P-08-27

Oskarshamn site investigation

Hydraulic injection tests in borehole KLX27A, 2008

Subarea Laxemar

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March 2008

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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 KLX27A at the Laxemar area, Oskarshamn. The tests are part of the general program for site investigations and specifically for the Laxemar subarea. The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties of the fractured zones and rock mass between them. Data is subsequently delivered for the site descriptive model.

This report describes the results and primary data evaluation of the hydraulic injection tests in borehole KLX27A performed between 16th of January and 10th of February 2008.

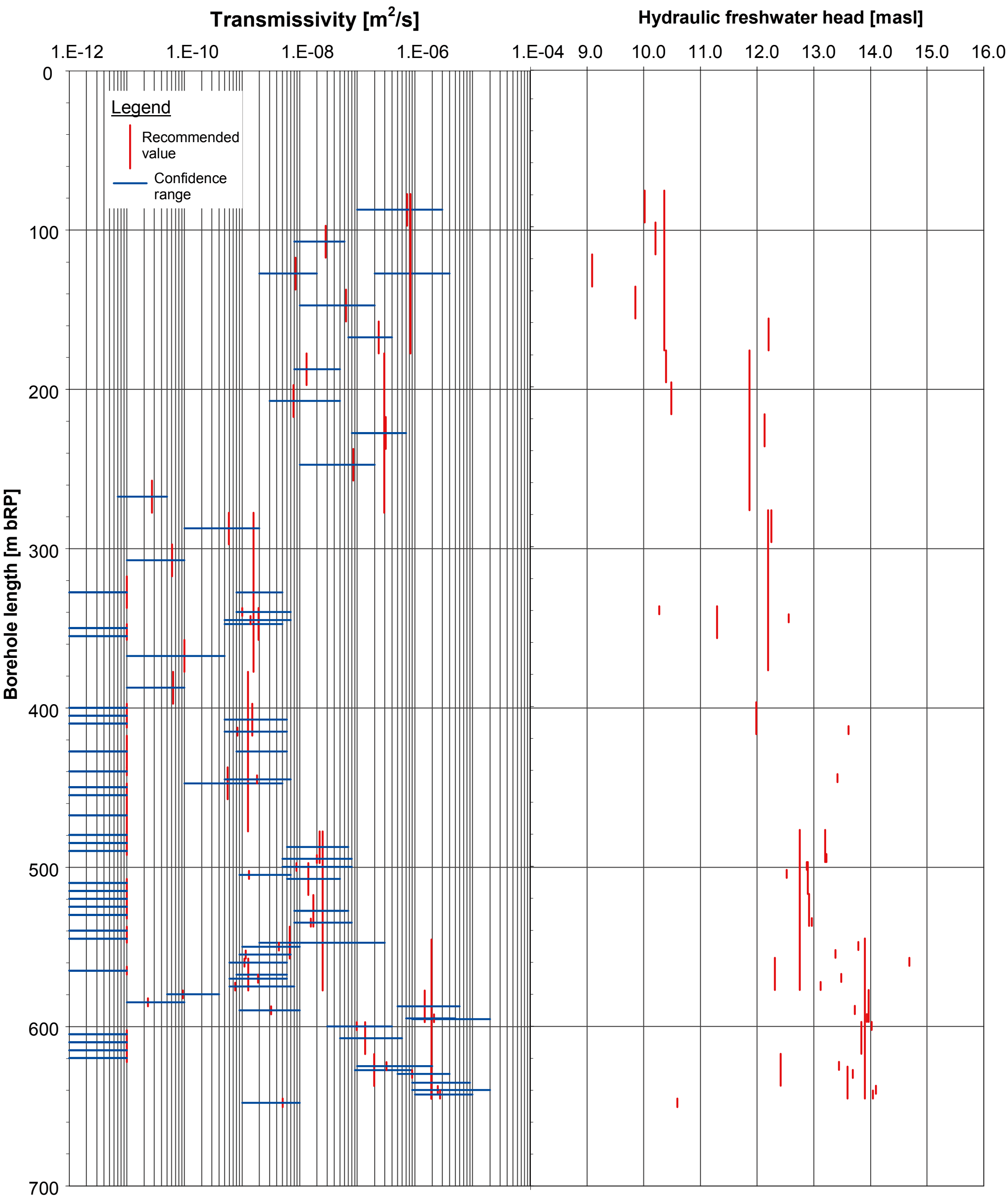
The objective of the hydrotests was to describe the rock around the borehole with respect of hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K) at different measurement scales of 100 m, 20 m and 5 m sections. Transient evaluation during flow and recovery period provided additional information such as flow regimes, hydraulic boundaries and cross-over flows. Constant pressure injection tests were conducted between 77.30–650.56 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 KLX27A 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 KLX27A. Testerna utfördes mellan den 16 januari till den 10 februari 2007.

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, 20 m och 5 m sektioner. Transient utvärdering under injektions- och återhämntningsfasen gav ytterligare information avseende flödesgeometri, hydrauliska gränser och sprickläckage. Injektionstester utfördes mellan 77,30–650,56 m borrhålslängd. Resultaten av testutvärderingen presenteras som transmissivitet, hydraulisk konduktivitet och grundvattennivå uttryckt i ekvivalent sötvattenpelare (fresh-water head).



Borehole KLX27A – Summary of results.

Contents

1 Introduction

A general program for site investigations presenting survey methods has been prepared /SKB 2001/, as well as a site-specific program for the investigations in the Simpevarp area /SKB 2006/. 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 according in borehole KLX27A between 16th of January and 10th of February 2008 following the methodology described in SKB MD 323.001e and in the activity plan AP PS 400-07-056 (SKB controlling documents). Data and results were delivered to the SKB site characterization database SICADA and are traceable by the activity plan number.

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 KLX27A. The commission was conducted by Golder Associates AB and Golder Associates GmbH.

Borehole KLX27A is situated in the Laxemar area approximately 5 km west of the nuclear power plant of Simpevarp, Figure 1-1. The borehole was drilled from August to November 2007 at 650.56 m length with an inner diameter of 197 m to a depth of 73.50 m and further on of 76 mm to the bottom of the borehole. The inclination of the borehole is –65.37°. The upper 14.76 m is cased with large diameter telescopic casing ranging from diameter (outer diameter) 208–323 mm. A cone casing is placed from 72.28 m to 77.02 m ranging from diameter (outer diameter) 84–104 mm.

The work was carried out in accordance with activity plan AP PS 400-07-056. In Table 1-1 controlling documents for performing this activity are listed. 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
Hydraulic injection tests in borehole KLX27A	AP PS 400-07-056	1.0
Method Descriptions	**Number**	**Version**
Hydraulic injection tests	SKB MD 323.001e	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 620.010e	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

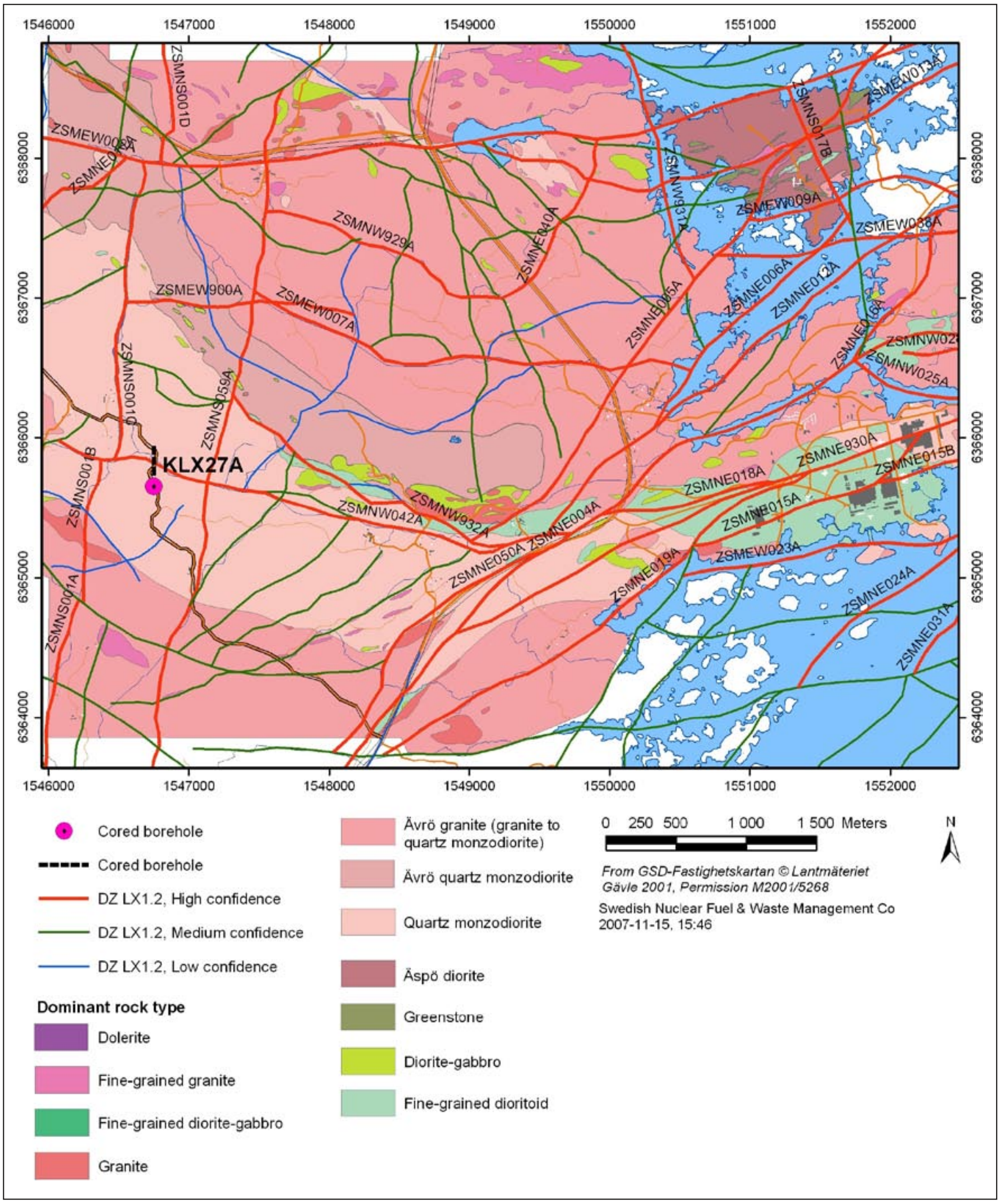


Figure 1-1. *The investigation area Laxemar, Oskarshamn with location of borehole KLX27A.*

2 Objective and scope

The objective of the hydrotests in borehole KLX27A 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, 20 m and 5 m sections and a final single packer test to cover the bottom of the borehole. Among these parameters transient evaluation during the flow and recovery period provides additional information such as flow regimes, hydraulic boundaries and cross-over flows.

The 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, 20 m and 5 m test sections, analyses and reporting. Furthermore, a single packer test was conducted at a depth of 645.20 m to the bottom of the hole. The used single packer tool consists of a modified tool design to keep the test section as short as possible.

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

The following hydraulic injection tests were performed between 16th of January and 10th of February 2008.

Between 357.30 m to 397.30 m, 417.30 m to 437.30 m and 457.30 m to 477.30 m no 5 m tests were performed because the appropriate 20 m sections show a flow below measurement limit (1 ml/min). The position range of the 5 m tests were calculated for covering a true vertical depth of 300 m to 700 m with consideration of the borehole inclination of –65.37° and adapting to the next appropriate section limits of the 20 m sections. Due to the inclination and length of the borehole, the 5 m sections cover finally a true vertical depth of 306.64 m to 586.55 m below top of casing (ToC).

Table 2-1. Performed injection tests at borehole KLX27A.

No. of injection tests*	Interval	Positions	Time/test	Total test time
6	100 m	77.30–645.20 m	125 min	12.5 hrs
29	20 m	77.30–645.20 m	90 min	43.5 hrs
46	5 m	337.30–645.20 m	90 min	69.0 hrs
Single Packer**	5.36 m	645.20–650.56 m	90 min	1.5 hrs
Total:				**126.5 hrs**

*Excluding repeated tests; **conducted with a modified tool.

2.1 Borehole

The borehole is telescope drilled with specifications on its construction according to Table 2-2. 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 borehole at the ground surface. The borehole diameter in Table 2-2 refers to the final diameter of the drill bit after drilling to full depth.

Table 2-2. Information about KLX27A (from SICADA 2007-12-12).

Title	Value				
Old idcode name (s):	KLX27A				
Comment:	No comment exists				
Borehole length (m):	650.56				
Reference level:	ToC				
Drilling period (s):	From date	To date	Secup (m)	Seclow (m)	Drilling type
	2007-08-15	2007-08-27	0.16	75.60	Percussion drilling
	2007-10-08	2007-11-21	75.60	650.56	Core drilling
Starting point coordinate: (centerpoint of ToC)	Length (m)	Northing (m)	Easting (m)	Elevation (m.a.s.l.)	Coord system
	0.00	6365608.29	1546742.63	16.98	RT90-RHB70
	3.00	6365609.54	1546742.65	14.25	RT90-RHB70
Angles:	Length (m)	Bearing	Inclination (– = down)		
	0.000	0.73	–65.37		RT90-RHB70
Borehole diameter:	Secup (m)	Seclow (m)	Hole diam (m)		
	0.16	9.20	0.341		
	9.20	14.76	0.254		
	14.76	73.50	0.197		
	73.50	75.60	0.157		
	75.60	77.02	0.086		
	77.02	650.56	0.076		
Core diameter:	Secup (m)	Seclow (m)	Core diam (m)		
	75.60	76.12	0.072		
	76.12	650.56	0.050		
Casing diameter:	Secup (m)	Seclow (m)	Case in (m)	Case out (m)	
	0.00	14.76	0.200	0.208	
	0.16	9.20	0.310	0.323	
Cone dimensions:	Secup (m)	Seclow (m)	Cone in (m)	Cone out (m)	
	72.28	75.28	0.100	0.104	
	75.28	77.02	0.080	0.084	
Grove milling:	Length (m)	Trace detectable			
	100.000	YES			
	150.000	YES			
	200.000	YES			
	250.000	YES			
	300.000	YES			
	350.000	YES			
	400.000	YES			
	450.000	YES			
	500.000	YES			
	550.000	YES			
	600.000	YES			
	630.000	YES			

2.2 Injection tests

Injection tests were conducted according to the Activity Plan AP PS 400-07-056 and the method description for hydraulic injection tests, SKB MD 323.001e (SKB internal documents). Tests were done in 100 m test sections between 77.30–645.20 m below ToC, in 20 m test sections between 77.30–645.20 m below ToC and in 5 m test sections between 337.30–645.20 m below ToC with the exception of the sections between 357.30–397.30 m, 417.30–437.30 m and 457.30–477.30 m (see Table 2-3). The initial criteria for performing injection tests in 20 m and 5 m sections was a measurable flow of Q > 0.001 L/min in the previous measured 100 m and 20 m tests covering the smaller test sections (see Figure 2-1). An additional single packer test was performed from 645.20 m to the bottom of the borehole. 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 KLX27A were conducted.

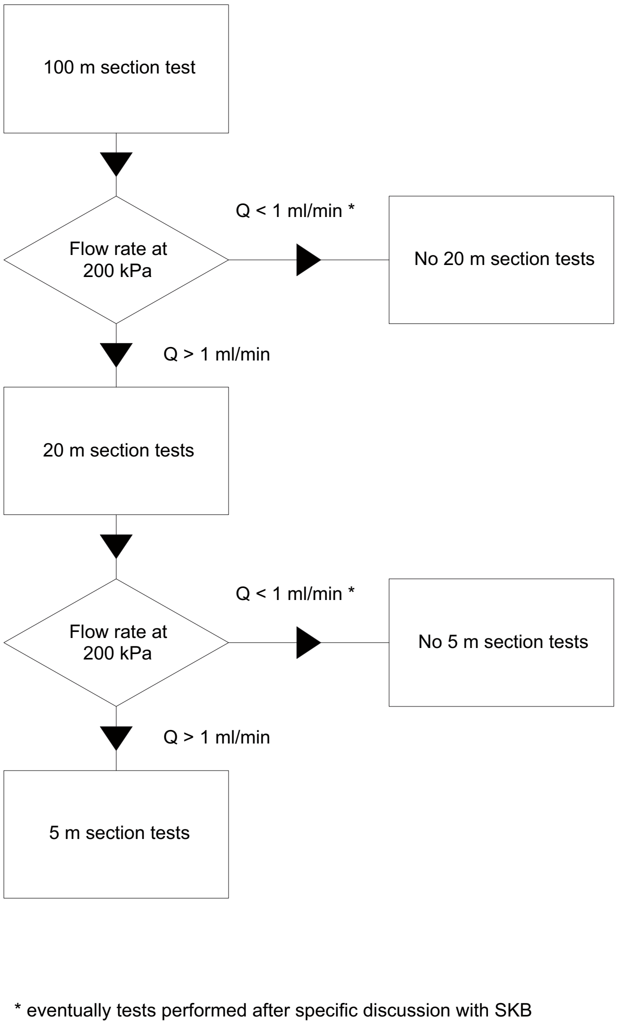


Figure 2-1. *Flow chart for test sections.*

Table 2-3. Tests performed.

Bh ID	Test section (m bToC)	Test type[1)]	Test no	Test start date, time	Test stop date, time
KLX27A	77.30–177.30	3	1	080118 08:23:00	080118 10:30:00
KLX27A	177.30–277.30	3	1	080118 13:33:00	080118 15:24:00
KLX27A	277.30–377.30	3	1	080118 17:05:00	080118 23:07:00
KLX27A	377.30–477.30	3	1	080119 09:51:00	080119 11:50:00
KLX27A	377.30–477.30	3	2	080119 12:09:00	080119 13:47:00
KLX27A	477.30–577.30	3	1	080119 15:26:00	080119 17:30:00
KLX27A	545.20–645.20	3	1	080120 09:30:00	080120 11:28:00
KLX27A	77.30–97.30	3	1	080121 17:33:00	080121 18:57:00
KLX27A	97.30–117.30	3	1	080122 08:37:00	080122 10:02:00
KLX27A	117.30–137.30	3	1	080122 10:43:00	080122 12:18:00
KLX27A	137.30–157.30	3	1	080122 13:38:00	080122 15:07:00
KLX27A	157.30–177.30	3	1	080122 15:44:00	080122 17:07:00
KLX27A	177.30–197.30	3	1	080122 17:51:00	080122 22:12:00
KLX27A	197.30–217.30	3	1	080123 08:45:00	080123 10:20:00
KLX27A	217.30–237.30	3	1	080123 10:54:00	080123 12:22:00
KLX27A	237.30–257.30	3	1	080123 13:32:00	080123 14:43:00
KLX27A	237.30–257.30	3	2	080123 14:51:00	080123 16:03:00
KLX27A	257.30–277.30	4B	1	080123 16:42:00	080123 19:21:00
KLX27A	277.30–297.30	3	1	080124 08:40:00	080124 09:19:00
KLX27A	277.30–297.30	3	2	080124 15:06:00	080124 20:02:00
KLX27A	297.30–317.30	4B	1	080125 08:42:00	080125 10:27:00
KLX27A	317.30–337.30	4B	1	080125 11:05:00	080125 12:42:00
KLX27A	337.30–357.30	3	1	080125 13:24:00	080125 14:47:00
KLX27A	357.30–377.30	3	1	080125 15:31:00	080125 16:54:00
KLX27A	377.30–397.30	4B	1	080125 17:35:00	080125 21:16:00
KLX27A	397.30–417.30	3	1	080126 08:39:00	080126 10:28:00
KLX27A	417.30–437.30	3	1	080126 11:10:00	080126 12:01:00
KLX27A	437.30–457.30	3	1	080126 13:38:00	080126 15:00:00
KLX27A	457.30–477.30	3	1	080126 15:37:00	080126 16:30:00
KLX27A	477.30–497.30	3	1	080126 17:13:00	080126 18:43:00
KLX27A	497.30–517.30	3	1	080127 08:40:00	080127 10:07:00
KLX27A	517.30–537.30	3	1	080127 10:48:00	080127 12:13:00
KLX27A	537.30–557.30	3	1	080127 12:56:00	080127 14:28:00
KLX27A	557.30–577.30	3	1	080127 15:38:00	080127 17:20:00
KLX27A	577.30–597.30	3	1	080127 18:07:00	080127 19:30:00
KLX27A	597.30–617.30	3	1	080128 08:48:00	080128 10:10:00
KLX27A	617.30–637.30	3	1	080128 10:56:00	080128 12:19:00
KLX27A	625.20–645.20	3	1	080128 13:24:00	080128 14:44:00
KLX27A	337.30–342.30	3	1	080130 14:37:00	080130 16:15:00
KLX27A	342.30–347.30	3	1	080130 16:51:00	080130 18:32:00
KLX27A	347.30–352.30	3	1	080131 08:35:00	080131 09:23:00
KLX27A	352.30–357.30	3	1	080131 09:56:00	080131 10:33:00
KLX27A	397.30–402.30	3	1	080131 11:31:00	080131 12:10:00

Bh ID	Test section (m bToC)	Test type[1)]	Test no	Test start date, time	Test stop date, time
KLX27A	402.30–407.30	3	1	080131 13:28:00	080131 14:07:00
KLX27A	407.30–412.30	3	1	080131 14:39:00	080131 15:18:00
KLX27A	412.30–417.30	3	1	080131 15:50:00	080131 17:29:00
KLX27A	437.30–442.30	3	1	080131 18:13:00	080131 18:51:00
KLX27A	442.30–447.30	3	1	080201 08:29:00	080201 09:11:00
KLX27A	442.30–447.30	3	2	080207 13:26:00	080207 15:07:00
KLX27A	447.30–452.30	3	1	080201 09:43:00	080201 10:22:00
KLX27A	452.30–457.30	3	1	080201 10:54:00	080201 11:35:00
KLX27A	477.30–482.30	3	1	080201 13:16:00	080201 13:54:00
KLX27A	482.30–487.30	3	1	080201 14:25:00	080201 15:04:00
KLX27A	487.30–492.30	3	1	080201 15:33:00	080201 16:12:00
KLX27A	492.30–497.30	3	1	080201 16:47:00	080201 18:51:00
KLX27A	497.30–502.30	3	1	080202 08:26:00	080202 09:50:00
KLX27A	502.30–507.30	3	1	080202 10:21:00	080202 11:41:00
KLX27A	507.30–512.30	3	1	080202 13:19:00	080202 13:57:00
KLX27A	512.30–517.30	3	1	080202 14:47:00	080202 15:26:00
KLX27A	517.30–522.30	3	1	080202 15:57:00	080202 16:34:00
KLX27A	522.30–527.30	3	1	080202 17:07:00	080202 17:45:00
KLX27A	527.30–532.30	3	1	080203 08:43:00	080203 09:22:00
KLX27A	532.30–537.30	3	1	080203 09:54:00	080203 11:19:00
KLX27A	537.30–542.30	3	1	080203 11:51:00	080203 12:29:00
KLX27A	542.30–547.30	3	1	080203 13:01:00	080203 13:41:00
KLX27A	547.30–552.30	3	1	080203 15:16:00	080203 16:41:00
KLX27A	552.30–557.30	3	1	080203 17:16:00	080203 19:29:00
KLX27A	557.30–562.30	3	1	080204 08:38:00	080204 10:17:00
KLX27A	562.30–567.30	3	1	080204 10:40:00	080204 11:18:00
KLX27A	567.30–572.30	3	1	080204 12:28:00	080204 14:07:00
KLX27A	572.30–577.30	3	1	080204 14:39:00	080204 16:15:00
KLX27A	577.30–582.30	4B	1	080204 16:44:00	080204 19:23:00
KLX27A	582.30–587.30	4B	1	080205 08:24:00	080205 10:05:00
KLX27A	587.30–592.30	3	1	080205 10:35:00	080205 12:03:00
KLX27A	592.30–597.30	3	1	080205 13:05:00	080205 14:27:00
KLX27A	597.30–602.30	3	1	080205 14:58:00	080205 16:19:00
KLX27A	602.30–607.30	3	1	080205 16:55:00	080205 17:35:00
KLX27A	607.30–612.30	3	1	080205 18:08:00	080205 18:47:00
KLX27A	612.30–617.30	3	1	080206 08:28:00	080206 09:06:00
KLX27A	617.30–622.30	3	1	080206 09:36:00	080206 10:16:00
KLX27A	622.30–627.30	3	1	080206 10:47:00	080206 12:10:00
KLX27A	627.30–632.30	3	1	080206 13:09:00	080206 14:32:00
KLX27A	632.30–637.30	3	1	080206 15:07:00	080206 16:31:00
KLX27A	637.30–642.30	3	1	080206 17:02:00	080206 18:25:00
KLX27A	640.20–645.20	3	1	080207 08:33:00	080207 09:54:00
KLX27A	645.20–650.56	3	1	080209 13:18:00	080209 15:17:00

[1)] 3: Injection test; 4B: pulse injection test.

2.3 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 respectively prior to every test performance.

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".

3 Equipment

3.1 Description of equipment

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

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

PSS2 is documented in photographs 1–6.

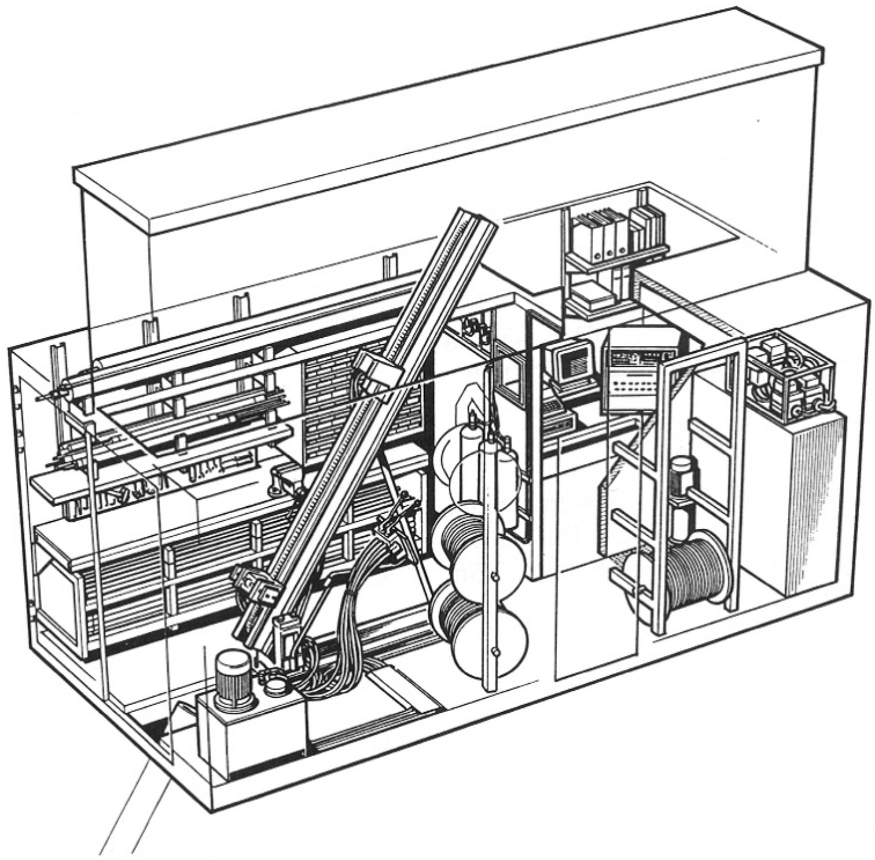


Figure 3-1. *A view of the layout and equipment of PSS2.*

Photo 1. *Hydraulic rig.*

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

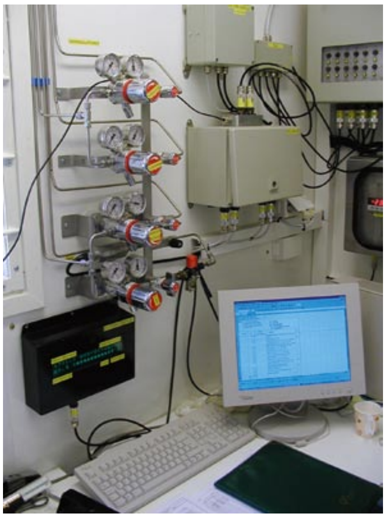


Photo 3. *Computer room, displays and gas regulators.*

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

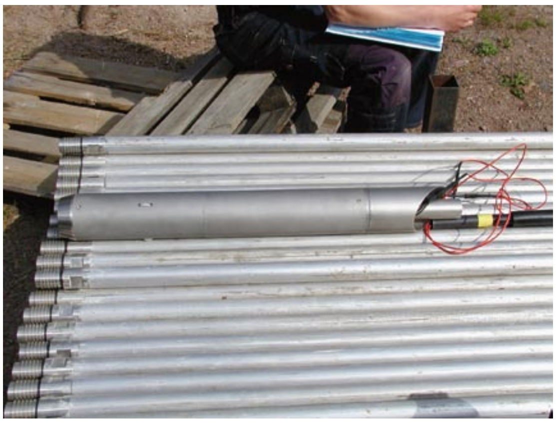


Photo 5. *Positioner, bottom end of down-in-hole string.*

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.
- Upper packer – SS and PUR 1.5 m with OD 72 mm, fixed ends, seal length 1.0 m, maximum pressure 6.5 MPa, working pressure 1.6 MPa.
- Breakpin – SS 250 mm with OD 33.7 mm. Maximum load of 47.3 (± 1.0) kN.
- Gauge carrier – SS 1.5 m carrying top section pressure transducer, connections from sensors below. Flow pipe is double bent at both ends to give room for sensor equipment. The pipe gauge carrier is covered by split pipes.
- Shut-in tool (test valve) – SS 1.0 m with a OD of 48 mm, Teflon coated valve piston, friction loss of 11 kPa at 10 L/min (260 kPa–50L/min). Working pressure 2.8–4.0 MPa. Breakpipe with maximum load of 47.3 (± 1.0) kN. The shut-in tool is covered by split pipes and connected to a stone catcher on the top.

The tool scheme is presented in Figures 3-2 (double packer) and 3-3 (single packer).

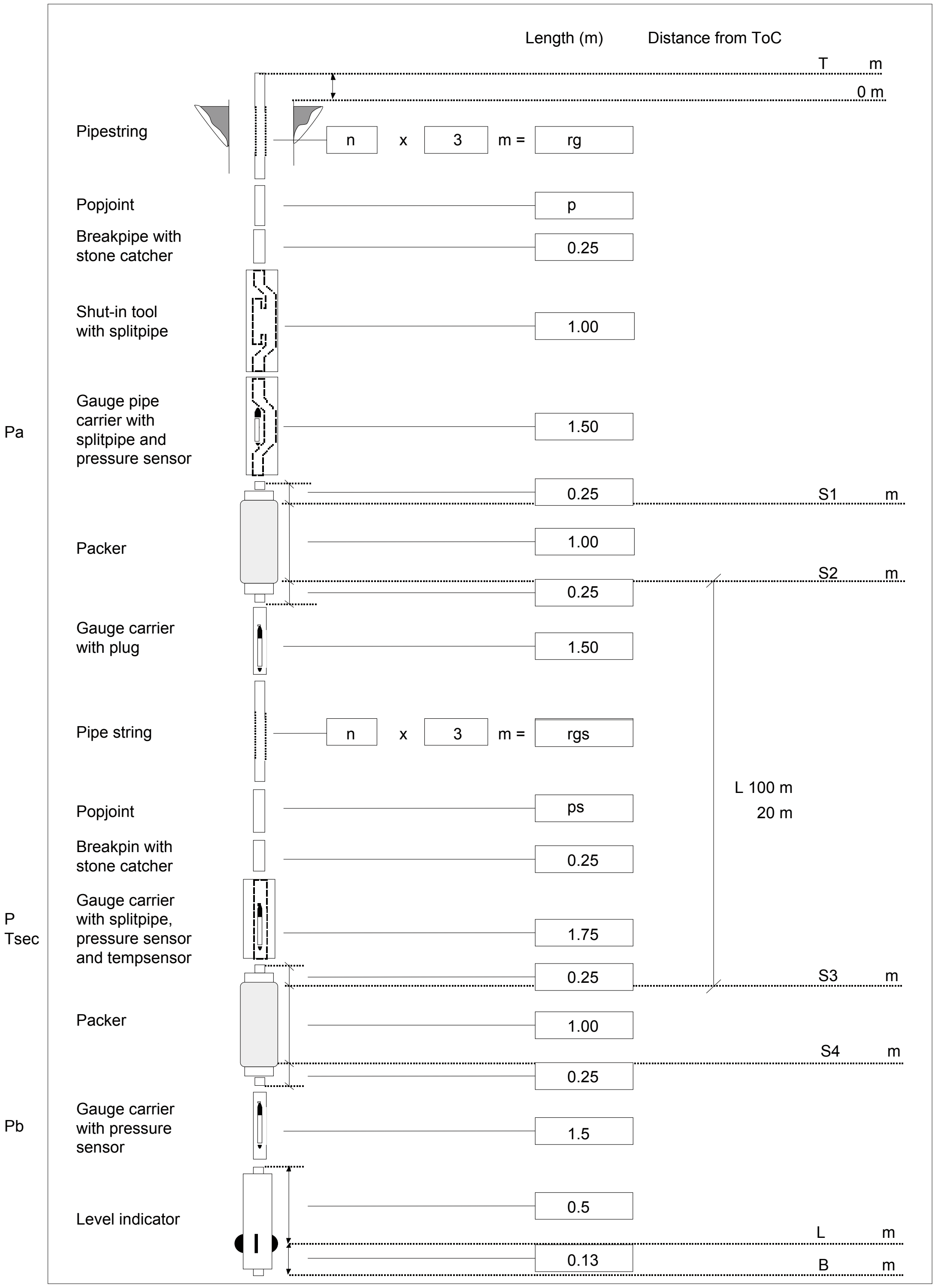


Figure 3-2. *Schematic drawing of the down-hole equipment in the PSS2 system (double packer).*

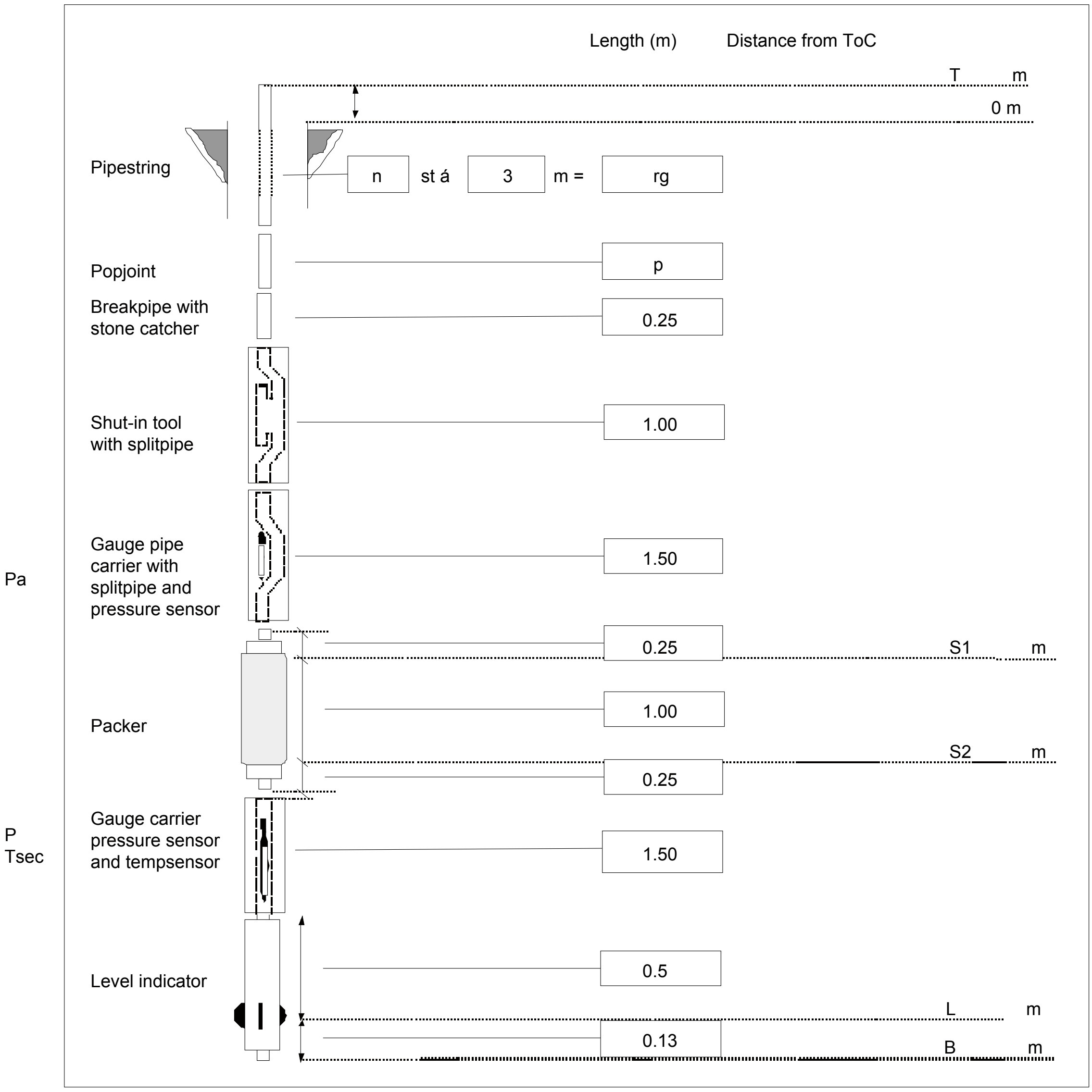


Figure 3-3. *Schematic drawing of the down-hole equipment in the PSS2 system (single packer) utilised in the bottom section 645.20–650.56 m.*

3.2 Sensors

Table 3-1. Technical specifications of sensors.

Keyword	Sensor	Name	Value/range	Unit	Comments
$P_{sec,a,b}$	Pressure	Druck PTX 162-1464abs	9–30 4–20 0–13,5 ± 0,1	VDC mA MPa % of FS	
$T_{sec,surf,air}$	Temperature	BGI	18–24 4–20 0–32 ± 0,1	VDC mA °C °C	
Q_{big}	Flow	Micro motion Elite sensor	0–100 ± 0,1	kg/min %	Massflow
Q_{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 3-2. Sensor positions and wellbore storage (WBS) controlling factors.

Borehole information		Sensors		Equipment affecting WBS coefficient			
ID	Test section (m)	Type	Position (m fr ToC)	Position	Function	Outer diameter (mm)	Net water volume in test section (m³)
KLX27A	77.30–177.30	p_a p T p_b L	75.30 176.43 176.26 179.30 180.55	Test section	Signal cable Pump string Packer line	9.1 33 6	0.359
KLX27A	77.30–97.30	p_a p T p_b L	75.30 96.43 96.26 99.30 99.55	Test section	Signal cable Pump string Packer line	9.1 33 6	0.072
KLX27A	337.30–342.30	p_a p T p_b L	335.30 336.43 336.26 344.30 344.55	Test section	Signal cable Pump string Packer line	9.1 33 6	0.018
KLX27A	645.20–650.56	p_a p T	643.20 646.20 646.03	Test section	Signal cable Pump string Packer line	9.1 33 6	0.019

3.3 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 3-4.

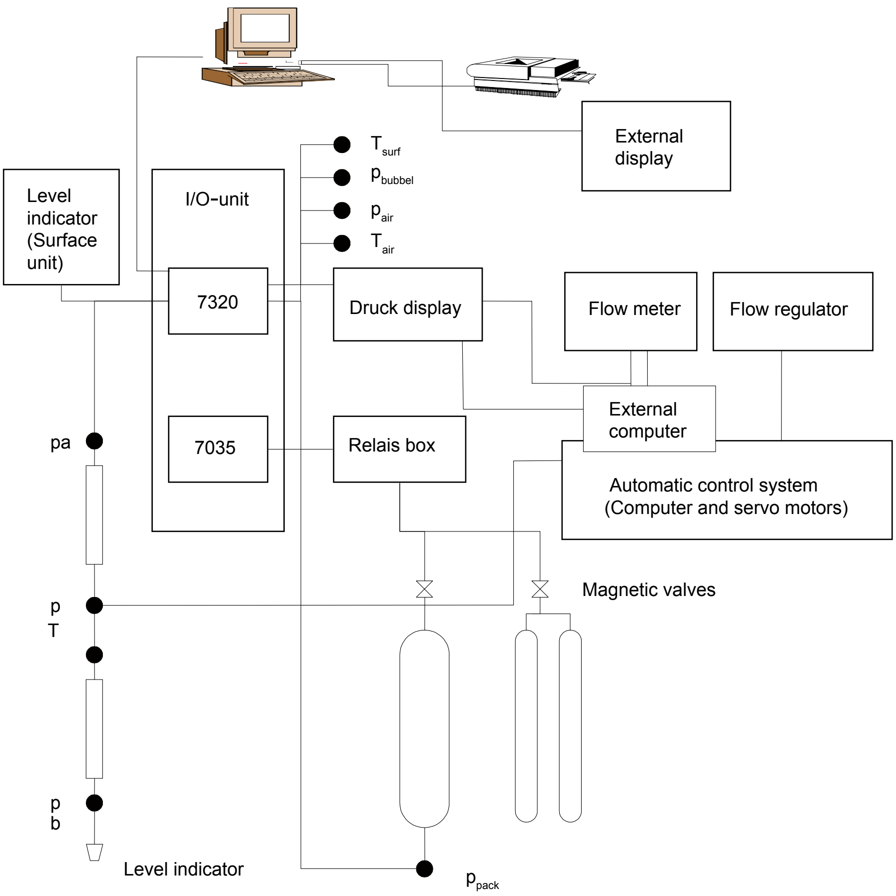


Figure 3-4. *Schematic drawing of the data acquisition system and the flow regulation control system in PSS2.*

4 Execution

4.1 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 Multikabel and hoses for packer and test valve. Clean the tubings with hot steam. Level 2!
- 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.

4.2 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 these groves are given by SKB in the activity plan (see Table 2-2) 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 test sections to avoid wrong placements and minimize elongation effects of the test string.

4.3 Execution of field work

4.3.1 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. Regularly the CHi and CHir phases were analysed quantitatively, in cases of very low section transmissivity, the PI phase was analysed.

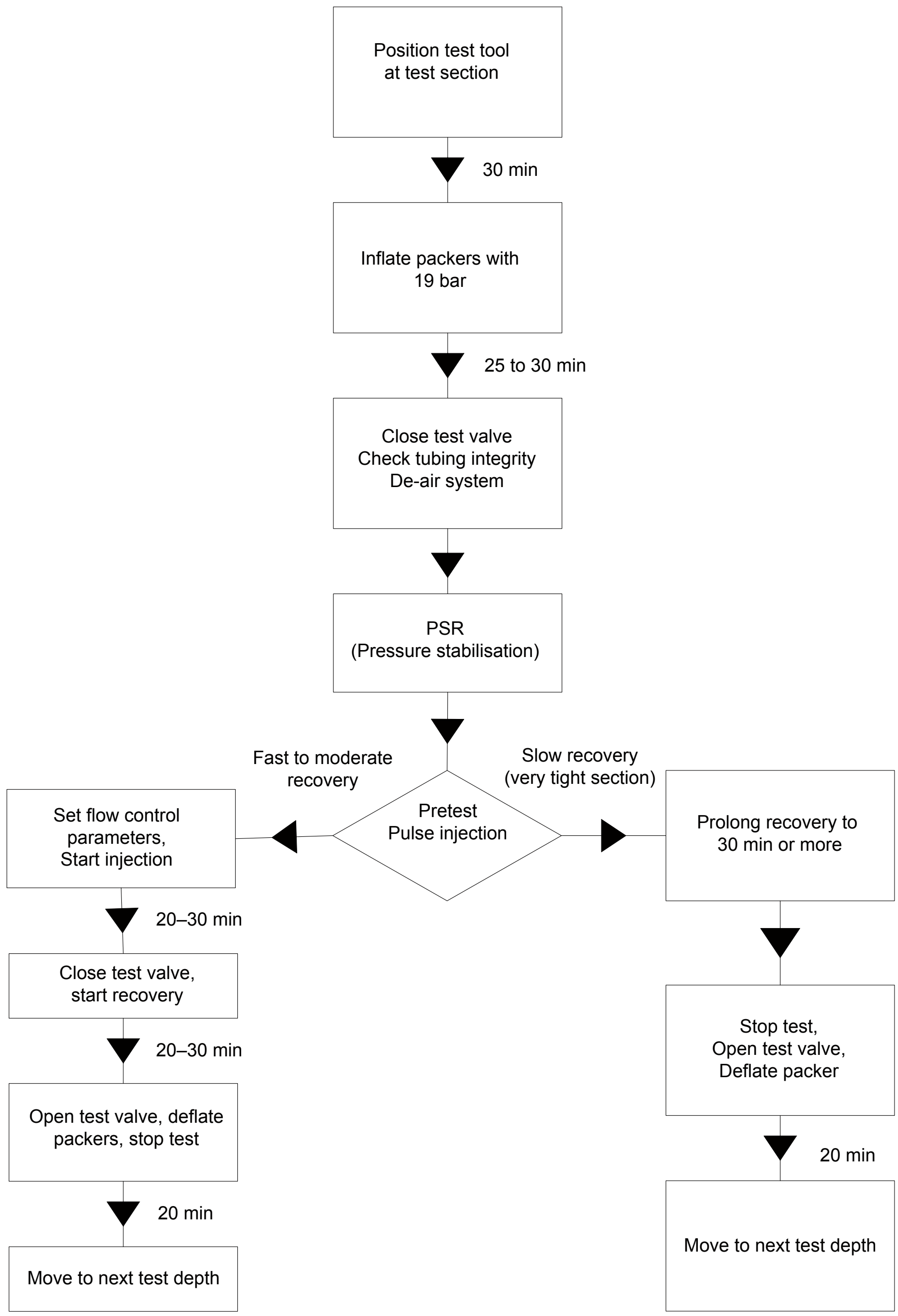


Figure 4-1. *Flow chart for test performance.*

4.3.2 Test procedure

A typical test cycle includes the following phases: 1) Transfer of down-hole equipment to the next section. 2) Packer inflation. 3) Pressure stabilisation. 4) Preliminary pulse injection. 5) Constant head injection. 6) Pressure recovery. 7) Packer deflation.

The preliminary pulse injection (Step 4) derives the first estimations of the formation transmissivity. It is conducted by applying a pressure difference of approx. 200 kPa to the static formation pressure. If the pulse recovery indicates a very low transmissivity (flow probably below 1 ml/min) the pulse recovery is prolonged and no constant head injection test is performed. The decision to continue the pulse or to conduct an injection tests is based on the pressure response of the pulse recovery. A pressure recovery less than 50% during the first ten minutes of the pulse indicates a low transmissivity. In such a case no injection test will be conducted.

The pressure static recovery (PSR) after packer inflation and before the pulse gives a direct measure of the magnitude of the packer compliance. A steep PSR indicates extremely low test section transmissivity. In such a case the packer compliance would influence the subsequent pulse test too much and introduce very large uncertainties. Therfore tests with this behaviour would be stopped after PSR phase.

If the preliminary pulse injection test indicates a formation transmissivity with a flow above 1 ml/min a constant head injection test (Step 5 and 6) is carried out. It is applied with 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 is measured. In cases, where small flow rates were expected, the automatic regulation unit was switched off and the test was performed manually (determined by the preliminary pulse injection). In those cases, the constant difference pressure was usually unequal to 200 kPa but close to that value.

In cases when the derived transmissivity of a test section influences the subsequent test program the constant head injection was conducted even if the preliminary pulse indicates a very tight section (e.g. flow below 1 ml/min). The injection phase is then performed to verify the results of the pulse.

The duration for each phase is presented in Table 4-1.

4.4 Data handling/post processing

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 analysis (field and final) of the injection phase (CHi). The synthesised data of the recovery phase (CHir) was used for the field analysis and to receive preliminary results for consistency reviews.

Table 4-1. Durations for packer inflation, pressure stabilisation, injection and recovery phase and packer deflation.

Step	Phase	Time
1	• Position test tool to new test section (correct position using the borehole markers).	Approx. 30 min.
2	• Inflate packers with appr. 2,000 kPa.	25 min.
3	• Close test valve.	10 min.
	• Check tubing integrity with appr. 800 kPa.	5 min.
	• De-air system.	2 min.
4	• Pretest, pulse injection (duration depends on the formation transmissivity).	…
5*	• Set automatic flow control parameters or setting for manual test.	5 min.
	• Start injection.	20 to 45 min.
6*	• Close test valve, start recovery.	20 min. or more
	• Open test valve.	10 min.
7	• Deflate packers.	25 min.
	• Move to next test depth.	…

*Step 5 and 6 conducted if the preliminary pulse indicates a formation transmissivity with a sufficient flow.

4.5 Analyses and interpretations

4.5.1 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.

4.5.2 Analysis approach

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

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

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

4.5.3 Analysis methodology

Each of the relevant test phases is subsequently analysed 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

The test cycle always starts with a pulse injection phase with the aim of deriving a first estimation of the formation transmissivity. In cases when the pulse recovery is slow (indicating low transmissivity) the pulse phase is extended and analysed as the main phase for the test.

The transmissivity derived from a pulse test is strongly influenced by the wellbore storage coefficient used as an input in the analysis. The wellbore storage coefficient is calculated as $C = dV/dP$ where dV is the volume difference injected during the brief flow period of the pulse and dP is the initial pressure difference of the pulse. dV is directly measured either by using the flowmeter readings or water level measurements in the injection vessel.

It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity. Figure 4-2 shows an example of a typical pressure versus time evolution for such a tight section.

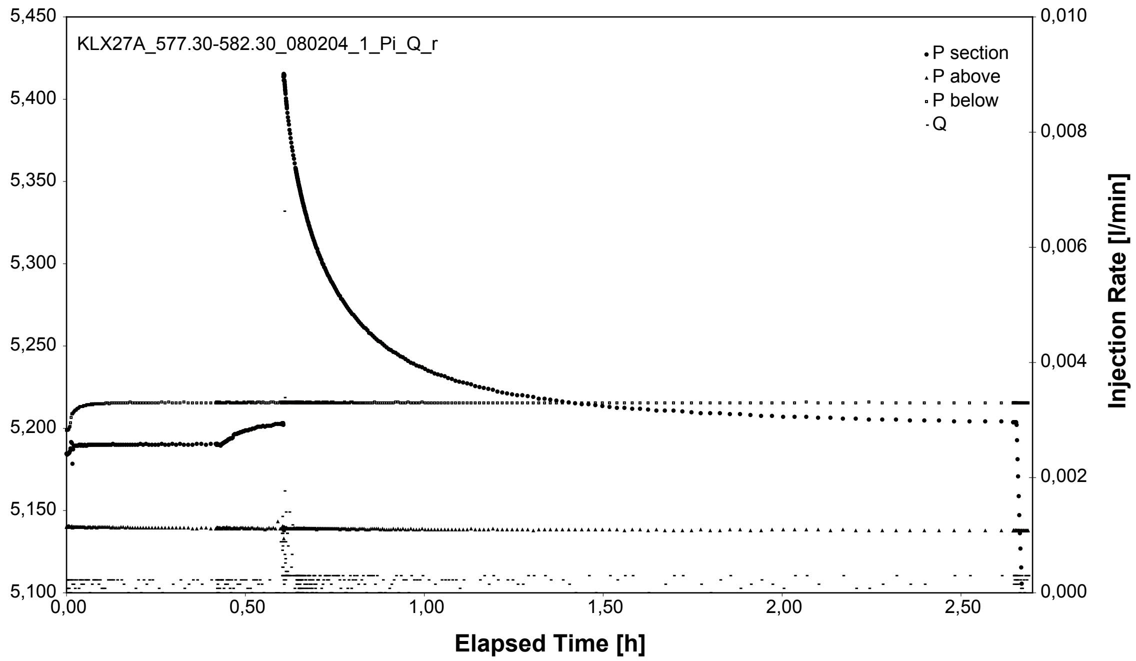


Figure 4-2. *Typical pressure versus time plot of a pulse injection test.*

- Flow model identification and type curve analysis in the deconvolution Peres Plot /Peres et al. 1989, Chakrabarty and Enachescu 1997/. A non-linear regression algorithm is used to provide optimized model parameters in the later stages. An example of type curves is presented in Figure 4-3.

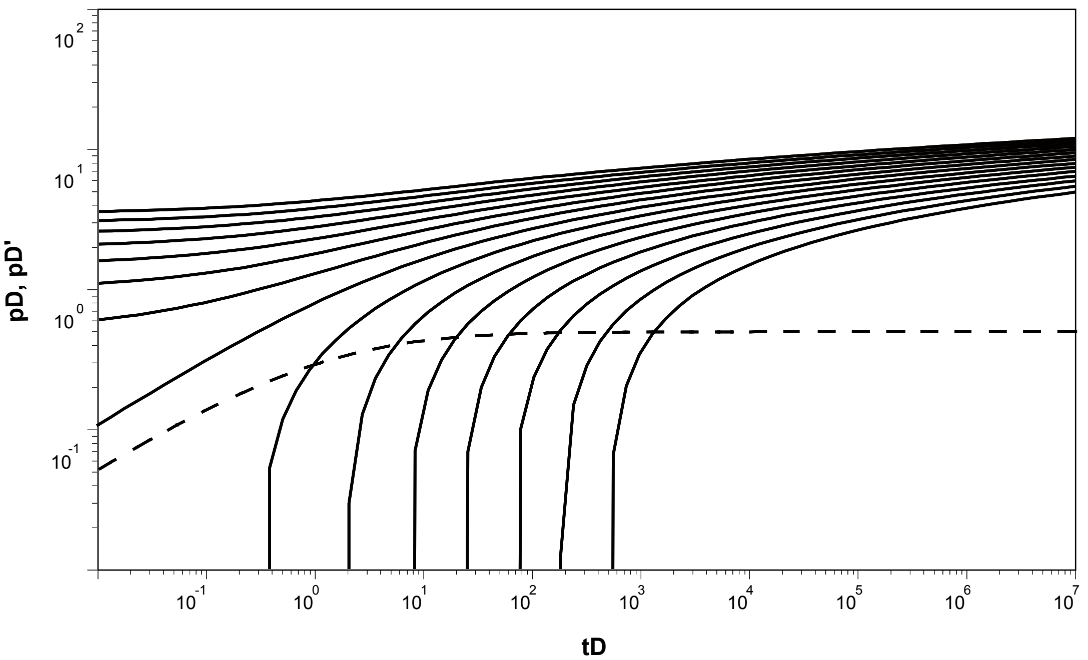


Figure 4-3. *Deconvolution type curve set for pulse test analysis.*

4.5.4 Correlation between storativity and skin factor

For the analysis of the conducted hydraulic tests below 100 m depth a storativity of $1 \cdot 10^{-6}$ and for hydraulic tests above 100 m a storativity of $1 \cdot 10^{-3}$ is assumed (SKB MD 320.004e). Based on this assumption the skin is calculated. In the following the correlation between storativity and skin for the relevant test phases will be explained in greater detail.

Injection phase (CHi)/Pulse tests (Pi)

Due to the fact that the early time data of the CHi and Pi phases, respectively, is not available or too noisy (attributed to the automatic regulation system) the storativity and the skin factor become correlated. Consequently they cannot be solved independently any more. In this case as a result of the analysis one determines the correlation group $e^{2\xi}/S$. This means that in such cases the skin factor can only be calculated when assuming the storativity as known.

Recovery phase (CHir)

The wellbore storage coefficient (C) is determined by matching the early time data with the corresponding type curve. The derived C-value is introduced in the equation of the type curve parameter:

$$(C_D e^{2\xi})_M = \frac{C \rho g}{2\pi r_w^2 S} e^{2\xi}$$

The equation above has two unknowns, the storativity (S) and the skin factor (ξ) which expresses the fact that for the case of constant rate and pressure recovery tests the storativity and the skin factor are 100% correlated. Therefore, the equation can only be either solved for skin by assuming that the storativity is known or solved for storativity by assuming the skin as known.

4.5.5 Determination of the ri-index and calculation of the radius of influence (ri)

The analysis provides also the radius of influence and the ri-index, which describes the late time behaviour of the derivative.

Ri-index

The determination of the ri-index is based on the shape of the derivative plotted in log-log coordinates and describes the behaviour of the derivative after the time t_2, representing the end of the near wellbore response. The ri-index also describes the flow regime at the end of the test. Following ri-indices can be assigned:

- Ri-index = 0: The middle and late time derivative shows a horizontal stabilization. This pressure response indicates that the size of the hydraulic feature is greater than the radius of influence. The calculated radius of influence is based on the entire test time t_P.
- Ri-index = 1: The derivative shows an upward trend at late times, indicating a decrease of transmissivity or a barrier boundary at some distance from the borehole. The size of the hydraulic feature near the borehole is estimated as the radius of influence based on t_2.
- Ri-index = –1: The derivative shows a downward trend at late times, indicating an increase of transmissivity or a constant head boundary at some distance from the borehole. The size of the hydraulic feature near the borehole is estimated as the radius of influence based on t_2.

Figure 4-4 presents the relationship between the shape of derivative and the ri-index.

