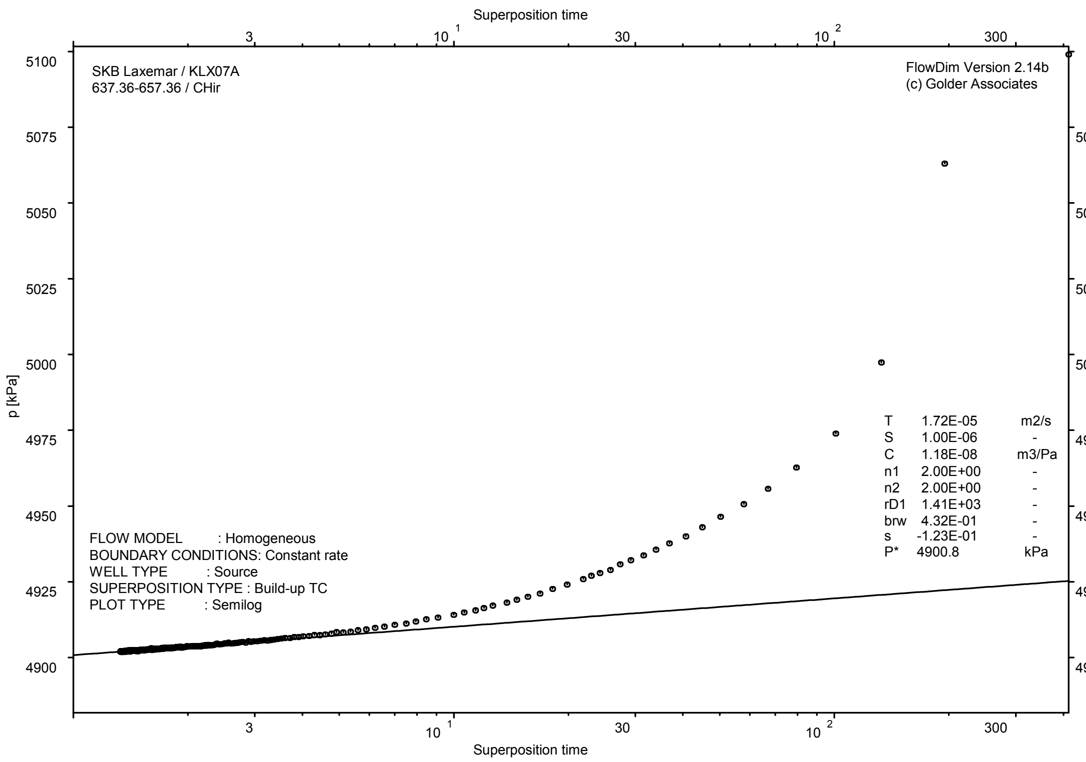
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

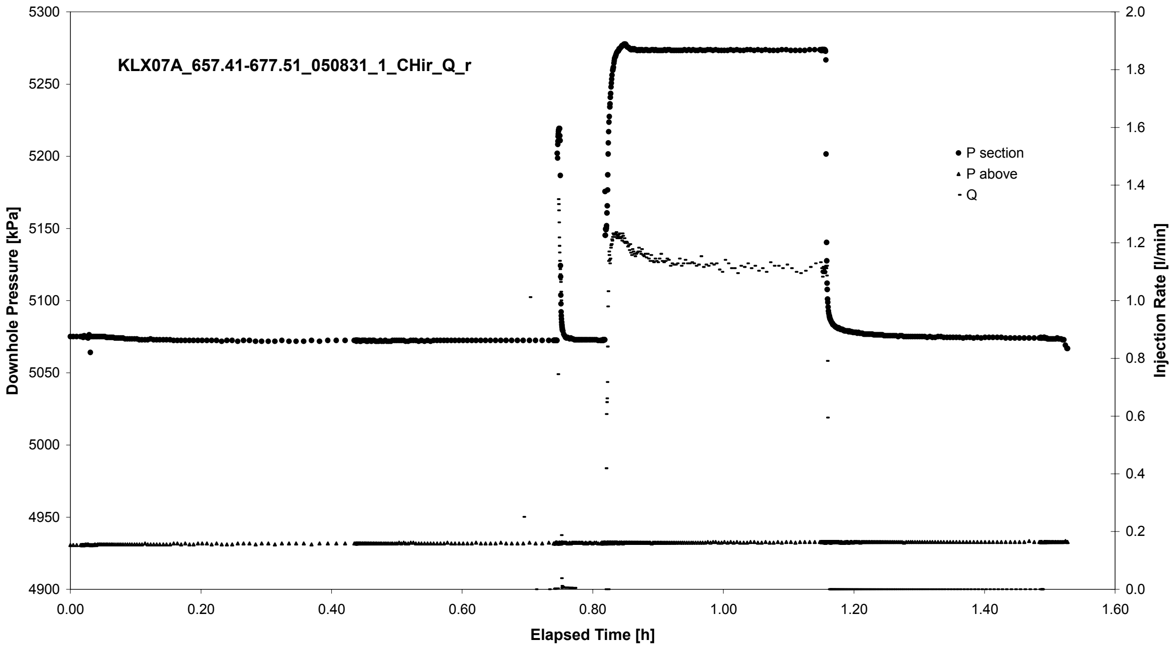


CHIR phase; HORNER match

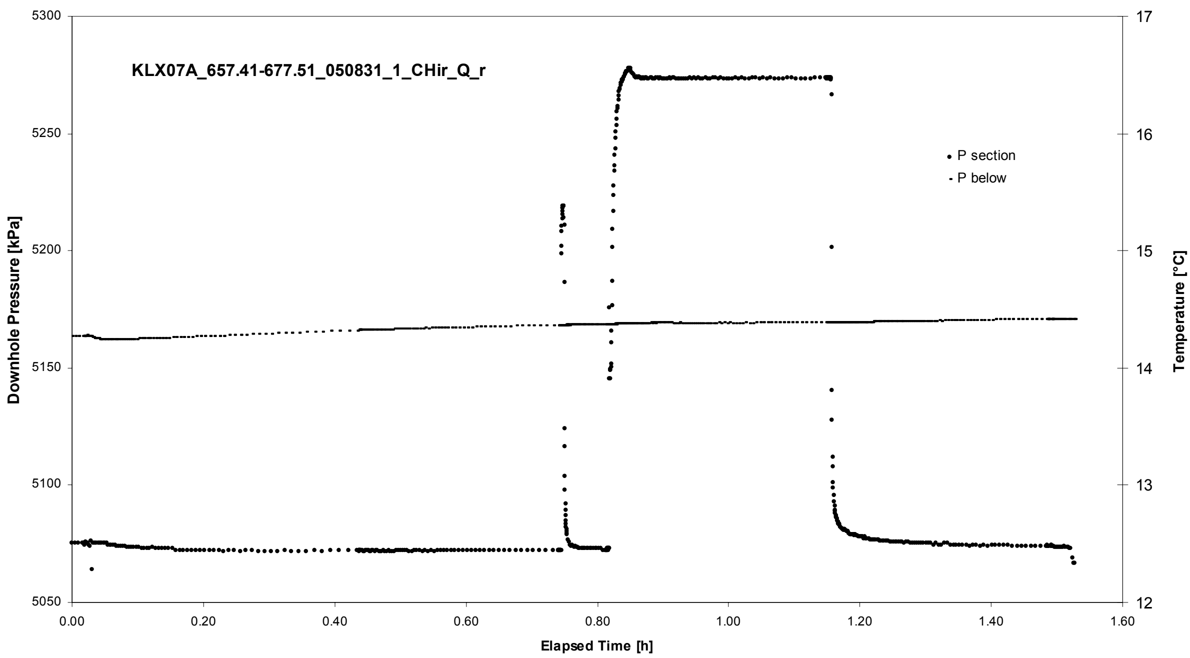
APPENDIX 2-39

Test 657.41-677.41 m

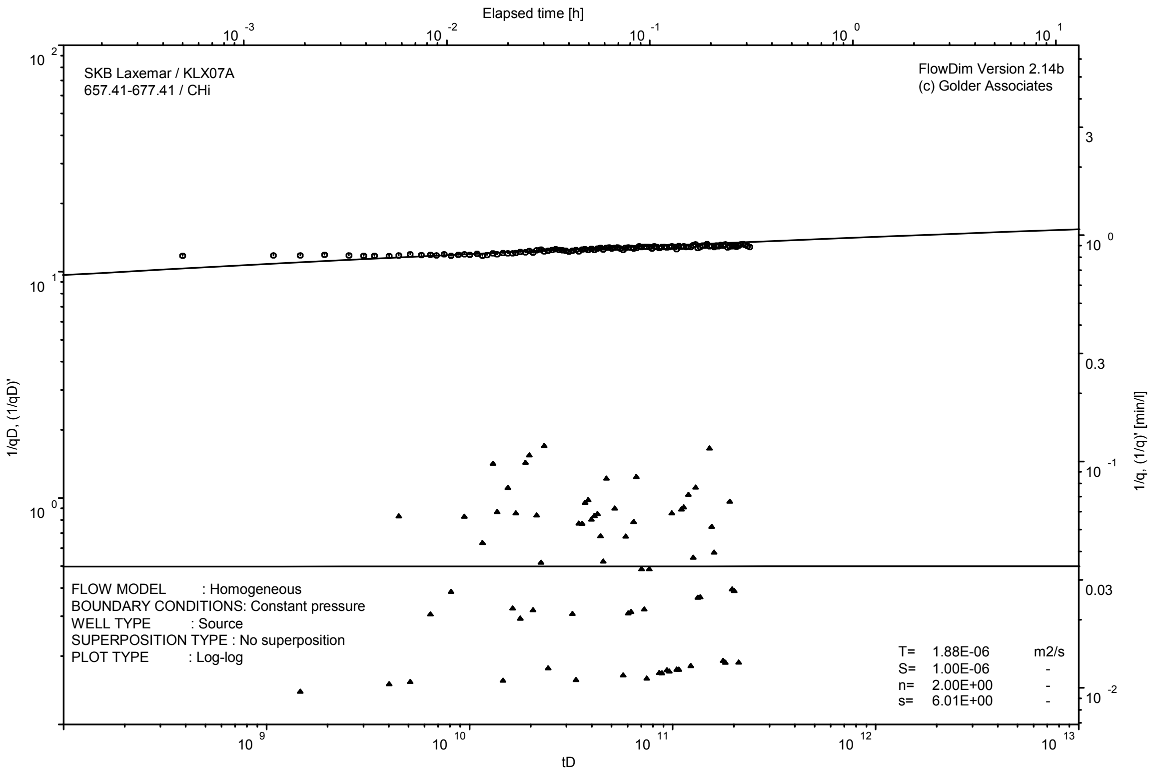
Analysis diagrams



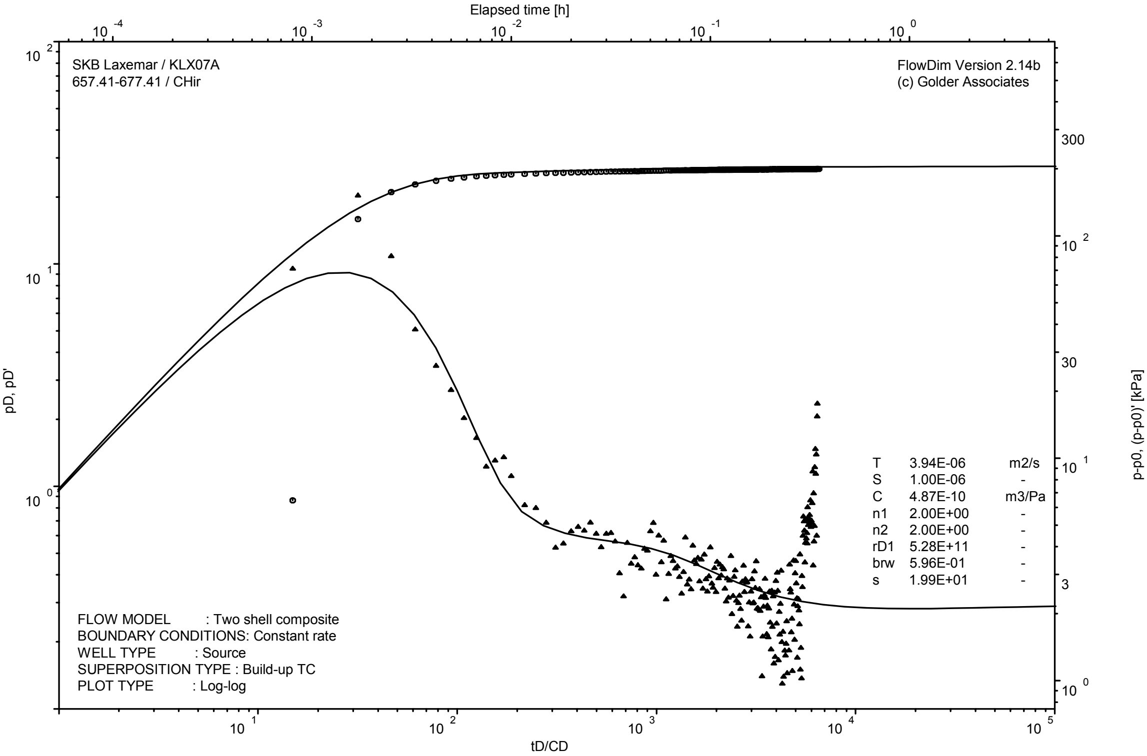
Pressure and flow rate vs. time; cartesian plot



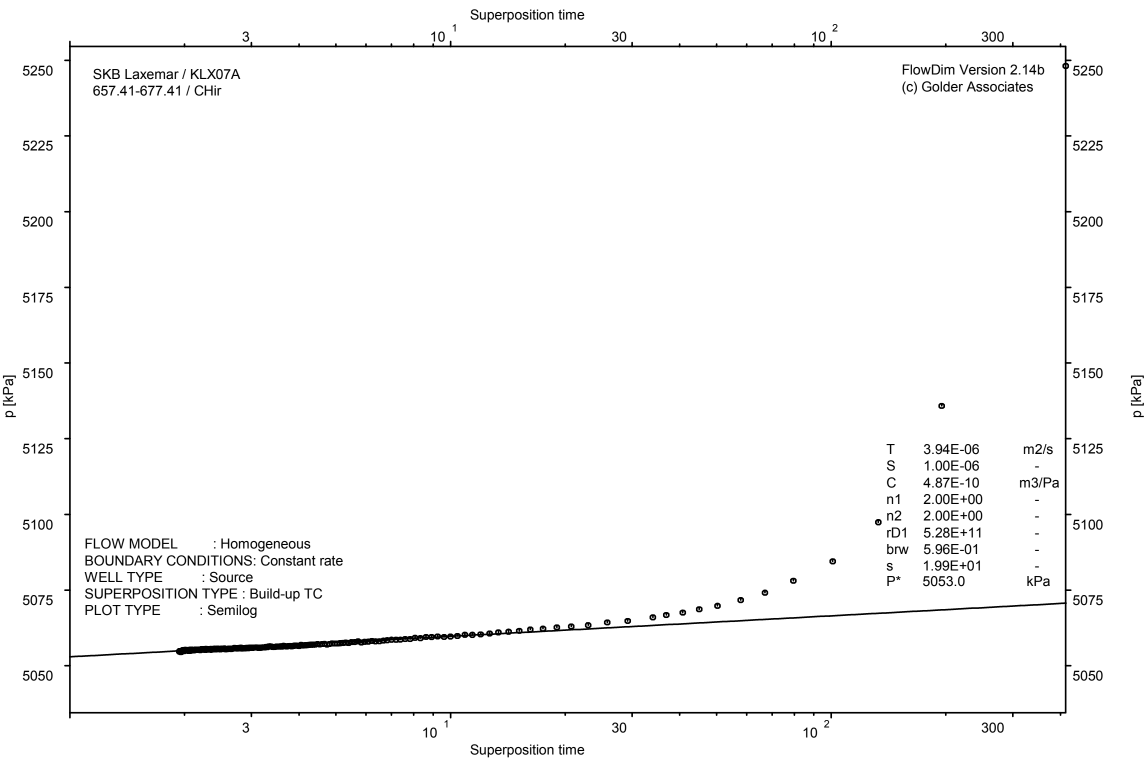
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

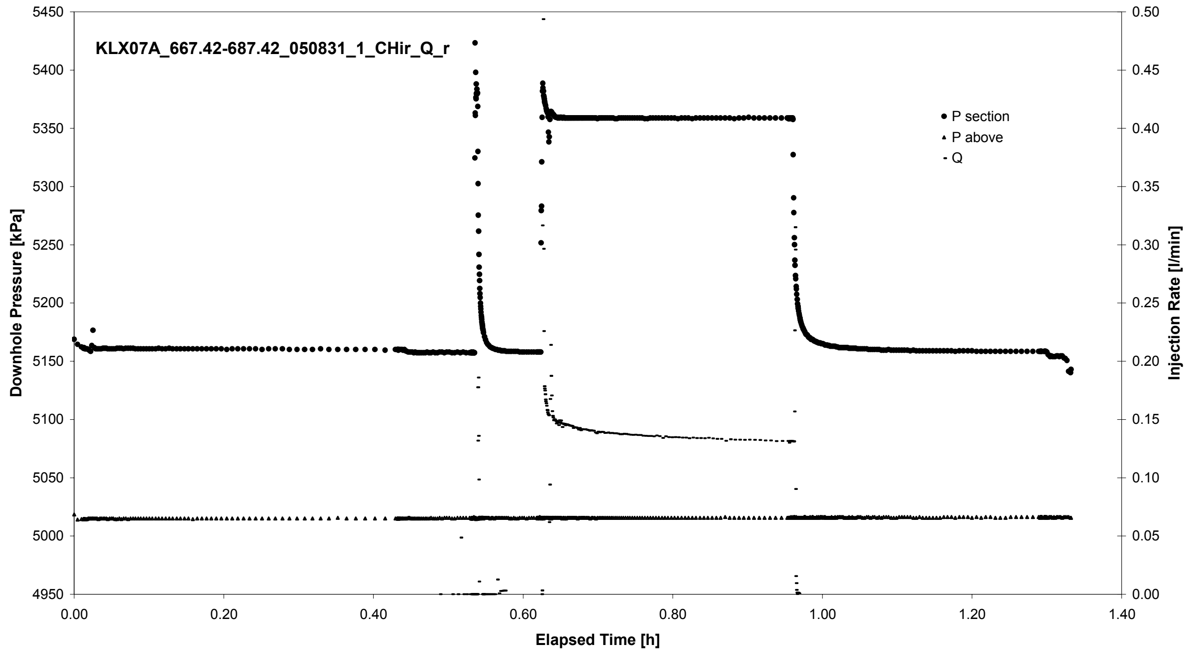


CHIR phase; HORNER match

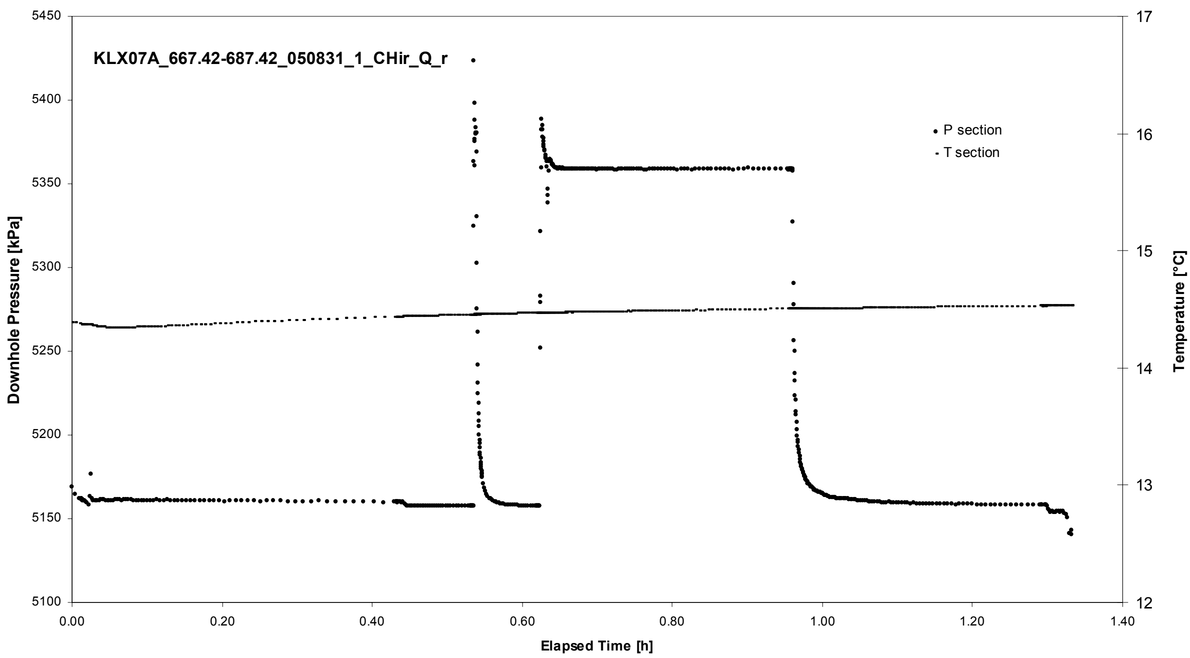
APPENDIX 2-40

Test 667.42-687.42 m

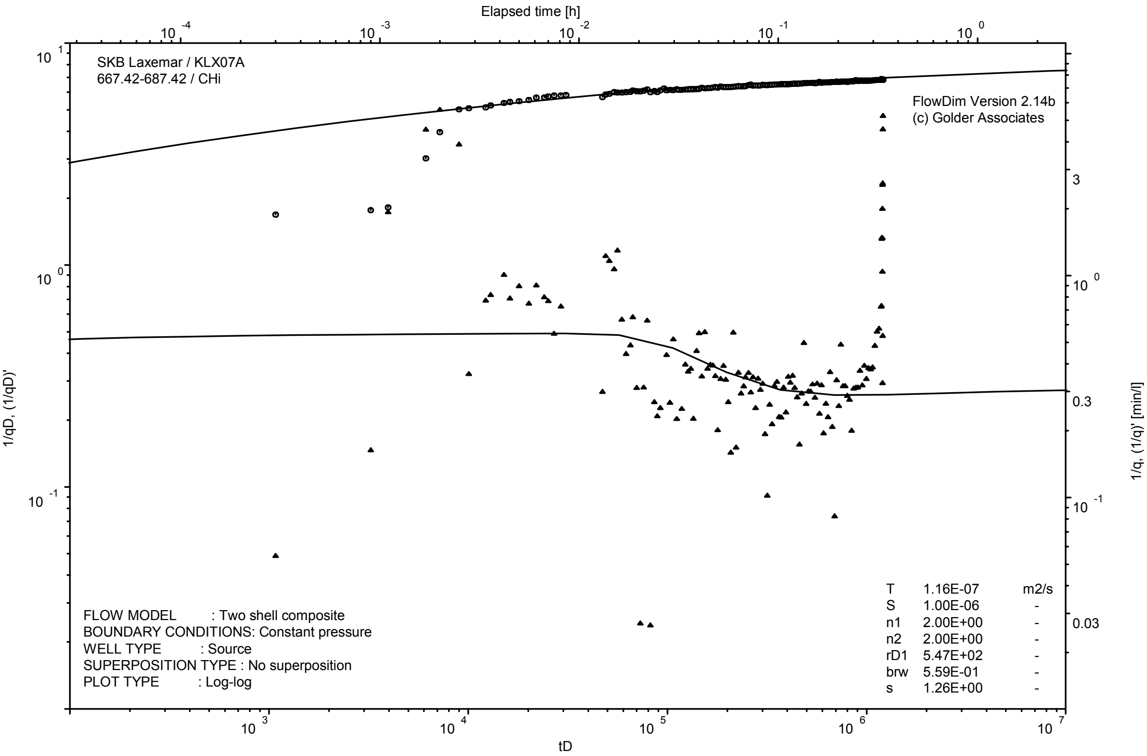
Analysis diagrams



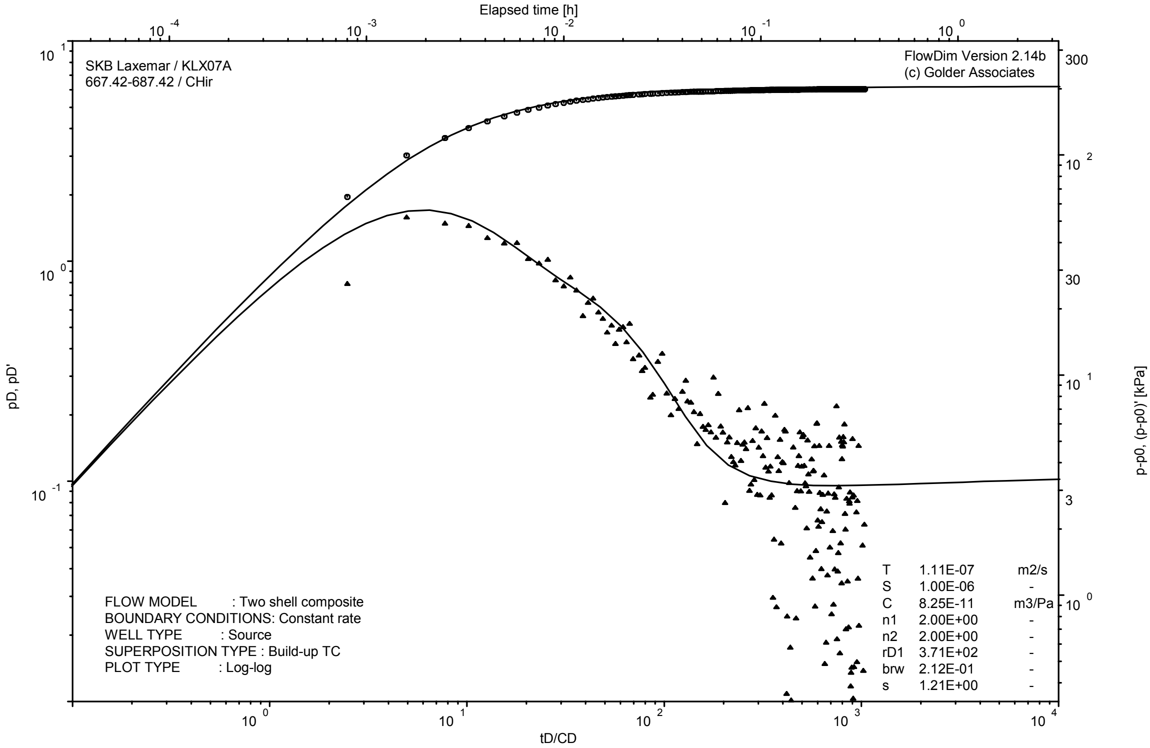
Pressure and flow rate vs. time; cartesian plot



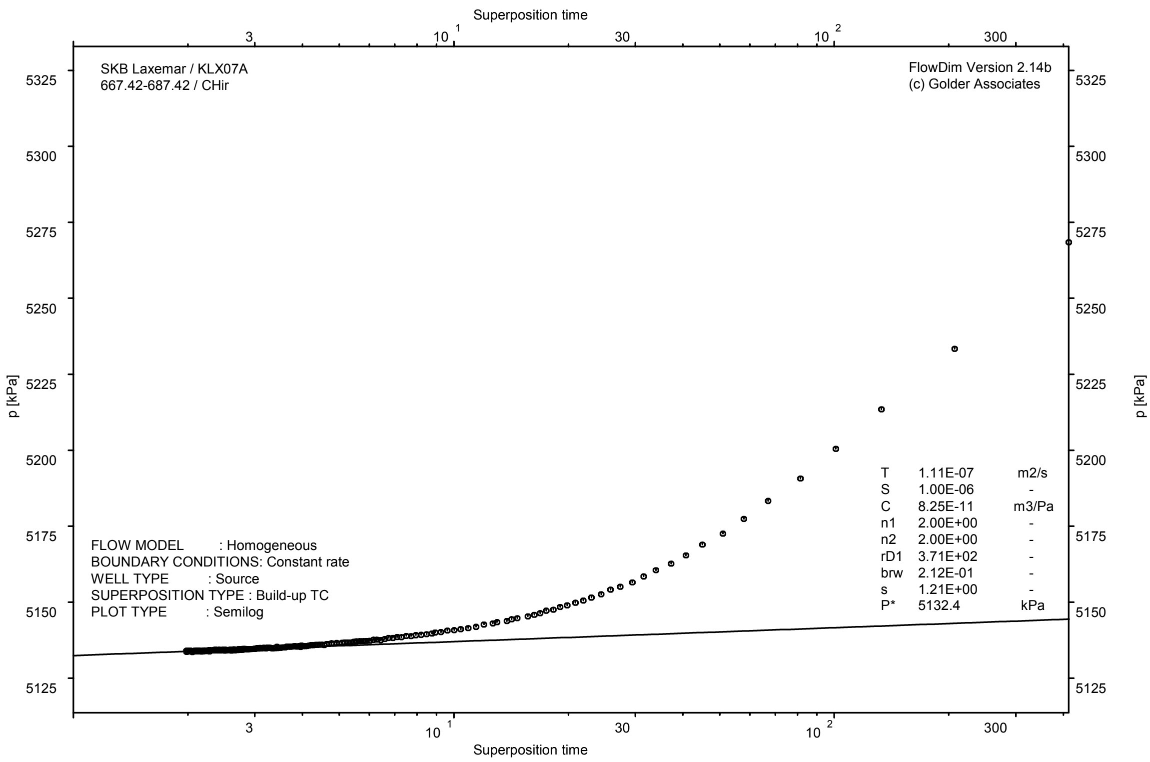
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

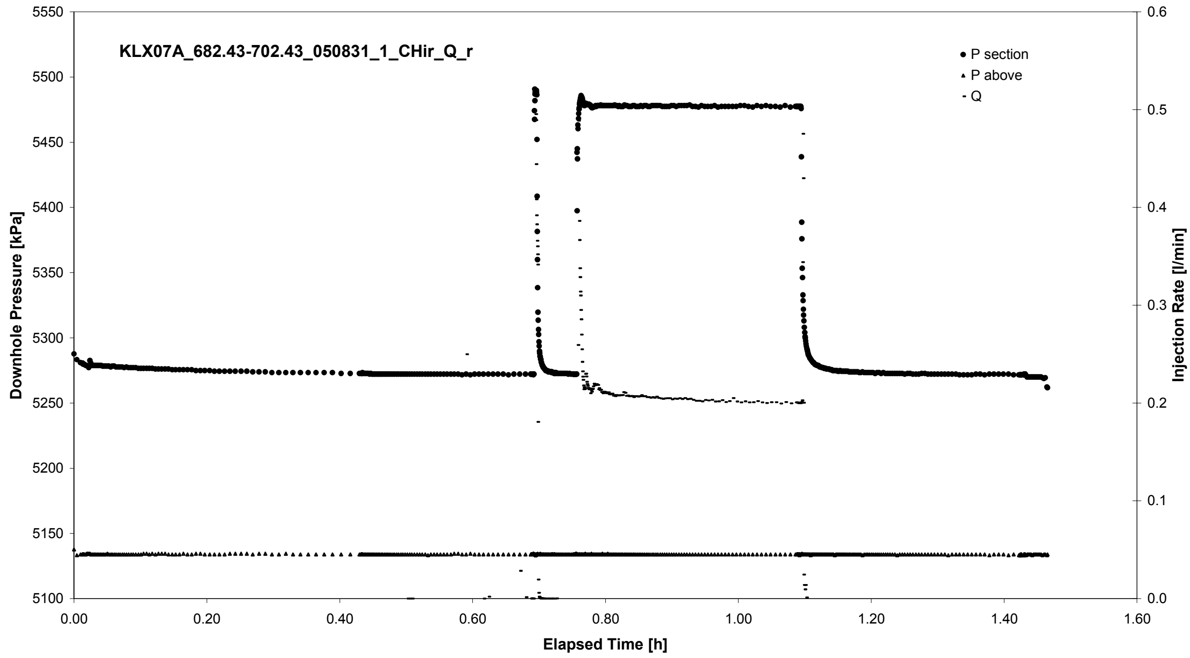


CHIR phase; HORNER match

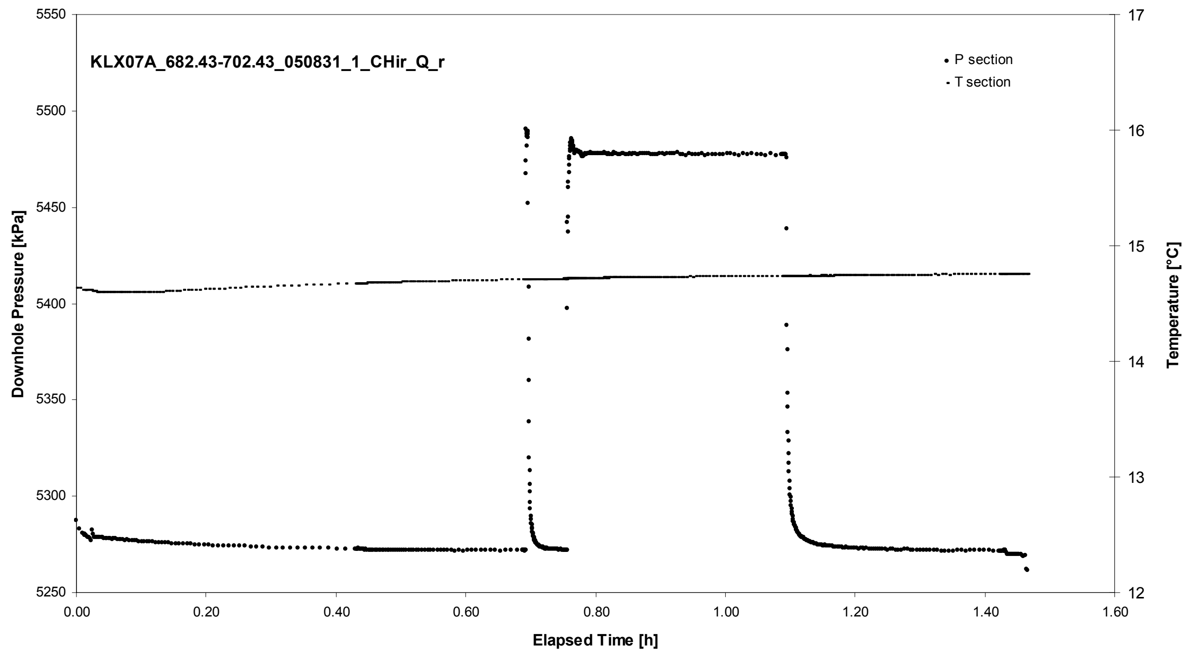
APPENDIX 2-41

Test 682.43-702.43 m

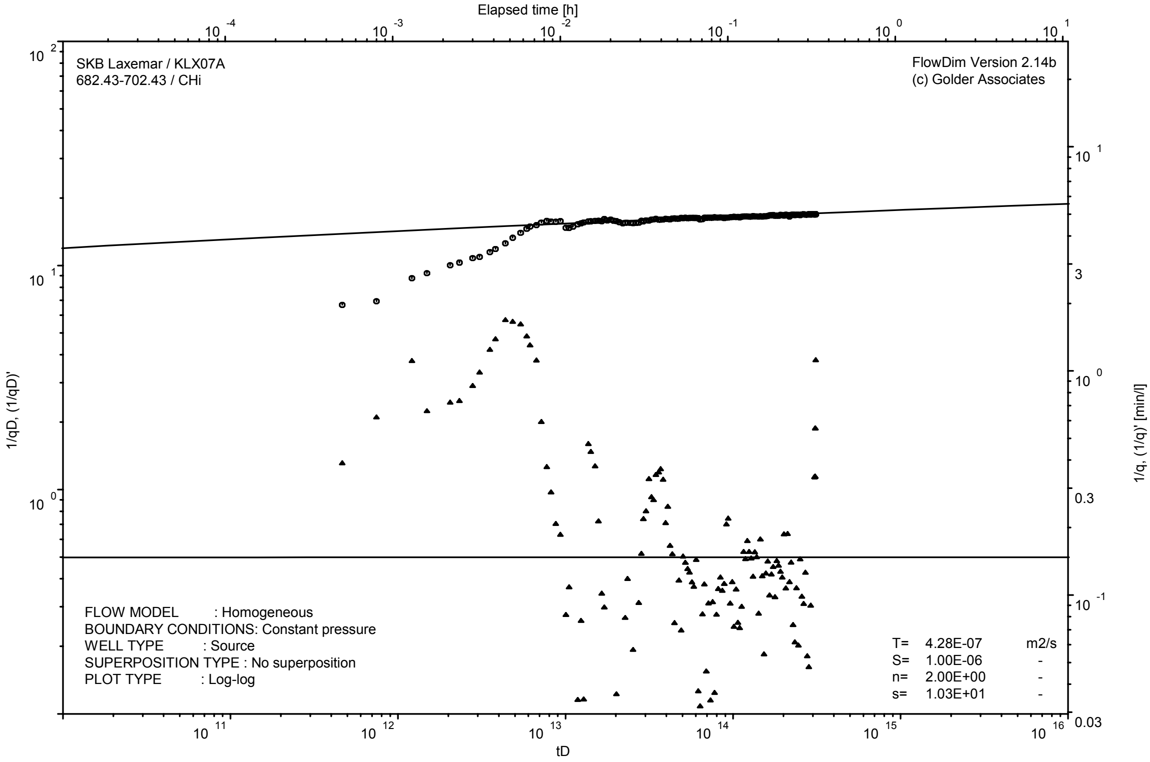
Analysis diagrams



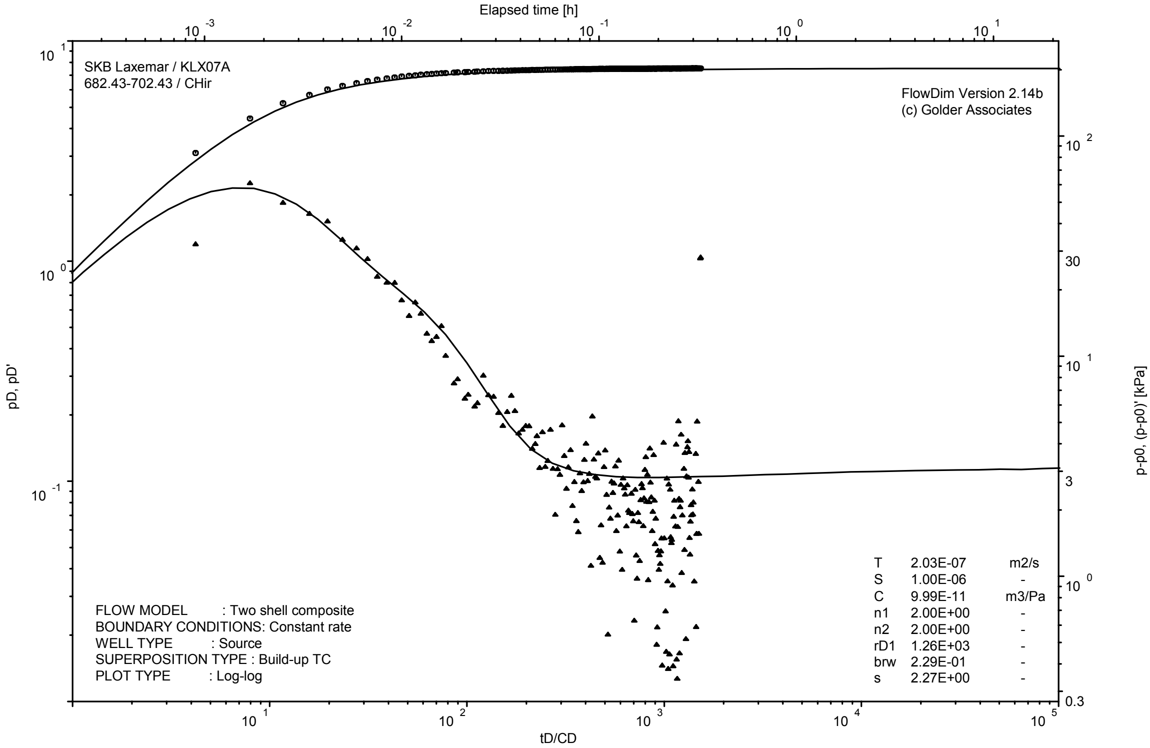
Pressure and flow rate vs. time; cartesian plot



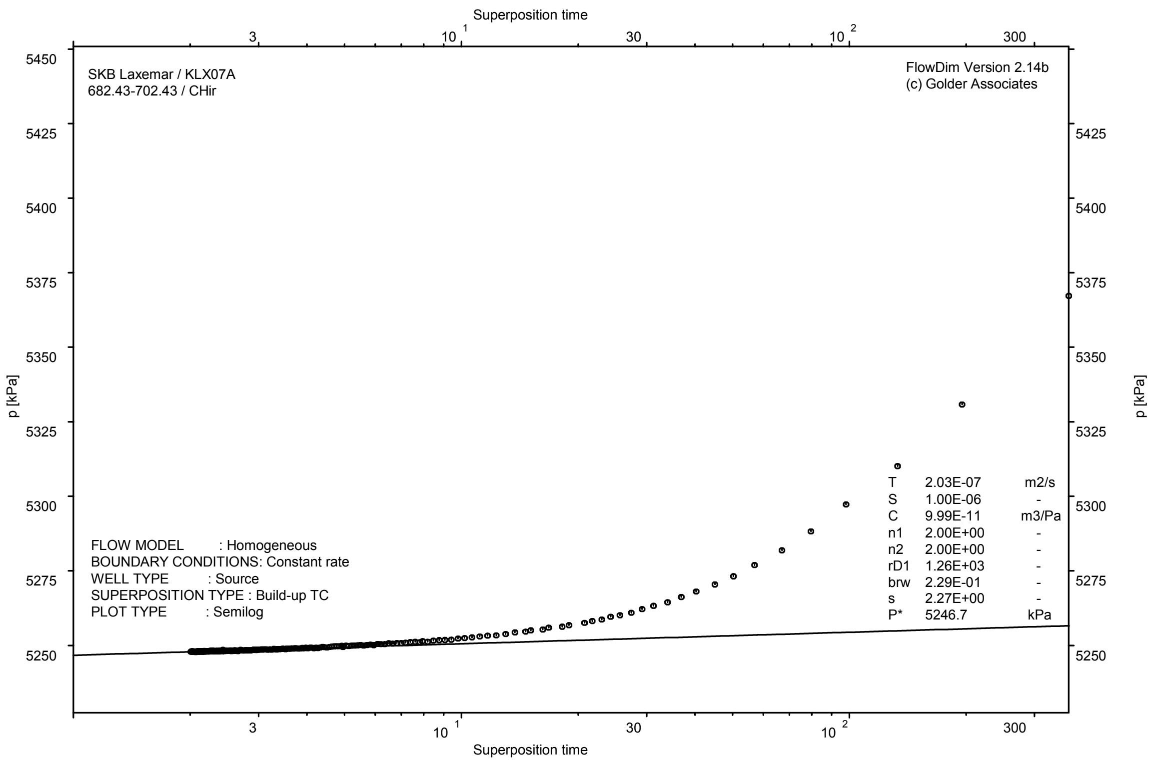
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