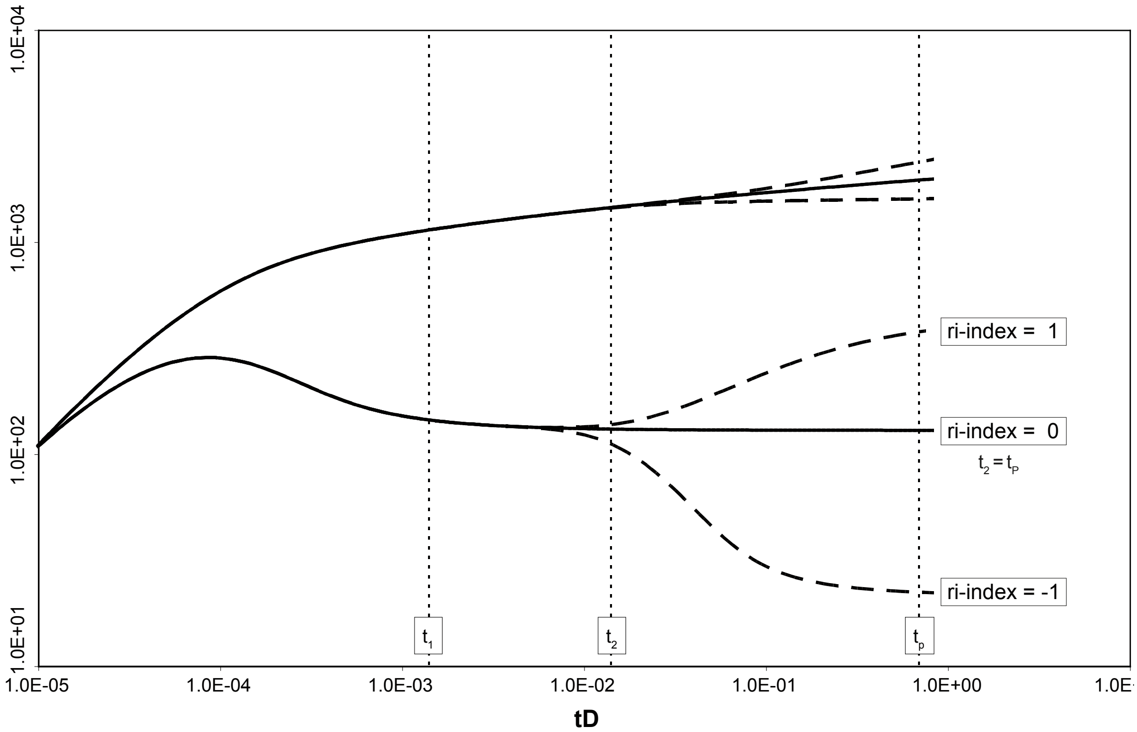


Figure 4-4. *Schematic plot of the assignments for the ri-indices.*

If no radial flow stabilization can be observed the ri-index is based on the flow regime at the end of the test: i.e. ri-index = 1 for tests with a derivative showing an upward trend at the end and a ri-index = –1 for tests with a derivative showing a downward trend. In such cases the calculated radius of influence is based on the entire test time t_P.

The assignment of the ri-index is based on /Rhen 2005/.

Calculation of the radius of influence

The radius of influence (ri) is calculated as follows:

$$ri = 1.89 \cdot \sqrt{\frac{T_T}{S_T} \cdot t_2} \ \text{[m]}$$

T_T recommended inner zone transmissivity [m²/s]

t_2 time when hydraulic formation properties changes (see previous chapter) [s]

S_T for the calculation of the ri the storage coefficient (S) is estimated from the transmissivity /Rhen et.al. 2006/:

$S_T = 0.0007 \cdot T_T^{0.5}$ [–]

4.5.6 Steady state analysis

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

4.5.7 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 be 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.

4.5.8 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 meters above sea level) was calculated from the extrapolated static formation pressure (p*), corrected for atmospheric pressure measured by the surface gauge and corrected for the vertical depth considering the inclination of the drill hole, 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 4-5 shows the methodology schematically.

The freshwater head in meters 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:

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

4.5.9 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

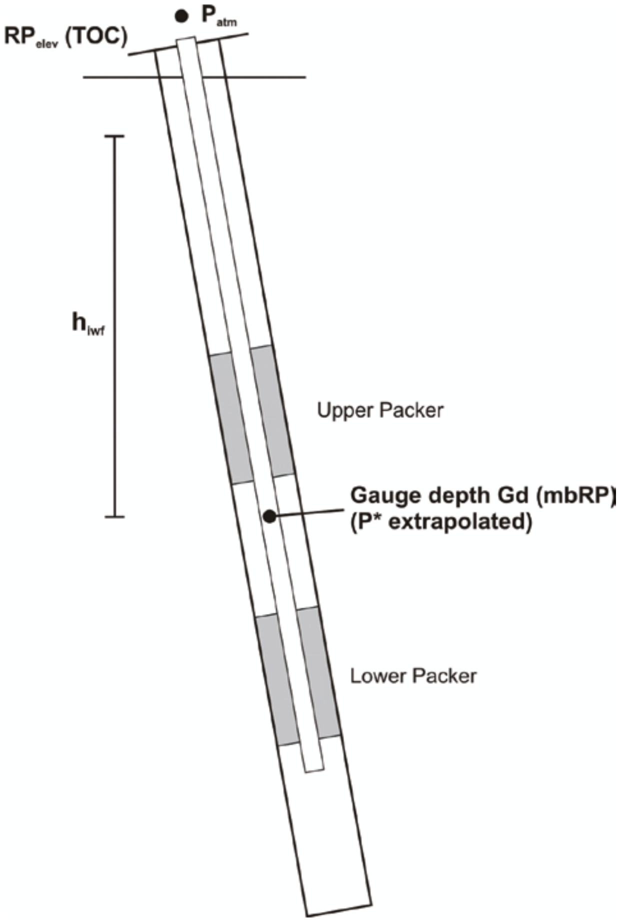


Figure 4-5. *Schematic methodologies for calculation of the freshwater head.*

from the individual analyses of a specific test usually differ. In the case when the differences are small (which is typically the case) the recommended transmissivity value is chosen from the test phase that shows the best data and derivative quality.

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

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

In cases when changing transmissivity with distance from the borehole (composite model) was diagnosted, the transmissivity of the zone, which was showing the better derivative quality, was recommended.

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.

4.6 Nonconformities

Malfunctions of the pressure transducer at position Pa (pressure above test section) were observed during performance of the single packer test. As this value is of minor importance for the evaluation of the conducted injection test, it was agreed by SKB to proceed with the test.

Some intervals were not tested because tests at the previous larger scale showed flow below the measurement limit of the equipment. Specifically the intervals that were not tested at the 5 m scale for this reason are the following,

297.30–317.30 m

317.30–337.30 m

357.30–377.30 m

377.30–397.30 m

417.30–437.30 m

457.30–477.30 m

This does however not constitute an nonconformity since this adopted approach is specififed in the activityplan and does not deviate from the planed test schedule.

5 Results

In the following, results of all tests are presented and analysed. Section 5.1 present the 100 m tests, 5.2 the 20 m tests, 5.3 the 5 m tests and 5.4 the single packer test. 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 Tables 6-1 and 6-2 of the Summary chapter. In addition, the results are presented in Appendices 2, 3 and 5.

The results are stored in the primary data base (SICADA). The SICADA data base contains data that will be used for further interpretation (modelling). The data are traceable in SICADA by the Activity plan number (AP PS 400-07-056; SKB controlling document).

5.1 100 m single-hole injection tests

In the following, the 100 m section tests conducted in borehole KLX27A are presented and analysed.

5.1.1 Section 77.30–177.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 198 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 1.2 L/min at start of the CHi phase to 0.8 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). With the exception of the relative fast recovery of the CHir 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 CHi phase shows a slight noisy but flat derivative, indicating radial flow. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a steep downward trend at middle times indicating a high positive skin and horizontal stabilization at late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2.1.

Selected representative parameters

The recommended transmissivity of $8.4 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHi phase, which shows slight better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-7}$ m^2/s 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 1,604.4 kPa.

Apart from the relative high skin derived from the CHir phase, both phases show consistency. No further analysis is recommended.

5.1.2 Section 177.30–277.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 202 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 2.8 L/min at start of the CHi phase to 0.72 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a slight noisy but flat derivative at middle and late times, indicating radial flow. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at middle times followed by a downward trend at late times, indicating a change of transmissivity at some distance to the borehole. A two shell composite model with radial flow and wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2.2.

Selected representative parameters

The recommended transmissivity of $2.9 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHir phase, which shows slight better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-8}$ m^2/s 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 2,503.9 kPa.

Apart from the different flow models used for analysis (homogeneous for the CHi and composite for the CHir phase), both phases show consistency. No further analysis is recommended.

5.1.3 Section 277.30–377.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 206 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 0.019 L/min at start of the CHi phase to 0.006 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a slight noisy but flat derivative at middle times, followed by a downward slope and a further horizontal stabilisation at late times. A two shell composite radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward slope and beginning of a horizontal stabilisation at late times. However, the skin dominated slope could be matched sufficiently only by using a two shell composite model with radial flow, wellbore storage and skin. The analysis is presented in Appendix 2.3.

Selected representative parameters

The recommended transmissivity of $1.6 \cdot 10^{-9}$ m²/s was derived from the analysis of the CHi phase (inner zone), which shows a good horizontal stabilisation of the derivative despite of the noisy data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-10}$ m²/s to $5.0 \cdot 10^{-9}$ m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,388.5 kPa.

Apart from the noisy data of the CHi phase, both phases show a very good consistency. No further analysis is recommended.

5.1.4 Section 377.30–477.30 m, test no. 1 and 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 pressure response and the recovery of the pulse test indicated a low formation transmissivity. Because of a power breakdown at the end of the pulse test, a new test sequence was conducted consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir). Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 222 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 10 mL/min at start of the CHi phase to 3 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a slight noisy but flat derivative at middle times and late times. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase covers only wellbore storage dominated response with transition to skin dominated response. Therefore, despite of the good data quality, the analysis shows a relative high level of ambiguity. However, an analysis using a homogenous flow model with radial flow, wellbore storage and skin was used for analysis. The analysis is presented in Appendix 2.4.

Selected representative parameters

The recommended transmissivity of $1.3 \cdot 10^{-9}$ m²/s was derived from the analysis of the CHi phase, which shows a good horizontal stabilisation of the derivative despite of the noisy data and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-10}$ m²/s to $6.0 \cdot 10^{-9}$ m²/s. The flow dimension displayed during the test is 2. According to a too short recovery phase which implied a too high level of uncertainty, a straight line extrapolation in a Horner plot was not performed. Therefore, no static pressure measured at transducer depth could be derived from the CHir phase.

Apart from the noisy data of the CHi phase and the too short recovery phase, both phases show a good consistency. No further analysis is recommended.

5.1.5 Section 477.30–577.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 206 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 0.12 L/min at start of the CHi phase to 0.05 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a slight noisy but flat derivative at middle and late times, indicating radial flow. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. Both phases show a negative skin which indicated a higher transmissivity of the close surrounding of the borehole wall. The analysis is presented in Appendix 2.5.

Selected representative parameters

The recommended transmissivity of $2.5{\cdot}10^{-8}$ m^2/s was derived from the analysis of the CHir phase, which shows slight better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0{\cdot}10^{-9}$ m^2/s to $6.0{\cdot}10^{-8}$ 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 5,145.7 kPa.

Both phases show a very good consistency. No further analysis is recommended.

5.1.6 Section 545.20–645.20 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 pressure response and the recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 207 kPa. A hydraulic connection to the bottom zone was observed during the CHi and CHir phases. The pressure in the bottom zone rose sharply at the beginning of the injection and increased during the further injection slightly up to a difference of 35 kPa. During the recovery the pressure in the bottom zone dropped steadily to the undisturbed pressure before start of injection. The injection rate decreased from 14.0 L/min at start of the CHi phase to 7.08 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Despite of the crossflow to the bottom zone, both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a slight noisy but flat derivative at middle times, followed by a downward slope and a further flat derivative at late times, indicating an increase of transmissivity at some distance to the borehole. A two shell composite model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a steep slope at the skin dominated part of the pressure recovery. To match this slope, a two shell composite model with radial flow model, wellbore storage and skin was chosen for the analysis. The CHir phase shows a negative skin which indicated a higher transmissivity of the close surrounding of the borehole wall. The analysis is presented in Appendix 2.6.

Selected representative parameters

The recommended transmissivity of $1.9 \cdot 10^{-6}$ m²/s was derived from the analysis of the CHir phase (inner zone), which shows slight better data and derivative quality. According to the test performance, the matched transmissivity especially of the outer zones is understood as influenced by the crossflow and not representative for the formation. The confidence range for the interval transmissivity is estimated with a relative wide range to be $9.0 \cdot 10^{-7}$ m²/s to $2.0 \cdot 10^{-5}$ 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 5,746.3 kPa.

According to the crossflow effects and a difference in skin (positive at the CHi phase and negative at the CHir phase), both phases show limited consistency. A full numerical test simulation may help to figure out the range of influence originated by the observed crossflow.

5.2 20 m single-hole injection tests

In the following, the 20 m section tests conducted in borehole KLX27A are presented and analysed.

5.2.1 Section 77.30–97.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 to the adjacent zones was observed. The injection rate decreased from 0.9 L/min at start of the CHi phase to 0.6 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). With the exception of the relative fast recovery of the CHir 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 CHi phase shows a slight noisy but flat derivative, indicating radial flow. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a steep downward trend at middle times indicating a high positive skin and horizontal stabilization at late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2.7.

Selected representative parameters

The recommended transmissivity of $7.4 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHi phase, which shows slight better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-7}$ m²/s to $3.0 \cdot 10^{-6}$ 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 891.6 kPa.

Apart from the relative high skin derived from the CHir phase, both phases show consistency. No further analysis is recommended.

5.2.2 Section 97.30–117.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 198 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 50 mL/min at start of the CHi phase to 25 mL/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). The Chi phase is a little bit noisy and the Chir phase shows a relative fast recovery. However, 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 trend of horizontal stabilisation at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The derivative of the CHir phase shows a downward trend at middle times and a beginning of horizontal stabilization at late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2.8.

Selected representative parameters

The recommended transmissivity of $2.8 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHi phase, which shows horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-9}$ m²/s to $6.0 \cdot 10^{-8}$ m²/s. A flow dimension of 2 was assumed for the test. 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 1,071.1 kPa.

The analyses of the CHi and CHir phases show good consistency, with the exception of the high skin value derived from the CHir phase. No further analysis is recommended.

5.2.3 Section 117.30–137.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 198 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 7 mL/min at start of the CHi phase to 5 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate the recorded data of the CHi phase is noisy, but still amenable for quantitative analysis. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase is noisy but shows a flat derivative at late times, indicating a flow dimension of 2 (radial flow). The CHir phase shows a downward trend at late times. This behaviour indicates a transition from wellbore storage and skin dominated flow to pure formation flow. Both phases were analysed using a radial infinite acting homogeneous flow model. The analysis is presented in Appendix 2.9.

Selected representative parameters

The recommended transmissivity of $8.5 \cdot 10^{-9}$ 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 $8.5 \cdot 10^{-9}$ m^2/s to $2.0 \cdot 10^{-9}$ m^2/s. A flow dimension of 2 was assumed for the test. 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 1,237.6 kPa.

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

5.2.4 Section 137.30–157.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 198 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 7 mL/min at start of the CHi phase to 5 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate the recorded data of the CHi phase is noisy, but still amenable for quantitative analysis. The CHir phase shows a fast recovery, which adds uncertainty to the derived parameters.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase is noisy but shows a flat derivative at late times, indicating a flow dimension of 2 (radial flow). The CHir phase shows a steep downward trend at middle times followed by horizontal stabilisation at late times. A radial infinite acting homogeneous flow model was chosen for both phases. The analysis is presented in Appendix 2.10.

Selected representative parameters

The recommended transmissivity of $6.4 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHi phase, which shows the clearest radial flow and best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-8}$ m^2/s to $2.0 \cdot 10^{-7}$ m^2/s. A flow dimension of 2 was assumed for the test. 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 1,422.5 kPa.

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

5.2.5 Section 157.30–177.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased, after initial oscillations induced by the regulation unit, from 0.7 L/min at start of the CHi phase to 0.1 L/min at the end, indicating a low to medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle times and an upward trend at late times. The upward trend was interpreted as the transition to a zone of lower transmissivity and analysed using a two shell composite flow model. The derivative of the CHir phase is consistent with the CHi phase, indicating a decreasing transmissivity at some distance from the borehole. A two shell composite model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2.11.

Selected representative parameters

The recommended transmissivity of $2.4 \cdot 10^{-7}$ 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 $7.0 \cdot 10^{-8}$ m^2/s 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 1,619.8 kPa.

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

5.2.6 Section 177.30–197.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 198 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 60 mL/min at start of the CHi phase to 32 mL/min at the end, indicating a low to medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a downward slope at middle times and a trend of horizontal stabilisation at late times. The CHi phase was matched using a radial composite flow model. The derivative of the CHir phase shows a downward slope at middle times, indicating an increase of transmissivity at some distance from the borehole. A two shell composite model with increasing transmissivity was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2.12.

Selected representative parameters

The recommended transmissivity of $1.3 \cdot 10^{-8}$ 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 $8.0 \cdot 10^{-9}$ m2/s to $5.0 \cdot 10^{-8}$ 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 1,782.0 kPa.

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

5.2.7 Section 197.30–217.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 199 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 12 mL/min at start of the CHi phase to 9 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate the recorded data of the CHi phase is noisy, but still amenable for quantitative analysis. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase is noisy throughout the test phase. An average of the derivative can be considered as horizontal stabilisation, indicating radial flow. The CHi phase was analysed using a homogeneous radial flow model. The derivative of the CHir phase shows wellbore storage and skin dominated flow and a trend to horizontal stabilisation at late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2.13.

Selected representative parameters

The recommended transmissivity of $7.8 \cdot 10^{-9}$ 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 $3.0 \cdot 10^{-9}$ m^2/s to $5.0 \cdot 10^{-8}$ m^2/s. A flow dimension of 2 was assumed for the test. 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 1,960.1 kPa.

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

5.2.8 Section 217.30–237.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 to the adjacent zones was observed. The injection rate decreased from 0.89 L/min at start of the CHi phase to 0.55 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). With the exception of the relative fast recovery of the CHir 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 CHi phase shows a slight noisy but flat derivative, indicating radial flow. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a steep downward trend at middle times, indicating a high positive skin, and horizontal stabilization at late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2.14.

Selected representative parameters

The recommended transmissivity of $3.1 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHi phase, which shows better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $9.0 \cdot 10^{-8}$ m^2/s to $5.0 \cdot 10^{-7}$ 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 2,153.2 kPa.

Apart from the relative high skin derived from the CHir phase, both phases show consistency. No further analysis is recommended.

5.2.9 Section 237.30–257.30 m, test no. 1 and 2, injection

Comments to test

The first test was cancelled due to unstable pressure conditions during the constant pressure injection phase. The regulation unit switched between the pump and vessel causing an increasing injection pressure. The second test was performed without technical problems. This comment describes the second 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 pressure response and the recovery of the pulse test indicated 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 254 kPa. The higher dp was chosen to avoid switching between the vessel and the pump. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 0.55 L/min at start of the CHi phase to 0.13 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at early times, followed by an upward trend at middle times and a trend of horizontal stabilisation at late times. The derivative of the CHir phase shows an upward slope at middle and late times without reaching horizontal stabilisation. Both phases were analysed using a composite radial flow model. The analysis is presented in Appendix 2.15.

Selected representative parameters

The recommended transmissivity of $8.5 \cdot 10^{-8}$ 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 $1.0 \cdot 10^{-8}$ m^2/s to $2.0 \cdot 10^{-7}$ m^2/s. The flow dimension used for the analysis is 2. The static pressure could not be extrapolated.

No further analysis is recommended.

5.2.10 Section 257.30–277.30 m, test no. 1, pulse injection

Comments to test

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

During the brief injection phase of the pulse injection a total volume of about 7.3 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 223 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $4.9 \cdot 10^{-11}$ m^3/Pa. It should be noted though that there is uncertainty connected with the determination of the wellbore storage coefficient, which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the deconvolved PI pressure derivative shows a continuing upward trend without horizontal stabilisation. The PI phase was analysed using a radial homogeneous flow model. The analysis is presented in Appendix 2.16.

Selected representative parameters

The recommended transmissivity of $2.7 \cdot 10^{-11}$ m^2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be $7.0 \cdot 10^{-12}$ to $5.0 \cdot 10^{-11}$ m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure could not be extrapolated due to the very low transmissivity.

5.2.11 Section 277.30–297.30 m, test no. 1 and 2, injection

Comments to test

The first test was cancelled due to problems with the regulation unit and unstable pressure conditions during the constant pressure injection phase. The second test was performed without technical problems. This comment describes the second 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 pressure response and the recovery of the pulse test indicated 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 to the adjacent zones was observed. The injection rate oscillated during the CHi phase around 2 mL/m, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate the recorded date is noisy and adds uncertainty to the analysis. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase is very noisy (due to the low injection rate) and does not allow flow model identification. The derivative of the CHir phase shows a continues downward trend, indication a transition from wellbore storage and skin dominated flow to pure formation flow. The Both phases were analysed using a homogeneous radial flow model. The analysis is presented in Appendix 2.17.

Selected representative parameters

The recommended transmissivity of $5.9 \cdot 10^{-10}$ 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 $1.0 \cdot 10^{-10}$ m^2/s to $2.0 \cdot 10^{-9}$ m^2/s. A flow dimension of 2 was assumed for the test analysis. 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 2,684.0 kPa.

No further analysis is recommended.

5.2.12 Section 297.30–317.30 m, test no. 1, pulse injection

Comments to test

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

During the brief injection phase of the pulse injection a total volume of about 12 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 208 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $5.8 \cdot 10^{-11}$ m³/Pa. It should be noted though that there is uncertainty connected with the determination of the wellbore storage coefficient, which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the deconvolved PI pressure derivative shows a continuing upward trend without horizontal stabilisation. The PI phase was analysed using a radial homogeneous flow model. The analysis is presented in Appendix 2.18.

Selected representative parameters

The recommended transmissivity of $6.1 \cdot 10^{-11}$ m²/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-11}$ to $1.0 \cdot 10^{-10}$ m²/s. The analysis was conducted using a flow dimension of 2. The static pressure could not be extrapolated due to the very low transmissivity.

5.2.13 Section 317.30–337.30 m, test no. 1, pulse 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). A preliminary pulse injection test should have shown a first estimate of the formation transmissivity. However, after inflating the packers and closing the test valve, the pressure rose by approx. 5 kPa. After conducting the pre-pulse the pressure decreases slowly and showed a horizontal stabilization. This phenomenon (no pulse recovery) can be attributed to a combination of a very tight section and a prolonged packer expansion (T probably smaller than 1E–11 m²/s). Due to the overlapping of pressure response and packer compliance the test was skipped. The test phase is not analysable.

The measured data is presented in Appendix 2.19.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1.0 \cdot 10^{-11}$ m²/s.

No further analysis recommended.

5.2.14 Section 337.30–357.30 m, test no. 1, injection

Comments to test

The test design consisted of a constant pressure injection phase (CHi) and a recovery phase (CHir).

The CHi phase was conducted using a pressure difference of 213 kPa. No hydraulic connection to the adjacent zones was observed. The test was conducted using the injection vessel with N2 backpressure. The injection rate decreased from 19 mL/min at start of the CHi phase to 6 mL/min at the end, indicating a relative low interval transmissivity (consistent with the pulse recovery). The regulation unit worked well, but the recorded flow data of the Chi phase is noisy. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative and a homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a slight downward trend at late times and is still influenced by wellbore storage and skin. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2.20.

Selected representative parameters

The recommended transmissivity of $1.9 \cdot 10^{-9}$ m²/s was derived from the analysis of the CHir phase, which shows a better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-10}$ m²/s to $5.0 \cdot 10^{-9}$ m²/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,203.5 kPa.

Both phases show good consistency. No further analysis is recommended.

5.2.15 Section 357.30–377.30 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). After inflating the packers and closing the test valve, the pressure increased by approx. 60 kPa. However, an injection phase was conducted using the vessel with N2 backpressure. The flow rate dropped below the measurement limit of 1 mL/min after approx. 10 min. The pressure during this phase was rising and the subsequent recovery was very slow. This phenomenon can be attributed to a tight section (T probably smaller than $1.0 \cdot 10^{-10}$ m²/s) and a prolonged packer expansion. None of the test phases is analysable.

The measured data is presented in Appendix 2.21.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-10}$ m²/s.

No further analysis is recommended.

5.2.16 Section 377.30–397.30 m, test no. 1, pulse injection

Comments to test

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

During the brief injection phase of the pulse injection a total volume of about 11 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 227 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $5.0 \cdot 10^{-11}$ m³/Pa. It should be noted though that there is uncertainty connected with the determination of the wellbore storage coefficient, which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the deconvolved PI pressure derivative shows a horizontal stabilization at early and middle times, indicating radial flow. At late times a steep upward trend is apparent, which can be attributed to the uncertainty of the initial pulse pressure. However, a radial homogeneous flow model was used for the analysis. The analysis is presented in Appendix 2.22.

Selected representative parameters

The recommended transmissivity of $6.4 \cdot 10^{-11}$ m^2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-11}$ to $1.0 \cdot 10^{-10}$ m^2/s. The analysis was conducted using a flow dimension of 2. The static pressure could not be extrapolated due to the very low transmissivity.

5.2.17 Section 397.30–417.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 198 kPa. No hydraulic connection to the adjacent zones was observed. The test was conducted with the injection vessel using N2 backpressure. The injection rate decreased from 9 mL/min at start of the CHi phase to 2 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The recorded flow rate of the CHi phase is noisy and adds uncertainty to the analysis. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative, which does not allow a flow model identification. However, a homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows an upward trend at early and middle times, followed by a change in slope at late times. This behaviour indicates a transition from wellbore storage and skin dominated flow to pure formation flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.23.

Selected representative parameters

The recommended transmissivity of $1.5 \cdot 10^{-9}$ 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 $5.0 \cdot 10^{-10}$ m^2/s to $6.0 \cdot 10^{-9}$ 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 3,738.4 kPa.

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

5.2.18 Section 417.30–437.30 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). After inflating the packers and closing the test valve, the pressure increased by approx. 50 kPa. To verify the response during the pressure static recovery phase, an injection phase was conducted using the vessel with N2 backpressure. The flow rate dropped below the measurement limit of 1 mL/min, immediately. This phenomenon can be attributed to a tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s) and a prolonged packer expansion. None of the test phases is analysable.

The measured data is presented in Appendix 2.24.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.2.19 Section 437.30–457.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 202 kPa. No hydraulic connection to the adjacent zones was observed. The test was conducted with the injection vessel using N2 backpressure. The injection rate decreased from 3 mL/min at start of the CHi phase to 1 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The recorded flow rate of the CHi phase is noisy and adds uncertainty to the analysis. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative, which does not allow a flow model identification. However, a homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows an upward trend, because the pressure response is still influenced by wellbore storage. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.24.

Selected representative parameters

The recommended transmissivity of $5.6 \cdot 10^{-10}$ 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 $1.0 \cdot 10^{-10}$ m^2/s to $5.0 \cdot 10^{-9}$ m^2/s. A flow dimension of 2 was assumed. Due to the low formation transmissivity no static pressure was derived.

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

5.2.20 Section 457.30–477.30 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). After inflating the packers and closing the test valve, the pressure increased by approx. 40 kPa. To verify the response during the pressure static recovery phase, an injection phase was conducted using the vessel with N2 backpressure. The flow rate dropped below the measurement limit of 1 mL/min, immediately. This phenomenon can be attributed to a tight section (T probably smaller than $1.0\cdot10^{-11}$ m²/s) and a prolonged packer expansion. None of the test phases is analysable.

The measured data is presented in Appendix 2.26.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0\cdot10^{-11}$ m²/s.

No further analysis is recommended.

5.2.21 Section 477.30–497.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 194 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 13 mL/min at start of the CHi phase to 12 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The automatic regulation unit worked well, but recorded flow rate is noisy. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative, which does not allow a flow model identification. However, a homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at middle times and late times, which is indicative for a transition from wellbore storage and skin dominated flow to pure formation flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.27.

Selected representative parameters

The recommended transmissivity of $2.2\cdot10^{-8}$ m²/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $6.0\cdot10^{-9}$ m²/s to $7.0\cdot10^{-8}$ 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 4,451.9 kPa.

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

5.2.22 Section 497.30–517.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 to the adjacent zones was observed. The injection rate decreased from 28 mL/min at start of the CHi phase to 17 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows an upward trend at middle times and a slight horizontal stabilization at late times. The derivative of the CHir phase is consistent to the derivative of the CHi phase. Both derivatives indicate a change in transmissivity at some distance from the borehole and a two shell composite flow model was used for the analysis. The analysis is presented in Appendix 2.28.

Selected representative parameters

The recommended transmissivity of $1.4 \cdot 10^{-8}$ 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 $6.0 \cdot 10^{-9}$ m^2/s to $5.0 \cdot 10^{-8}$ m^2/s. The flow dimension 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 4,623.8 kPa.

The analyses of both phases show good consistency. No further analysis is recommended.

5.2.23 Section 517.30–537.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 197 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 42 mL/min at start of the CHi phase to 27 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivatives of the CHi and CHir phase show a horizontal stabilization at middle times followed by a downward trend at late times. This is indicative for an increase in transmissivity away from the borehole. A two shell composite flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2.29.

Selected representative parameters

The recommended transmissivity of $1.7 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the best horizontal stabilization and derivative quality. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-9}$ m^2/s to $7.0 \cdot 10^{-8}$ m^2/s. The flow dimension 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 4,798.9 kPa.

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

5.2.24 Section 537.30–557.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 214 kPa. No hydraulic connection to the adjacent zones was observed. The test was conducted using the injection vessel with N2 backpressure and the pressure dropped approx. 6 kPa during the CHi phase. The injection rate decreased from 15 mL/min at start of the CHi phase to 6 mL/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). The CHi phase is noisy, but still amenable for quantitative analysis. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy, but relatively flat derivative. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at middle and late times, which is indicative for a transition from wellbore storage and skin dominated flow to pure formation flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.30.

Selected representative parameters

The recommended transmissivity of $6.7 \cdot 10^{-9}$ 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 $2.0 \cdot 10^{-9}$ m^2/s to $3.0 \cdot 10^{-7}$ 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 4,907.9 kPa.

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

5.2.25 Section 557.30–577.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 205 kPa. No hydraulic connection to the adjacent zones was observed. The test was conducted using the injection vessel with N2 backpressure and the pressure dropped approx. 4 kPa during the CHi phase. The injection rate decreased from 9 mL/min at start of the CHi phase to 3 mL/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). The CHi phase is noisy, but still amenable for quantitative analysis. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a relatively flat derivative. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase is still influenced by wellbore storage and skin dominated flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.31.

Selected representative parameters

The recommended transmissivity of $1.3 \cdot 10^{-9}$ 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 $8.0 \cdot 10^{-10}$ m^2/s to $6.0 \cdot 10^{-9}$ 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 4,141.4 kPa.

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

5.2.26 Section 577.30–597.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 198 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 1 L/min at start of the CHi phase to 0.96 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). The automatic regulation unit worked well. However, the recorded data of the CHi phase is noisy. The subsequent CHir phase shows a fast recovery. Therefore, the results of the analyses should be regarded as order of magnitude, only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The early time data of the derivative of the CHir phase is not very conclusive, but it shows a steep downward trend, indicating a high positive skin. A horizontal stabilization is apparent at middle and late times. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.32.

Selected representative parameters

The recommended transmissivity of $5.1 \cdot 10^{-6}$ m²/s was derived from the analysis of the CHir phase. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-7}$ m²/s to $6.0 \cdot 10^{-6}$ 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 5,331.8 kPa.

The analyses of the CHi and CHir phases show consistency, with the exception of the very high skin derived from the CHir phase. No further analysis is recommended.

5.2.27 Section 597.30–617.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high 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 196 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 111 mL/min at start of the CHi phase to 71 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The automatic regulation unit worked well. However, a slight change of the pressure difference occurred during the injection phase. The subsequent CHir phase shows a fast recovery. However, both phases are still amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a slight noisy, but flat derivative, indicating radial flow. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a steep downward trend followed by a kind of horizontal stabilization, indicating a high positive skin. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.33.

Selected representative parameters

The recommended transmissivity of $1.4 \cdot 10^{-7}$ m²/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-8}$ m²/s to $6.0 \cdot 10^{-7}$ 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 5,504.2 kPa.

The analyses of the CHi and CHir phases show consistency, with the exception of the relative high skin derived from the CHir phase. No further analysis is recommended.

5.2.28 Section 617.30–637.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high 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 237 kPa. During the injection the pressure rose by 20 kPa in the bottom zone, indicating a connection to the adjacent zones. The injection rate decreased from 3.4 L/min at start of the CHi phase to 1.6 L/min at the end, indicating a medium to 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 indicating an increase in transmissivity at some distance from the borehole. A two shell composite radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows downward trend, as well, and a composite radial flow model with wellbore storage and skin was used for the analysis. The analysis is presented in Appendix 2.34.

Selected representative parameters

The recommended transmissivity of $2.0 \cdot 10^{-7}$ 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 $9.0 \cdot 10^{-8}$ m²/s 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 5,663.2 kPa.

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

5.2.29 Section 625.20–645.20 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 pressure response and the recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 198 kPa. During the injection the pressure rose by 30 kPa in the bottom zone, indicating a connection to the adjacent zones. The injection rate decreased from 13 L/min at start of the CHi phase to 6 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). With the exception of some oscillations at the start 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 shows a slight horizontal stabilization at early times followed by a downward trend at middle times and a kind of a horizontal stabilization at a lower level. This is indicative for an increase in transmissivity at some distance from the borehole. With the exception of the horizontal stabilization at late times the derivative of the CHir phase is consistent to the behaviour of the CHi derivative. Both phases were analysed using a two shell composite flow model. The analysis is presented in Appendix 2.35.

Selected representative parameters

The recommended transmissivity of $1.9 \cdot 10^{-6}$ 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 $9.0 \cdot 10^{-7}$ m²/s to $9.0 \cdot 10^{-6}$ 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 5,743.2 kPa.

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

5.3 5 m single-hole injection tests

In the following, the 5 m section tests conducted in borehole KLX27A are presented and analysed.

5.3.1 Section 337.30–342.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 211 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 15 mL/min at start of the CHi phase to 4 mL/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). With the exception of the relative noisy data of the CHi phase, caused by the low flow rate, 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 and shows a downward trend at late times. The CHir phase is less noisy, but shows the same behaviour at late times, indicating a change in transmissivity or flow dimension at some distance to the borehole. A two shell composite with increasing transmissivity away from the borehole was chosen for the analysis of both phases. The analysis is presented in Appendix 2.36.

Selected representative parameters

The recommended transmissivity of $1.0 \cdot 10^{-9}$ m²/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-10}$ m²/s to $7.0 \cdot 10^{-9}$ 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 type curve extrapolation in the Horner plot to a value of 3,063.1 kPa.

Both phases show consistency. No further analysis is recommended.

5.3.2 Section 342.30–347.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 206 kPa. No hydraulic connection to the adjacent zones was observed. During the entire flow period, the injection rate oscillated between 1 and 2 mL, indicating a low interval transmissivity (consistent with the pulse recovery). The CHi data are very noisy and the results of the analysis of this phase should be regarded as order of magnitude only. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of CHi phase is too noisy and no flow model indentification is possible. The CHir derivative is less noisy, but the duration was too short to see horizontal stabilization. The phase is still in transition from wellbore dominated flow to pure formation flow. Both phases were analysed using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2.37.

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 best data quality. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-10}$ m^2/s to $7.0 \cdot 10^{-9}$ m^2/s. The flow dimension used for the analysis 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 3,127.8 kPa.

No further analysis is recommended.

5.3.3 Section 347.30–352.30 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 increased by 60 kPa in 30 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.38.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.4 Section 352.30–357.30 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 increased by 170 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m²/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.39.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m²/s.

No further analysis is recommended.

5.3.5 Section 397.30–402.30 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 increased by 193 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m²/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.40.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m²/s.

No further analysis is recommended.

5.3.6 Section 402.30–407.30 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 increased by 88 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m²/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.41.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m²/s.

No further analysis is recommended.

5.3.7 Section 407.30–412.30 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 increased by 102 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m²/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.42.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.8 Section 412.30–417.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated 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 198 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 5 mL/min at start of the CHi phase to 1.8 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). With the exception of the relative noisy data of the CHi phase, caused by the low flow rate, both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative with a kind of a horizontal stabilization at middle and late times. The CHir phase is of better quality and shows a trend to horizontal stabilization at late times, indicating radial flow. Both phases were analysed using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2.43.

Selected representative parameters

The recommended transmissivity of $8.3 \cdot 10^{-10}$ 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 $5.0 \cdot 10^{-10}$ m^2/s to $6.0 \cdot 10^{-9}$ 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 3,754.4 kPa.

Regarding the low flow rate and the quality of the CHi phase data, both phases show consistency. No further analysis is recommended.

5.3.9 Section 437.30–442.30 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 increased by 140 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.44.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.10 Section 442.30–447.30 m, test no. 1 and 2, injection

Comments to test

The first test was cancelled after the pressure in the interval kept rising during packer inflation. When running out of hole with the tool after performing the 5 m double packer tests, it was decided to stop at this test depth and repeat this test. This comment describes the second test.

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. After inflating the packers, the interval pressure increased by 60 kPa in 20 minutes and become stable. The pressure response and the recovery of the pulse test indicated 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 173 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate oscillated during the CHi phase around 1 mL/m, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate, the data of the CHi phase are very noisy and the results of the analysis of this phase should be regarded as order of magnitude only. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is too noisy to identify a flow dimension. The CHir derivative shows wellbore dominated flow. Both phases were analysed using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2.45.

Selected representative parameters

The recommended transmissivity of $1.8 \cdot 10^{-9}$ 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 $5.0 \cdot 10^{-10}$ m^2/s to $7.0 \cdot 10^{-9}$ m^2/s. The flow dimension used for the analysis 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 4,015.9 kPa.

No further analysis is recommended.

5.3.11 Section 447.30–452.30 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 increased by 232 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m²/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.46.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m²/s.

No further analysis is recommended.

5.3.12 Section 452.30–457.30 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 increased by 97 kPa in 15 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m²/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.47.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m²/s.

No further analysis is recommended.

5.3.13 Section 477.30–482.30 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 increased by 163 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m²/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.48.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m²/s.

No further analysis is recommended.

5.3.14 Section 482.30–487.30 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 increased by 64 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.49.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.15 Section 487.30–492.30 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 increased by 97 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.50.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.16 Section 492.30–497.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 21 mL/min at start of the CHi phase to 10 mL/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy but seems to be horizontal at middle and late times. The CHir derivative is of better quality and shows a horizontal stabilization at late times, indicating radial flow. Both phases were analysed using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2.51.

Selected representative parameters

The recommended transmissivity of $2.0 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality and a clear horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-9}$ m^2/s 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 4,452.1 kPa.

Both phases show consistency. No further analysis is recommended.

5.3.17 Section 497.30–502.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 37 mL/min at start of the CHi phase to 13 mL/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows an upward slope at middle and late times. This is indicative for a change in flow dimension or decreasing transmissivity away from the borehole. The CHir phase shows similar behaviour. After transition from wellbore storage and skin effects dominated flow to formation flow, the derivative shows an upward slope. In both cases the upward slope was interpreted as a change in transmissivity. Both phases were analysed using a radial two shell composite flow model. The analysis is presented in Appendix 2.52.

Selected representative parameters

The recommended transmissivity of $8.8 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHi phase (inner zone). The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-9}$ m^2/s to $8.0 \cdot 10^{-8}$ m^2/s. Though no horizontal stabilization of the derivative was reached, 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 4,492.4 kPa.

Both phases show consistency. No further analysis is recommended.

5.3.18 Section 502.30–507.30 m, test no. 1, injection

Comments to test

The test consisted of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Due to the reaction during packer inflation, no pulse test was conducted.

The CHi phase was conducted using a pressure difference of 194 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 4.5 mL/min at start of the CHi phase to about 2 mL/min at the end, indicating low interval transmissivity. Due to the low flow rate, the CHi phase is noisy and the results should be regarded as order of magnitude only. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test, the derivative of the CHi phase is noisy and no clear shape can be seen. The CHir phase was too short to reach radial flow and the derivative shows the transition from wellbore dominated flow to pure formation flow. Both phases were analysed using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2.53.

Selected representative parameters

The recommended transmissivity of $1.3 \cdot 10^{-9}$ 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 $9.0 \cdot 10^{-10}$ m^2/s to $7.0 \cdot 10^{-9}$ m^2/s. Though no horizontal stabilization of the derivative was reached, 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 4,532.8 kPa.

Both phases show consistency. No further analysis is recommended.

5.3.19 Section 507.30–512.30 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 increased by 137 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.54.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.20 Section 512.30–517.30 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 increased by 181 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.55.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.21 Section 517.30–522.30 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 increased by 266 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.56.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.22 Section 522.30–527.30 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 increased by 44 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.57.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.23 Section 527.30–532.30 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 increased by 76 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.58.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.24 Section 532.30–537.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 40 mL/min at start of the CHi phase to 24 mL/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy but shows a horizontal part at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The derivative of the CHir phase shows an upward slope at late middle times followed by a horizontal stabilization. At late times, the derivative shows a downward trend. The analysis of the CHir phase was conducted using a two shell composite flow model with wellbore storage and skin. The analysis is presented in Appendix 2.59.

Selected representative parameters

The recommended transmissivity of $1.6 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHi phase, which shows a clear horizontal stabilization. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-9}$ m^2/s 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 4,799.4 kPa.

Both phases show some inconsistencies regarding the flow model. The derived transmissivities are similar. Therefore, no further analysis is recommended.

5.3.25 Section 537.30–542.30 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 increased by 162 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.60.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m²/s.

No further analysis is recommended.

5.3.26 Section 542.30–547.30 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 increased by 279 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m²/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.61.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m²/s.

No further analysis is recommended.

5.3.27 Section 547.30–552.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 205 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 9.5 mL/min at start of the CHi phase to 4.5 mL/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). Except the noisy data 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 CHi phase is noisy and does not show a clear shape. The derivative of the CHir phase shows at late times the transition from wellbore dominated flow to formation flow. Both phases were analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2.62.

Selected representative parameters

The recommended transmissivity of $4.4 \cdot 10^{-9}$ 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 $1.0 \cdot 10^{-9}$ m²/s to $1.0 \cdot 10^{-8}$ m²/s. The analyses were conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,938.3 kPa.

No further analysis is recommended.

5.3.28 Section 552.30–557.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 199 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from approx. 3.5 mL/min at start of the CHi phase to approx. 1.5 mL/min at the end, indicating a medium to low interval transmissivity (consistent with the pulse recovery). With exception of the noise 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 noisy and does not show a clear horizontal stabilization. A flow dimension of 2 (radial flow) was assumed. The derivative of the CHir phase shows at late times the transition from wellbore dominated flow to formation flow. Both phases were analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2.63.

Selected representative parameters

The recommended transmissivity of $1.2 \cdot 10^{-9}$ 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 $9.0 \cdot 10^{-10}$ m^2/s to $7.0 \cdot 10^{-9}$ m^2/s. The analyses were conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,977.8 kPa.

No further analysis is recommended.

5.3.29 Section 557.30–562.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 175 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate oscillated during the entire CHi phase between 1 and 1.5 mL/min, indicating a low interval transmissivity (consistent with the pulse recovery). The CHi data are very noisy and therefore the quality is not good. The results of the analysis of this phase should be regarded as order of magnitude only. The data quality of the CHir phase is good and 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 and does not show a clear horizontal stabilization. A flow dimension of 2 (radial flow) was assumed. The derivative of the CHir phase shows at late times the transition from wellbore dominated flow to formation flow. Both phases were analysed using an infinite acting radial flow model. The analysis is presented in Appendix 2.64.

Selected representative parameters

The recommended transmissivity of $1.1 \cdot 10^{-9}$ 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 $6.0 \cdot 10^{-10}$ m^2/s to $6.0 \cdot 10^{-9}$ m^2/s. The analyses were conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,034.1 kPa.

Both phases show consistency. No further analysis is recommended.

5.3.30 Section 562.30–567.30 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 increased by 146 kPa in 10 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0 \cdot 10^{-11}$ m^2/s). None of the test phases is analysable.

The measured data are presented in Appendix 2.65.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.3.31 Section 567.30–572.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 194 kPa. No hydraulic connection to the adjacent zones was observed. The test was conducted with the injection vessel and N2 backpressure. The injection rate oscillates at around 1 mL/min, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate the recorded data is very noisy. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative, which does not allow a flow model identification. However, a homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at middle times and late times, which is indicative for a transition from wellbore storage and skin dominated flow to pure formation flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.66.

Selected representative parameters

The recommended transmissivity of $1.9 \cdot 10^{-9}$ 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 $6.0 \cdot 10^{-10}$ m^2/s to $6.0 \cdot 10^{-9}$ 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 5,109.5 kPa.

No further analysis is recommended.

5.3.32 Section 572.30–577.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 208 kPa. No hydraulic connection to the adjacent zones was observed. The test was conducted using the injection vessel with N2 backpressure. The injection rate decreased from approx. 6 mL/min at start of the CHi phase to approx. 3 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). With exception of the noise of the recorded flow data 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 CHi phase shows a noisy but relatively flat derivative. An infinite acting radial flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilization at late times. A homogeneous flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.67.

Selected representative parameters

The recommended transmissivity of $7.6 \cdot 10^{-10}$ 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 $6.0 \cdot 10^{-10}$ m^2/s to $8.0 \cdot 10^{-9}$ m^2/s. The analyses were conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,149.3 kPa.

The analyses of both phases show consistency. No further analysis is recommended.

5.3.33 Section 577.30–582.30 m, test no. 1, pulse injection

Comments to test

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

During the brief injection phase of the pulse injection a total volume of about 3 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 218 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $1.4 \cdot 10^{-11}$ m^3/Pa. It should be noted though that there is uncertainty connected with the determination of the wellbore storage coefficient, which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the deconvolved PI pressure derivative shows a horizontal stabilization at early times, followed by an upward trend at middle times and a new horizontal stabilization at late times. This behaviour is indicative for a change in transmissivity at some distance from the borehole. A two shell composite flow model with decreasing transmissivity was used for the analysis. The analysis is presented in Appendix 2.68.

Selected representative parameters

The recommended transmissivity of $9.4 \cdot 10^{-11}$ m^2/s was derived from the analysis of the Pi phase (outer zone). The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-11}$ to $4.0 \cdot 10^{-10}$ m^2/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the very low transmissivity.

5.3.34 Section 582.30–587.30 m, test no. 1, pulse injection

Comments to test

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

During the brief injection phase of the pulse injection a total volume of about 2 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 199 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $7.0 \cdot 10^{-12}$ m^3/Pa. It should be noted though that there is uncertainty connected with the determination of the wellbore storage coefficient, which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the deconvolved PI pressure derivative shows a horizontal stabilization at early times and middle times, indicating radial flow. The short downward trend at late times can be attributed to the uncertainty of the pulse initial pressure. Therefore, the early and middle time was considered for the analysis, only. The analysis is presented in Appendix 2.69.

Selected representative parameters

The recommended transmissivity of $2.3 \cdot 10^{-11}$ m^2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-11}$ to $1.0 \cdot 10^{-10}$ m^2/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the very low transmissivity.

5.3.35 Section 587.30–592.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 200 kPa. No hydraulic connection to the adjacent zones was observed. During the injection the flow rate was intensely oscillating. The average flow is approx. 7 mL/min, indicating a low to medium interval transmissivity (consistent with the pulse recovery). Due to the oscillations the CHi phase is not analysable. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHir shows a horizontal stabilization at middle times and a downward trend at late times, indicating an increase in transmissivity at some distance from the borehole. A two shell composite flow model with wellbore storage and skin was used for the analysis. The analysis is presented in Appendix 2.70.

Selected representative parameters

The recommended transmissivity of $3.2 \cdot 10^{-9}$ 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 $9.0 \cdot 10^{-10}$ m^2/s to $1.0 \cdot 10^{-8}$ 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 5,285.7 kPa.

No further analysis is recommended.

5.3.36 Section 592.30–597.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a relative 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 199 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 1.2 L/min at start of the CHi phase to 1.1 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). The automatic regulation unit worked well. However, the recorded data of the CHi phase is noisy. The subsequent CHir phase shows a fast recovery. Therefore, the results of the analyses should be regarded as order of magnitude, only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The early time data of the derivative of the CHir phase is not very conclusive. A kind of a horizontal stabilization is apparent at middle and late times. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.71.

Selected representative parameters

The recommended transmissivity of $2.2 \cdot 10^{-6}$ m²/s was derived from the analysis of the CHi phase, which shows slight better data quality. The confidence range for the interval transmissivity is estimated to be $7.0 \cdot 10^{-7}$ m²/s to $5.0 \cdot 10^{-6}$ 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 5,331.8 kPa.

The analyses of the CHi and CHir phases show consistency, with the exception of the high skin derived from the CHir phase. Due to the noise in the data and the fast recovery, no further analysis is recommended.

5.3.37 Section 597.30–602.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and 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 199 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 76 mL/min at start of the CHi phase to 72 mL/min at the end, indicating a low to medium interval transmissivity (consistent with the pulse recovery). The automatic regulation unit worked well. However, the recorded data of the CHi phase is noisy. The subsequent CHir phase shows a relative fast recovery. Therefore, the results of the analyses should be regarded as order of magnitude, only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The early time data of the derivative of the CHir phase is not very conclusive, but it shows a steep downward trend, indicating a high positive skin. A horizontal stabilization is apparent at middle and late times. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.72.

Selected representative parameters

The recommended transmissivity of $9.8 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-8}$ m²/s to $4.0 \cdot 10^{-7}$ 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 5,375.6 kPa.

The analyses of the CHi and CHir phases show consistency, with the exception of the very high skin derived from the CHir phase. No further analysis is recommended.

5.3.38 Section 602.30–607.30 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 approx. 40 kPa in 10 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.

The measured data is presented in Appendix 2.73.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis recommended.

5.3.39 Section 607.30–612.30 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 approx. 75 kPa in 15 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.

The measured data is presented in Appendix 2.74.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis recommended.

5.3.40 Section 612.30–617.30 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 approx. 95 kPa in 10 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.

The measured data is presented in Appendix 2.75.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis recommended.

5.3.41 Section 617.30–622.30 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 approx. 70 kPa in 10 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.

The measured data is presented in Appendix 2.76.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis recommended.

5.3.42 Section 622.30–627.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high 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 207 kPa. During the injection the pressure rose by 20 kPa in the bottom zone, indicating a connection to the adjacent zone. The injection rate decreased from 2.0 L/min at start of the CHi phase to 1.2 L/min at the end, indicating a medium to high interval transmissivity (consistent with the pulse recovery). The automatic regulation unit worked well, but the recorded data is noisy. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is noisy and does not allow flow model identification. However, an infinite acting radial flow model was used for the analysis. The derivative of the CHir phase shows a horizontal stabilization at middle times followed by an downward trend at late times indicating an increase in transmissivity at some distance from the borehole. Therefore, a composite radial flow model with wellbore storage and skin was used for the analysis. The analysis is presented in Appendix 2.77.

Selected representative parameters

The recommended transmissivity of $3.2 \cdot 10^{-7}$ 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 $1.0 \cdot 10^{-7}$ m^2/s to $2.0 \cdot 10^{-6}$ 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 5,587.1 kPa.

The analyses of the CHi and CHir phases show an inconsistency regarding the flow model, which can be attributed to the poor data quality of the CHi phase. No further analysis is recommended.

5.3.43 Section 627.30–632.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high 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 198 kPa. During the injection the pressure rose by 10 kPa in the bottom zone, indicating a connection to the adjacent zone. The injection rate decreased from 1.2 L/min at start of the CHi phase to 0.8 L/min at the end, indicating a medium to 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 at middle times and a kind of a horizontal stabilization. This is indicative for a change in transmissivity away from the test interval. The derivative of the CHir phase shows a horizontal stabilization at middle times followed by a downward trend at late times. This is consistent to the derivative of the CHi phase. Both phases were matched using a two shell composite radial flow model with increasing transmissivity. The analysis is presented in Appendix 2.78.

Selected representative parameters

The recommended transmissivity of $9.0 \cdot 10^{-7}$ 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 $5.0 \cdot 10^{-7}$ m^2/s 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 5,632.7 kPa.

Both analyses show some inconsistency regarding the inner zone transmissivity, which can be explained by the different skins derived from the analyses. However, regarding the used flow models the analyses show consistency. No further analysis is recommended.

5.3.44 Section 632.30–637.30 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a high 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 198 kPa. During the injection the pressure rose by approx. 5 kPa in the bottom zone, indicating a connection to the adjacent zone. The injection rate decreased from 1.0 L/min at start of the CHi phase to 0.7 L/min at the end, indicating a medium to 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 followed by a downward trend at middle times and a new horizontal stabilization at a lower lever at late times. This is consistent with an increase of transmissivity at some distance from the borehole. A two shell composite flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilization at middle times followed by a downward trend at late times, which is consistent to the CHi phase. A two shell composite flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.79.

Selected representative parameters

The recommended transmissivity of $7.9 \cdot 10^{-7}$ 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 $5.0 \cdot 10^{-7}$ m²/s to $4.0 \cdot 10^{-6}$ 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 5,671.5 kPa.

The analyses of both phases show consistency. No further analysis is recommended.

5.3.45 Section 637.30–642.30 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted using a pressure difference of 199 kPa. During the injection the pressure rose by approx. 110 kPa in the bottom zone, indicating a connection to the adjacent zone. The injection rate decreased from 9.5 L/min at start of the CHi phase to 5.9 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 derivatives of the CHi and CHir phase show a horizontal stabilization at early times followed by a downward trend at middle times and a new horizontal stabilization at a lower lever at late times. This is consistent with an increase of transmissivity at some distance from the borehole. A two shell composite flow model was used for the analysis of both phases. The analysis is presented in Appendix 2.80.

Selected representative parameters

The recommended transmissivity of $2.5 \cdot 10^{-6}$ 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 $9.0 \cdot 10^{-7}$ m²/s to $2.0 \cdot 10^{-5}$ 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 5,723.2 kPa.

The analyses of both phases show consistency. No further analysis is recommended.

5.3.46 Section 640.20–645.20 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 pressure response and the recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 199 kPa. During the injection the pressure rose by approx. 35 kPa in the bottom zone, indicating a connection to the adjacent zone. The injection rate decreased from 9.8 L/min at start of the CHi phase to 6.3 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 derivatives of the CHi phase shows a horizontal stabilization at early times followed by a downward trend at middle times and a new horizontal stabilization at a lower lever at late times. This indicates an increase of transmissivity at some distance from the borehole. With the exception of the horizontal stabilization at late times, the behaviour is consistent to the behaviour of the CHir phase. A two shell composite flow model was used for the analysis of both phases. The analysis is presented in Appendix 2.81.

Selected representative parameters

The recommended transmissivity of $2.7·10^{-6}$ 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 $1.0·10^{-6}$ m^2/s to $1.0·10^{-5}$ 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 5,747.7 kPa.

The analyses of both phases show consistency. No further analysis is recommended.

5.4 Single packer injection test

In the following, the single packer test conducted in borehole KLX27A is presented and analysed.

5.4.1 Section 645.20–650.56 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 pressure response and the recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 209 kPa. The test was conducted using the injection vessel wit N2 backpressure. The injection rate decreased from 5 mL/min at start of the CHi phase to 3 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate the recorded data during the injection phase is noisy. The CHir phase shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative, which does not allow a flow model identification. However, a homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at middle times and late times, which is indicative for a transition from wellbore storage and skin dominated flow to pure formation flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2.82.

Selected representative parameters

The recommended transmissivity of $5.1 \cdot 10^{-9}$ 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 $1.0 \cdot 10^{-9}$ m^2/s to $1.0 \cdot 10^{-8}$ 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 5,759.9 kPa.

No further analysis is recommended.

6 Summary of results

This 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.

6.1 General test data and results

Table 6-1. General test data from hydraulic tests in KLX27A (for nomenclature see Appendix 4 and below).

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
77.30	177.30	080118 08:23	080118 10:30	1.35E–05	1.41E–05	1,800	1,800	1,608	1,605	1,803	1,605	9.5	**CHi / CHir**
177.30	277.30	080118 13:33	080118 15:24	1.20E–05	1.44E–05	1,800	1,800	2,495	2,513	2,715	2,511	10.8	**CHi / CHir**
277.30	377.30	080118 17:05	080118 23:07	1.00E–07	1.17E–07	1,800	14,400	3,385	3,396	3,602	3,390	12.2	**CHi / CHir**
377.30	477.30	080119 09:51	080119 11:50	4.83E–08	5.50E–08	1,800	1,800	4,257	4,265	4,487	4,355	13.6	**CHi / CHir**
477.30	577.30	080119 12:09	080119 13:47	8.33E–07	1.02E–06	1,800	1,800	5,136	5,153	5,359	5,174	14.9	**CHi / CHir**
545.20	645.20	080119 15:26	080,119 17:30	1.18E–04	1.27E–04	1,800	1,800	5,723	5,749	5,956	5,749	14.8	**CHi / CHir**
77.30	97.30	080120 09:30	080120 11:28	9.32E–06	9.68E–06	1,200	1,200	896	891	1,090	892	8.2	**CHi / CHir**
97.30	117.30	080121 17:33	080121 18:57	4.17E–07	4.50E–07	1,200	1,200	1,076	1,072	1,270	1,072	8.5	**CHi / CHir**
117.30	137.30	080122 08:37	080122 10:02	8.33E–08	8.03E–08	1,200	1,200	1,253	1,244	1,442	1,244	8.8	**CHi / CHir**
137.30	157.30	080122 10:43	080122 12:18	8.83E–07	9.00E–07	1,200	1,200	1,431	1,421	1,619	1,424	9.2	**CHi / CHir**
157.30	177.30	080122 13:38	080122 15:07	1.97E–06	2.20E–06	1,200	1,200	1,608	1,612	1,812	1,630	9.4	**CHi / CHir**
177.30	197.30	080122 15:44	080122 17:07	5.33E–07	6.00E–07	1,200	10,800	1,790	1,791	1,989	1,784	9.7	**CHi / CHir**
197.30	217.30	080122 17:51	080122 22:12	1.33E–07	1.50E–07	1,200	1,200	1,963	1,968	2,167	1,973	10.0	**CHi / CHir**
217.30	237.30	080123 08:45	080123 10:20	9.13E–06	1.05E–05	1,200	1,200	2,141	2,154	2,353	2,154	10.3	**CHi / CHir**
237.30	257.30	080123 10:54	080123 12:22	2.12E–06	3.37E–06	1,200	1,200	2,321	2,362	2,616	2,452	10.6	**CHi / CHir**
257.30	277.30	080123 13:32	080123 14:43	#NV	#NV	10	7,200	2,496	2,517	2,741	2,532	10.8	**Pi**
277.30	297.30	080123 14:51	080123 16:03	1.30E–03	2.42E–08	1,200	10,800	2,675	2,701	2,902	2,689	11.1	**CHi / CHir**
297.30	317.30	080123 16:42	080123 19:21	#NV	#NV	10	3,600	2,851	2,883	3,091	2,929	11.4	**Pi**
317.30	337.30	080124 08:40	080124 09:19	#NV	#NV	#NV	#NV	3,026	#NV	#NV	#NV	11.7	**–**
337.30	357.30	080124 15:06	080124 20:02	8.33E–08	1.03E–07	1,200	1,200	3,201	3,223	3,436	3,236	12.0	**CHi / CHir**
357.30	377.30	080125 08:42	080125 10:27	#NV	#NV	#NV	#NV	3,379	#NV	#NV	#NV	12.2	**–**
377.30	397.30	080125 11:05	080125 12:42	#NV	#NV	10	10,800	3,560	3,591	3,799	3,624	12.5	**Pi**
397.30	417.30	080125 13:24	080126 08:39	3.33E–08	4.12E–08	1,200	1,200	3,734	3,759	3,957	3,801	12.8	**CHi / CHir**
417.30	437.30	080126 11:10	080126 12:01	#NV	#NV	#NV	#NV	3,910	#NV	#NV	#NV	13.1	**–**

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
437.30	457.30	080126 13:38	080126 15:00	1.83E–08	2.33E–08	1,200	1,200	4,086	4,107	4,309	4,211	13.4	**CHi / CHir**
457.30	477.30	080126 15:37	080126 16:30	#NV	#NV	#NV	#NV	4,260	#NV	#NV	#NV	13.6	**–**
477.30	497.30	080126 17:13	080126 18:43	1.85E–07	1.98E–07	1,200	1,200	4,436	4,460	4,654	4,456	13.9	**CHi / CHir**
497.30	517.30	080127 08:40	080127 10:07	2.50E–07	2.83E–07	1,200	1,200	4,614	4,629	4,828	4,651	14.2	**CHi / CHir**
517.30	537.30	080127 10:48	080127 12:13	4.50E–07	6.33E–07	1,200	1,200	4,788	4,805	5,002	4,810	14.4	**CHi / CHir**
537.30	557.30	080127 12:56	080127 14:28	1.00E–07	1.00E–07	1,200	1,200	4,964	4,980	5,194	4,982	14.7	**CHi / CHir**
557.30	577.30	080127 15:38	080127 17:20	5.67E–08	6.83E–08	1,200	1,200	5,140	5,173	5,378	5,184	15.0	**CHi / CHir**
577.30	597.30	080127 18:07	080127 19:30	1.60E–05	1.62E–05	1,200	1,200	5,315	5,331	5,529	5,531	15.2	**CHi / CHir**
597.30	617.30	080128 08:48	080128 10:10	1.18E–06	1.20E–06	1,200	1,200	5,490	5,503	5,699	5,504	15.5	**CHi / CHir**
617.30	637.30	080128 10:56	080128 12:19	2.65E–05	2.92E–05	1,200	1,200	5,665	5,681	5,918	5,683	15.7	**CHi / CHir**
625.30	645.30	080128 13:24	080128 14:44	1.05E–04	1.14E–04	1,200	1,200	5,735	5,749	5,947	5,751	15.8	**CHi / CHir**
337.30	342.30	080130 14:37	080130 16:15	6.67E–08	8.33E–08	1,200	1,200	3,071	3,085	3,296	3,101	11.8	**CHi / CHir**
342.30	347.30	080130 16:51	080130 18:32	1.67E–08	2.17E–08	1,200	1,200	3,114	3,141	3,347	3,146	11.8	**CHi / CHir**
347.30	352.30	080131 08:35	080131 09:23	#NV	#NV	#NV	#NV	3,160	#NV	#NV	#NV	12.0	**–**
352.30	357.30	080131 09:56	080131 10:33	#NV	#NV	#NV	#NV	3,203	#NV	#NV	#NV	12.0	**–**
397.30	402.30	080131 11:31	080131 12:10	#NV	#NV	#NV	#NV	3,602	#NV	#NV	#NV	12.6	**–**
402.30	407.30	080131 13:28	080131 14:07	#NV	#NV	#NV	#NV	3,646	#NV	#NV	#NV	12.7	**–**
407.30	412.30	080131 14:39	080131 15:18	#NV	#NV	#NV	#NV	3,690	#NV	#NV	#NV	12.8	**–**
412.30	417.30	080131 15:50	080131 17:29	3.00E–08	3.33E–08	1,200	1,200	3,734	3,765	3,960	3,786	12.8	**CHi / CHir**
437.30	442.30	080131 18:13	080131 18:51	#NV	#NV	#NV	#NV	3,954	#NV	#NV	#NV	13.2	**–**
442.30	447.30	080201 08:29	080201 09:11	1.67E–08	1.67E–08	1,200	1,200	3,400	4,063	4,234	4,069	13.3	**CHi / CHir**
447.30	452.30	080207 13:26	080207 15:07	#NV	#NV	#NV	#NV	4,041	#NV	#NV	#NV	13.3	**–**
452.30	457.30	080201 09:43	080201 10:22	#NV	#NV	#NV	#NV	4,086	#NV	#NV	#NV	13.4	**–**
477.30	482.30	080201 10:54	080201 11:35	#NV	#NV	#NV	#NV	4,306	#NV	#NV	#NV	13.7	**–**
482.30	487.30	080201 13:16	080201 13:54	#NV	#NV	#NV	#NV	4,350	#NV	#NV	#NV	13.8	**–**
487.30	492.30	080201 14:25	080201 15:04	#NV	#NV	#NV	#NV	4,393	#NV	#NV	#NV	13.9	**–**
492.30	497.30	080201 15:33	080201 16:12	1.83E–07	1.83E–07	1,200	3,600	4,437	4,452	4,651	4,453	13.9	**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 (m³/s)	Q_m (m³/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
497.30	502.30	080202 08:26	080202 09:50	2.17E–07	2.67E–07	1,200	1,200	4,483	4,499	4,694	4,513	14.1	**CHi / CHir**
502.30	507.30	080202 10:21	080202 11:41	3.00E–08	3.33E–08	1,200	1,200	4,526	4,552	4,749	4,557	14.1	**CHi / CHir**
507.30	512.30	080202 13:19	080202 13:57	#NV	#NV	#NV	#NV	4,569	#NV	#NV	#NV	14.2	**–**
512.30	517.30	080202 14:47	080202 15:26	#NV	#NV	#NV	#NV	4,612	#NV	#NV	#NV	14.2	**–**
517.30	522.30	080202 15:57	080202 16:34	#NV	#NV	#NV	#NV	4,657	#NV	#NV	#NV	14.3	**–**
522.30	527.30	080202 17:07	080202 17:45	#NV	#NV	#NV	#NV	4,700	#NV	#NV	#NV	14.3	**–**
527.30	532.30	080203 08:43	080203 09:22	#NV	#NV	#NV	#NV	4,748	#NV	#NV	#NV	14.5	**–**
532.30	537.30	080203 09:54	080203 11:19	4.00E–07	4.50E–07	1,200	1,200	4,791	4,806	5,005	4,811	14.5	**CHi / CHir**
537.30	542.30	080203 11:51	080203 12:29	#NV	#NV	#NV	#NV	4,834	#NV	#NV	#NV	14.6	**–**
542.30	547.30	080203 13:01	080203 13:41	#NV	#NV	#NV	#NV	4,877	#NV	#NV	#NV	14.6	**–**
547.30	552.30	080203 15:16	080203 16:41	7.67E–08	8.33E–08	1,200	1,200	4,926	4,943	5,155	4,941	14.7	**CHi / CHir**
552.30	557.30	080203 17:16	080203 19:29	2.50E–08	2.83E–08	1,200	3,600	4,965	4,985	5,184	4,980	14.7	**CHi / CHir**
557.30	562.30	080204 08:38	080204 10:17	1.67E–08	2.00E–08	1,200	1,200	5,011	5,058	5,233	5,056	14.8	**CHi / CHir**
562.30	567.30	080204 10:40	080204 11:18	#NV	#NV	#NV	#NV	5,053	#NV	#NV	#NV	14.9	**–**
567.30	572.30	080204 12:28	080204 14:07	1.83E–08	1.83E–08	1,200	1,200	5,097	5,127	5,333	5,133	14.9	**CHi / CHir**
572.30	577.30	080204 14:39	080204 16:15	5.00E–08	5.00E–08	1,200	1,200	5,141	5,162	5,370	5,183	15.0	**CHi / CHir**
577.30	582.30	080204 16:44	080204 19:23	#NV	#NV	10	7,200	5,185	5,202	5,415	5,204	15.0	**Pi**
582.30	587.30	080205 08:24	080205 10:05	#NV	#NV	10	3,600	5,229	5,251	5,454	5,269	15.1	**Pi**
587.30	592.30	080205 10:35	080205 12:03	9.50E–08	1.17E–07	1,200	1,200	5,273	5,288	5,488	5,289	15.2	**CHi / CHir**
592.30	597.30	080205 13:05	080205 14:27	1.87E–05	1.87E–05	1,200	1,200	5,317	5,331	5,530	5,331	15.3	**CHi / CHir**
597.30	602.30	080205 14:58	080205 16:19	1.20E–06	1.23E–06	1,200	1,200	5,358	5,374	5,573	5,375	15.3	**CHi / CHir**
602.30	607.30	080205 16:55	080205 17:35	#NV	#NV	#NV	#NV	5,403	#NV	#NV	#NV	15.4	**–**
607.30	612.30	080205 18:08	080205 18:47	#NV	#NV	#NV	#NV	5,447	#NV	#NV	#NV	15.4	**–**
612.30	617.30	080206 08:28	080206 09:06	#NV	#NV	#NV	#NV	5,491	#NV	#NV	#NV	15.5	**–**
617.30	622.30	080206 09:36	080206 10:16	#NV	#NV	#NV	#NV	5,534	#NV	#NV	#NV	15.6	**–**
622.30	627.30	080206 10:47	080206 12:10	1.92E–05	2.07E–05	1,200	1,200	5,578	5,598	5,805	5,597	15.6	**CHi / CHir**
627.30	632.30	080206 13:09	080206 14:32	1.32E–05	1.35E–05	1,200	1,200	5,622	5,632	5,830	5,631	15.7	**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
632.30	637.30	080206 15:07	080206 16:31	1.10E–05	1.12E–05	1,200	1,200	5,665	5,672	5,870	5,672	15.7	**CHi / CHir**
637.30	642.30	080206 17:02	080206 18:25	9.88E–05	1.04E–04	1,200	1,200	5,709	5,724	5,923	5,725	15.5	**CHi / CHir**
640.20	645.20	080207 08:33	080207 09:54	1.05E–04	1.10E–04	1,200	1,200	5,735	5,749	5,948	5,750	15.8	**CHi / CHir**
645.20	650.56	080209 13:18	080209 15:17	5.00E–08	5.17E–08	1,200	2,400	5,752	5,769	5,978	5,764	15.8	**CHi / CHir**

Nomenclature	
Q_p	Flow in test section immediately before stop of flow [m^3/s].
Q_m	Arithmetical mean flow during perturbation phase [m^3/s].
t_p	Duration of perturbation phase [s].
t_f	Duration of recovery phase [s].
p_0	Pressure in borehole before packer inflation [kPa].
p_i	Pressure in test section before start of flowing [kPa].
p_p	Pressure in test section before stop of flowing [kPa].
p_F	Pressure in test section at the end of the recovery [kPa].
Te_w	Temperature in test section.
Test phases	CHi Constant Head injection phase.
	CHir: Recovery phase following the constant head injection phase.
	Pi: Pulse injection phase.
#NV	Not analysed/no values.

Table 6-2. Results from analysis of hydraulic tests in KLX27A (for nomenclature see Appendix 4 and below).

Interval position		Stationary flow parameters		Transient analysis Flow regime		Formation parameters											Static conditions	
Up m bToC	Low m bToC	Q/s m^2/s	T_M m^2/s	Perturb. Phase	Recovery Phase	T_{f1} m^2/s	T_{f2} m^2/s	T_{s1} m^2/s	T_{s2} m^2/s	T_T m^2/s	T_{TMIN} m^2/s	T_{TMAX} m^2/s	C m^3/Pa	ξ –	dt_1 min	dt_2 min	p* kPa	h_{wif} m.a.s.l.
77.30	177.30	6.7E–07	8.7E–07	2	WBS2	8.4E–07	#NV	2.9E–06	#NV	8.4E–07	2.0E–07	4.0E–06	2.9E–10	1.6	0.43	12.58	1,604.4	10.36
177.30	277.30	5.8E–07	7.6E–07	2	WBS22	4.3E–07	#NV	2.9E–07	5.8E–07	2.9E–07	8.0E–08	7.0E–07	2.8E–09	–2.8	0.85	3.83	2,503.9	11.87
277.30	377.30	4.8E–09	6.2E–09	22	WBS22	1.6E–09	3.1E–09	1.2E–09	3.0E–09	1.6E–09	8.0E–10	5.0E–09	2.8E–10	–1.4	1.28	3.82	3,388.5	12.19
377.30	477.30	2.1E–09	2.8E–09	2	WBS2	1.3E–09	#NV	1.1E–09	#NV	1.3E–09	8.0E–10	6.0E–09	2.4E–10	0.2	0.83	21.14	#NV	#NV
477.30	577.30	4.0E–08	5.2E–08	2	WBS2	2.5E–08	#NV	2.5E–08	#NV	2.5E–08	9.0E–09	6.0E–08	1.9E–10	–1.4	3.02	15.39	5,145.7	12.75
545.20	645.20	5.6E–06	7.3E–06	22	WBS22	7.6E–06	1.9E–05	1.9E–06	9.7E–06	1.9E–06	9.0E–07	2.0E–05	5.3E–10	–4.2	1.23	3.07	5,746.3	13.90
77.30	97.30	4.6E–07	4.8E–07	2	WBS2	7.4E–07	#NV	1.9E–06	#NV	7.4E–07	1.0E–07	3.0E–06	7.1E–11	3.6	0.51	8.81	891.6	10.01
97.30	117.30	2.1E–08	2.2E–08	2	WBS2	2.8E–08	#NV	9.1E–08	#NV	2.8E–08	8.0E–09	6.0E–08	5.1E–11	3.8	1.70	11.06	1,071.1	10.21
117.30	137.30	4.1E–09	4.3E–09	2	WBS2	3.6E–09	#NV	8.5E–09	#NV	8.5E–09	2.0E–09	2.0E–08	5.9E–11	10.1	1.51	#NV	1,237.6	9.09
137.30	157.30	4.4E–08	4.6E–08	2	WBS2	6.4E–08	#NV	1.5E–07	#NV	6.4E–08	1.0E–08	2.0E–07	4.6E–11	4.6	0.74	13.83	1,422.5	9.85
157.30	177.30	9.7E–08	1.0E–07	22	WBS22	1.2E–07	7.2E–08	2.4E–07	1.3E–07	2.4E–07	7.0E–08	4.0E–07	7.5E–11	5.4	0.49	1.28	1,619.8	12.20
177.30	197.30	2.6E–08	2.8E–08	22	WBS22	1.3E–08	2.6E–08	3.6E–09	1.8E–08	1.3E–08	8.0E–09	5.0E–08	4.3E–10	–1.0	0.76	2.51	1,782.0	10.39
197.30	217.30	6.6E–09	6.9E–09	2	WBS2	5.8E–09	#NV	7.8E–09	#NV	7.8E–09	3.0E–09	5.0E–08	1.1E–10	1.6	#NV	#NV	1,960.1	10.48
217.30	237.30	4.5E–07	4.7E–07	2	WBS2	3.1E–07	#NV	2.3E–06	#NV	3.1E–07	9.0E–08	5.0E–07	4.6E–11	0.6	1.46	15.90	2,153.2	12.13
237.30	257.30	8.2E–08	8.6E–08	22	WBS22	7.3E–08	2.9E–08	8.5E–08	1.7E–08	8.5E–08	1.0E–08	2.0E–07	1.9E–09	–3.1	#NV	#NV	#NV	#NV
257.30	277.30	#NV	#NV	#NV	WBS2	#NV	#NV	2.7E–11	#NV	2.7E–11	7.0E–12	5.0E–11	4.9E–11	–2.5	#NV	#NV	#NV	#NV
277.30	297.30	1.1E–09	1.1E–09	2	WBS2	1.0E–09	#NV	5.9E–10	#NV	5.9E–10	1.0E–10	2.0E–09	5.7E–11	2.1	#NV	#NV	2,684.0	12.25
297.30	317.30	#NV	#NV	#NV	2	#NV	#NV	6.1E–11	#NV	6.1E–11	1.0E–11	1.0E–10	5.8E–11	–1.3	#NV	#NV	#NV	#NV
317.30	337.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
337.30	357.30	3.8E–09	4.0E–09	2	WBS2	1.2E–09	#NV	1.9E–09	#NV	1.9E–09	5.0E–10	5.0E–09	8.4E–11	–0.4	#NV	#NV	3,203.5	11.30
357.30	377.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–10	1.0E–11	5.0E–10	#NV	#NV	#NV	#NV	#NV	#NV
377.30	397.30	#NV	#NV	#NV	2	#NV	#NV	6.4E–11	#NV	6.4E–11	1.0E–11	1.0E–10	5.0E–11	1.2	1.68	30.60	#NV	#NV
397.30	417.30	1.7E–09	1.7E–09	2	WBS2	9.1E–10	#NV	1.5E–09	#NV	1.5E–09	5.0E–10	6.0E–09	8.6E–11	1.9	#NV	#NV	3,738.4	11.98
417.30	437.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
437.30	457.30	8.9E–10	9.3E–10	2	WBS2	8.0E–10	#NV	5.6E–10	#NV	5.6E–10	1.0E–10	5.0E–09	9.2E–11	0.7	#NV	#NV	#NV	#NV
457.30	477.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
477.30	497.30	9.4E–09	9.8E–09	2	WBS2	1.3E–08	#NV	2.2E–08	#NV	2.2E–08	6.0E–09	7.0E–08	4.5E–11	5.0	#NV	#NV	4,451.9	13.20

Interval position		Stationary flow parameters		Transient analysis Flow regime		Formation parameters											Static conditions	
Up m bToC	Low m bToC	Q/s m^2/s	T_M m^2/s	Perturb. Phase	Recovery Phase	T_{f1} m^2/s	T_{f2} m^2/s	T_{s1} m^2/s	T_{s2} m^2/s	T_T m^2/s	T_{TMIN} m^2/s	T_{TMAX} m^2/s	C m^3/Pa	ξ –	dt_1 min	dt_2 min	p* kPa	h_{wif} m.a.s.l.
497.30	517.30	1.2E–08	1.3E–08	22	WBS22	2.1E–08	8.5E–09	1.4E–08	6.2E–09	1.4E–08	6.0E–09	5.0E–08	5.6E–11	1.0	1.09	3.62	4,623.8	12.89
517.30	537.30	2.2E–08	2.3E–08	22	WBS22	1.3E–08	2.1E–08	1.7E–08	2.9E–08	1.7E–08	8.0E–09	7.0E–08	3.5E–11	0.0	1.03	5.47	4,799.7	12.92
537.30	557.30	4.6E–09	4.8E–09	2	WBS2	4.1E–09	#NV	6.7E–09	#NV	6.7E–09	2.0E–09	3.0E–07	5.6E–11	5.6	#NV	#NV	4,970.9	12.68
557.30	577.30	2.7E–09	2.8E–09	2	WBS2	1.8E–09	#NV	1.3E–09	#NV	1.3E–09	8.0E–10	6.0E–09	5.6E–11	–0.2	#NV	#NV	5,141.4	12.32
577.30	597.30	7.9E–07	8.3E–07	2	WBS2	1.5E–06	#NV	5.1E–06	#NV	1.5E–06	5.0E–07	6.0E–06	7.0E–11	5.8	1.32	14.69	5,331.8	13.97
597.30	617.30	5.9E–08	6.2E–08	2	WBS2	1.4E–07	#NV	2.5E–07	#NV	1.4E–07	5.0E–08	6.0E–07	4.0E–11	9.5	1.10	4.72	5,504.2	13.84
617.30	637.30	1.1E–06	1.2E–06	22	WBS22	4.6E–07	1.1E–06	2.0E–07	6.5E–07	2.0E–07	9.0E–08	9.0E–07	7.9E–10	–4.4	1.69	4.42	5,663.2	12.42
625.30	645.30	5.2E–06	5.4E–06	22	WBS22	3.1E–06	3.1E–05	1.9E–06	9.6E–06	1.9E–06	9.0E–07	9.0E–06	1.5E–09	–4.1	1.34	3.76	5,743.3	13.59
337.30	342.30	3.1E–09	2.6E–09	22	WBS22	1.0E–09	2.0E–09	4.3E–10	1.1E–09	1.0E–09	8.0E–10	7.0E–09	2.1E–11	–1.1	0.97	3.69	3,063.1	10.27
342.30	347.30	8.0E–10	6.6E–10	2	WBS22	7.2E–10	#NV	1.4E–09	#NV	1.4E–09	5.0E–10	7.0E–09	1.9E–11	6.0	#NV	#NV	3,127.8	12.56
347.30	352.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
352.30	357.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
397.30	402.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
402.30	407.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
407.30	412.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
412.30	417.30	1.5E–09	1.3E–09	2	WBS2	1.2E–09	#NV	8.3E–10	#NV	8.3E–10	5.0E–10	6.0E–09	2.0E–11	0.3	#NV	#NV	3,754.4	13.61
437.30	442.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
442.30	447.30	9.6E–10	7.9E–10	2	WBS2	5.4E–10	#NV	1.8E–09	#NV	1.8E–09	5.0E–10	7.0E–09	3.4E–11	10.4	#NV	#NV	4,015.9	13.42
447.30	452.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
452.30	457.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
477.30	482.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
482.30	487.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
487.30	492.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
492.30	497.30	9.0E–09	7.5E–09	2	WBS2	9.6E–09	#NV	2.0E–08	#NV	2.0E–08	5.0E–09	8.0E–08	1.3E–11	8.9	2.48	21.08	4,452.1	13.22
497.30	502.30	1.1E–08	9.0E–09	22	WBS22	8.8E–09	4.9E–09	3.0E–08	7.9E–09	8.8E–09	5.0E–09	8.0E–08	1.7E–11	0.0	0.57	2.23	4,492.4	12.88
502.30	507.30	1.5E–09	1.2E–09	2	WBS2	1.0E–09	#NV	1.3E–09	#NV	1.3E–09	9.0E–10	7.0E–09	3.0E–11	2.4	#NV	#NV	4,532.8	12.52
507.30	512.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
512.30	517.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
517.30	522.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV

Interval position		Stationary flow parameters		Transient analysis Flow regime		Formation parameters											Static conditions	
Up m bToC	Low m bToC	Q/s m^2/s	T_M m^2/s	Perturb. Phase	Recovery Phase	T_{f1} m^2/s	T_{f2} m^2/s	T_{s1} m^2/s	T_{s2} m^2/s	T_T m^2/s	T_{TMIN} m^2/s	T_{TMAX} m^2/s	C m^3/Pa	ξ –	dt_1 min	dt_2 min	p* kPa	h_{wif} m.a.s.l.
522.30	527.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
527.30	532.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
532.30	537.30	2.0E–08	1.6E–08	2	WBS22	1.6E–08	#NV	3.1E–08	1.4E–08	1.6E–08	8.0E–09	8.0E–08	1.1E–11	0.4	0.6	16.3	4,799.4	12.97
537.30	542.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
542.30	547.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
547.30	552.30	3.6E–09	2.9E–09	2	WBS2	3.5E–09	#NV	4.4E–09	#NV	4.4E–09	1.0E–09	1.0E–08	1.5E–11	3.9	#NV	#NV	4,938.3	13.79
552.30	557.30	1.2E–09	1.0E–09	2	WBS2	9.7E–10	#NV	1.2E–09	#NV	1.2E–09	9.0E–10	7.0E–09	2.2E–11	2.6	#NV	#NV	4,977.8	13.38
557.30	562.30	9.3E–10	7.7E–10	2	WBS2	7.7E–10	#NV	1.1E–09	#NV	1.1E–09	6.0E–10	6.0E–09	1.8E–11	3.8	#NV	#NV	5,034.1	14.69
562.30	567.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
567.30	572.30	8.7E–10	7.2E–10	2	WBS2	5.1E–10	#NV	1.9E–09	#NV	1.9E–09	6.0E–10	6.0E–09	1.9E–11	10.7	#NV	#NV	5,109.5	13.49
572.30	577.30	2.4E–09	2.0E–09	2	WBS2	1.4E–09	#NV	7.6E–10	#NV	7.6E–10	6.0E–10	8.0E–09	1.8E–11	–0.8	1.78	15.54	5,149.3	13.12
577.30	582.30	#NV	#NV	#NV	22	#NV	#NV	1.8E–10	9.4E–11	9.4E–11	5.0E–11	4.0E–10	1.4E–11	1.7	13.7	44.7	#NV	#NV
582.30	587.30	#NV	#NV	#NV	2	#NV	#NV	2.3E–11	#NV	2.3E–11	1.0E–11	1.0E–10	7.0E–12	1.1	1.8	26.3	#NV	#NV
587.30	592.30	4.7E–09	3.9E–09	NA	WBS22	NA	NA	3.2E–09	8.0E–09	3.2E–09	9.0E–10	1.0E–08	1.1E–11	0.6	#NV	#NV	5,285.7	13.72
592.30	597.30	9.2E–07	7.6E–07	2	WBS2	2.2E–06	#NV	3.9E–06	#NV	2.2E–06	7.0E–07	5.0E–06	2.8E–11	8.2	0.8	13.8	5,331.5	13.94
597.30	602.30	5.9E–08	4.9E–08	2	WBS2	9.8E–08	#NV	3.9E–07	#NV	9.8E–08	3.0E–08	4.0E–07	1.0E–11	5.2	0.8	14.9	5,375.6	14.02
602.30	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
607.30	612.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
612.30	617.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
617.30	622.30	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
622.30	627.30	9.1E–07	7.5E–07	2	WBS22	7.2E–07	#NV	3.2E–07	1.1E–06	3.2E–07	1.0E–07	2.0E–06	8.5E–10	–3.3	1.1	3.38	5,587.1	13.44
627.30	632.30	6.5E–07	5.4E–07	22	WBS22	3.6E–07	3.6E–06	9.0E–07	2.2E–06	9.0E–07	5.0E–07	4.0E–06	6.3E–11	3.2	0.2	0.97	5,632.7	13.69
632.30	637.30	5.5E–07	4.5E–07	22	WBS22	9.1E–07	4.6E–06	7.9E–07	2.2E–06	7.9E–07	5.0E–07	4.0E–06	3.1E–11	3.5	0.1	0.80	5,671.5	13.26
637.30	642.30	4.9E–06	4.0E–06	22	WBS22	2.7E–06	1.3E–05	2.5E–06	1.0E–05	2.5E–06	9.0E–07	2.0E–05	6.4E–10	–3.2	0.4	2.09	5,723.2	14.10
640.20	645.20	5.2E–06	4.3E–06	22	WBS22	3.0E–06	9.9E–06	2.7E–06	9.1E–06	2.7E–06	1.0E–06	1.0E–05	1.9E–09	–3.1	0.5	1.93	5,747.7	14.04
645.20	650.56	2.4E–09	2.0E–09	2	WBS2	2.4E–09	#NV	5.1E–09	#NV	5.1E–09	1.0E–09	1.0E–08	4.7E–11	10.3	0.5	13.9	5,759.9	10.59

Nomenclature	
Q/s	Specific capacity.
T_M	Transmissivity according to /Moye 1967/.
Flow regime	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.
T_f	Transmissivity derived from the analysis of the perturbation phase (CHi). In case a homogeneous flow model was used only one T_f value is reported, in case a two zone composite flow model was used both T_{f1} (inner zone) and T_{f2} (outer zone) are given.
T_s	Transmissivity derived from the analysis of the recovery phase (CHir or Pi). In case a homogeneous flow model was used only one T_s value is reported, in case a two zone composite flow model was used both T_{s1} (inner zone) and T_{s2} (outer zone) are given.
T_T	Recommended transmissivity.
T_{TMIN}	Confidence range lower limit.
T_{TMAX}	Confidence range upper limit.
C	Wellbore storage coefficient.
ξ	Skin factor (calculated based on a storativity of $1 \cdot 10^{-6}$).
dt_1	Estimated start time of evaluation.
dt_2	Estimated stop time of evaluation.
p*	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.
h_{wif}	Fresh-water head (based on transducer depth and p*).
#NV	Not analysed/no values.

Table 6-3. Results from the ri-index calculation of hydraulic tests in KLX27A (see Section 4.5.5 for details and nomenclature).

Borehole secup (m)	Borehole seclow (m)	Recommended transmissivity T_T (m²/s)	Time t_2 for radius of influence calculation (s)	Ri-index (–)	Radius of influence (m)
77.30	177.30	8.41E–07	1,800	0	91.78
177.30	277.30	2.92E–07	230	–1	25.17
277.30	377.30	1.57E–09	229	–1	6.81
377.30	477.30	1.27E–09	1,800	0	18.09
477.30	577.30	2.50E–08	1,800	0	38.11
545.20	645.20	1.94E–06	184	–1	36.18
77.30	97.30	7.36E–07	1,200	0	72.48
97.30	117.30	2.82E–08	1,200	0	32.07
117.30	137.30	8.46E–09	1,200	0	23.73
137.30	157.30	6.39E–08	1,200	0	39.34
157.30	177.30	2.35E–07	77	1	13.78
177.30	197.30	1.31E–08	151	–1	9.38
197.30	217.30	7.80E–09	1,200	0	23.26
217.30	237.30	3.13E–07	1,200	0	58.53
237.30	257.30	8.53E–08	#NV	1	#NV
257.30	277.30	2.73E–11	7,200	0	13.86
277.30	297.30	5.89E–10	10,800	0	36.57
297.30	317.30	6.26E–12	3,600	0	6.78
317.30	337.30	1.00E–11	#NV	#NV	#NV
337.30	357.30	1.94E–09	1,200	0	16.42
357.30	377.30	1.00E–10	#NV	#NV	#NV
377.30	397.30	6.36E–11	1,836	0	8.64
397.30	417.30	1.51E–09	1,200	0	15.43
417.30	437.30	1.00E–11	#NV	#NV	#NV
437.30	457.30	5.64E–10	1,200	0	12.06
457.30	477.30	1.00E–11	#NV	#NV	#NV
477.30	497.30	2.22E–08	1,200	0	30.21
497.30	517.30	1.42E–08	217	1	11.49
517.30	537.30	1.72E–08	328	–1	14.82
537.30	557.30	6.70E–09	1,200	0	22.39
557.30	577.30	1.28E–09	1,200	0	14.80
577.30	597.30	1.49E–06	1,200	0	86.46
597.30	617.30	1.36E–07	1,200	0	47.52
617.30	637.30	1.96E–07	265	–1	24.48
625.30	645.30	1.91E–06	226	–1	39.89
337.30	342.30	1.01E–09	221	–1	5.99
342.30	347.30	1.41E–09	1,200	0	15.16
347.30	352.30	1.00E–11	#NV	#NV	#NV
352.30	357.30	1.00E–11	#NV	#NV	#NV
397.30	402.30	1.00E–11	#NV	#NV	#NV
402.30	407.30	1.00E–11	#NV	#NV	#NV
407.30	412.30	1.00E–11	#NV	#NV	#NV
412.30	417.30	8.29E–10	1,200	0	13.28
437.30	442.30	1.00E–11	#NV	#NV	#NV
442.30	447.30	1.81E–09	1,200	0	16.14

Borehole secup (m)	Borehole seclow (m)	Recommended transmissivity T_T (m²/s)	Time t_2 for radius of influence calculation (s)	Ri-index (–)	Radius of influence (m)
447.30	452.30	1.00E–11	#NV	#NV	#NV
452.30	457.30	1.00E–11	#NV	#NV	#NV
477.30	482.30	1.00E–11	#NV	#NV	#NV
482.30	487.30	1.00E–11	#NV	#NV	#NV
487.30	492.30	1.00E–11	#NV	#NV	#NV
492.30	497.30	1.99E–08	1,265	0	30.18
497.30	502.30	8.76E–09	134	1	7.99
502.30	507.30	1.32E–09	1,200	0	14.92
507.30	512.30	1.00E–11	#NV	#NV	#NV
512.30	517.30	1.00E–11	#NV	#NV	#NV
517.30	522.30	1.00E–11	#NV	#NV	#NV
522.30	527.30	1.00E–11	#NV	#NV	#NV
527.30	532.30	1.00E–11	#NV	#NV	#NV
532.30	537.30	1.57E–08	1,200	0	27.70
537.30	542.30	1.00E–11	#NV	#NV	#NV
542.30	547.30	1.00E–11	#NV	#NV	#NV
547.30	552.30	4.36E–09	1,200	0	20.11
552.30	557.30	1.15E–09	3,600	0	24.96
557.30	562.30	1.09E–09	1,200	0	14.22
562.30	567.30	1.00E–11	#NV	#NV	#NV
567.30	572.30	1.89E–09	1,200	0	16.32
572.30	577.30	7.57E–10	1,200	0	12.98
577.30	582.30	9.53E–12	2,680	1	6.50
582.30	587.30	2.43E–12	3,600	0	5.35
587.30	592.30	3.21E–09	1,200	–1	18.63
592.30	597.30	2.15E–06	1,200	0	94.76
597.30	602.30	9.78E–08	1,200	0	43.76
602.30	607.30	1.00E–11	#NV	#NV	#NV
607.30	612.30	1.00E–11	#NV	#NV	#NV
612.30	617.30	1.00E–11	#NV	#NV	#NV
617.30	622.30	1.00E–11	#NV	#NV	#NV
622.30	627.30	3.21E–07	203	–1	24.23
627.30	632.30	8.99E–07	58	–1	16.75
632.30	637.30	7.87E–07	48	–1	14.78
637.30	642.30	2.50E–06	126	–1	31.84
640.20	645.20	2.72E–06	116	–1	31.19
645.20	650.56	5.08E–09	2,400	0	29.55

The Figures 6-1 to 6-3 present the transmissivity, conductivity and hydraulic freshwater head profiles.

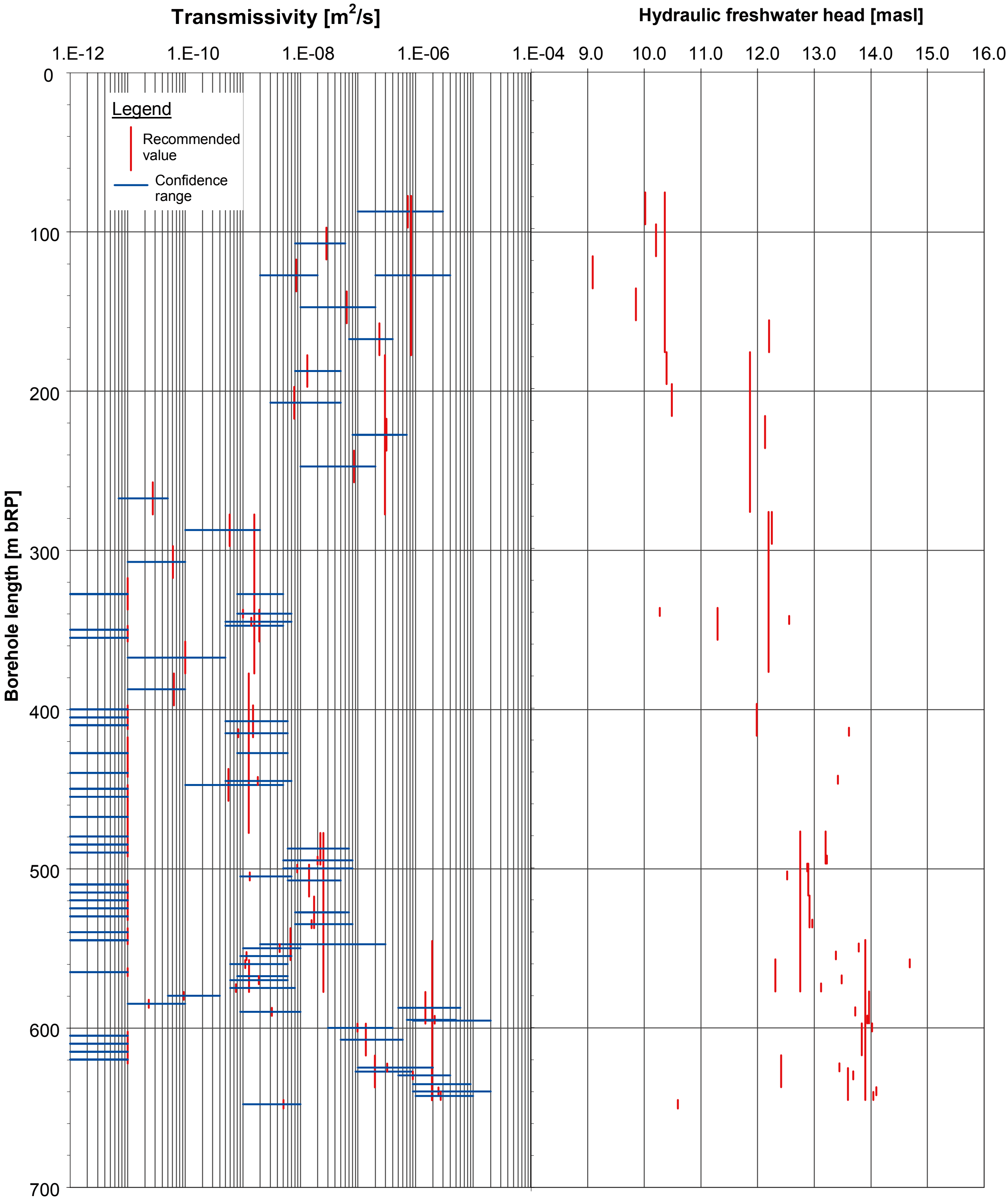


Figure 6-1. Results summary – profiles of transmissivity and equivalent freshwater head, transmissivities derived from injection tests, freshwater head extrapolated.

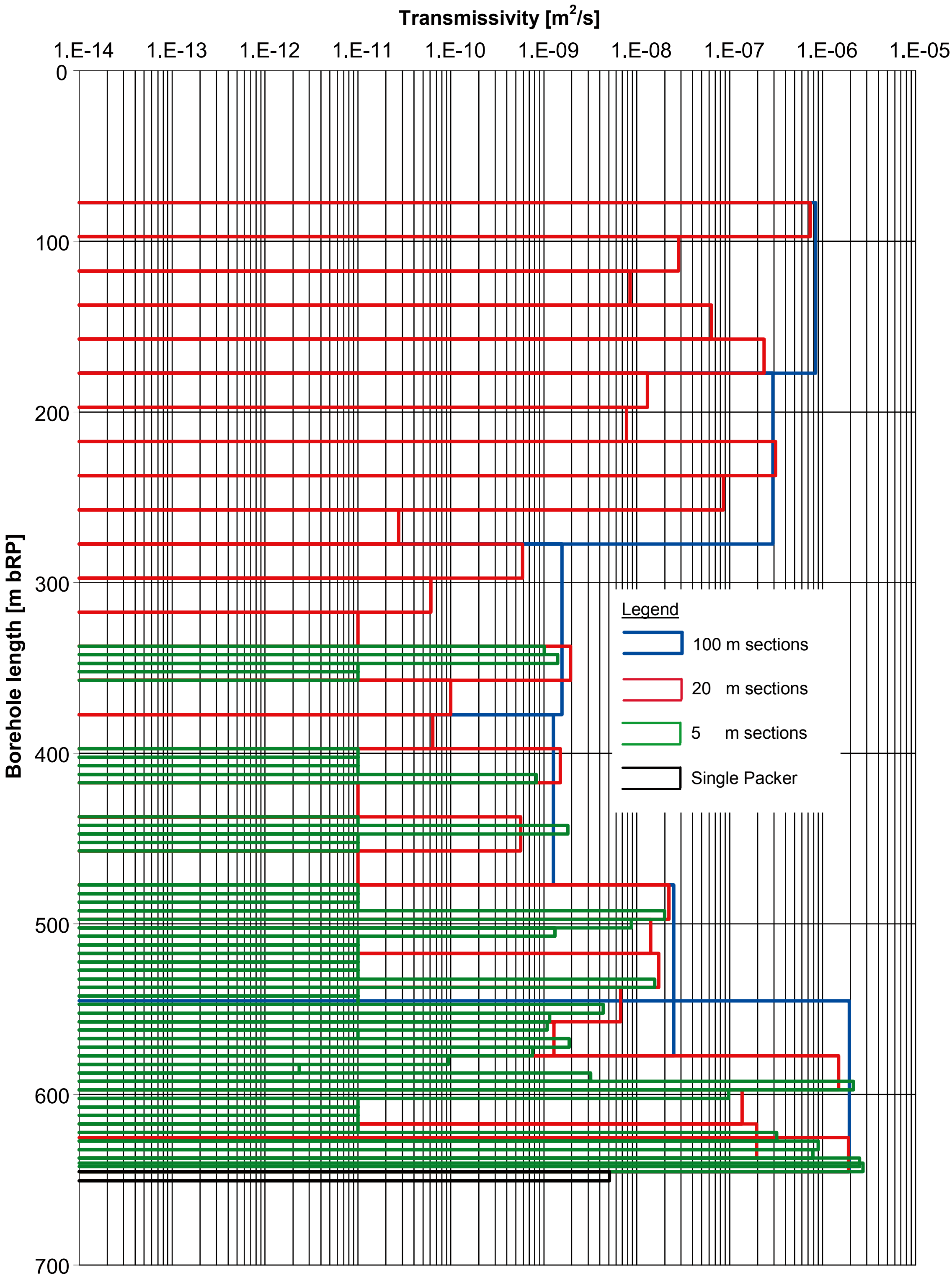


Figure 6-2. Results summary – profile of transmissivity.

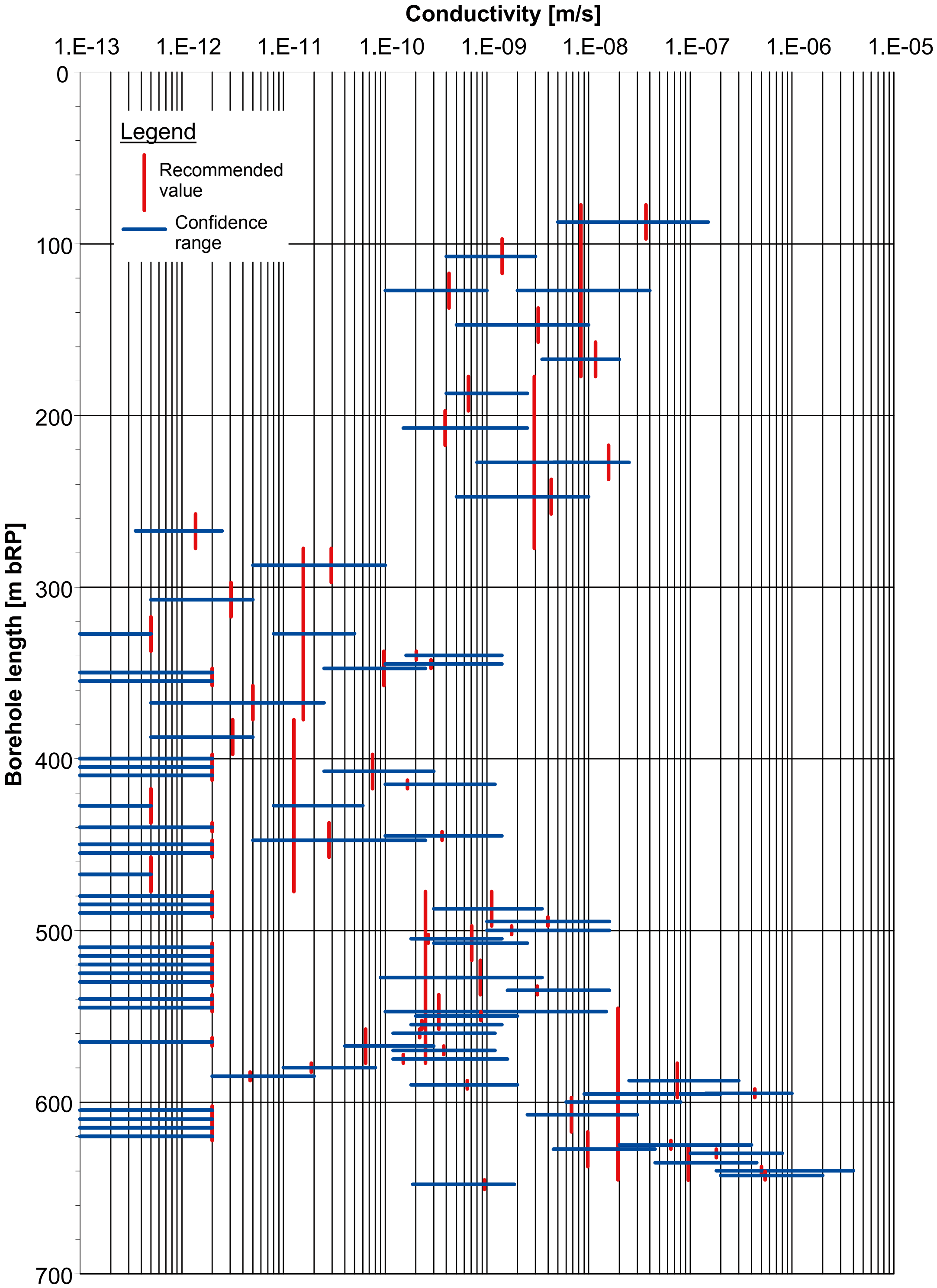


***Figure 6-3.** Results summary – profile of hydraulic conductivity.*

6.2 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.

6.2.1 Comparison of steady state and transient analysis results

The steady state derived transmissivities (T_M) and specific capacities (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 the transmissivities derived from the steady state analysis differ by less than one order of magnitude from the transmissivities derived from the transient analysis.

6.2.2 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 of a 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). The water compressibility depends on the temperature and salinity. However, for temperature and salinity values as encountered at the Oskarshamn site the water compressibility varies only slightly between $4.5 \cdot 10^{-10}$ and $5.0 \cdot 10^{-10}$ 1/Pa.

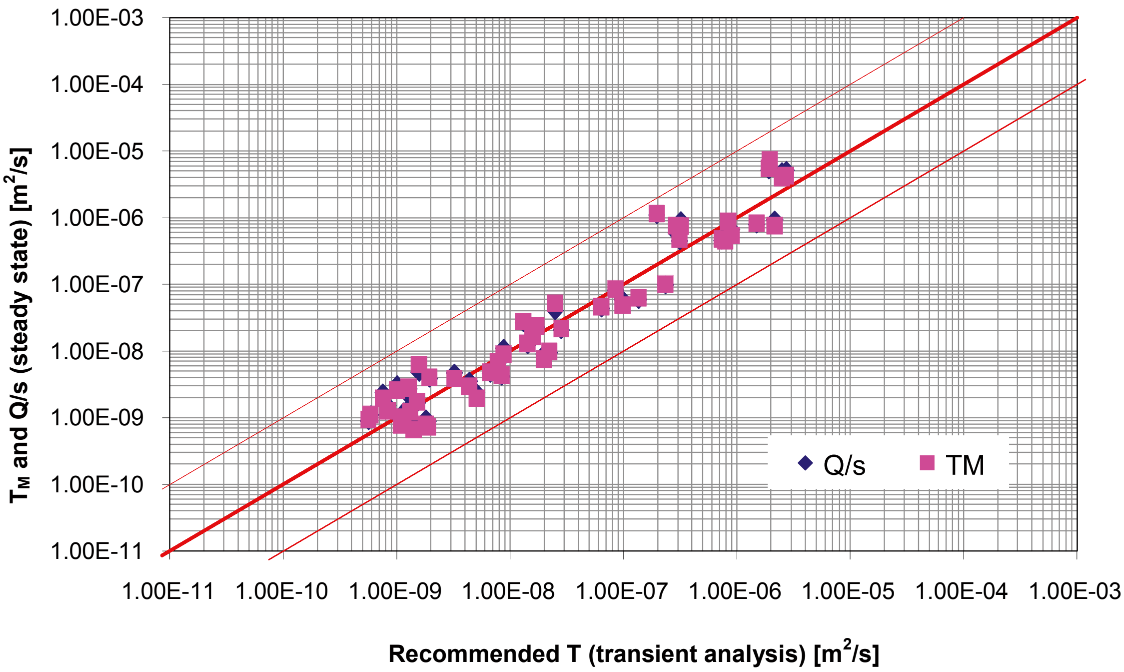


Figure 6-4. *Correlation analysis of transmissivities derived by steady state and transient methods.*

A water compressibility of $5 \cdot 10^{-10}$ 1/Pa and a rock compressibility of $1 \cdot 10^{-10}$ 1/Pa was assumed for the analysis. In addition, the test zone compressibility is influenced by the test tool (packer compliance). The test tool compressibility was calculated as follow:

$$c = \frac{\Delta V}{\Delta p} \times \frac{1}{V} \text{ [1/Pa]}$$

ΔV Volume change of 2 Packers (The volume change was estimated at $7 \cdot 10^{-7}$ m³/100 kPa based on the results of laboratory tests conducted by GEOSIGMA) [m³].

Δp Pressure change in test section (usually $2 \cdot 10^{5}$ Pa) [Pa].

V Volume in test section [m³].

The following table presents the calculated compressibilities for each relevant section length. The average value for the test tool compressibility based on different section lengths is $1 \cdot 10^{-10}$ 1/Pa.

The sum of the compressibilities (water, rock, test tool) leads to a test zone compressibility with a value of $7 \cdot 10^{-10}$ 1/Pa. This value is used for the calculation of the theoretical wellbore storage coefficient.

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 differ mainly up to two orders of magnitude from the theoretical. 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 two orders of magnitude does not seem probable. This discrepancy is not fully understood, but following hypotheses may be formulated:

- increased compressibility of the packer system,
- as shown by previous work conducted at site, the phenomenon of increased wellbore storage coefficients can be explained by turbulent flow induced by the test in the vicinity of the borehole. Considering the fact that deviations concerning the wellbore storage rather occur in test sections with a higher transmissivity (which can lead to turbulent flow) seems to rest upon this hypothesis.

Table 6-4. Test tool compressibility values based on packer displacement.

Length of test section [m]	Volume in test section [m³]	Compressibility [1/Pa]
5	0.023	$3 \cdot 10^{-10}$
20	0.091	$8 \cdot 10^{-11}$
100	0.454	$2 \cdot 10^{-11}$
Average compressibility:		$\mathbf{1 \cdot 10^{-10}}$

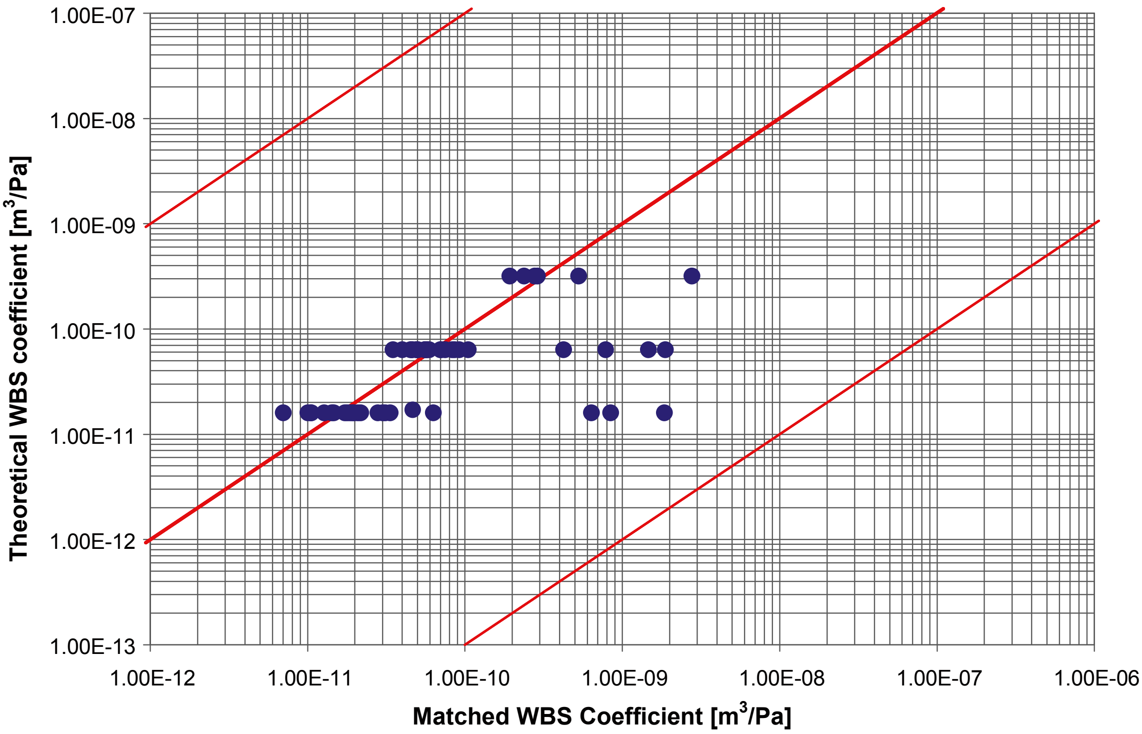


Figure 6-5. *Correlation analysis of theoretical and matched wellbore storage coefficients.*

7 Conclusions

7.1 Transmissivity

Figure 6-1 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 4.5.9.

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 few cases the tests were not analysable because the compliance phase following the packer inflation was to long or because the conducted preliminary pulse did not recover. Both responses are indicative for a very low interval transmissivity and a transmissivity value of $1 \cdot 10^{-11}$ m²/s was recommended (regarded as the upper limit of the confidence range).

If the conducted preliminary pulse injection (Pi) showed a slow recovery the pulse test was prolonged and no further injection test was performed. The pulse test was used for a quantitative analysis. In five cases the preliminary pulse was prolonged and the recommended transmissivity range from $2.3 \cdot 10^{-11}$ m²/s to $9.4 \cdot 10^{-11}$ m²/s.

The recommended transmissivities derived from the conducted injection tests (CHi and CHir) range between $5.6 \cdot 10^{-10}$ m²/s and $2.7 \cdot 10^{-06}$ m²/s.

A few of the 20 m sections show a slightly higher transmissivity than the appropriate 100 m section. The same was observed at a few of the 5 m section tests in comparison to the appropriate 20 m sections. However, the differences are small and covered by the confidence ranges. Furthermore, in a few cases the derived higher transmissivities can be explained by crossflows to the adjacent zones.

7.2 Equivalent freshwater head

Figure 6-1 presents a profile of the derived equivalent freshwater head expressed in meters above sea level. The method used for deriving the equivalent freshwater head is described in Section 4.5.8.

The head profile shows the freshwater head ranges from 9.09 m to 14.69 m. The highest freshwater head was measured between 557 m and 562 m, whereas the lowest freshwater head was measured between 117 m and 137 m.

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. In several cases, no freshwater head was calculated due to the high uncertainty of the formation pressure.

7.3 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.