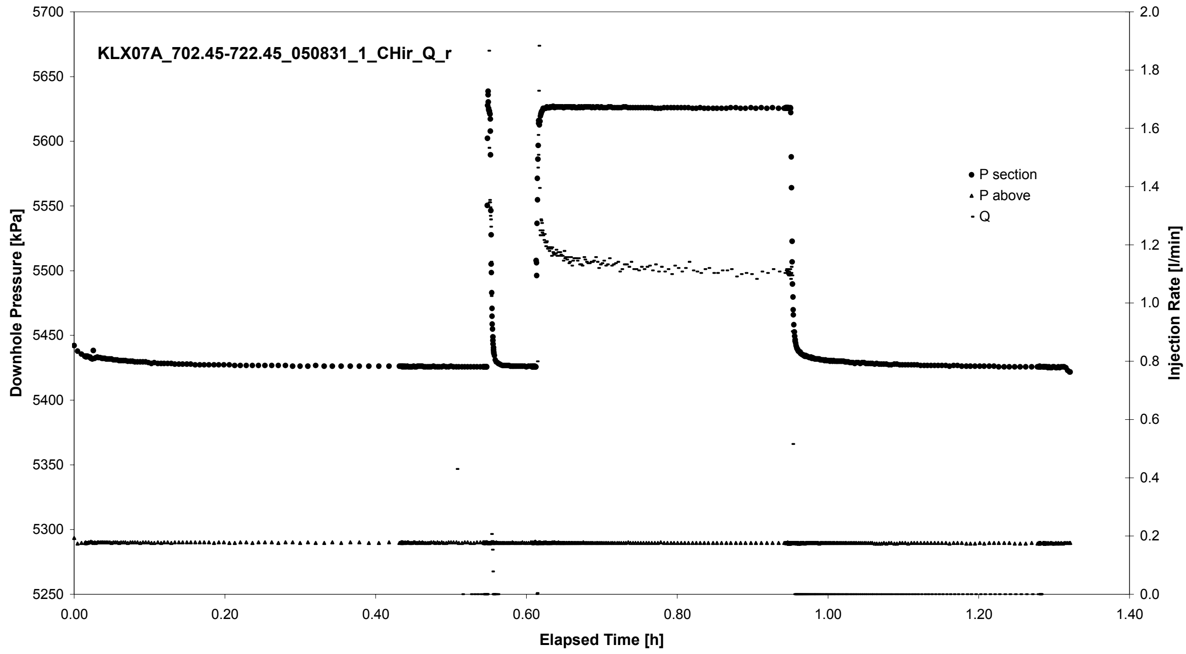


CHIR phase; HORNER match

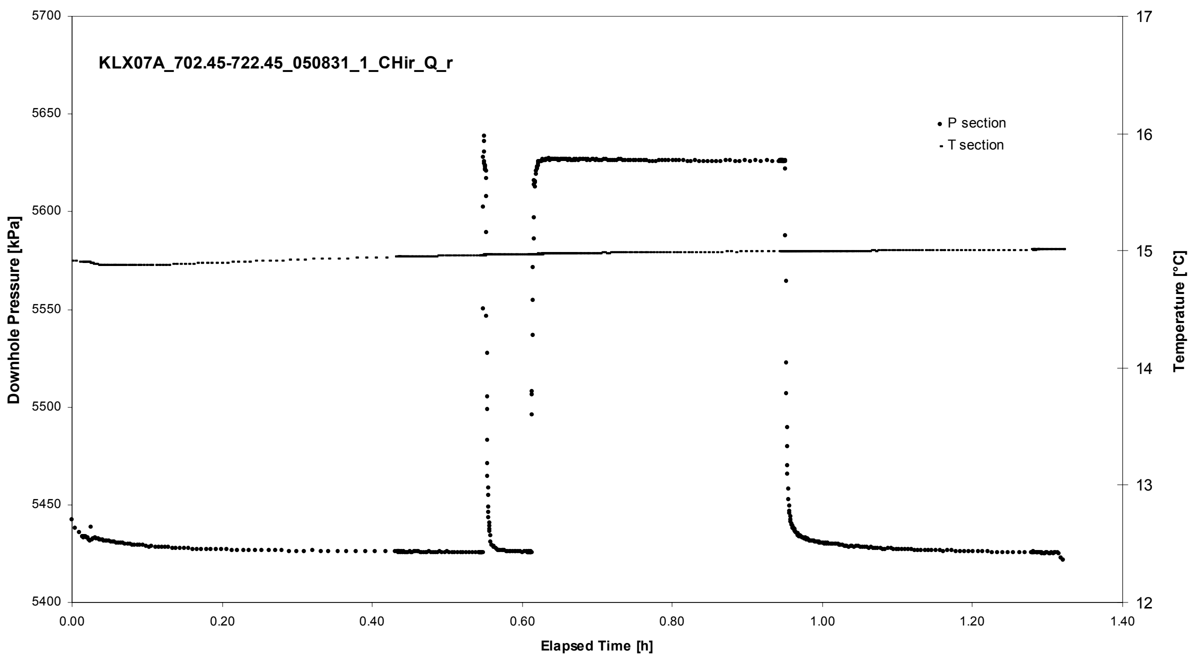
APPENDIX 2-42

Test 702.45-722.45 m

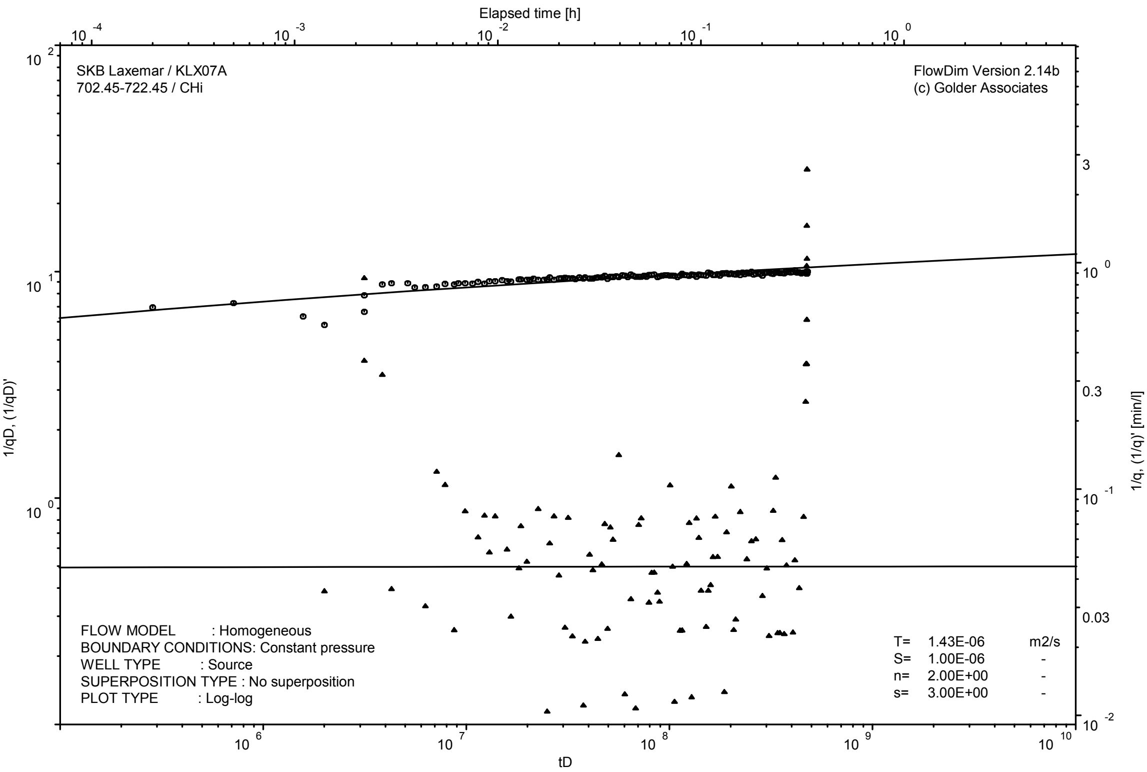
Analysis diagrams



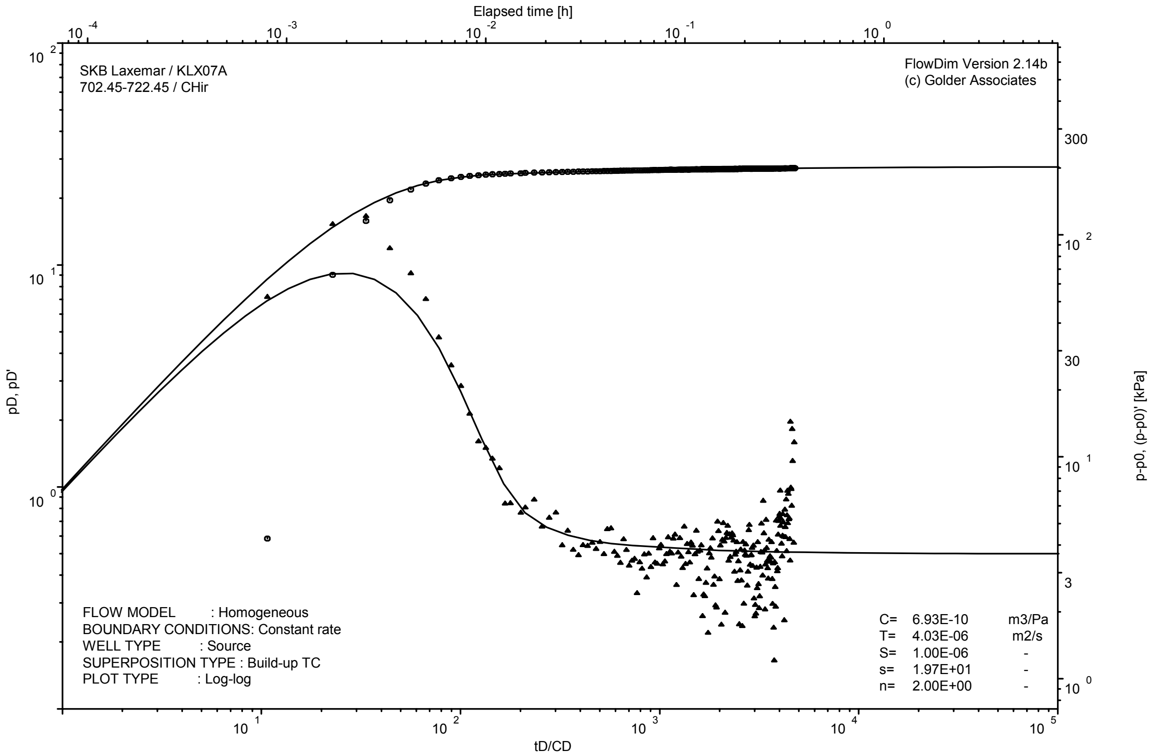
Pressure and flow rate vs. time; cartesian plot



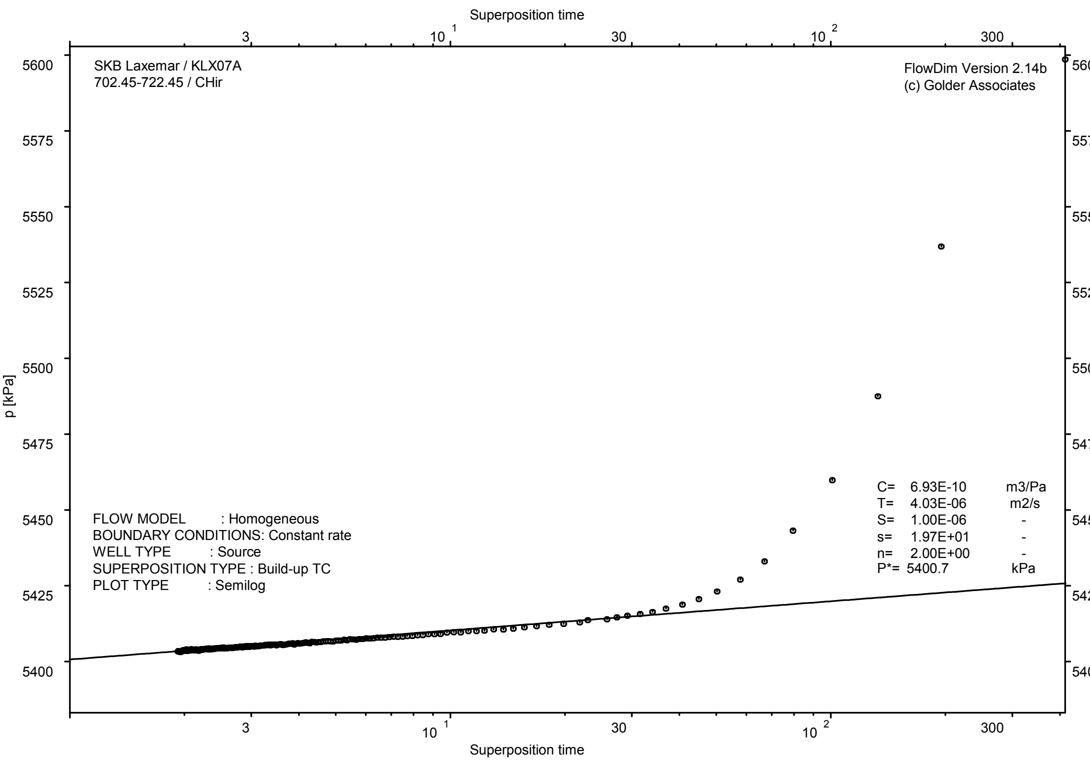
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

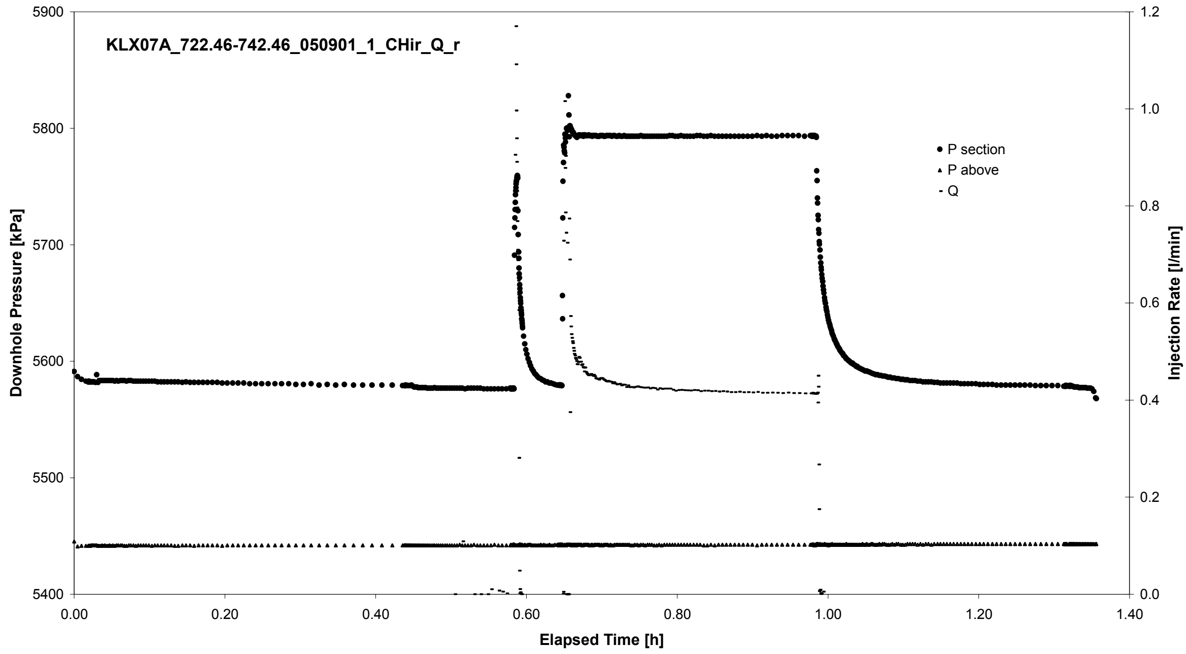


CHIR phase; HORNER match

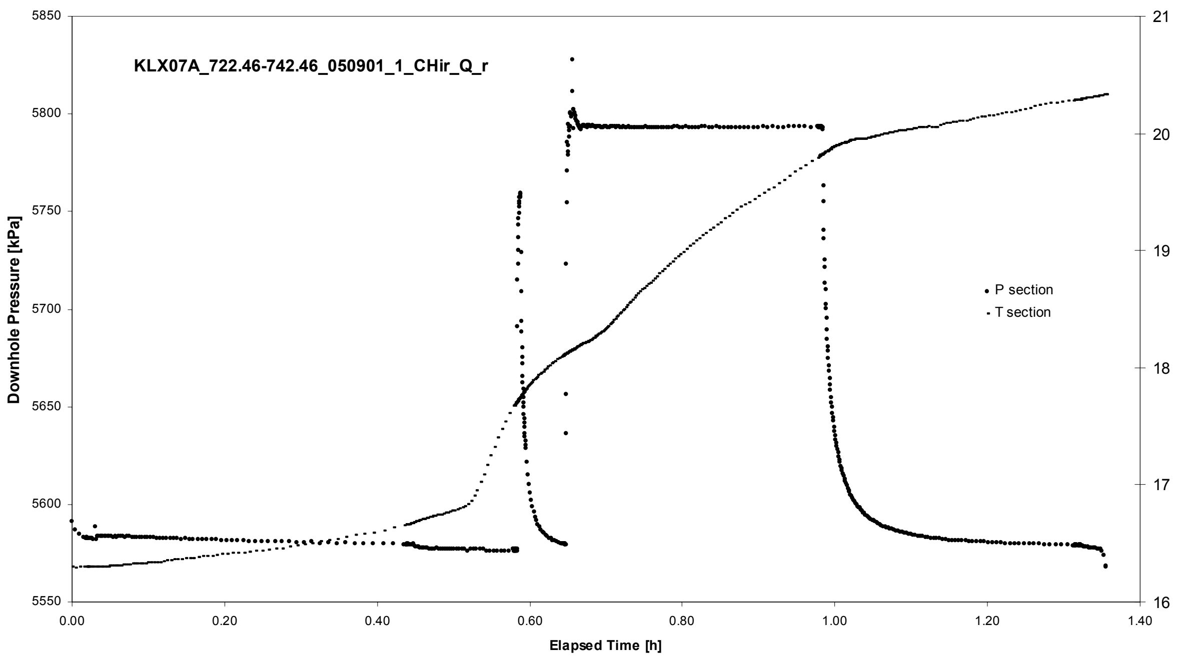
APPENDIX 2-43

Test 722.46-742.46 m

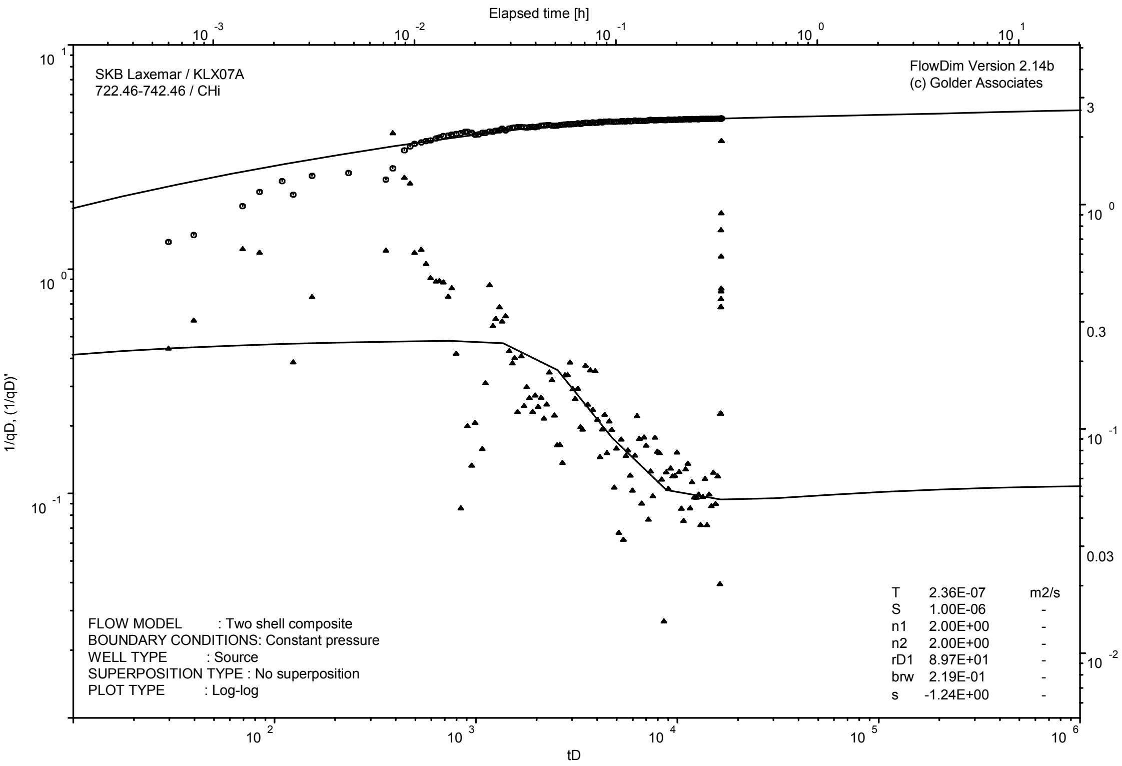
Analysis diagrams



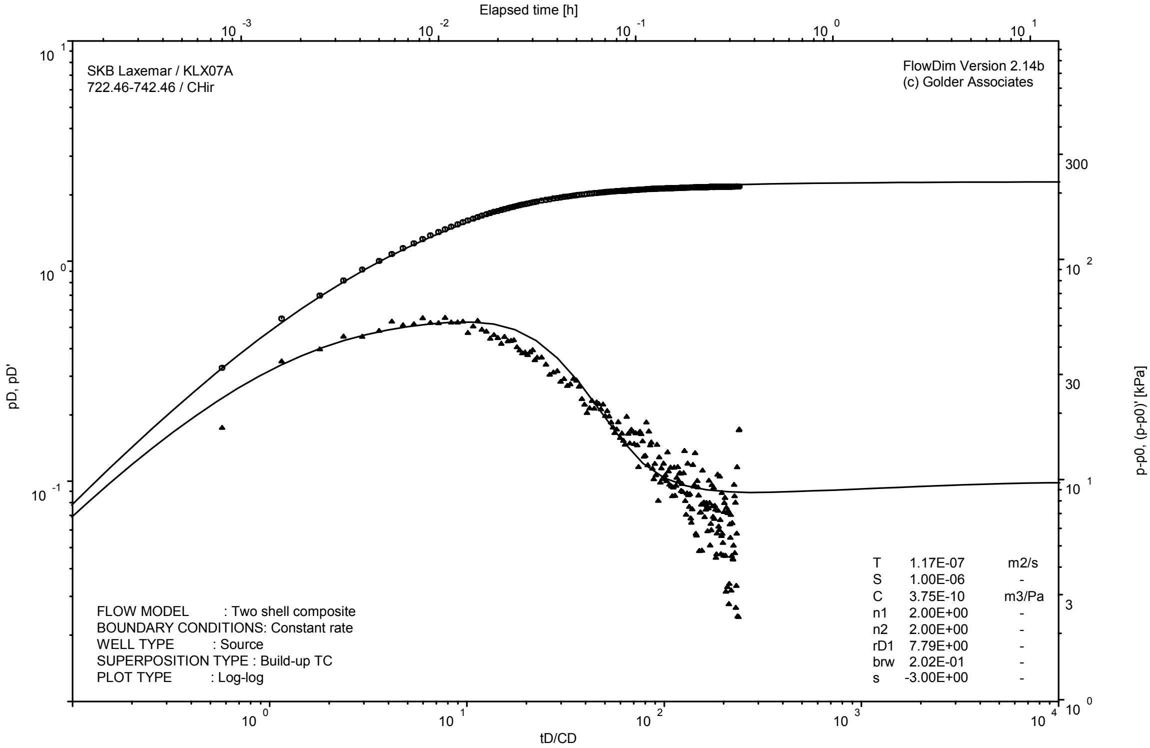
Pressure and flow rate vs. time; cartesian plot



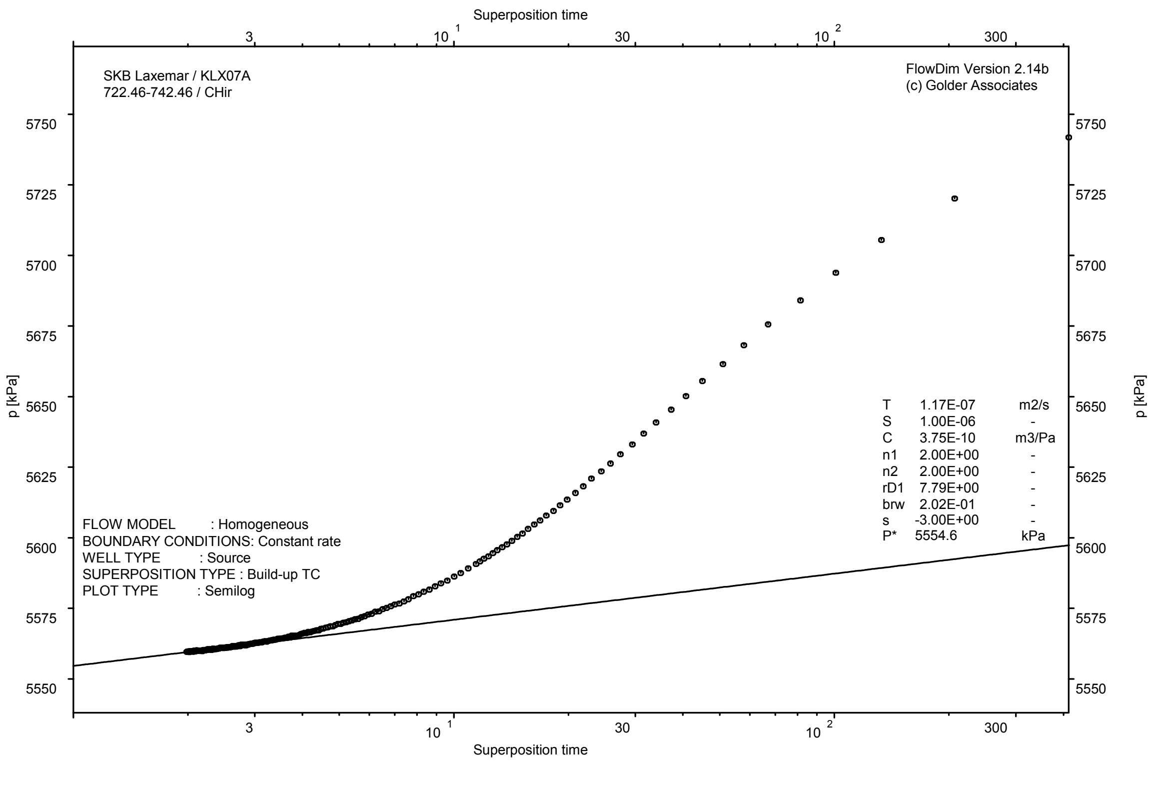
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

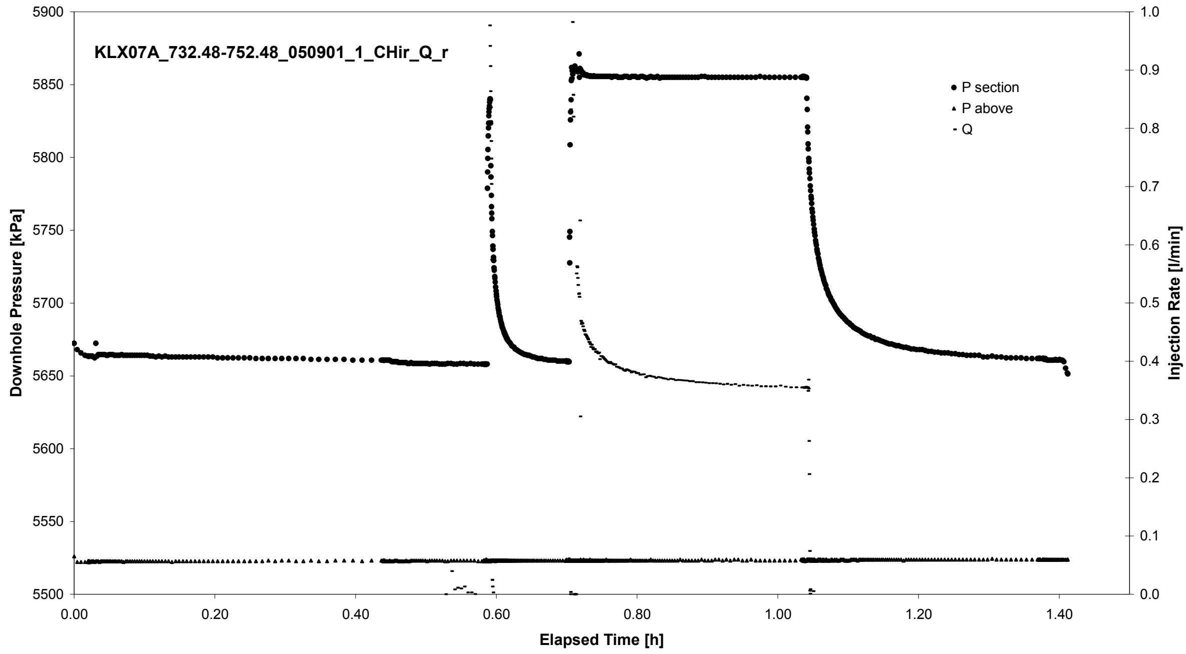


CHIR phase; HORNER match

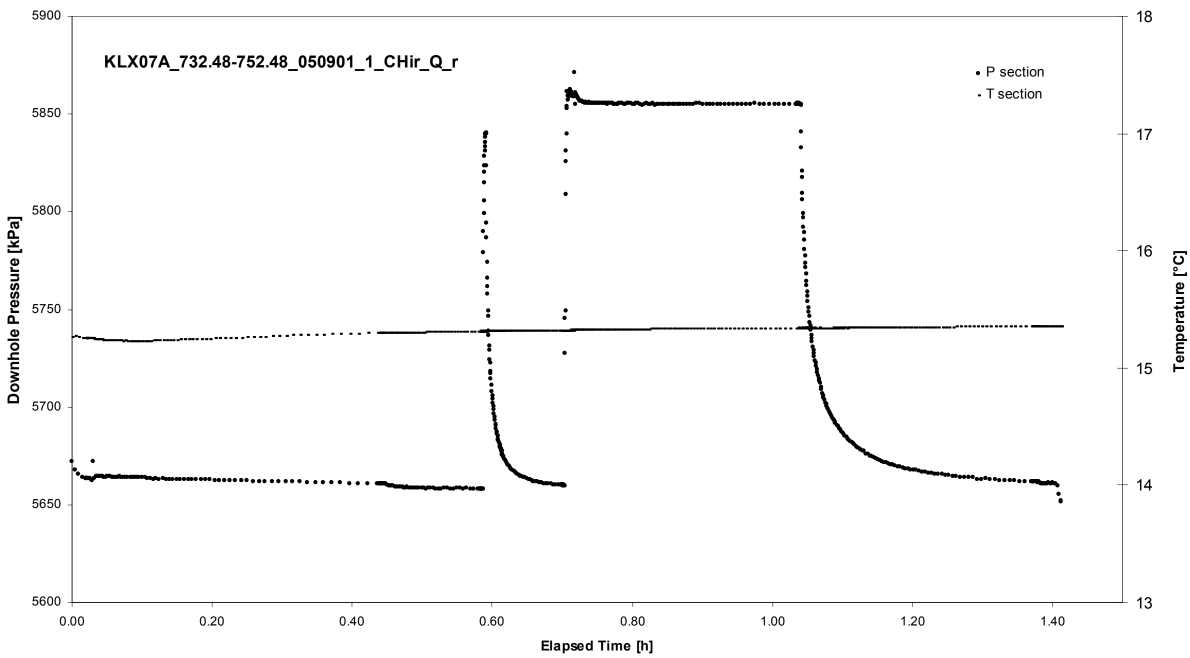
APPENDIX 2-44

Test 732.48-752.48 m

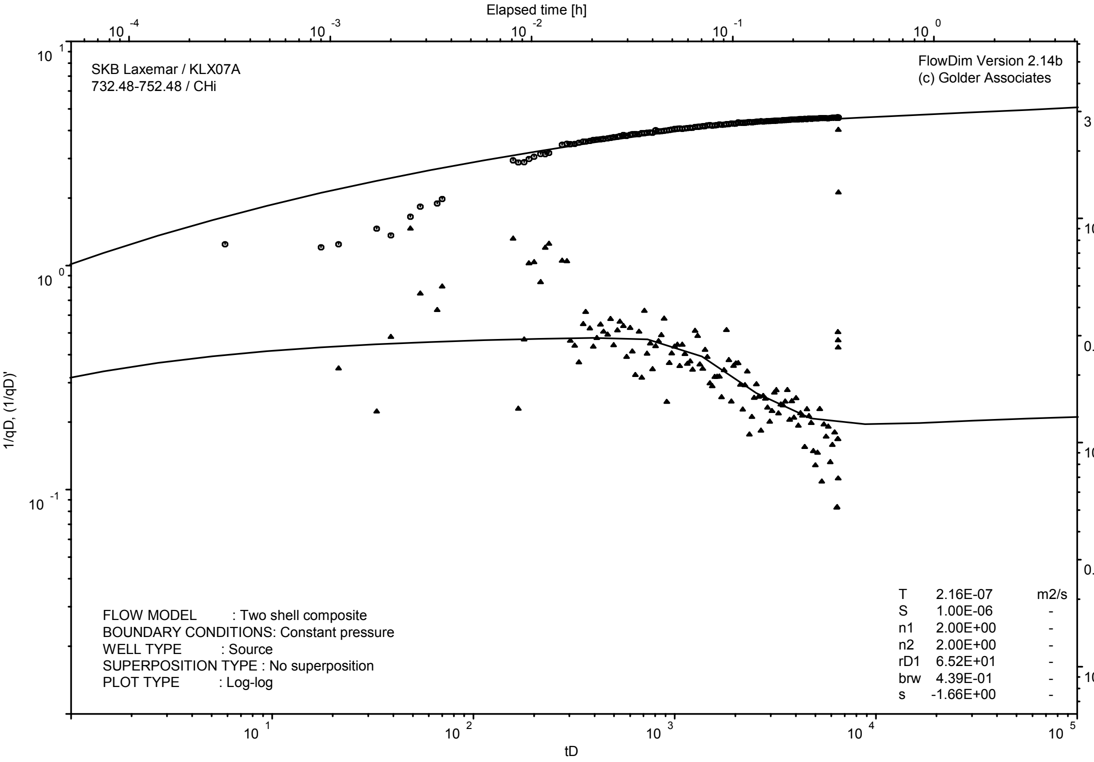
Analysis diagrams



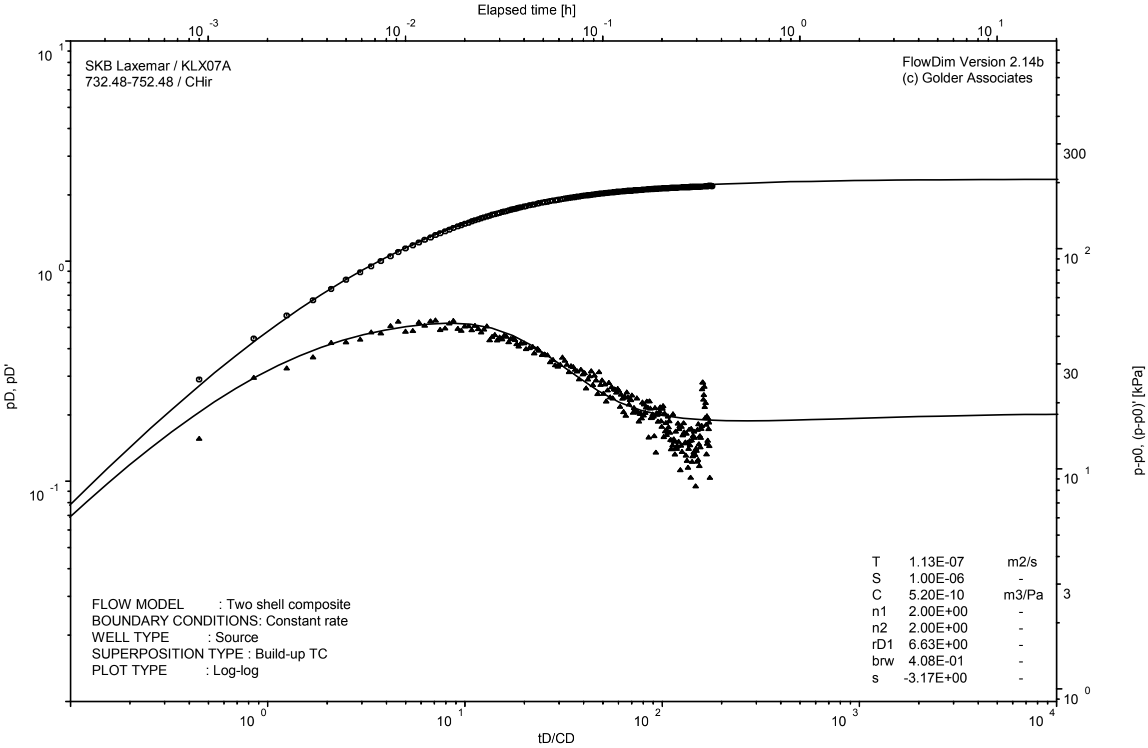
Pressure and flow rate vs. time; cartesian plot



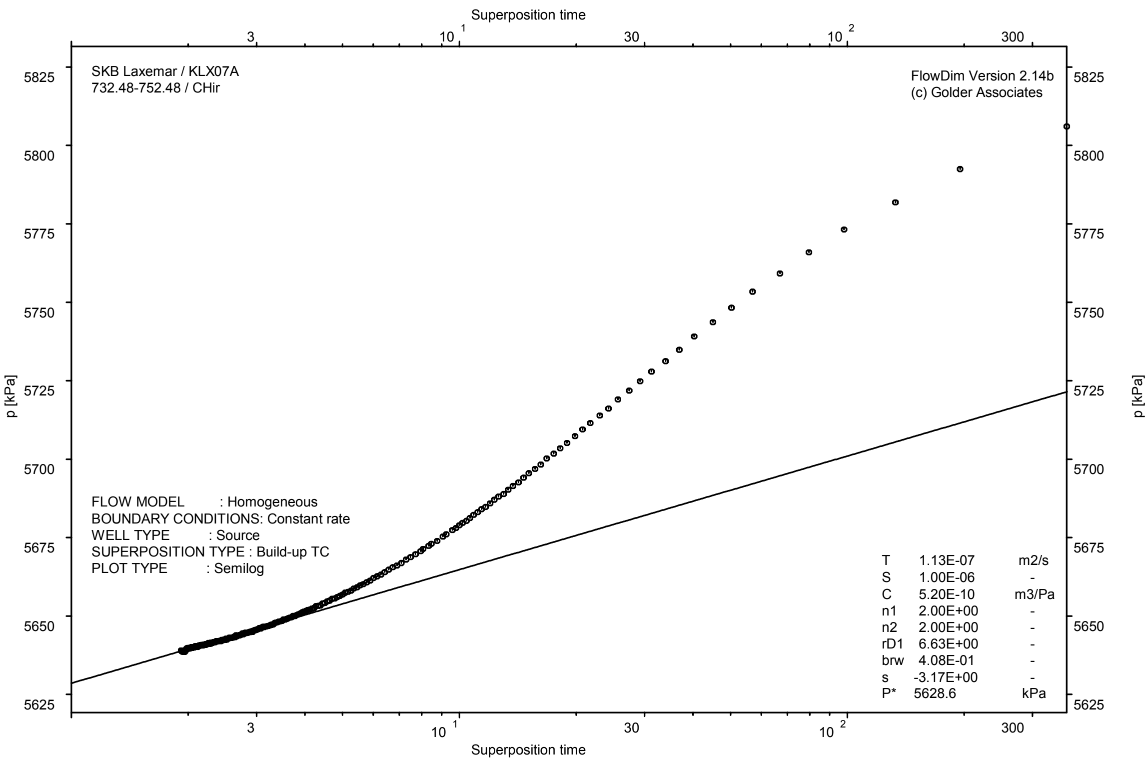
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

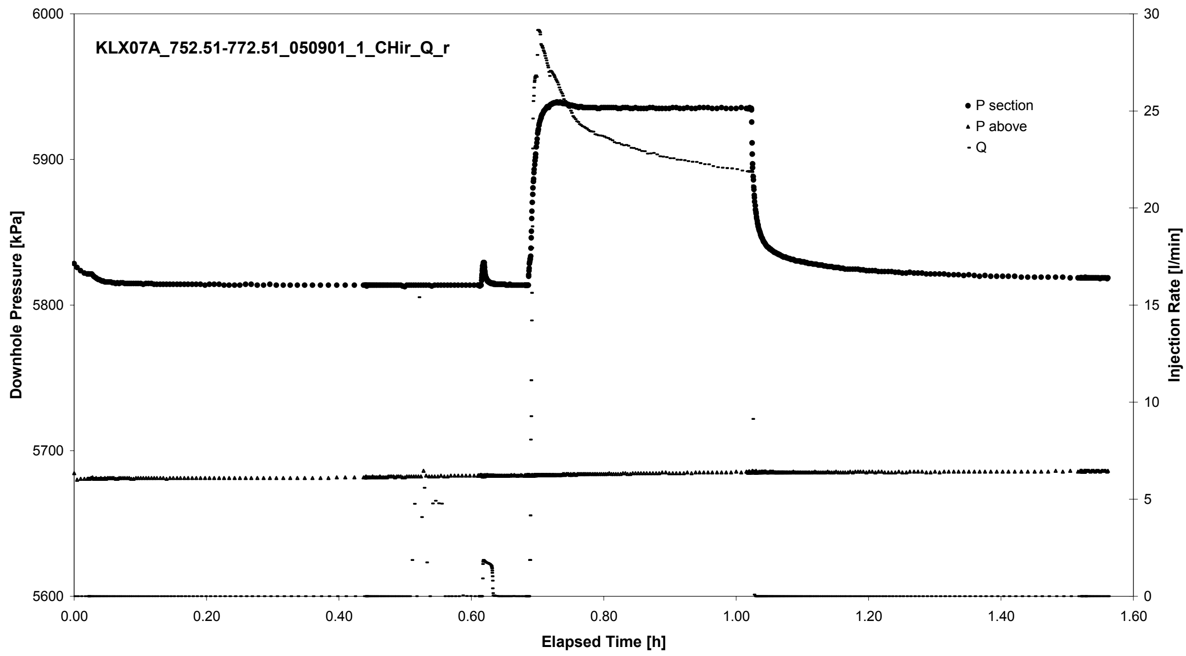


CHIR phase; HORNER match

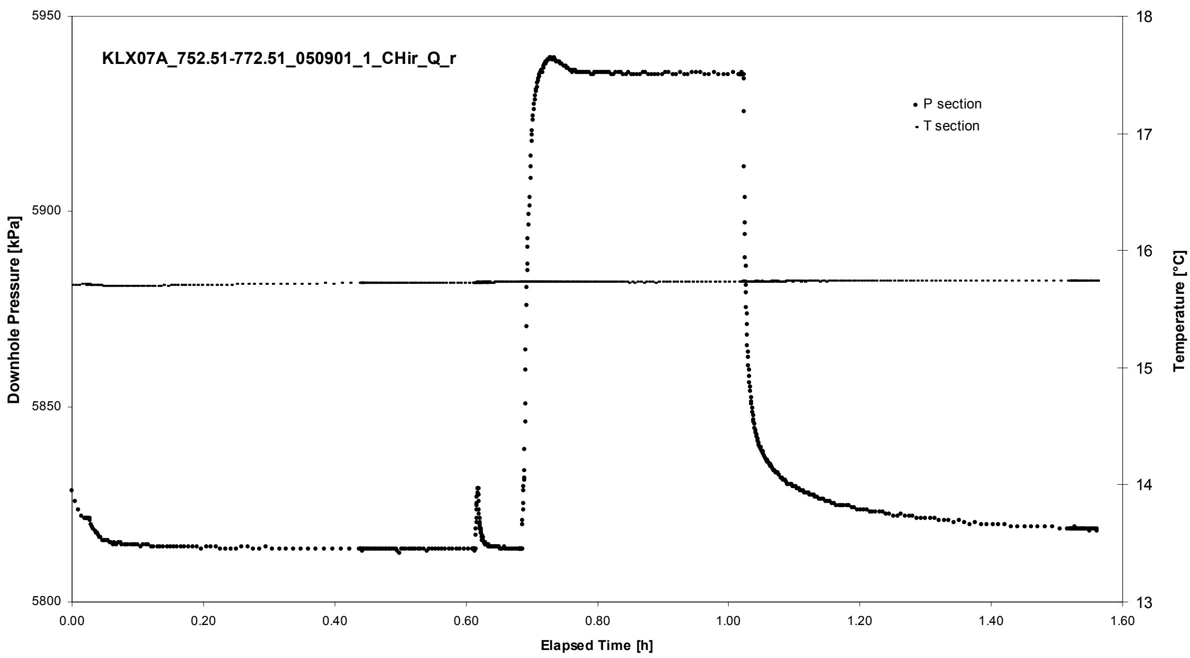
APPENDIX 2-45

Test 752.51-772.51 m

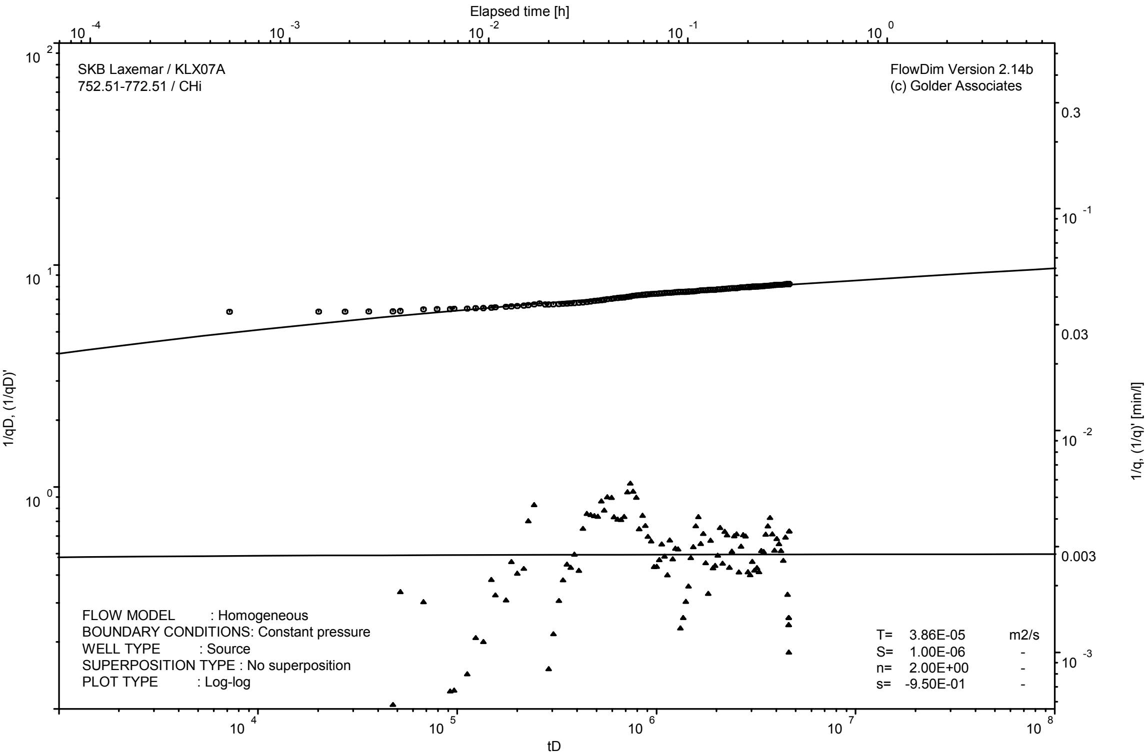
Analysis diagrams



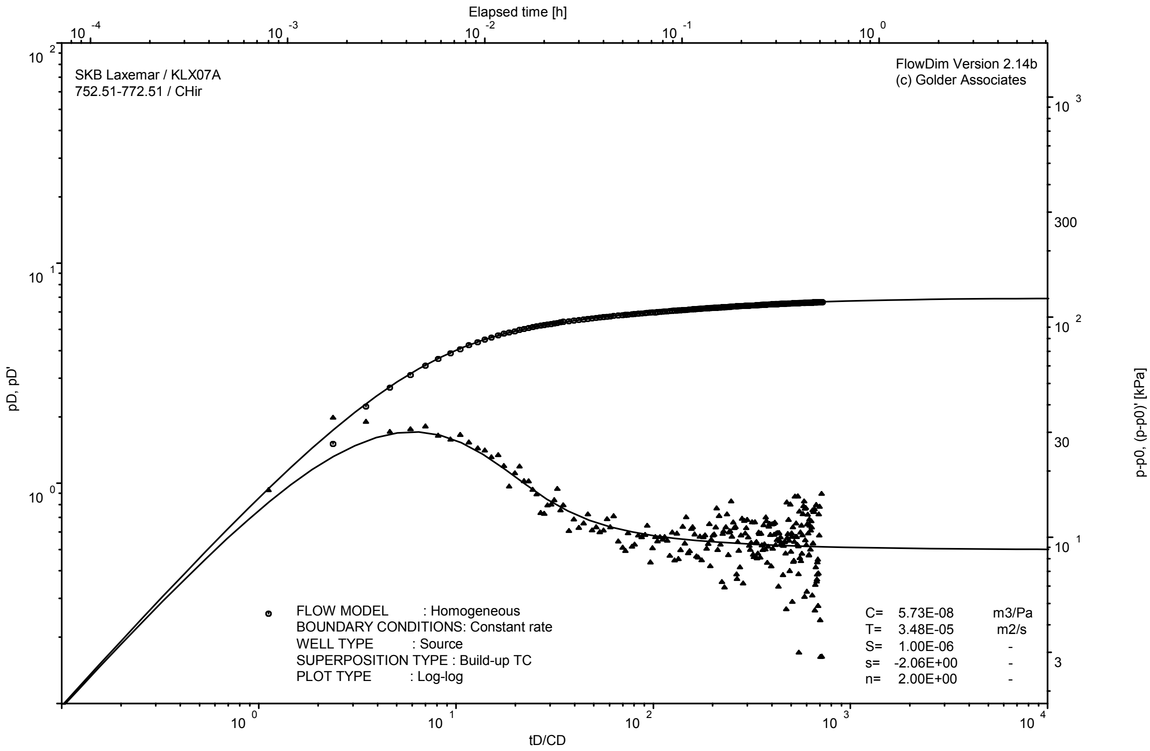
Pressure and flow rate vs. time; cartesian plot