8 References

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APPENDIX 1

File Description Table

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2008-01-18	17:05	277.30	377.30	__KLX27A_0277.30_200801181705.ht2	KLX27A_277.30-377.30_080118_1_CHir_Q_r.csv	Chir	10.02.2008	19.01.2008	
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2008-01-26	11:10	417.30	437.30	__KLX27A_0417.30_200801261110.ht2	KLX27A_417.30-437.30_080126_1_CHir_Q_r.csv	Chir	10.02.2008	26.01.2008	
2008-01-26	13:38	437.30	457.30	__KLX27A_0437.30_200801261338.ht2	KLX27A_437.30-457.30_080126_1_CHir_Q_r.csv	Chir	10.02.2008	26.01.2008	
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2008-01-27	18:07	577.30	597.30	__KLX27A_0577.30_200801271807.ht2	KLX27A_577.30-597.30_080127_1_CHir_Q_r.csv	Chir	10.02.2008	28.01.2008	
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2008-01-28	13:24	625.20	645.20	__KLX27A_0625.20_200801281324.ht2	KLX27A_625.20-645.20_080128_1_CHir_Q_r.csv	Chir	10.02.2008	28.01.2008	
2008-01-30	14:37	337.30	342.30	__KLX27A_0337.30_200801301437.ht2	KLX27A_337.30-342.30_080130_1_CHir_Q_r.csv	Chir	10.02.2008	30.01.2008	
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2008-01-31	18:13	437.30	442.30	__KLX27A_0437.30_200801311813.ht2	KLX27A_437.30-442.30_080131_1_CHir_Q_r.csv	Chir	10.02.2008	01.02.2008	
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2008-02-02	08:26	497.30	502.30	__KLX27A_0497.30_200802020826.ht2	KLX27A_497.30-502.30_080202_1_CHir_Q_r.csv	Chir	10.02.2008	02.02.2008	
2008-02-02	10:21	502.30	507.30	__KLX27A_0502.30_200802021021.ht2	KLX27A_502.30-507.30_080202_1_CHir_Q_r.csv	Chir	10.02.2008	02.02.2008	
2008-02-02	13:19	507.30	512.30	__KLX27A_0507.30_200802021319.ht2	KLX27A_507.30-512.30_080202_1_CHir_Q_r.csv	Chir	10.02.2008	02.02.2008	
2008-02-02	14:47	512.30	517.30	__KLX27A_0512.30_200802021447.ht2	KLX27A_512.30-517.30_080202_1_CHir_Q_r.XLS	Chir	10.02.2008	02.02.2008	
2008-02-02	15:57	517.30	522.30	__KLX27A_0517.30_200802021557.ht2	KLX27A_517.30-522.30_080202_1_CHir_Q_r.csv	Chir	10.02.2008	02.02.2008	
2008-02-02	17:07	522.30	527.30	__KLX27A_0522.30_200802021707.ht2	KLX27A_522.30-527.30_080202_1_CHir_Q_r.csv	Chir	10.02.2008	03.02.2008	
2008-02-03	08:43	527.30	532.30	__KLX27A_0527.30_200802030843.ht2	KLX27A_527.30-532.30_080203_1_CHir_Q_r.csv	Chir	10.02.2008	03.02.2008	
2008-02-03	09:54	532.30	537.30	__KLX27A_0532.30_200802030954.ht2	KLX27A_532.30-537.30_080203_1_CHir_Q_r.csv	Chir	10.02.2008	03.02.2008	
2008-02-03	11:51	537.30	542.30	__KLX27A_0537.30_200802031151.ht2	KLX27A_537.30-542.30_080203_1_CHir_Q_r.csv	Chir	10.02.2008	03.02.2008	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX17A				
TEST- AND FILEPROTOCOL					**Testorder dated : 2008-01-16**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2008-02-03	13:01	542.30	547.30	__KLX27A_0542.30_200802031301.ht2	KLX27A_542.30-547.30_080203_1_CHir_Q_r.csv	Chir	10.02.2008	03.02.2008	
2008-02-03	15:16	547.30	552.30	__KLX27A_0547.30_200802031516.ht2	KLX27A_547.30-552.30_080203_1_CHir_Q_r.csv	Chir	10.02.2008	03.02.2008	
2008-02-03	17:16	552.30	557.30	__KLX27A_0552.30_200802031716.ht2	KLX27A_552.30-557.30_080203_1_CHir_Q_r.csv	Chir	10.02.2008	04.02.2008	
2008-02-04	08:38	557.30	562.30	__KLX27A_0557.30_200802040838.ht2	KLX27A_557.30-562.30_080204_1_CHir_Q_r.csv	Chir	10.02.2008	04.02.2008	
2008-02-04	10:40	562.30	567.30	__KLX27A_0562.30_200802041040.ht2	KLX27A_562.30-567.30_080204_1_CHir_Q_r.csv	Chir	10.02.2008	04.02.2008	
2008-02-04	12:28	567.30	572.30	__KLX27A_0567.30_200802041228.ht2	KLX27A_567.30-572.30_080204_1_CHir_Q_r.csv	Chir	10.02.2008	04.02.2008	
2008-02-04	14:39	572.30	577.30	__KLX27A_0572.30_200802041439.ht2	KLX27A_572.30-577.30_080204_1_CHir_Q_r.csv	Chir	10.02.2008	04.02.2008	
2008-02-04	16:44	577.30	582.30	__KLX27A_0577.30_200802041644.ht2	KLX27A_577.30-582.30_080204_1_Pi_Q_r.csv	Pi	10.02.2008	05.02.2008	
2008-02-05	08:24	582.30	587.30	__KLX27A_0582.30_200802050824.ht2	KLX27A_582.30-587.30_080205_1_Pi_Q_r.csv	Pi	10.02.2008	05.02.2008	
2008-02-05	10:35	587.30	592.30	__KLX27A_0587.30_200802051035.ht2	KLX27A_587.30-592.30_080205_1_CHir_Q_r.csv	Chir	10.02.2008	05.02.2008	
2008-02-05	13:05	592.30	597.30	__KLX27A_0592.30_200802051305.ht2	KLX27A_592.30-597.30_080205_1_CHir_Q_r.csv	Chir	10.02.2008	05.02.2008	
2008-02-05	14:58	597.30	602.30	__KLX27A_0597.30_200802051458.ht2	KLX27A_597.30-602.30_080205_1_CHir_Q_r.csv	Chir	10.02.2008	05.02.2008	
2008-02-05	16:55	602.30	607.30	__KLX27A_0602.30_200802051655.ht2	KLX27A_602.30-607.30_080205_1_CHir_Q_r.csv	Chir	10.02.2008	05.02.2008	
2008-02-05	18:08	607.30	612.30	__KLX27A_0607.30_200802051808.ht2	KLX27A_607.30-612.30_080205_1_CHir_Q_r.csv	Chir	10.02.2008	06.02.2008	
2008-02-06	08:28	612.30	617.30	__KLX27A_0612.30_200802060828.ht2	KLX27A_612.30-617.30_080206_1_CHir_Q_r.csv	Chir	10.02.2008	06.02.2008	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX17A				
TEST- AND FILEPROTOCOL					Testorder dated : 2008-01-16				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2008-02-06	09:36	617.30	622.30	__KLX27A_0617.30_200802060936.ht2	KLX27A_617.30-622.30_080206_1_CHir_Q_r.csv	Chir	10.02.2008	06.02.2008	
2008-02-06	10:47	622.30	627.30	__KLX27A_0622.30_200802061047.ht2	KLX27A_622.30-627.30_080206_1_CHir_Q_r.csv	Chir	10.02.2008	06.02.2008	
2008-02-06	13:09	627.30	632.30	__KLX27A_0627.30_200802061309.ht2	KLX27A_627.30-632.30_080206_1_CHir_Q_r.csv	Chir	10.02.2008	06.02.2008	
2008-02-06	15:07	632.30	637.30	__KLX27A_0632.30_200802061507.ht2	KLX27A_632.30-637.30_080206_1_CHir_Q_r.csv	Chir	10.02.2008	06.02.2008	
2008-02-06	17:02	637.30	642.30	__KLX27A_0637.30_200802061702.ht2	KLX27A_637.30-642.30_080206_1_CHir_Q_r.csv	Chir	10.02.2008	07.02.2008	
2008-02-07	08:33	640.20	645.20	__KLX27A_0640.20_200802070833.ht2	KLX27A_640.20-645.20_080207_1_CHir_Q_r.csv	Chir	10.02.2008	07.02.2008	
2008-02-07	13:26	442.30	447.30	__KLX27A_0442.30_200802071326.ht2	KLX27A_442.30-447.30_080207_2_CHir_Q_r.csv	Chir	10.02.2008	07.02.2008	
2008-02-09	13:18	645.20	650.56	__KLX27A_0645.20_200802091318.ht2	KLX27A_645.20-650.56_080209_1_CHir_Q_r.csv	Chir	10.02.2008	10.02.2008	

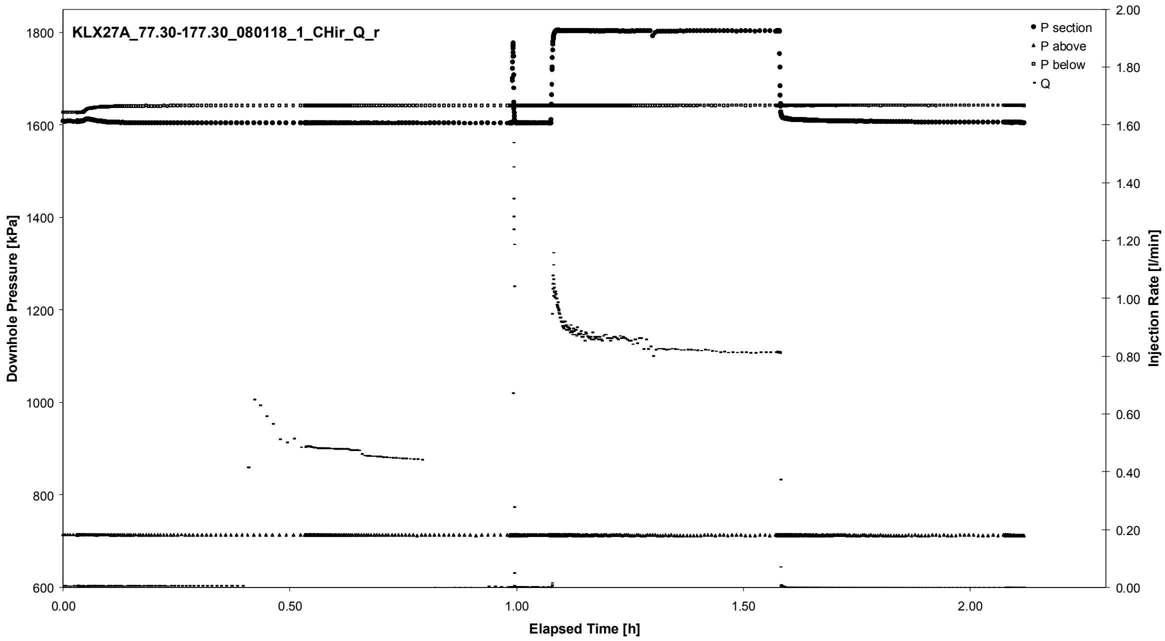
APPENDIX 2

Analysis diagrams

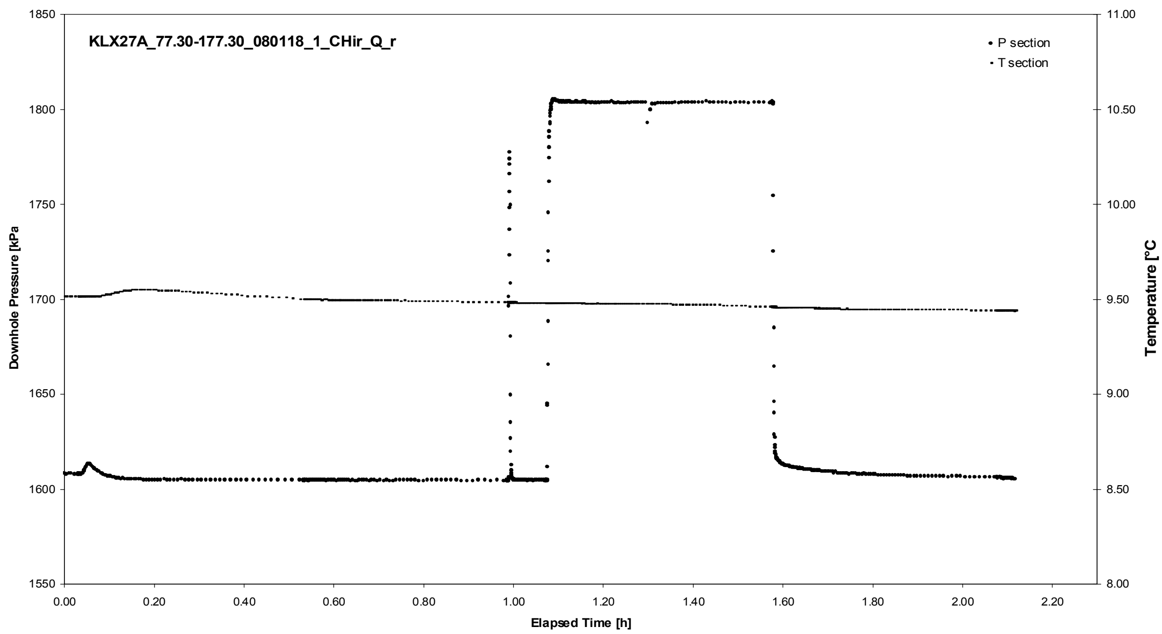
APPENDIX 2-1

Test 77.30 – 177.30 m

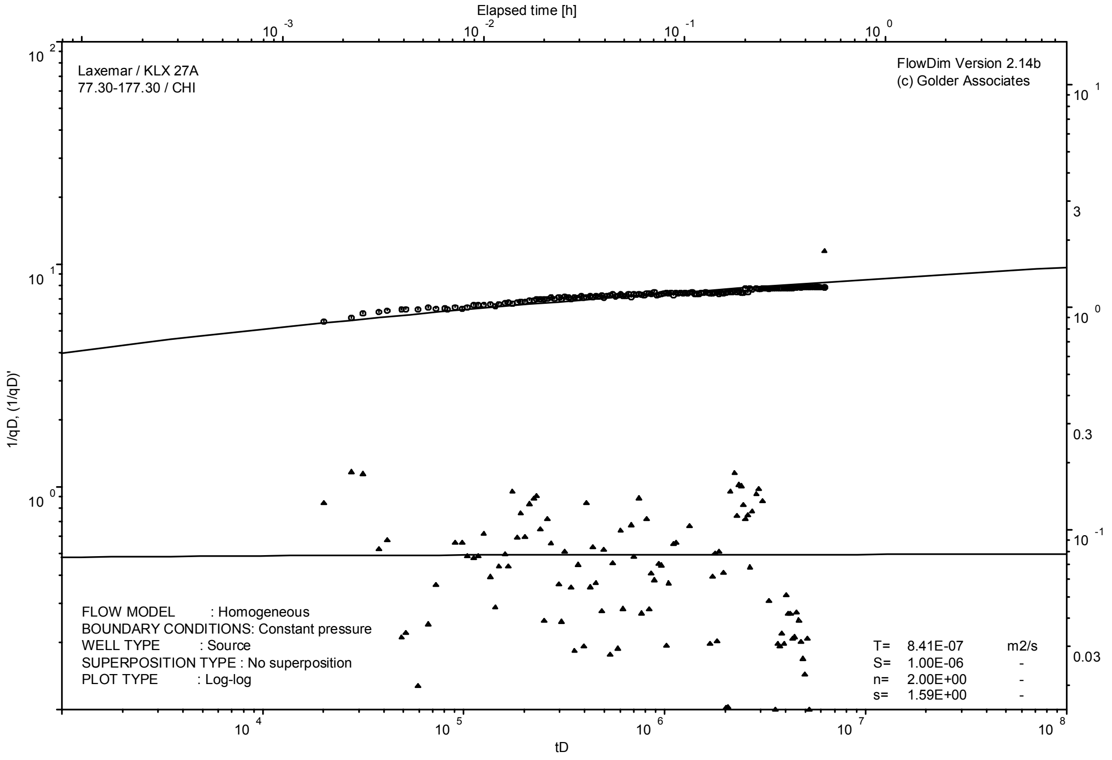
Analysis diagrams



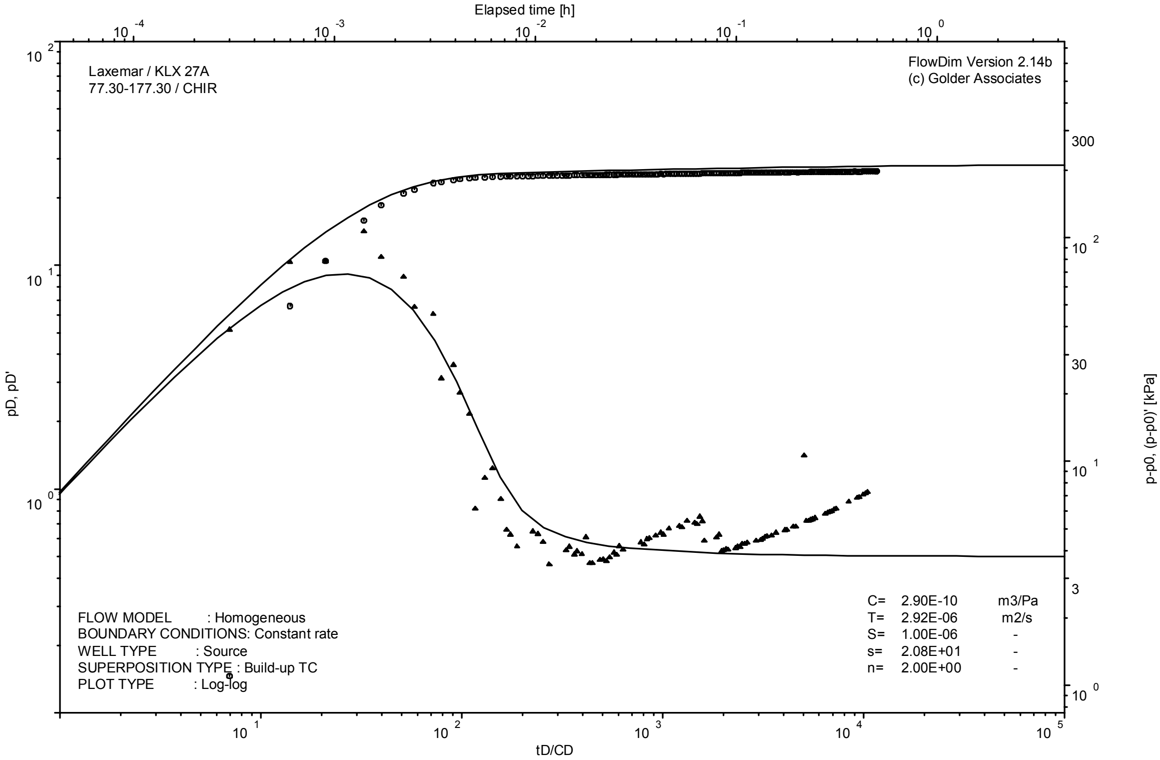
Pressure and flow rate vs. time; cartesian plot



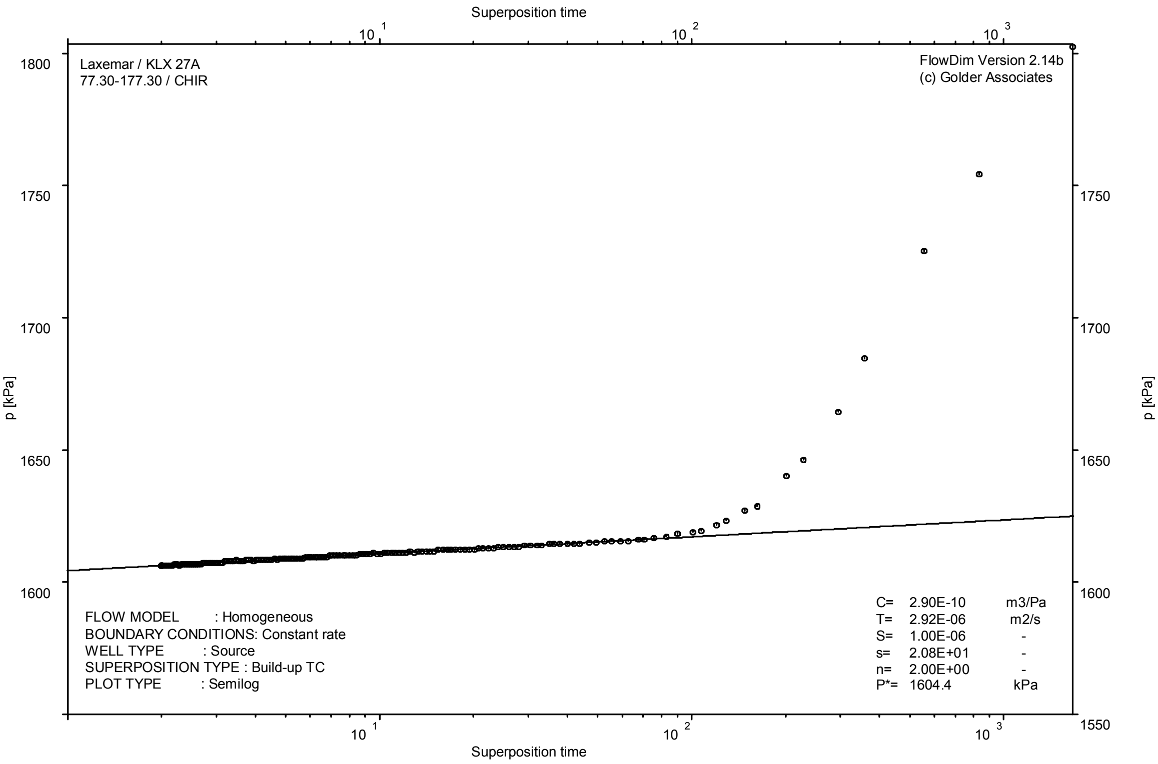
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

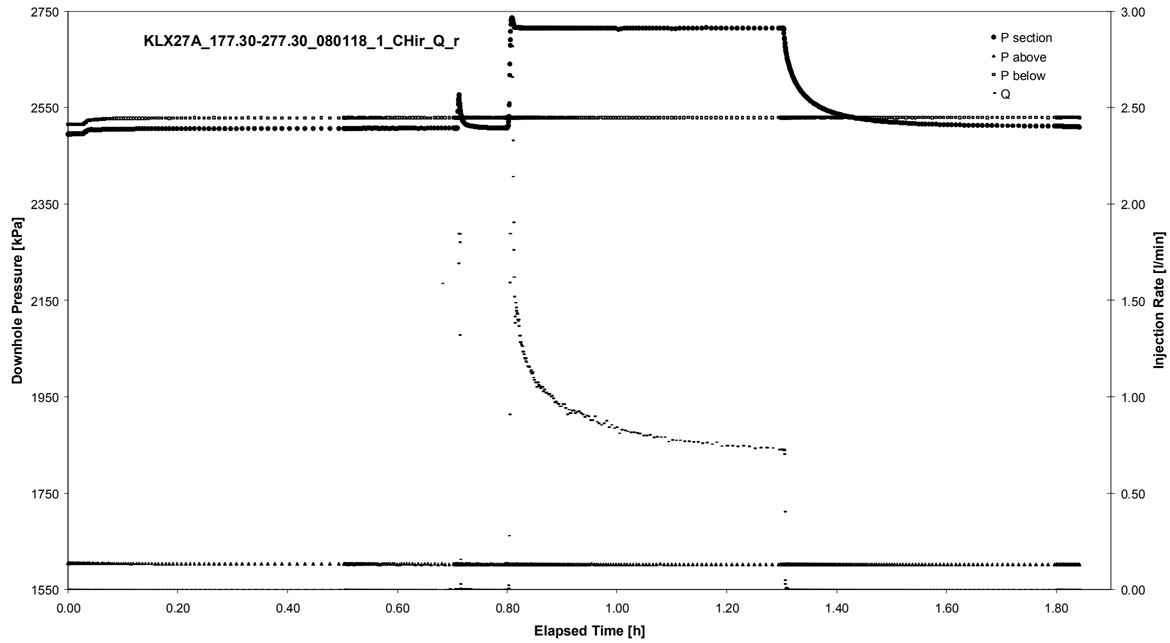


CHIR phase; HORNER match

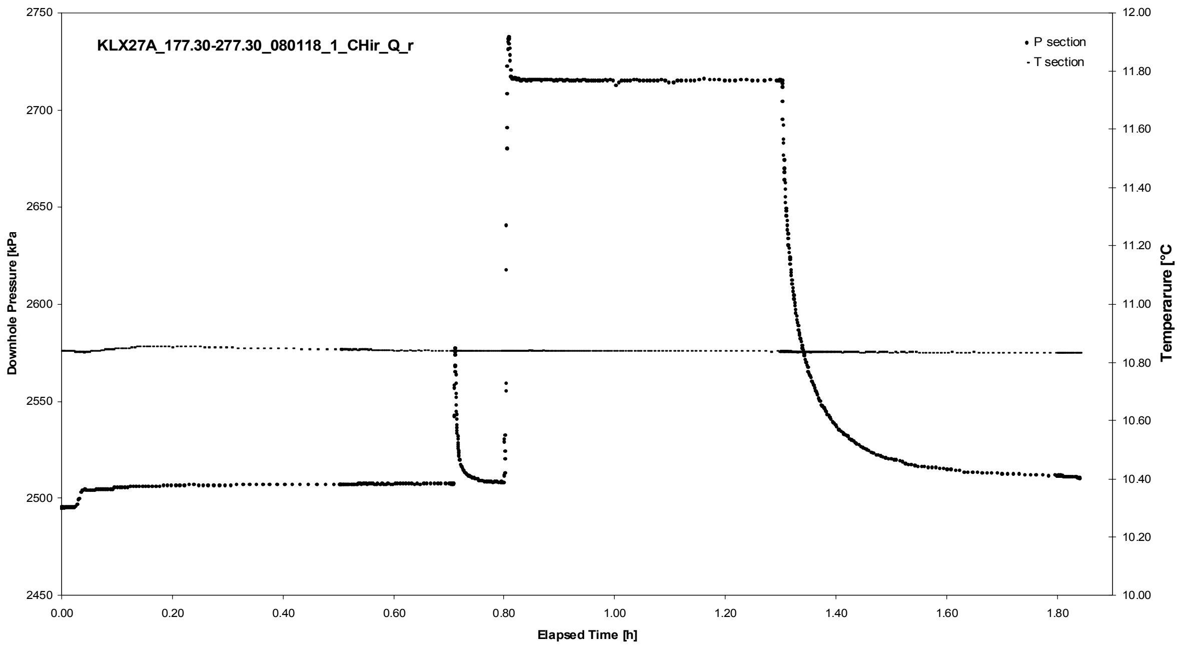
APPENDIX 2-2

Test 177.30 – 277.30 m

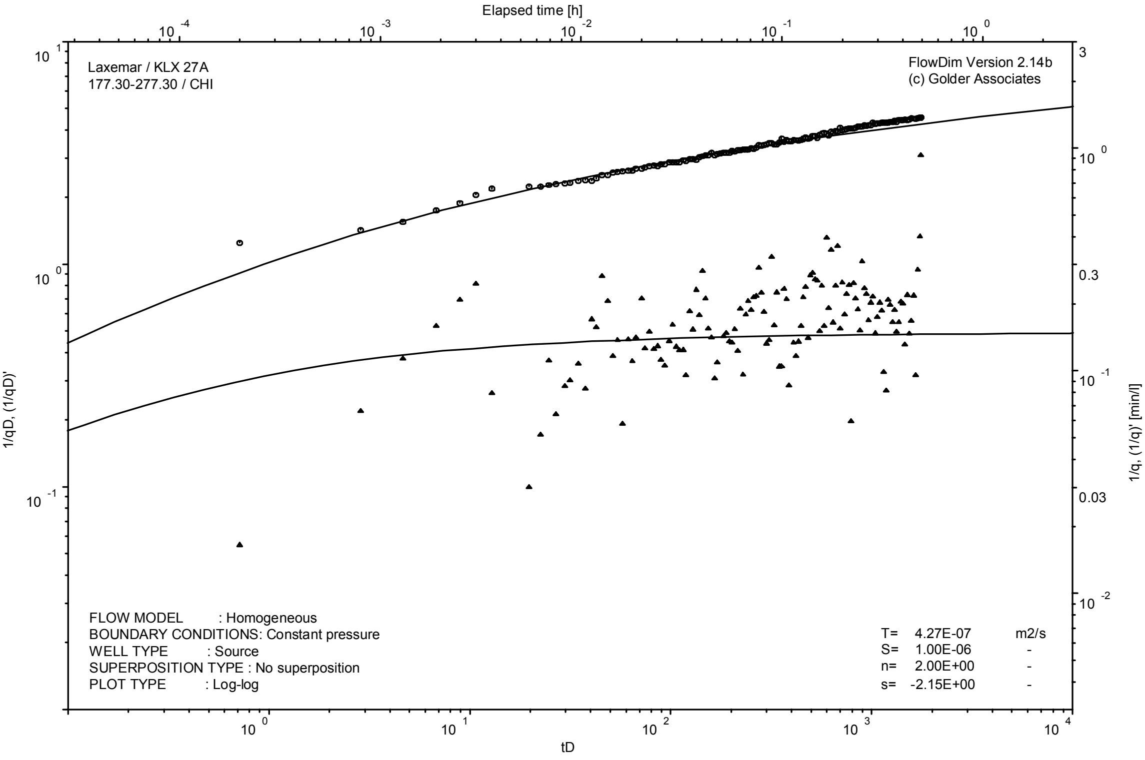
Analysis diagrams



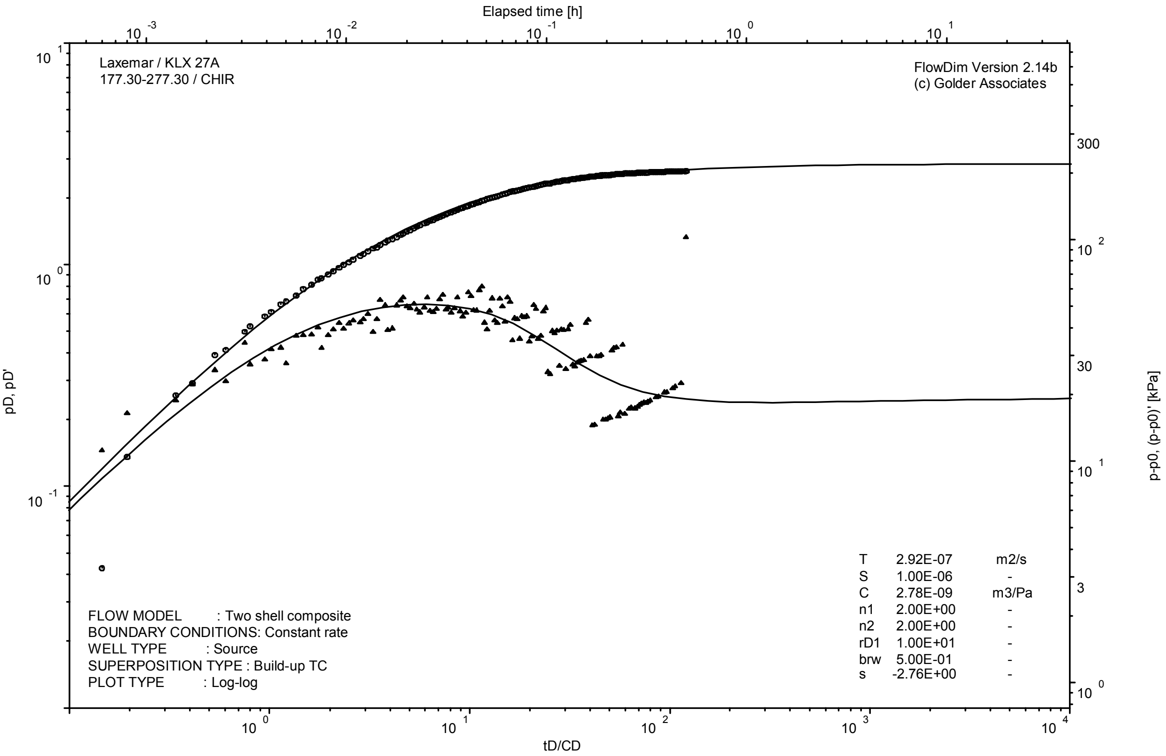
Pressure and flow rate vs. time; cartesian plot



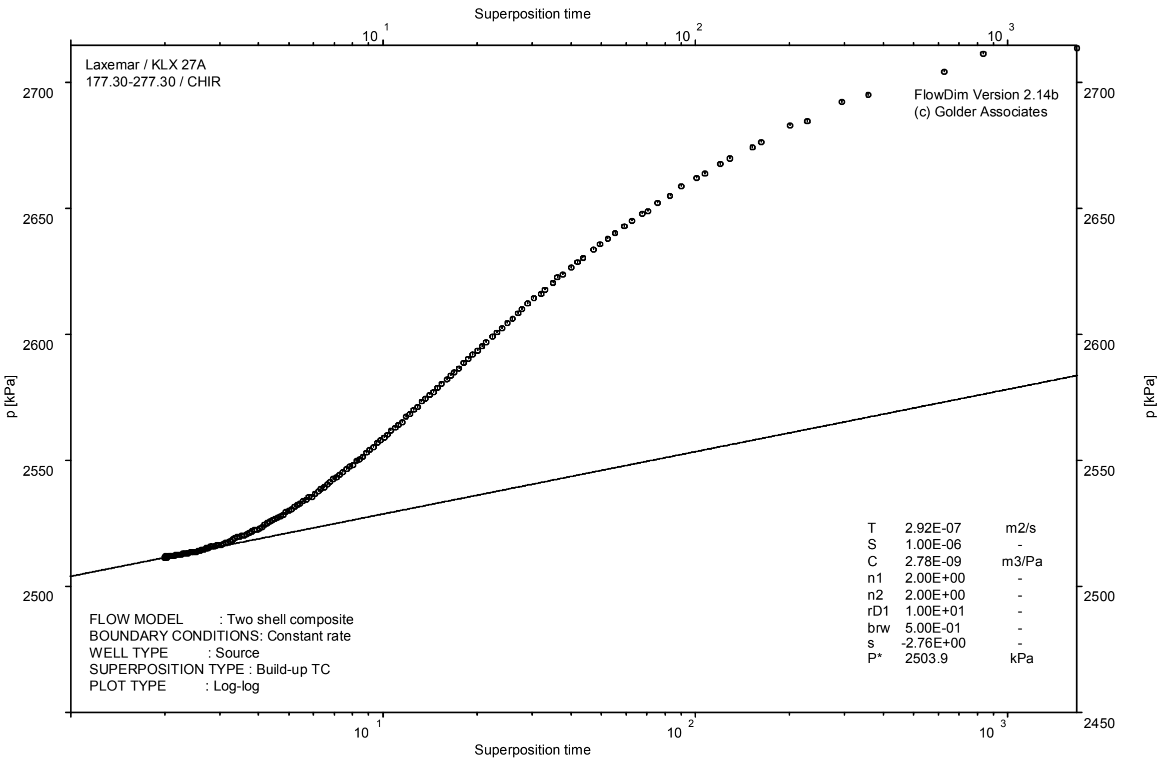
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

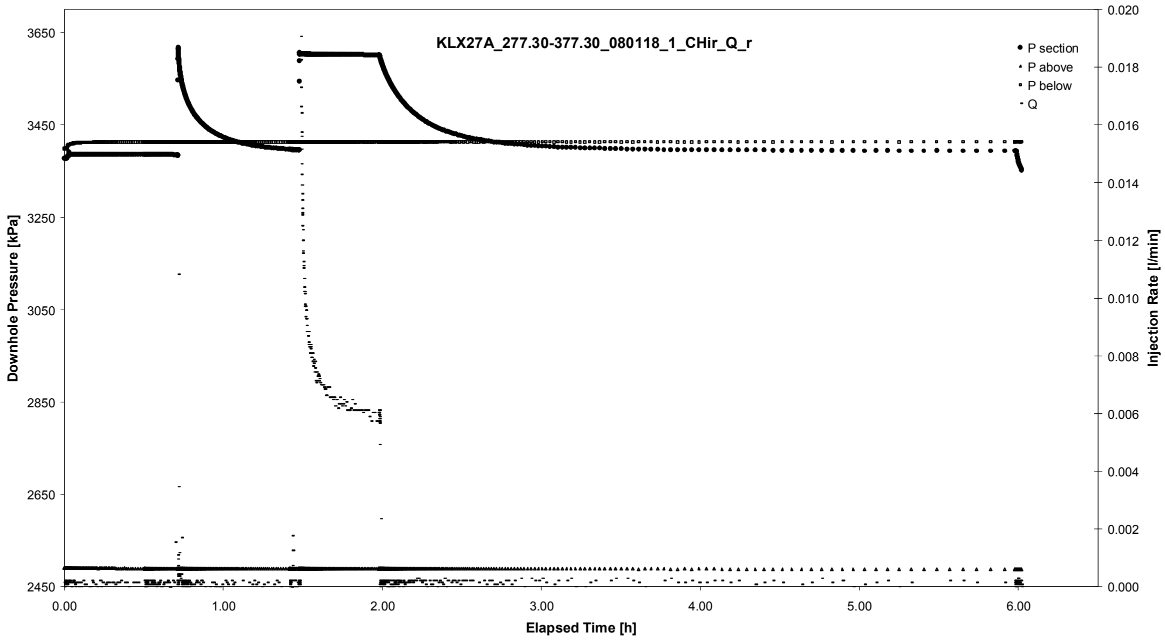


CHIR phase; HORNER match

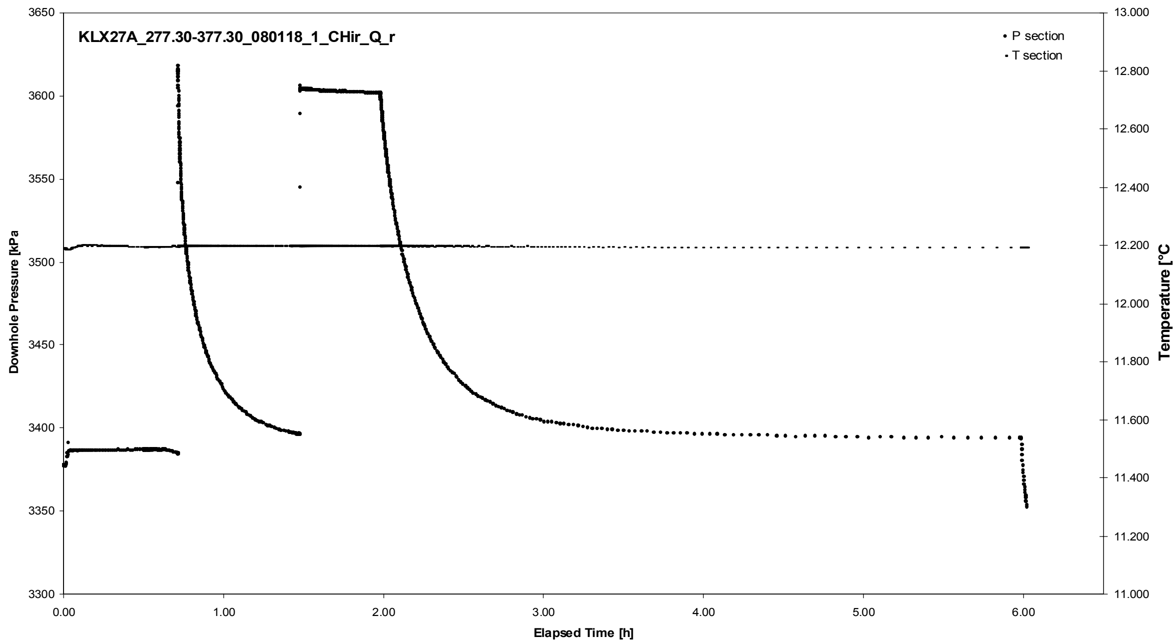
APPENDIX 2-3

Test 277.30 – 377.30 m

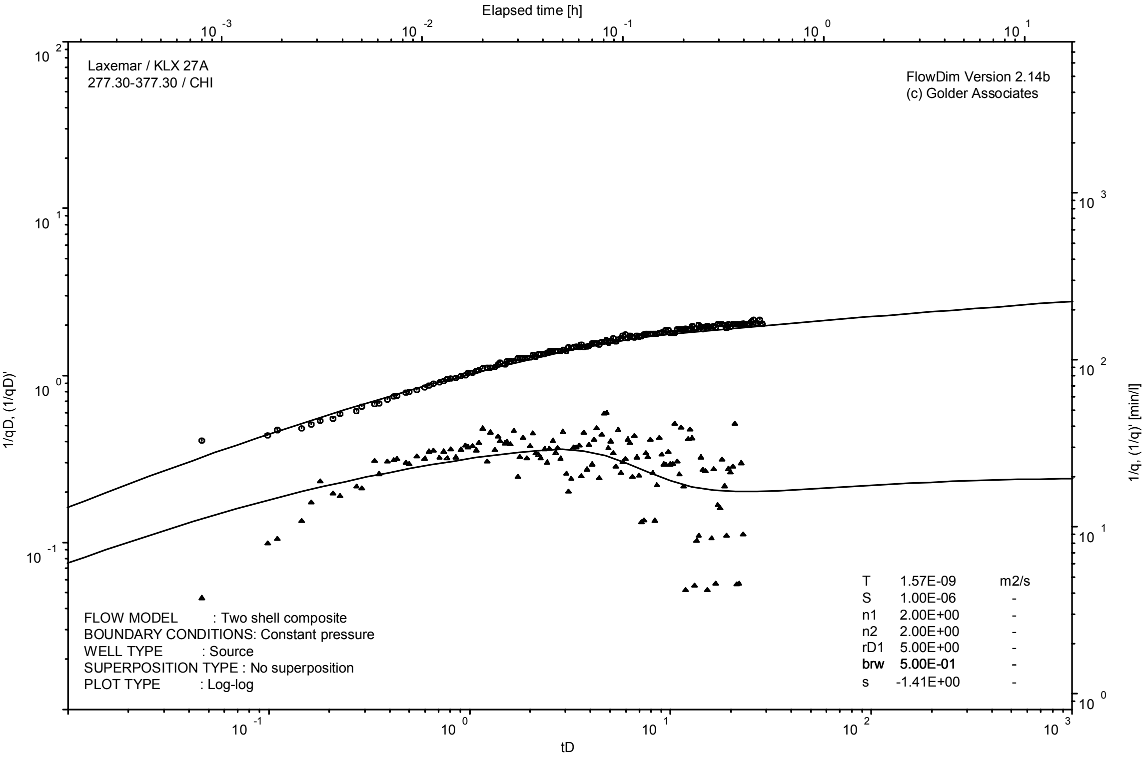
Analysis diagrams



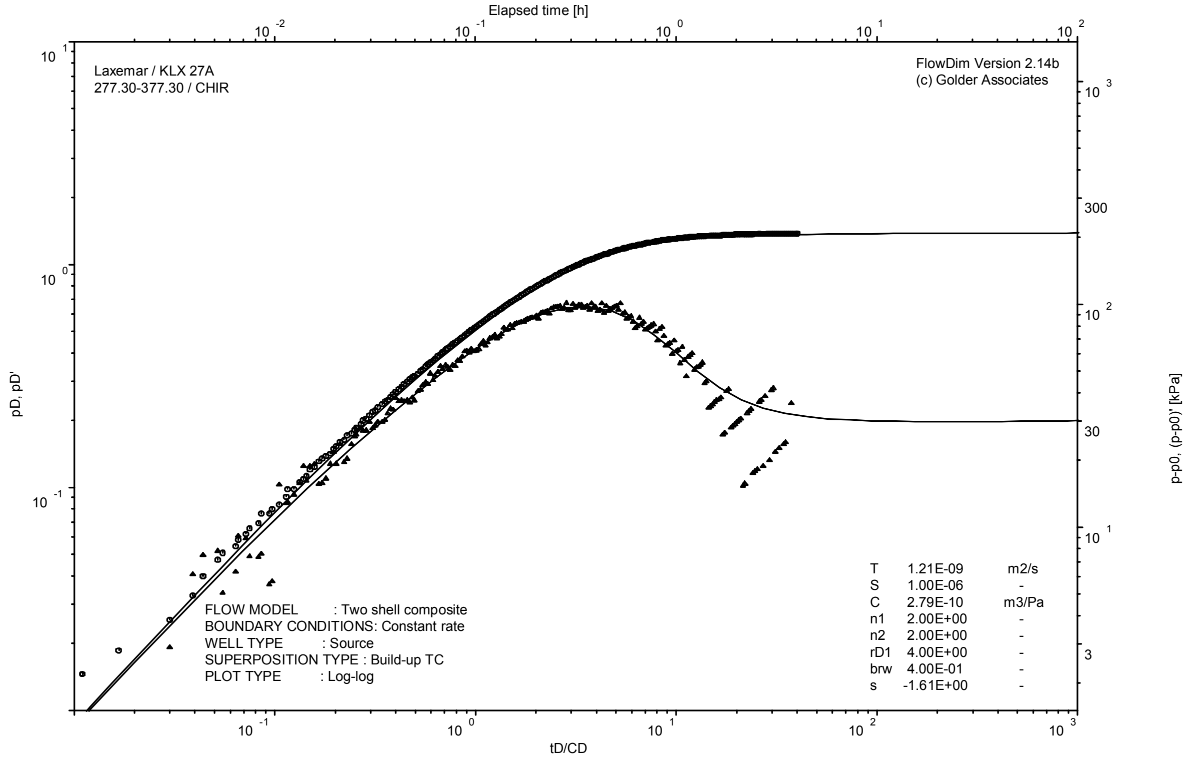
Pressure and flow rate vs. time; cartesian plot



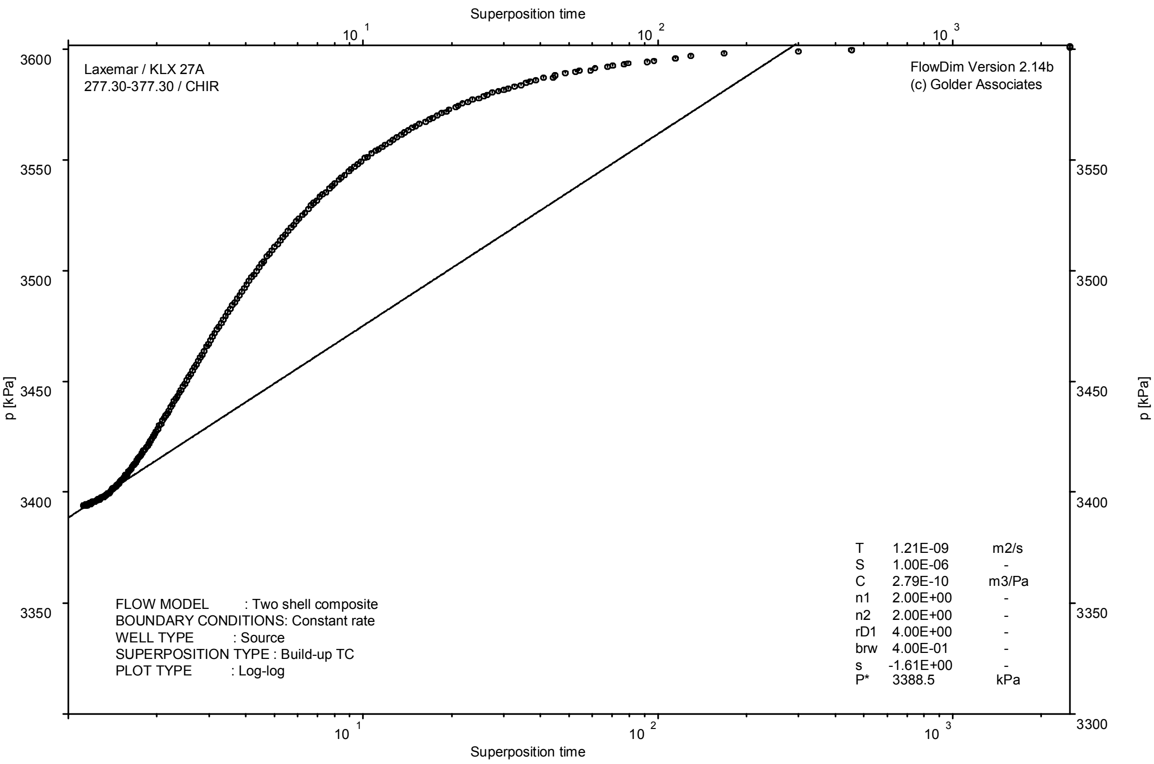
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

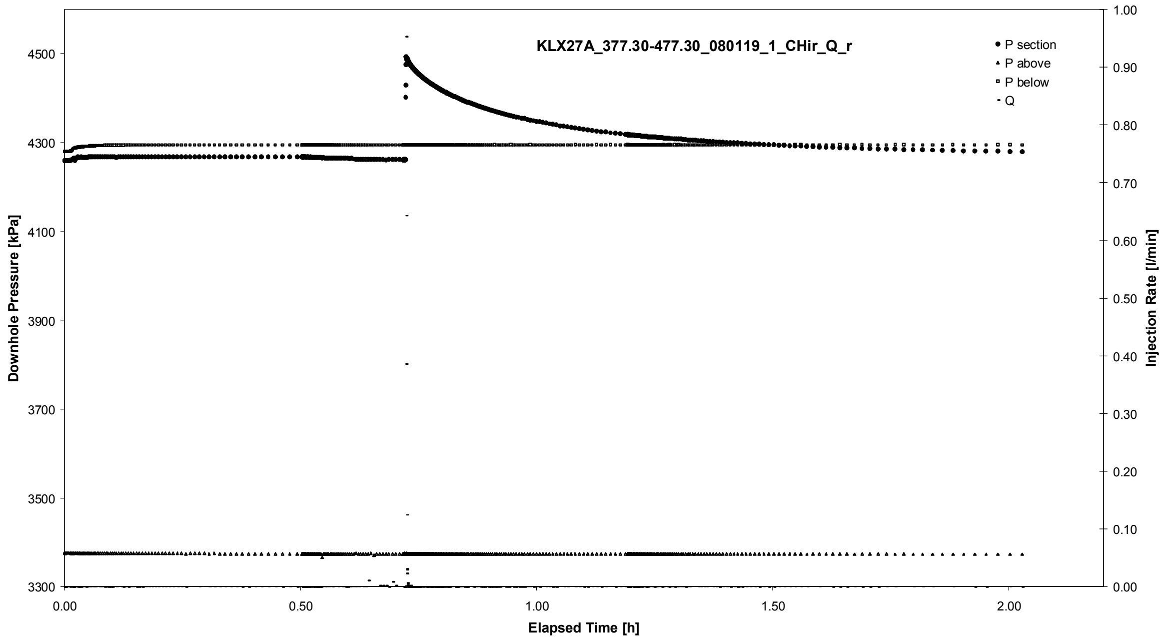


CHIR phase; HORNER match

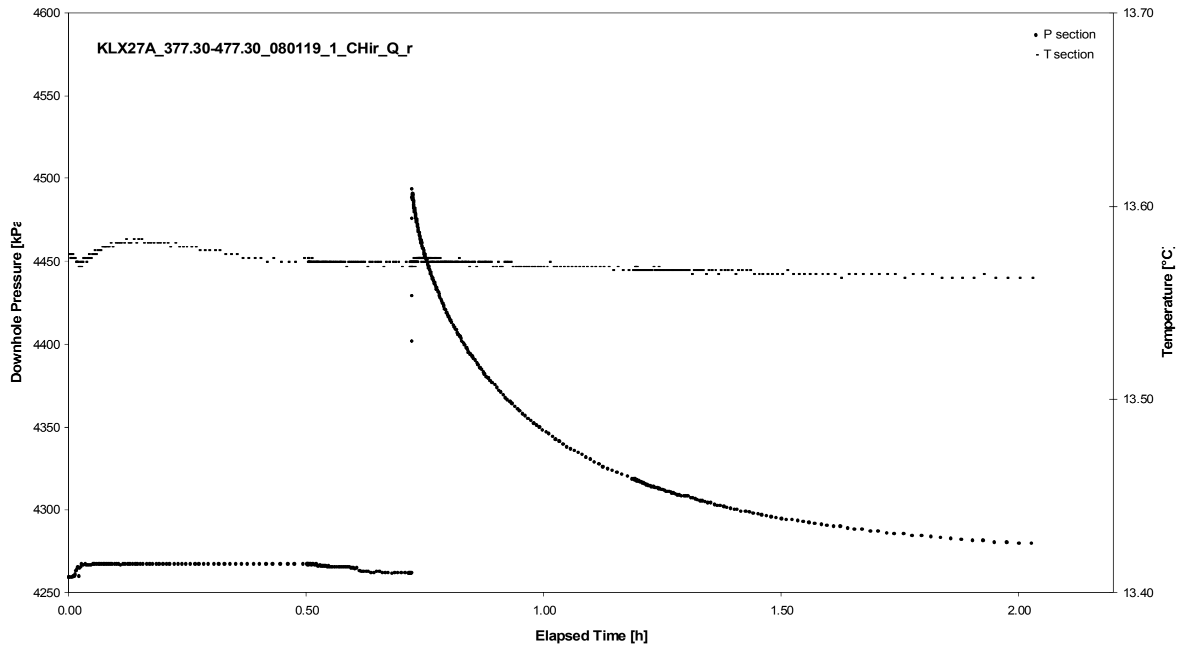
APPENDIX 2-4

Test 377.30 – 477.30 m

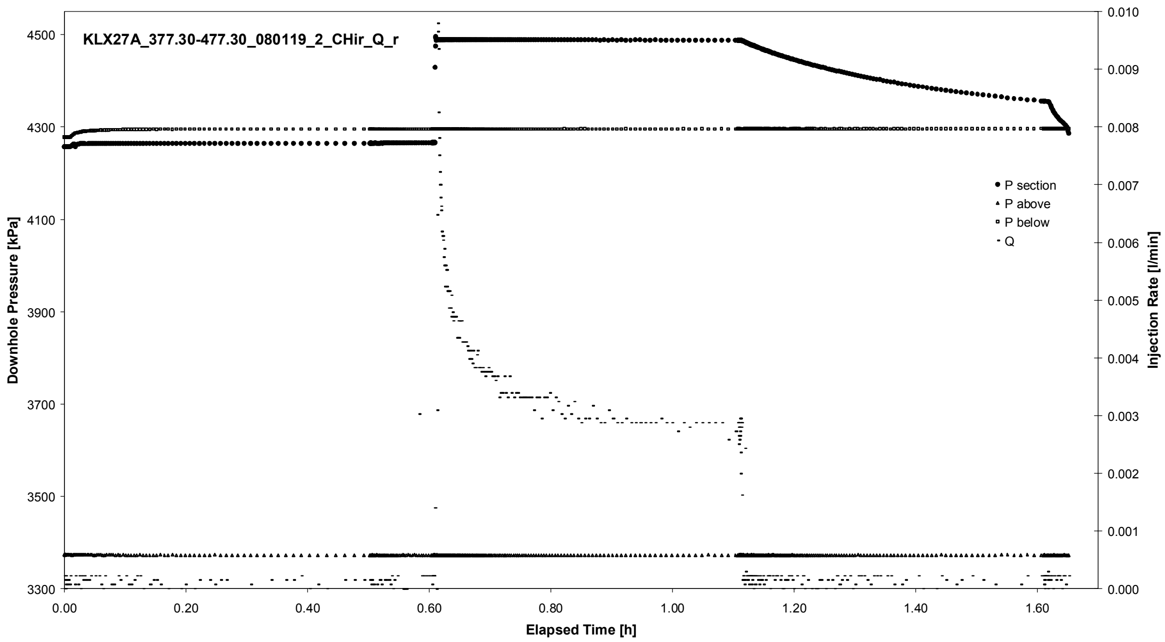
Analysis diagrams



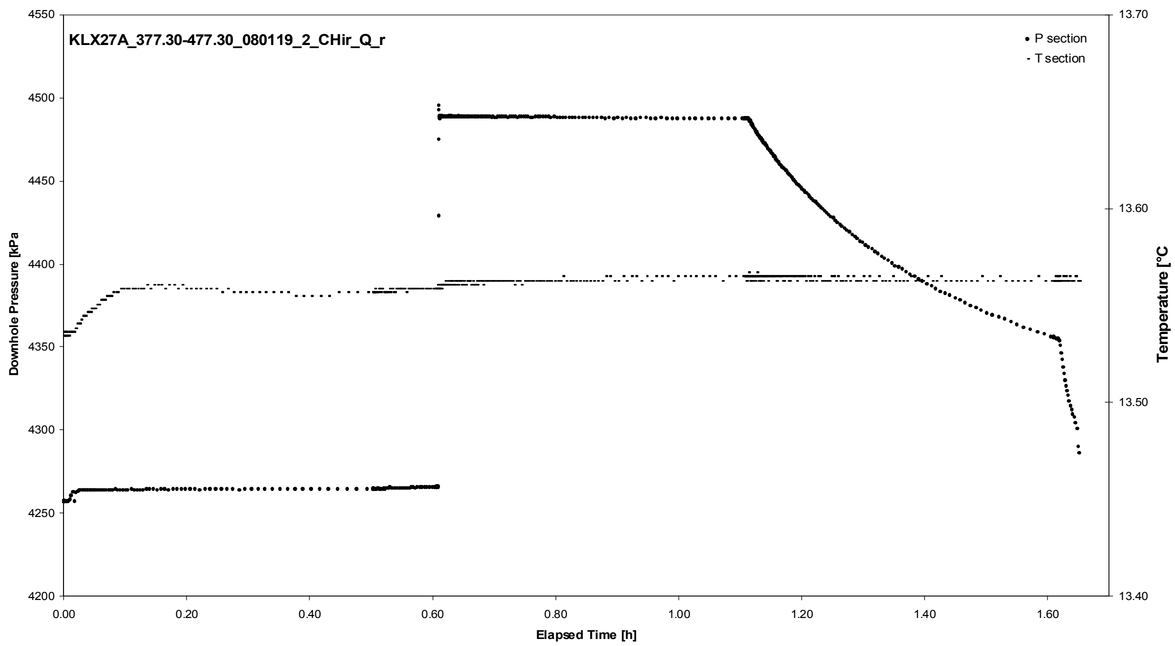
Pressure and flow rate vs. time; cartesian plot (repeated)



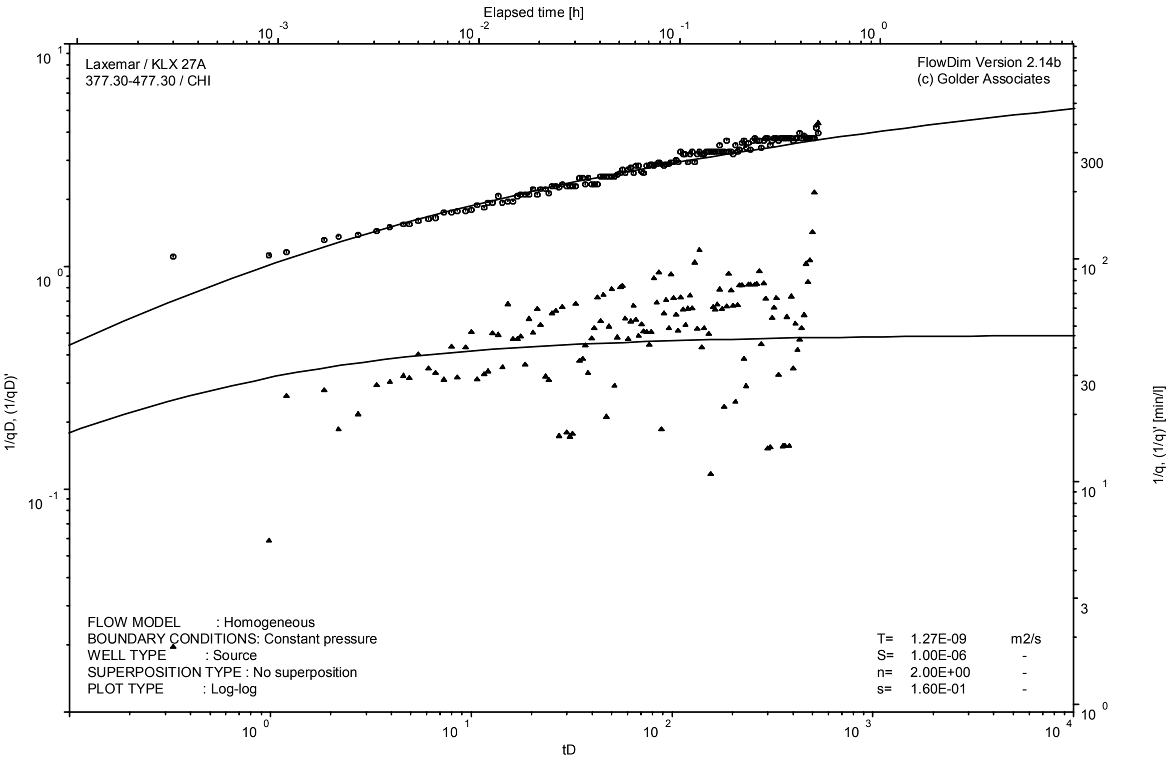
Interval pressure and temperature vs. time; cartesian plot (repeated)



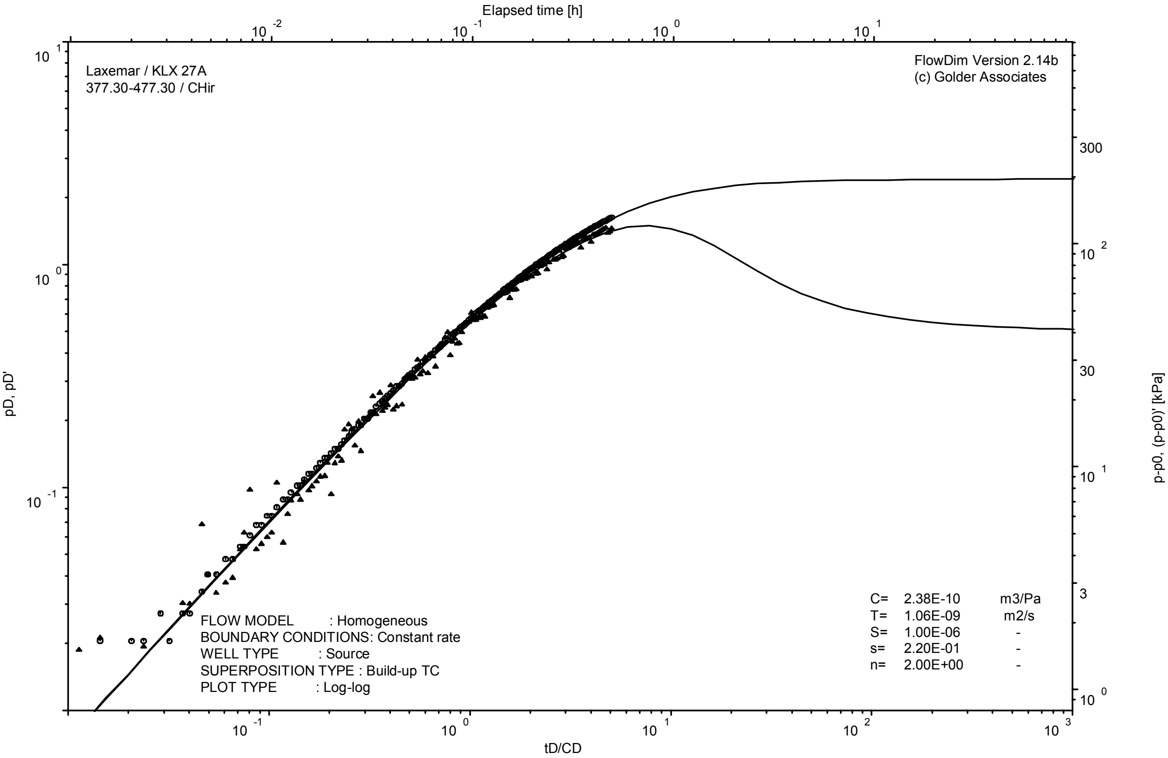
Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