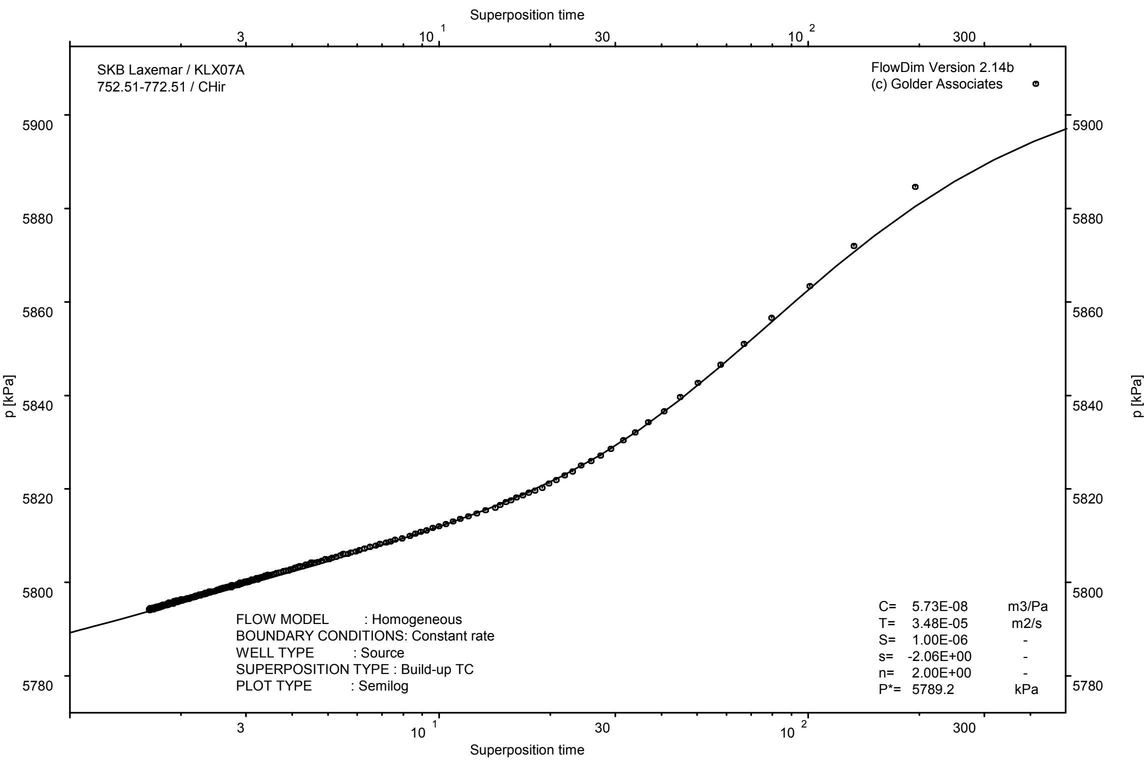
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

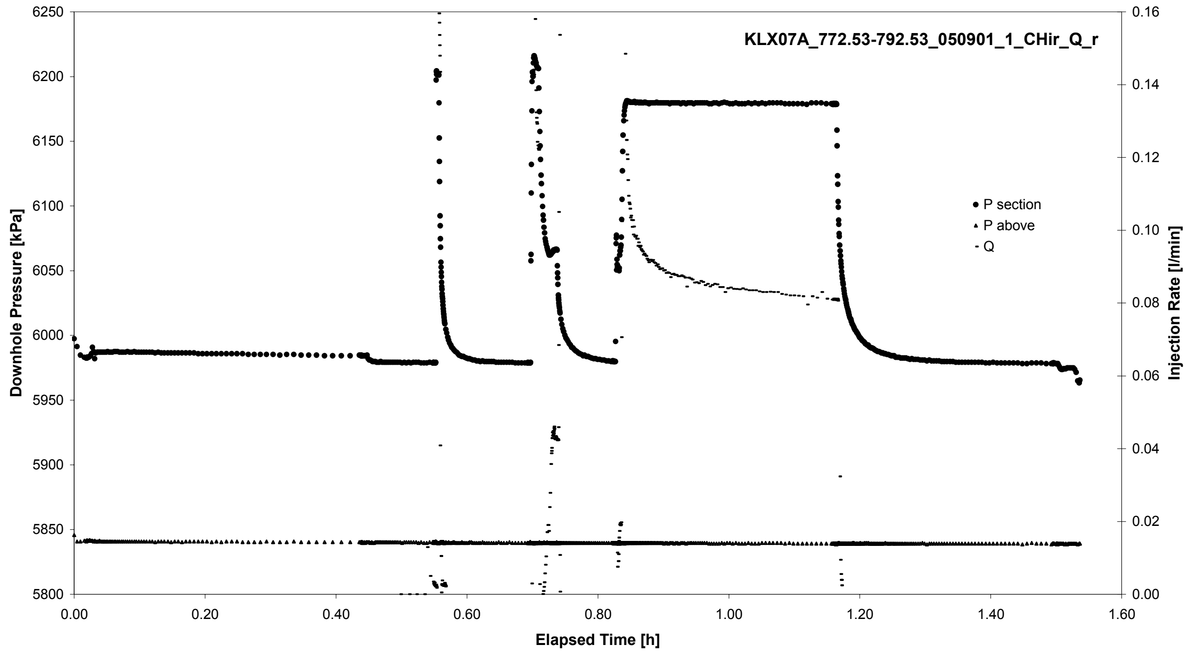


CHIR phase; HORNER match

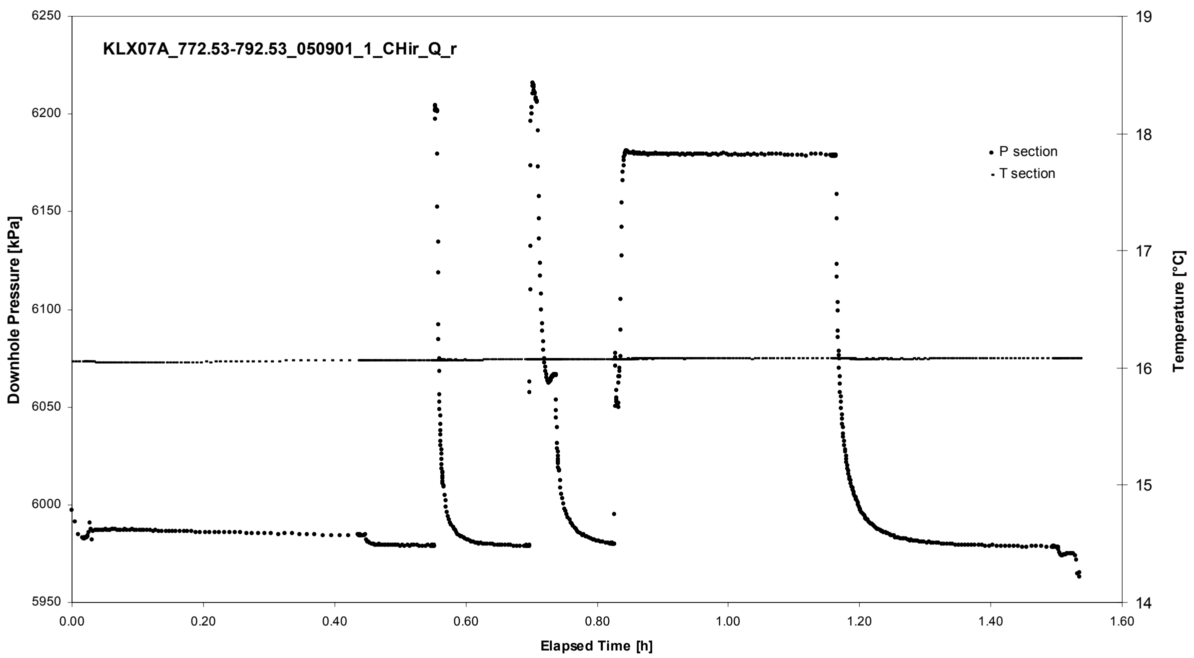
APPENDIX 2-46

Test 772.53-792.53 m

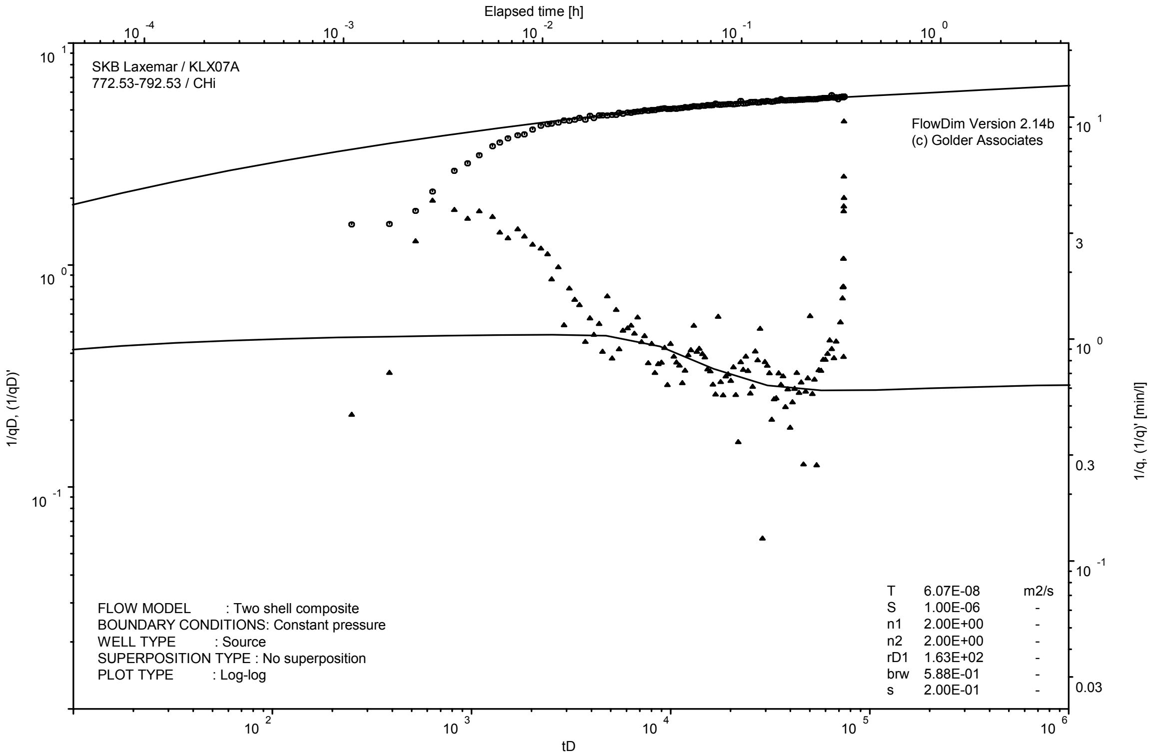
Analysis diagrams



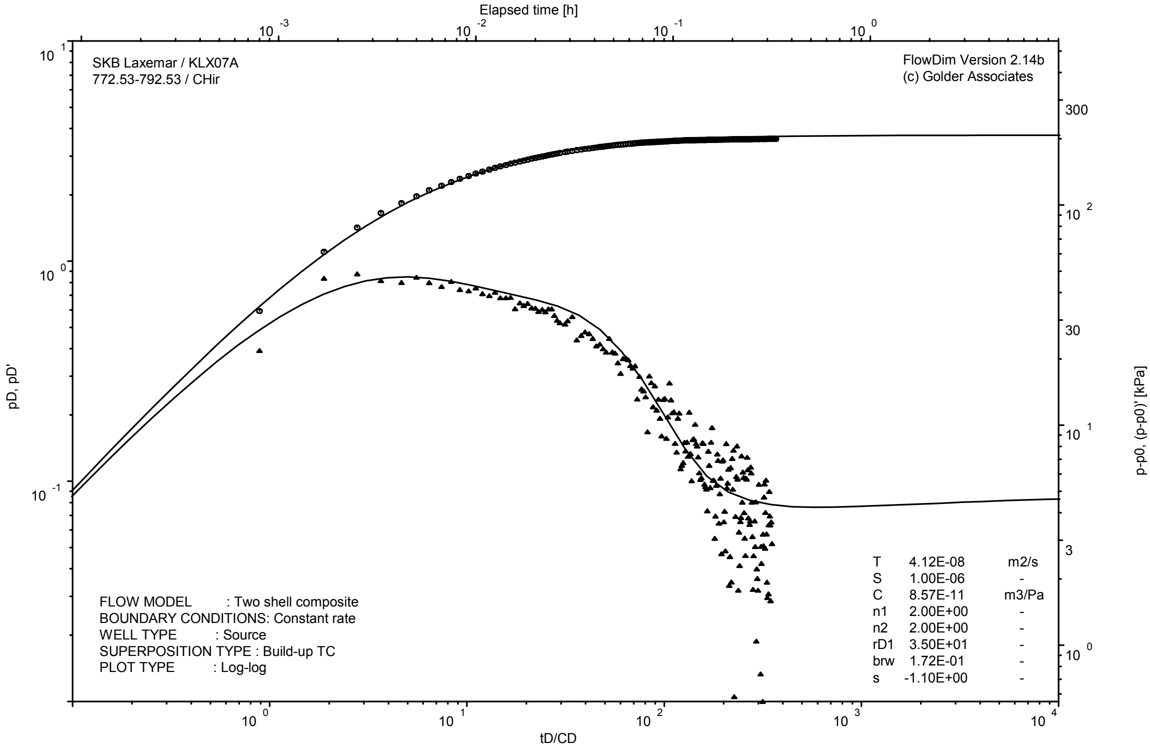
Pressure and flow rate vs. time; cartesian plot



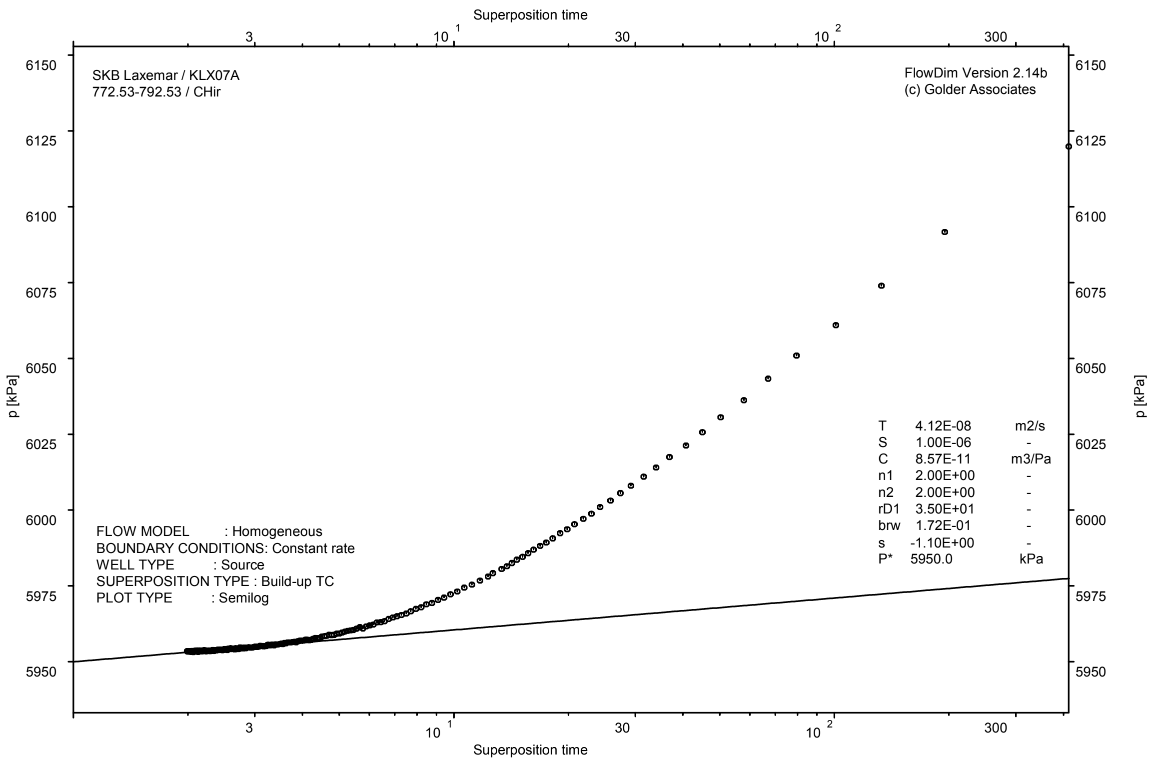
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

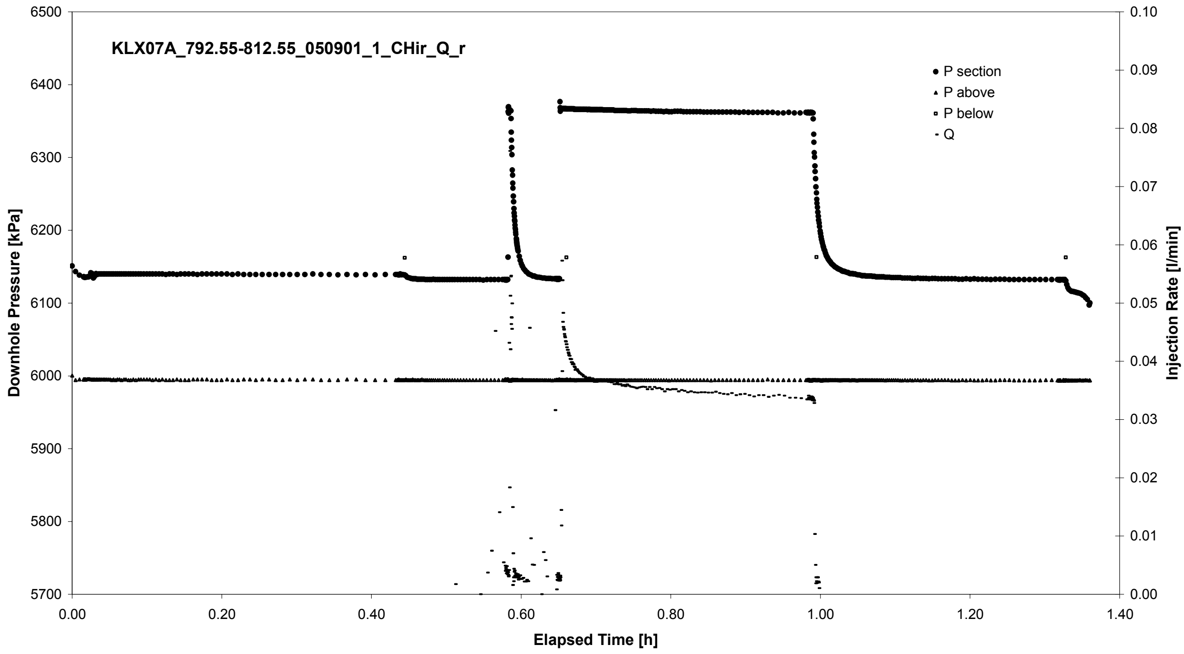


CHIR phase; HORNER match

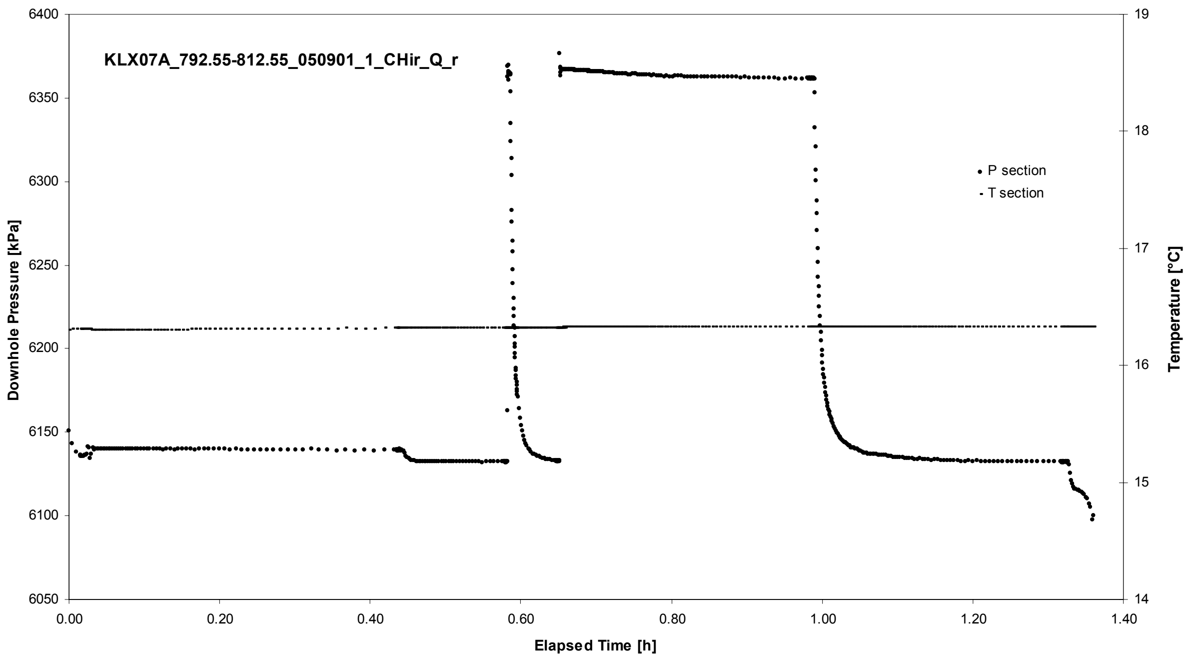
APPENDIX 2-47

Test 792.55-812.55 m

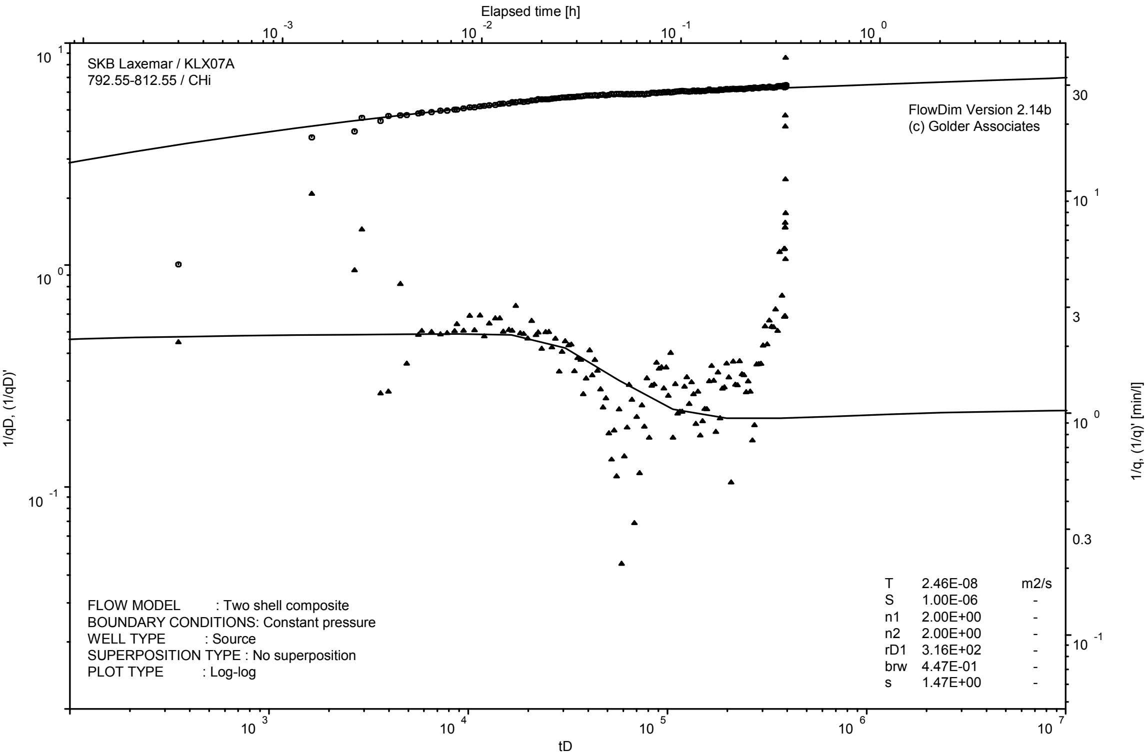
Analysis diagrams



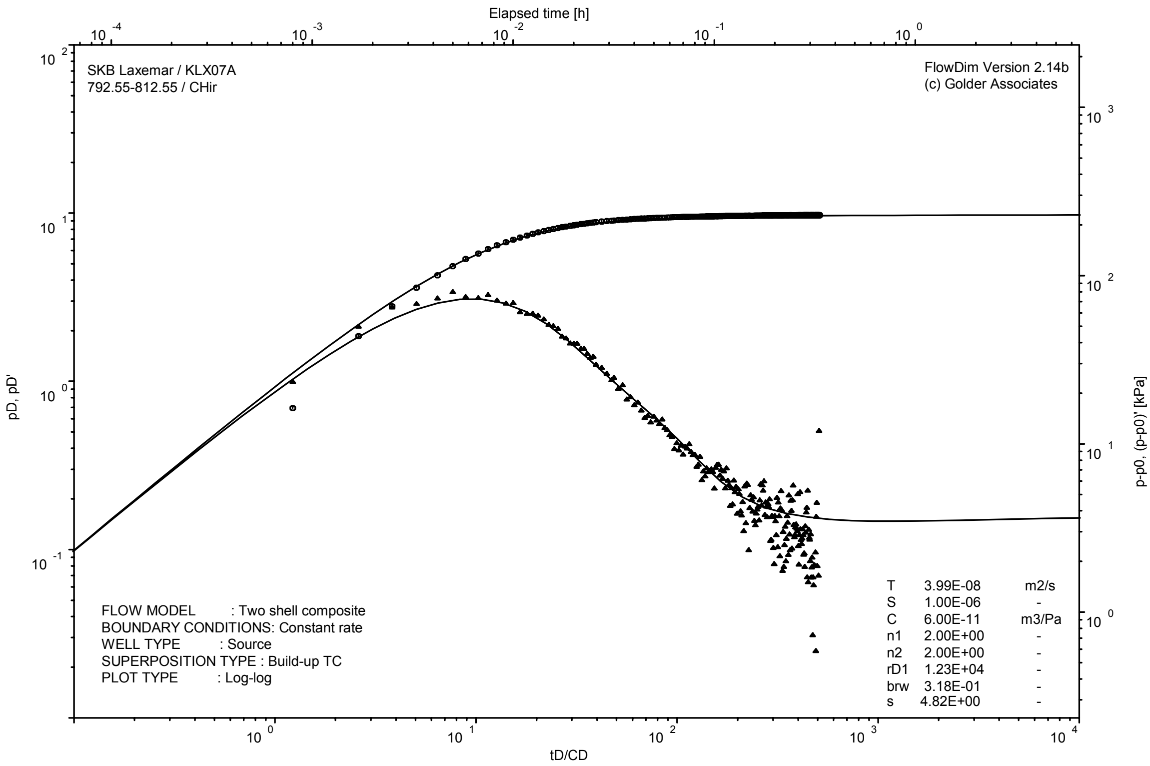
Pressure and flow rate vs. time; cartesian plot



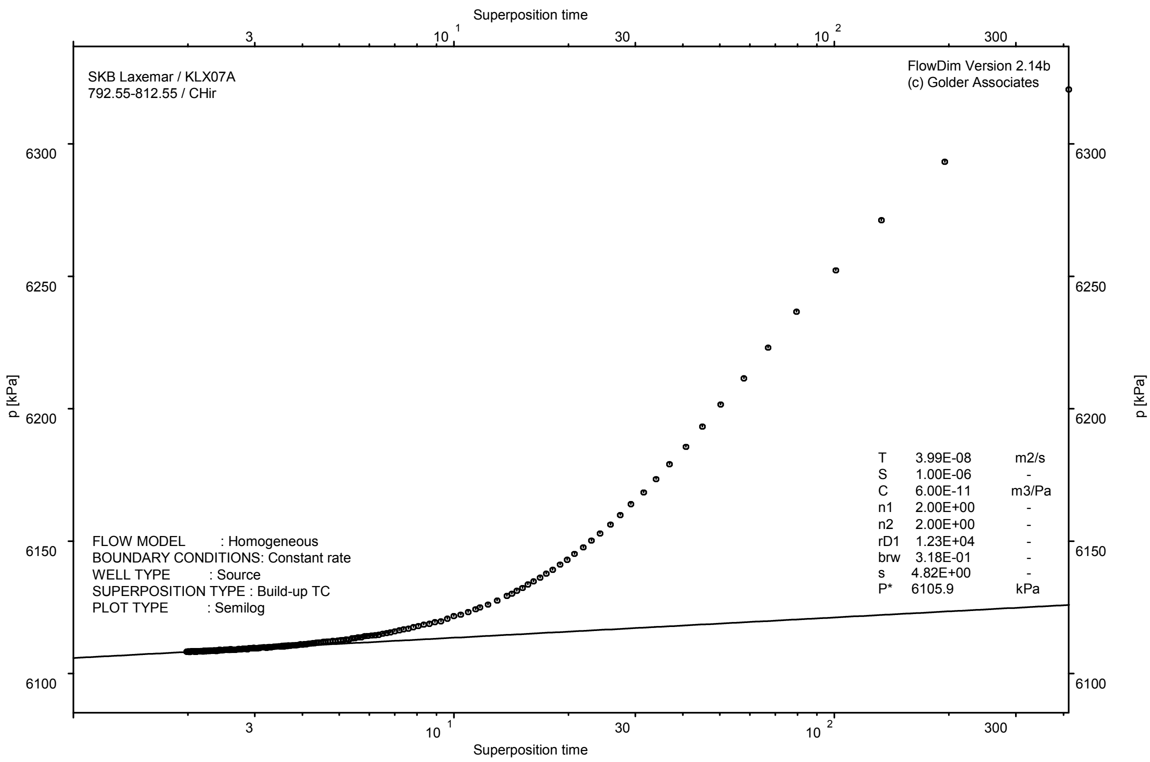
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

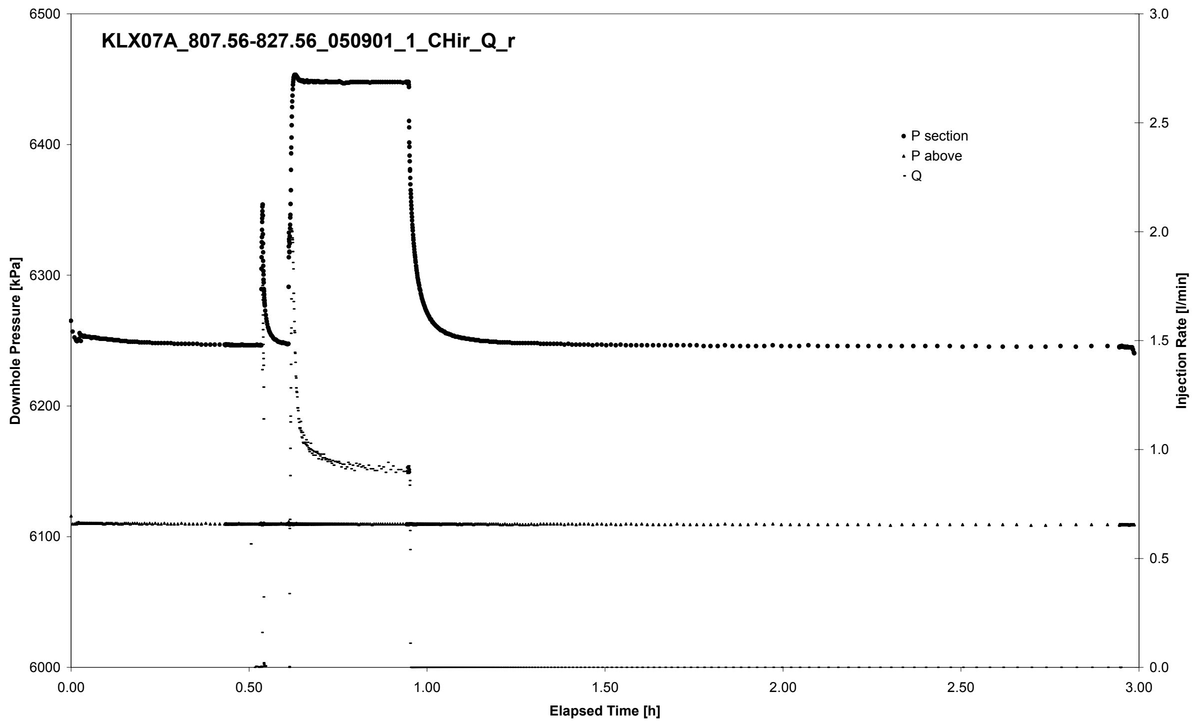


CHIR phase; HORNER match

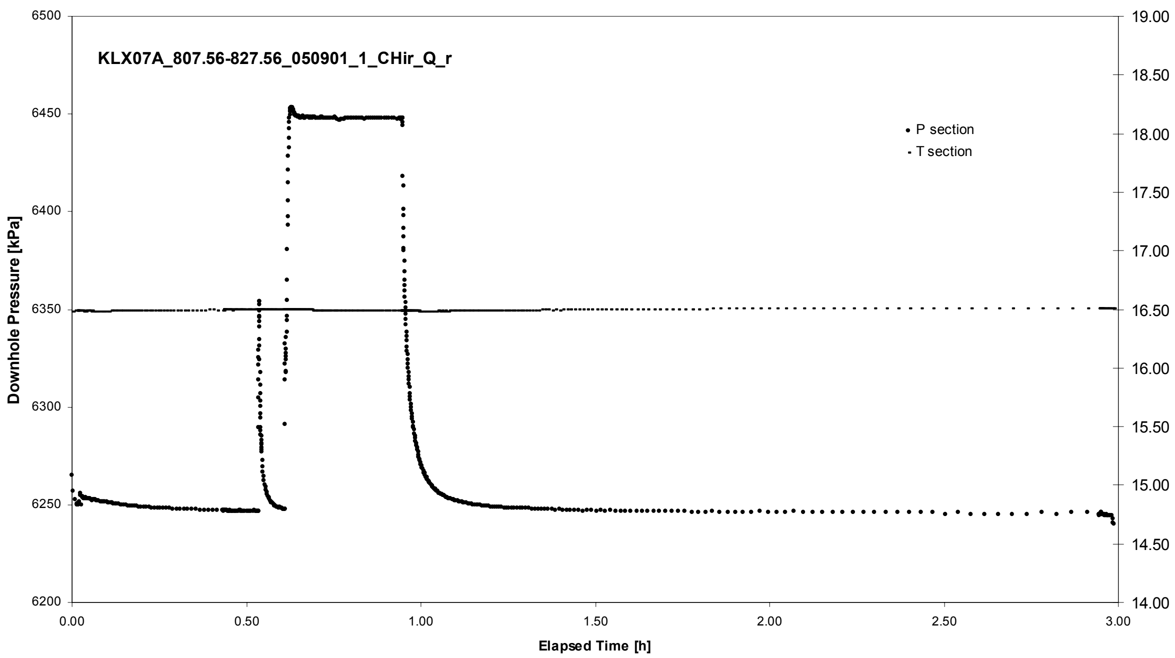
APPENDIX 2-48

Test 807.56-827.56 m

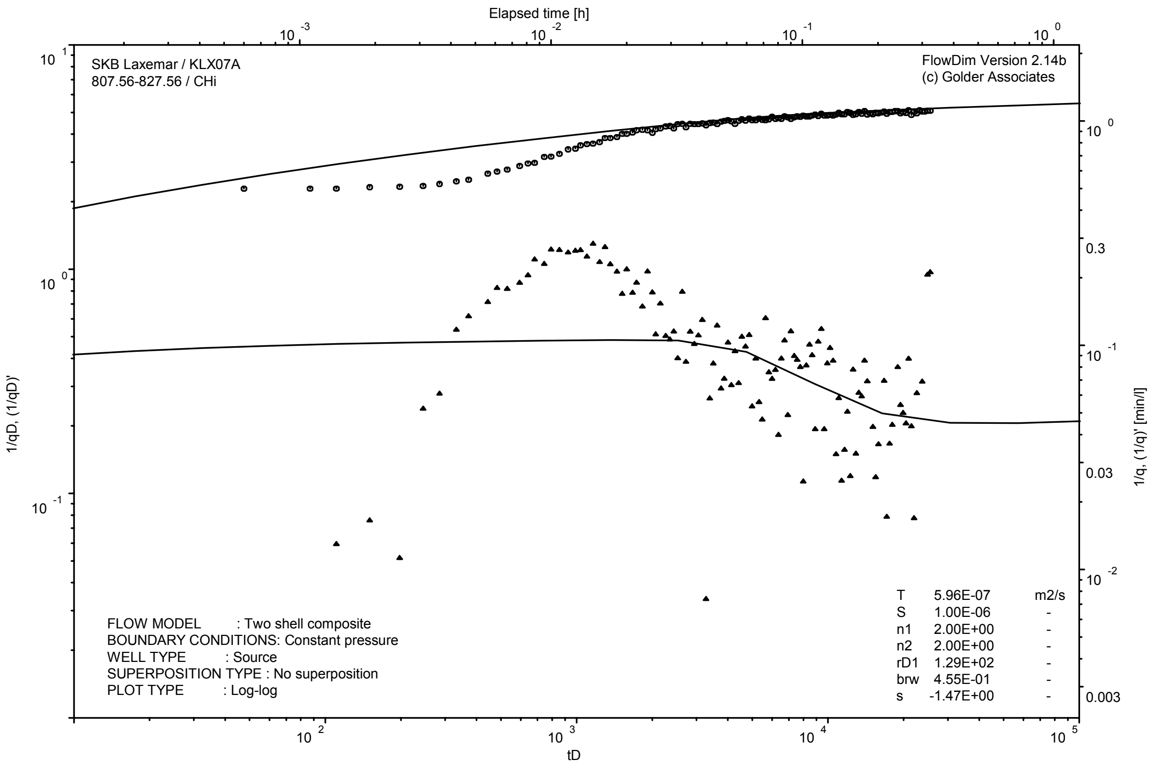
Analysis diagrams



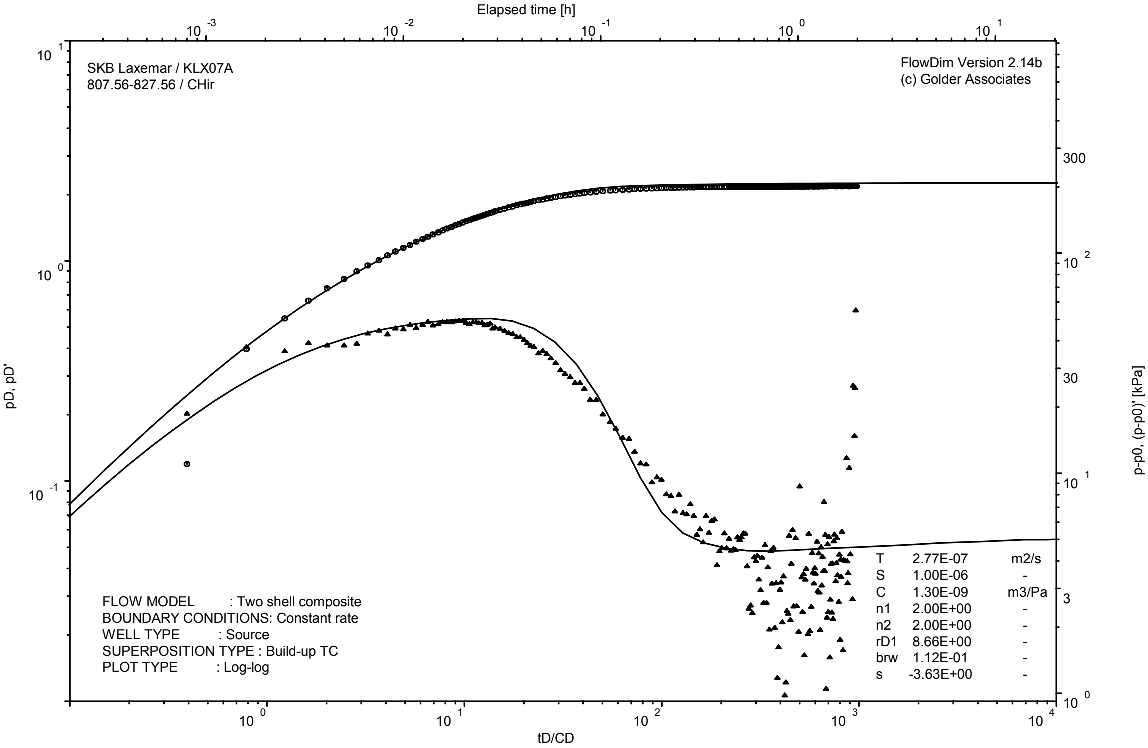
Pressure and flow rate vs. time; cartesian plot



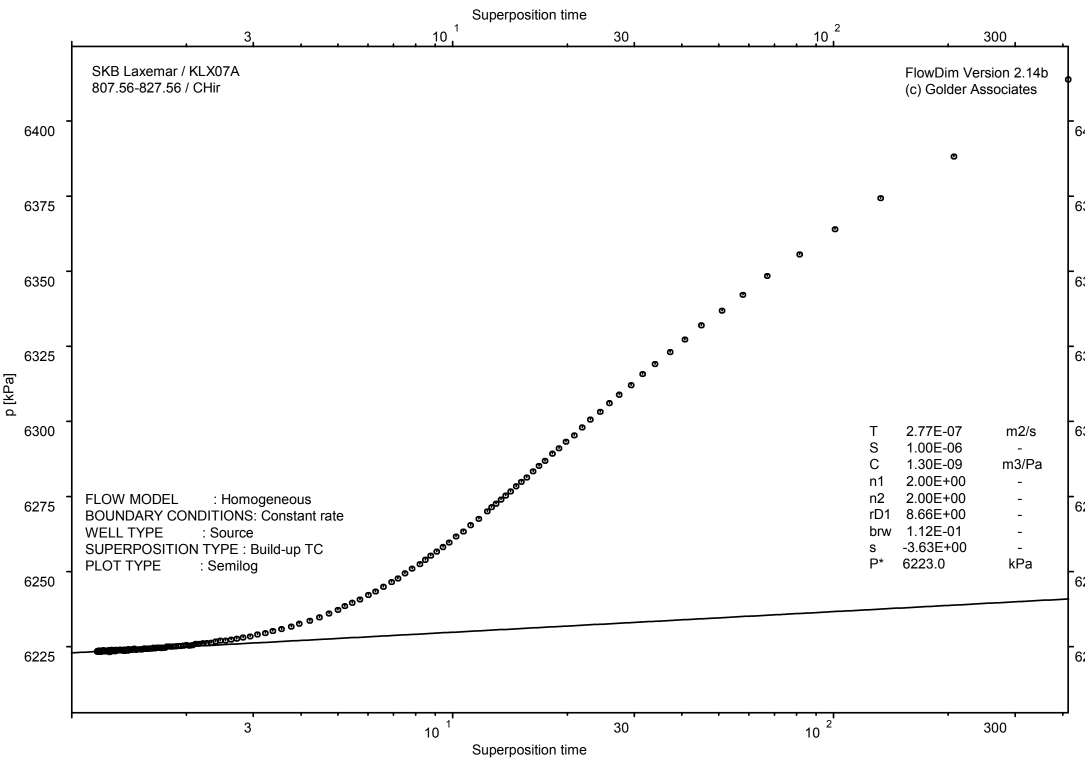
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

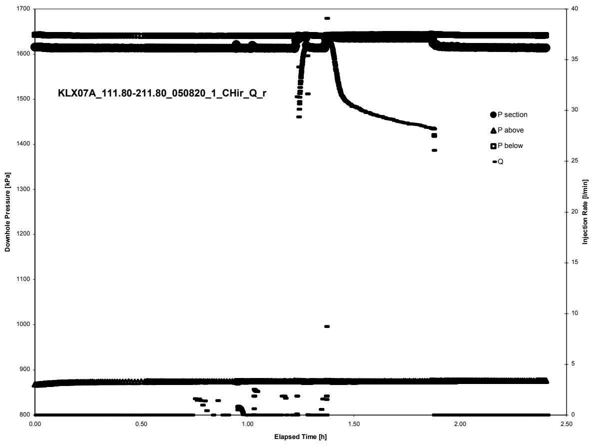
APPENDIX 3

Test Summary Sheets

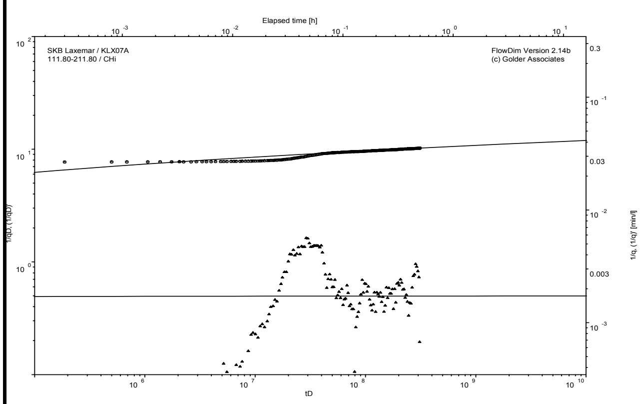
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050820 16:35
Test section from - to (m):	111.80-211.80 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

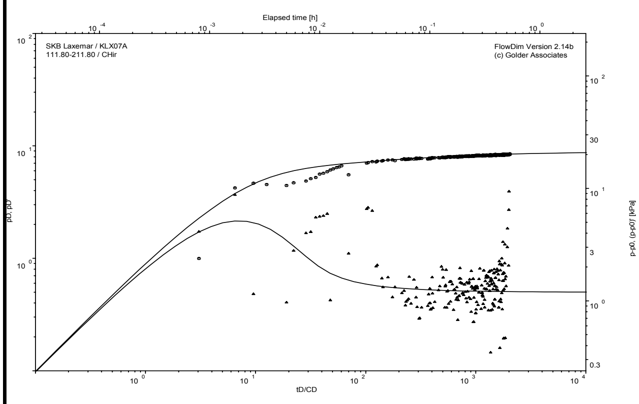
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1615		
p_i (kPa) =	1613		
p_p(kPa) =	1634	p_F (kPa) =	1614
Q_p (m^3/s)=	4.70E-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)=	9.1		
Derivative fact.=	0.02	Derivative fact.=	0.13
Results		**Results**	
Q/s (m^2/s)=	2.2E-04		
T_M (m^2/s)=	2.9E-04		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	5.2	dt_1 (min) =	2.25
dt_2 (min) =	25.4	dt_2 (min) =	27.80
T (m^2/s) =	3.6E-04	T (m^2/s) =	3.3E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.6E-06	K_s (m/s) =	3.3E-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-07
C_D (-) =	NA	C_D (-) =	2.2E+01
ξ (-) =	-1.53	ξ (-) =	-0.18
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	5.23	C (m^3/Pa) =	2.0E-07
dt_2 (min) =	25.44	C_D (-) =	2.2E+01
T_T (m^2/s) =	3.6E-04	ξ (-) =	-1.53
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-05		
S_s (1/m) =	5.0E-08		

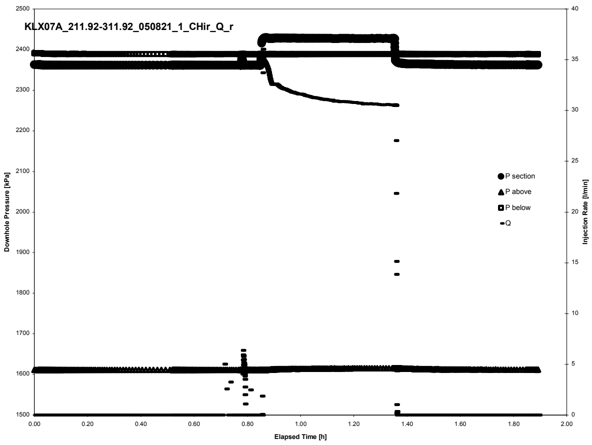
Comments:

The recommended transmissivity of 3.6E-4 m2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-4 to 6.0E-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 1594.0 kPa.