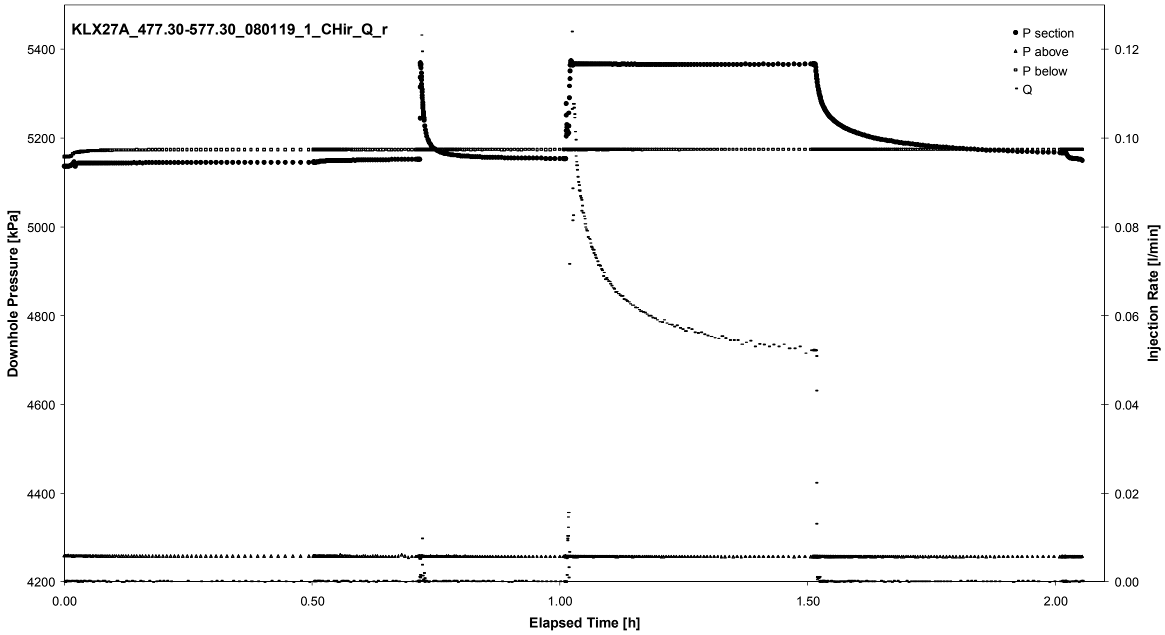
Not Analysable

CHIR phase; HORNER match

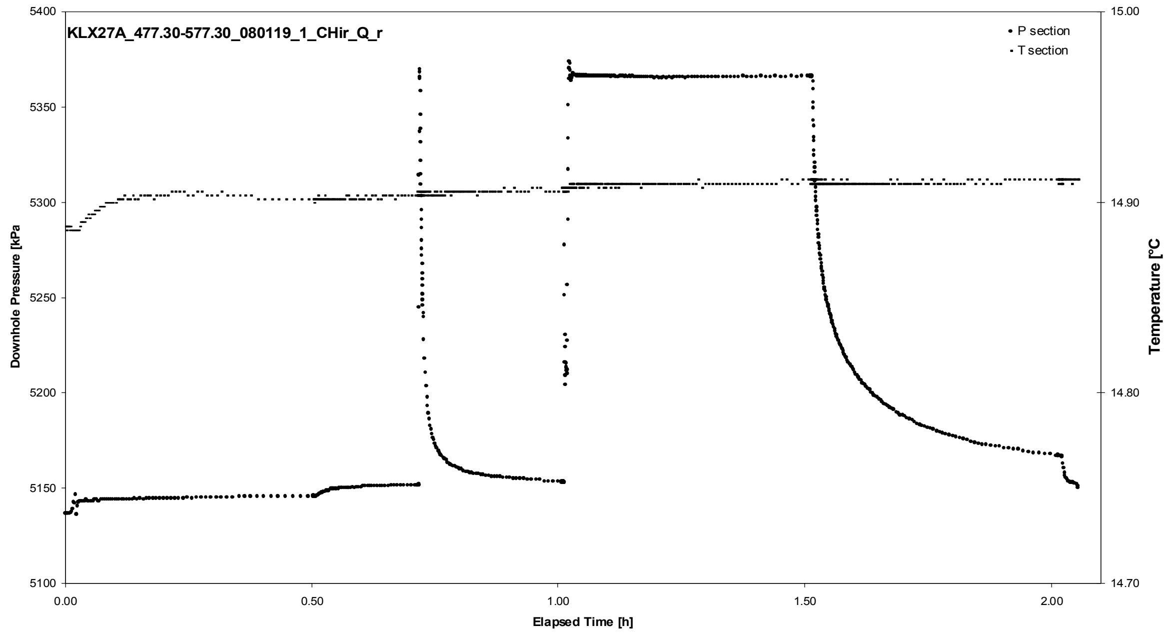
APPENDIX 2-5

Test 477.30 – 577.30 m

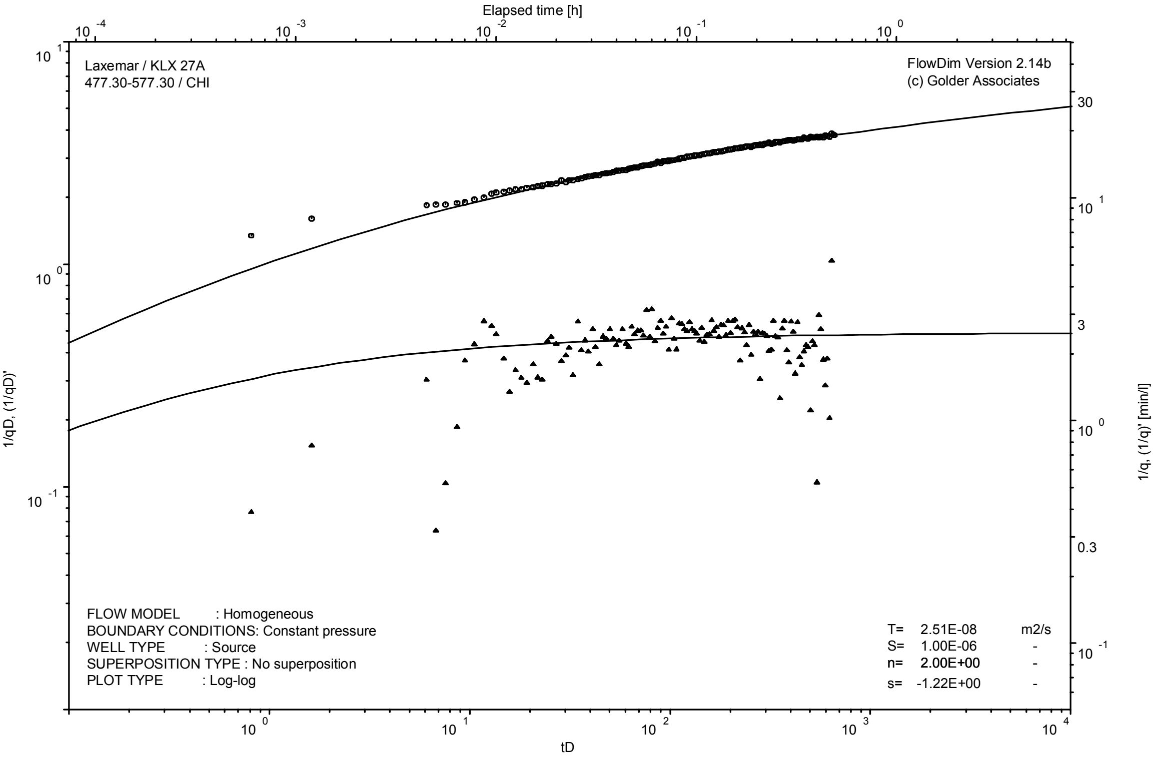
Analysis diagrams



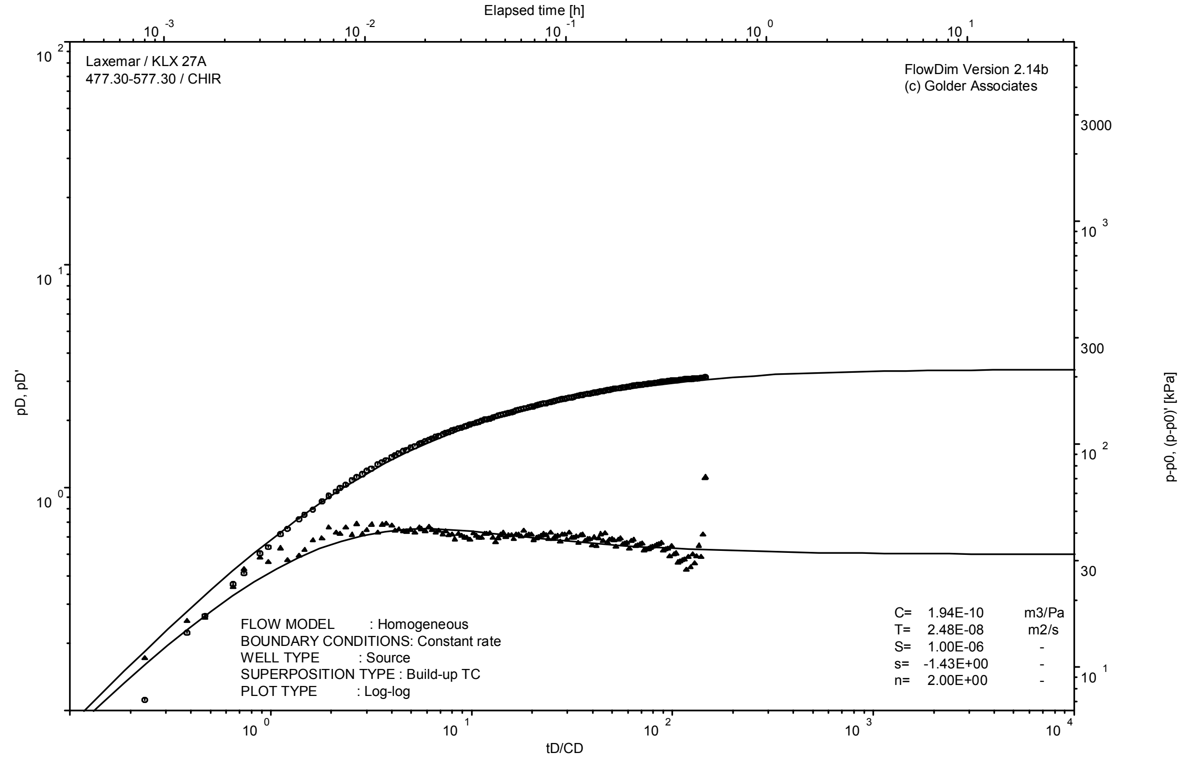
Pressure and flow rate vs. time; cartesian plot



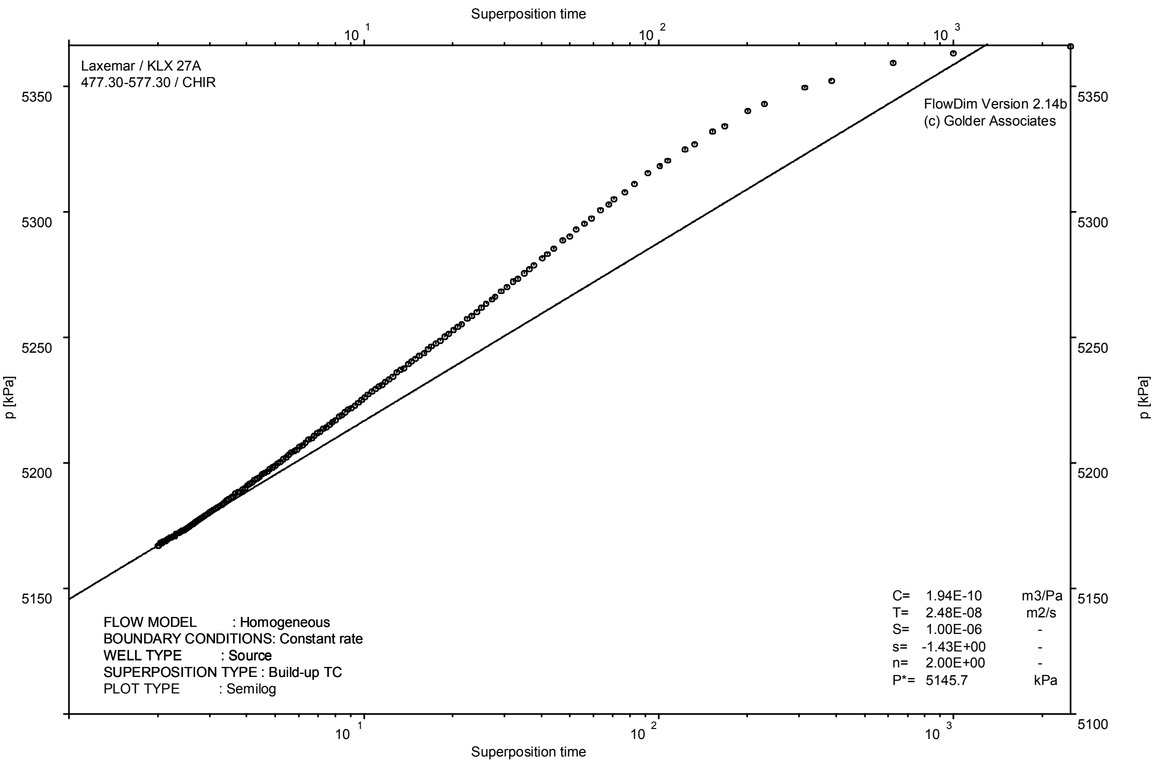
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

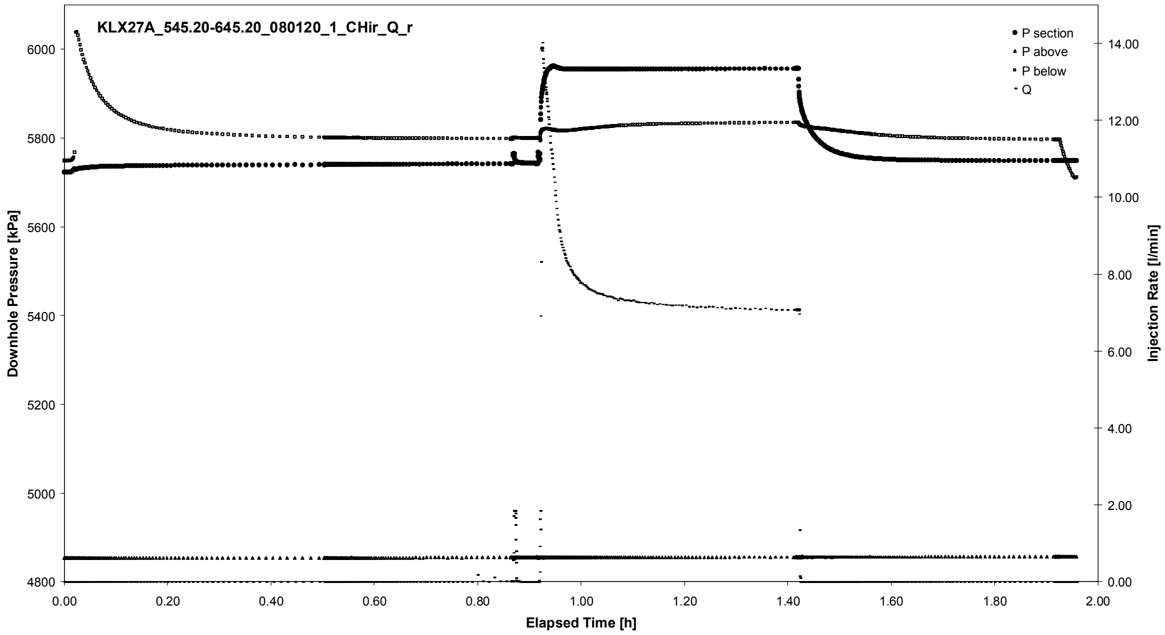


CHIR phase; HORNER match

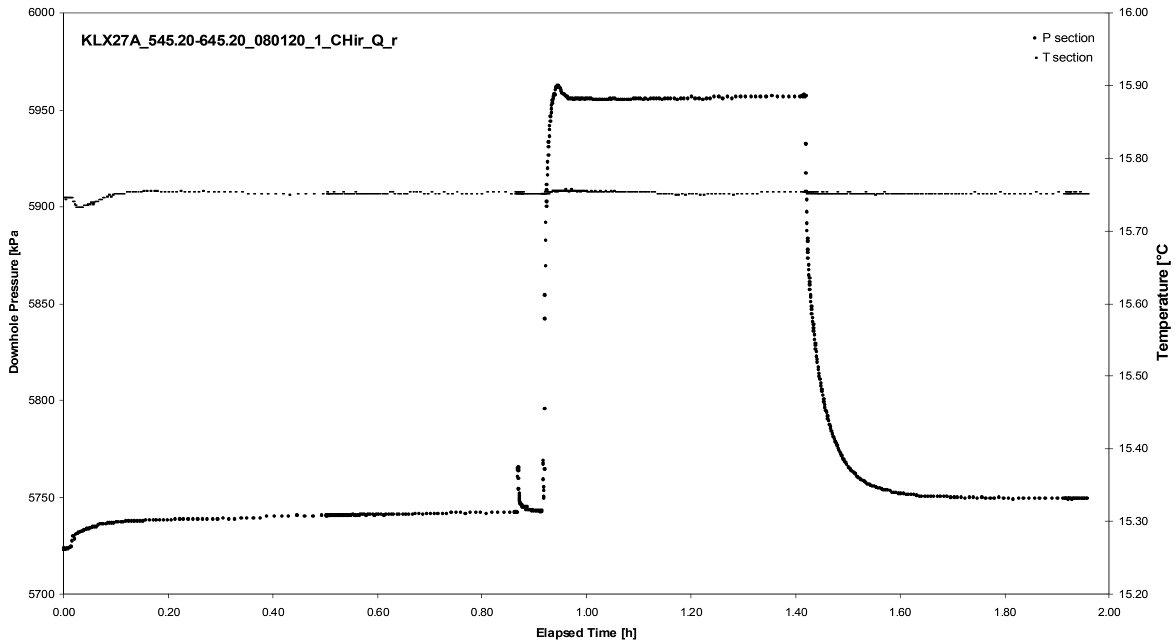
APPENDIX 2-6

Test 545.20 – 645.20 m

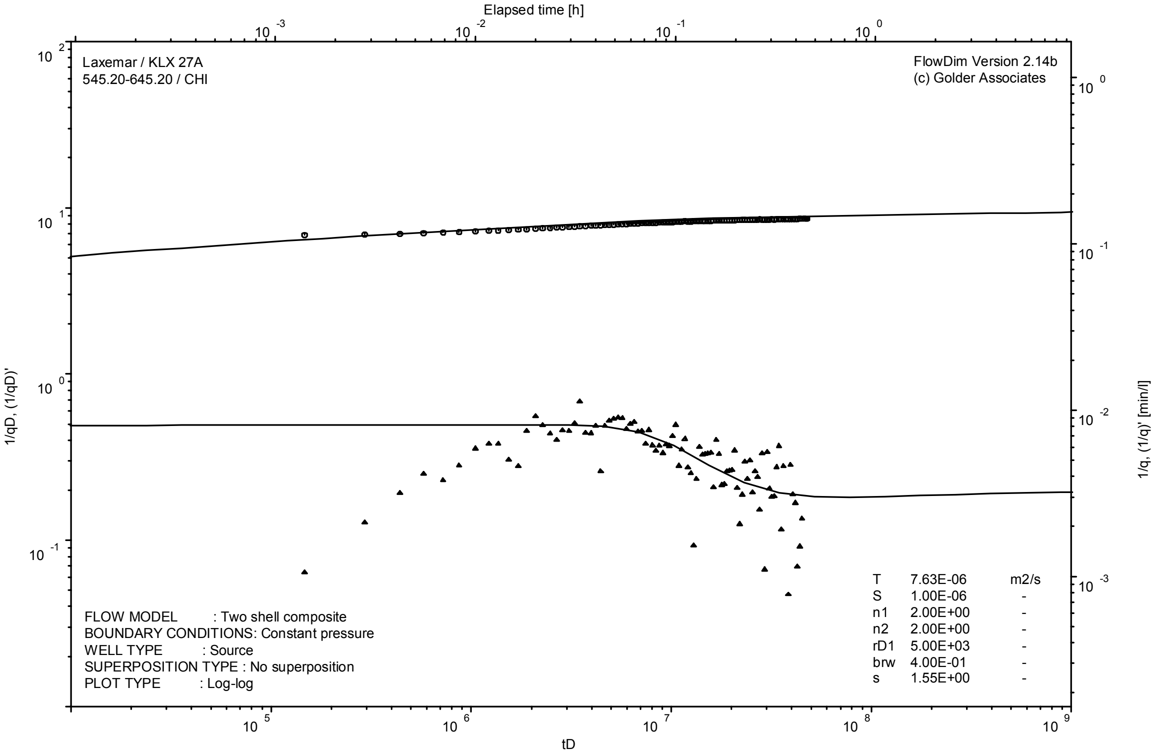
Analysis diagrams



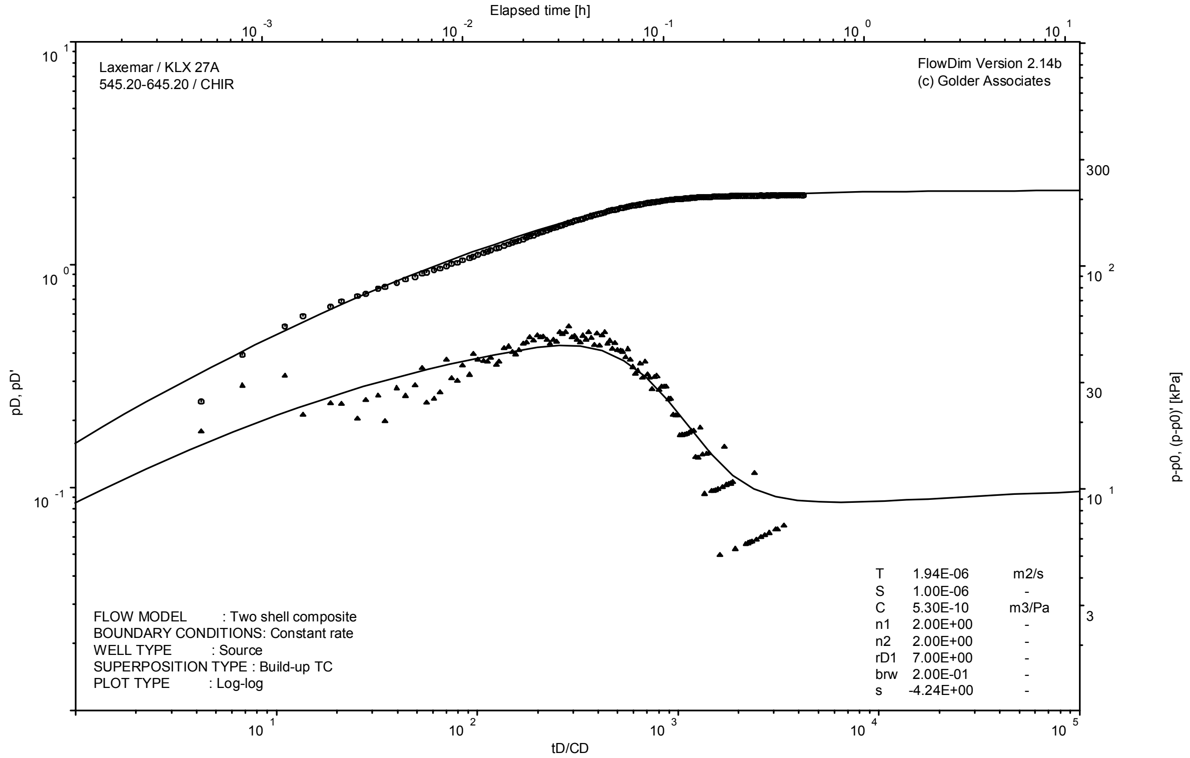
Pressure and flow rate vs. time; cartesian plot



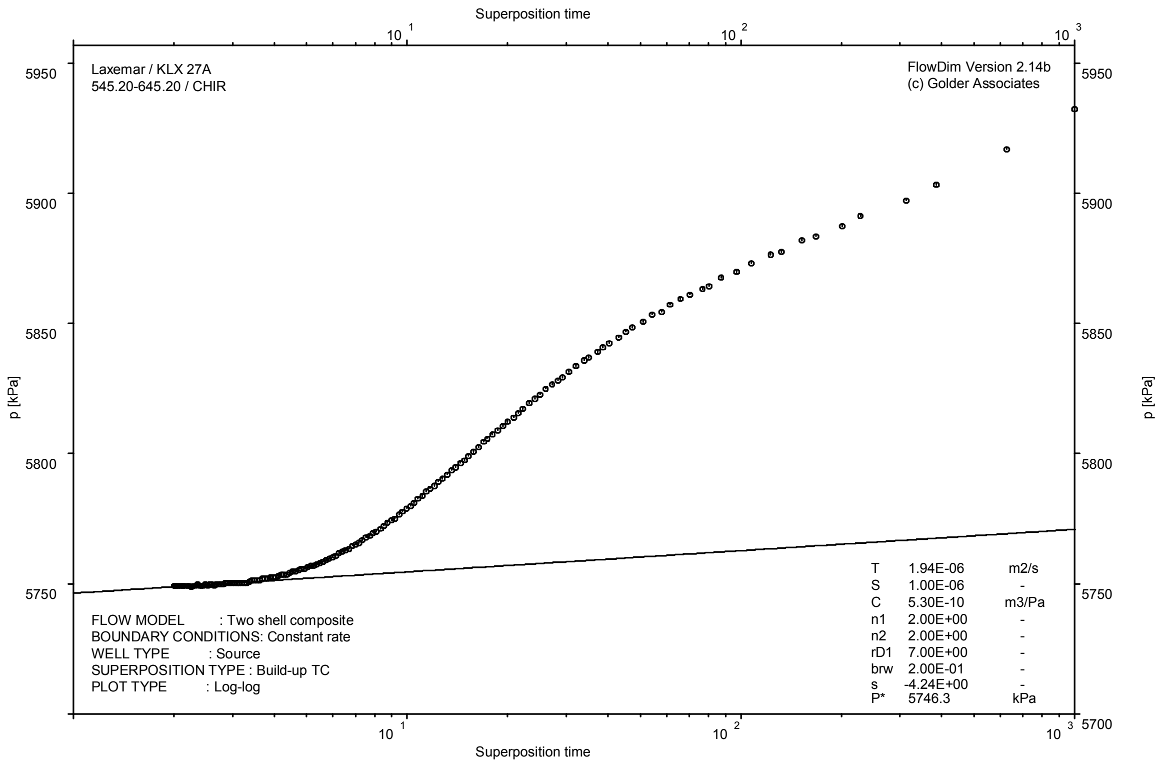
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

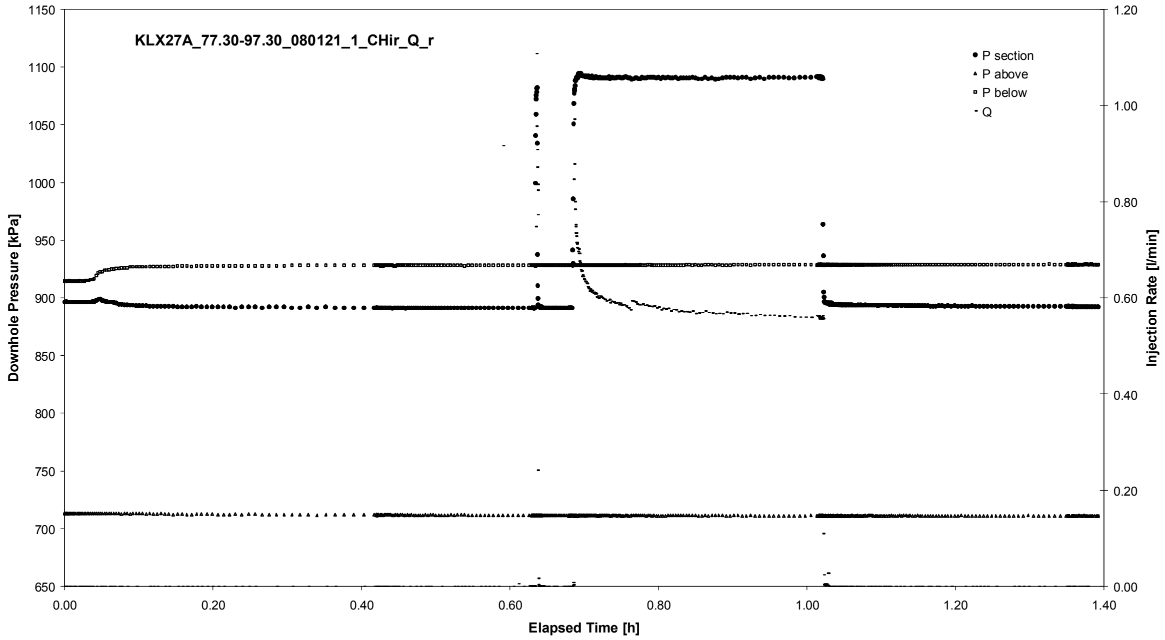


CHIR phase; HORNER match

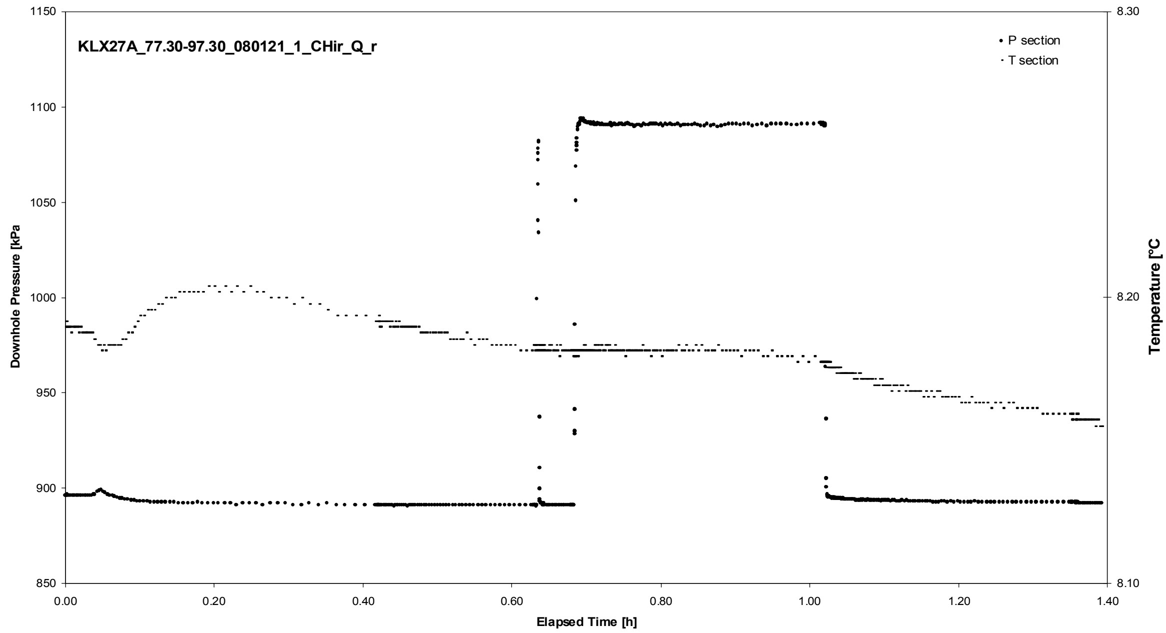
APPENDIX 2-7

Test 77.30 – 97.30 m

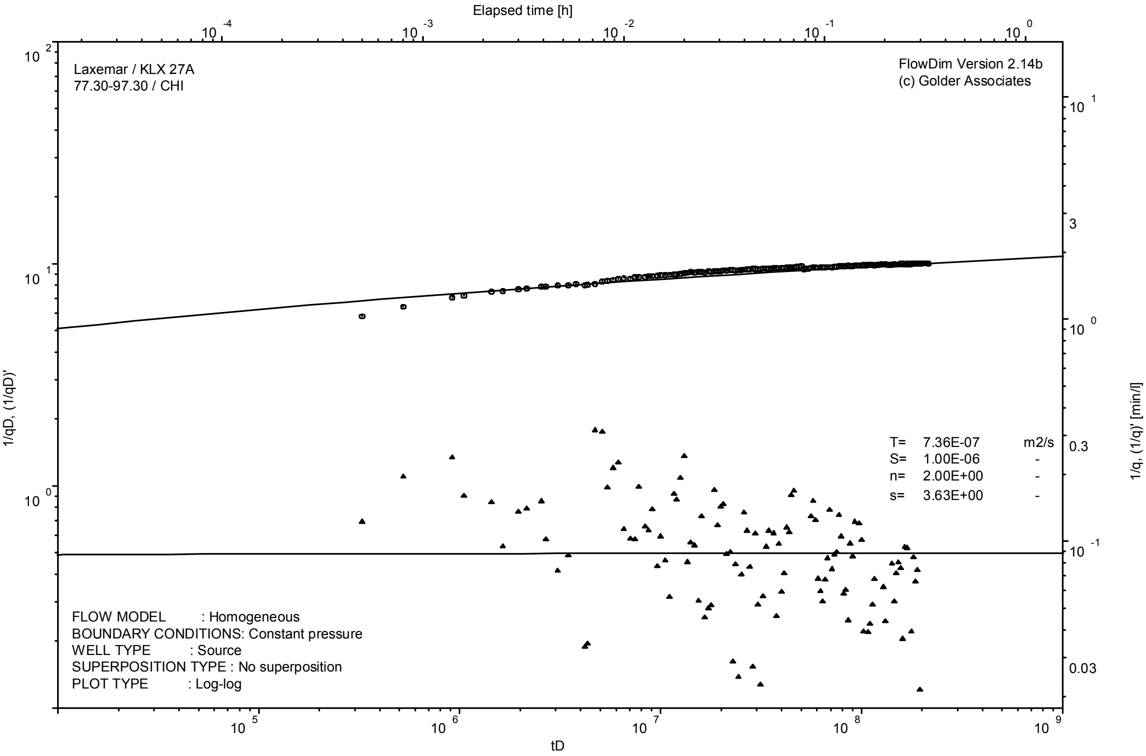
Analysis diagrams



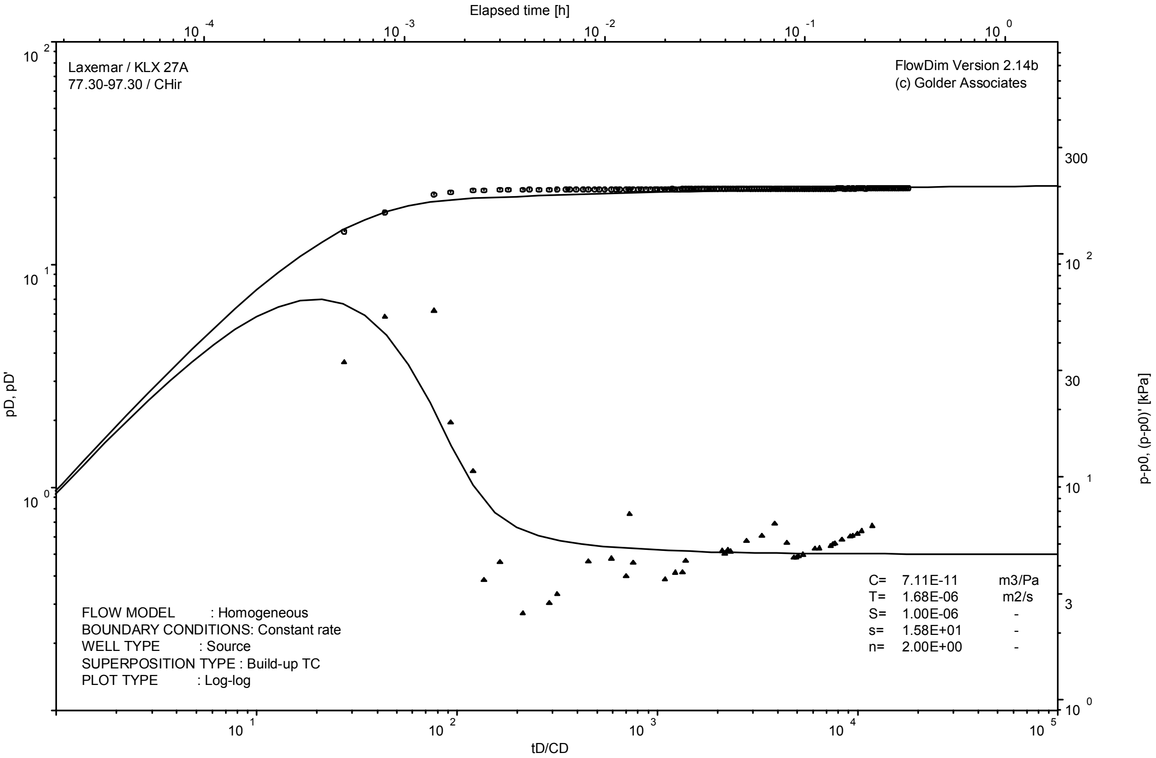
Pressure and flow rate vs. time; cartesian plot



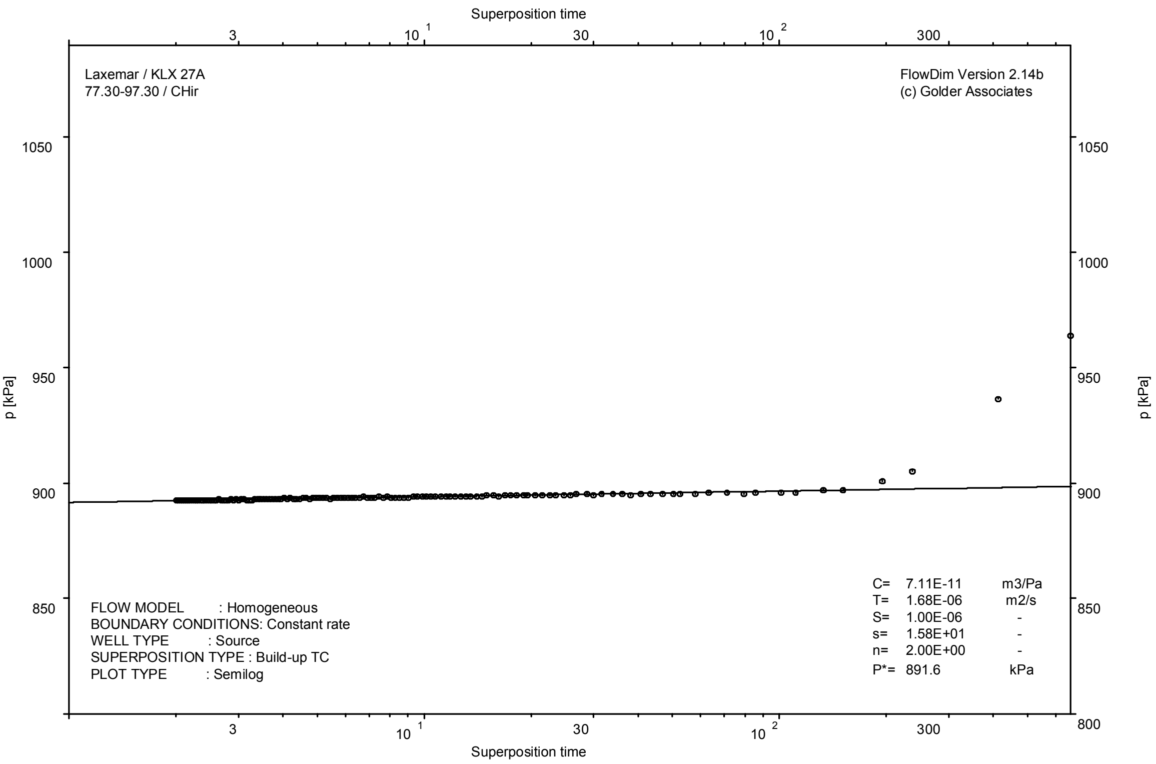
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

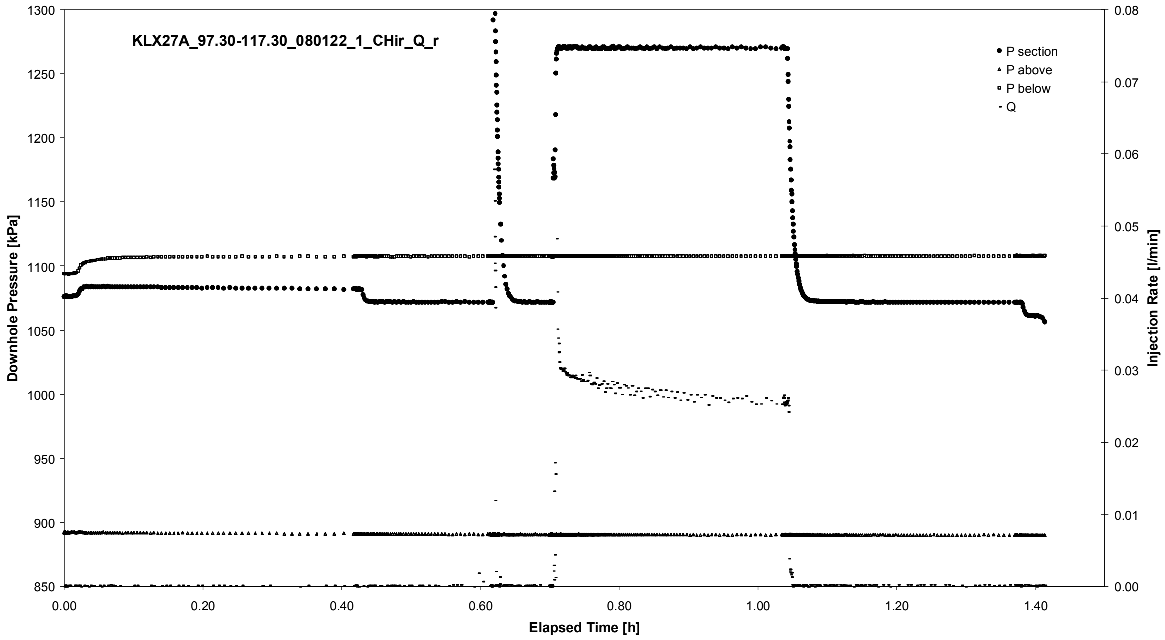


CHIR phase; HORNER match

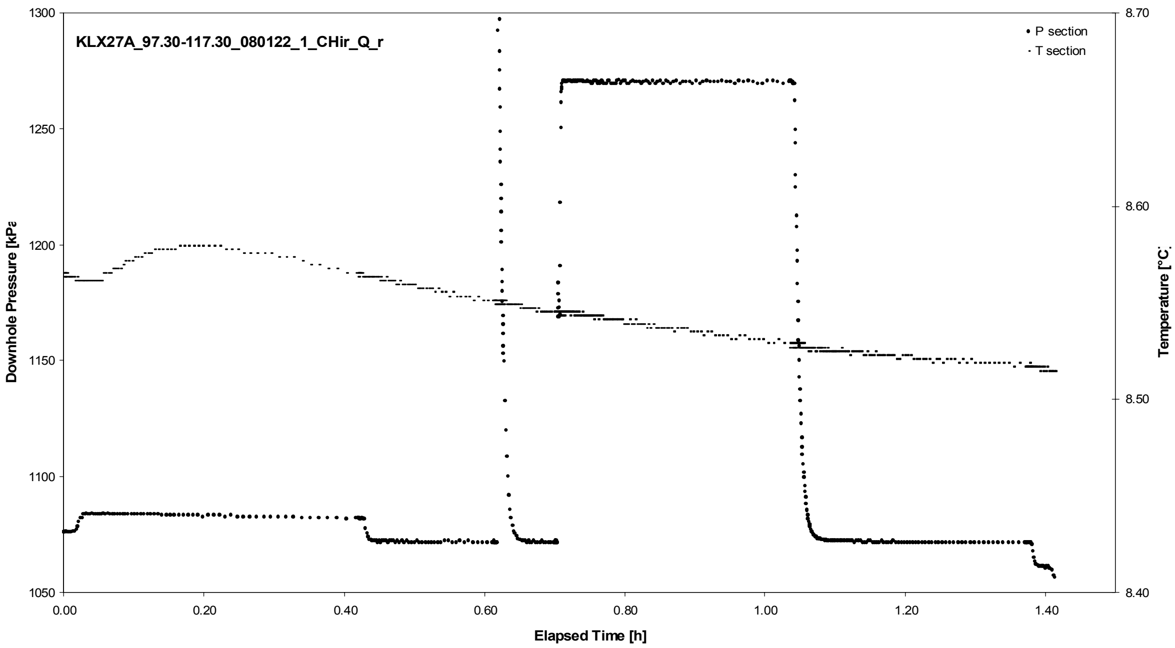
APPENDIX 2-8

Test 97.30 – 117.30 m

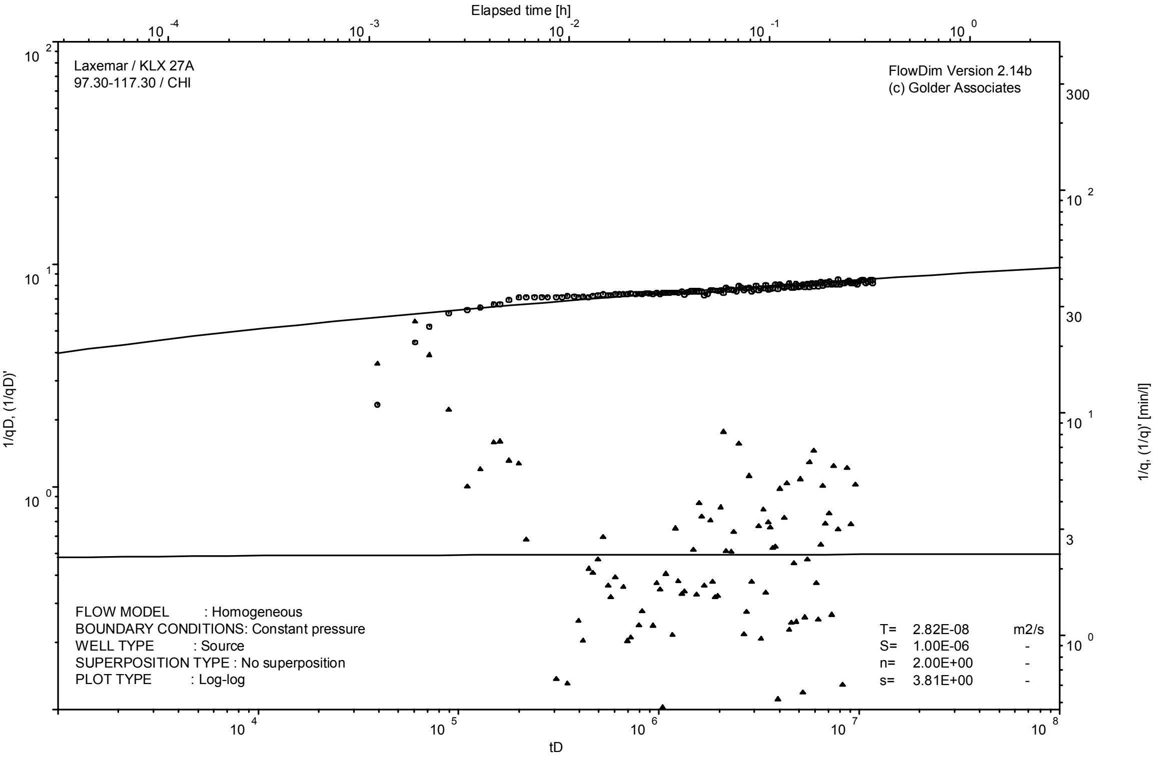
Analysis diagrams



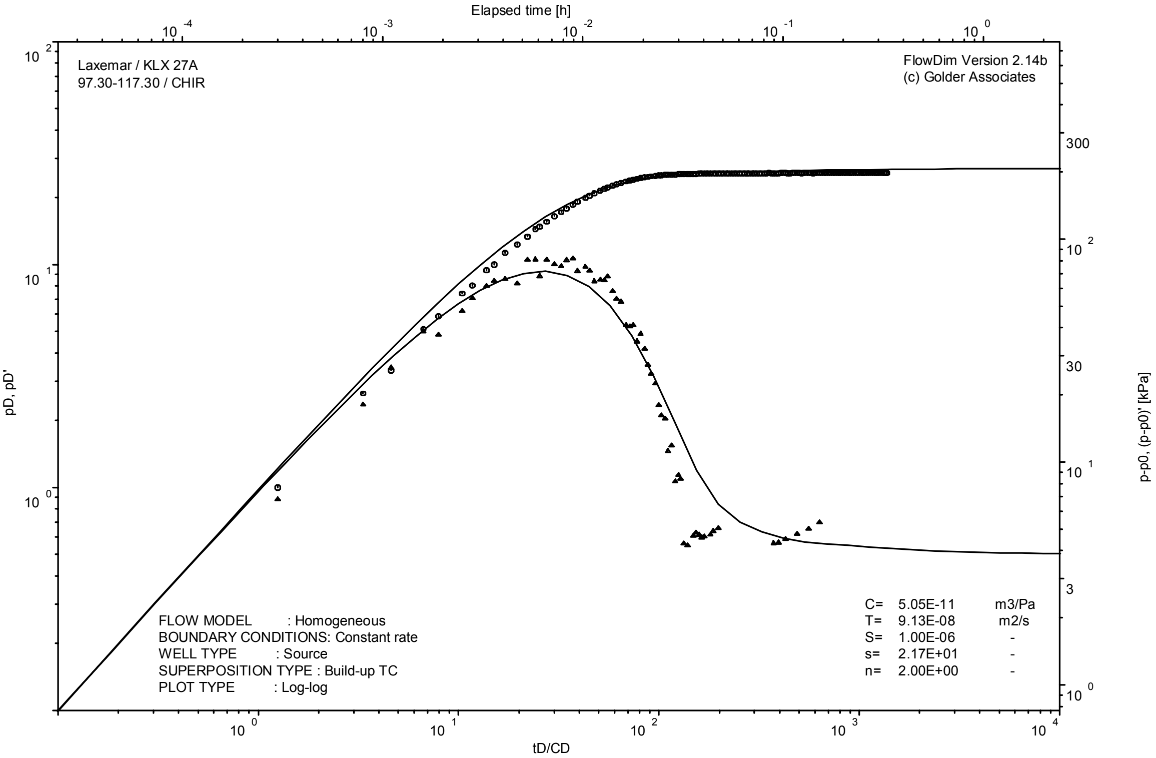
Pressure and flow rate vs. time; cartesian plot



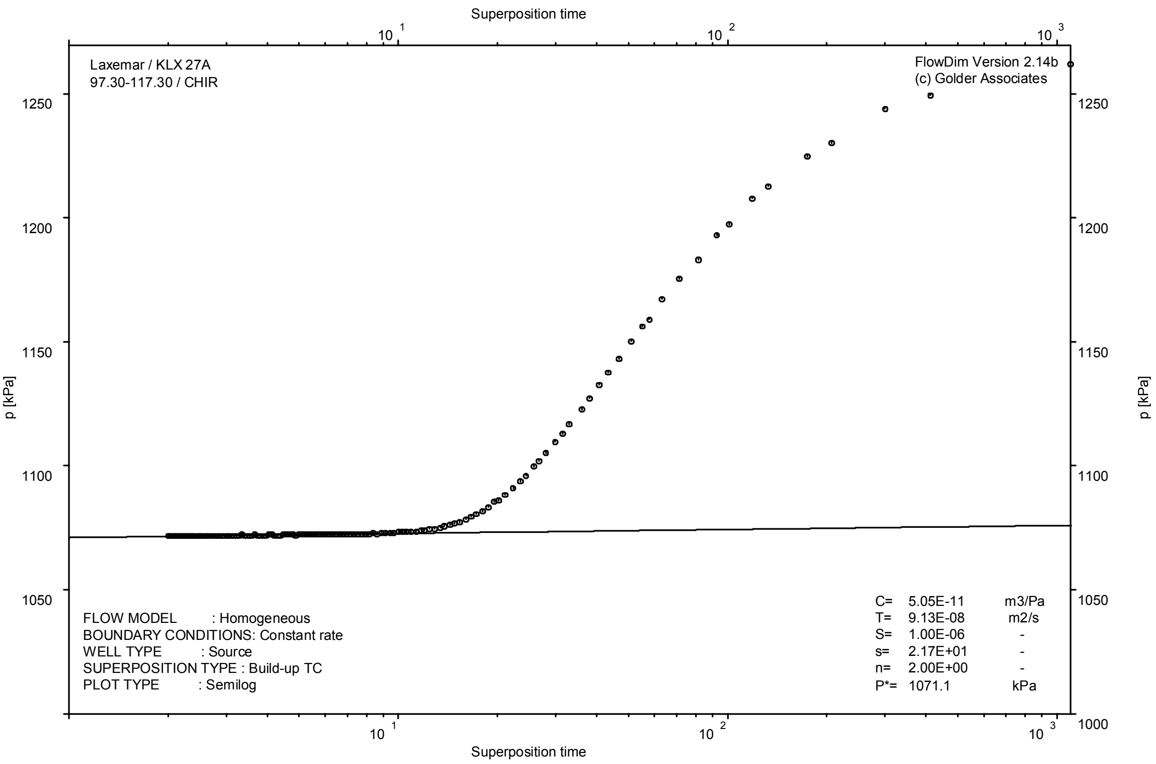
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