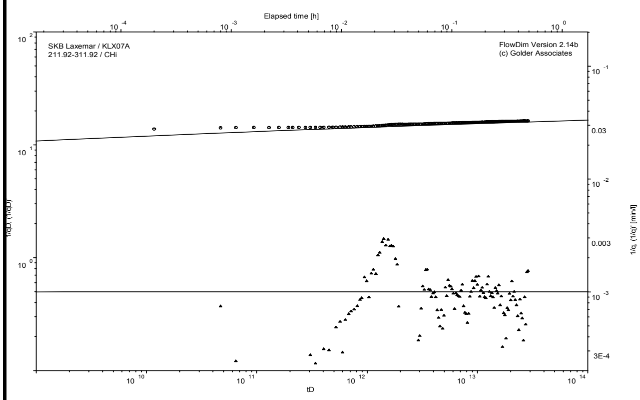
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050821 15:28
Test section from - to (m):	211.92-311.92	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

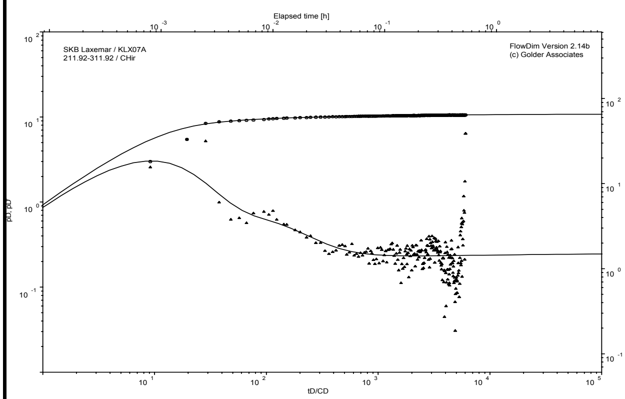
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2363		
p_i (kPa) =	2361		
p_p(kPa) =	2427	p_F (kPa) =	2362
Q_p (m^3/s)=	5.08E-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)=	10.3		
Derivative fact.=	0.02	Derivative fact.=	0.13
Results		**Results**	
Q/s (m^2/s)=	7.6E-05		
T_M (m^2/s)=	9.8E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.36	dt_1 (min) =	3.80
dt_2 (min) =	22.55	dt_2 (min) =	25.30
T (m^2/s) =	2.0E-04	T (m^2/s) =	2.7E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.0E-06	K_s (m/s) =	2.7E-06
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.7E-08
C_D (-) =	NA	C_D (-) =	3.0E+00
ξ (-) =	5.85	ξ (-) =	1.77
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	3.80	C (m^3/Pa) =	2.7E-08
dt_2 (min) =	25.30	C_D (-) =	3.0E+00
T_T (m^2/s) =	2.7E-04	ξ (-) =	1.77
S (-) =	1.0E-06		
K_s (m/s) =	1.4E-05		
S_s (1/m) =	5.0E-08		

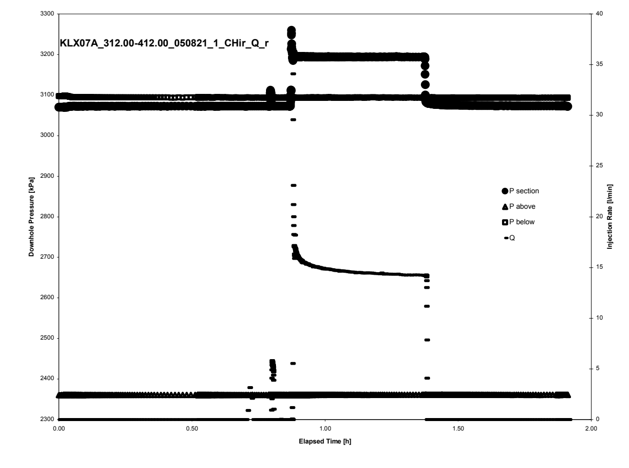
Comments:

The recommended transmissivity of 2.7E-4 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-5 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 2342.3 kPa.

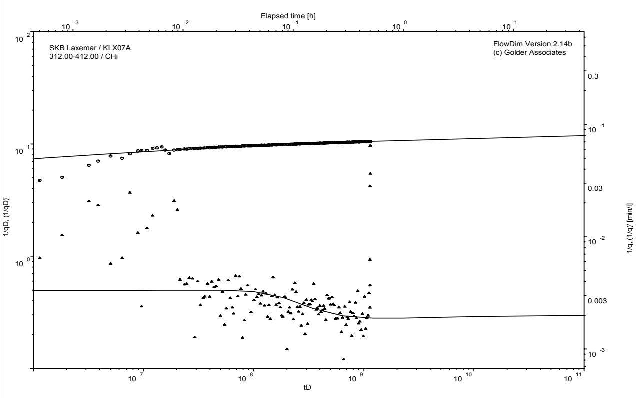
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050821 18:57
Test section from - to (m):	312.00-412.00 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

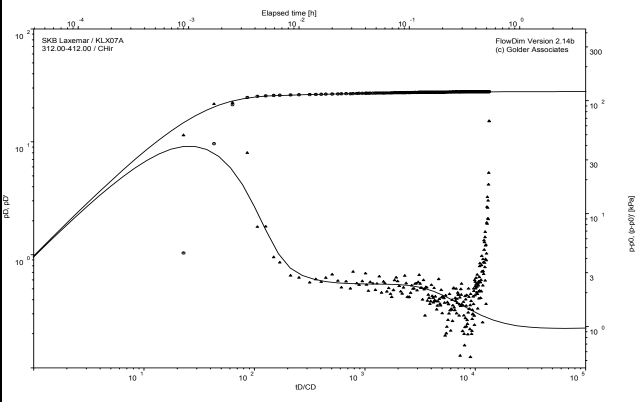
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3070		
p_i (kPa) =	3073		
p_p(kPa) =	3193	p_F (kPa) =	3071
Q_p (m^3/s)=	2.33E-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.=	0.05	Derivative fact.=	0.12
Results		**Results**	
Q/s (m^2/s)=	1.9E-05		
T_M (m^2/s)=	2.5E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.82	dt_1 (min) =	1.00
dt_2 (min) =	3.10	dt_2 (min) =	6.90
T (m^2/s) =	3.2E-05	T (m^2/s) =	8.9E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.6E-06	K_s (m/s) =	4.4E-06
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.1E-09
C_D (-) =	NA	C_D (-) =	8.9E-01
ξ (-) =	1.67	ξ (-) =	18.50
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	1.00	C (m^3/Pa) =	8.1E-09
dt_2 (min) =	6.90	C_D (-) =	8.9E-01
T_T (m^2/s) =	8.9E-05	ξ (-) =	18.50
S (-) =	1.0E-06		
K_s (m/s) =	4.4E-06		
S_s (1/m) =	5.0E-08		

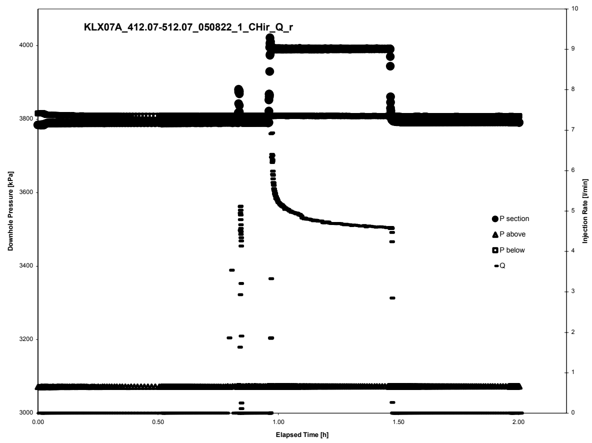
Comments:

The recommended transmissivity of 8.9E-5 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-5 to 2.0E-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 3053.9 kPa.

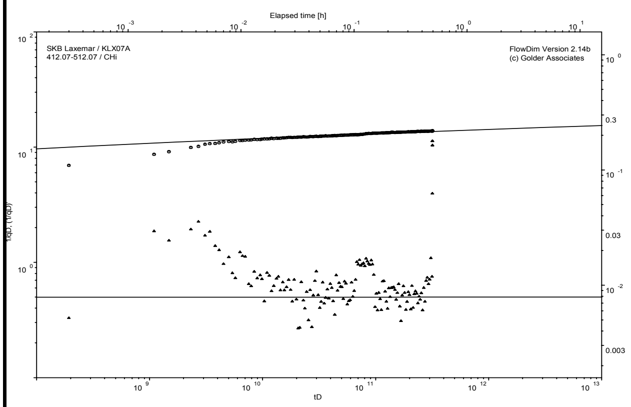
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050822 09:58
Test section from - to (m):	412.07-512.07 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

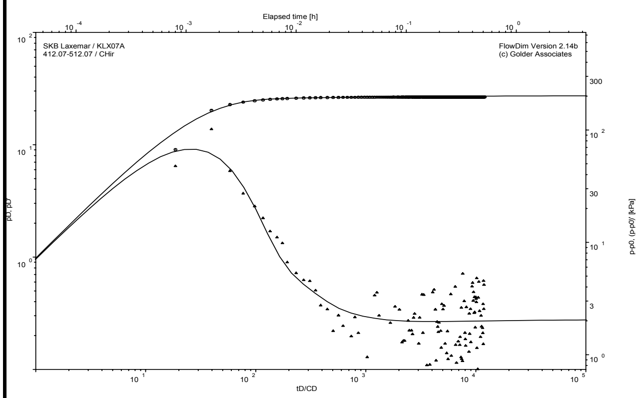
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3785		
p_i (kPa) =	3791		
p_p(kPa) =	3991	p_F (kPa) =	3792
Q_p (m^3/s)=	7.62E-05		
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)=	12.4		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.7E-06		
T_M (m^2/s)=	4.9E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.97	dt_1 (min) =	3.40
dt_2 (min) =	25.44	dt_2 (min) =	29.64
T (m^2/s) =	8.3E-06	T (m^2/s) =	3.0E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.3E-08	K_s (m/s) =	3.0E-07
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.7E-09
C_D (-) =	NA	C_D (-) =	1.8E-01
ξ (-) =	5.18	ξ (-) =	19.30
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.97	C (m^3/Pa) =	1.7E-09
dt_2 (min) =	25.44	C_D (-) =	1.8E-01
T_T (m^2/s) =	8.3E-06	ξ (-) =	5.18
S (-) =	1.0E-06		
K_s (m/s) =	8.3E-08		
S_s (1/m) =	1.0E-08		

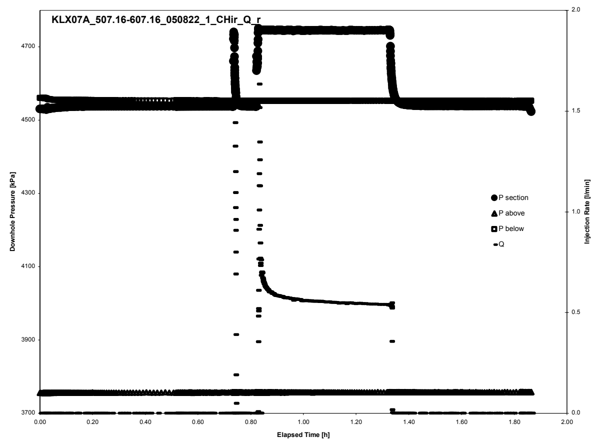
Comments:

The recommended transmissivity of 8.3E-6 m2/s was derived from the analysis of the CHi, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E-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 3772.6 kPa.

Test Summary Sheet

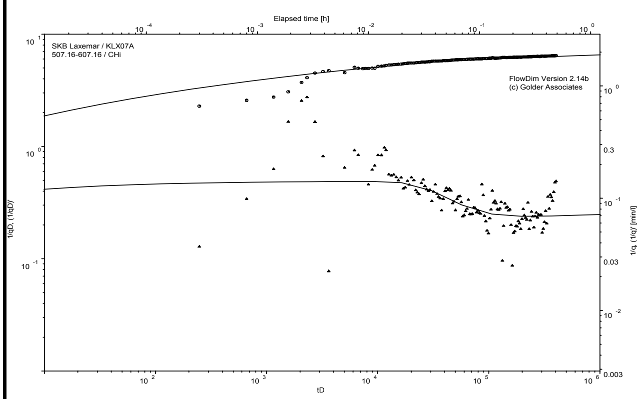
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050822 13:45
Test section from - to (m):	507.16-607.16 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

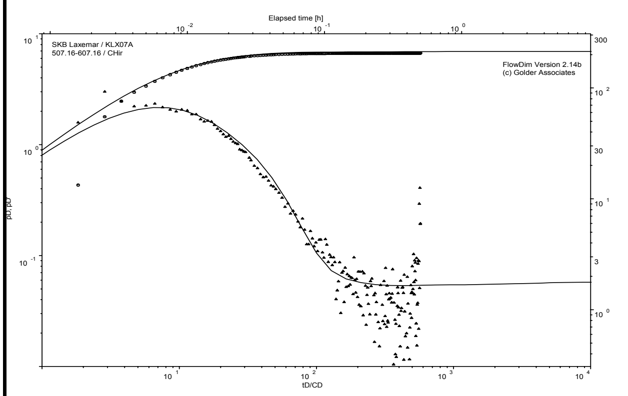


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4530		
p_i (kPa) =	4538		
p_p(kPa) =	4746	p_F (kPa) =	4539
Q_p (m^3/s)=	9.00E-06		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.5		
Derivative fact.=	0.08	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	4.2E-07		
T_M (m^2/s)=	5.5E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	9.15	dt_1 (min) =	*
dt_2 (min) =	24.20	dt_2 (min) =	*
T (m^2/s) =	8.3E-07	T (m^2/s) =	4.8E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.3E-09	K_s (m/s) =	4.8E-09
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9.7E-10
C_D (-) =	NA	C_D (-) =	1.1E-01
ξ (-) =	-0.14	ξ (-) =	1.13
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) =	*	C (m^3/Pa) =	9.7E-10
dt_2 (min) =	*	C_D (-) =	1.1E-01
T_T (m^2/s) =	4.8E-07	ξ (-) =	1.13
S (-) =	1.0E-06		
K_s (m/s) =	2.4E-08		
S_s (1/m) =	5.0E-08		

Comments:

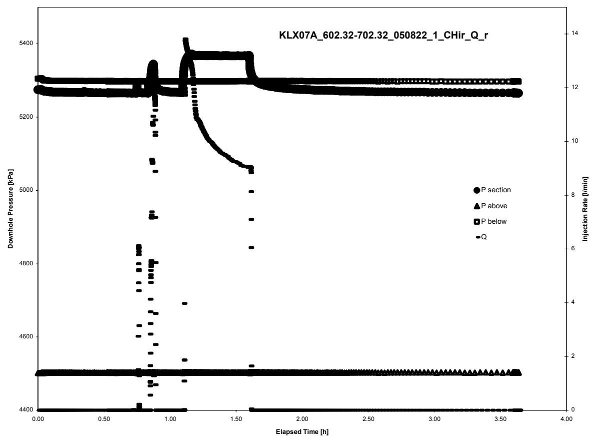
*: IARF not reached

The recommended transmissivity of 4.8E-7 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-7 to 9.0E-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 4515.4 kPa.

Test Summary Sheet

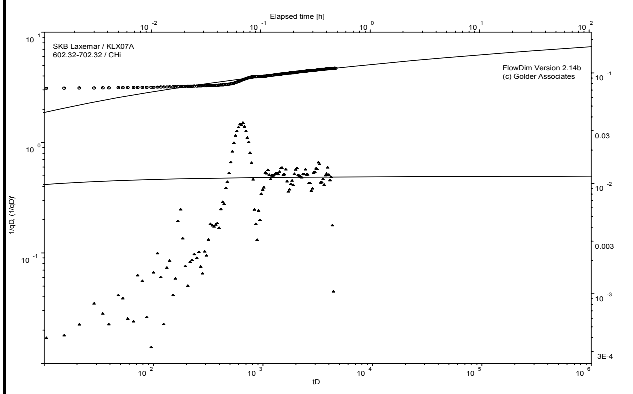
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050822 17:07
Test section from - to (m):	602.32-702.32 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5274		
p_i (kPa) =	5267		
p_p(kPa) =	5367	p_F (kPa) =	5264
Q_p (m^3/s)=	1.50E-04		
tp (s) =	1800	t_F (s) =	7200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.7		
Derivative fact.=	0.02	Derivative fact.=	0.17
Results		**Results**	
Q/s (m^2/s)=	1.5E-05		
T_M (m^2/s)=	1.9E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	6.78	dt_1 (min) =	3.30
dt_2 (min) =	26.27	dt_2 (min) =	28.90
T (m^2/s) =	1.1E-05	T (m^2/s) =	9.8E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-07	K_s (m/s) =	9.8E-08
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.9E-08
C_D (-) =	NA	C_D (-) =	4.3E+00
ξ (-) =	-3.99	ξ (-) =	-4.74
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

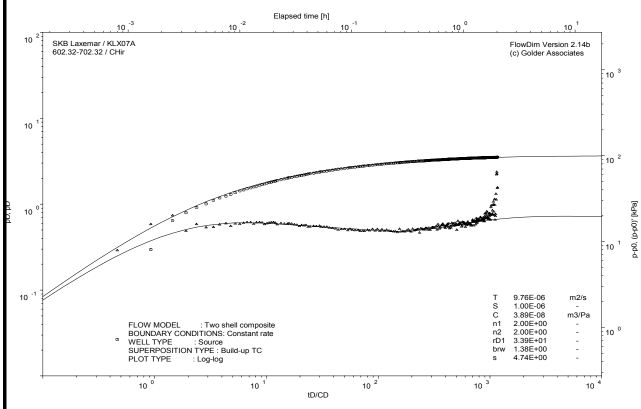
Log-Log plot incl. derivates- flow period



Selected representative parameters.

dt_1 (min) =	3.30	C (m^3/Pa) =	3.9E-08
dt_2 (min) =	28.90	C_D (-) =	4.3E+00
T_T (m^2/s) =	9.8E-06	ξ (-) =	-4.74
S (-) =	1.0E-06		
K_s (m/s) =	4.9E-07		
S_s (1/m) =	5.0E-08		

Log-Log plot incl. derivatives- recovery period



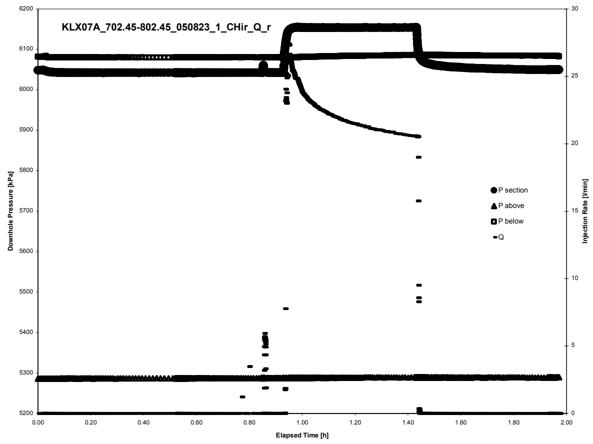
Comments:

The recommended transmissivity of 9.8E-6 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-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 5240.6 kPa.

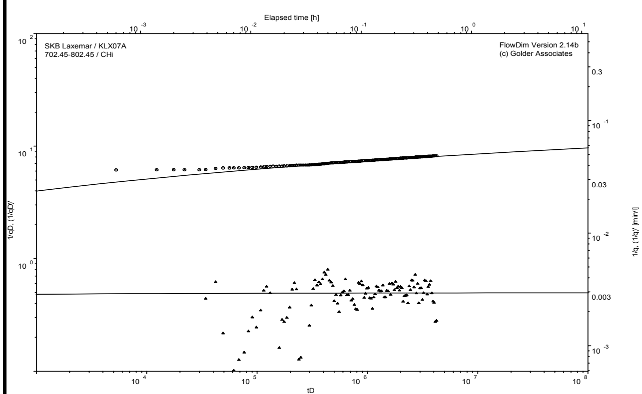
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050823 09:33
Test section from - to (m):	702.45-802.45 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

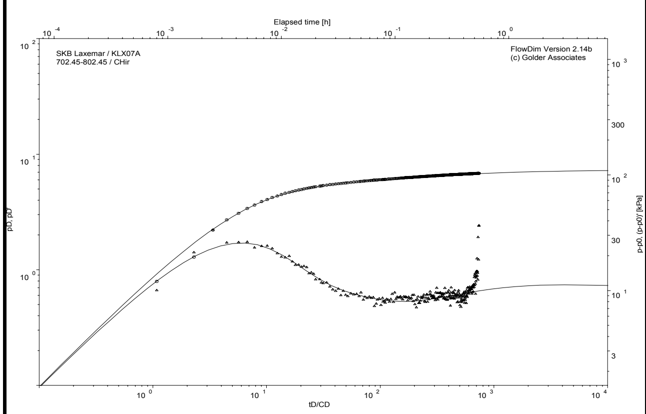
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	6048		
p_i (kPa) =	6043		
p_p(kPa) =	6154	p_F (kPa) =	6049
Q_p (m^3/s)=	3.42E-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)=	16.2		
Derivative fact.=	0.02	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	3.0E-05		
T_M (m^2/s)=	3.9E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.90	dt_1 (min) =	1.19
dt_2 (min) =	26.20	dt_2 (min) =	3.40
T (m^2/s) =	4.0E-05	T (m^2/s) =	3.8E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.0E-07	K_s (m/s) =	3.8E-07
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.5E-08
C_D (-) =	NA	C_D (-) =	7.1E+00
ξ (-) =	-1.08	ξ (-) =	-2.12
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	1.19	C (m^3/Pa) =	6.5E-08
dt_2 (min) =	3.40	C_D (-) =	7.1E+00
T_T (m^2/s) =	3.8E-05	ξ (-) =	-2.12
S (-) =	1.0E-06		
K_s (m/s) =	1.9E-06		
S_s (1/m) =	5.0E-08		

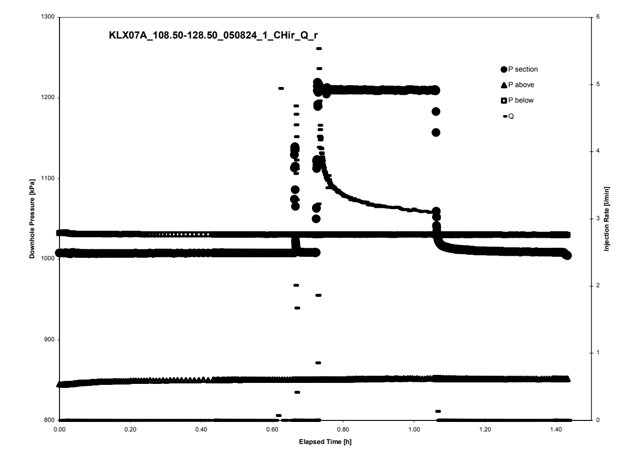
Comments:

The recommended transmissivity of 3.8E-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 2.0E-5 to 5.0E-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 6022.8 kPa.

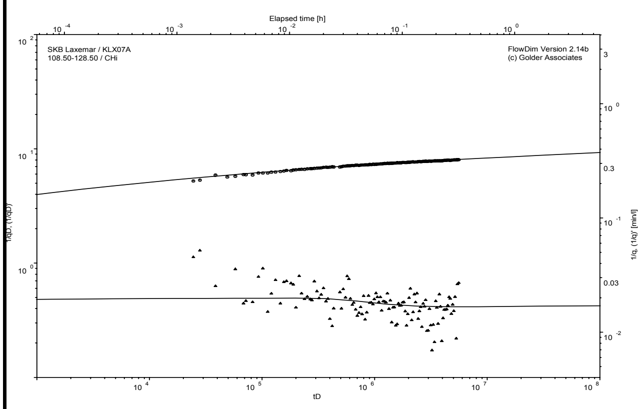
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050824 16:10
Test section from - to (m):	108.50-128.50 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

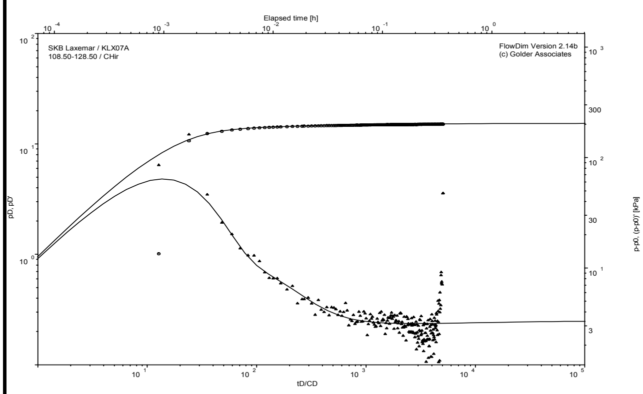
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1008		
p_i (kPa) =	1008		
p_p(kPa) =	1209	p_F (kPa) =	1008
Q_p (m^3/s)=	5.17E-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)=	8.5		
Derivative fact.=	0.07	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	2.5E-06		
T_M (m^2/s)=	2.6E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.02	dt_1 (min) =	*
dt_2 (min) =	1.48	dt_2 (min) =	*
T (m^2/s) =	3.2E-06	T (m^2/s) =	6.4E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.6E-07	K_s (m/s) =	3.2E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.0E-09
C_D (-) =	NA	C_D (-) =	1.1E-01
ξ (-) =	0.39	ξ (-) =	0.50
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.02	C (m^3/Pa) =	1.0E-09
dt_2 (min) =	1.48	C_D (-) =	1.1E-01
T_T (m^2/s) =	3.2E-06	ξ (-) =	0.39
S (-) =	1.0E-06		
K_s (m/s) =	1.6E-07		
S_s (1/m) =	5.0E-08		

Comments:

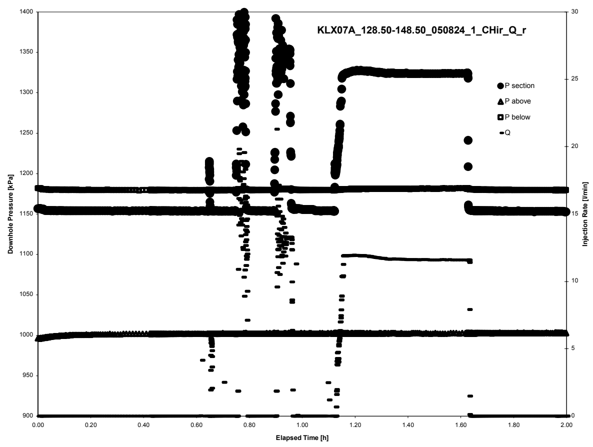
*: IARF not reached

The recommended transmissivity of 3.2E-6 m2/s was derived from the analysis of the CHi phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-6 to 5.0E-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 986.4 kPa.

Test Summary Sheet

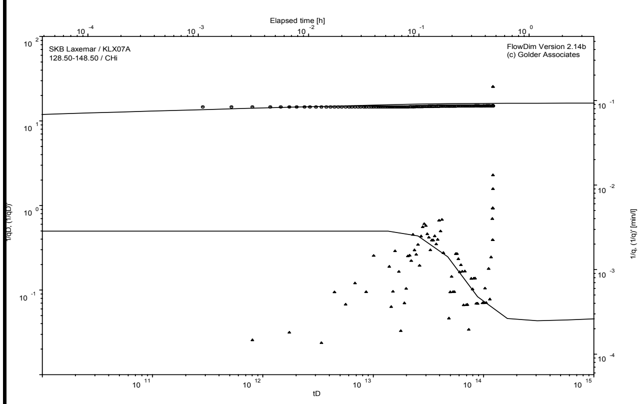
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050824 18:21
Test section from - to (m):	128.50-148.50 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

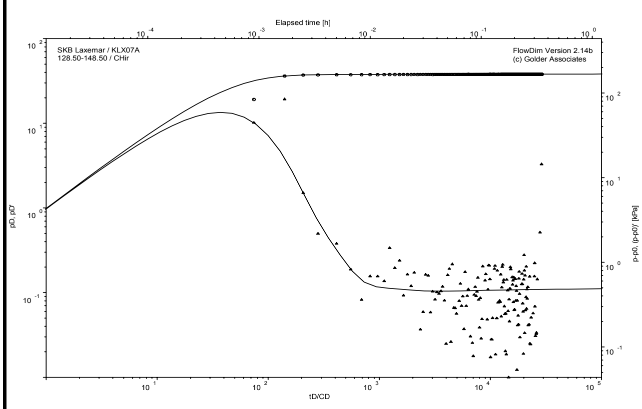


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1156		
p_i (kPa) =	1153		
p_p(kPa) =	1324	p_F (kPa) =	1153
Q_p (m^3/s)=	1.93E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	8.6		
Derivative fact.=	0.02	Derivative fact.=	0.13
Results		**Results**	
Q/s (m^2/s)=	1.1E-05		
T_M (m^2/s)=	1.2E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	1.40
dt_2 (min) =	*	dt_2 (min) =	15.80
T (m^2/s) =	2.7E-04	T (m^2/s) =	3.1E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.3E-05	K_s (m/s) =	1.6E-05
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.9E-09
C_D (-) =	NA	C_D (-) =	2.1E-01
ξ (-) =	7.59	ξ (-) =	30.70
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) =	1.40	C (m^3/Pa) =	1.9E-09
dt_2 (min) =	15.80	C_D (-) =	2.1E-01
T_T (m^2/s) =	3.1E-04	ξ (-) =	30.70
S (-) =	1.0E-06		
K_s (m/s) =	1.6E-05		
S_s (1/m) =	5.0E-08		

Comments:

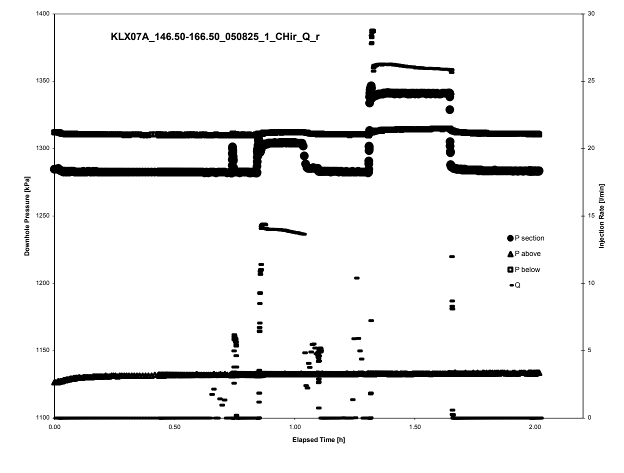
*: IARF not measured

The recommended transmissivity of 3.1E-4 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-5 to 5.0E-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 1133.7 kPa.

Test Summary Sheet

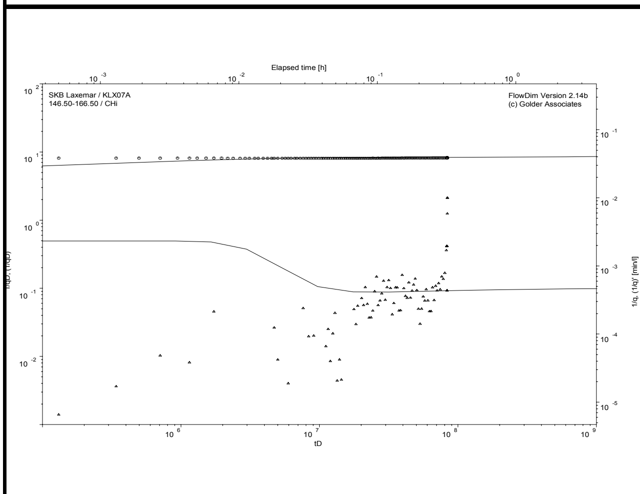
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050825 08:15
Test section from - to (m):	146.50-166.50 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

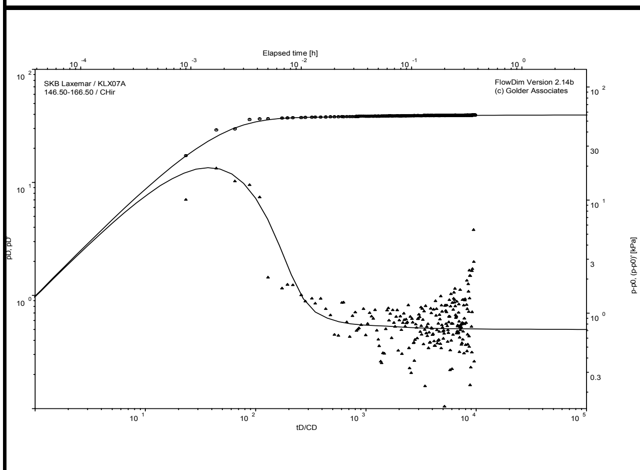


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1285		
p_i (kPa) =	1282		
p_p(kPa) =	1341	p_F (kPa) =	1283
Q_p (m^3/s)=	4.30E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	8.8		
Derivative fact.=	0.05	Derivative fact.=	0.18
Results		**Results**	
Q/s (m^2/s)=	7.1E-05		
T_M (m^2/s)=	7.5E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	5.73	dt_1 (min) =	2.10
dt_2 (min) =	17.06	dt_2 (min) =	21.00
T (m^2/s) =	4.7E-04	T (m^2/s) =	4.7E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.4E-05	K_s (m/s) =	2.4E-05
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-08
C_D (-) =	NA	C_D (-) =	4.7E+00
ξ (-) =	0.06	ξ (-) =	29.20
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) =	2.10	C (m^3/Pa) =	4.2E-08
dt_2 (min) =	21.00	C_D (-) =	4.7E+00
T_T (m^2/s) =	4.7E-04	ξ (-) =	29.20
S (-) =	1.0E-06		
K_s (m/s) =	2.4E-05		
S_s (1/m) =	5.0E-08		

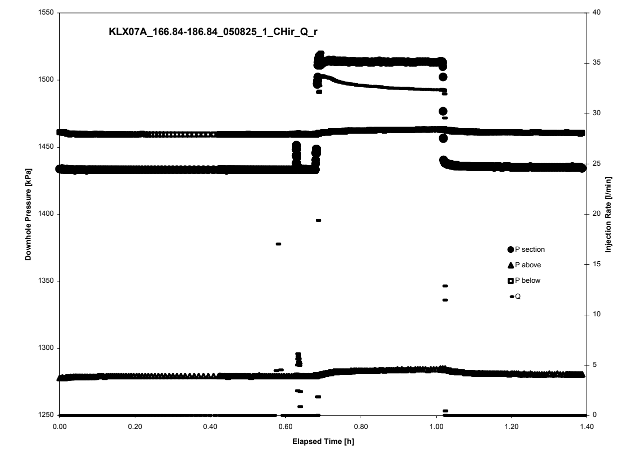
Comments:

The recommended transmissivity of 4.7E-4 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-4 to 7.0E-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 1265.8 kPa.

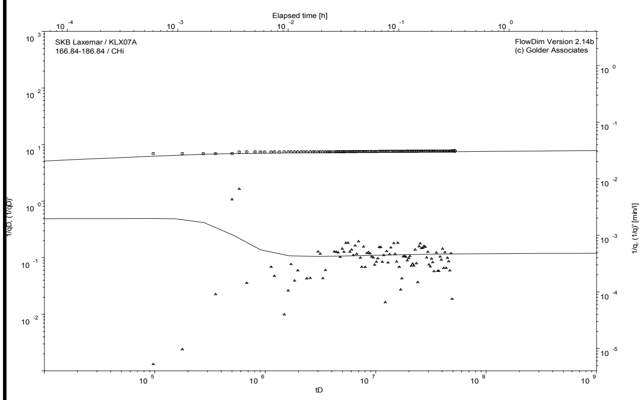
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050825 11:10
Test section from - to (m):	166.84-186.84 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

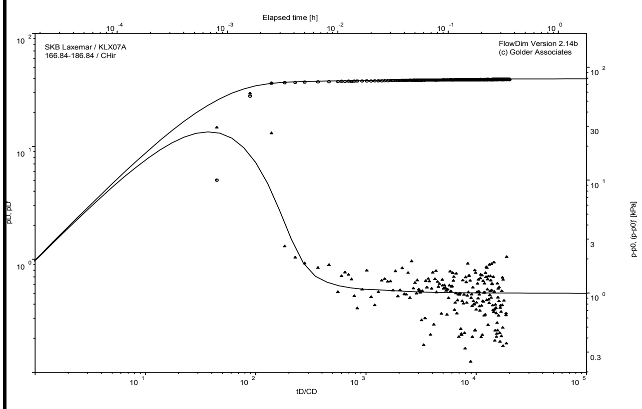
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1433		
p_i (kPa) =	1433		
p_p(kPa) =	1513	p_F (kPa) =	1434
Q_p (m^3/s)=	5.37E-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)=	9.0		
Derivative fact.=	0.02	Derivative fact.=	0.12
Results		**Results**	
Q/s (m^2/s)=	6.6E-05		
T_M (m^2/s)=	6.9E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.63	dt_1 (min) =	0.80
dt_2 (min) =	17.82	dt_2 (min) =	18.30
T (m^2/s) =	3.4E-04	T (m^2/s) =	4.3E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.7E-05	K_s (m/s) =	2.2E-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 (-) =	-0.11	ξ (-) =	29.60
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.80	C (m^3/Pa) =	1.8E-08
dt_2 (min) =	18.30	C_D (-) =	2.0E+00
T_T (m^2/s) =	4.3E-04	ξ (-) =	29.60
S (-) =	1.0E-06		
K_s (m/s) =	2.2E-05		
S_s (1/m) =	5.0E-08		

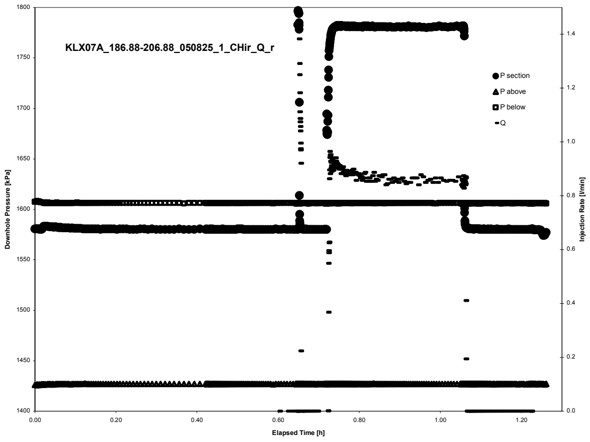
Comments:

The recommended transmissivity of 4.3E-4 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-4 to 7.0E-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 1416.3 kPa.

Test Summary Sheet

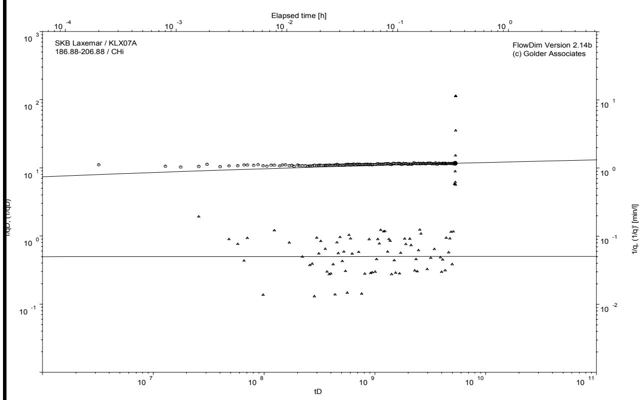
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050825 13:32
Test section from - to (m):	186.88-206.88 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

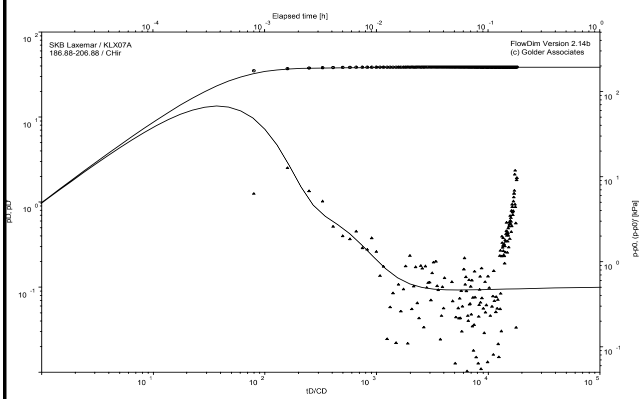


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1581		
p_i (kPa) =	1580		
p_p(kPa) =	1781	p_F (kPa) =	1580
Q_p (m^3/s)=	1.33E-05		
tp (s) =	1200	t_F (s) =	600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.2		
Derivative fact.=	0.02	Derivative fact.=	0.1
Results		**Results**	
Q/s (m^2/s)=	6.5E-07		
T_M (m^2/s)=	6.8E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.70	dt_1 (min) =	2.10
dt_2 (min) =	16.88	dt_2 (min) =	7.10
T (m^2/s) =	1.3E-06	T (m^2/s) =	2.2E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.5E-08	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) =	1.1E-10
C_D (-) =	NA	C_D (-) =	1.2E-02
ξ (-) =	4.26	ξ (-) =	32.20
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) =	2.10	C (m^3/Pa) =	1.1E-10
dt_2 (min) =	7.10	C_D (-) =	1.2E-02
T_T (m^2/s) =	2.2E-05	ξ (-) =	32.20
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-06		
S_s (1/m) =	5.0E-08		

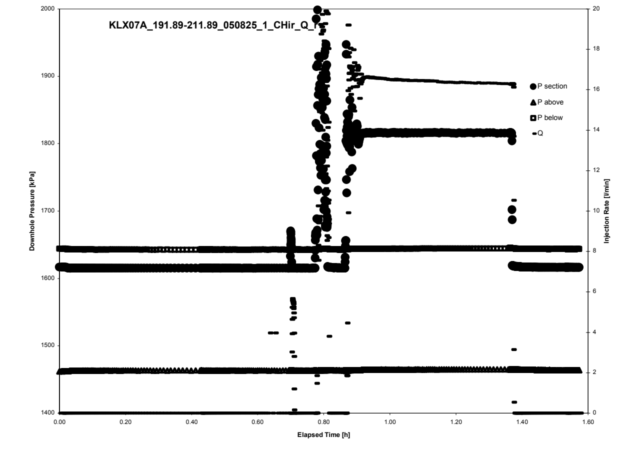
Comments:

The recommended transmissivity of 2.2E-5 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-6 to 5.0E-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 1560.3 kPa.

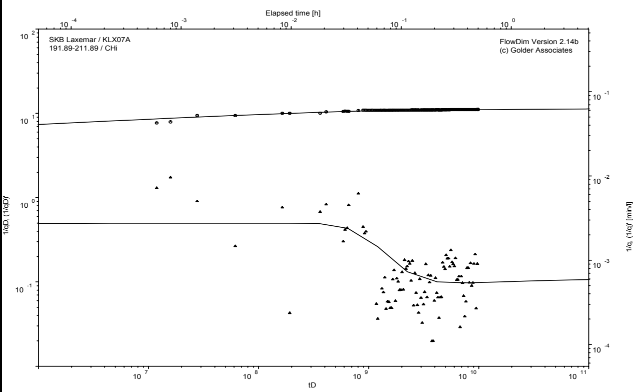
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050825 15:22
Test section from - to (m):	191.89-211.89 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

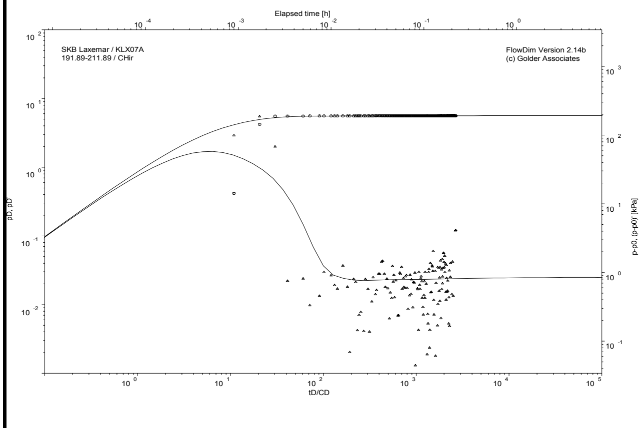
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1617		
p_i (kPa) =	1615		
p_p(kPa) =	1815	p_F (kPa) =	1616
Q_p (m^3/s)=	2.72E-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)=	9.20		
Derivative fact.=	0.05	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	1.3E-05		
T_M (m^2/s)=	1.4E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	10.84	dt_1 (min) =	1.05
dt_2 (min) =	26.74	dt_2 (min) =	10.00
T (m^2/s) =	1.1E-04	T (m^2/s) =	2.5E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.3E-06	K_s (m/s) =	1.3E-05
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.4E-09
C_D (-) =	NA	C_D (-) =	2.6E-01
ξ (-) =	2.91	ξ (-) =	-0.50
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.05	C (m^3/Pa) =	2.4E-09
dt_2 (min) =	10.00	C_D (-) =	2.6E-01
T_T (m^2/s) =	2.5E-04	ξ (-) =	-0.50
S (-) =	1.0E-06		
K_s (m/s) =	1.3E-05		
S_s (1/m) =	5.0E-08		

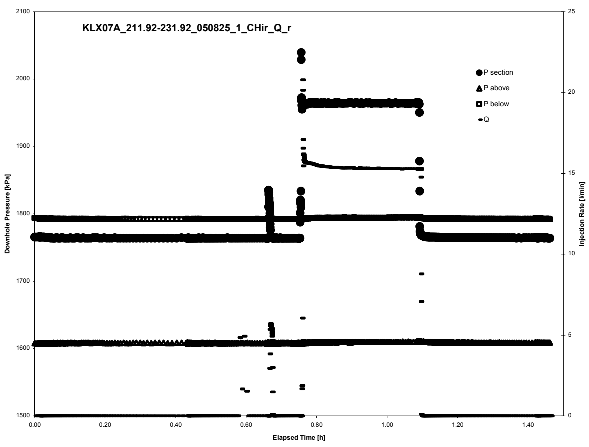
Comments:

The recommended transmissivity of 2.5E-4 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-5 to 5.0E-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 1596.6 kPa.

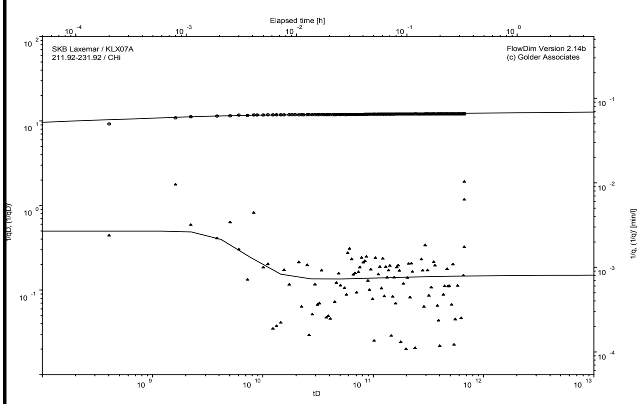
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050825 17:38
Test section from - to (m):	211.92-231.92 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

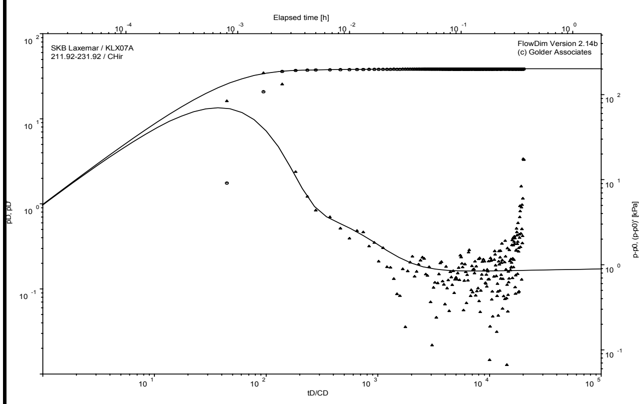
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1765		
p_i (kPa) =	1764		
p_p(kPa) =	1965	p_F (kPa) =	1764
Q_p (m^3/s)=	2.55E-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.=	0.02	Derivative fact.=	0.1
Results		**Results**	
Q/s (m^2/s)=	1.2E-05		
T_M (m^2/s)=	1.3E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.75	dt_1 (min) =	5.10
dt_2 (min) =	19.55	dt_2 (min) =	16.60
T (m^2/s) =	8.0E-05	T (m^2/s) =	2.2E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.0E-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) =	3.2E-09
C_D (-) =	NA	C_D (-) =	3.5E-01
ξ (-) =	5.21	ξ (-) =	30.50
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	5.10	C (m^3/Pa) =	3.2E-09
dt_2 (min) =	16.60	C_D (-) =	3.5E-01
T_T (m^2/s) =	2.2E-04	ξ (-) =	30.50
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-05		
S_s (1/m) =	5.0E-08		

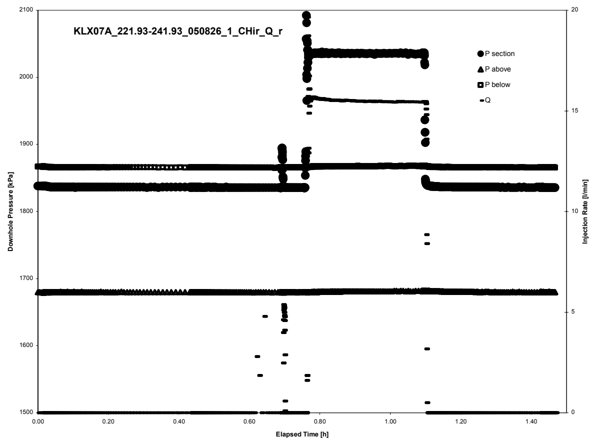
Comments:

The recommended transmissivity of 2.2E-4 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-5 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 1745.2 kPa.

Test Summary Sheet

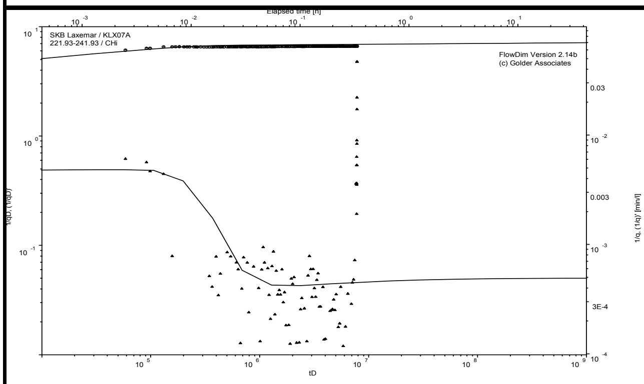
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050826 08:21
Test section from - to (m):	221.93-241.93 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

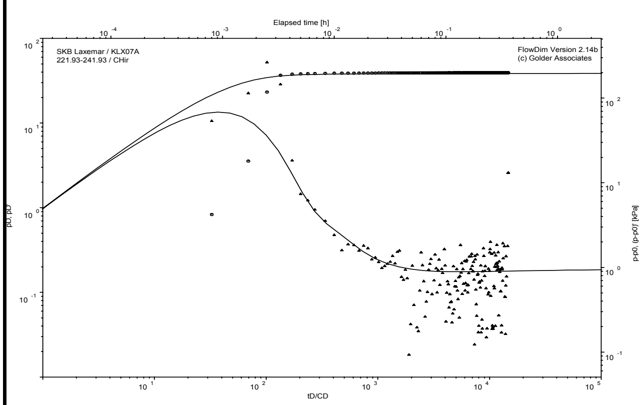


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1838		
p_i (kPa) =	1836		
p_p(kPa) =	2036	p_F (kPa) =	1836
Q_p (m^3/s)=	2.57E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.5		
Derivative fact.=	0.05	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	1.3E-05		
T_M (m^2/s)=	1.3E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.12	dt_1 (min) =	4.20
dt_2 (min) =	18.18	dt_2 (min) =	19.20
T (m^2/s) =	1.3E-04	T (m^2/s) =	2.1E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.7E-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) =	4.5E-09
C_D (-) =	NA	C_D (-) =	5.0E-01
ξ (-) =	-0.17	ξ (-) =	30.30
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) =	4.20	C (m^3/Pa) =	4.5E-09
dt_2 (min) =	19.20	C_D (-) =	5.0E-01
T_T (m^2/s) =	2.1E-04	ξ (-) =	30.30
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-05		
S_s (1/m) =	5.0E-08		

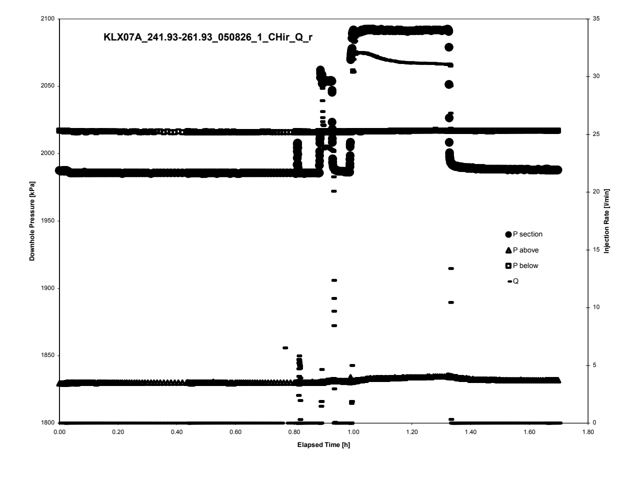
Comments:

The recommended transmissivity of 2.1E-4 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-5 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 1820.1 kPa.

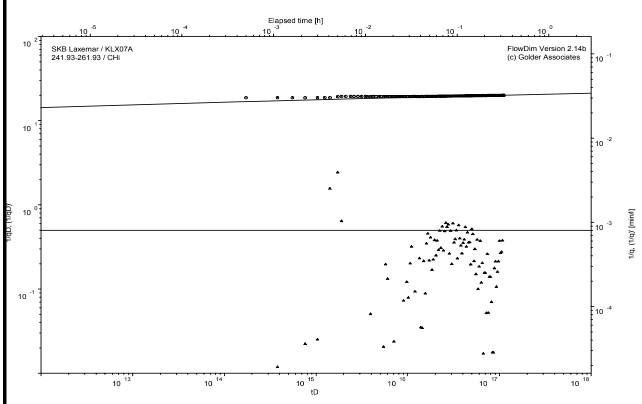
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050826 10:33
Test section from - to (m):	241.95-261.95 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

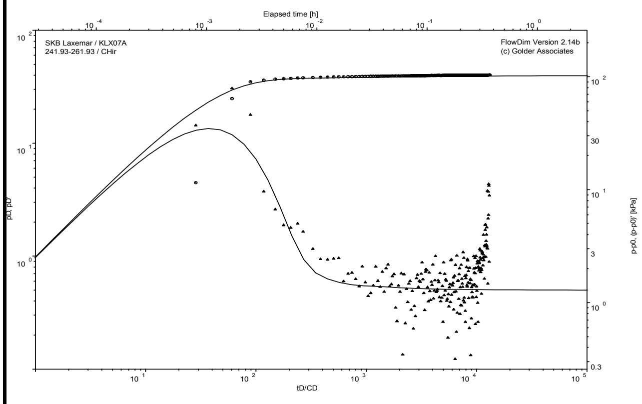
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1987		
p_i (kPa) =	1986		
p_p(kPa) =	2092	p_F (kPa) =	1988
Q_p (m^3/s)=	5.17E-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)=	9.8		
Derivative fact.=	0.02	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	4.8E-05		
T_M (m^2/s)=	5.0E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.88	dt_1 (min) =	1.50
dt_2 (min) =	8.92	dt_2 (min) =	17.00
T (m^2/s) =	1.5E-04	T (m^2/s) =	3.2E-04
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.6E-06	K_s (m/s) =	1.6E-05
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.1E-08
C_D (-) =	NA	C_D (-) =	2.3E+00
ξ (-) =	10.30	ξ (-) =	29.50
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.50	C (m^3/Pa) =	2.1E-08
dt_2 (min) =	17.00	C_D (-) =	2.3E+00
T_T (m^2/s) =	3.2E-04	ξ (-) =	29.50
S (-) =	1.0E-06		
K_s (m/s) =	1.6E-05		
S_s (1/m) =	5.0E-08		

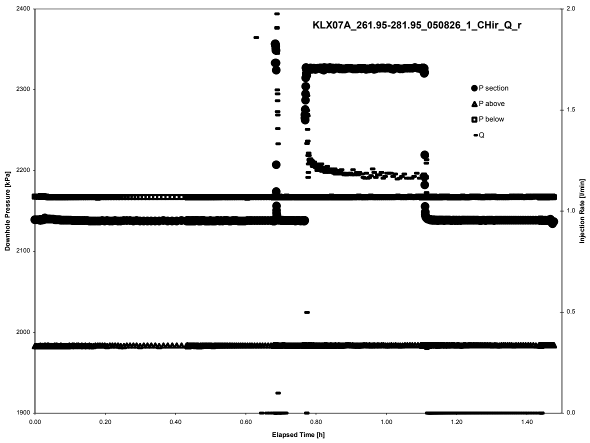
Comments:

The recommended transmissivity of 3.2E-4 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-5 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 1971.2 kPa.

Test Summary Sheet

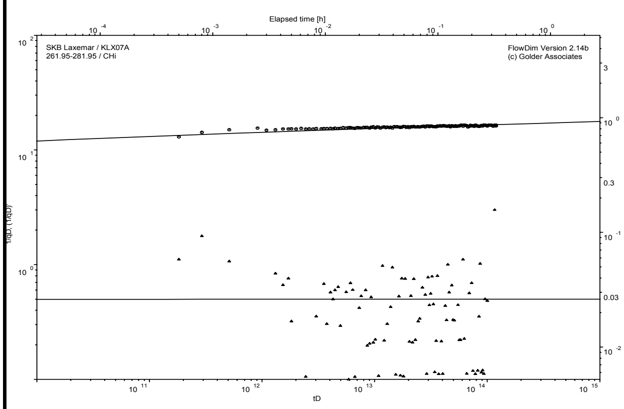
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050826 13:17
Test section from - to (m):	261.95-281.95 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

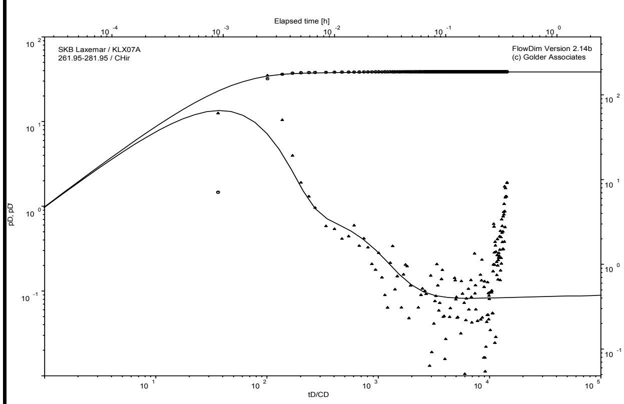


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2139		
p_i (kPa) =	2138		
p_p(kPa) =	2326	p_F (kPa) =	2139
Q_p (m^3/s)=	2.00E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.1		
Derivative fact.=	0.1	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	1.0E-06		
T_M (m^2/s)=	1.1E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.70	dt_1 (min) =	0.48
dt_2 (min) =	15.70	dt_2 (min) =	14.80
T (m^2/s) =	2.7E-06	T (m^2/s) =	3.5E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.3E-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) =	3.7E-10
C_D (-) =	NA	C_D (-) =	4.1E-02
ξ (-) =	8.91	ξ (-) =	31.60
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) =	0.70	C (m^3/Pa) =	3.7E-10
dt_2 (min) =	15.70	C_D (-) =	4.1E-02
T_T (m^2/s) =	2.7E-06	ξ (-) =	8.91
S (-) =	1.0E-06		
K_s (m/s) =	1.3E-07		
S_s (1/m) =	5.0E-08		

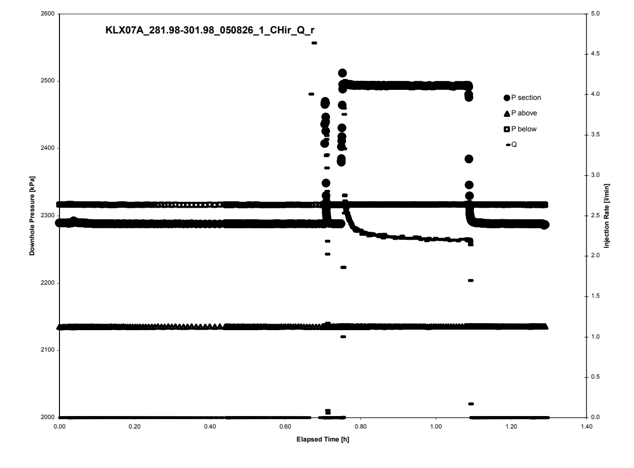
Comments:

The recommended transmissivity of 2.7E-6 m2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 5.0E-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 2120.2 kPa.

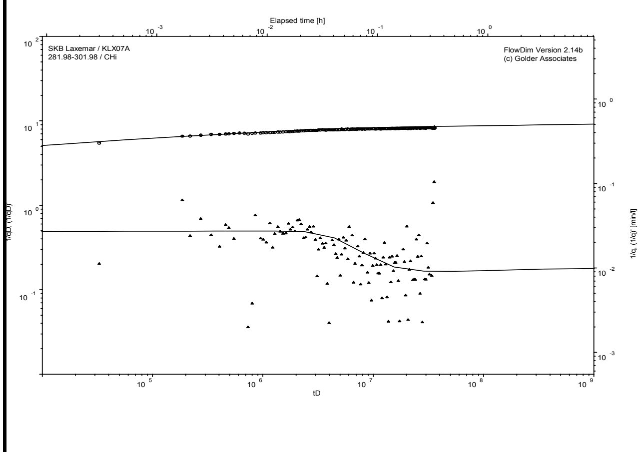
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050826 15:36
Test section from - to (m):	281.98-301.98 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

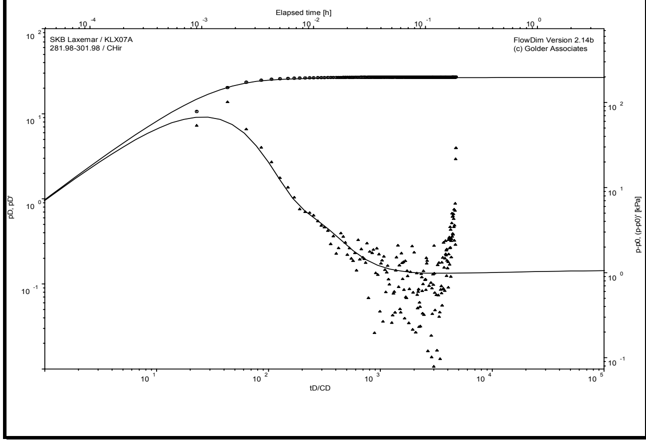
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2289		
p_i (kPa) =	2288		
p_p(kPa) =	2491	p_F (kPa) =	2288
Q_p (m^3/s)=	3.67E-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)=	10.3		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.8E-06		
T_M (m^2/s)=	1.9E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	11.63	dt_1 (min) =	4.40
dt_2 (min) =	18.62	dt_2 (min) =	9.30
T (m^2/s) =	6.4E-06	T (m^2/s) =	2.8E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.2E-07	K_s (m/s) =	1.4E-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 (-) =	8.1E-02
ξ (-) =	1.47	ξ (-) =	19.70
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	4.40	C (m^3/Pa) =	7.4E-10
dt_2 (min) =	9.30	C_D (-) =	8.1E-02
T_T (m^2/s) =	2.8E-05	ξ (-) =	19.70
S (-) =	1.0E-06		
K_s (m/s) =	1.4E-06		
S_s (1/m) =	5.0E-08		

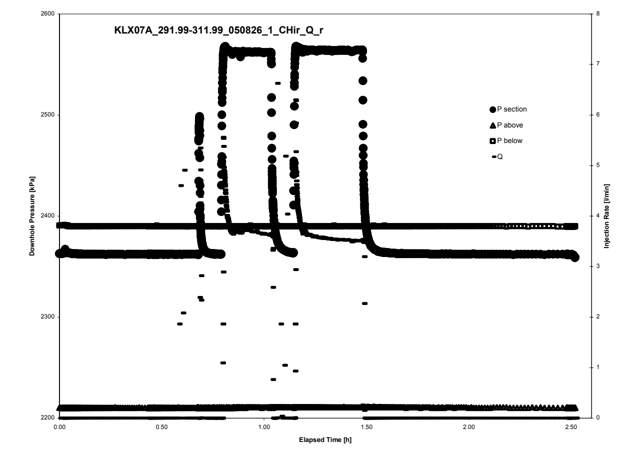
Comments:

The recommended transmissivity of 2.8E-5 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-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 2268.4 kPa.

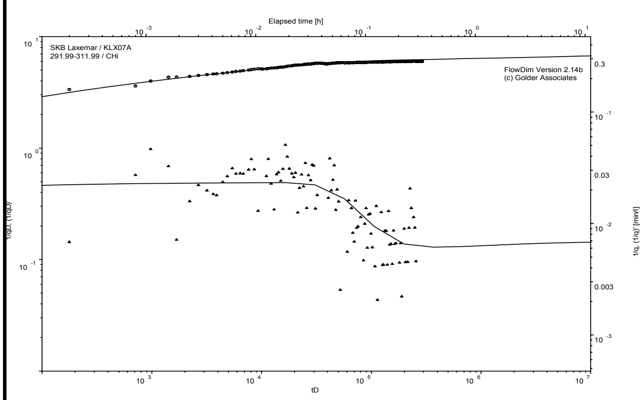
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050826 17:29
Test section from - to (m):	291.99-311.91	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

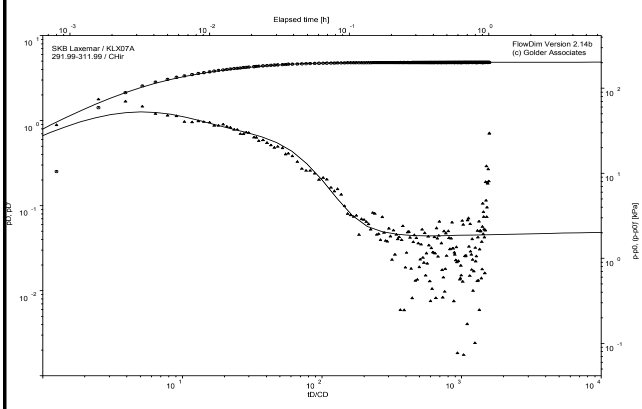
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2363		
p_i (kPa) =	2364		
p_p(kPa) =	2564	p_F (kPa) =	2362
Q_p (m^3/s)=	5.83E-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)=	10.5		
Derivative fact.=	0.02	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	2.9E-06		
T_M (m^2/s)=	3.0E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	13.10
dt_2 (min) =	*	dt_2 (min) =	54.60
T (m^2/s) =	9.4E-06	T (m^2/s) =	2.2E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.7E-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) =	3.3E-09
C_D (-) =	NA	C_D (-) =	3.6E-01
ξ (-) =	-1.02	ξ (-) =	-1.79
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	13.10	C (m^3/Pa) =	3.3E-09
dt_2 (min) =	54.60	C_D (-) =	3.6E-01
T_T (m^2/s) =	2.2E-05	ξ (-) =	-1.79
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-06		
S_s (1/m) =	5.0E-08		

Comments:

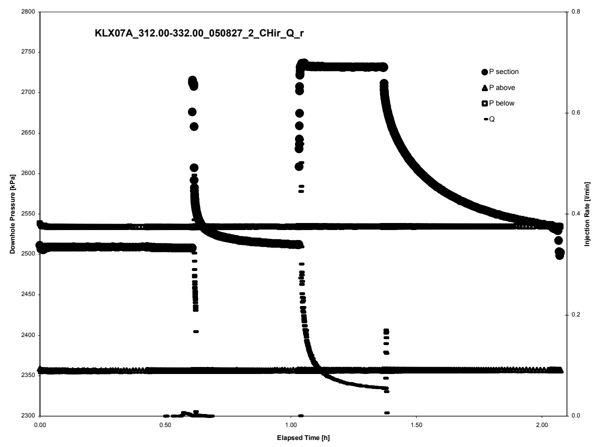
*: IARF not measured

The recommended transmissivity of 2.2E-5 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-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 2341.4 kPa.

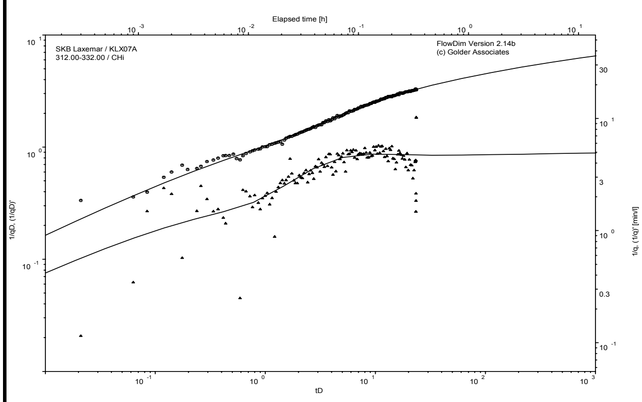
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX07A	Test start:	050827 11:12
Test section from - to (m):	312.00-332.00 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

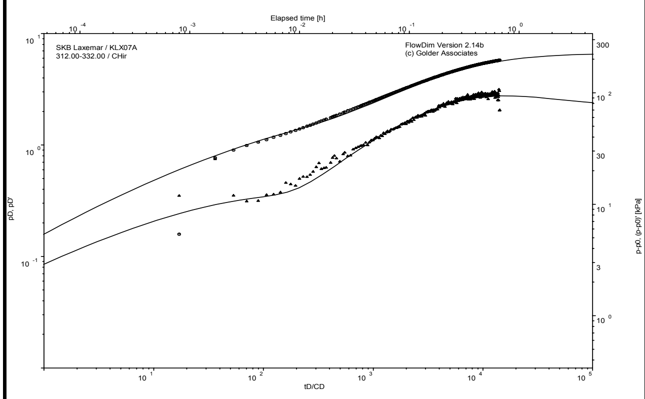
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2507		
p_i (kPa) =	2512		
p_p(kPa) =	2731	p_F (kPa) =	2536
Q_p (m^3/s)=	8.33E-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)=	10.7		
Derivative fact.=	0.06	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.7E-08		
T_M (m^2/s)=	3.9E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	5.23	dt_1 (min) =	29.40
dt_2 (min) =	16.57	dt_2 (min) =	38.30
T (m^2/s) =	1.3E-08	T (m^2/s) =	1.5E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.5E-10	K_s (m/s) =	7.4E-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-12
C_D (-) =	NA	C_D (-) =	7.6E-04
ξ (-) =	-3.32	ξ (-) =	-2.76
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	29.40	C (m^3/Pa) =	6.9E-12
dt_2 (min) =	38.30	C_D (-) =	7.6E-04
T_T (m^2/s) =	1.5E-08	ξ (-) =	-2.76
S (-) =	1.0E-06		
K_s (m/s) =	7.4E-10		
S_s (1/m) =	5.0E-08		

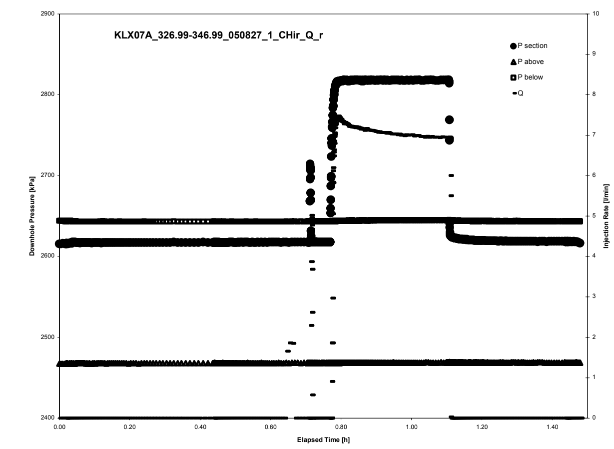
Comments:

The recommended transmissivity of 1.5E-8 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better 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 2502.0 kPa.

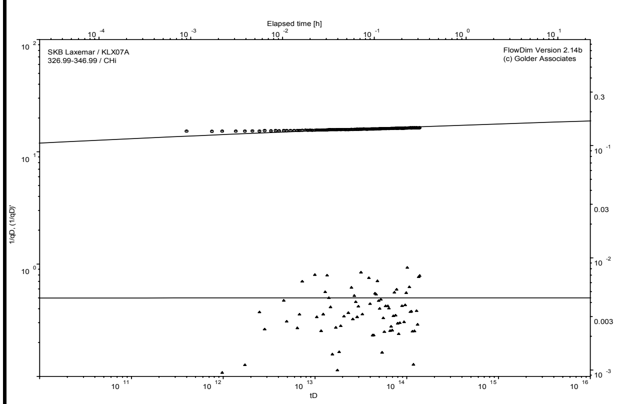
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050827 14:01
Test section from - to (m):	326.99-346.99 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

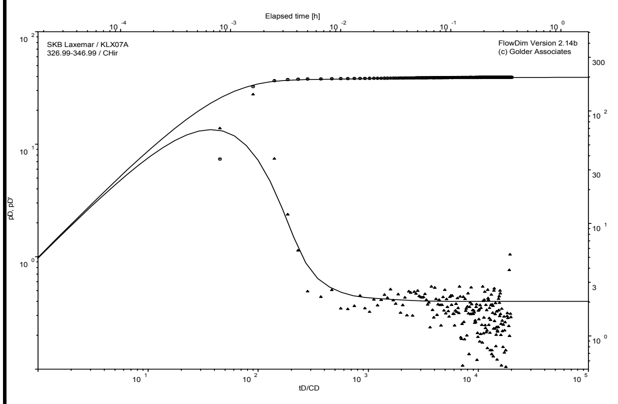
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2616		
p_i (kPa) =	2618		
p_p(kPa) =	2818	p_F (kPa) =	2618
Q_p (m^3/s)=	1.17E-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)=	10.8		
Derivative fact.=	0.02	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	5.7E-06		
T_M (m^2/s)=	6.0E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.75	dt_1 (min) =	1.20
dt_2 (min) =	15.23	dt_2 (min) =	16.60
T (m^2/s) =	1.5E-05	T (m^2/s) =	4.5E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.4E-07	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 (-) =	8.15	ξ (-) =	30.80
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) =	1.5E-09
dt_2 (min) =	16.60	C_D (-) =	1.7E-01
T_T (m^2/s) =	4.5E-05	ξ (-) =	30.80
S (-) =	1.0E-06		
K_s (m/s) =	2.3E-06		
S_s (1/m) =	5.0E-08		

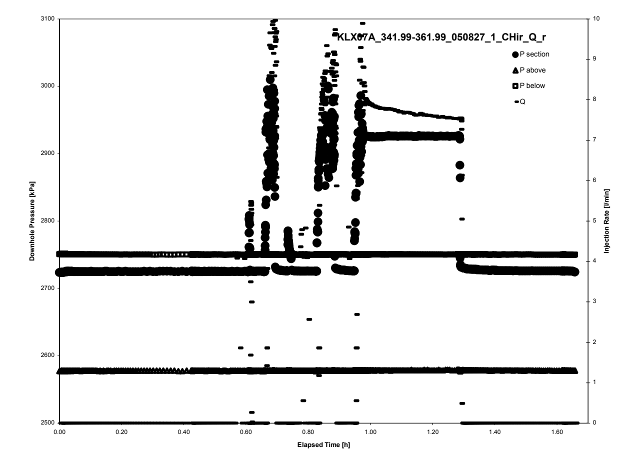
Comments:

The recommended transmissivity of 4.5E-5 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-5 to 7.0E-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 2598.5 kPa.

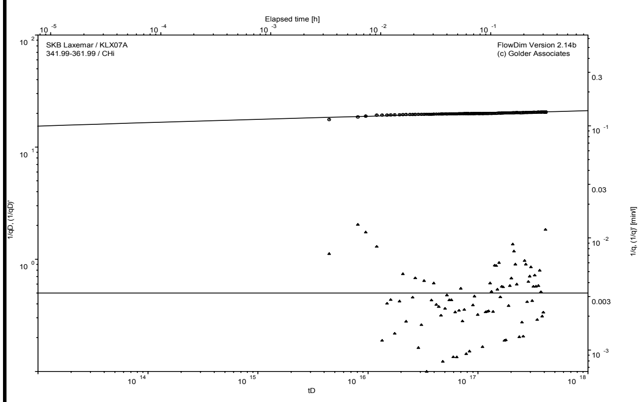
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050827 16:09
Test section from - to (m):	341.99-361.99 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

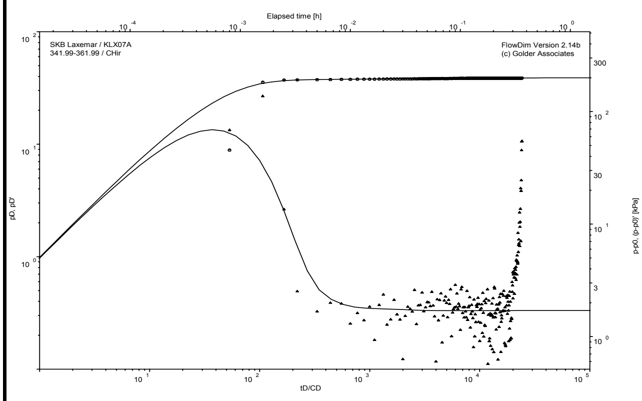
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2724		
p_i (kPa) =	2726		
p_p(kPa) =	2926	p_F (kPa) =	2726
Q_p (m^3/s)=	1.25E-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)=	11.0		
Derivative fact.=	0.02	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	6.1E-06		
T_M (m^2/s)=	6.4E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.73	dt_1 (min) =	1.10
dt_2 (min) =	12.84	dt_2 (min) =	16.40
T (m^2/s) =	2.0E-05	T (m^2/s) =	5.9E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.0E-06	K_s (m/s) =	2.9E-06
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-09
C_D (-) =	NA	C_D (-) =	1.5E-01
ξ (-) =	12.00	ξ (-) =	30.90
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.10	C (m^3/Pa) =	1.4E-09
dt_2 (min) =	16.40	C_D (-) =	1.5E-01
T_T (m^2/s) =	5.9E-05	ξ (-) =	30.90
S (-) =	1.0E-06		
K_s (m/s) =	2.9E-06		
S_s (1/m) =	5.0E-08		

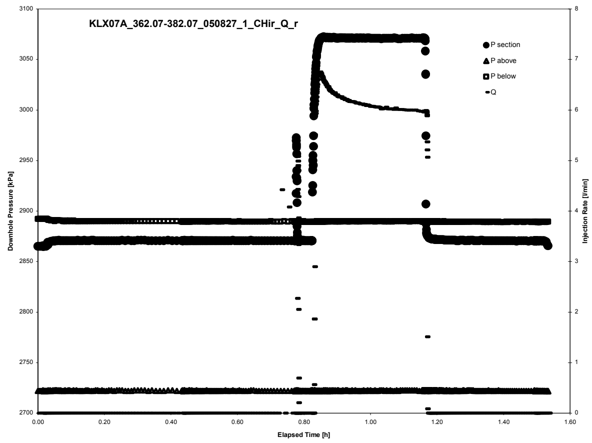
Comments:

The recommended transmissivity of 5.9E-5 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-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 2705.3 kPa.

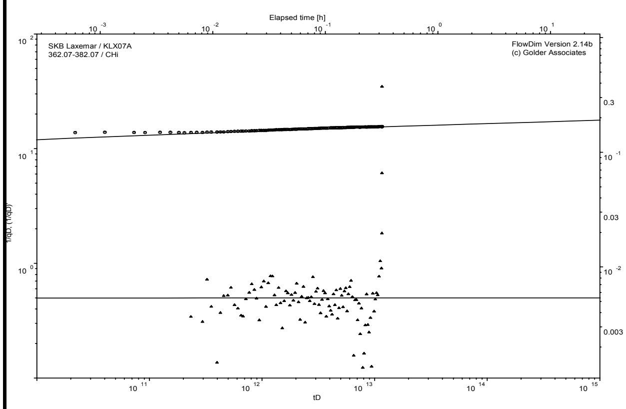
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050827 18:31
Test section from - to (m):	362.07-382.07 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

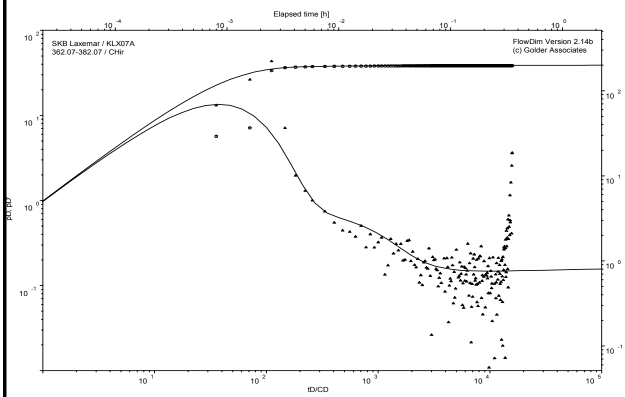
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2865		
p_i (kPa) =	2871		
p_p(kPa) =	3071	p_F (kPa) =	2871
Q_p (m^3/s)=	9.83E-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)=	11.2		
Derivative fact.=	0.05	Derivative fact.=	0.1
Results		**Results**	
Q/s (m^2/s)=	4.8E-06		
T_M (m^2/s)=	5.0E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.20	dt_1 (min) =	0.54
dt_2 (min) =	17.20	dt_2 (min) =	1.45
T (m^2/s) =	1.2E-05	T (m^2/s) =	3.1E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.1E-07	K_s (m/s) =	1.6E-06
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.6E-09
C_D (-) =	NA	C_D (-) =	1.8E-01
ξ (-) =	7.00	ξ (-) =	30.80
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) =	1.6E-09
dt_2 (min) =	17.20	C_D (-) =	1.8E-01
T_T (m^2/s) =	1.2E-05	ξ (-) =	7.00
S (-) =	1.0E-06		
K_s (m/s) =	6.1E-07		
S_s (1/m) =	5.0E-08		

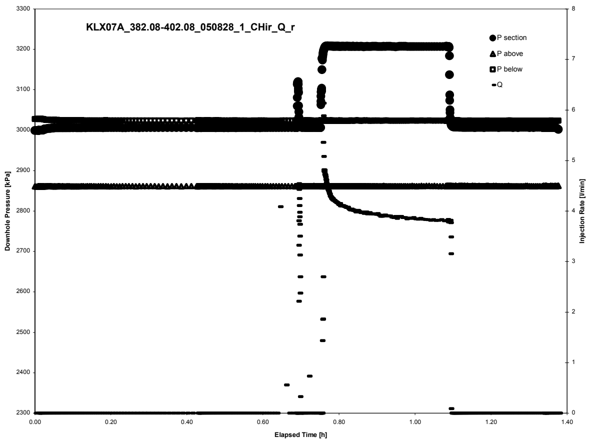
Comments:

The recommended transmissivity of 1.2E-5 m2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-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 2851.3 kPa.

Test Summary Sheet

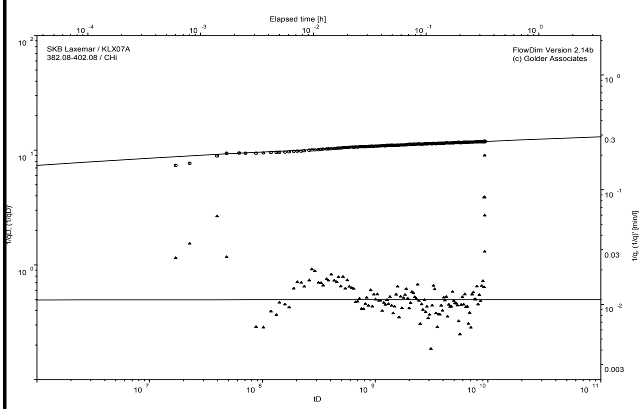
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050828 08:24
Test section from - to (m):	382.08-402.08	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

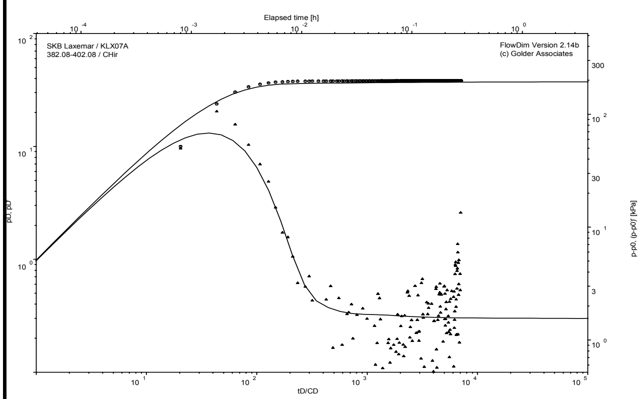


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2999		
p_i (kPa) =	3006		
p_p(kPa) =	3207	p_F (kPa) =	3006
Q_p (m^3/s)=	6.33E-05		
tp (s) =	1200	t_F (s) =	900
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.4		
Derivative fact.=	0.1	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.1E-06		
T_M (m^2/s)=	3.2E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.80	dt_1 (min) =	1.55
dt_2 (min) =	17.50	dt_2 (min) =	14.58
T (m^2/s) =	5.9E-06	T (m^2/s) =	3.3E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.9E-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) =	1.8E-09
C_D (-) =	NA	C_D (-) =	2.0E-01
ξ (-) =	3.78	ξ (-) =	30.80
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) =	1.8E-09
dt_2 (min) =	17.50	C_D (-) =	2.0E-01
T_T (m^2/s) =	5.9E-06	ξ (-) =	3.78
S (-) =	1.0E-06		
K_s (m/s) =	2.9E-07		
S_s (1/m) =	5.0E-08		

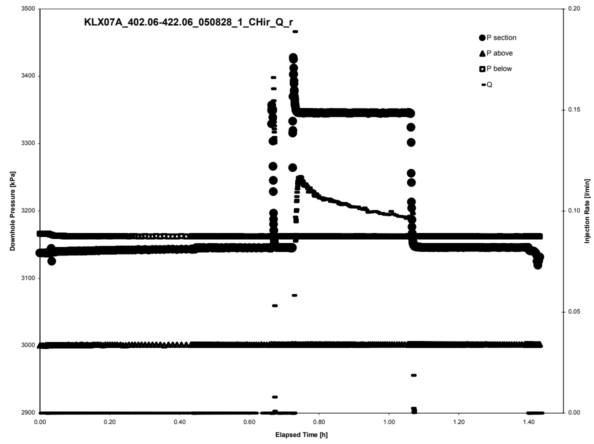
Comments:

The recommended transmissivity of 5.9E-6 m2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-6 to 8.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2989.3 kPa.