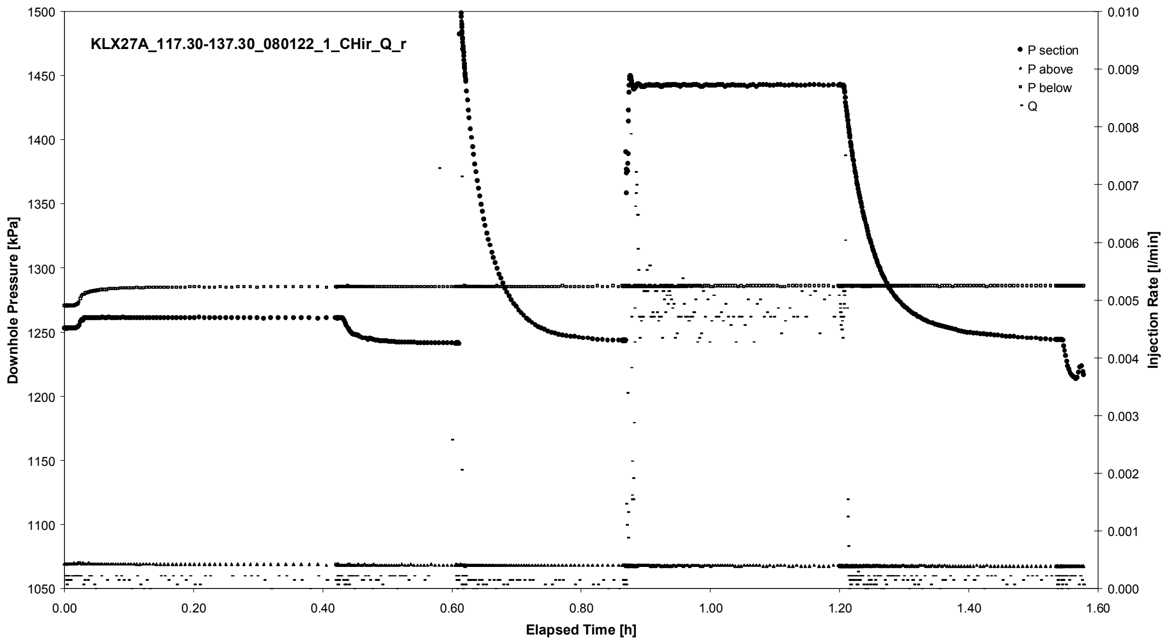


CHIR phase; HORNER match

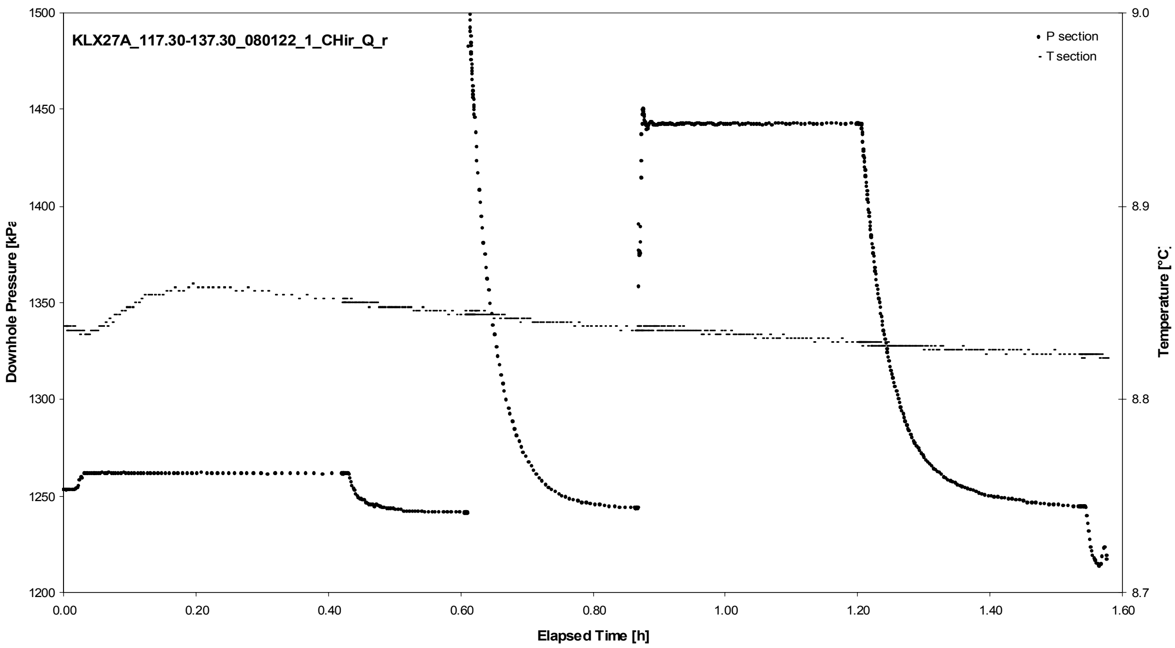
APPENDIX 2-9

Test 117.30 – 137.30 m

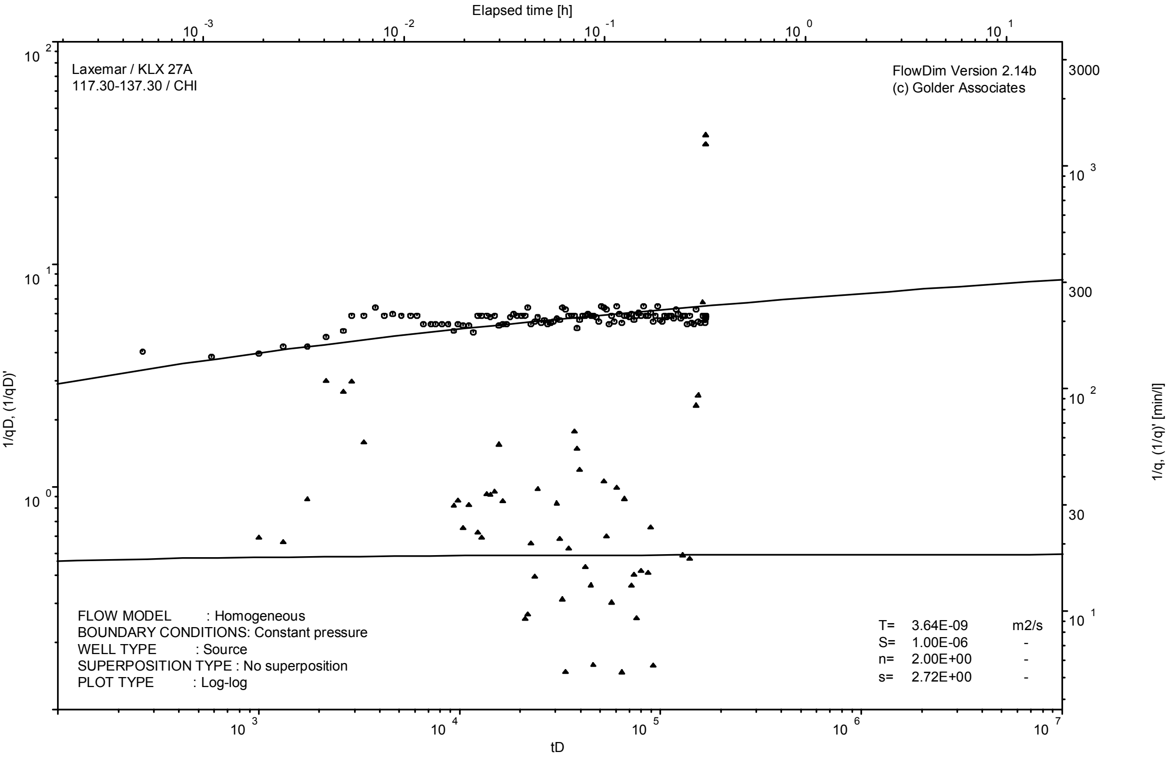
Analysis diagrams



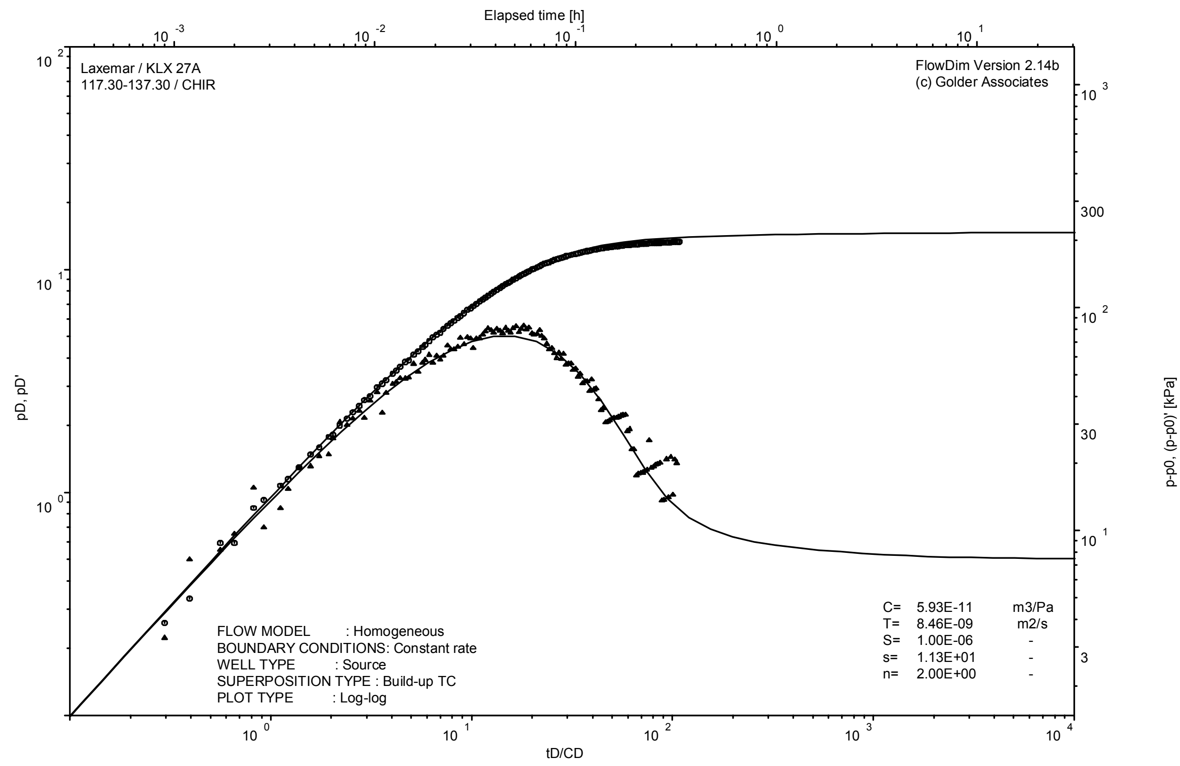
Pressure and flow rate vs. time; cartesian plot



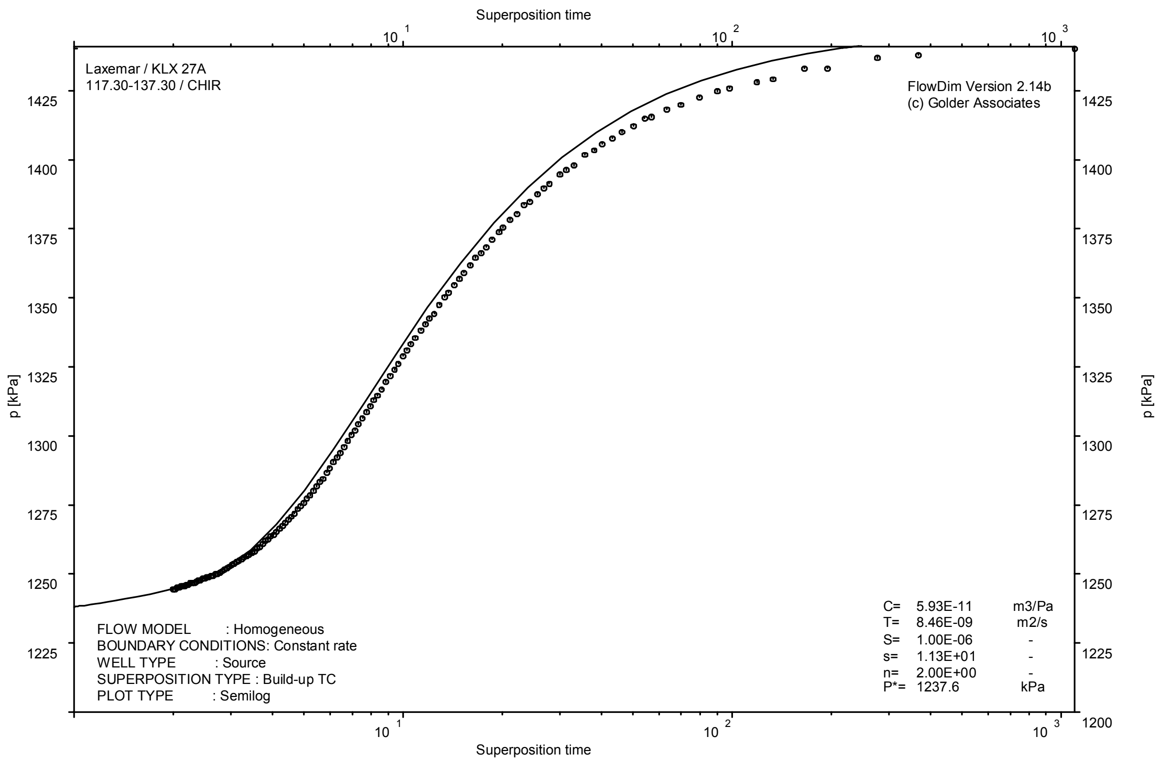
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

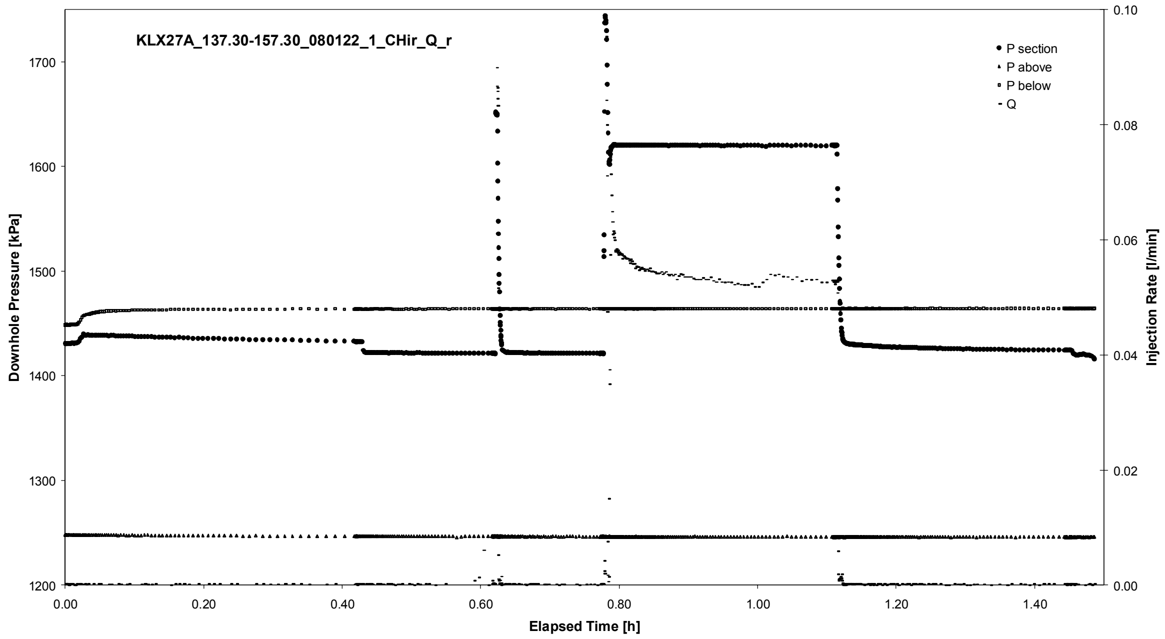


CHIR phase; HORNER match

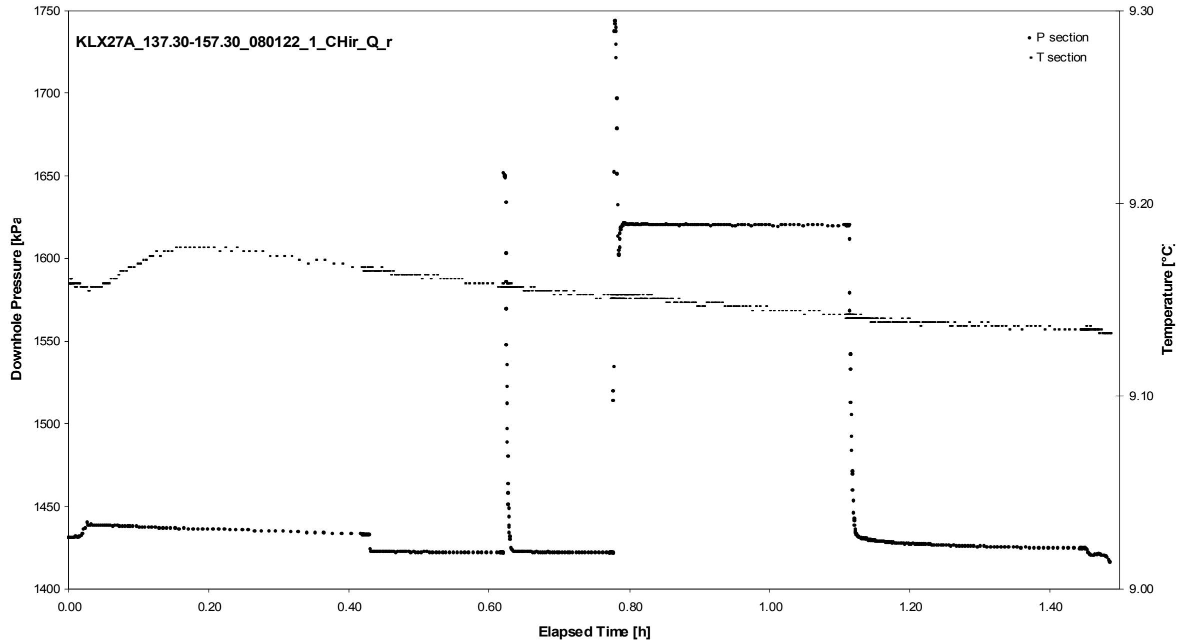
APPENDIX 2-10

Test 137.30 – 157.30 m

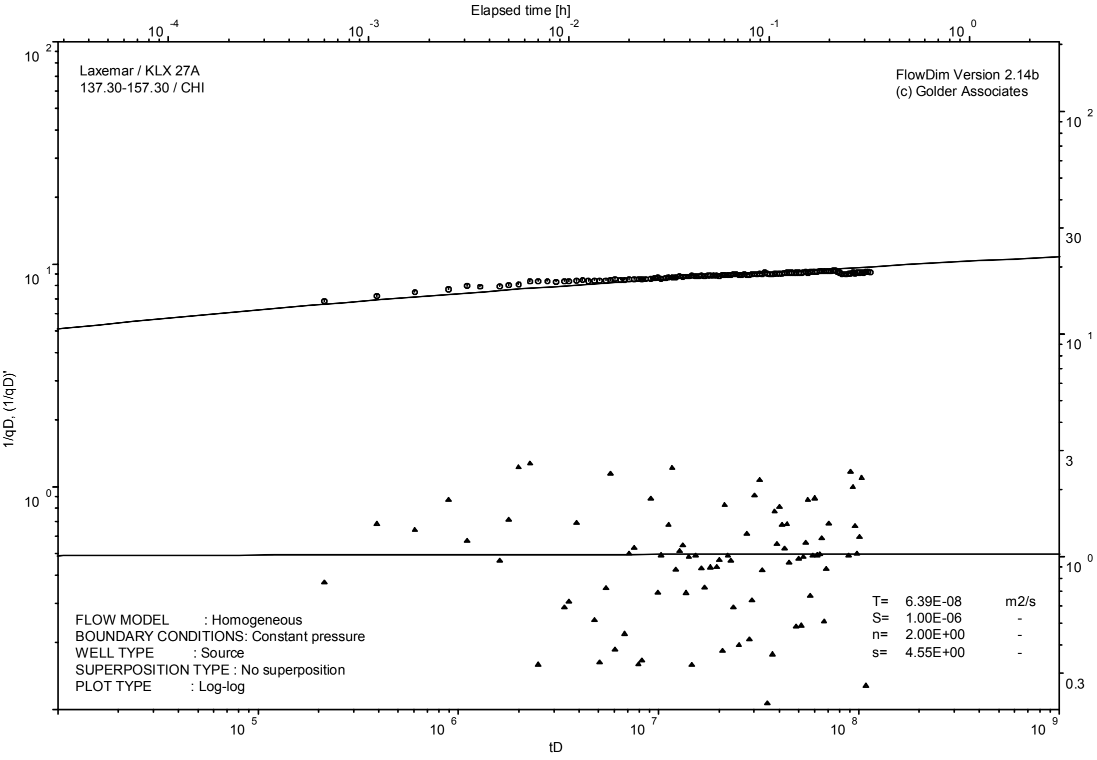
Analysis diagrams



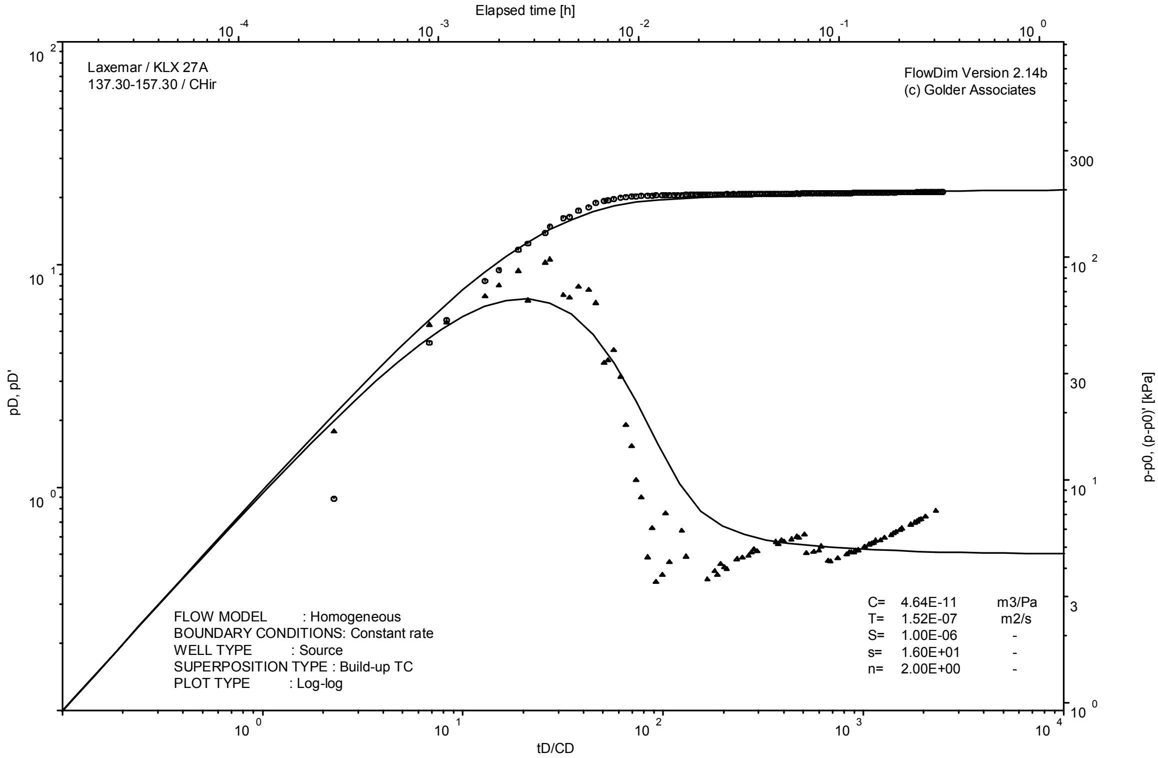
Pressure and flow rate vs. time; cartesian plot



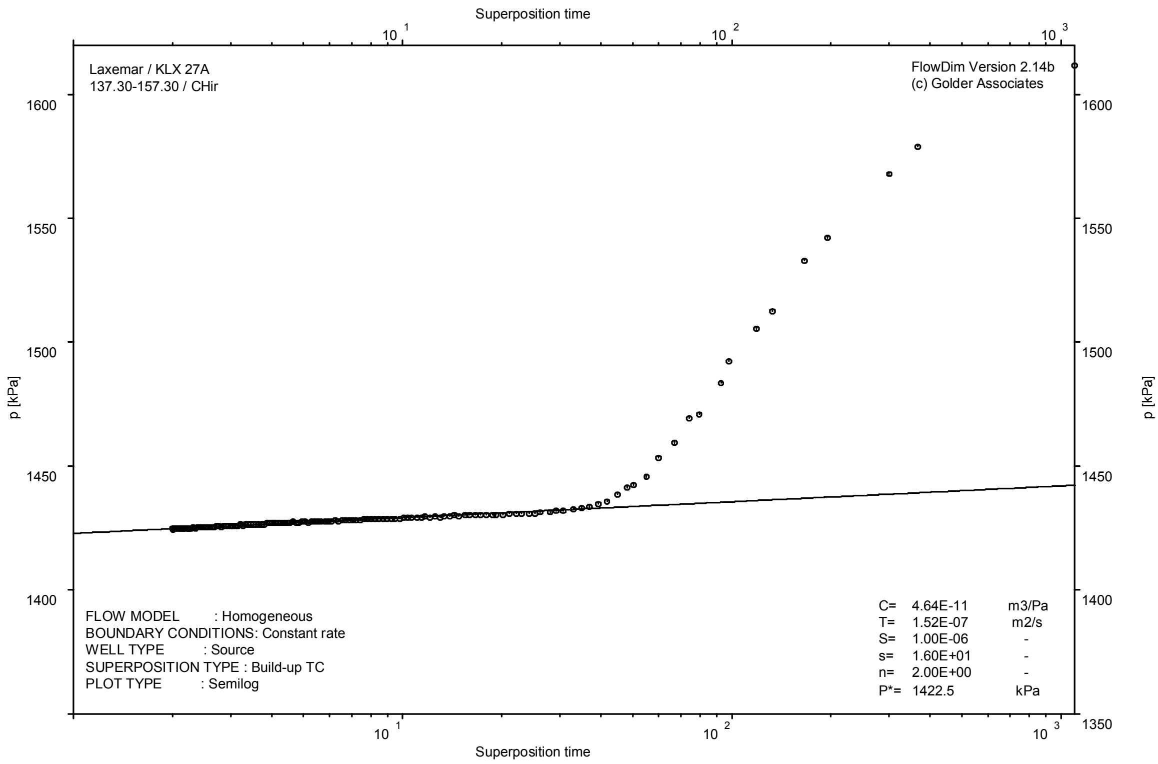
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

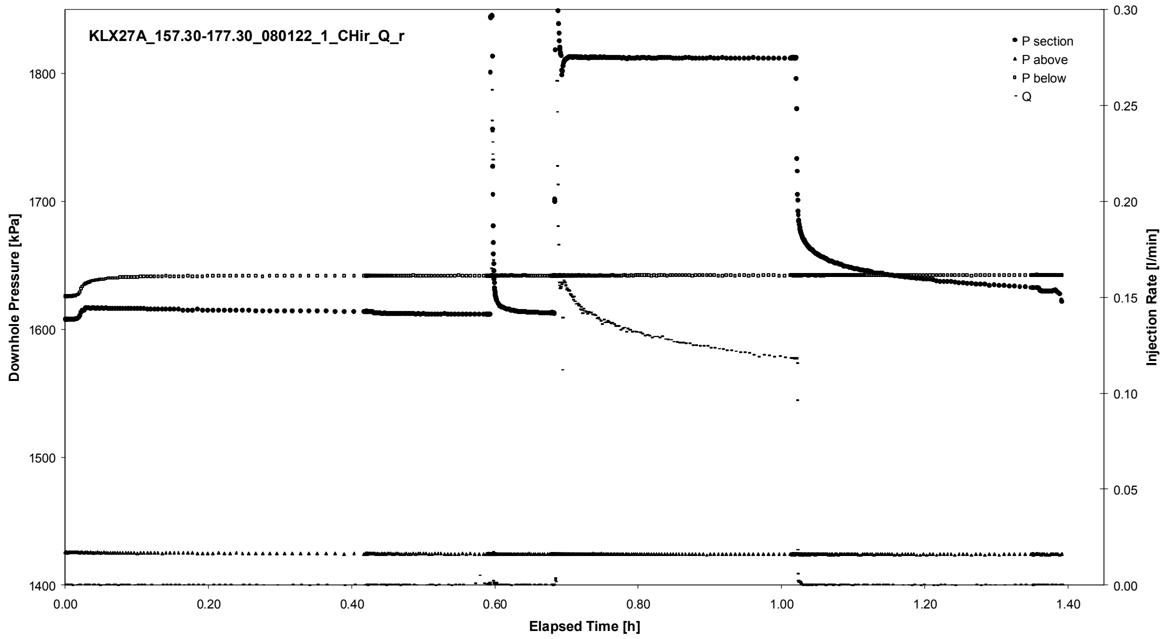


CHIR phase; HORNER match

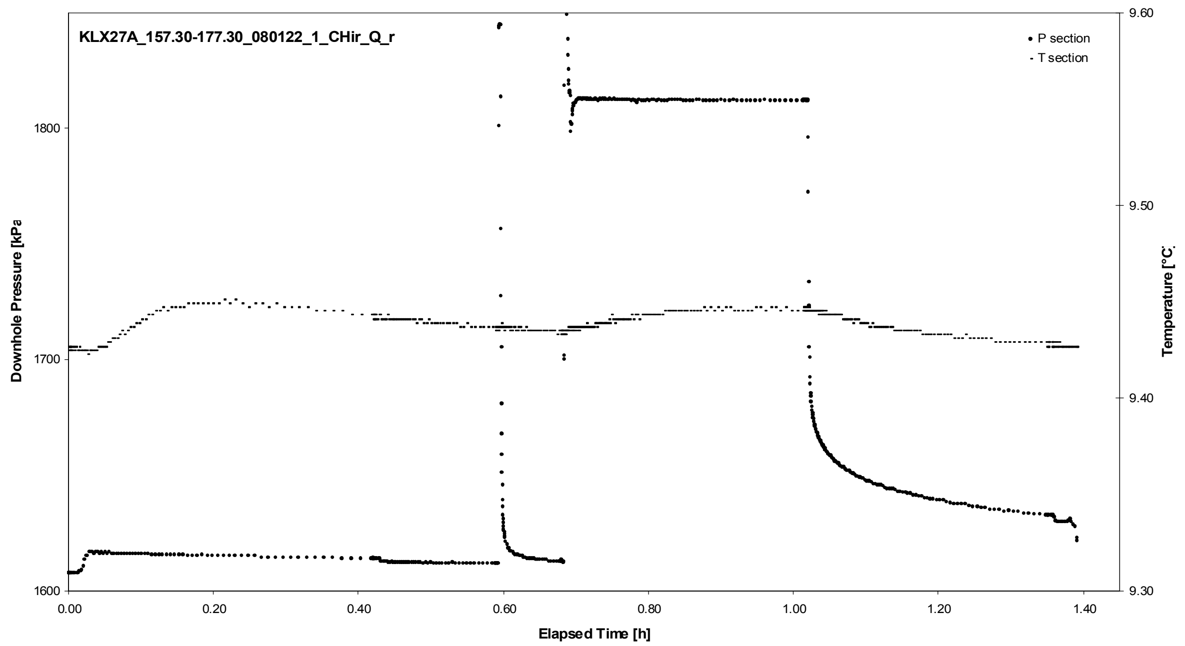
APPENDIX 2-11

Test 157.30 – 177.30 m

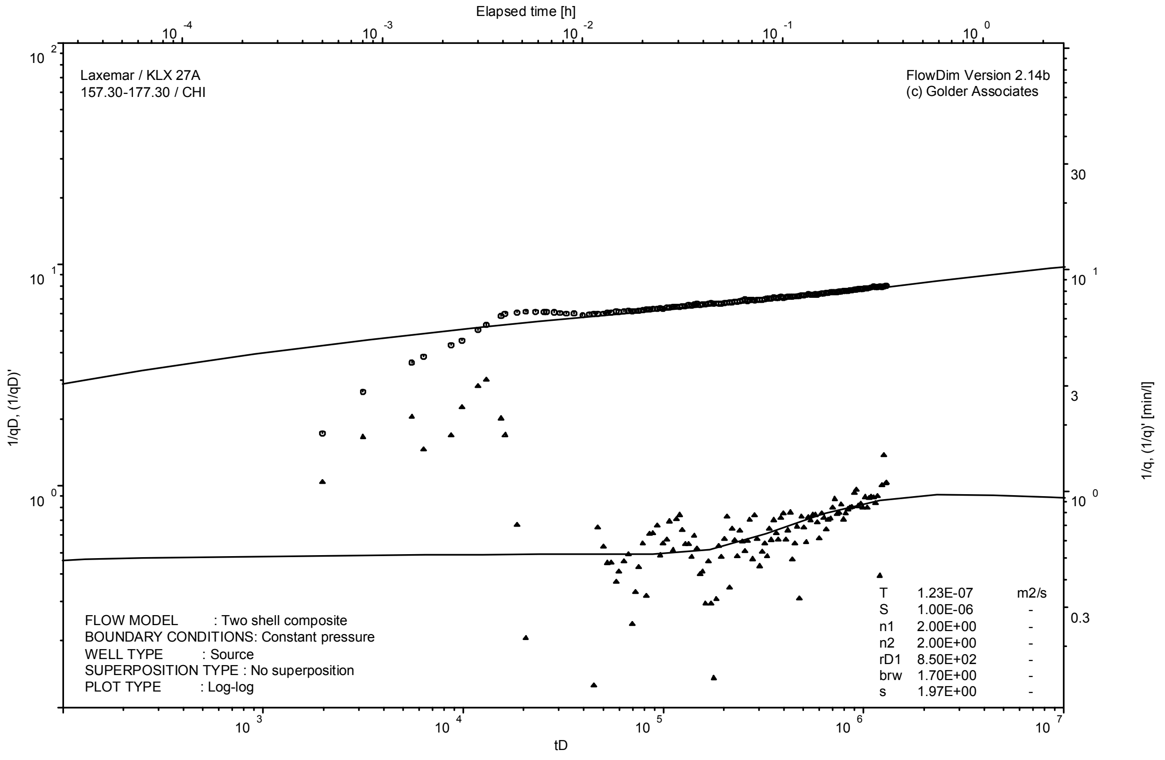
Analysis diagrams



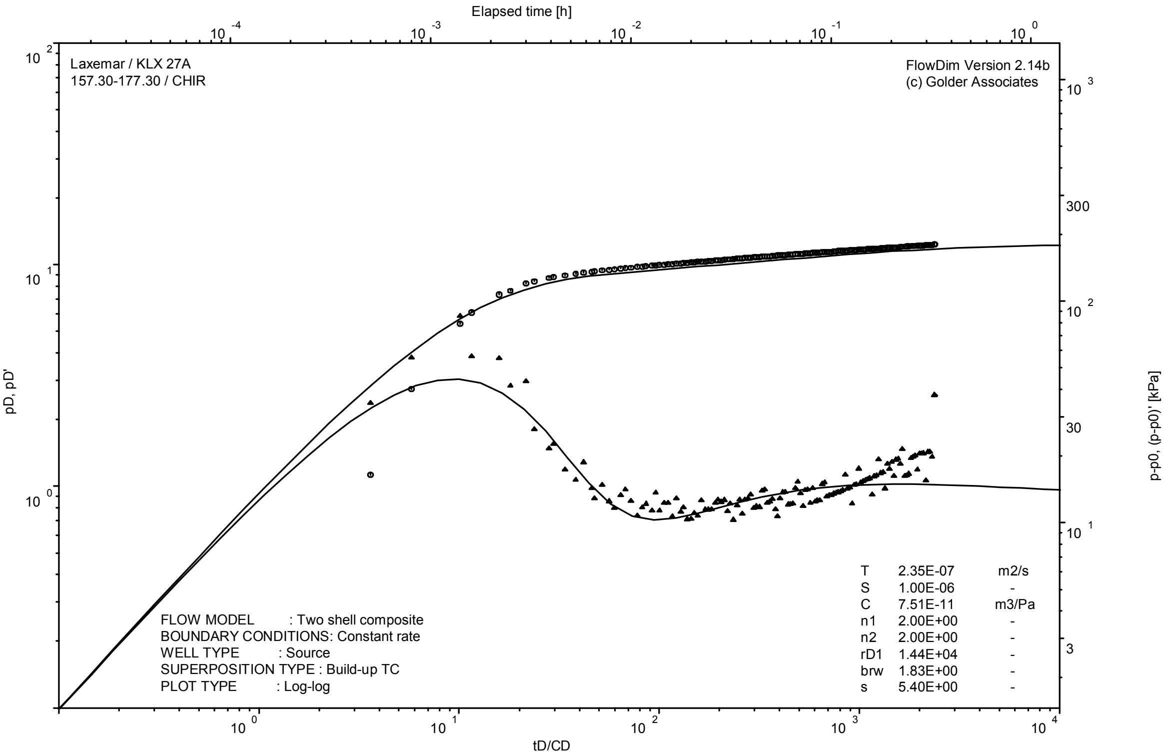
Pressure and flow rate vs. time; cartesian plot



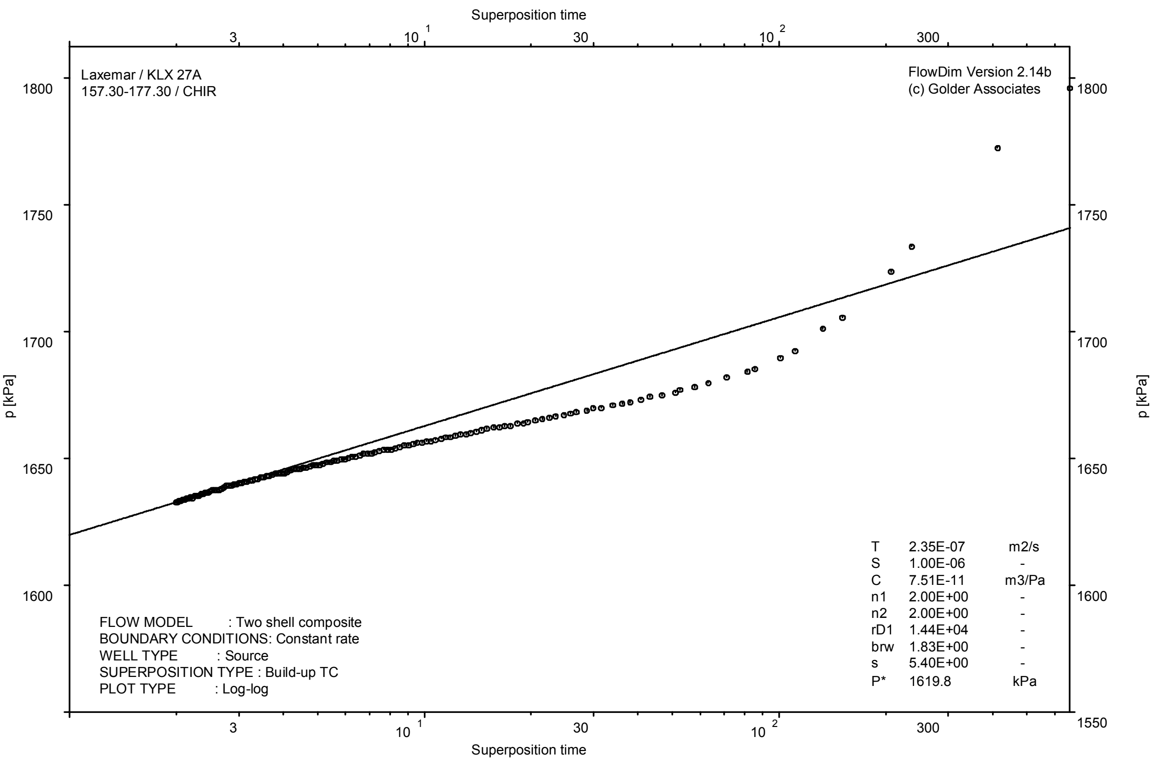
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

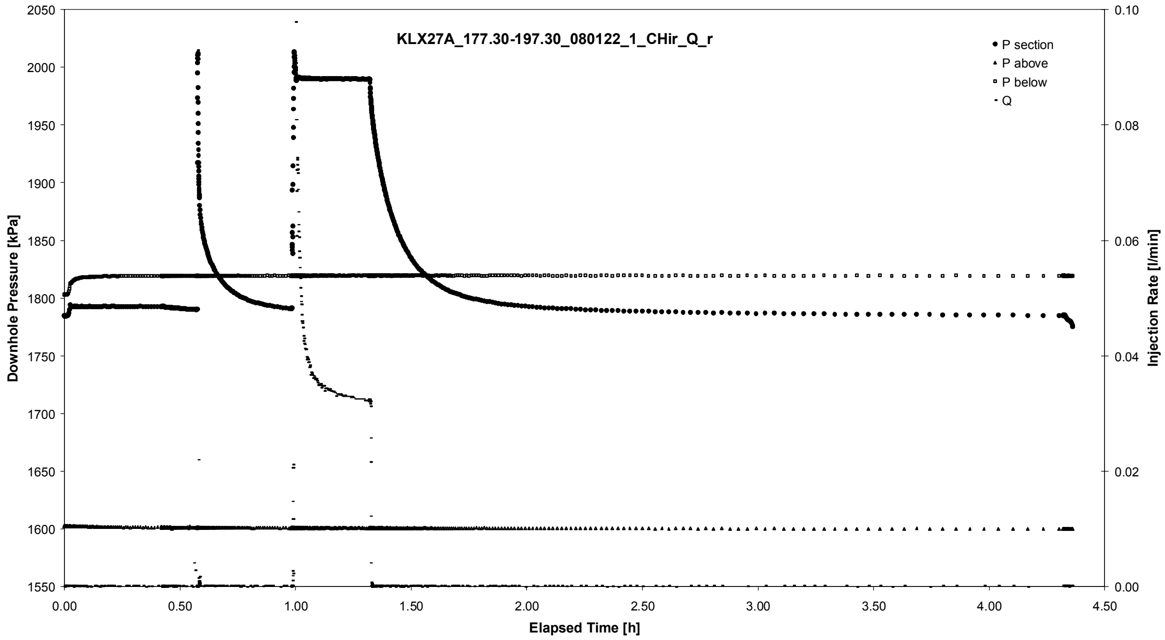


CHIR phase; HORNER match

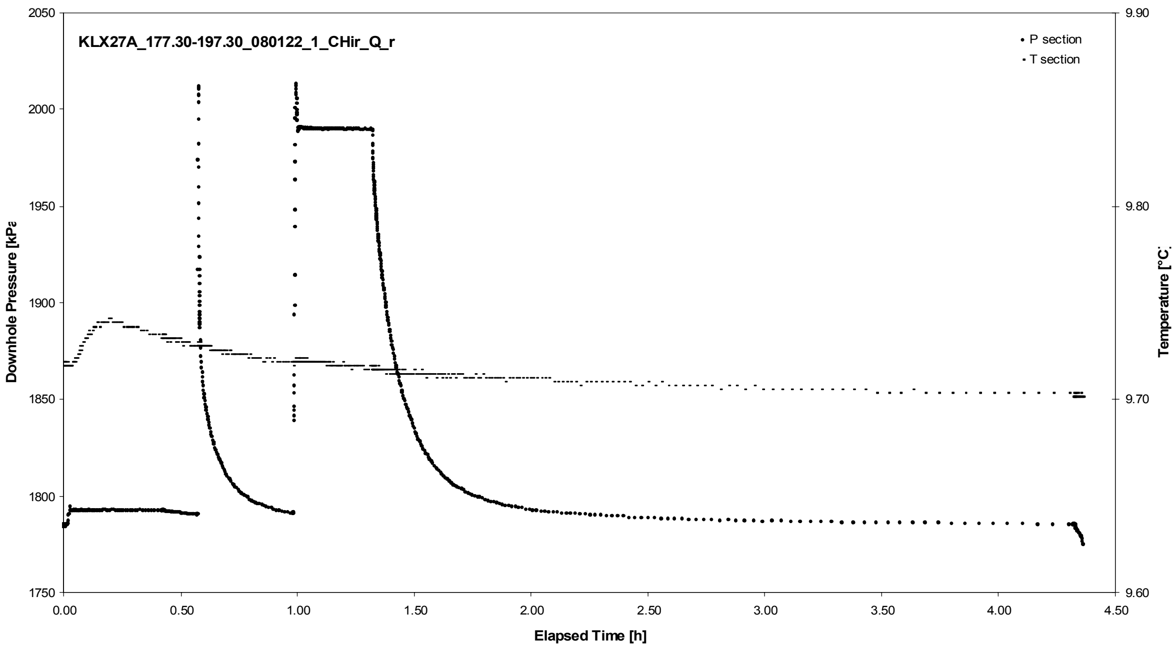
APPENDIX 2-12

Test 177.30 – 197.30 m

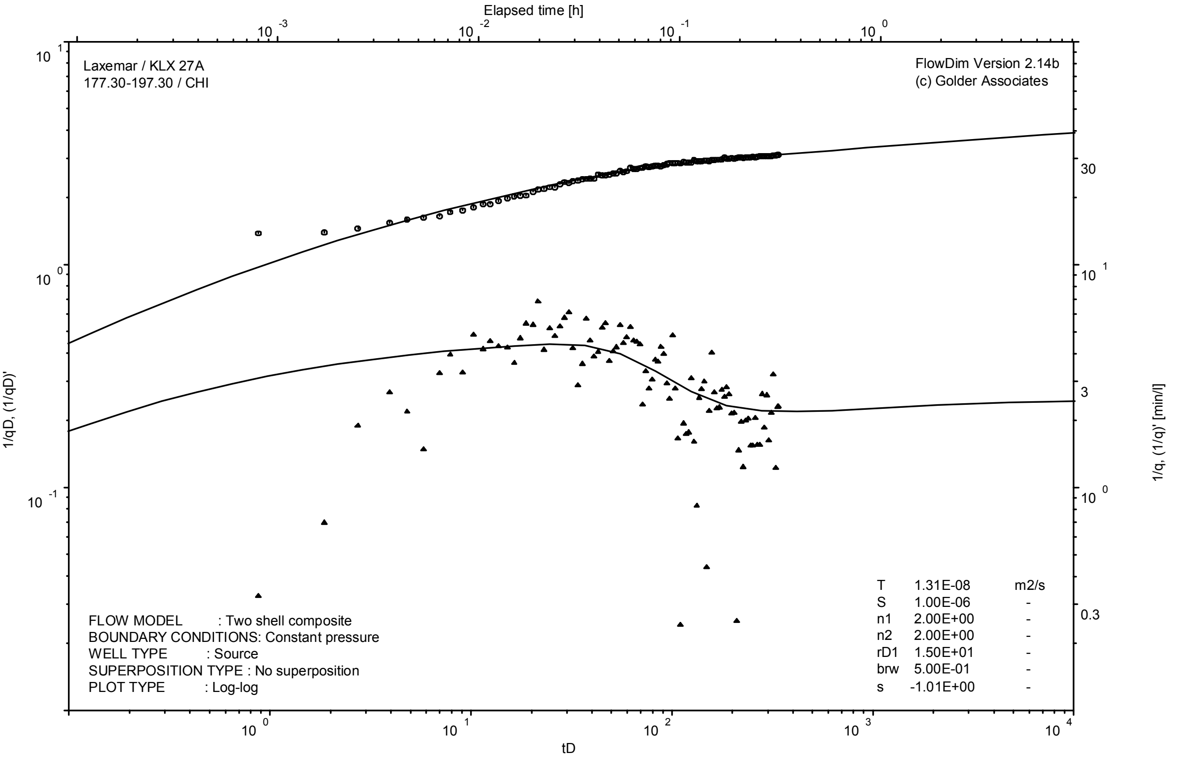
Analysis diagrams



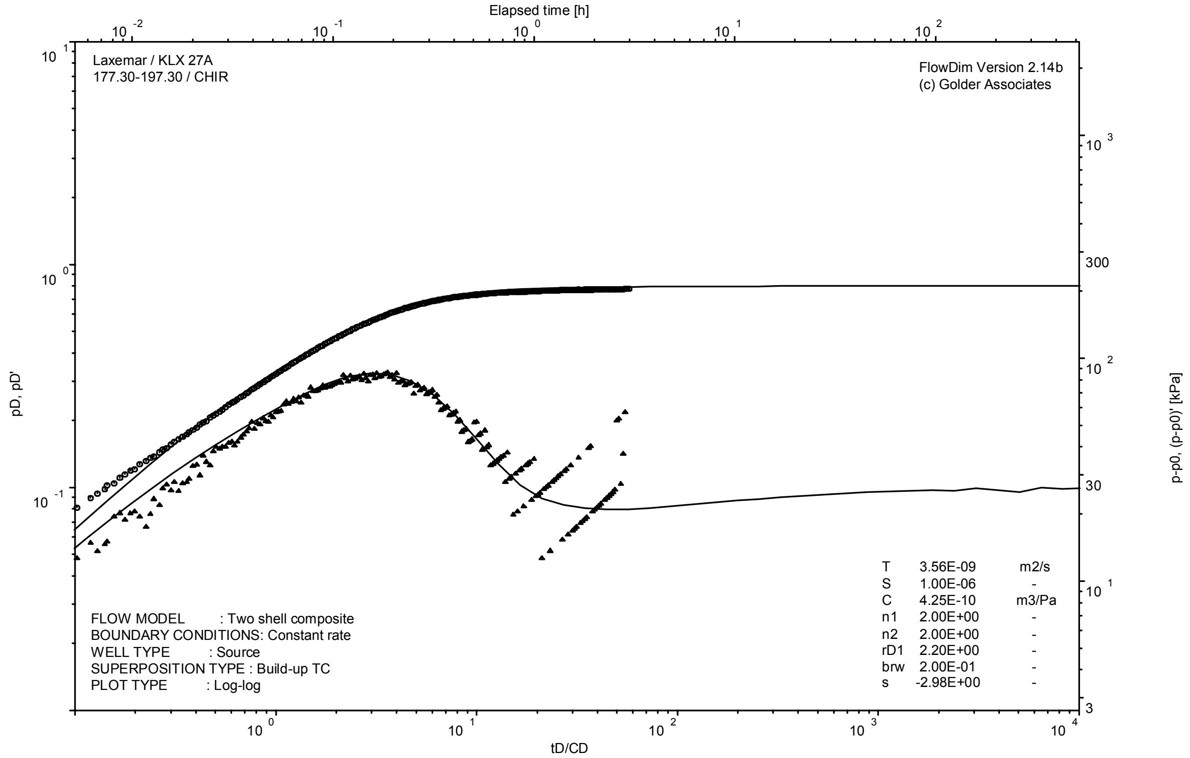
Pressure and flow rate vs. time; cartesian plot



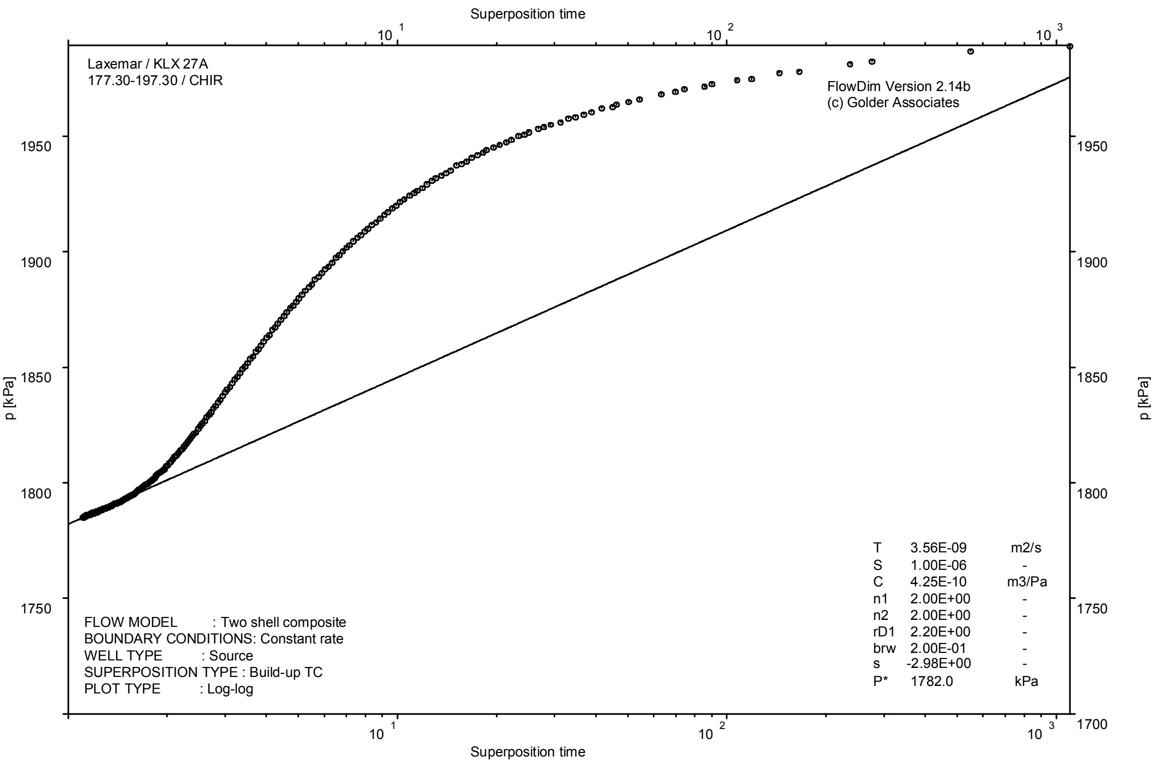
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

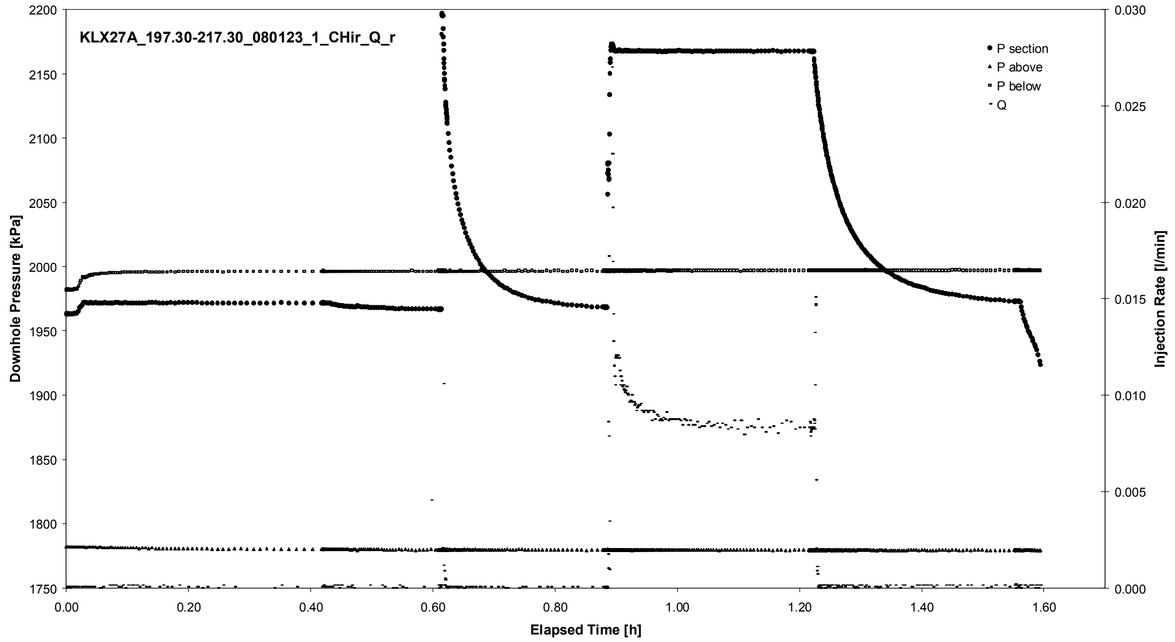


CHIR phase; HORNER match

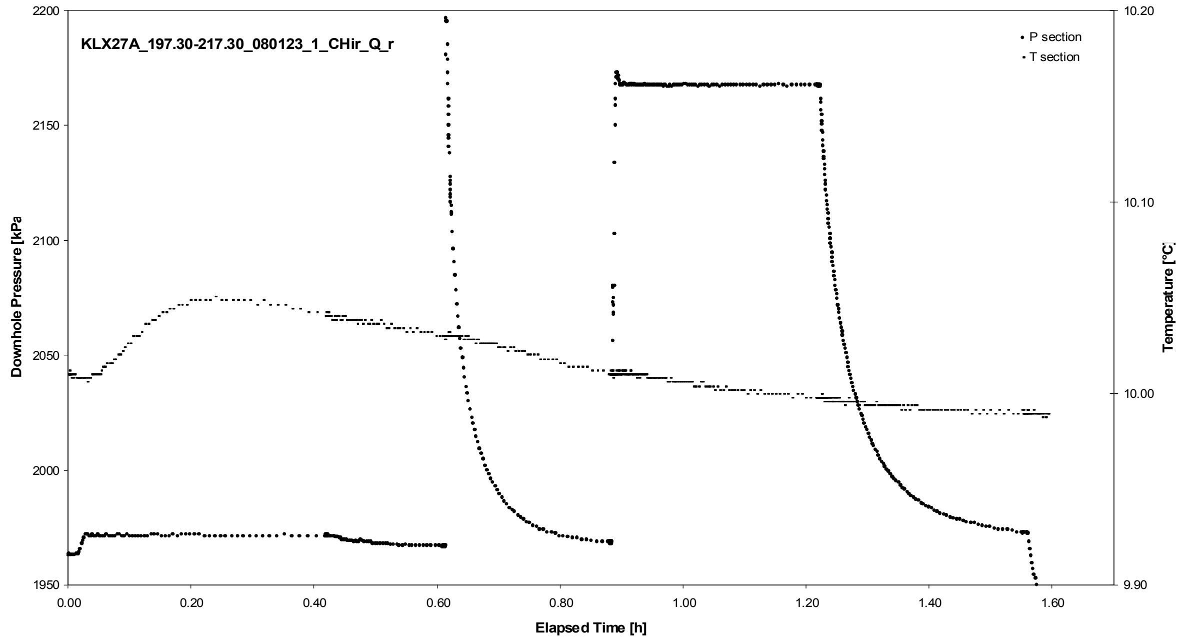
APPENDIX 2-13

Test 197.30 – 217.30 m

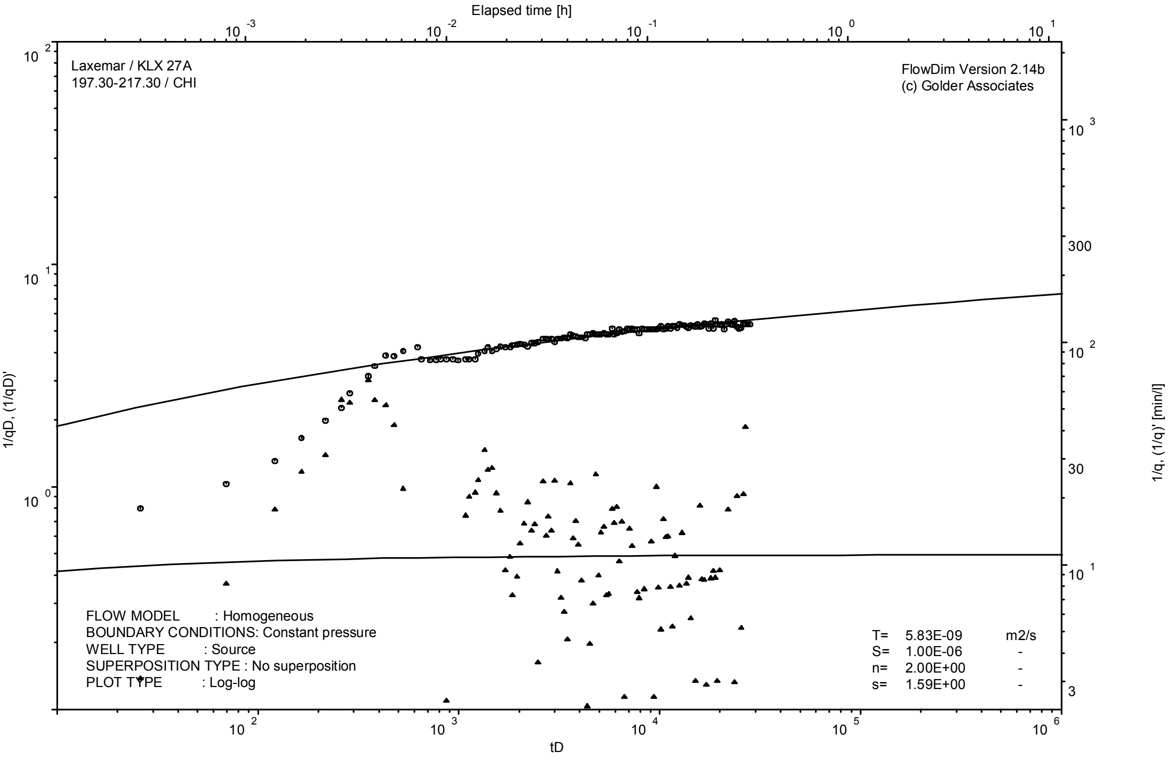
Analysis diagrams



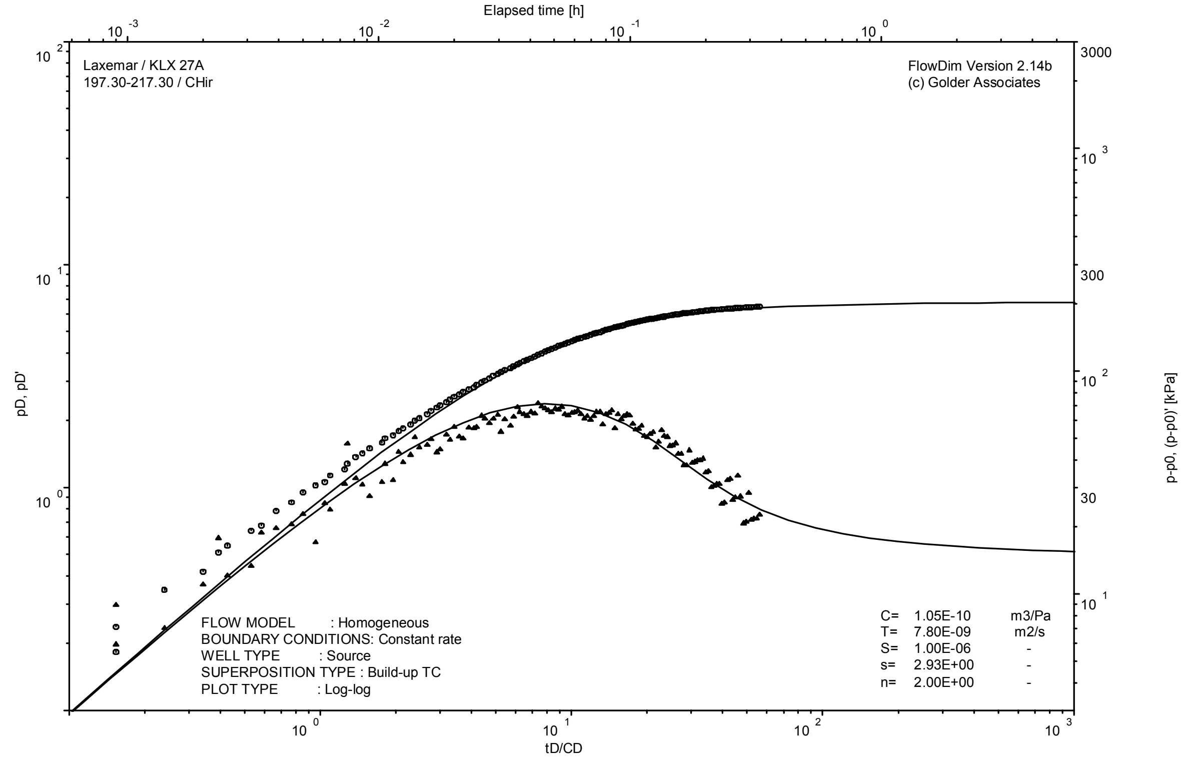
Pressure and flow rate vs. time; cartesian plot