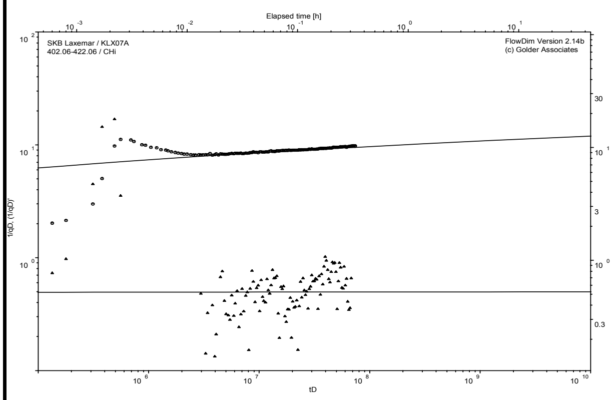
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050828 10:31
Test section from - to (m):	402.06-422.06 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

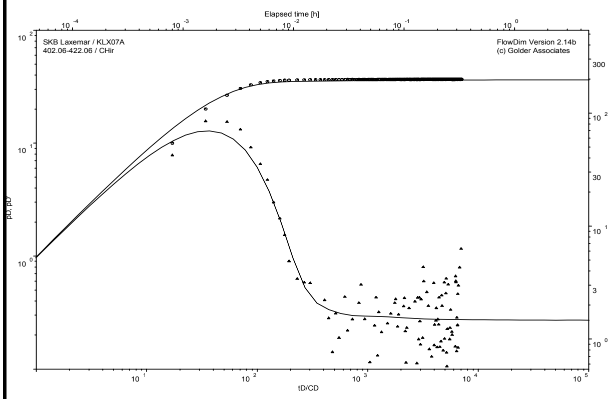
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3138		
p_i (kPa) =	3145		
p_p(kPa) =	3346	p_F (kPa) =	3145
Q_p (m^3/s)=	1.50E-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)=	11.6		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	7.3E-08		
T_M (m^2/s)=	7.7E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.90	dt_1 (min) =	2.05
dt_2 (min) =	8.30	dt_2 (min) =	18.05
T (m^2/s) =	1.2E-07	T (m^2/s) =	8.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.2E-09	K_s (m/s) =	4.5E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.2E-11
C_D (-) =	NA	C_D (-) =	5.7E-03
ξ (-) =	3.29	ξ (-) =	35.50
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	1.90	C (m^3/Pa) =	5.2E-11
dt_2 (min) =	8.30	C_D (-) =	5.7E-03
T_T (m^2/s) =	1.2E-07	ξ (-) =	3.29
S (-) =	1.0E-06		
K_s (m/s) =	6.2E-09		
S_s (1/m) =	5.0E-08		

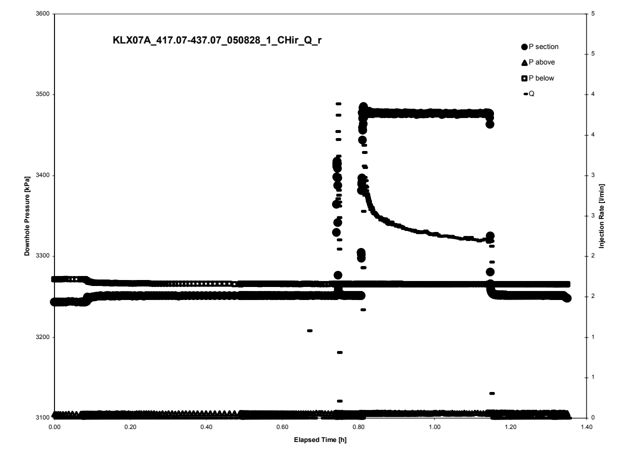
Comments:

The recommended transmissivity of 1.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3127.1 kPa.

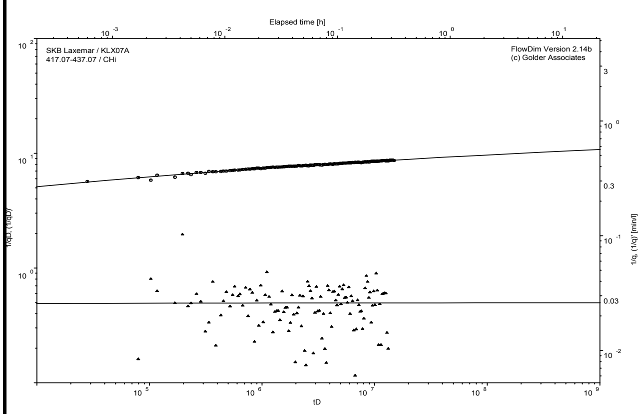
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050828 13:21
Test section from - to (m):	417.07-437.07 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

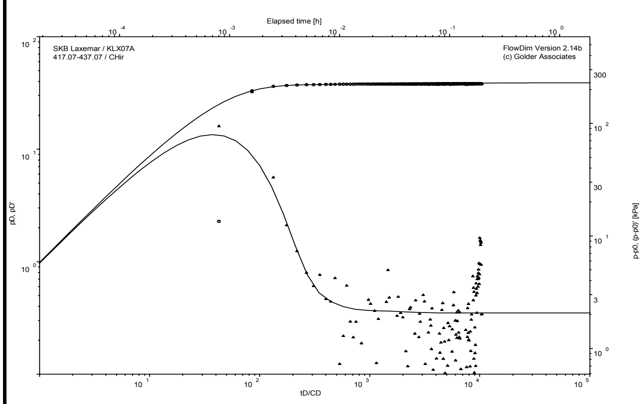
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3243		
p_i (kPa) =	3251		
p_p(kPa) =	3477	p_F (kPa) =	3251
Q_p (m^3/s)=	3.67E-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.=	0.05	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.6E-06		
T_M (m^2/s)=	1.7E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.40	dt_1 (min) =	0.85
dt_2 (min) =	14.20	dt_2 (min) =	10.56
T (m^2/s) =	2.2E-06	T (m^2/s) =	1.4E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-07	K_s (m/s) =	7.0E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.4E-10
C_D (-) =	NA	C_D (-) =	4.8E-02
ξ (-) =	1.07	ξ (-) =	31.50
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.40	C (m^3/Pa) =	4.4E-10
dt_2 (min) =	14.20	C_D (-) =	4.8E-02
T_T (m^2/s) =	2.2E-06	ξ (-) =	1.07
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-07		
S_s (1/m) =	5.0E-08		

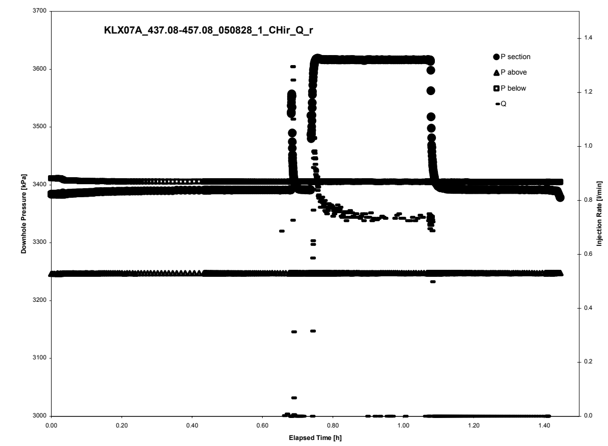
Comments:

The recommended transmissivity of 2.21E-6 m2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-7 to 4.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3231.4 kPa.

Test Summary Sheet

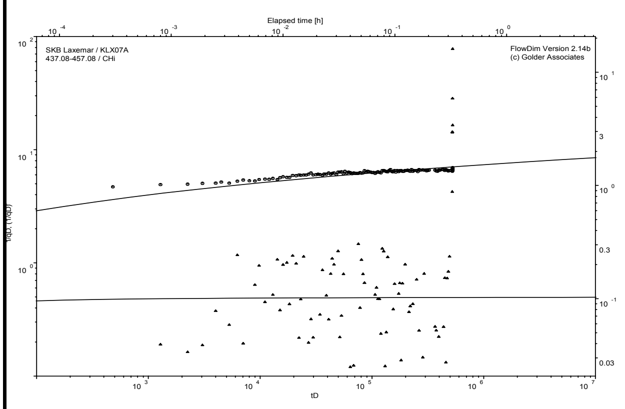
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050828 15:25
Test section from - to (m):	437.08-457.08 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

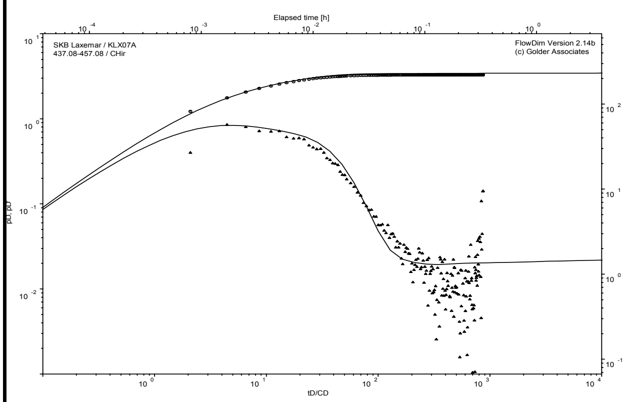


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3384		
p_i (kPa) =	3391		
p_p(kPa) =	3616	p_F (kPa) =	3390
Q_p (m^3/s)=	1.23E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.9		
Derivative fact.=	0.05	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	5.4E-07		
T_M (m^2/s)=	5.6E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.86	dt_1 (min) =	0.30
dt_2 (min) =	8.64	dt_2 (min) =	0.50
T (m^2/s) =	5.6E-07	T (m^2/s) =	2.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.8E-08	K_s (m/s) =	1.5E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.6E-10
C_D (-) =	NA	C_D (-) =	2.8E-02
ξ (-) =	0.07	ξ (-) =	-1.66
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) =	0.30	C (m^3/Pa) =	2.6E-10
dt_2 (min) =	0.50	C_D (-) =	2.8E-02
T_T (m^2/s) =	2.9E-07	ξ (-) =	-1.66
S (-) =	1.0E-06		
K_s (m/s) =	1.5E-08		
S_s (1/m) =	5.0E-08		

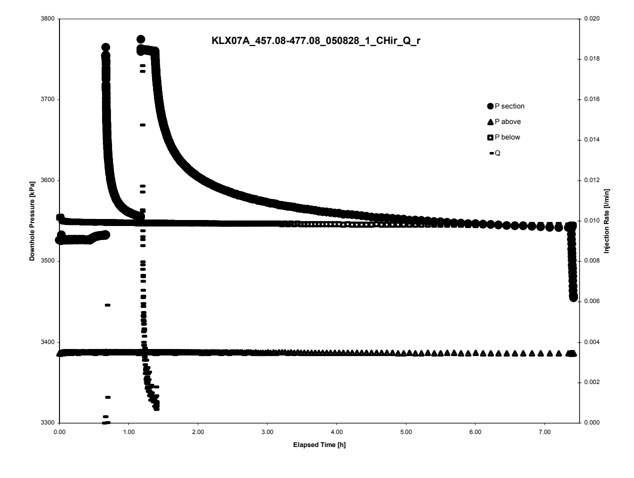
Comments:

The recommended transmissivity of 2.9E-7 m2/s was derived from the analysis of the CHir phase (inner zone). The confidence range for the interval transmissivity is estimated to be 1.0E-7 to 6.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3370.9 kPa.

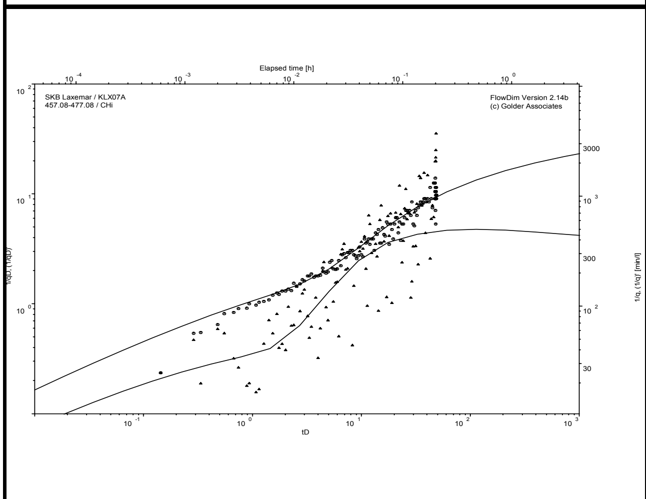
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050828 17:32
Test section from - to (m):	457.08-477.08 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

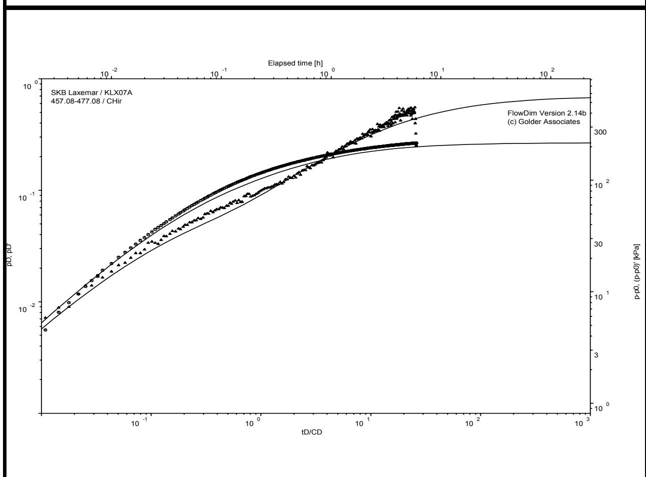
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3526		
p_i (kPa) =	3555		
p_p(kPa) =	3759	p_F (kPa) =	3544
Q_p (m^3/s)=	1.67E-08		
tp (s) =	720	t_F (s) =	21600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.1		
Derivative fact.=	0.05	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	8.0E-10		
T_M (m^2/s)=	8.4E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	*
dt_2 (min) =	*	dt_2 (min) =	*
T (m^2/s) =	1.3E-10	T (m^2/s) =	9.6E-11
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.5E-12	K_s (m/s) =	4.8E-12
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.1E-11
C_D (-) =	NA	C_D (-) =	5.6E-03
ξ (-) =	-1.31	ξ (-) =	-3.15
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	*	C (m^3/Pa) =	5.1E-11
dt_2 (min) =	*	C_D (-) =	5.6E-03
T_T (m^2/s) =	9.6E-11	ξ (-) =	-3.15
S (-) =	1.0E-06		
K_s (m/s) =	4.8E-12		
S_s (1/m) =	5.0E-08		

Comments:

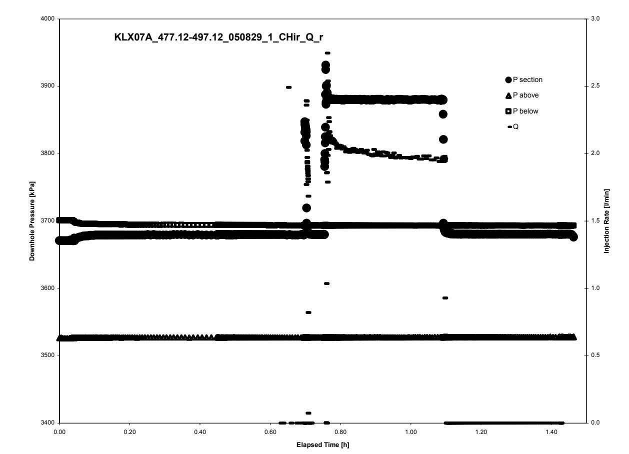
*: IARF not measured

The recommended transmissivity of 9.6E-11m2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-11 to 3.0E-10 m2/s. A flow dimension of 2 was assumed. 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 3508.2 kPa.

Test Summary Sheet

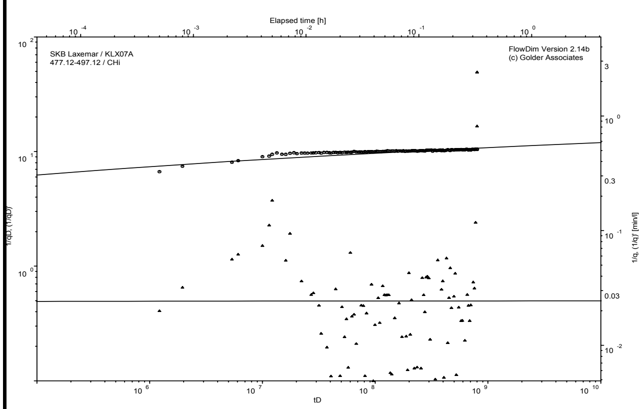
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050829 08:35
Test section from - to (m):	477.12-497.12 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

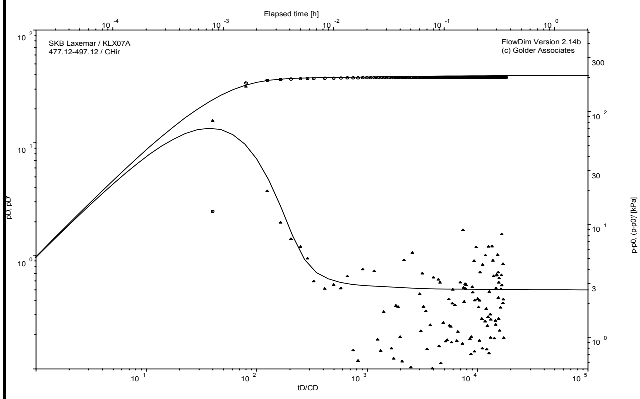


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3671		
p_i (kPa) =	3680		
p_p(kPa) =	3880	p_F (kPa) =	3680
Q_p (m^3/s)=	3.30E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.2		
Derivative fact.=	0.03	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	1.6E-06		
T_M (m^2/s)=	1.7E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.78	dt_1 (min) =	3.60
dt_2 (min) =	17.34	dt_2 (min) =	19.60
T (m^2/s) =	2.7E-06	T (m^2/s) =	9.9E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.3E-07	K_s (m/s) =	5.0E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.6E-10
C_D (-) =	NA	C_D (-) =	5.1E-02
ξ (-) =	2.94	ξ (-) =	31.40
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) =	3.60	C (m^3/Pa) =	4.6E-10
dt_2 (min) =	19.60	C_D (-) =	5.1E-02
T_T (m^2/s) =	9.9E-06	ξ (-) =	31.40
S (-) =	1.0E-06		
K_s (m/s) =	5.0E-07		
S_s (1/m) =	5.0E-08		

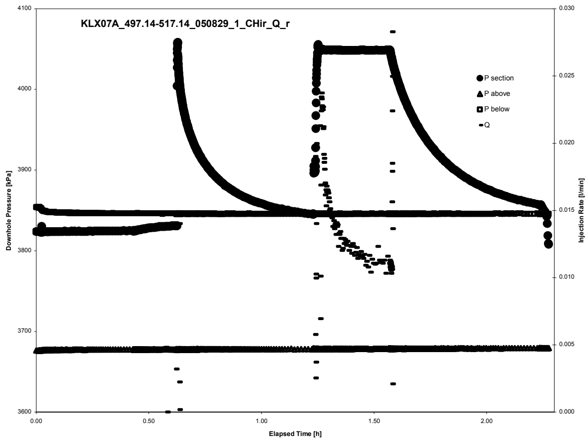
Comments:

The recommended transmissivity of 9.9E-6 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E-6 to 2.0E-5 m2/s. A flow dimension of two was used for the analyses. 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 3661.7 kPa.

Test Summary Sheet

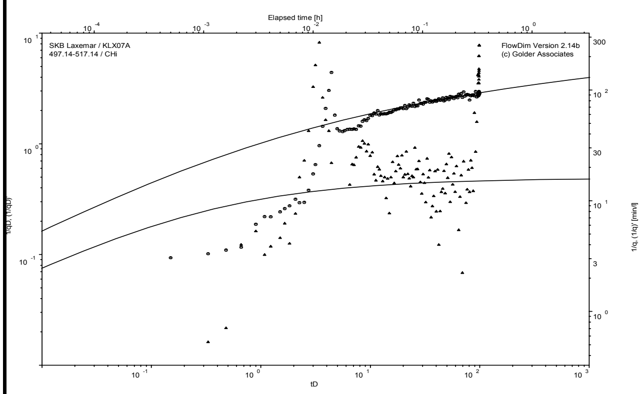
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050829 10:40
Test section from - to (m):	497.14-517.14 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

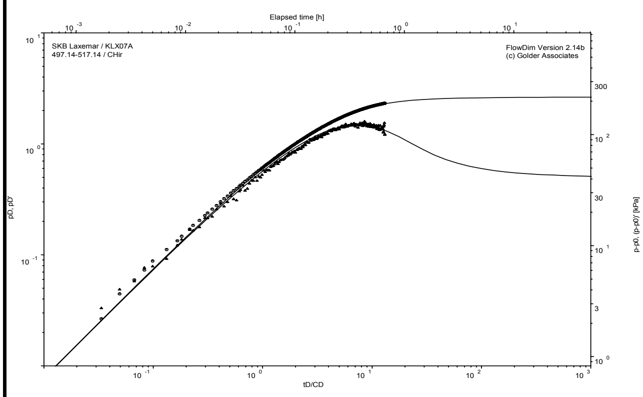


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3823		
p_i (kPa) =	3845		
p_p(kPa) =	4049	p_F (kPa) =	3857
Q_p (m^3/s)=	1.67E-07		
tp (s) =	1200	t_F (s) =	2400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.5		
Derivative fact.=	0.1	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	8.0E-09		
T_M (m^2/s)=	8.4E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	10.18	dt_1 (min) =	*
dt_2 (min) =	17.40	dt_2 (min) =	*
T (m^2/s) =	3.9E-09	T (m^2/s) =	5.4E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.0E-10	K_s (m/s) =	2.7E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.3E-10
C_D (-) =	NA	C_D (-) =	6.9E-02
ξ (-) =	-1.74	ξ (-) =	2.50
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) =	*	C (m^3/Pa) =	6.3E-10
dt_2 (min) =	*	C_D (-) =	6.9E-02
T_T (m^2/s) =	5.4E-09	ξ (-) =	2.50
S (-) =	1.0E-06		
K_s (m/s) =	2.7E-10		
S_s (1/m) =	5.0E-08		

Comments:

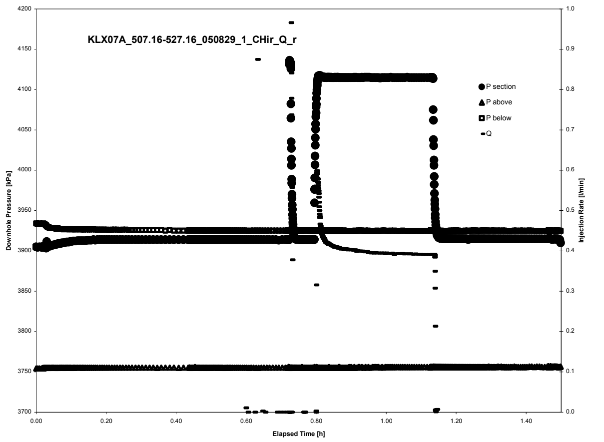
*: IARF not measured

The recommended transmissivity of 5.4E-9 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-9 to 8.0E-9 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3810.1 kPa.

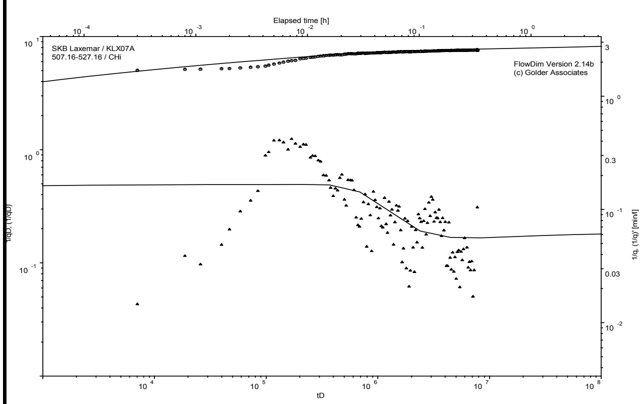
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050829 14:23
Test section from - to (m):	507.16-527.16 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

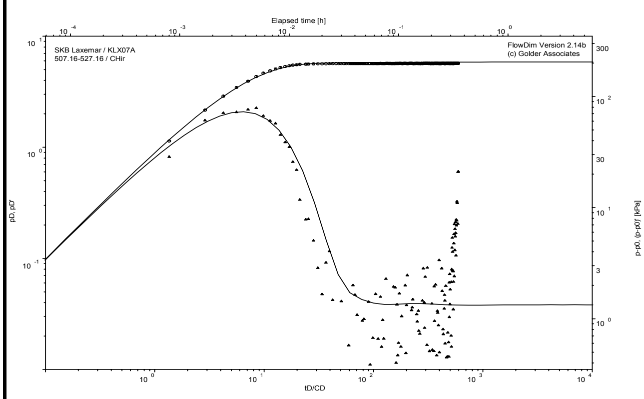
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3904		
p_i (kPa) =	3914		
p_p(kPa) =	4114	p_F (kPa) =	3914
Q_p (m^3/s)=	6.48E-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)=	12.5		
Derivative fact.=	0.07	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	3.2E-07		
T_M (m^2/s)=	3.3E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.97	dt_1 (min) =	*
dt_2 (min) =	1.57	dt_2 (min) =	*
T (m^2/s) =	3.9E-07	T (m^2/s) =	3.0E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.9E-08	K_s (m/s) =	1.5E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.1E-10
C_D (-) =	NA	C_D (-) =	4.5E-02
ξ (-) =	1.60	ξ (-) =	1.56
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) =	4.1E-10
dt_2 (min) =	*	C_D (-) =	4.5E-02
T_T (m^2/s) =	3.0E-07	ξ (-) =	1.56
S (-) =	1.0E-06		
K_s (m/s) =	1.5E-08		
S_s (1/m) =	5.0E-08		

Comments:

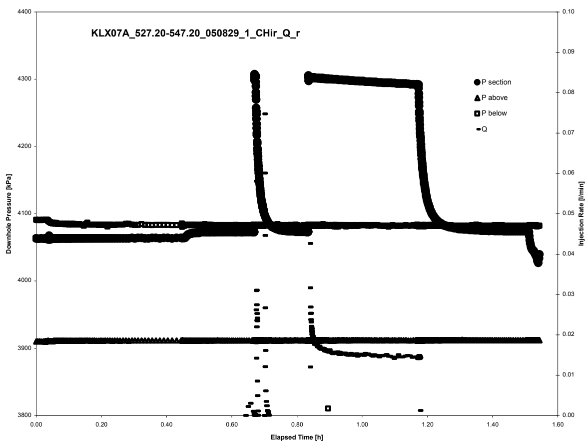
*: IARF not measured

The recommended transmissivity of 3.0E-7 m2/s was derived from the analysis of the CHir phase (inner zone). The confidence range for the interval transmissivity is estimated to be 1.0E-7 to 6.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3891.4 kPa.

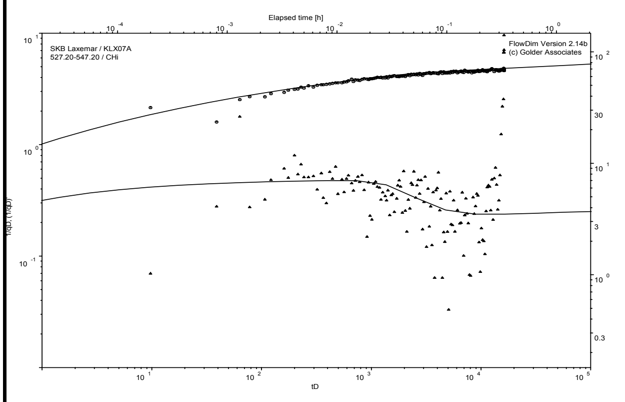
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050829 16:35
Test section from - to (m):	527.20-547.20 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

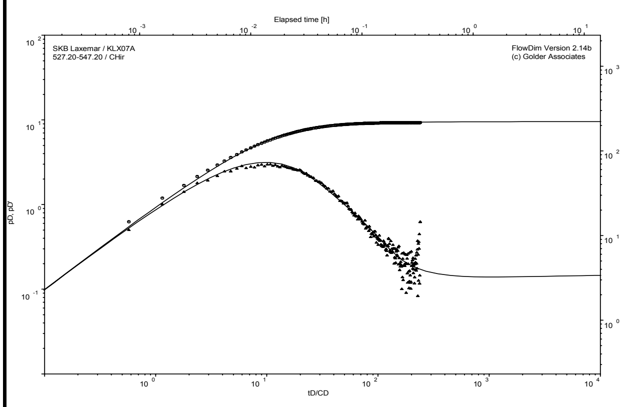
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4063		
p_i (kPa) =	4073		
p_p(kPa) =	4292	p_F (kPa) =	4074
Q_p (m^3/s)=	2.33E-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.=	0.13	Derivative fact.=	0.04
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) =	0.20	dt_1 (min) =	*
dt_2 (min) =	1.00	dt_2 (min) =	*
T (m^2/s) =	8.1E-09	T (m^2/s) =	1.8E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.1E-10	K_s (m/s) =	9.0E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.8E-11
C_D (-) =	NA	C_D (-) =	6.3E-03
ξ (-) =	0.44	ξ (-) =	4.84
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	0.20	C (m^3/Pa) =	5.8E-11
dt_2 (min) =	1.00	C_D (-) =	6.3E-03
T_T (m^2/s) =	8.1E-09	ξ (-) =	0.44
S (-) =	1.0E-06		
K_s (m/s) =	4.1E-10		
S_s (1/m) =	5.0E-08		

Comments:

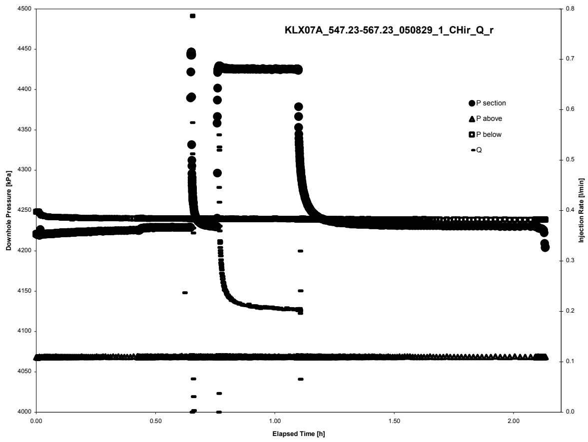
*: IARF not measured

The recommended transmissivity of 8.1E-9 m2/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-9 to 2.0E-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 4045.7 kPa.

Test Summary Sheet

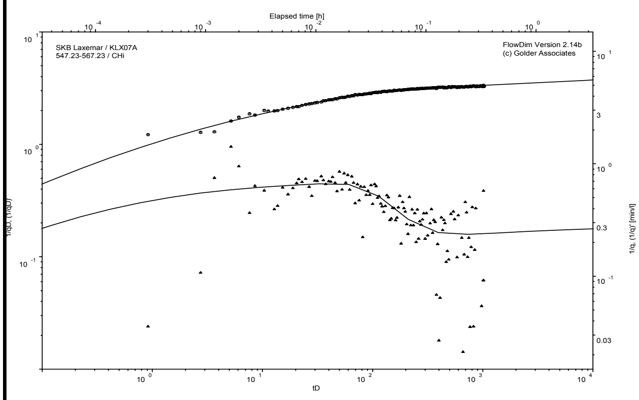
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050829 18:49
Test section from - to (m):	547.23-567.23 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

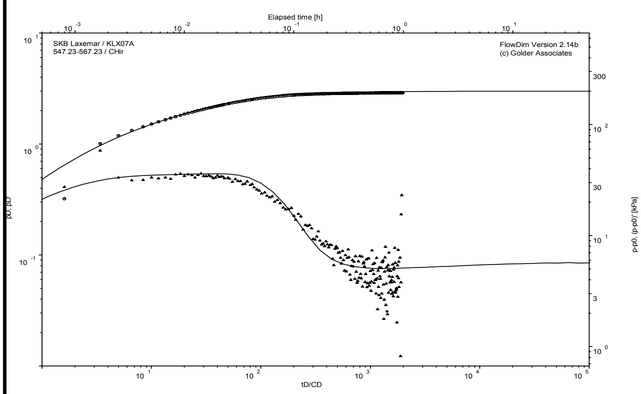


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4220		
p_i (kPa) =	4230		
p_p(kPa) =	4425	p_F (kPa) =	4230
Q_p (m^3/s)=	3.33E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.1		
Derivative fact.=	0.06	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	1.7E-07		
T_M (m^2/s)=	1.8E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.37	dt_1 (min) =	0.20
dt_2 (min) =	1.27	dt_2 (min) =	1.50
T (m^2/s) =	9.0E-08	T (m^2/s) =	8.6E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.5E-09	K_s (m/s) =	4.3E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9.9E-11
C_D (-) =	NA	C_D (-) =	1.1E-02
ξ (-) =	-2.15	ξ (-) =	-2.34
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) =	0.20	C (m^3/Pa) =	9.9E-11
dt_2 (min) =	1.50	C_D (-) =	1.1E-02
T_T (m^2/s) =	8.6E-08	ξ (-) =	-2.34
S (-) =	1.0E-06		
K_s (m/s) =	4.3E-09		
S_s (1/m) =	5.0E-08		

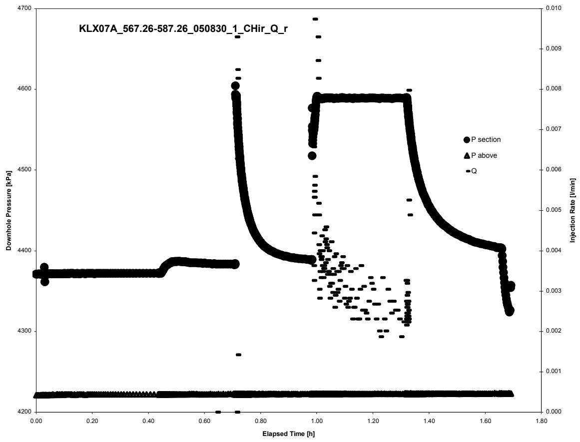
Comments:

The recommended transmissivity of 8.6E-8 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to 4.0E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4205.0 kPa.

Test Summary Sheet

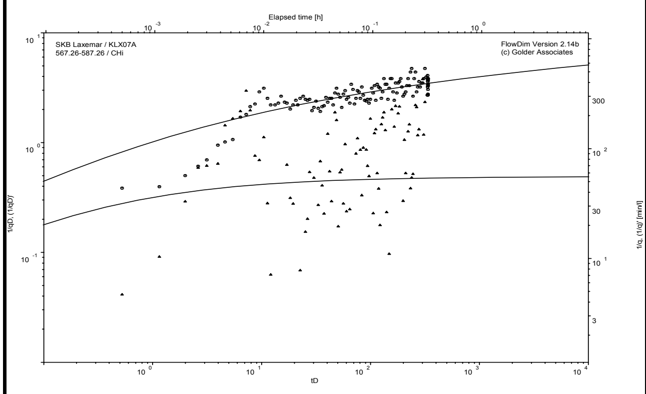
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050830 09:08
Test section from - to (m):	567.26-587.26 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

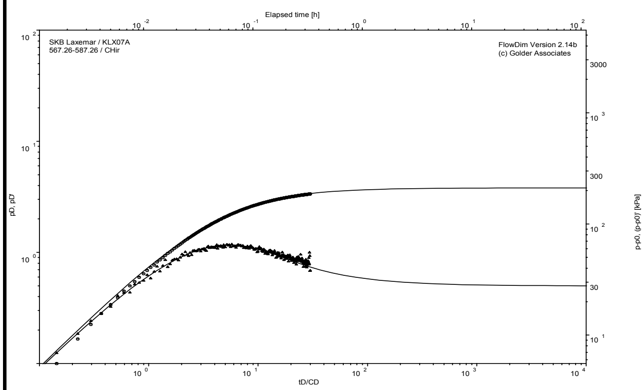


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4371		
p_i (kPa) =	4389		
p_p(kPa) =	4589	p_F (kPa) =	4403
Q_p (m^3/s)=	5.00E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.3		
Derivative fact.=	0.14	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.5E-09		
T_M (m^2/s)=	2.6E-09		
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) =	1.4E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.8E-11	K_s (m/s) =	7.1E-11
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.6E-11
C_D (-) =	NA	C_D (-) =	4.0E-03
ξ (-) =	-0.50	ξ (-) =	-0.03
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) =	*	C (m^3/Pa) =	3.6E-11
dt_2 (min) =	*	C_D (-) =	4.0E-03
T_T (m^2/s) =	1.4E-09	ξ (-) =	-0.03
S (-) =	1.0E-06		
K_s (m/s) =	7.1E-11		
S_s (1/m) =	5.0E-08		

Comments:

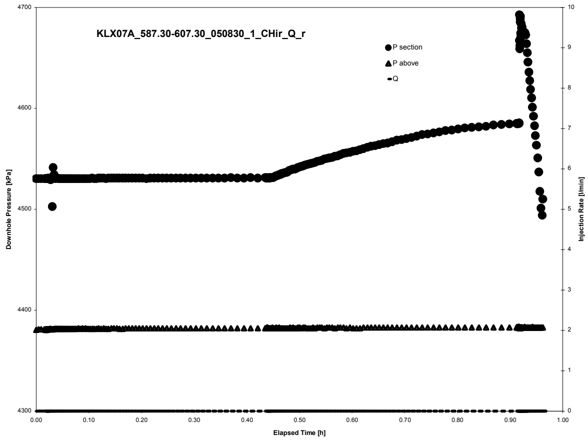
*: IARF not measured

The recommended transmissivity of 1.4E-9 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-10 to 3.0E-9 m2/s. The flow dimension used for the analyses 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 4353.9 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050830 11:38
Test section from - to (m):	587.30-607.30 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) =	4531		
p_i (kPa) =	NA		
p_p(kPa) =	NA	p_F (kPa) =	NA
Q_p (m^3/s)=	NA		
tp (s) =	NA	t_F (s) =	NA
S el S^* (-)=	NA	S el S^* (-)=	NA
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.5		
Derivative fact.=	NA	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) =	NA	dt_1 (min) =	NA
dt_2 (min) =	NA	dt_2 (min) =	NA
T (m^2/s) =	NA	T (m^2/s) =	NA
S (-) =	NA	S (-) =	NA
K_s (m/s) =	NA	K_s (m/s) =	NA
S_s (1/m) =	NA	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	NA	ξ (-) =	NA
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period

Not Analysed

Log-Log plot incl. derivatives- recovery period

Not Analysed

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	NA
dt_2 (min) =	NA	C_D (-) =	NA
T_T (m^2/s) =	NA	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

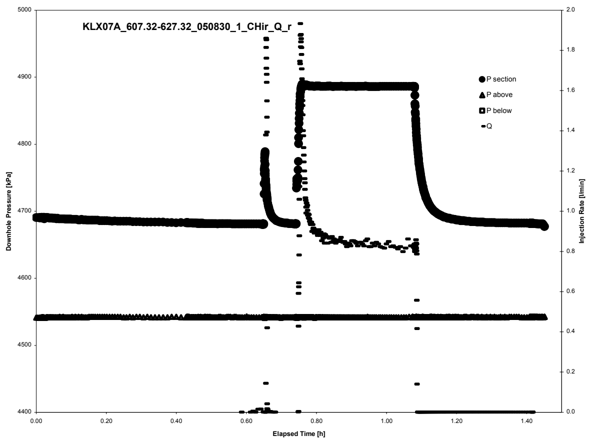
Comments:

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

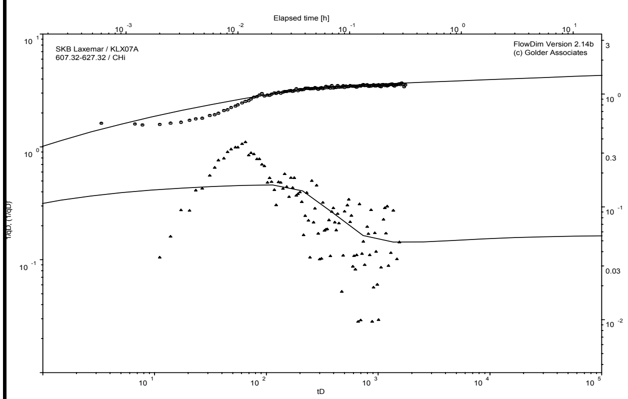
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050830 14:27
Test section from - to (m):	607.32-627.32 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

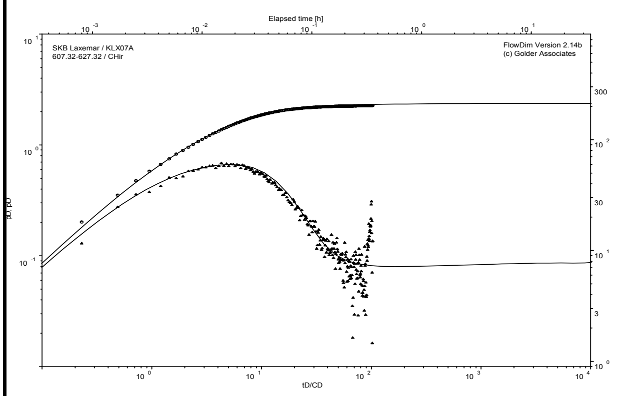
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4690		
p_i (kPa) =	4681		
p_p(kPa) =	4886	p_F (kPa) =	4681
Q_p (m^3/s)=	1.40E-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)=	13.7		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	6.7E-07		
T_M (m^2/s)=	7.0E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	10.34	dt_1 (min) =	16.80
dt_2 (min) =	16.44	dt_2 (min) =	19.20
T (m^2/s) =	1.1E-06	T (m^2/s) =	1.5E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.5E-08	K_s (m/s) =	7.3E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.1E-09
C_D (-) =	NA	C_D (-) =	2.3E-01
ξ (-) =	-2.56	ξ (-) =	-3.30
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	16.80	C (m^3/Pa) =	2.1E-09
dt_2 (min) =	19.20	C_D (-) =	2.3E-01
T_T (m^2/s) =	1.5E-06	ξ (-) =	-3.30
S (-) =	1.0E-06		
K_s (m/s) =	7.3E-08		
S_s (1/m) =	5.0E-08		

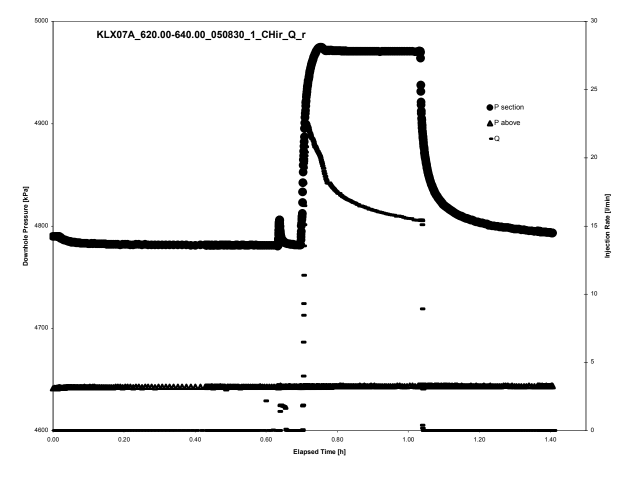
Comments:

The recommended transmissivity of 1.5E-6 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-7 to 3.0E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4653.6 kPa.

Test Summary Sheet

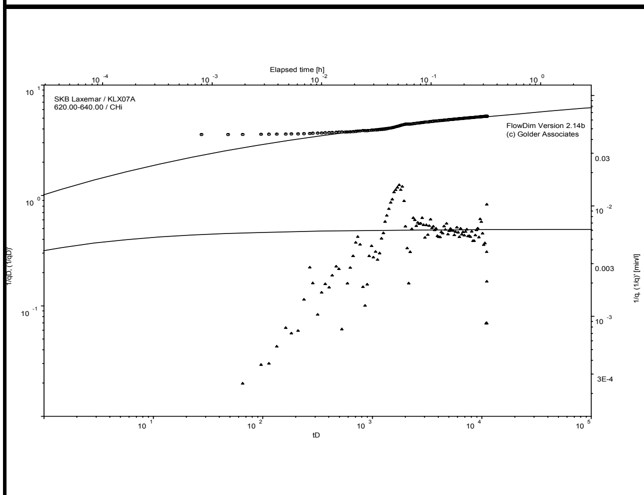
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050830 16:32
Test section from - to (m):	620.00-640.00 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

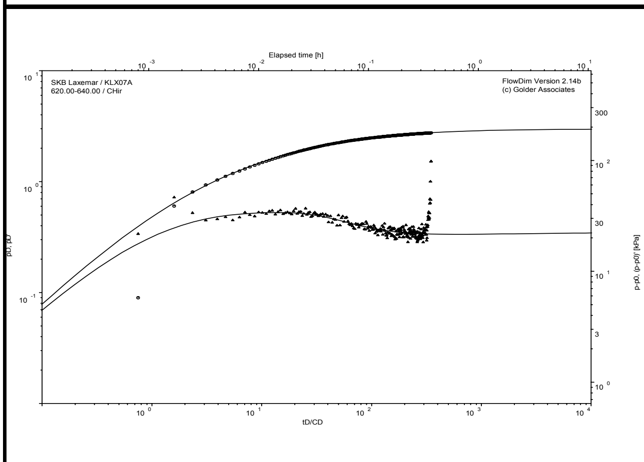


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4790		
p_i (kPa) =	4781		
p_p(kPa) =	4970	p_F (kPa) =	4794
Q_p (m^3/s)=	2.57E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.8		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.3E-05		
T_M (m^2/s)=	1.4E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	6.47	dt_1 (min) =	10.10
dt_2 (min) =	17.70	dt_2 (min) =	20.00
T (m^2/s) =	1.1E-05	T (m^2/s) =	1.0E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.6E-07	K_s (m/s) =	5.0E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.7E-08
C_D (-) =	NA	C_D (-) =	8.5E+00
ξ (-) =	-3.34	ξ (-) =	-4.91
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) =	10.10	C (m^3/Pa) =	7.7E-08
dt_2 (min) =	20.00	C_D (-) =	8.5E+00
T_T (m^2/s) =	1.0E-05	ξ (-) =	-4.91
S (-) =	1.0E-06		
K_s (m/s) =	5.0E-07		
S_s (1/m) =	5.0E-08		

Comments:

The recommended transmissivity of 1.0E-5 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-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 4754.0 kPa.