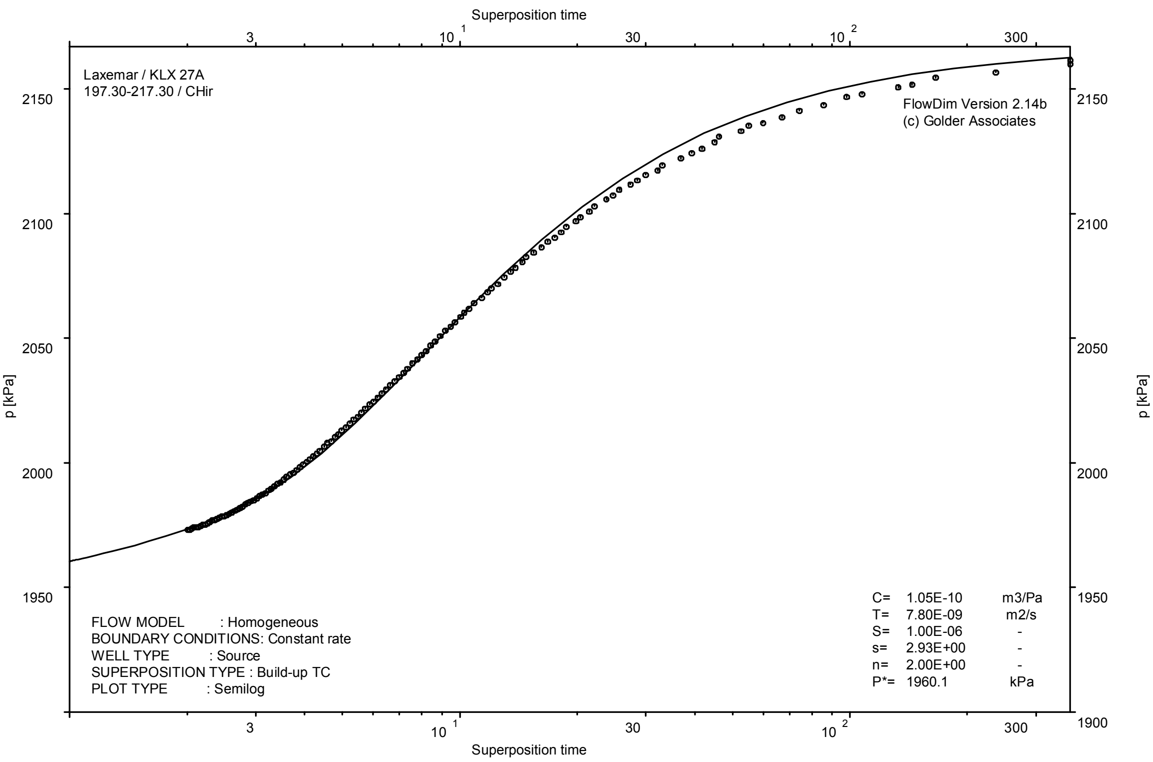
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

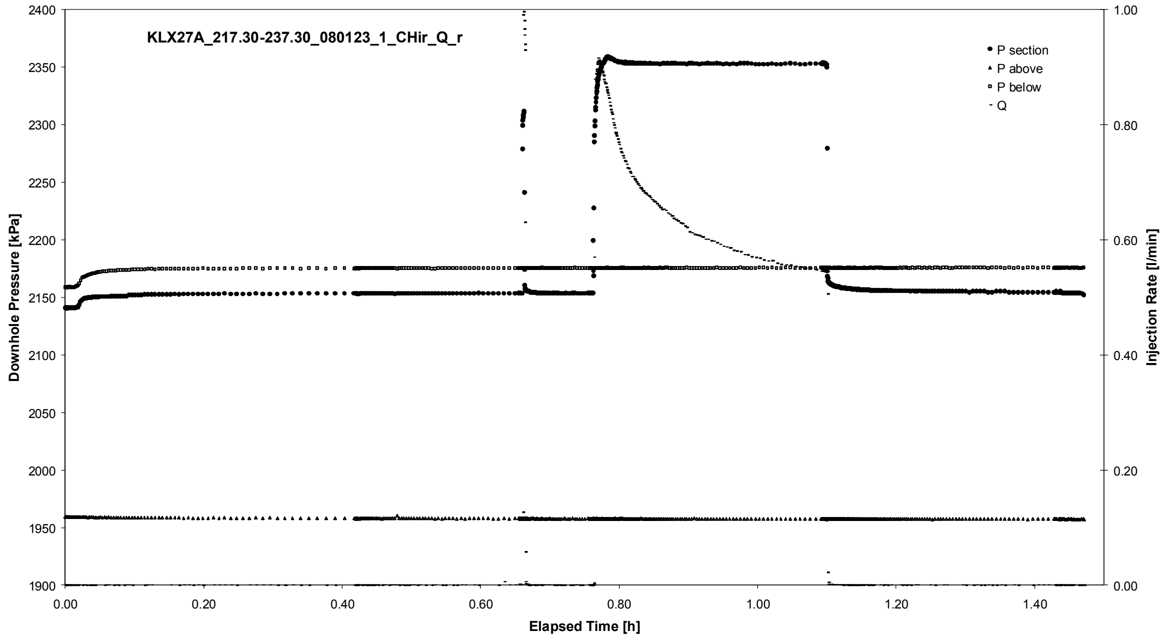


CHIR phase; HORNER match

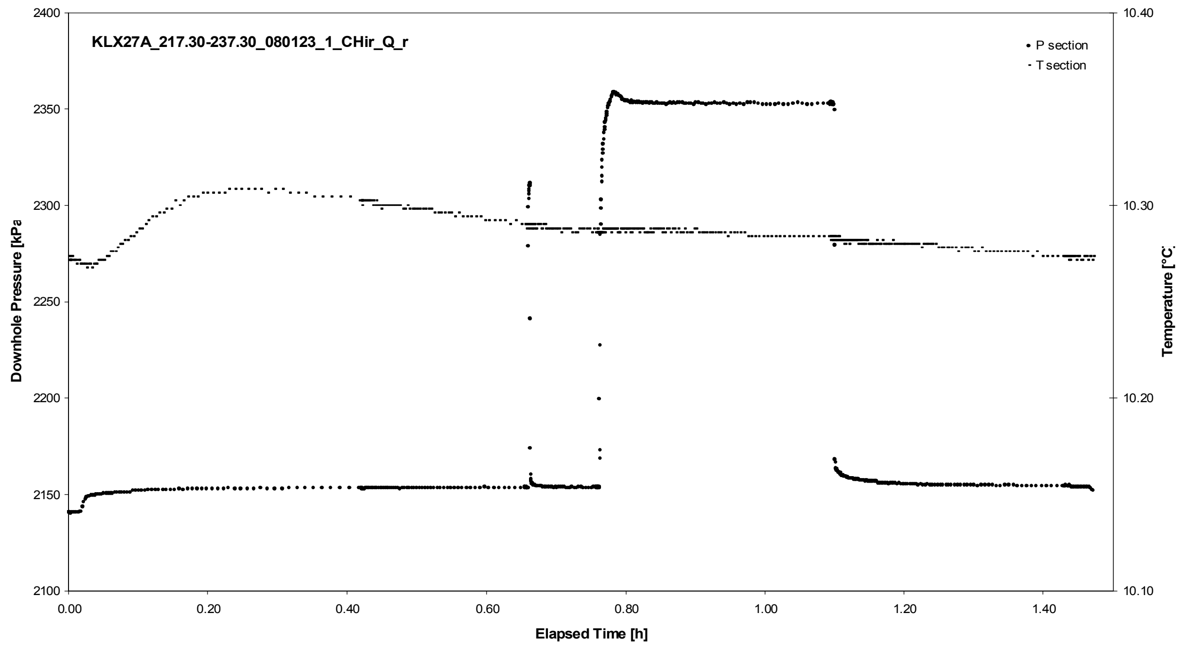
APPENDIX 2-14

Test 217.30 – 237.30 m

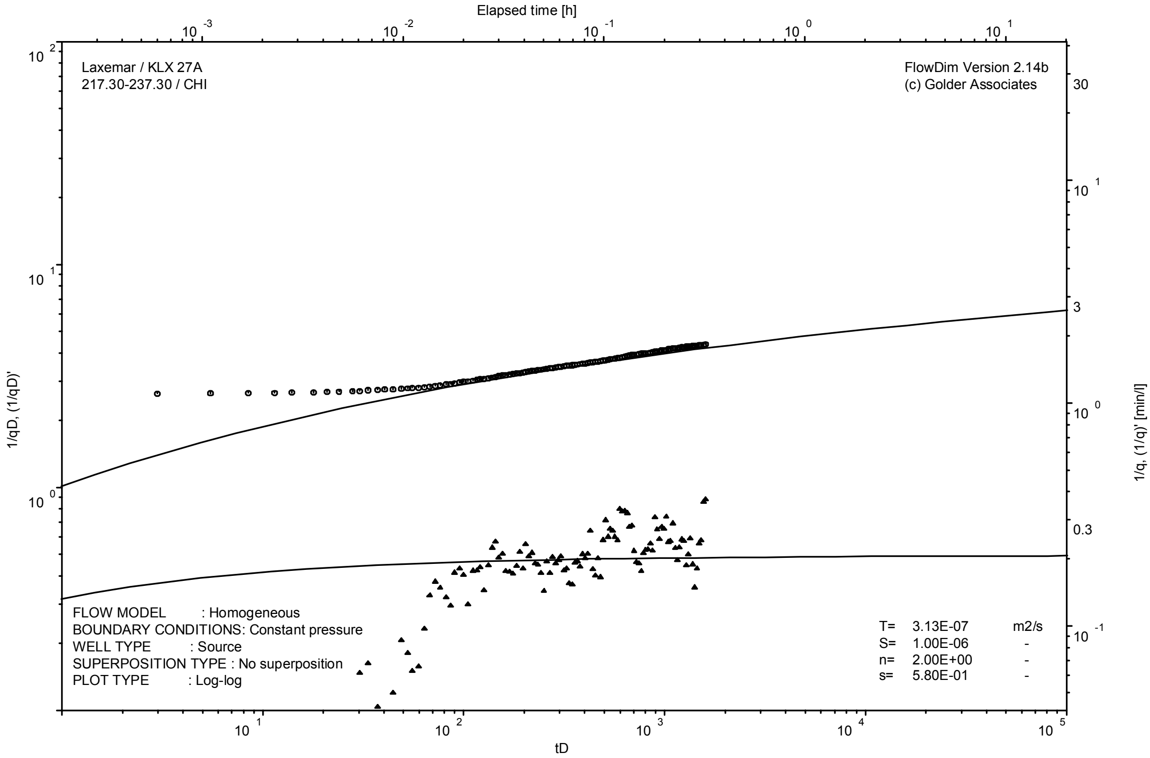
Analysis diagrams



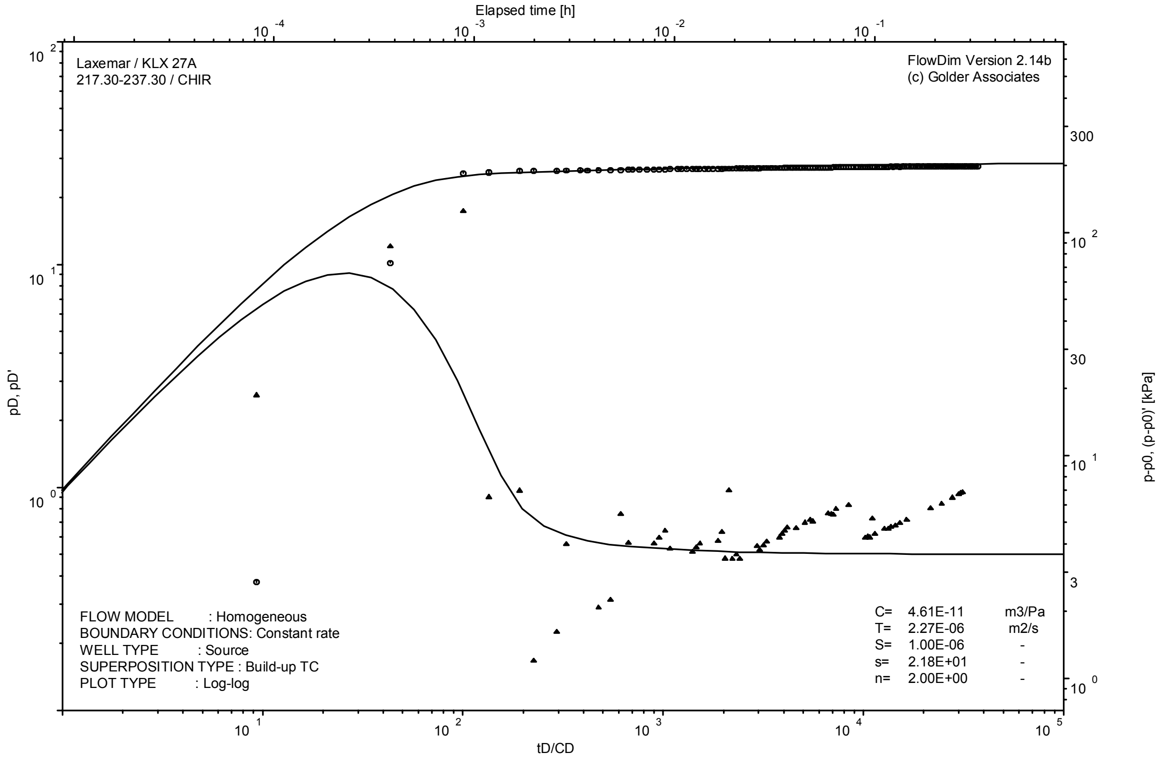
Pressure and flow rate vs. time; cartesian plot



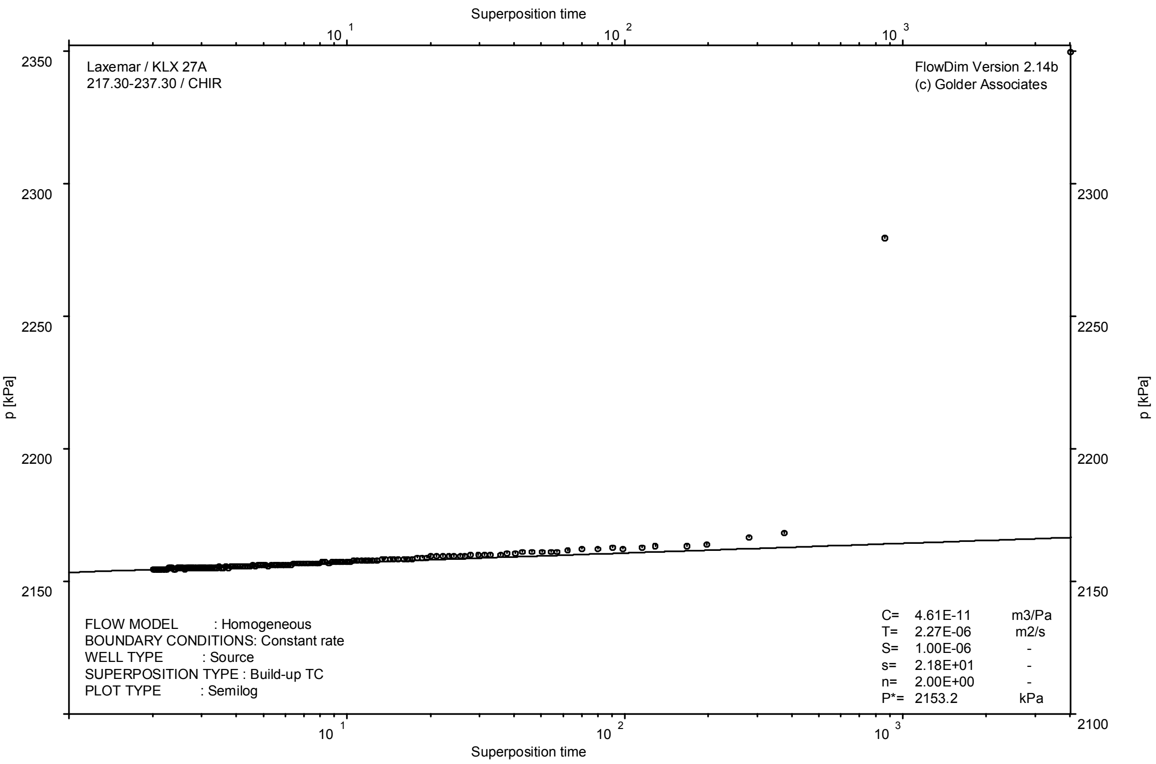
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

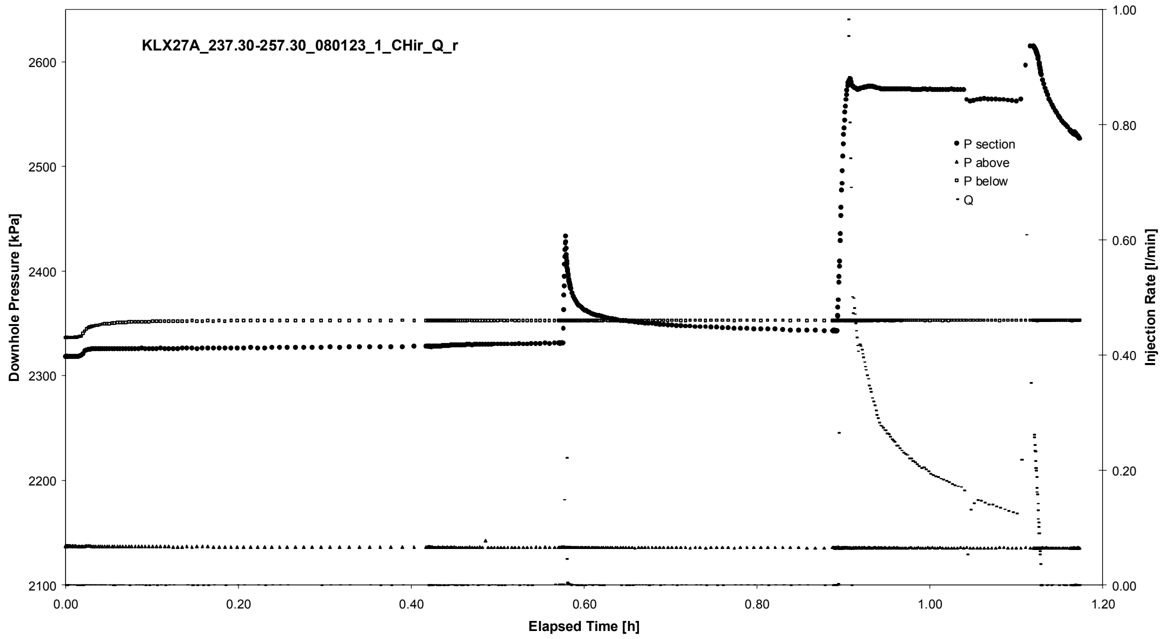


CHIR phase; HORNER match

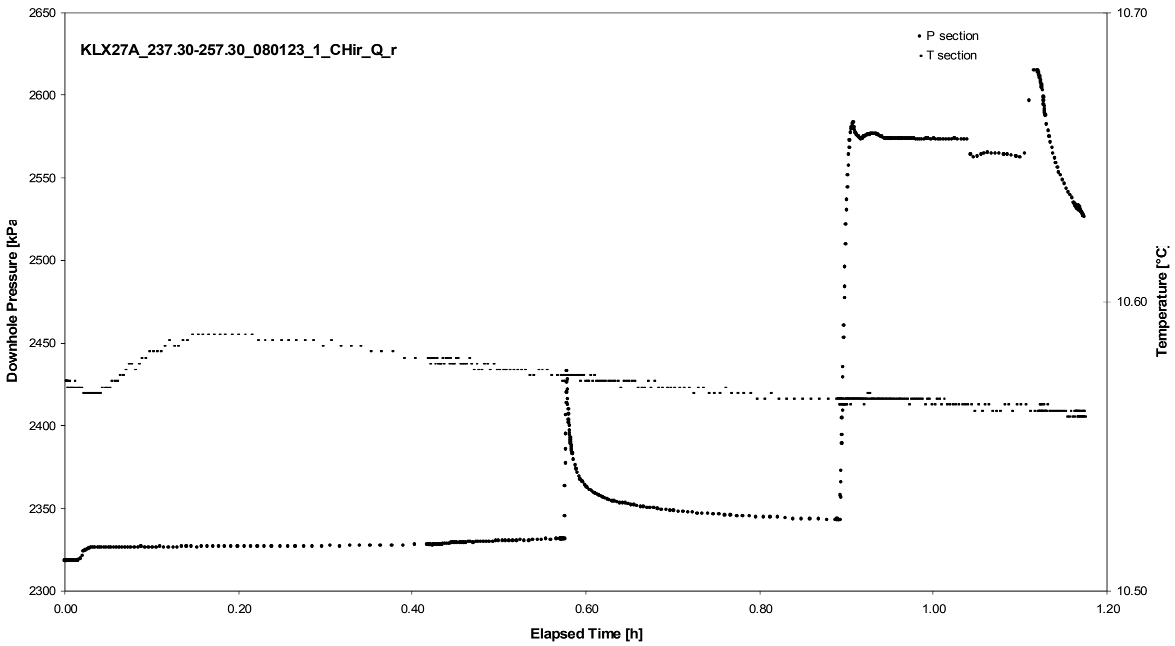
APPENDIX 2-15

Test 237.30 – 257.30 m

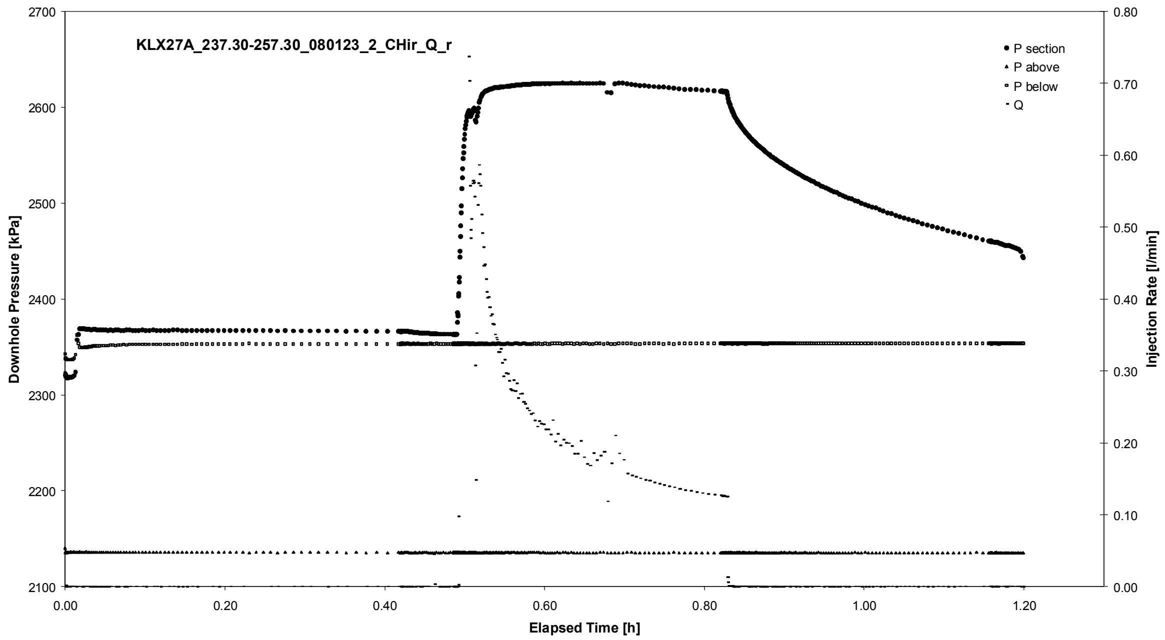
Analysis diagrams



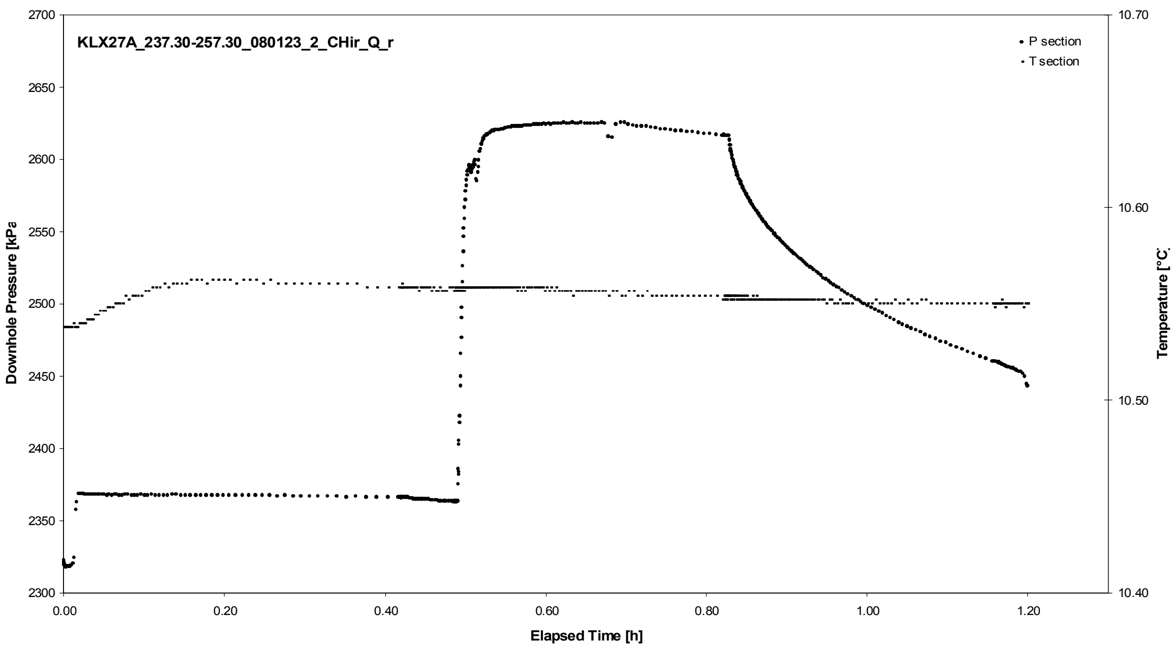
Pressure and flow rate vs. time; cartesian plot (repeated)



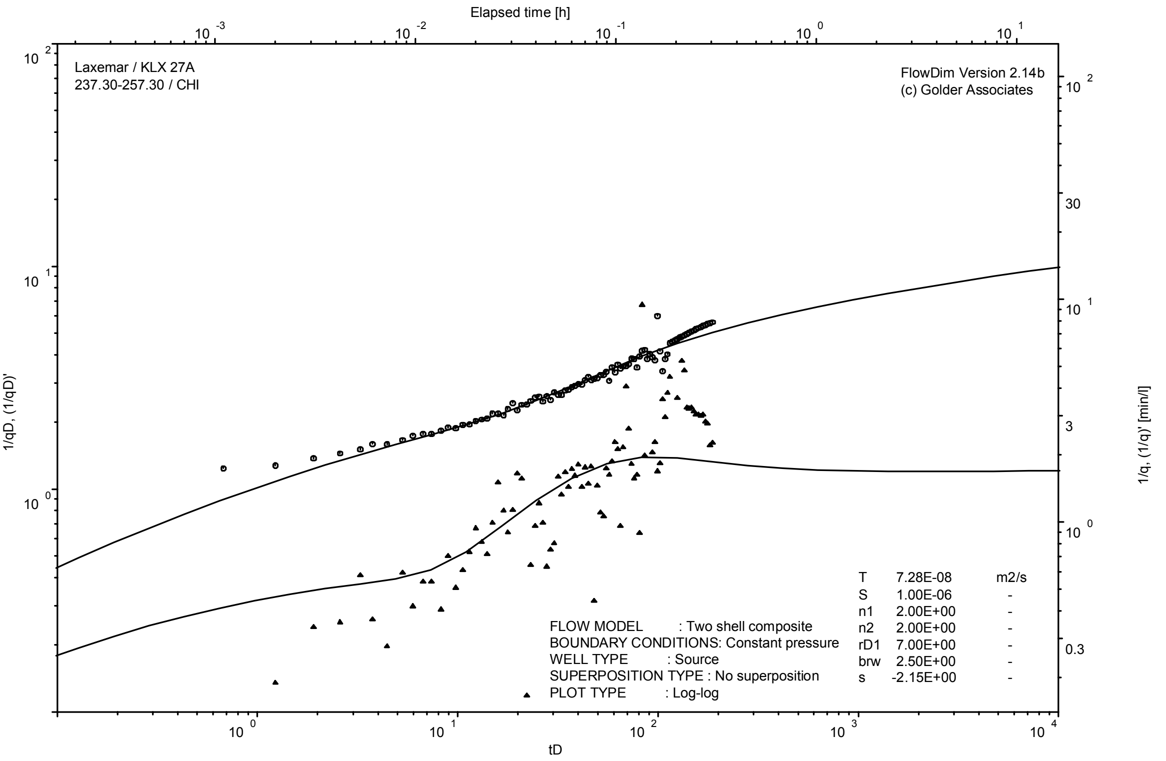
Interval pressure and temperature vs. time; cartesian plot (repeated)



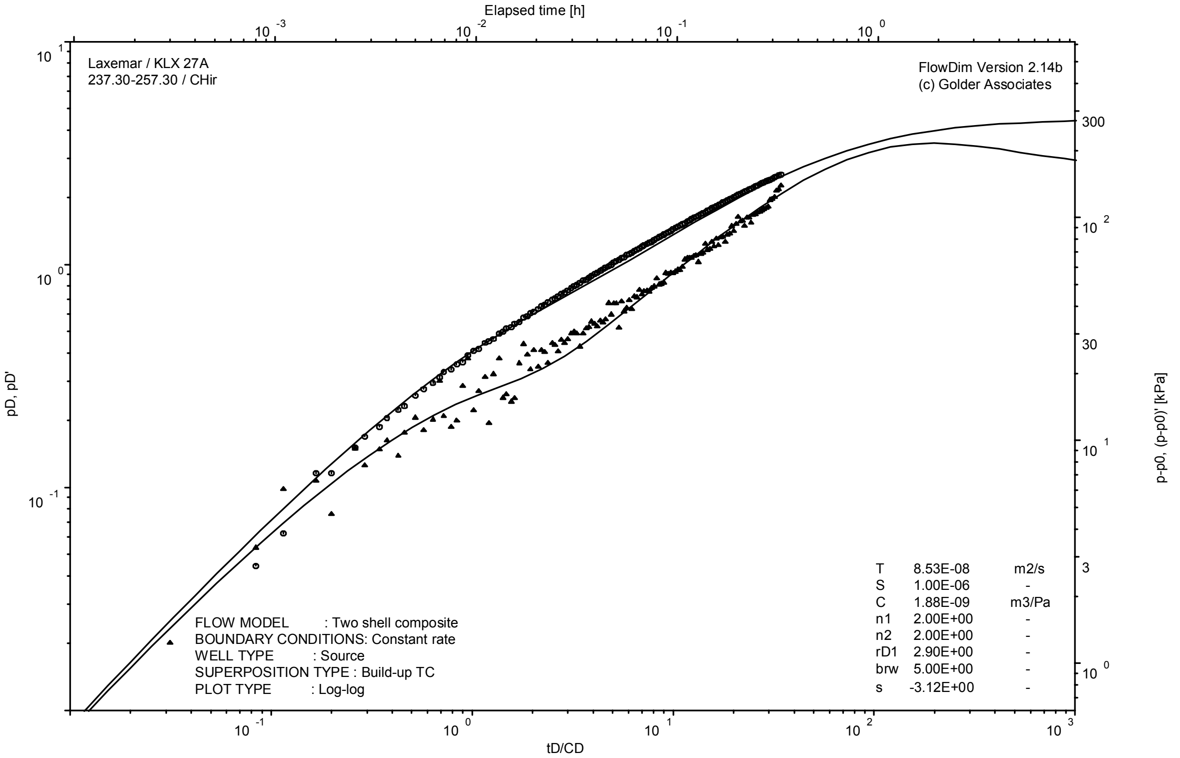
Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

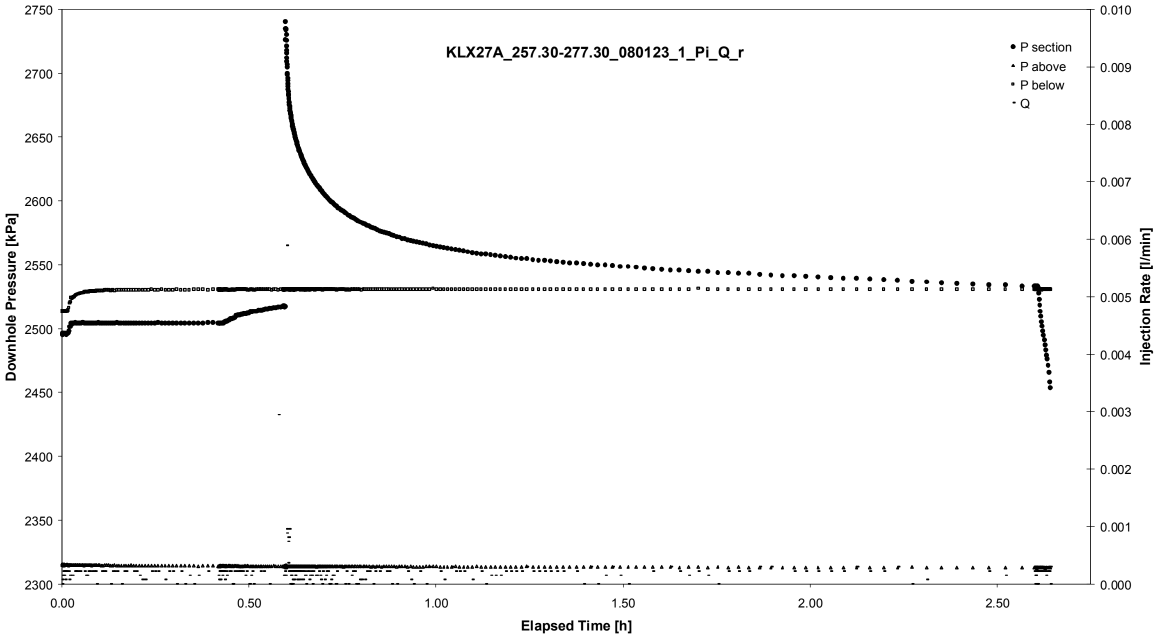
Not Analysable

CHIR phase; HORNER match

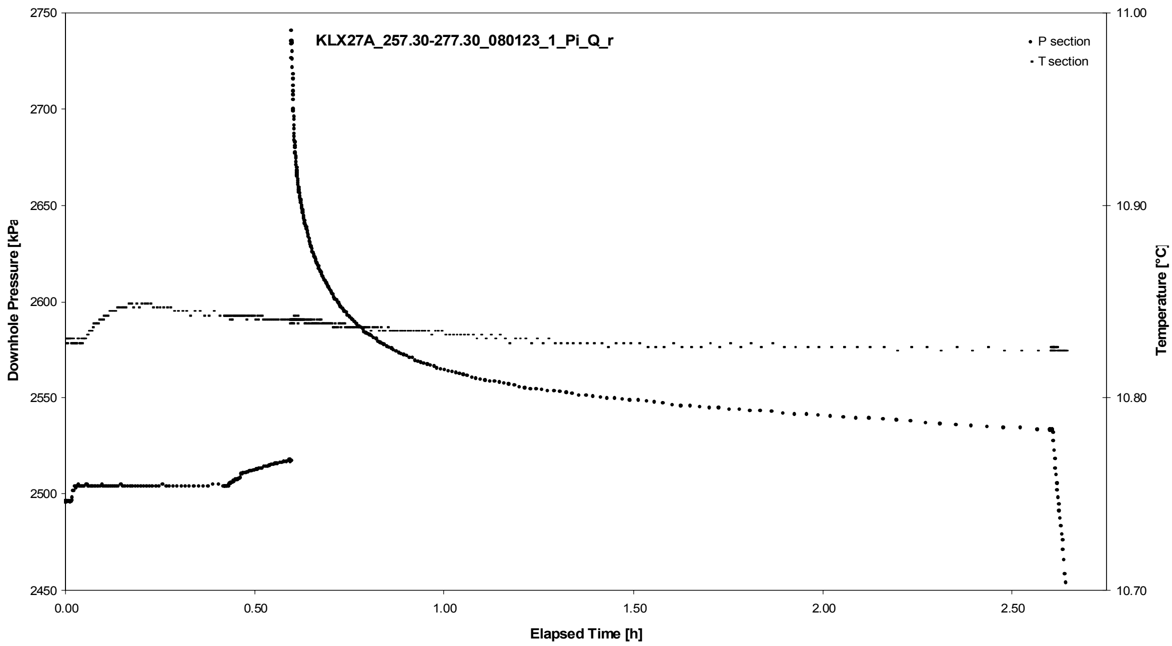
APPENDIX 2-16

Test 257.30 – 277.30 m

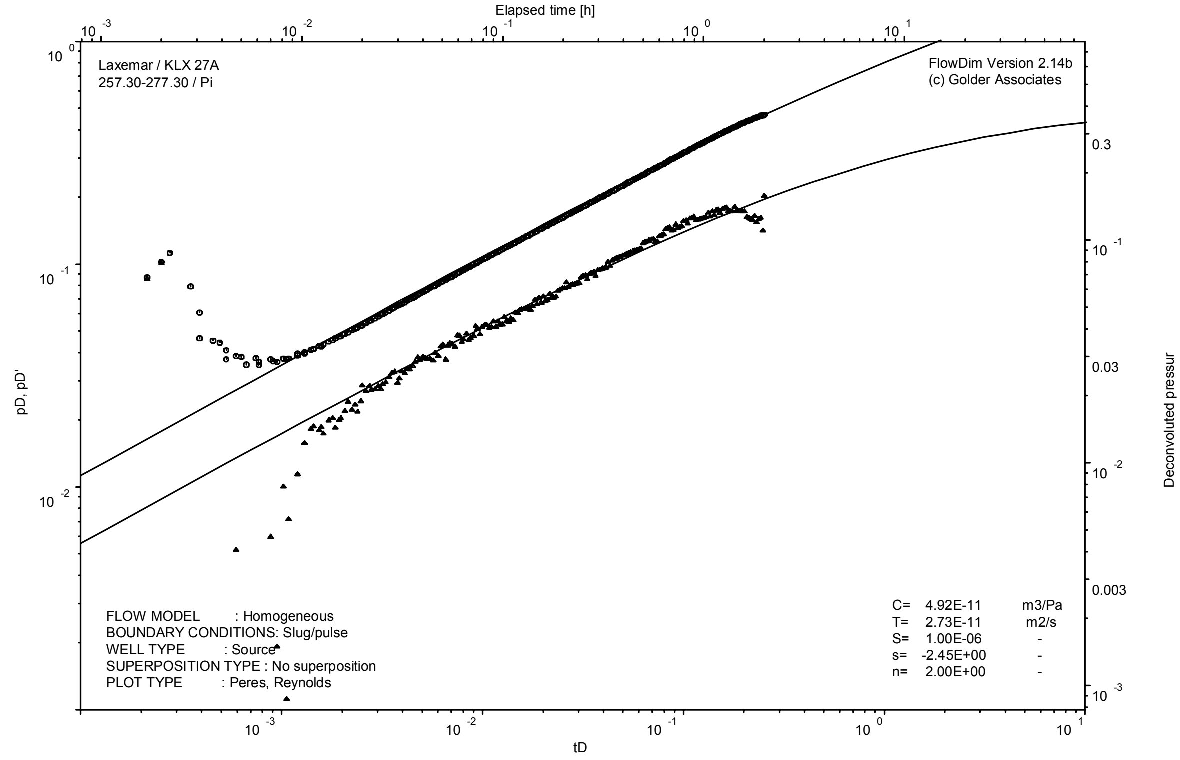
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

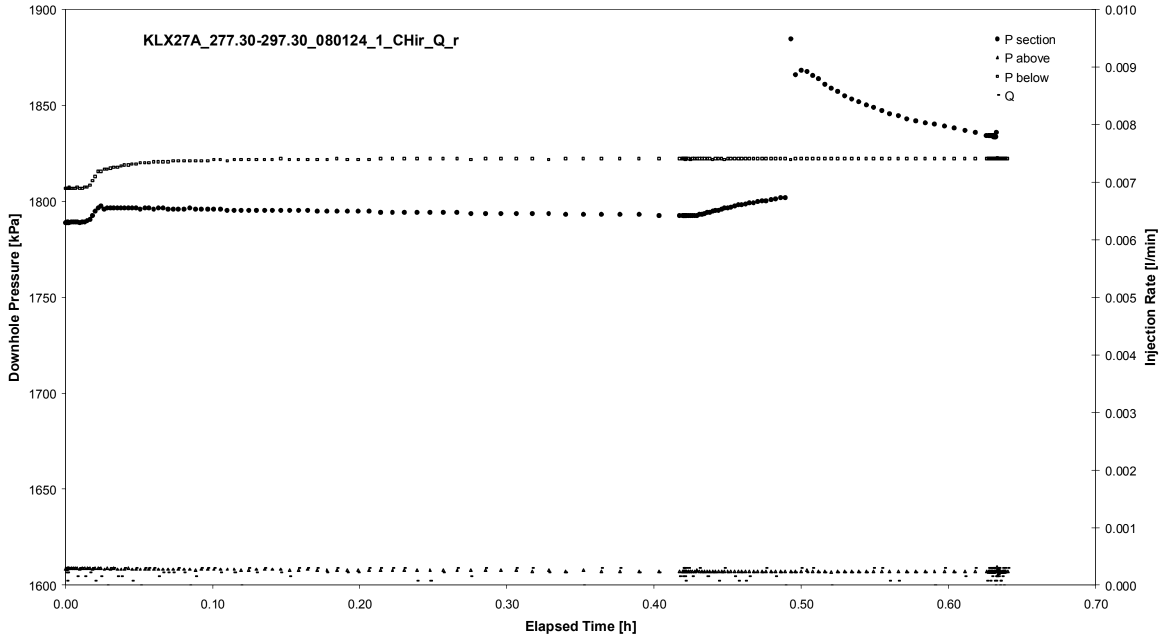


Pulse injection; deconvolution match

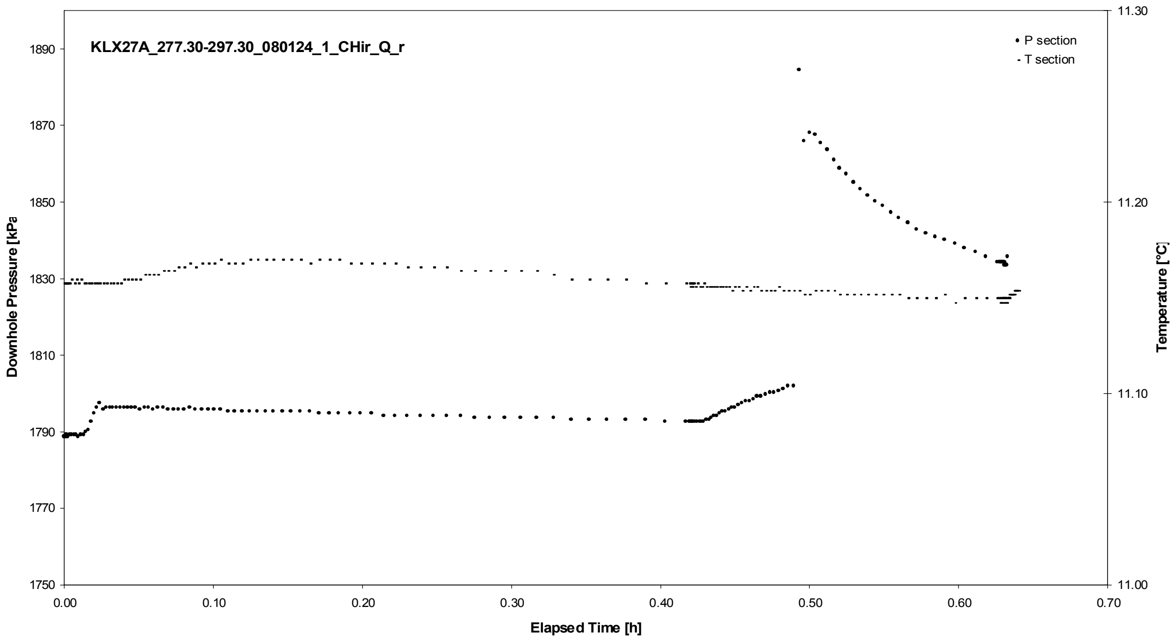
APPENDIX 2-17

Test 277.30 – 297.30 m

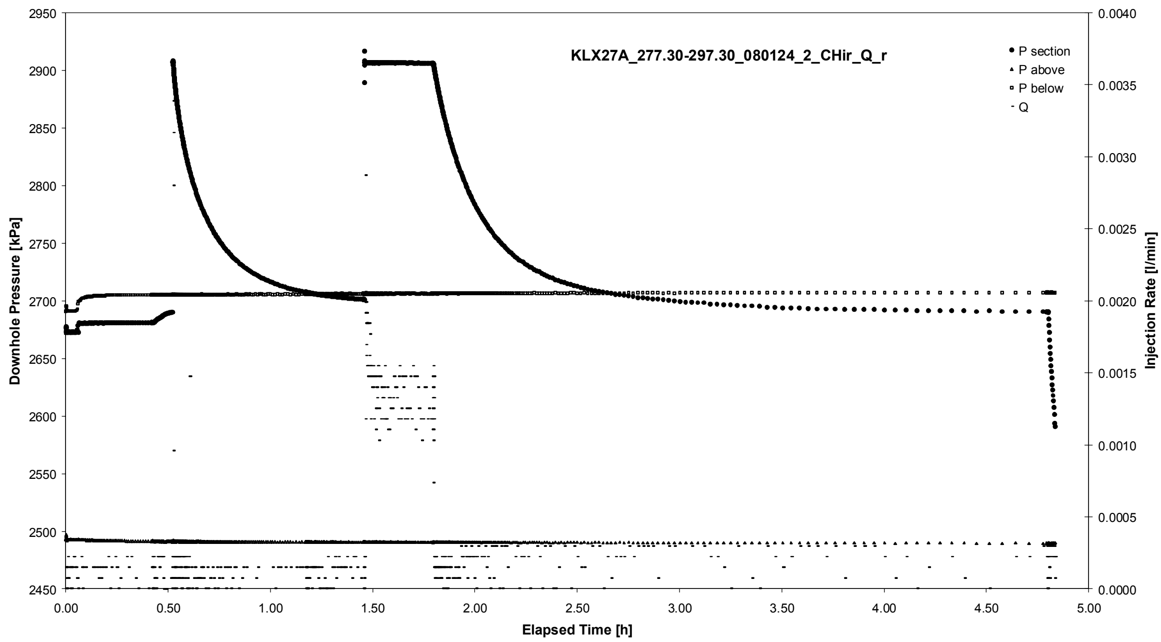
Analysis diagrams



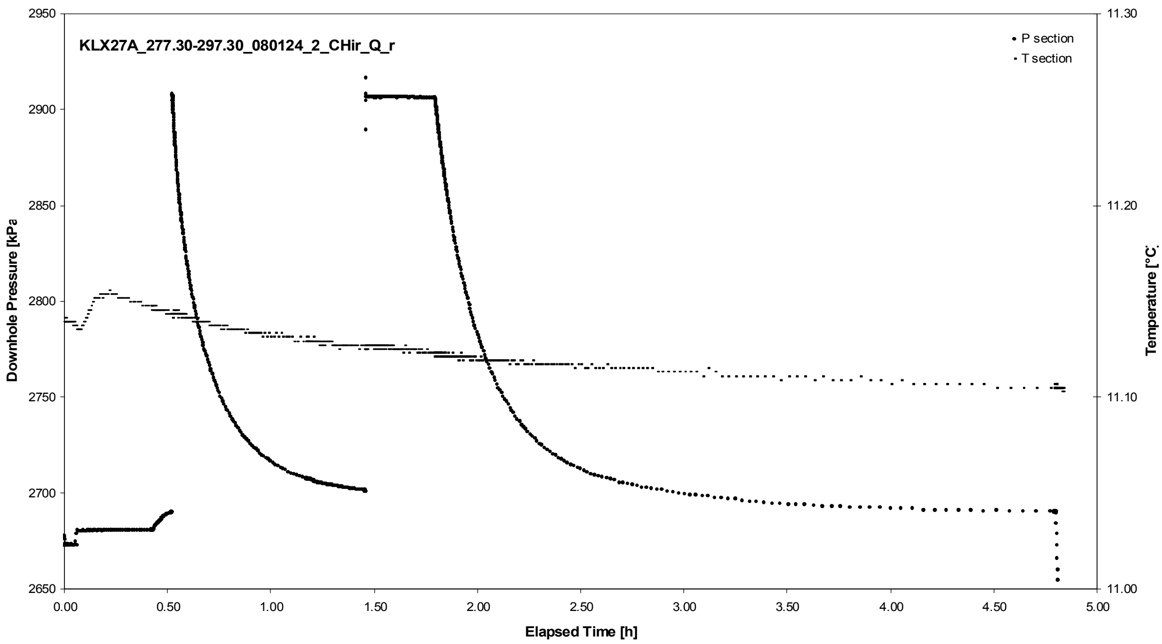
Pressure and flow rate vs. time; cartesian plot (repeated)



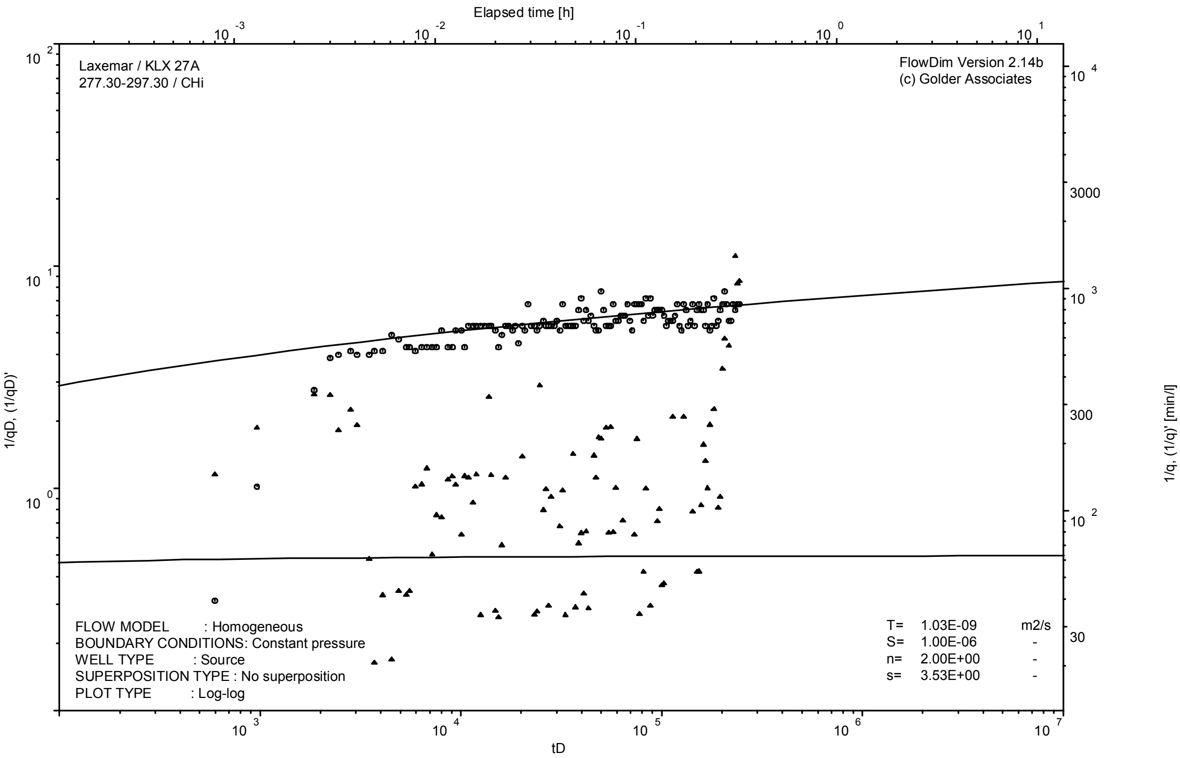
Interval pressure and temperature vs. time; cartesian plot (repeated)



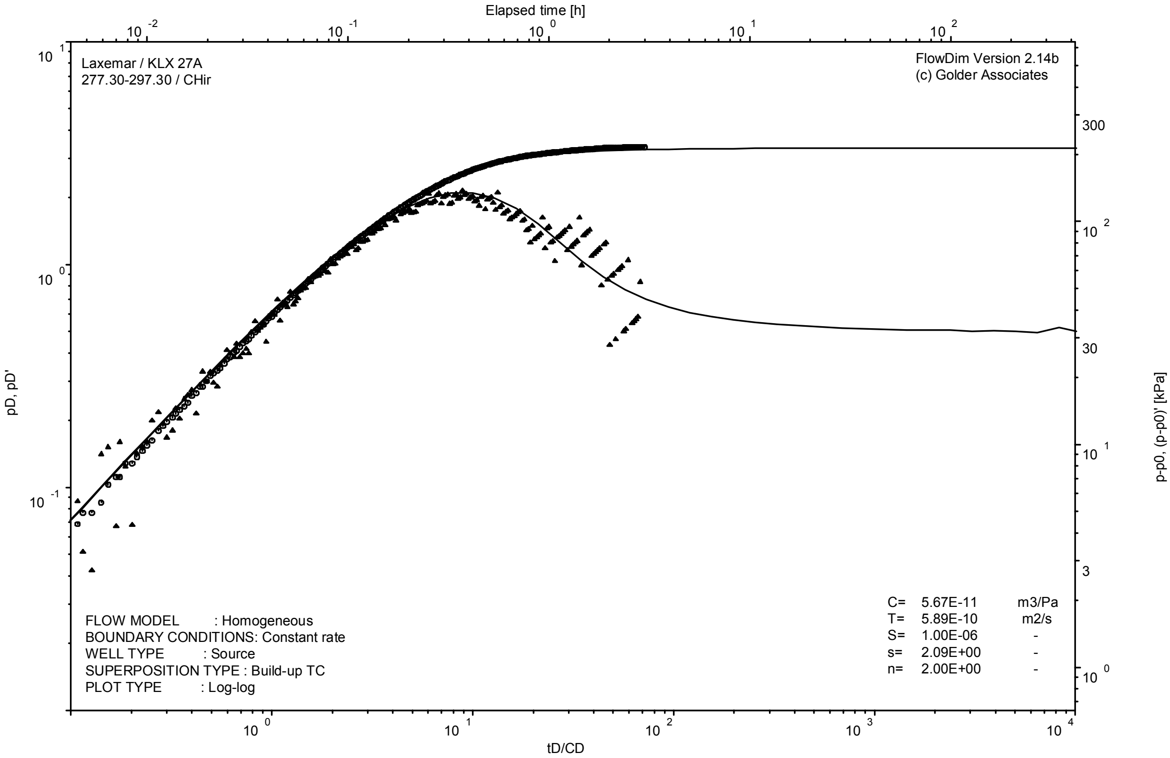
Pressure and flow rate vs. time; cartesian plot