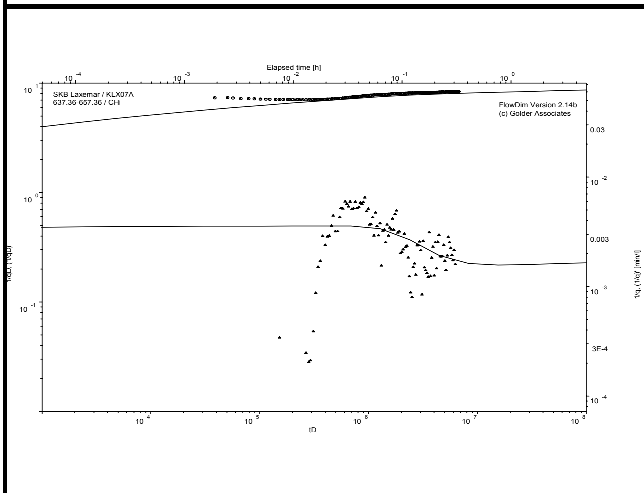
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050830 18:37
Test section from - to (m):	637.36-657.36 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

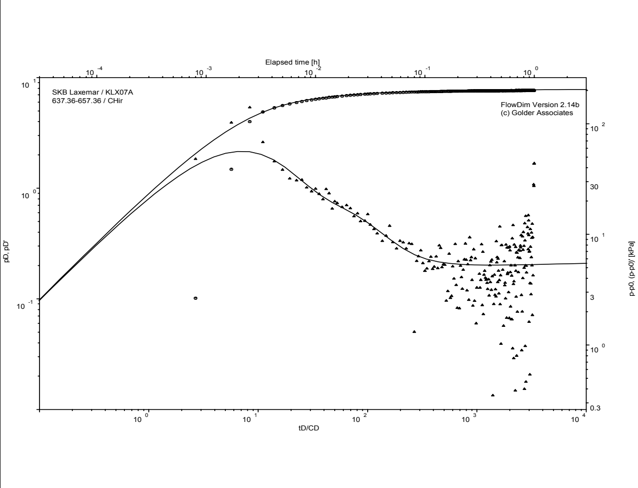
Linear plot Q and p

Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4927		
p_i (kPa) =	4926		
p_p(kPa) =	5126	p_F (kPa) =	4925
Q_p (m^3/s)=	2.75E-04		
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)=	14.1		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.3E-05		
T_M (m^2/s)=	1.4E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	9.10
dt_2 (min) =	*	dt_2 (min) =	57.20
T (m^2/s) =	3.8E-05	T (m^2/s) =	4.0E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.9E-06	K_s (m/s) =	2.0E-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-08
C_D (-) =	NA	C_D (-) =	1.3E+00
ξ (-) =	-0.40	ξ (-) =	-0.12
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) =	9.10	C (m^3/Pa) =	1.2E-08
dt_2 (min) =	57.20	C_D (-) =	1.3E+00
T_T (m^2/s) =	4.0E-05	ξ (-) =	-0.12
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-06		
S_s (1/m) =	5.0E-08		

Comments:

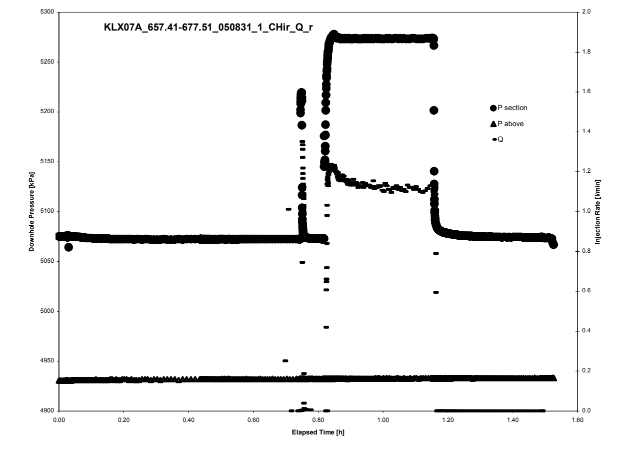
*: IARF not measured

The recommended transmissivity of 4.0E-5 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-5 to 6.0E-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 4900.8 kPa.

Test Summary Sheet

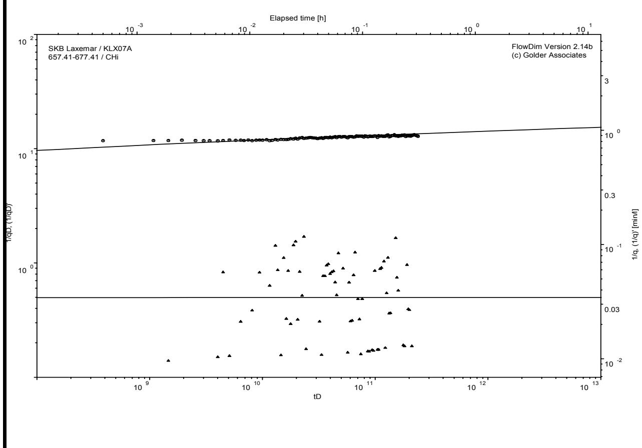
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050831 09:19
Test section from - to (m):	657.41-677.41 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

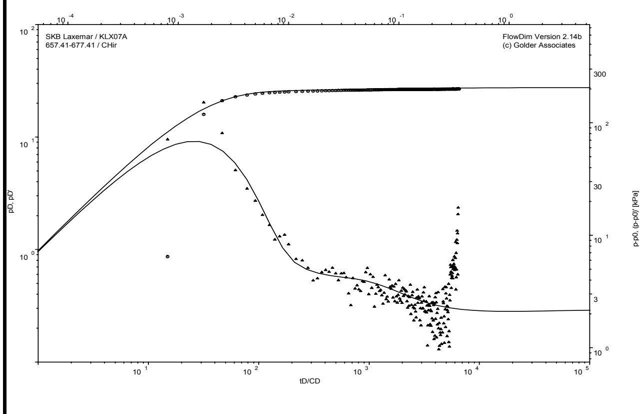


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5075		
p_i (kPa) =	5073		
p_p(kPa) =	5274	p_F (kPa) =	5074
Q_p (m^3/s)=	1.83E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.4		
Derivative fact.=	0.05	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	8.9E-07		
T_M (m^2/s)=	9.4E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.06	dt_1 (min) =	0.90
dt_2 (min) =	12.43	dt_2 (min) =	2.90
T (m^2/s) =	1.9E-06	T (m^2/s) =	3.9E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	9.4E-08	K_s (m/s) =	2.0E-07
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 (-) =	6.01	ξ (-) =	19.90
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) =	0.90	C (m^3/Pa) =	4.9E-10
dt_2 (min) =	2.90	C_D (-) =	5.4E-02
T_T (m^2/s) =	3.9E-06	ξ (-) =	19.90
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-07		
S_s (1/m) =	5.0E-08		

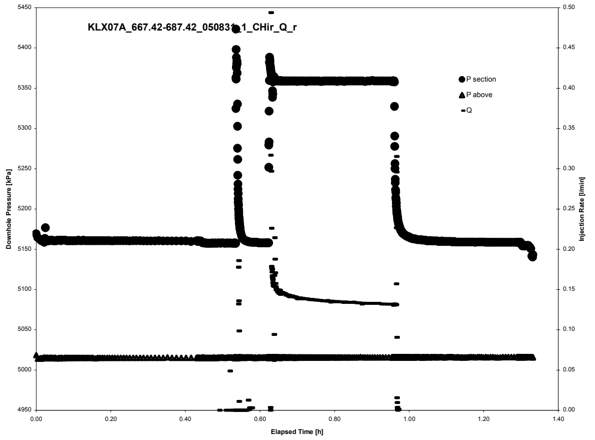
Comments:

The recommended transmissivity of 3.9E-6 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 7.0E-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 5053.0 kPa.

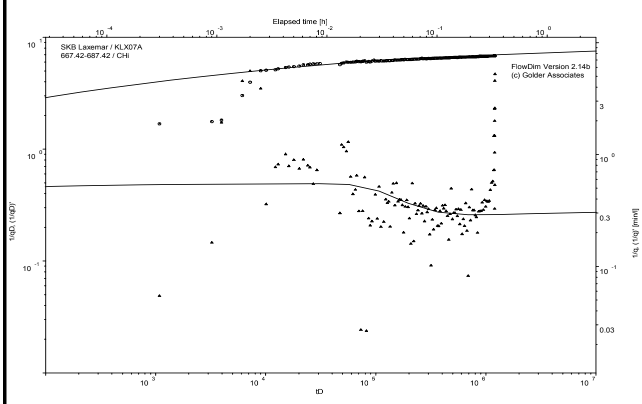
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050831 14:40
Test section from - to (m):	667.42-687.42 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

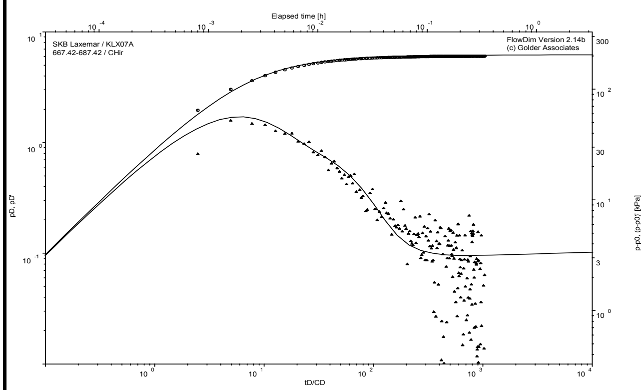
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5161		
p_i (kPa) =	5158		
p_p(kPa) =	5359	p_F (kPa) =	5158
Q_p (m^3/s)=	2.17E-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)=	14.5		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.1E-07		
T_M (m^2/s)=	1.1E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.79	dt_1 (min) =	8.30
dt_2 (min) =	15.83	dt_2 (min) =	17.00
T (m^2/s) =	2.1E-07	T (m^2/s) =	5.2E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-08	K_s (m/s) =	2.6E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.3E-11
C_D (-) =	NA	C_D (-) =	9.1E-03
ξ (-) =	1.26	ξ (-) =	1.21
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	8.30	C (m^3/Pa) =	8.3E-11
dt_2 (min) =	17.00	C_D (-) =	9.1E-03
T_T (m^2/s) =	5.2E-07	ξ (-) =	1.21
S (-) =	1.0E-06		
K_s (m/s) =	2.6E-08		
S_s (1/m) =	5.0E-08		

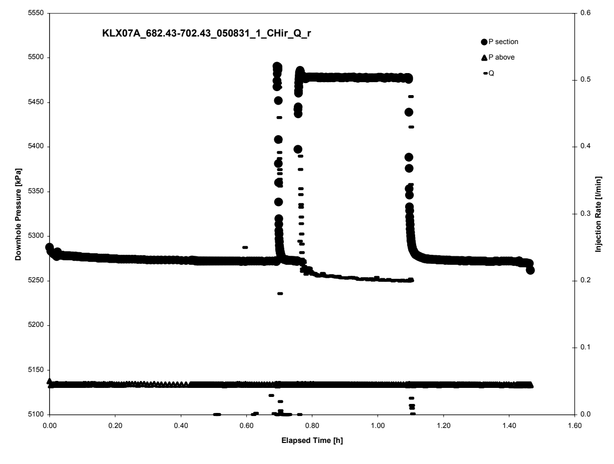
Comments:

The recommended transmissivity of 5.2E-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-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 5132.4 kPa.

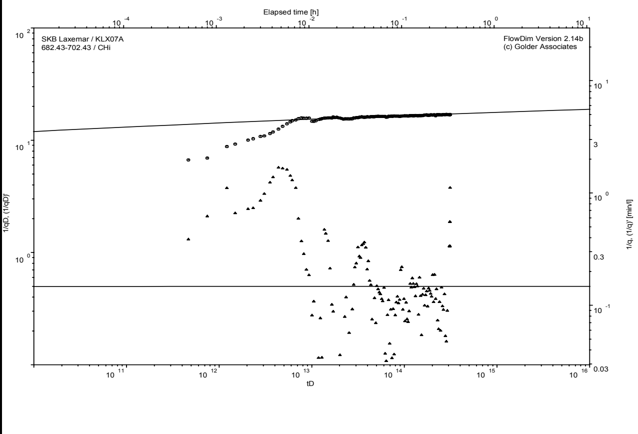
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050831 16:52
Test section from - to (m):	682.43-702.43 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

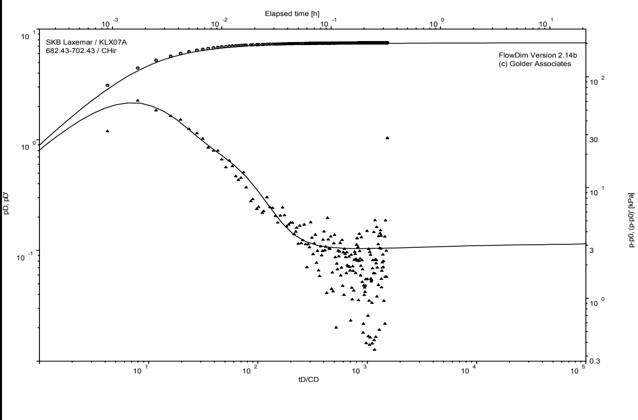
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5278		
p_i (kPa) =	5272		
p_p(kPa) =	5478	p_F (kPa) =	5272
Q_p (m^3/s)=	3.33E-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)=	14.7		
Derivative fact.=	0.14	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	1.6E-07		
T_M (m^2/s)=	1.7E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.35	dt_1 (min) =	4.80
dt_2 (min) =	16.20	dt_2 (min) =	19.20
T (m^2/s) =	4.3E-07	T (m^2/s) =	8.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.1E-08	K_s (m/s) =	4.5E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.0E-10
C_D (-) =	NA	C_D (-) =	1.1E-02
ξ (-) =	10.30	ξ (-) =	2.27
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	4.80	C (m^3/Pa) =	1.0E-10
dt_2 (min) =	19.20	C_D (-) =	1.1E-02
T_T (m^2/s) =	8.9E-07	ξ (-) =	2.27
S (-) =	1.0E-06		
K_s (m/s) =	4.5E-08		
S_s (1/m) =	5.0E-08		

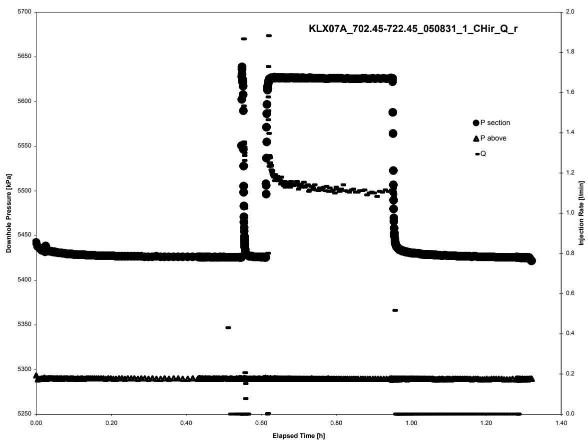
Comments:

The recommended transmissivity of 8.9E-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better 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 5246.7 kPa.

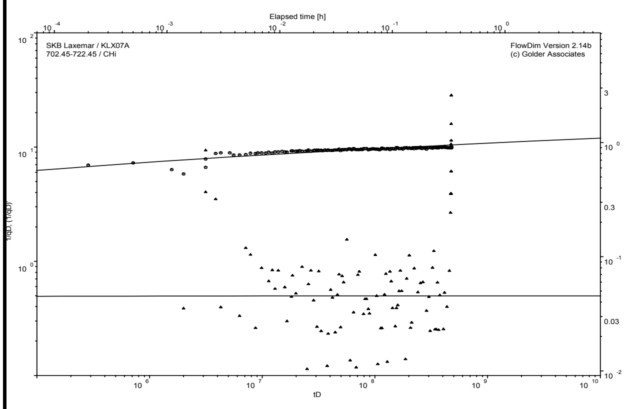
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050831 19:04
Test section from - to (m):	702.45-722.45 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

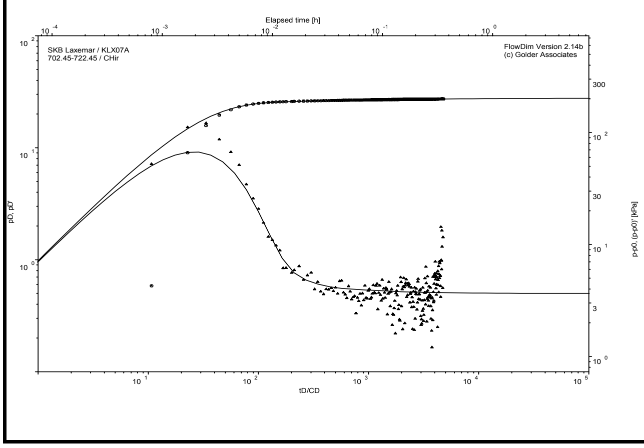
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5433		
p_i (kPa) =	5426		
p_p(kPa) =	5625	p_F (kPa) =	5426
Q_p (m^3/s)=	1.83E-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)=	15.0		
Derivative fact.=	0.05	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	9.0E-07		
T_M (m^2/s)=	9.5E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.76	dt_1 (min) =	2.40
dt_2 (min) =	15.82	dt_2 (min) =	20.30
T (m^2/s) =	1.4E-06	T (m^2/s) =	4.0E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.2E-08	K_s (m/s) =	2.0E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.9E-10
C_D (-) =	NA	C_D (-) =	7.6E-02
ξ (-) =	3.00	ξ (-) =	19.70
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	2.40	C (m^3/Pa) =	6.9E-10
dt_2 (min) =	20.30	C_D (-) =	7.6E-02
T_T (m^2/s) =	4.0E-06	ξ (-) =	19.70
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-07		
S_s (1/m) =	5.0E-08		

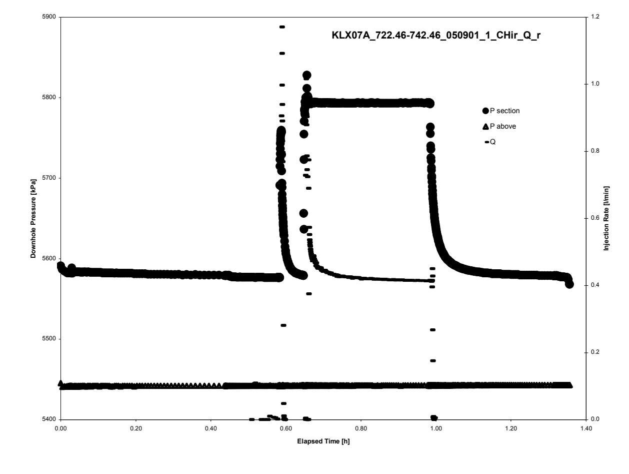
Comments:

The recommended transmissivity of 4.0E-6 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-6 to 6.0E-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 5400.7 kPa.

Test Summary Sheet

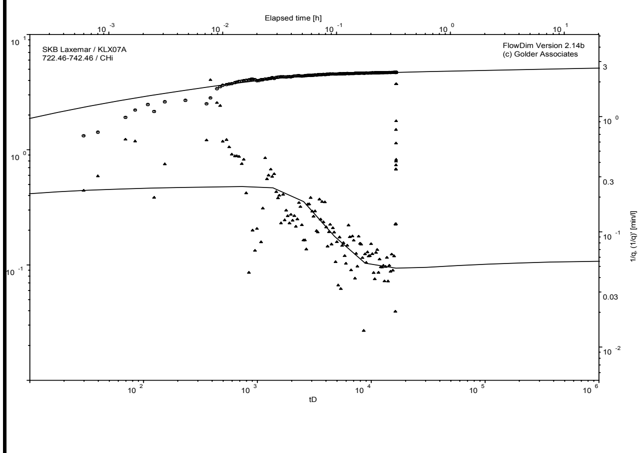
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050901 08:07
Test section from - to (m):	722.46-742.46 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

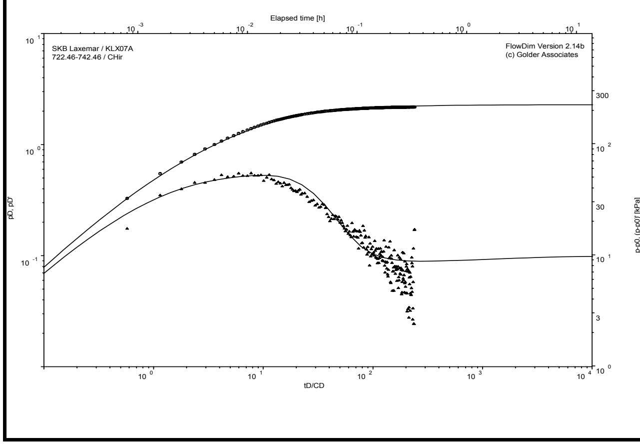


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5582		
p_i (kPa) =	5580		
p_p(kPa) =	5794	p_F (kPa) =	5579
Q_p (m^3/s)=	6.67E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.3		
Derivative fact.=	0.06	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.1E-07		
T_M (m^2/s)=	3.2E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	12.68	dt_1 (min) =	12.60
dt_2 (min) =	18.69	dt_2 (min) =	17.40
T (m^2/s) =	1.1E-06	T (m^2/s) =	5.8E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.5E-08	K_s (m/s) =	2.9E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.8E-10
C_D (-) =	NA	C_D (-) =	4.1E-02
ξ (-) =	-1.24	ξ (-) =	-3.00
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) =	12.60	C (m^3/Pa) =	3.8E-10
dt_2 (min) =	17.40	C_D (-) =	4.1E-02
T_T (m^2/s) =	5.8E-07	ξ (-) =	-3.00
S (-) =	1.0E-06		
K_s (m/s) =	2.9E-08		
S_s (1/m) =	5.0E-08		

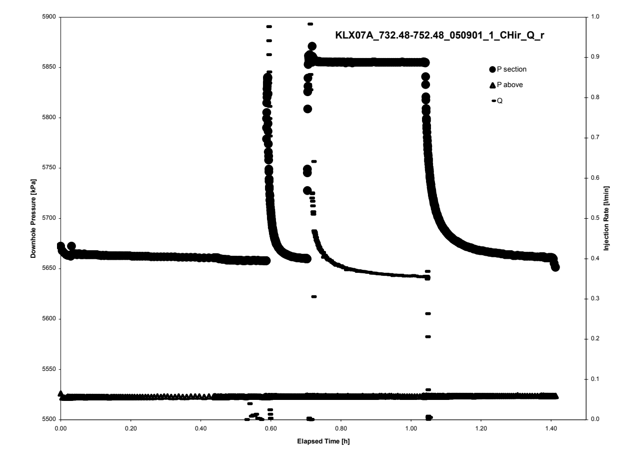
Comments:

The recommended transmissivity of 5.8E-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-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 5554.6 kPa.

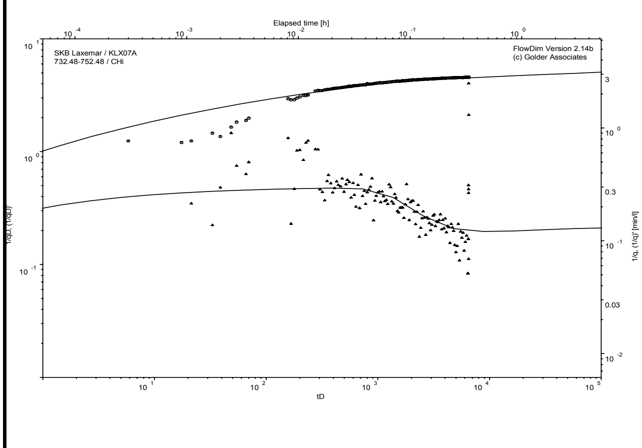
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050901 10:12
Test section from - to (m):	732.48-752.48 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

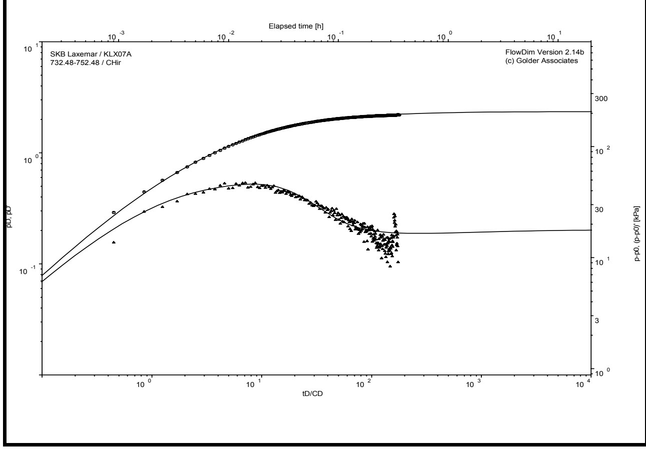
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5664		
p_i (kPa) =	5660		
p_p(kPa) =	5856	p_F (kPa) =	5661
Q_p (m^3/s)=	5.83E-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)=	15.3		
Derivative fact.=	0.05	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.9E-07		
T_M (m^2/s)=	3.1E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.93	dt_1 (min) =	13.15
dt_2 (min) =	2.65	dt_2 (min) =	20.00
T (m^2/s) =	2.2E-07	T (m^2/s) =	2.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-08	K_s (m/s) =	1.4E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.2E-10
C_D (-) =	NA	C_D (-) =	5.7E-02
ξ (-) =	-1.66	ξ (-) =	-3.17
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	13.15	C (m^3/Pa) =	5.2E-10
dt_2 (min) =	20.00	C_D (-) =	5.7E-02
T_T (m^2/s) =	2.9E-07	ξ (-) =	-3.17
S (-) =	1.0E-06		
K_s (m/s) =	1.4E-08		
S_s (1/m) =	5.0E-08		

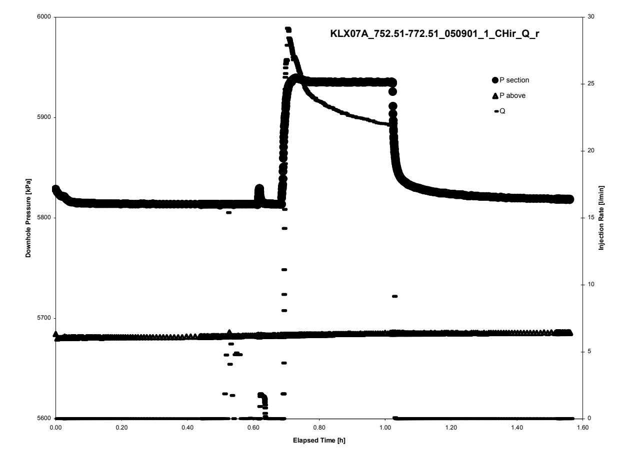
Comments:

The recommended transmissivity of 2.9E-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-7 to 6.0E-6 m2/s. A flow dimension of 2 was assumed. 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 5628.6 kPa.

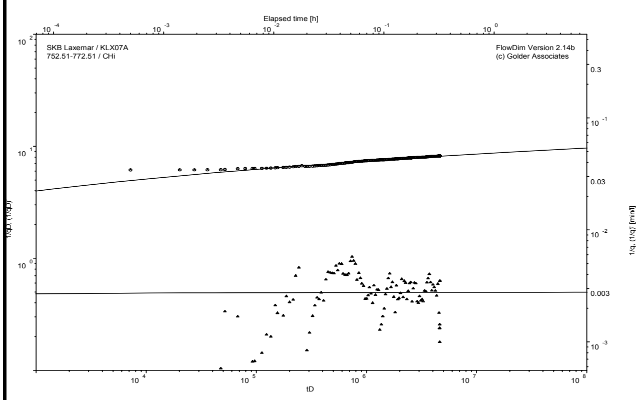
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050901 12:30
Test section from - to (m):	752.51-772.51 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

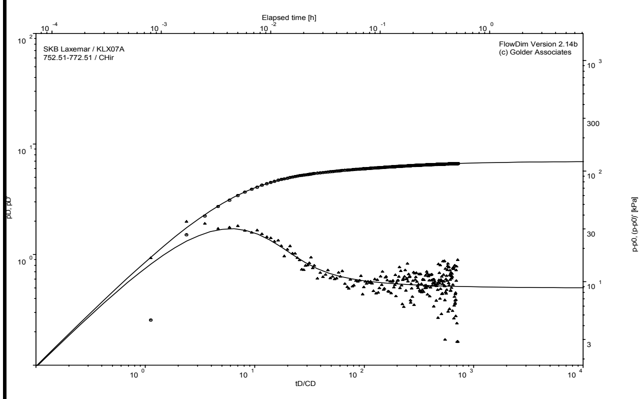
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5821		
p_i (kPa) =	5814		
p_p(kPa) =	5935	p_F (kPa) =	5819
Q_p (m^3/s)=	3.65E-04		
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)=	15.7		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.0E-05		
T_M (m^2/s)=	3.1E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	4.75	dt_1 (min) =	4.50
dt_2 (min) =	17.60	dt_2 (min) =	27.60
T (m^2/s) =	3.9E-05	T (m^2/s) =	3.5E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.9E-06	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) =	5.7E-08
C_D (-) =	NA	C_D (-) =	6.3E+00
ξ (-) =	-0.95	ξ (-) =	-2.06
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	4.50	C (m^3/Pa) =	5.7E-08
dt_2 (min) =	27.60	C_D (-) =	6.3E+00
T_T (m^2/s) =	3.5E-05	ξ (-) =	-2.06
S (-) =	1.0E-06		
K_s (m/s) =	1.7E-06		
S_s (1/m) =	5.0E-08		

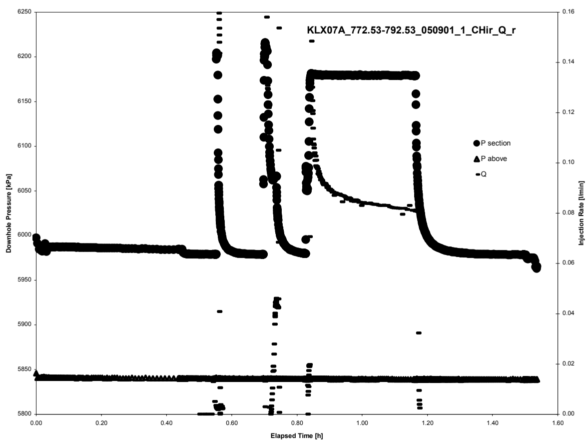
Comments:

The recommended transmissivity of 3.5E-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 2.0E-5 to 5.0E-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 5789.2 kPa.

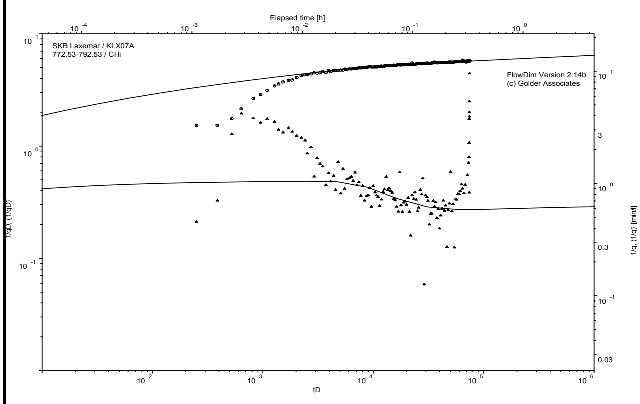
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050901 15:01
Test section from - to (m):	772.53-792.53 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

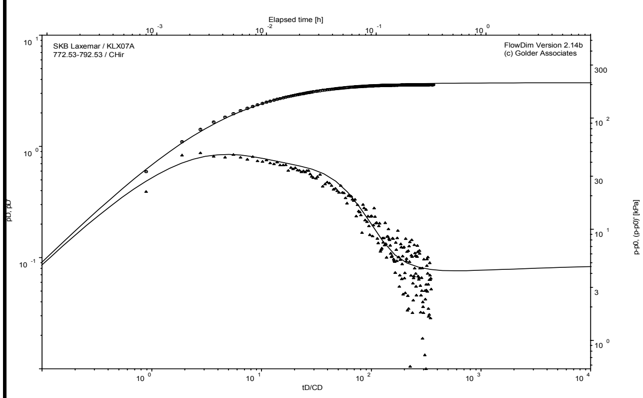
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5983		
p_i (kPa) =	5980		
p_p(kPa) =	6179	p_F (kPa) =	5978
Q_p (m^3/s)=	1.33E-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)=	16.1		
Derivative fact.=	0.1	Derivative fact.=	
Results		**Results**	
Q/s (m^2/s)=	6.6E-08		
T_M (m^2/s)=	6.9E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	9.44	dt_1 (min) =	0.30
dt_2 (min) =	13.57	dt_2 (min) =	1.80
T (m^2/s) =	1.0E-07	T (m^2/s) =	4.1E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.0E-09	K_s (m/s) =	2.1E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.6E-11
C_D (-) =	NA	C_D (-) =	9.4E-03
ξ (-) =	0.20	ξ (-) =	-1.10
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.			
dt_1 (min) =	0.30	C (m^3/Pa) =	8.6E-11
dt_2 (min) =	1.80	C_D (-) =	9.4E-03
T_T (m^2/s) =	4.1E-08	ξ (-) =	-1.10
S (-) =	1.0E-06		
K_s (m/s) =	2.1E-09		
S_s (1/m) =	5.0E-08		

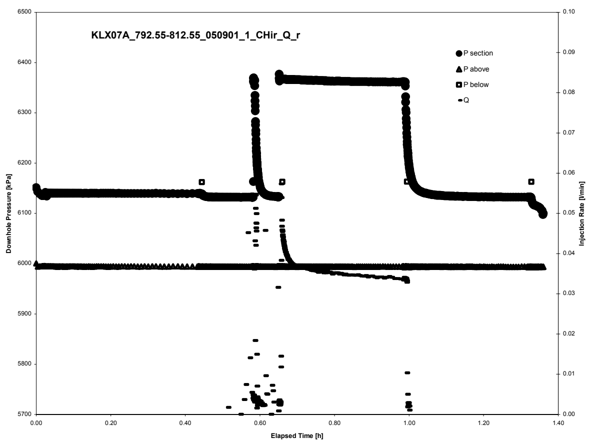
Comments:

The recommended transmissivity of 4.1E-8 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-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 5950.0 kPa.

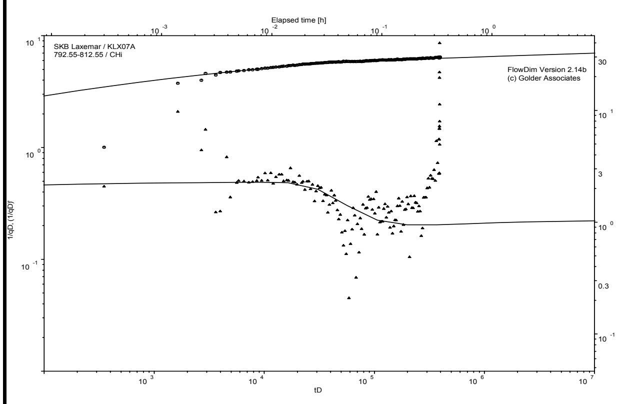
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050901 17:21
Test section from - to (m):	792.55-812.55 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

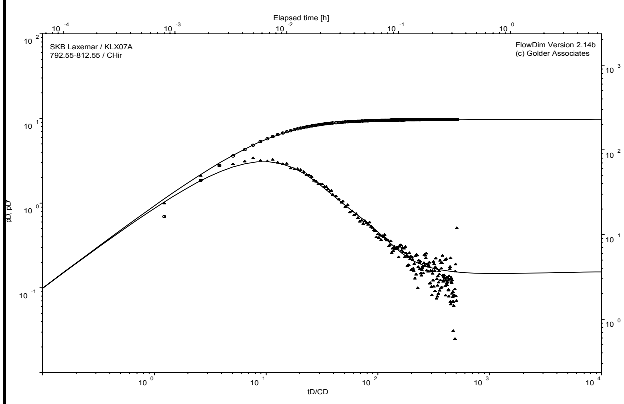
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6136		
p_i (kPa) =	6133		
p_p(kPa) =	6361	p_F (kPa) =	6132
Q_p (m^3/s)=	5.00E-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)=	16.3		
Derivative fact.=	0.1	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	2.2E-08		
T_M (m^2/s)=	2.3E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.30	dt_1 (min) =	*
dt_2 (min) =	1.15	dt_2 (min) =	*
T (m^2/s) =	2.5E-08	T (m^2/s) =	4.0E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.2E-09	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) =	6.0E-11
C_D (-) =	NA	C_D (-) =	6.6E-03
ξ (-) =	1.47	ξ (-) =	4.82
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) =	6.0E-11
dt_2 (min) =	*	C_D (-) =	6.6E-03
T_T (m^2/s) =	4.0E-08	ξ (-) =	4.82
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-09		
S_s (1/m) =	5.0E-08		

Comments:

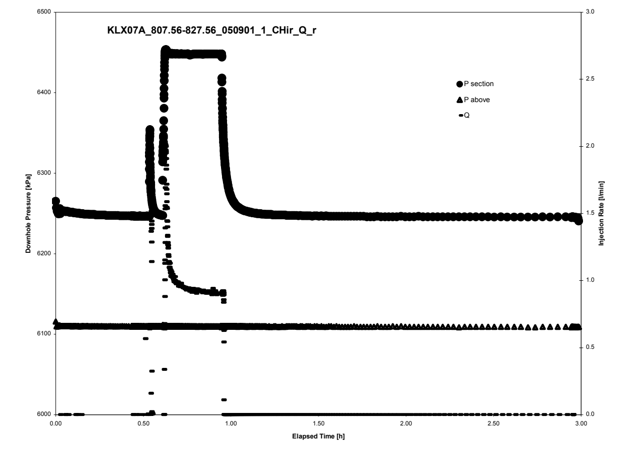
*: IARF not measured

The recommended transmissivity of 4.0E-8 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-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 6105.9 kPa.

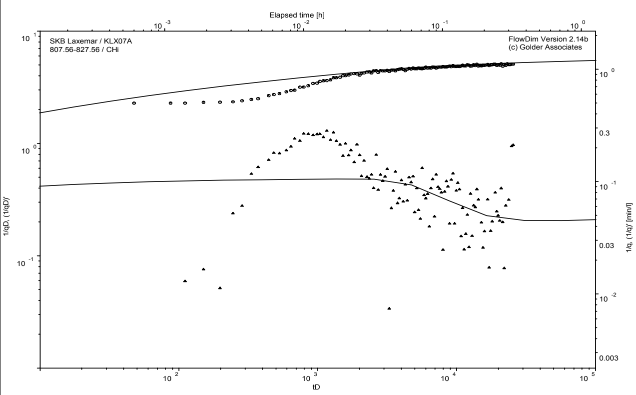
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX07A	Test start:	050901 19:41
Test section from - to (m):	807.56-827.56 m	Responsible for test execution:	Stephan Rohs
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

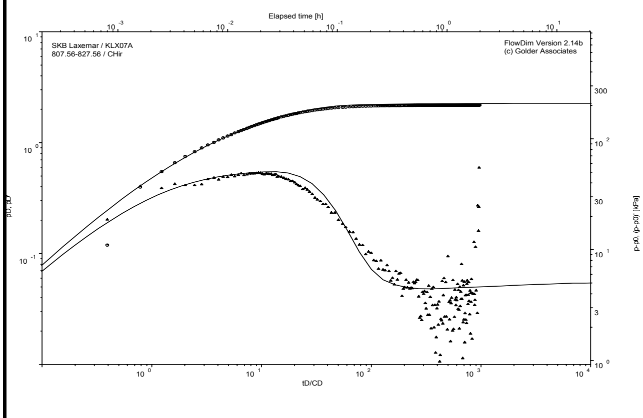
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	6251		
p_i (kPa) =	6248		
p_p(kPa) =	6448	p_F (kPa) =	6246
Q_p (m^3/s)=	1.43E-05		
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)=	16.5		
Derivative fact.=	0.11	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	7.0E-07		
T_M (m^2/s)=	7.4E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	*	dt_1 (min) =	17.00
dt_2 (min) =	*	dt_2 (min) =	72.00
T (m^2/s) =	1.3E-06	T (m^2/s) =	2.5E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.5E-08	K_s (m/s) =	1.2E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-09
C_D (-) =	NA	C_D (-) =	1.4E-01
ξ (-) =	-1.47	ξ (-) =	-3.63
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	17.00	C (m^3/Pa) =	1.3E-09
dt_2 (min) =	72.00	C_D (-) =	1.4E-01
T_T (m^2/s) =	2.5E-06	ξ (-) =	-3.63
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-07		
S_s (1/m) =	5.0E-08		

Comments:

The recommended transmissivity of 2.5E-6 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-7 to 5.0E-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 6223.0 kPa.

APPENDIX 4

Nomenclature

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		^oC

		logging). Temperature		
Te_{w0}		Temperature in the test section during undisturbed conditions (taken from temperature logging). Temperature		°C
Te_o		Temperature in the observation section (taken from temperature logging). Temperature		°C
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 v1.4)

SICADA/Data Import Template

SKB & Ergodata AB 2004

File Identity	
Created By	Stephan Rohs
Created	2005-10-10

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Activity Type	KLX07A KLX07A - Injection test

Project	AP PS 400-05-045

Activity Information						**Additional Activity Data**				
						C10	P20	P200	P220	R25
Idcode	**Start Date**	**Stop Date**	**Secup (m)**	**Seclow (m)**	**Section No**	**Company**	**Field crew manager**	**Field crew**	**evaluating data**	**Report**
KLX07A	20050820 16:35	20050901 22:40	108.50	827.56		Golder	Stephan Rohs	Stephan Rohs, Tomas Cronquist	Cristian Enachescu, Jörg Böhner, Stephan Rohs	Cristian Enachescu, Jörg Böhner, Stephan Rohs

Table **plu_s_hole_test_d**

PLU Injection and pumping, General information

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

idcode	start_date	stop_date	secup	seclow	section_no	test_type	formation_type	start_flow_period	stop_flow_period	flow_rate_end_qp	value_type_qp	mean_flow_rate_qm	q_measl__l	q_measl__u	tot_volume_vp
KLX07A	050820 16:35	050820 18:59	111.80	211.80		3	1	2005-08-21 19:50:06	2005-08-21 20:20:16	2.33E-04	0	5.02E-04	1.67E-08	8.33E-04	9.03E-01
KLX07A	050821 15:28	050821 17:22	211.92	311.92		3	1	2005-08-21 16:19:54	2005-08-21 16:50:04	5.08E-04	0	5.23E-04	1.67E-08	8.33E-04	9.42E-01
KLX07A	050821 18:57	050821 20:52	312.00	412.00		3	1	2005-08-21 19:50:06	2005-08-21 20:20:16	2.33E-04	0	2.45E-04	1.67E-08	8.33E-04	4.41E-01
KLX07A	050822 09:58	050822 11:58	412.07	512.07		3	1	2005-08-22 10:56:33	2005-08-22 11:26:43	7.62E-05	0	8.00E-05	1.67E-08	8.33E-04	1.44E-01
KLX07A	050822 13:45	050822 15:37	507.16	607.16		3	1	2005-08-22 14:35:37	2005-08-22 15:05:47	9.00E-06	0	9.33E-06	1.67E-08	8.33E-04	1.68E-02
KLX07A	050822 17:07	050822 20:46	602.32	702.32		3	1	2005-08-22 18:13:54	2005-08-22 18:44:04	1.50E-04	0	1.70E-04	1.67E-08	8.33E-04	3.06E-01
KLX07A	050823 09:33	050822 11:31	702.45	802.45		3	1	2005-08-23 10:29:39	2005-08-22 10:59:49	3.42E-04	0	3.67E-04	1.67E-08	8.33E-04	6.60E-01
KLX07A	050824 16:10	050824 17:37	108.50	128.50		3	1	2005-08-24 16:55:02	2005-08-24 17:15:22	5.17E-05	0	5.50E-05	1.67E-08	8.33E-04	6.60E-02
KLX07A	050824 18:21	050824 20:21	128.50	148.50		3	1	2005-08-24 19:29:14	2005-08-24 19:59:24	1.93E-04	0	1.95E-04	1.67E-08	8.33E-04	2.34E-01
KLX07A	050825 08:15	050825 10:27	146.50	166.50		3	1	2005-08-25 09:35:05	2005-08-25 10:05:15	4.30E-04	0	4.35E-04	1.67E-08	8.33E-04	5.22E-01
KLX07A	050825 11:10	050825 12:33	166.84	186.84		3	1	2005-08-25 11:51:49	2005-08-25 12:11:59	5.37E-04	0	5.47E-04	1.67E-08	8.33E-04	6.56E-01
KLX07A	050825 13:32	050825 14:48	186.88	206.88		3	1	2005-08-25 14:15:51	2005-08-25 14:36:01	1.33E-05	0	1.45E-05	1.67E-08	8.33E-04	1.74E-02
KLX07A	050825 15:22	050825 16:56	191.89	211.89		3	1	2005-08-25 16:14:32	2005-08-25 16:44:42	2.72E-04	0	2.75E-04	1.67E-08	8.33E-04	4.95E-01
KLX07A	050825 17:38	050825 19:06	211.92	231.92		3	1	2005-08-25 18:24:30	2005-08-25 18:44:40	2.55E-04	0	2.57E-04	1.67E-08	8.33E-04	3.08E-01
KLX07A	050826 08:21	050826 09:49	221.93	241.93		3	1	2005-08-26 09:07:38	2005-08-26 09:27:48	2.57E-04	0	2.58E-04	1.67E-08	8.33E-04	3.10E-01
KLX07A	050826 10:33	050826 12:15	241.93	261.93		3	1	2005-08-26 11:33:49	2005-08-26 11:53:59	5.17E-04	0	5.23E-04	1.67E-08	8.33E-04	6.28E-01
KLX07A	050826 13:17	050826 14:46	261.95	281.95		3	1	2005-08-26 14:04:32	2005-08-26 14:24:42	2.00E-05	0	2.00E-05	1.67E-08	8.33E-04	2.40E-02
KLX07A	050826 15:36	050826 16:54	281.98	301.98		3	1	2005-08-26 16:22:16	2005-08-26 16:42:26	3.67E-05	0	3.83E-05	1.67E-08	8.33E-04	4.60E-02
KLX07A	050826 17:29	050826 20:01	291.99	311.99		3	1	2005-08-26 18:39:12	2005-08-26 18:59:22	5.83E-05	0	6.00E-05	1.67E-08	8.33E-04	7.20E-02
KLX07A	050827 11:12	050827 13:17	312.00	332.00		3	1	2005-08-27 12:15:01	2005-08-27 12:35:11	8.33E-07	0	1.33E-06	1.67E-08	8.33E-04	1.60E-03
KLX07A	050827 14:01	050827 15:30	326.99	346.99		3	1	2005-08-27 14:48:43	2005-08-27 15:08:53	1.17E-04	0	1.18E-04	1.67E-08	8.33E-04	1.42E-01
KLX07A	050827 16:09	050827 17:49	341.99	361.99		3	1	2005-08-27 17:07:05	2005-08-27 17:27:15	1.25E-04	0	1.28E-04	1.67E-08	8.33E-04	1.54E-01
KLX07A	050827 18:31	050827 20:04	362.07	382.07		3	1	2005-08-27 19:21:59	2005-08-27 19:42:09	9.83E-05	0	1.02E-04	1.67E-08	8.33E-04	1.22E-01
KLX07A	050828 08:24	050828 11:08	382.08	402.08		3	1	2005-08-28 09:10:31	2005-08-28 09:10:51	6.33E-05	0	6.67E-05	1.67E-08	8.33E-04	8.00E-02
KLX07A	050828 10:31	050828 11:57	402.06	422.06		3	1	2005-08-28 11:15:04	2005-08-28 11:35:14	1.50E-06	0	1.67E-06	1.67E-08	8.33E-04	2.00E-03
KLX07A	050828 13:21	050828 14:43	417.07	437.07		3	1	2005-08-28 14:10:56	2005-08-28 14:31:06	3.67E-05	0	3.83E-05	1.67E-08	8.33E-04	4.60E-02
KLX07A	050828 15:25	050828 16:32	437.08	457.08		3	1	2005-08-28 16:10:48	2005-08-28 16:10:58	1.23E-05	0	1.25E-05	1.67E-08	8.33E-04	1.50E-02
KLX07A	050828 17:32	050829 00:57	457.08	477.08		3	1	2005-08-28 18:43:08	2005-08-28 18:55:18	1.67E-08	0	5.00E-08	1.67E-08	8.33E-04	3.60E-05
KLX07A	050829 08:35	050829 10:03	477.12	497.12		3	1	2005-08-29 09:21:41	2005-08-29 09:41:51	3.33E-05	0	3.33E-05	1.67E-08	8.33E-04	4.00E-02
KLX07A	050829 10:40	050829 12:56	497.14	517.14		3	1	2005-08-29 11:54:29	2005-08-29 12:14:39	1.67E-07	0	2.83E-07	1.67E-08	8.33E-04	3.40E-04
KLX07A	050829 14:23	050829 15:53	507.16	527.16		3	1	2005-08-29 15:11:18	2005-08-29 15:31:28	6.67E-06	0	6.67E-06	1.67E-08	8.33E-04	8.00E-03
KLX07A	050829 16:35	050829 18:09	527.20	547.20		3	1	2005-08-29 17:26:52	2005-08-29 17:47:02	2.33E-07	0	2.67E-07	1.67E-08	8.33E-04	3.20E-04
KLX07A	050829 18:49	050829 20:18	547.23	567.23		3	1	2005-08-29 19:35:59	2005-08-29 19:56:09	3.33E-06	0	3.67E-06	1.67E-08	8.33E-04	4.40E-03
KLX07A	050830 09:08	050830 10:50	567.26	587.26		3	1	2005-08-30 10:08:06	2005-08-30 10:28:16	5.00E-08	0	5.00E-08	1.67E-08	8.33E-04	6.00E-05
KLX07A	050830 11:38	050830 12:37	587.30	607.30		3	1	#NV	#NV	0.00E+00	-1	0.00E+00	1.67E-08	8.33E-04	0.00E+00
KLX07A	050830 14:27	050830 15:54	607.32	627.32		3	1	2005-08-30 15:12:44	2005-08-30 15:32:54	1.40E-05	0	1.47E-05	1.67E-08	8.33E-04	1.76E-02
KLX07A	050830 16:32	050830 17:56	620.00	640.00		3	1	2005-08-30 17:14:38	2005-08-30 17:34:48	2.57E-04	0	2.85E-04	1.67E-08	8.33E-04	3.42E-01
KLX07A	050830 18:37	050830 20:53	637.36	657.36		3	1	2005-08-30 19:31:27	2005-08-30 19:51:37	2.75E-04	0	2.87E-04	1.67E-08	8.33E-04	3.44E-01
KLX07A	050831 09:19	050831 10:51	657.41	677.41		3	1	2005-08-31 10:09:00	2005-08-31 10:29:10	1.83E-05	0	1.83E-05	1.67E-08	8.33E-04	2.20E-02
KLX07A	050831 14:40	050831 16:00	667.42	687.42		3	1	2005-08-31 15:18:46	2005-08-31 15:38:56	2.17E-06	0	2.33E-06	1.67E-08	8.33E-04	2.80E-03
KLX07A	050831 16:52	050831 18:20	682.43	702.43		3	1	2005-08-31 17:38:42	2005-08-31 17:58:52	3.33E-06	0	3.50E-06	1.67E-08	8.33E-04	4.20E-03
KLX07A	050831 19:04	050831 20:24	702.45	722.45		3	1	2005-08-31 19:42:07	2005-08-31 20:02:17	1.83E-05	0	1.83E-05	1.67E-08	8.33E-04	2.20E-02
KLX07A	050901 08:07	050901 09:29	722.46	742.46		3	1	2005-09-01 08:46:50	2005-09-01 09:07:00	6.67E-06	0	7.33E-06	1.67E-08	8.33E-04	8.80E-03
KLX07A	050901 10:12	050901 11:37	732.48	752.48		3	1	2005-09-01 10:54:54	2005-09-01 11:15:04	5.83E-06	0	6.33E-06	1.67E-08	8.33E-04	7.60E-03
KLX07A	050901 12:30	050901 14:04	752.51	772.51		3	1	2005-09-01 13:12:31	2005-09-01 13:32:41	3.65E-04	0	3.92E-04	1.67E-08	8.33E-04	4.70E-01
KLX07A	050901 15:01	050901 16:33	772.53	792.53		3	1	2005-09-01 15:51:40	2005-09-01 16:11:50	1.33E-06	0	1.47E-06	1.67E-08	8.33E-04	1.76E-03
KLX07A	050901 17:21	050901 18:43	792.55	812.55		3	1	2005-09-01 18:01:01	2005-09-01 18:21:01	5.00E-07	0	6.67E-07	1.67E-08	8.33E-04	8.00E-04
KLX07A	050901 19:41	050901 22:40	807.56	827.56		3	1	2005-09-01 20:18:39	2005-08-01 20:38:49	1.43E-05	0	1.63E-05	1.67E-08	8.33E-04	1.96E-02

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
KLX07A	111.80	211.80	1800	1800			4.11	1613	1634	1614	9.1						161.80
KLX07A	211.92	311.92	1800	1800			4.48	2361	2427	2362	10.3						261.92
KLX07A	312.00	412.00	1800	1800			5.02	3073	3193	3071	11.4						362.00
KLX07A	412.07	512.07	1800	1800			6.20	3791	3991	3792	12.4						462.07
KLX07A	507.16	607.16	1800	1800			7.24	4538	4746	4539	13.5						557.16
KLX07A	602.32	702.32	1800	7200			6.64	5267	5367	5264	14.7						652.32
KLX07A	702.45	802.45	1800	1800			8.59	6043	6154	6049	16.2						752.45
KLX07A	108.50	128.50	1200	1200			4.76	1008	1209	1008	8.5						118.50
KLX07A	128.50	148.50	1200	1200			4.53	1153	1324	1153	8.8						138.50
KLX07A	146.50	166.50	1200	1200			4.41	1282	1341	1283	8.7						156.50
KLX07A	166.84	186.84	1200	1200			4.51	1433	1513	1434	9.0						176.84
KLX07A	186.88	206.88	1200	600			4.32	1580	1781	1580	9.2						196.88
KLX07A	191.89	211.89	1800	600			4.34	1615	1815	1616	9.2						201.89
KLX07A	211.92	231.92	1200	1200			4.31	1764	1965	1764	9.4						221.92
KLX07A	221.93	241.93	1200	1200			4.27	1836	2036	1836	9.5						231.93
KLX07A	241.93	261.93	1200	1200			4.34	1986	2092	1988	9.8						251.93
KLX07A	261.95	281.95	1200	1200			4.33	2138	2326	2139	10.1						271.95
KLX07A	281.98	301.98	1200	600			4.36	2288	2491	2288	10.3						291.98
KLX07A	291.99	311.99	1200	3600			4.34	2364	2564	2362	10.5						301.99
KLX07A	312.00	332.00	1200	2400			5.87	2512	2731	2536	10.7						322.00
KLX07A	326.99	346.99	1200	1200			4.73	2618	2818	2618	10.8						336.99
KLX07A	341.99	361.99	1200	1200			4.74	2726	2926	2726	11.0						351.99
KLX07A	362.07	382.07	1200	1200			5.27	2871	3071	2871	11.2						372.07
KLX07A	382.08	402.08	1200	900			5.31	3006	3207	3006	11.4						392.08
KLX07A	402.06	422.06	1200	1200			5.45	3145	3346	3145	11.6						412.06
KLX07A	417.07	437.07	1200	600			5.49	3251	3477	3251	11.7						427.07
KLX07A	437.08	457.08	1200	1200			5.66	3391	3616	3390	11.9						447.08
KLX07A	457.08	477.08	720	21600			5.41	3555	3759	3544	12.1						467.08
KLX07A	477.12	497.12	1200	1200			6.17	3680	3880	3680	12.2						487.12
KLX07A	497.14	517.14	1200	2400			6.06	3845	4049	3857	12.5						507.14
KLX07A	507.16	527.16	1200	1200			6.57	3914	4114	3914	12.5						517.16
KLX07A	527.20	547.20	1200	1200			6.59	4073	4292	4074	12.8						537.20
KLX07A	547.23	567.23	1200	1200			7.05	4230	4425	4230	13.1						557.23
KLX07A	567.26	587.26	1200	1200			6.44	4389	4589	4403	13.2						577.26
KLX07A	587.30	607.30	0	0			#NV	#NV	#NV	#NV	13.5						597.30
KLX07A	607.32	627.32	1200	1200			5.46	4681	4886	4681	13.7						617.32
KLX07A	620.00	640.00	1200	1200			5.78	4781	4970	4794	13.5						630.00
KLX07A	637.36	657.36	1200	3600			7.14	4926	5126	4925	14.1						647.36
KLX07A	657.41	677.41	1200	1200			6.96	5073	5274	5074	14.4						667.41
KLX07A	667.42	687.42	1200	1200			7.23	5158	5359	5158	14.5						677.42
KLX07A	682.43	702.43	1200	1200			7.17	5272	5478	5272	14.7						692.43
KLX07A	702.45	722.45	1200	1200			7.28	5426	5625	5426	15.0						712.45
KLX07A	722.46	742.46	1200	1200			7.40	5580	5794	5579	15.2						732.46
KLX07A	732.48	752.48	1200	1200			7.15	5660	5856	5661	15.3						742.48
KLX07A	752.51	772.51	1200	1800			7.98	5814	5935	5819	15.7						762.51
KLX07A	772.53	792.53	1200	1200			8.85	5980	6179	5978	16.1						782.53
KLX07A	792.55	812.55	1200	1200			9.24	6133	6361	6132	16.3						802.55
KLX07A	807.56	827.56	1200	7200			9.58	6248	6448	6246	16.5						817.56

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 for test section, see descr.
seclen_class	FLOAT	m	Planned ordinary test interval during test campaign.
spec_capacity_q_s	FLOAT	m**2/s	Specific capacity (Q/s) of test section, see table descript.
value_type_q_s	CHAR		0:true value,-1:Q/s<lower meas.limit,1:Q/s>upper meas.limit
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/s	K_M: Hydraulic conductivity based on Moye (1967)
formation_width_b	FLOAT	m	b:Aquifer thickness repr. for T(generally b=Lw) ,see descr.
width_of_channel_b	FLOAT	m	B:Inferred width of formation for evaluated TB
tb	FLOAT	m**3/s	TB:Flow capacity in 1D formation of T & width B, see descr.
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,1D model,see descript.
assumed_sb	FLOAT	m	SB* : Assumed SB,S=storativity,B=width of formation,see...
leakage_factor_lf	FLOAT	m	Lf:1D model for evaluation of Leakage factor
transmissivity_tt	FLOAT	m**2/s	TT:Transmissivity of formation, 2D radial flow model,see...
value_type_tt	CHAR		0:true value,-1:TT<lower meas.limit,1:TT>upper meas.limit,
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 TT,see table descr
u_measl_q_s	FLOAT	m**2/s	Estimated upper meas. limit for evaluated TT,see description
storativity_s	FLOAT		S:Storativity of formation based on 2D rad flow,see descr.
assumed_s	FLOAT		Assumed Storativity,2D model evaluation,see table descr.
bc_s	FLOAT		Best choice of S (Storativity) ,see descr.
ri	FLOAT	m	Radius of influence
ri_index	CHAR		ri index=index of radius of influence :-1,0 or 1, see descr.
leakage_coeff	FLOAT	1/s	K'/b':2D rad flow model evaluation of leakage coeff,see desc
hydr_cond_ksf	FLOAT	m/s	Ksf:3D model evaluation of hydraulic conductivity,see desc.
value_type_ksf	CHAR		0:true value,-1:Ksf<lower meas.limit,1:Ksf>upper meas.limit,
l_measl_ksf	FLOAT	m/s	Estimated lower meas.limit for evaluated Ksf,see table desc.
u_measl_ksf	FLOAT	m/s	Estimated upper meas.limit for evaluated Ksf,see table descr
spec_storage_ssf	FLOAT	1/m	Ssf:Specific storage,3D model evaluation,see table descr.
assumed_ssf	FLOAT	1/m	Ssf*:Assumed Spec.storage,3D model evaluation,see table des.
c	FLOAT	m**3/pa	C: Wellbore storage coefficient; flow or recovery period
cd	FLOAT		CD: Dimensionless wellbore storage coefficient
skin	FLOAT		Skin factor;best estimate of flow/recovery period,see descr.
dt1	FLOAT	s	Estimated start time of evaluation, see table description
dt2	FLOAT	s	Estimated stop time of evaluation. see table description
t1	FLOAT	s	Start time for evaluated parameter from start flow period
t2	FLOAT	s	Stop time for evaluated parameter from start of flow period
dte1	FLOAT	s	Start time for evaluated parameter from start of recovery
dte2	FLOAT	s	Stop time for evaluated parameter from start of recovery
p_horner	FLOAT	kPa	p*:Horner extrapolated pressure, see table description
transmissivity_t_nlr	FLOAT	m**2/s	T_NLR Transmissivity based on None Linear Regression...
storativity_s_nlr	FLOAT		S_NLR=storativity based on None Linear Regression,see..
value_type_t_nlr	CHAR		0:true value,-1:T_NLR<lower meas.limit,1:>upper meas.limit
bc_t_nlr	CHAR		Best choice code. 1 means T_NLR is best choice of T, else 0
c_nlr	FLOAT	m**3/pa	Wellbore storage coefficient, based on NLR, see descr.
cd_nlr	FLOAT		Dimensionless wellbore storage constant, see table descrip.
skin_nlr	FLOAT		Skin factor based on Non Linear Regression,see desc.
transmissivity_t_grf	FLOAT	m**2/s	T_GRF:Transmissivity based on Genelized Radial 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 based on Generalized Radial Flow, see des.
flow_dim_grf	FLOAT		Inferred flow dimesion based on Generalized Rad. Flow 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
KLX07A	050820 16:35	050820 18:59	111.80	211.80		3	1	161.80	100	2.20E-04	0				2.86E-04	0	0	2.86E-06
KLX07A	050821 15:28	050821 17:22	211.92	311.92		3	1	261.92	100	7.56E-05	0				9.84E-05	0	0	9.84E-07
KLX07A	050821 18:57	050821 20:52	312.00	412.00		3	1	362.00	100	1.91E-05	0				2.48E-05	0	0	2.48E-07
KLX07A	050822 09:58	050822 11:58	412.07	512.07		3	1	462.07	100	3.74E-06	0				4.87E-06	0	0	4.87E-08
KLX07A	050822 13:45	050822 15:37	507.16	607.16		3	1	557.16	100	4.24E-07	0				5.53E-07	0	0	5.53E-09
KLX07A	050822 17:07	050822 20:46	602.32	702.32		3	1	652.32	100	1.47E-05	0				1.92E-05	0	0	1.92E-07
KLX07A	050823 09:33	050822 11:31	702.45	802.45		3	1	752.45	100	3.02E-05	0				3.93E-05	0	0	3.93E-07
KLX07A	050824 16:10	050824 17:37	108.50	128.50		3	1	118.50	20	2.52E-06	0				2.64E-06	0	0	1.32E-07
KLX07A	050824 18:21	050824 20:21	128.50	148.50		3	1	138.50	20	1.11E-05	0				1.16E-05	0	0	5.80E-07
KLX07A	050825 08:15	050825 10:27	146.50	166.50		3	1	156.50	20	7.15E-05	0				7.48E-05	0	0	3.74E-06
KLX07A	050825 11:10	050825 12:33	166.84	186.84		3	1	176.84	20	6.58E-05	0				6.88E-05	0	0	3.44E-06
KLX07A	050825 13:32	050825 14:48	186.88	206.88		3	1	196.88	20	6.51E-07	0				6.81E-07	0	0	3.41E-08
KLX07A	050825 15:22	050825 16:56	191.89	211.89		3	1	201.89	20	1.33E-05	0				1.39E-05	0	0	6.95E-07
KLX07A	050825 17:38	050825 19:06	211.92	231.92		3	1	221.92	20	1.24E-05	0				1.30E-05	0	0	6.50E-07
KLX07A	050826 08:21	050826 09:49	221.93	241.93		3	1	231.93	20	1.26E-05	0				1.32E-05	0	0	6.60E-07
KLX07A	050826 10:33	050826 12:15	241.93	261.93		3	1	251.93	20	4.79E-05	0				5.01E-05	0	0	2.51E-06
KLX07A	050826 13:17	050826 14:46	261.95	281.95		3	1	271.95	20	1.04E-06	0				1.09E-06	0	0	5.45E-08
KLX07A	050826 15:36	050826 16:54	281.98	301.98		3	1	291.98	20	1.77E-06	0				1.85E-06	0	0	9.25E-08
KLX07A	050826 17:29	050826 20:01	291.99	311.99		3	1	301.99	20	2.86E-06	0				2.99E-06	0	0	1.50E-07
KLX07A	050827 11:12	050827 13:17	312.00	332.00		3	1	322.00	20	3.73E-08	0				3.90E-08	0	0	1.95E-09
KLX07A	050827 14:01	050827 15:30	326.99	346.99		3	1	336.99	20	5.72E-06	0				5.99E-06	0	0	3.00E-07
KLX07A	050827 16:09	050827 17:49	341.99	361.99		3	1	351.99	20	6.13E-06	0				6.41E-06	0	0	3.21E-07
KLX07A	050827 18:31	050827 20:04	362.07	382.07		3	1	372.07	20	4.82E-06	0				5.05E-06	0	0	2.53E-07
KLX07A	050828 08:24	050828 11:08	382.08	402.08		3	1	392.08	20	3.09E-06	0				3.23E-06	0	0	1.62E-07
KLX07A	050828 10:31	050828 11:57	402.06	422.06		3	1	412.06	20	7.32E-08	0				7.66E-08	0	0	3.83E-09
KLX07A	050828 13:21	050828 14:43	417.07	437.07		3	1	427.07	20	1.59E-06	0				1.66E-06	0	0	8.30E-08
KLX07A	050828 15:25	050828 16:32	437.08	457.08		3	1	447.08	20	5.38E-07	0				5.63E-07	0	0	2.82E-08
KLX07A	050828 17:32	050829 00:57	457.08	477.08		3	1	467.08	20	8.01E-10	0				8.38E-10	0	0	4.19E-11
KLX07A	050829 08:35	050829 10:03	477.12	497.12		3	1	487.12	20	1.62E-06	0				1.69E-06	0	0	8.45E-08
KLX07A	050829 10:40	050829 12:56	497.14	517.14		3	1	507.14	20	8.01E-09	0				8.38E-09	0	0	4.19E-10
KLX07A	050829 14:23	050829 15:53	507.16	527.16		3	1	517.16	20	3.18E-07	0				3.33E-07	0	0	1.67E-08
KLX07A	050829 16:35	050829 18:09	527.20	547.20		3	1	537.20	20	1.05E-08	0				1.09E-08	0	0	5.45E-10
KLX07A	050829 18:49	050829 20:18	547.23	567.23		3	1	557.23	20	1.68E-07	0				1.75E-07	0	0	8.75E-09
KLX07A	050830 09:08	050830 10:50	567.26	587.26		3	1	577.26	20	2.45E-09	0				2.57E-09	0	0	1.29E-10
KLX07A	050830 11:38	050830 12:37	587.30	607.30		3	1	597.30	20	#NV	-1				#NV	0	-1	#NV
KLX07A	050830 14:27	050830 15:54	607.32	627.32		3	1	617.32	20	6.70E-07	0				7.01E-07	0	0	3.51E-08
KLX07A	050830 16:32	050830 17:56	620.00	640.00		3	1	630.00	20	1.33E-05	0				1.39E-05	0	0	6.95E-07
KLX07A	050830 18:37	050830 20:53	637.36	657.36		3	1	647.36	20	1.35E-05	0				1.41E-05	0	0	7.05E-07
KLX07A	050831 09:19	050831 10:51	657.41	677.41		3	1	667.41	20	8.95E-07	0				9.36E-07	0	0	4.68E-08
KLX07A	050831 14:40	050831 16:00	667.42	687.42		3	1	677.42	20	1.06E-07	0				1.11E-07	0	0	5.55E-09
KLX07A	050831 16:52	050831 18:20	682.43	702.43		3	1	692.43	20	1.59E-07	0				1.66E-07	0	0	8.30E-09
KLX07A	050831 19:04	050831 20:24	702.45	722.45		3	1	712.45	20	9.04E-07	0				9.45E-07	0	0	4.73E-08
KLX07A	050901 08:07	050901 09:29	722.46	742.46		3	1	732.46	20	3.06E-07	0				3.20E-07	0	0	1.60E-08
KLX07A	050901 10:12	050901 11:37	732.48	752.48		3	1	742.48	20	2.92E-07	0				3.05E-07	0	0	1.53E-08
KLX07A	050901 12:30	050901 14:04	752.51	772.51		3	1	762.51	20	2.96E-05	0				3.10E-05	0	0	1.55E-06
KLX07A	050901 15:01	050901 16:33	772.53	792.53		3	1	782.53	20	6.57E-08	0				6.88E-08	0	0	3.44E-09
KLX07A	050901 17:21	050901 18:43	792.55	812.55		3	1	802.55	20	2.15E-08	0				2.25E-08	0	0	1.13E-09
KLX07A	050901 19:41	050901 22:40	807.56	827.56		3	1	817.56	20	7.03E-07	0				7.35E-07	0	0	3.68E-08

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	bc_s	ri	ri_index
KLX07A	111.80	211.80									3.58E-04	0	1	1.00E-04	6.00E-04	1.00E-06	1.00E-06		416.89	0
KLX07A	211.92	311.92									2.73E-04	0	1	9.00E-05	4.00E-04	1.00E-06	1.00E-06		116.24	-1
KLX07A	312.00	412.00									8.87E-05	0	1	7.00E-05	2.00E-04	1.00E-06	1.00E-06		141.06	-1
KLX07A	412.07	512.07									8.25E-06	0	1	5.00E-06	1.00E-05	1.00E-06	1.00E-06		162.43	0
KLX07A	507.16	607.16									4.82E-07	0	1	1.00E-07	9.00E-07	1.00E-06	1.00E-06		79.86	-1
KLX07A	602.32	702.32									9.76E-06	0	1	8.00E-06	3.00E-05	1.00E-06	1.00E-06		166.26	1
KLX07A	702.45	802.45									3.79E-05	0	1	2.00E-05	5.00E-05	1.00E-06	1.00E-06		80.05	1
KLX07A	108.50	128.50									3.22E-06	0	1	1.00E-06	5.00E-06	1.00E-06	1.00E-06		28.53	-1
KLX07A	128.50	148.50									3.09E-04	0	1	8.00E-05	5.00E-04	1.00E-06	1.00E-06		328.06	0
KLX07A	146.50	166.50									4.74E-04	0	1	2.00E-04	7.00E-04	1.00E-06	1.00E-06		365.13	0
KLX07A	166.84	186.84									4.30E-04	0	1	2.00E-04	7.00E-04	1.00E-06	1.00E-06		356.34	0
KLX07A	186.88	206.88									2.19E-05	0	1	8.00E-06	5.00E-05	1.00E-06	1.00E-06		36.95	-1
KLX07A	191.89	211.89									2.52E-04	0	1	8.00E-05	5.00E-04	1.00E-06	1.00E-06		220.46	0
KLX07A	211.92	231.92									2.18E-04	0	1	7.00E-05	4.00E-04	1.00E-06	1.00E-06		117.09	-1
KLX07A	221.93	241.93									2.10E-04	0	1	9.00E-05	4.00E-04	1.00E-06	1.00E-06		107.08	-1
KLX07A	241.93	261.93									3.17E-04	0	1	7.00E-05	4.00E-04	1.00E-06	1.00E-06		330.19	0
KLX07A	261.95	281.95									2.65E-06	0	1	9.00E-07	5.00E-06	1.00E-06	1.00E-06		99.84	0
KLX07A	281.98	301.98									2.78E-05	0	1	6.00E-06	4.00E-05	1.00E-06	1.00E-06		61.99	-1
KLX07A	291.99	311.99									2.23E-05	0	1	8.00E-06	3.00E-05	1.00E-06	1.00E-06		77.42	-1
KLX07A	312.00	332.00									1.48E-08	0	1	9.00E-09	4.00E-08	1.00E-06	1.00E-06		47.65	1
KLX07A	326.99	346.99									4.53E-05	0	1	1.00E-05	7.00E-05	1.00E-06	1.00E-06		203.06	0
KLX07A	341.99	361.99									5.86E-05	0	1	2.00E-05	8.00E-05	1.00E-06	1.00E-06		216.53	0
KLX07A	362.07	382.07									1.21E-05	0	1	6.00E-06	4.00E-05	1.00E-06	1.00E-06		145.95	0
KLX07A	382.08	402.08									5.87E-06	0	1	3.00E-06	8.00E-06	1.00E-06	1.00E-06		121.80	0
KLX07A	402.06	422.06									1.23E-07	0	1	7.00E-08	4.00E-07	1.00E-06	1.00E-06		46.34	0
KLX07A	417.07	437.07									2.21E-06	0	1	8.00E-07	4.00E-06	1.00E-06	1.00E-06		95.41	0
KLX07A	437.08	457.08									2.91E-07	0	1	1.00E-07	6.00E-07	1.00E-06	1.00E-06		9.07	-1
KLX07A	457.08	477.08									9.60E-11	0	1	6.00E-11	3.00E-10	1.00E-06	1.00E-06		30.21	1
KLX07A	477.12	497.12									9.92E-06	0	1	5.00E-06	2.00E-05	1.00E-06	1.00E-06		138.88	0
KLX07A	497.14	517.14									5.36E-09	0	1	3.00E-09	8.00E-09	1.00E-06	1.00E-06		29.94	1
KLX07A	507.16	527.16									2.99E-07	0	1	1.00E-07	6.00E-07	1.00E-06	1.00E-06		#NV	-1
KLX07A	527.20	547.20									8.10E-09	0	1	6.00E-09	2.00E-08	1.00E-06	1.00E-06		5.29	-1
KLX07A	547.23	567.23									8.58E-08	0	1	7.00E-08	4.00E-07	1.00E-06	1.00E-06		11.78	-1
KLX07A	567.26	587.26									1.41E-09	0	1	9.00E-10	3.00E-09	1.00E-06	1.00E-06		15.16	0
KLX07A	587.30	607.30									1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06	1.00E-06		#NV	#NV
KLX07A	607.32	627.32									1.45E-06	0	1	7.00E-07	3.00E-06	1.00E-06	1.00E-06		85.94	-1
KLX07A	620.00	640.00									9.96E-06	0	1	8.00E-06	3.00E-05	1.00E-06	1.00E-06		90.18	-1
KLX07A	637.36	657.36									3.98E-05	0	1	1.00E-05	6.00E-05	1.00E-06	1.00E-06		107.51	-1
KLX07A	657.41	677.41									3.94E-06	0	1	9.00E-07	7.00E-06	1.00E-06	1.00E-06		41.97	-1
KLX07A	667.42	687.42									5.24E-07	0	1	1.00E-07	7.00E-07	1.00E-06	1.00E-06		29.18	-1
KLX07A	682.43	702.43									8.86E-07	0	1	5.00E-07	1.00E-06	1.00E-06	1.00E-06		25.73	-1
KLX07A	702.45	722.45									4.03E-06	0	1	1.00E-06	6.00E-06	1.00E-06	1.00E-06		110.87	0
KLX07A	722.46	742.46									5.79E-07	0	1	1.00E-07	7.00E-07	1.00E-06	1.00E-06		36.33	-1
KLX07A	732.48	752.48									2.89E-07	0	1	1.00E-07	6.00E-07	1.00E-06	1.00E-06		37.19	-1
KLX07A	752.51	772.51									3.48E-05	0	1	2.00E-05	5.00E-05	1.00E-06	1.00E-06		232.78	0
KLX07A	772.53	792.53									4.12E-08	0	1	3.00E-08	8.00E-08	1.00E-06	1.00E-06		10.72	-1
KLX07A	792.55	812.55									3.99E-08	0	1	3.00E-08	8.00E-08	1.00E-06	1.00E-06		#NV	-1
KLX07A	807.56	827.56									2.29E-06	0	1	8.00E-07	5.00E-06	1.00E-06	1.00E-06		52.39	-1

idcode	secup	seclow	leakage_coeff	ond_ksf	value_type_ksf	l_measl_ksf	u_measl_ksf	spec_storage_ssf	assumed_ssf	c	cd	skin	dt1	dt2	t1	t2	dte1	dte2	p_horner	transmissivity_t_nlr	storativity_s_nlr	value_type_t_nlr	bc_t_nlr	c_nlr	cd_nlr	skin_nlr	transmissivity_t_grf	value_type_t_grf	bc_t_grf	storativity_s_grf	flow_dim_grf	comment
KLX07A	111.80	211.80								1.98E-07	2.18E+01	-0.18	312	1526					1594.0													
KLX07A	211.92	311.92								2.71E-08	2.99E+00	1.77	228	1519					2342.3													
KLX07A	312.00	412.00								8.08E-09	8.91E-01	18.49	57	414					3053.9													
KLX07A	412.07	512.07								1.67E-09	1.84E-01	5.18	58	1526					3772.6													
KLX07A	507.16	607.16								9.70E-10	1.07E-01	1.13	#NV	#NV					4515.4													
KLX07A	602.32	702.32								3.89E-08	4.29E+00	-4.74	196	1734					5240.6													
KLX07A	702.45	802.45								6.47E-08	7.13E+00	-2.12	71	204					6022.8													
KLX07A	108.50	128.50								1.04E-09	1.15E-01	0.39	15	89					986.4													
KLX07A	128.50	148.50								1.94E-09	2.14E-01	30.71	84	948					1133.7													
KLX07A	146.50	166.50								4.22E-08	4.65E+00	29.17	126	1260					1265.8													
KLX07A	166.84	186.84								1.78E-08	1.96E+00	29.60	48	1098					1416.3													
KLX07A	186.88	206.88								1.05E-10	1.16E-02	32.20	126	426					1560.3													
KLX07A	191.89	211.89								2.40E-09	2.65E-01	-0.48	63	600					1596.6													
KLX07A	211.92	231.92								3.19E-09	3.52E-01	30.50	306	996					1745.2													
KLX07A	221.93	241.93								4.50E-09	4.96E-01	30.29	252	1152					1820.1													
KLX07A	241.93	261.93								2.05E-08	2.26E+00	29.53	87	1017					1971.2													
KLX07A	261.95	281.95								3.68E-10	4.06E-02	8.91	42	943					2120.2													
KLX07A	281.98	301.98								7.39E-10	8.15E-02	19.70	264	555					2268.4													
KLX07A	291.99	311.99								3.31E-09	3.65E-01	-1.79	783	3276					2341.4													
KLX07A	312.00	332.00								6.87E-12	7.57E-04	-2.76	1764	2328					2502.0													
KLX07A	326.99	346.99								1.50E-09	1.65E-01	30.80	72	996					2598.5													
KLX07A	341.99	361.99								1.39E-09	1.53E-01	30.90	66	984					2705.3													
KLX07A	362.07	382.07								1.61E-09	1.77E-01	7.00	70	1029					2851.3													
KLX07A	382.08	402.08								1.80E-09	1.98E-01	3.78	49	1052					2989.3													
KLX07A	402.06	422.06								5.20E-11	5.73E-03	3.29	113	496					3127.1													
KLX07A	417.07	437.07								4.40E-10	4.85E-02	1.07	22	854					3231.4													
KLX07A	437.08	457.08								2.56E-10	2.82E-02	-1.66	21	30					3370.9													
KLX07A	457.08	477.08								5.08E-11	5.60E-03	-3.15	#NV	#NV					3508.2													
KLX07A	477.12	497.12								4.59E-10	5.06E-02	31.40	216	1176					3661.7													
KLX07A	497.14	517.14								5.36E-09	5.91E-01	2.50	#NV	#NV					3810.1													
KLX07A	507.16	527.16								4.07E-10	4.49E-02	1.56	#NV	#NV					3891.4													
KLX07A	527.20	547.20								5.76E-11	6.35E-03	0.44	13	61					4045.7													
KLX07A	547.23	567.23								9.87E-11	1.09E-02	-2.34	12	93					4205.0													
KLX07A	567.26	587.26								3.62E-11	3.99E-03	0.03	#NV	#NV					4353.9													
KLX07A	587.30	607.30								#NV	#NV	#NV	#NV	#NV					#NV													
KLX07A	607.32	627.32								2.05E-09	2.26E-01	-3.30	1011	1152					4653.3													
KLX07A	620.00	640.00								7.70E-08	8.49E+00	-4.91	606	1200					4754.0													
KLX07A	637.36	657.36								1.18E-08	1.30E+00	-0.12	546	3432					4900.8													
KLX07A	657.41	677.41								4.87E-10	5.37E-02	19.89	54	174					5053.0													
KLX07A	667.42	687.42								8.25E-11	9.09E-03	1.21	501	1020					5132.4													
KLX07A	682.43	702.43								9.99E-11	1.10E-02	2.27	288	1149					5246.7													
KLX07A	702.45	722.45								6.93E-10	7.64E-02	19.72	141	1215					5400.7													
KLX07A	722.46	742.46								3.75E-10	4.13E-02	-3.00	756	1044					5554.6													
KLX07A	732.48	752.48								5.20E-10	5.73E-02	-3.17	789	1199					5628.6													
KLX07A	752.51	772.51								5.73E-08	6.32E+00	-2.06	270	1656					5789.2													
KLX07A	772.53	792.53								8.57E-11	9.45E-03	-1.10	18	111					5950.0													
KLX07A	792.55	812.55								6.00E-11	6.61E-03	4.82	#NV	#NV					6105.9													
KLX07A	807.56	827.56								1.30E-09	1.43E-01	-3.63	1022	4320					6223.0													

Table	plu_s_hole_test_obs Data of observation sections of single hole test

Column	Datatype	Unit	Column Description
site	CHAR		Investigation site name
activity_type	CHAR		Activity type code
idcode	CHAR		Object or borehole identification code
start_date	DATE		Date (yymmdd hh:mm:ss)
secup	FLOAT	m	Upper section limit (m)
seclow	FLOAT	m	Lower section limit (m)
obs_secup	FLOAT	m	Upper limit of observation section
obs_seclow	FLOAT	m	Lower limit of observation section
pi_above	FLOAT	kPa	Groundwater pressure above test section,start of flow period
pp_above	FLOAT	kPa	Groundwater pressure above test section,at stop flow period
pf_above	FLOAT	kPa	Groundwater pressure above test section at stop recovery per
pi_below	FLOAT	kPa	Groundwater pressure below test section at start flow period
pp_below	FLOAT	kPa	Groundwater pressure below test section at stop flow period
pf_below	FLOAT	kPa	Groundwater pressure below test section at stop recovery per
comments	VARCHAR		Comment text row (unformatted text)

idcode	start_date	stop_date	secup	seclow	section_no	obs_secup	obs_seclow	pi_above	pp_above	pf_above	pi_below	pp_below	pf_below	comments
KLX07A	050820 16:35	050820 18:59	111.80	211.80		110.80	844.73	875	875	876	1640	1643	1641	
KLX07A	050821 15:28	050821 17:22	211.92	311.92		210.92	844.73	1610	1615	1612	2389	2389	2388	
KLX07A	050821 18:57	050821 20:52	312.00	412.00		311.00	844.73	2360	2361	2361	3093	3094	3093	
KLX07A	050822 09:58	050822 11:58	412.07	512.07		411.07	844.73	3072	3073	3073	3808	3808	3808	
KLX07A	050822 13:45	050822 15:37	507.16	607.16		506.16	844.73	3775	3775	3775	4553	4553	4553	
KLX07A	050822 17:07	050822 20:46	602.32	702.32		601.32	844.73	4503	4503	4503	5298	5298	5297	
KLX07A	050823 09:33	050822 11:31	702.45	802.45		701.45	844.73	5287	5289	5289	6080	6086	6084	
KLX07A	050824 16:10	050824 17:37	108.50	128.50		107.50	844.73	850	852	852	1031	1031	1031	
KLX07A	050824 18:21	050824 20:21	128.50	148.50		127.50	844.73	1002	1003	1003	1180	1182	1180	
KLX07A	050825 08:15	050825 10:27	146.50	166.50		145.50	844.73	1133	1133	1134	1311	1314	1311	
KLX07A	050825 11:10	050825 12:33	166.84	186.84		165.84	844.73	1280	1285	1281	1459	1463	1461	
KLX07A	050825 13:32	050825 14:48	186.88	206.88		185.88	844.73	1427	1427	1427	1606	1606	1606	
KLX07A	050825 15:22	050825 16:56	191.89	211.89		190.89	844.73	1463	1465	1465	1643	1645	1643	
KLX07A	050825 17:38	050825 19:06	211.92	231.92		210.92	844.73	1609	1611	1609	1792	1795	1792	
KLX07A	050826 08:21	050826 09:49	221.93	241.93		220.93	844.73	1680	1681	1680	1865	1867	1865	
KLX07A	050826 10:33	050826 12:15	241.93	261.93		240.93	844.73	1831	1835	1832	2016	2017	2017	
KLX07A	050826 13:17	050826 14:46	261.95	281.95		260.95	844.73	1984	1984	1984	2167	2167	2168	
KLX07A	050826 15:36	050826 16:54	281.98	301.98		280.98	844.73	2135	2136	2136	2316	2317	2317	
KLX07A	050826 17:29	050826 20:01	291.99	311.99		290.99	844.73	2211	2211	2210	2390	2390	2389	
KLX07A	050827 11:12	050827 13:17	312.00	332.00		311.00	844.73	2352	2357	2357	2534	2535	2535	
KLX07A	050827 14:01	050827 15:30	326.99	346.99		325.99	844.73	2469	2469	2469	2643	2645	2644	
KLX07A	050827 16:09	050827 17:49	341.99	361.99		340.99	844.73	2578	2579	2578	2750	2750	2750	
KLX07A	050827 18:31	050827 20:04	362.07	382.07		361.07	844.73	2722	2723	2722	2889	2889	2889	
KLX07A	050828 08:24	050828 11:08	382.08	402.08		381.08	844.73	2861	2862	2862	3024	3024	3024	
KLX07A	050828 10:31	050828 11:57	402.06	422.06		401.06	844.73	3002	3002	3002	3162	3163	3162	
KLX07A	050828 13:21	050828 14:43	417.07	437.07		416.07	844.73	3106	3106	3106	3266	3266	3266	
KLX07A	050828 15:25	050828 16:32	437.08	457.08		436.08	844.73	3247	3247	3248	3405	3405	3405	
KLX07A	050828 17:32	050829 00:57	457.08	477.08		456.08	844.73	3388	3388	3386	3548	3547	3544	
KLX07A	050829 08:35	050829 10:03	477.12	497.12		476.12	844.73	3527	3527	3528	3694	3693	3693	
KLX07A	050829 10:40	050829 12:56	497.14	517.14		496.14	844.73	3678	3679	3679	3846	3845	3845	
KLX07A	050829 14:23	050829 15:53	507.16	527.16		506.16	844.73	3755	3756	3757	3925	3925	3925	
KLX07A	050829 16:35	050829 18:09	527.20	547.20		526.20	844.73	3912	3912	3912	4083	4083	4082	
KLX07A	050829 18:49	050829 20:18	547.23	567.23		546.23	844.73	4069	4069	4069	4239	4239	4238	
KLX07A	050830 09:08	050830 10:50	567.26	587.26		566.26	844.73	4223	4223	4224	#NV	#NV	#NV	bottom gauge failed
KLX07A	050830 11:38	050830 12:37	587.30	607.30		586.30	844.73	#NV	#NV	#NV	#NV	#NV	#NV	bottom gauge failed
KLX07A	050830 14:27	050830 15:54	607.32	627.32		606.32	844.73	4542	4542	4542	#NV	#NV	#NV	bottom gauge failed
KLX07A	050830 16:32	050830 17:56	620.00	640.00		619.00	844.73	4643	4643	4643	#NV	#NV	#NV	bottom gauge failed
KLX07A	050830 18:37	050830 20:53	637.36	657.36		636.36	844.73	4780	4783	4779	#NV	#NV	#NV	bottom gauge failed
KLX07A	050831 09:19	050831 10:51	657.41	677.41		656.41	844.73	4932	4933	4933	#NV	#NV	#NV	bottom gauge failed
KLX07A	050831 14:40	050831 16:00	667.42	687.42		666.42	844.73	5016	5016	5016	#NV	#NV	#NV	bottom gauge failed
KLX07A	050831 16:52	050831 18:20	682.43	702.43		681.43	844.73	5134	5134	5134	#NV	#NV	#NV	bottom gauge failed
KLX07A	050831 19:04	050831 20:24	702.45	722.45		701.45	844.73	5290	5289	5290	#NV	#NV	#NV	bottom gauge failed
KLX07A	050901 08:07	050901 09:29	722.46	742.46		721.46	844.73	5443	5443	5443	#NV	#NV	#NV	bottom gauge failed
KLX07A	050901 10:12	050901 11:37	732.48	752.48		731.48	844.73	5524	5523	5524	#NV	#NV	#NV	bottom gauge failed
KLX07A	050901 12:30	050901 14:04	752.51	772.51		751.51	844.73	5683	5686	5686	#NV	#NV	#NV	bottom gauge failed
KLX07A	050901 15:01	050901 16:33	772.53	792.53		771.53	844.73	5840	5840	5839	#NV	#NV	#NV	bottom gauge failed
KLX07A	050901 17:21	050901 18:43	792.55	812.55		791.55	844.73	5994	5994	5994	#NV	#NV	#NV	bottom gauge failed
KLX07A	050901 19:41	050901 22:40	807.56	827.56		806.56	844.73	6110	6110	6109	#NV	#NV	#NV	bottom gauge failed