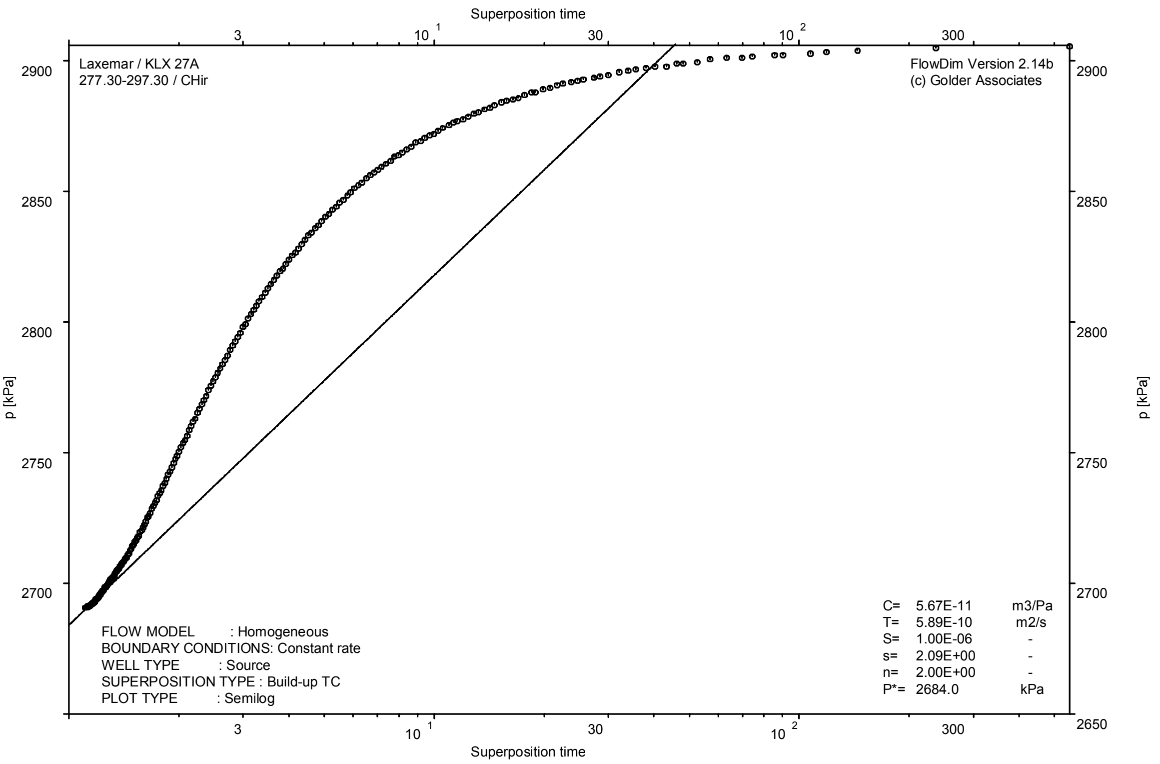
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

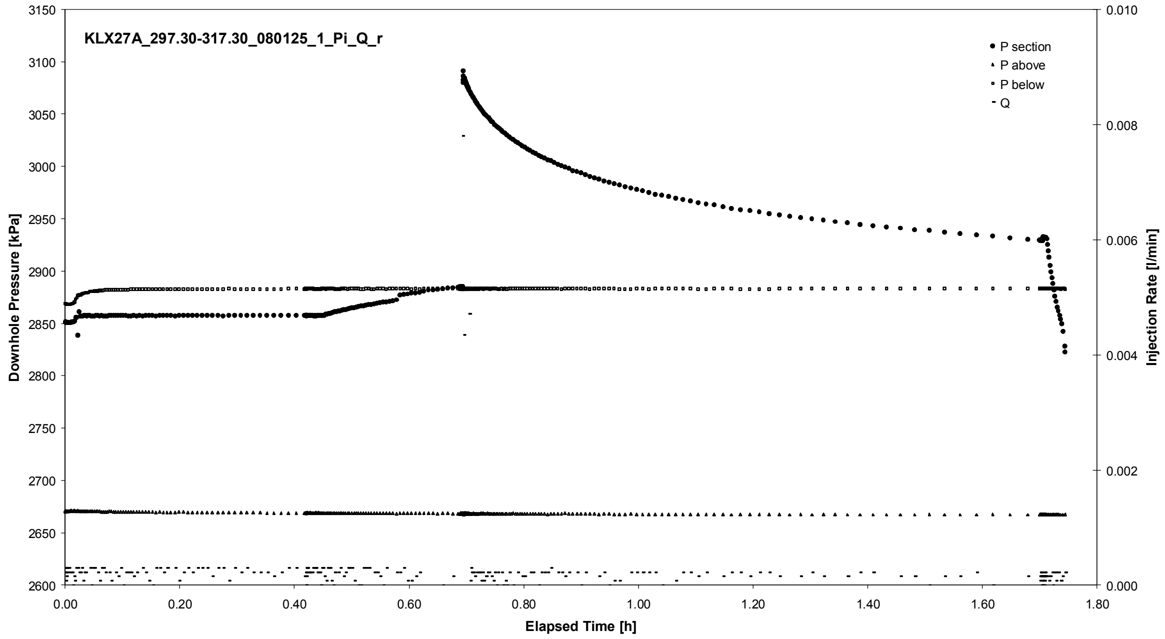


CHIR phase; HORNER match

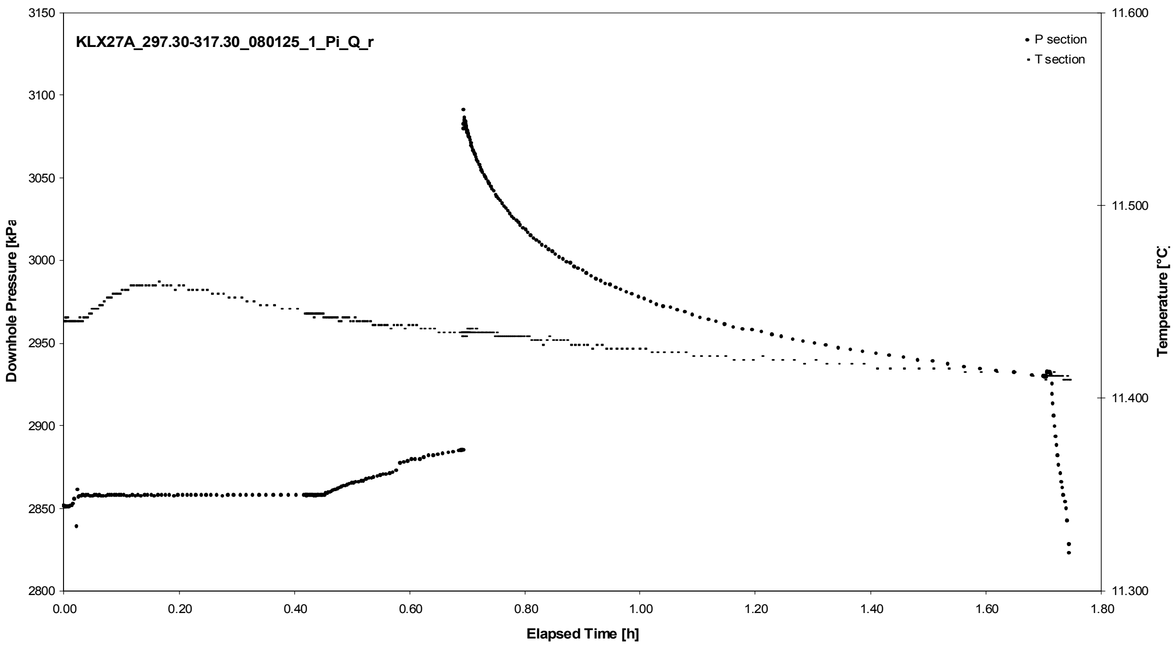
APPENDIX 2-18

Test 297.30 – 317.30 m

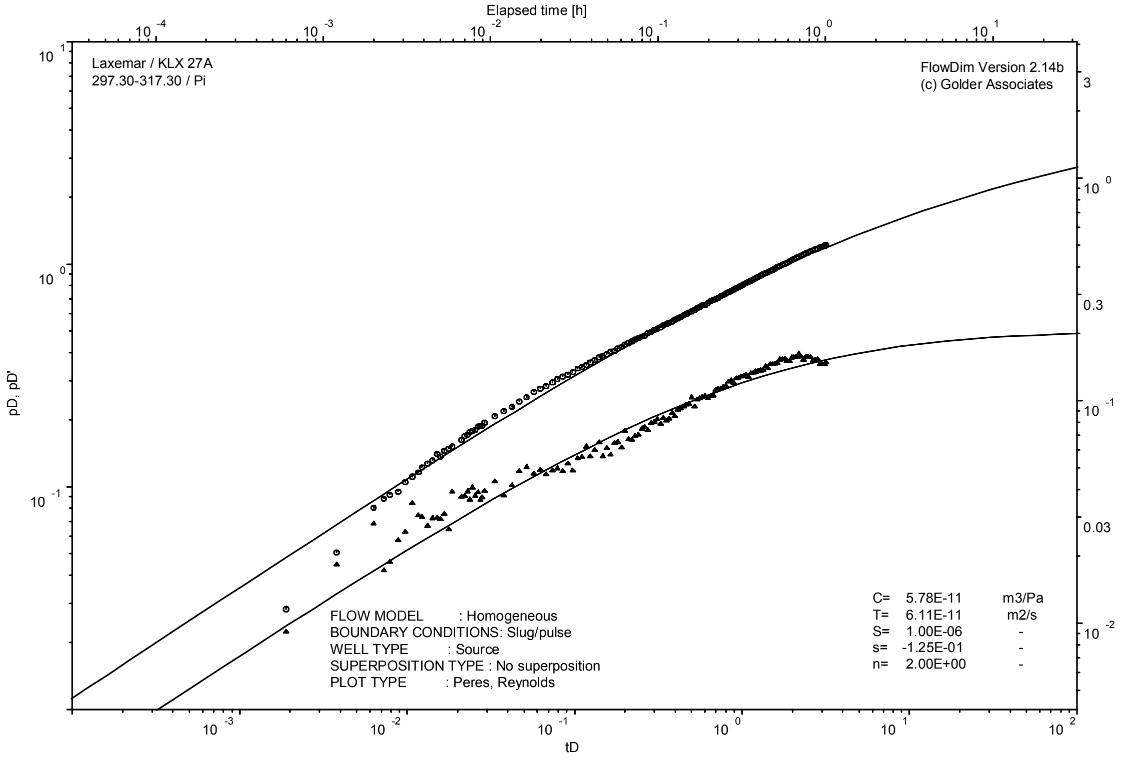
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

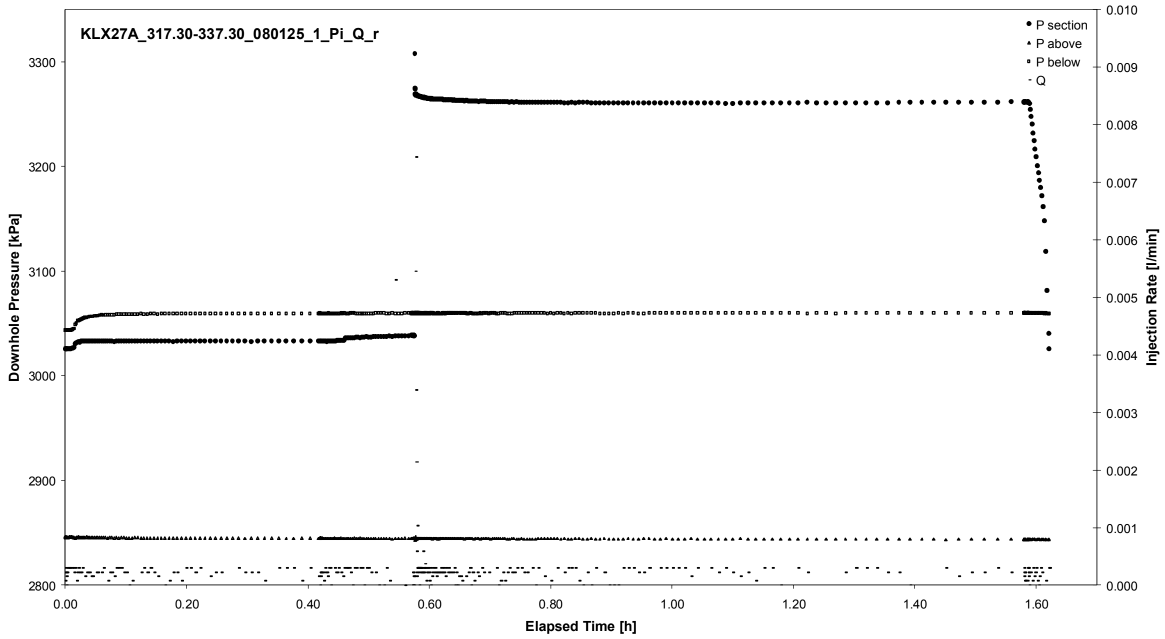


Pulse injection; deconvolution match

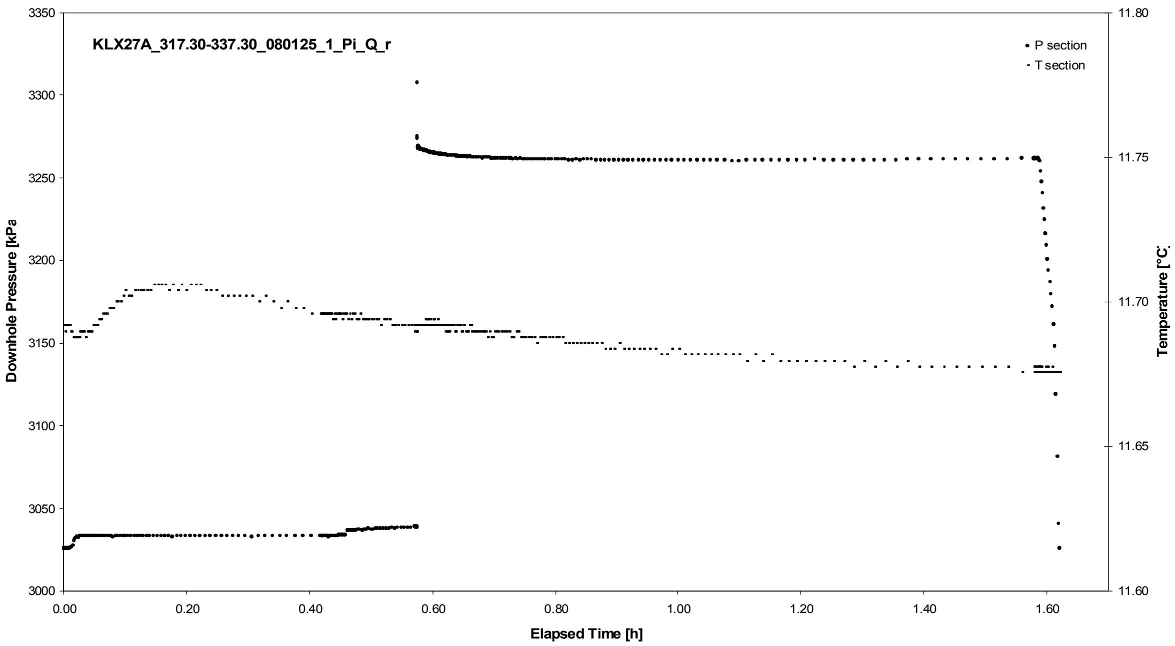
APPENDIX 2-19

Test 317.30 – 337.30 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

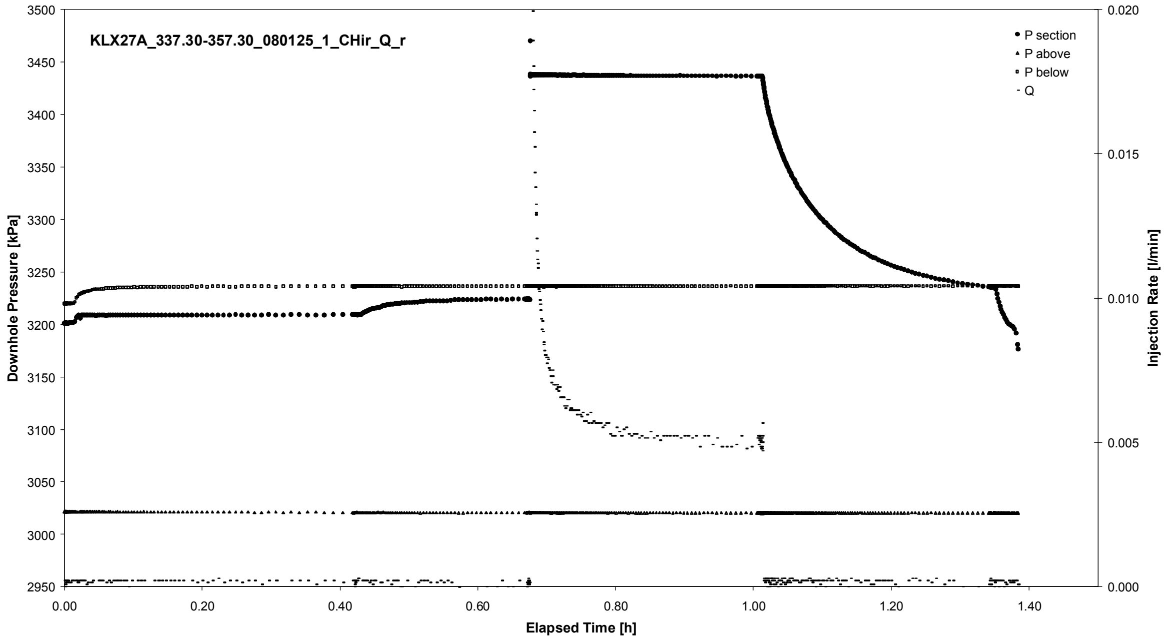
Not analysed

Pulse injection; deconvolution match

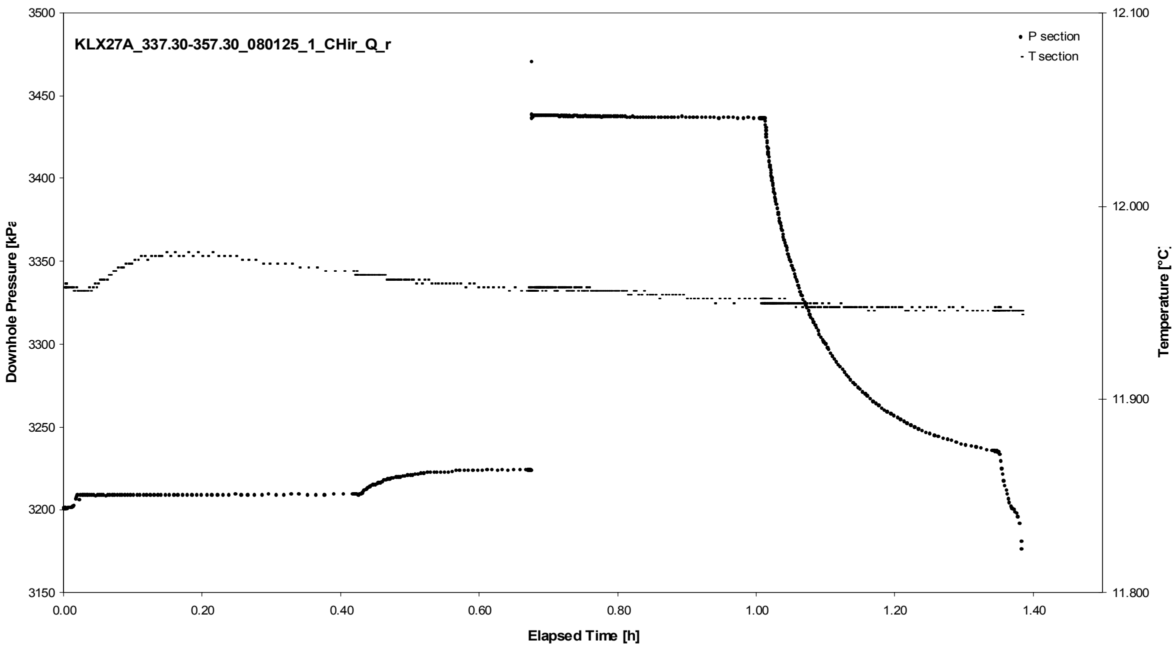
APPENDIX 2-20

Test 337.30 – 357.30 m

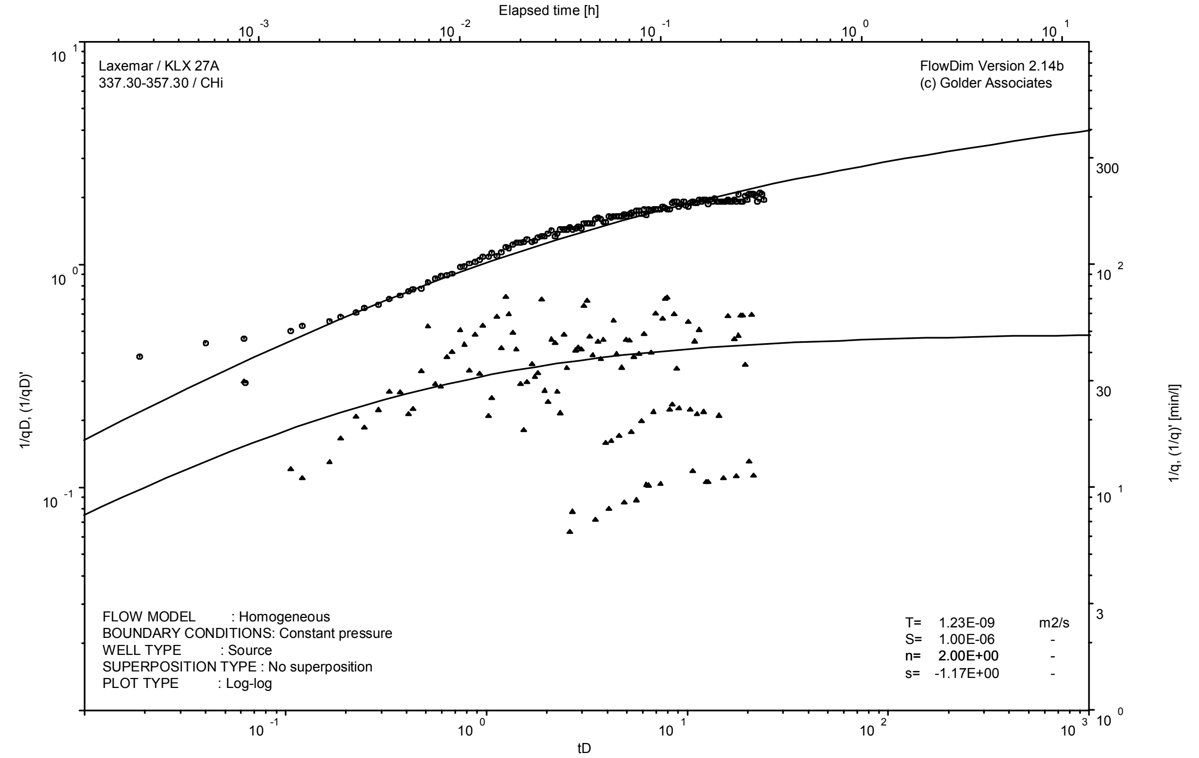
Analysis diagrams



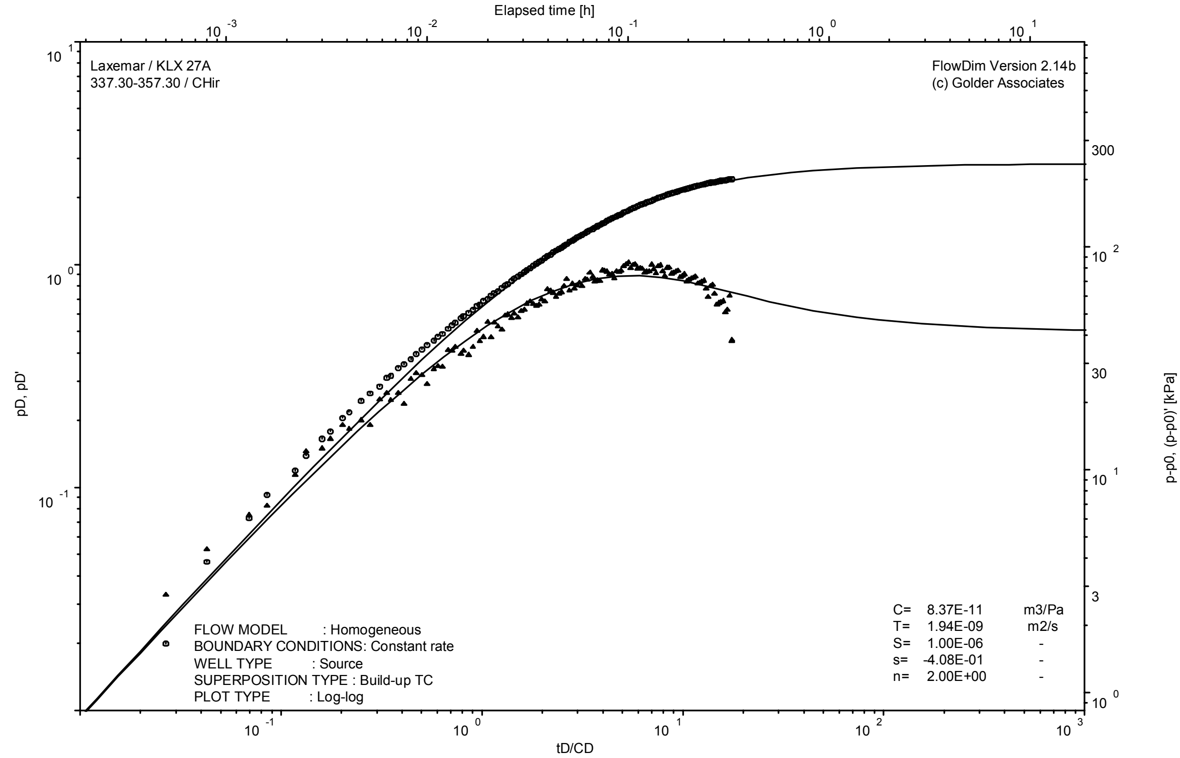
Pressure and flow rate vs. time; cartesian plot



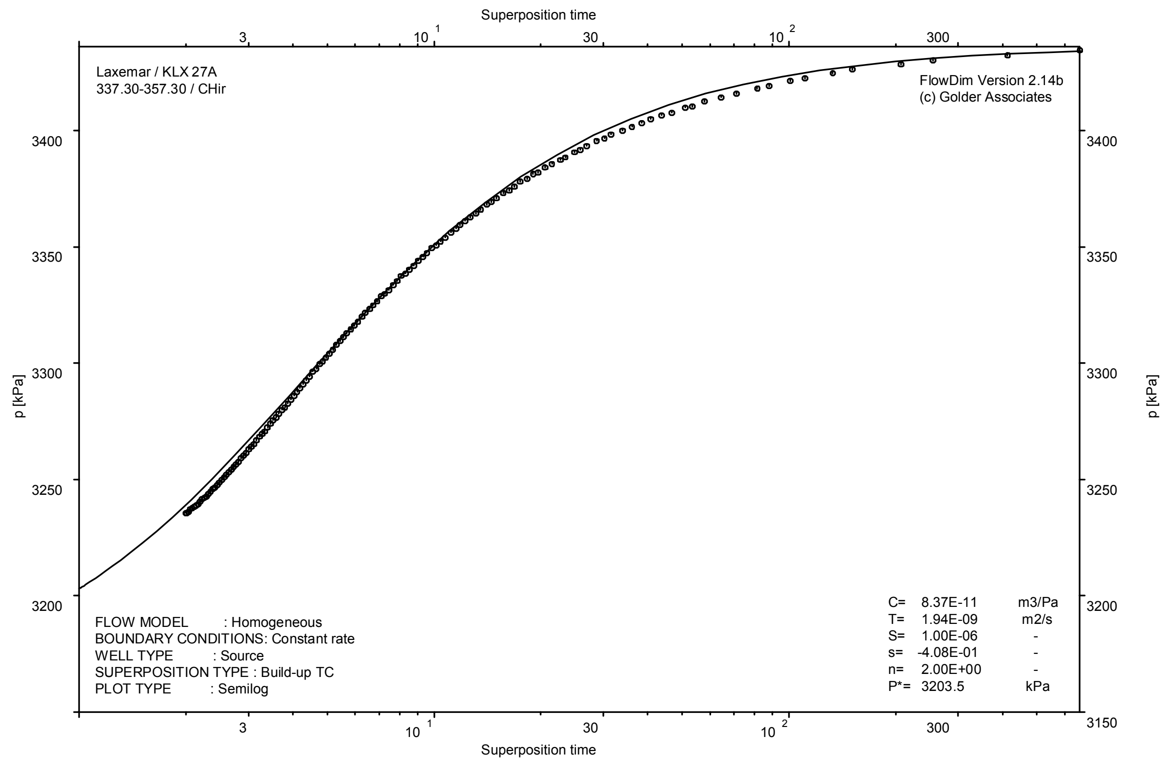
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

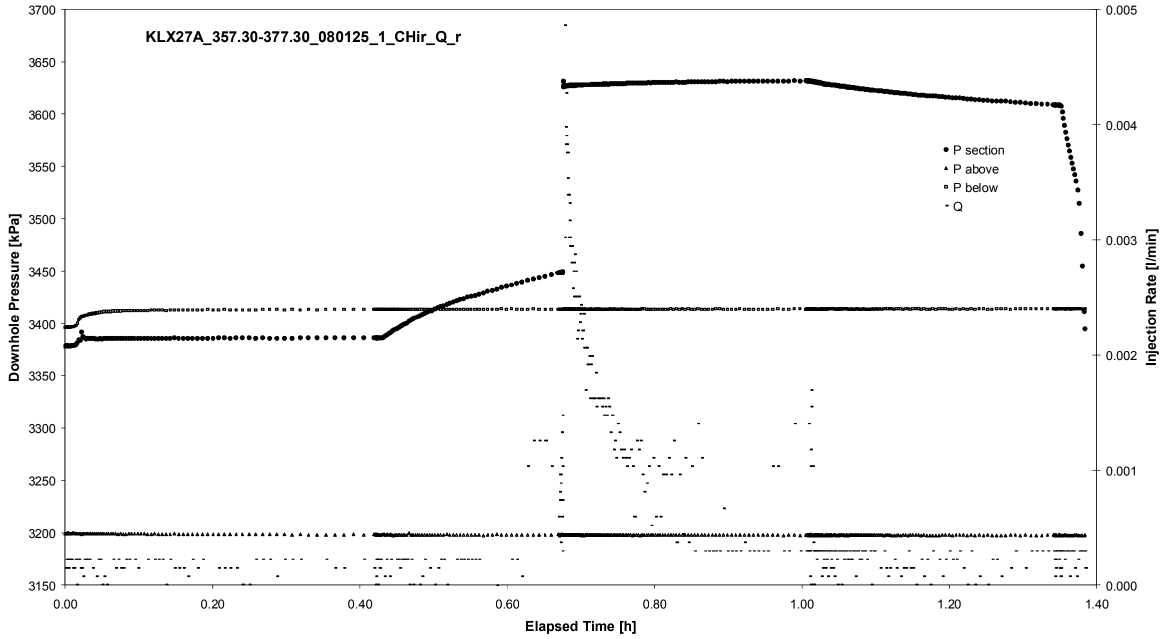


CHIR phase; HORNER match

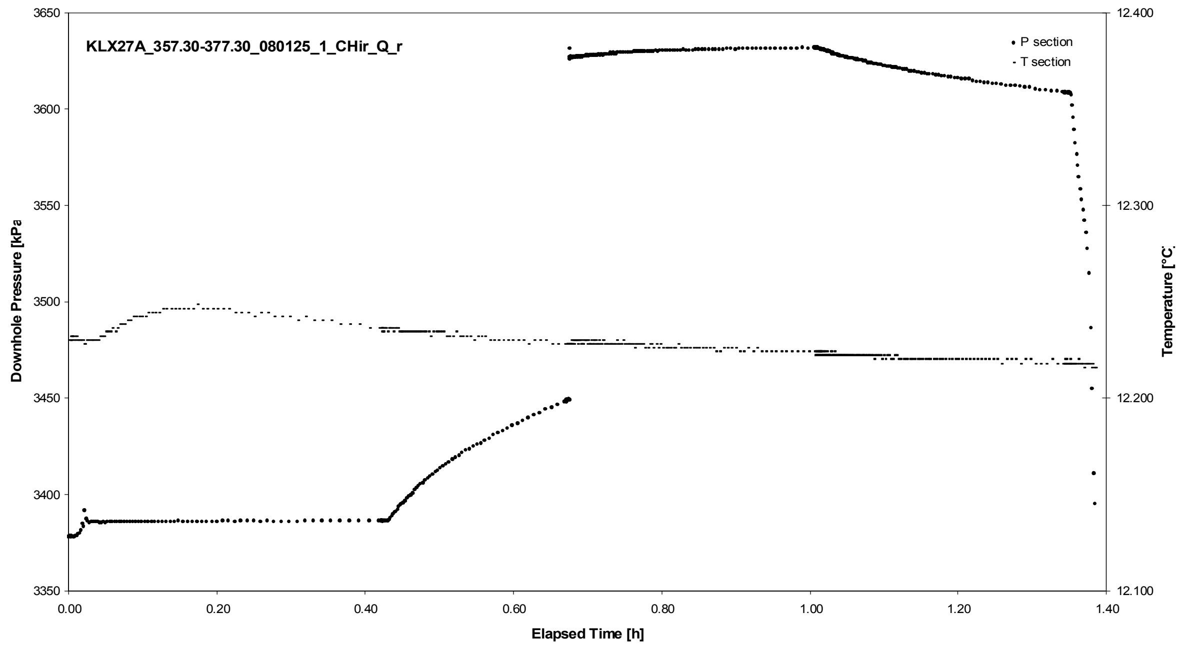
APPENDIX 2-21

Test 357.30 – 377.30 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

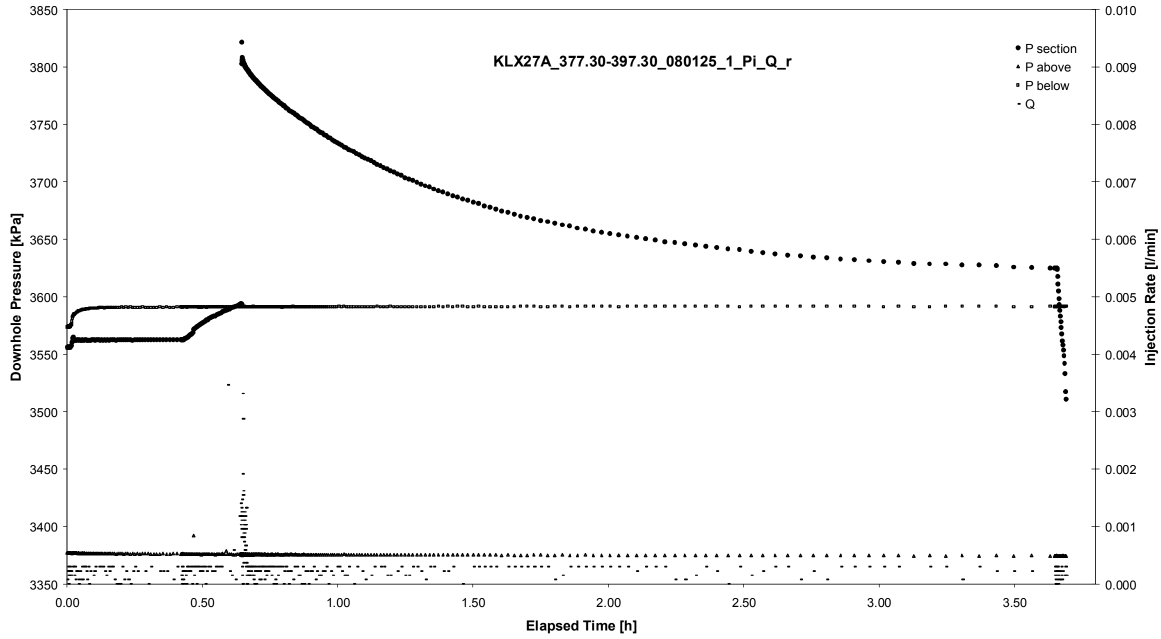
Not analysed

CHIR phase; HORNER match

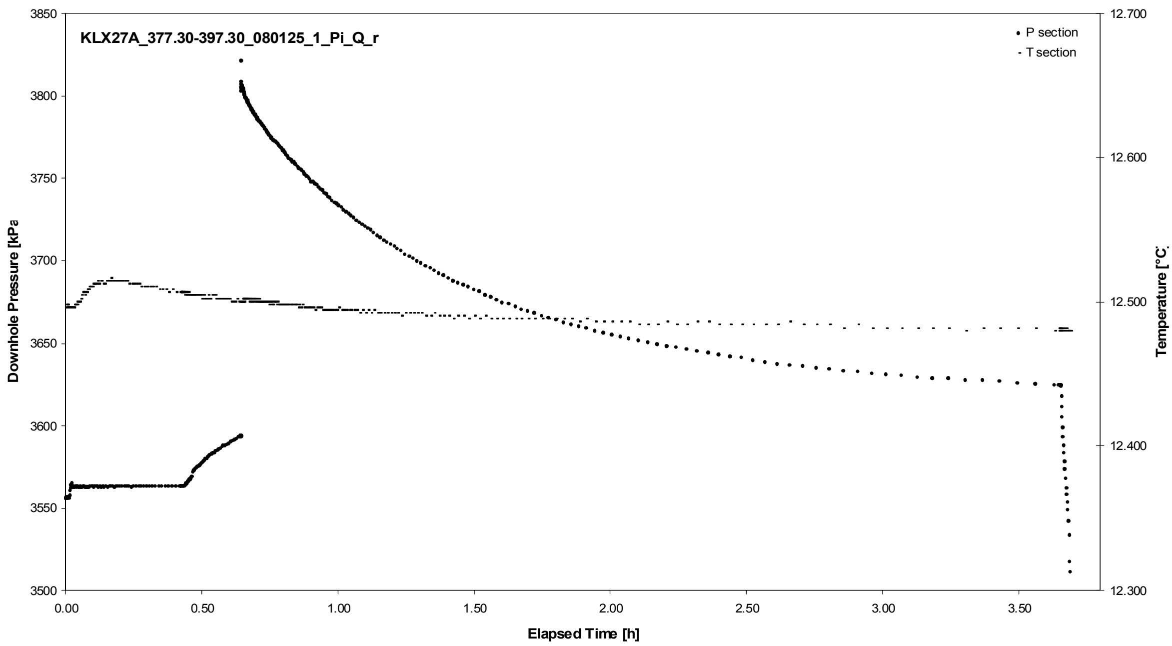
APPENDIX 2-22

Test 377.30 – 397.30 m

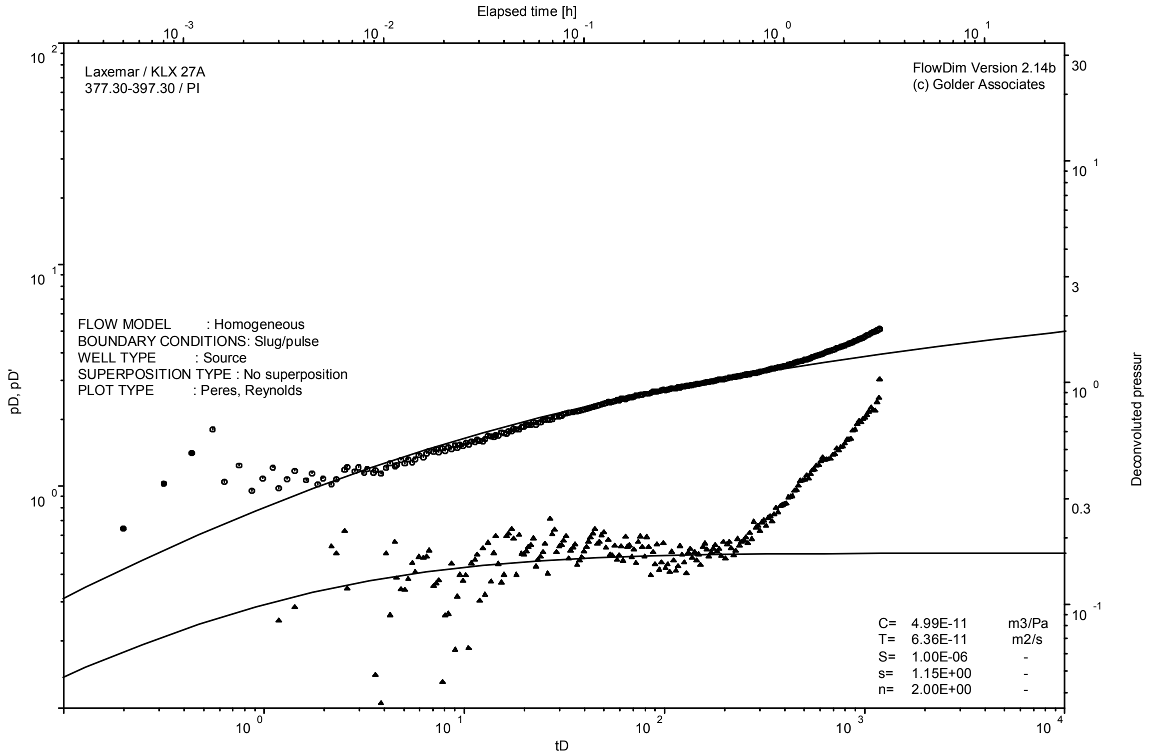
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

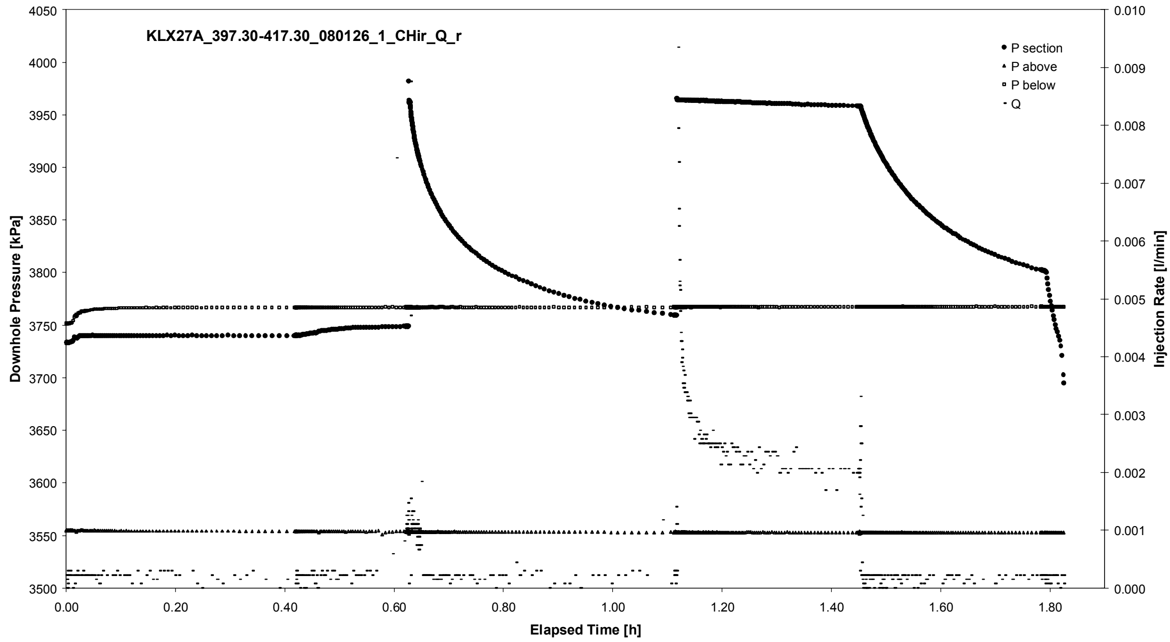


Pulse injection; deconvolution match

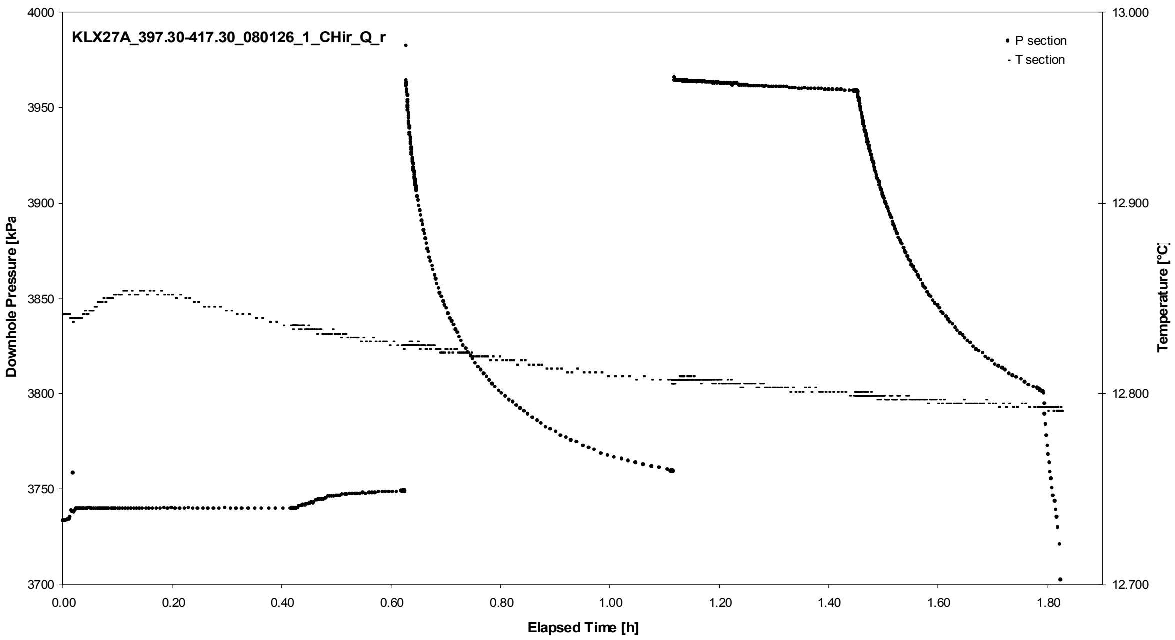
APPENDIX 2-23

Test 397.30 – 417.30 m

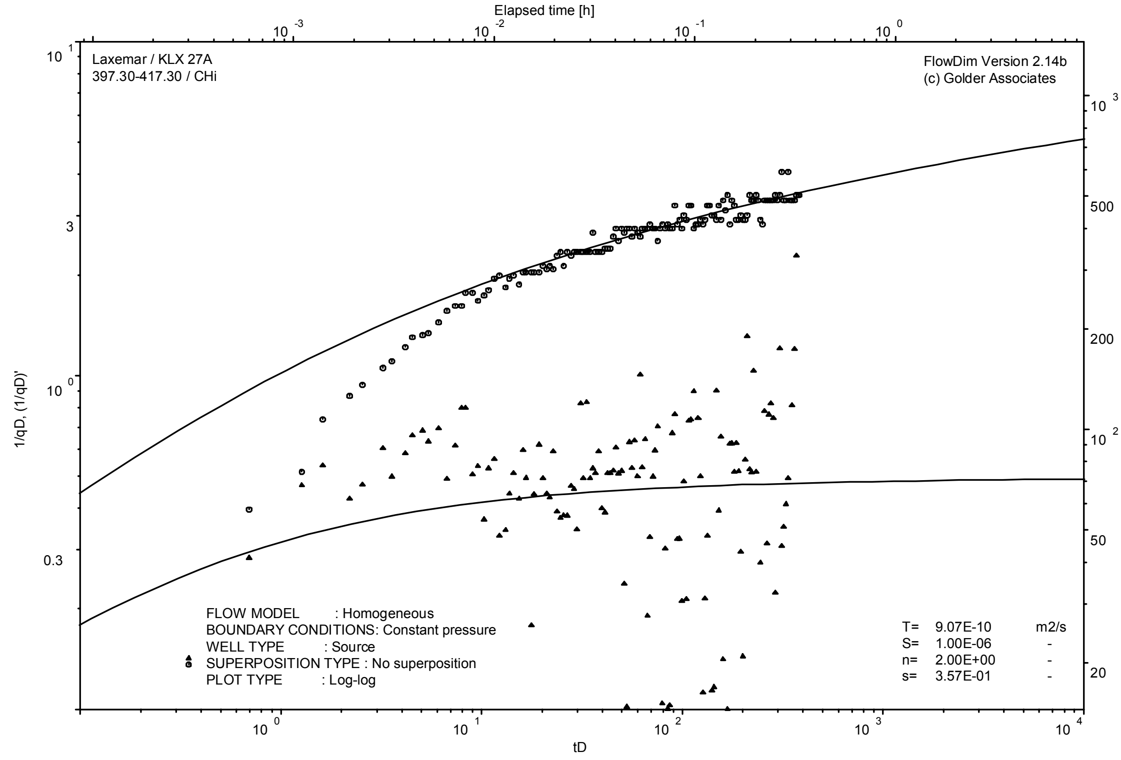
Analysis diagrams



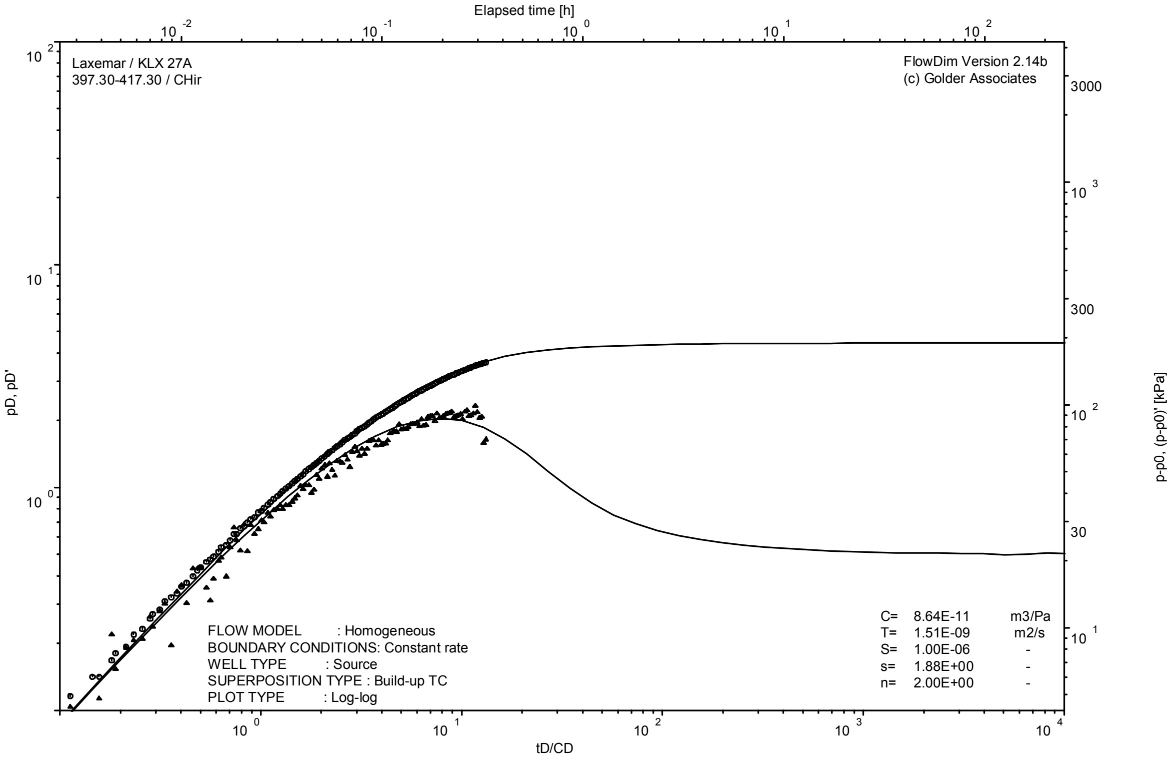
Pressure and flow rate vs. time; cartesian plot



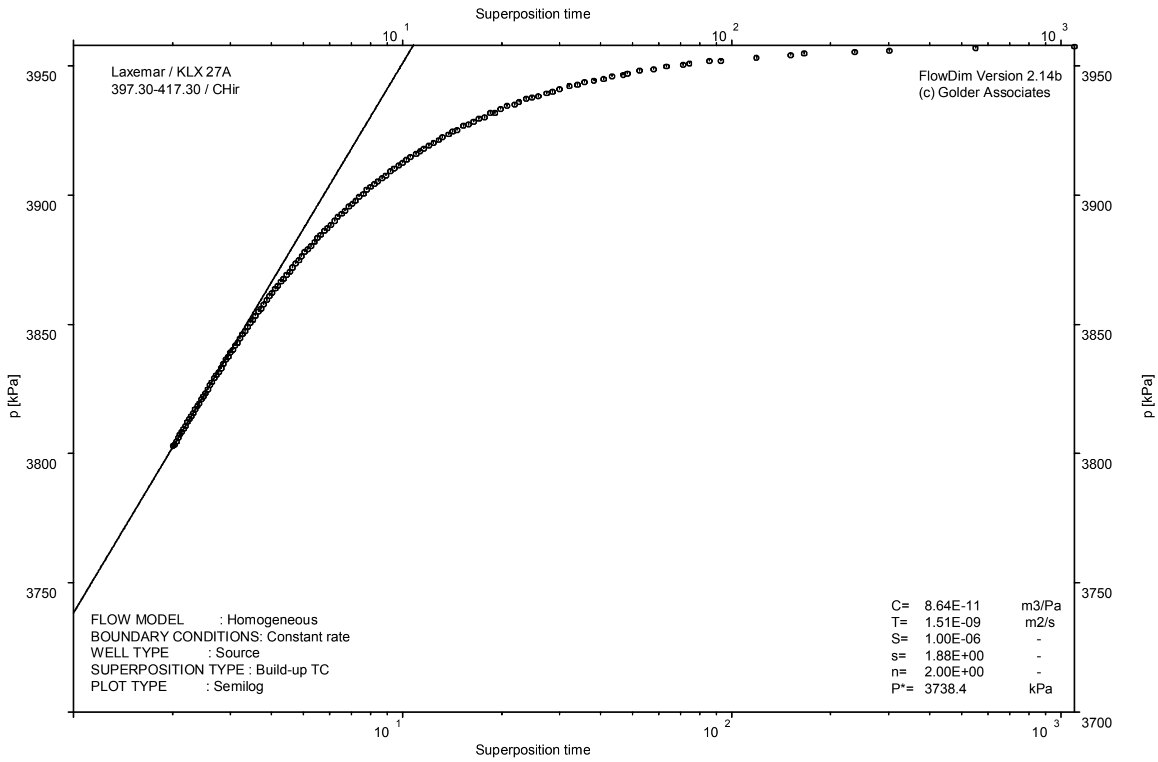
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

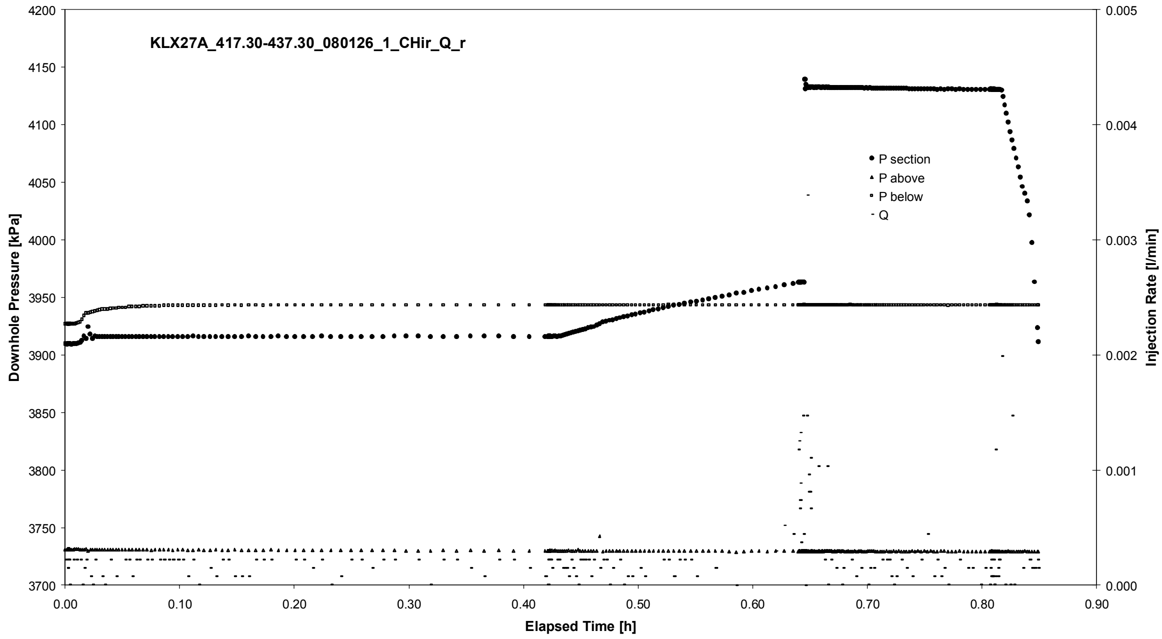


CHIR phase; HORNER match

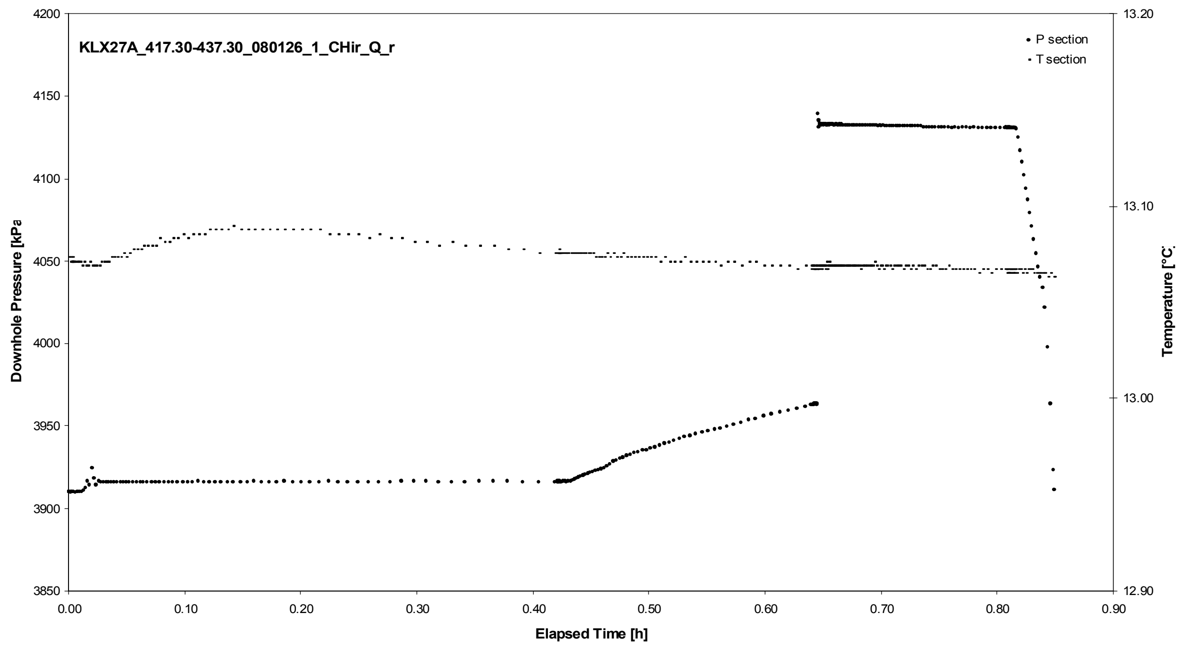
APPENDIX 2-24

Test 417.30 – 437.30 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

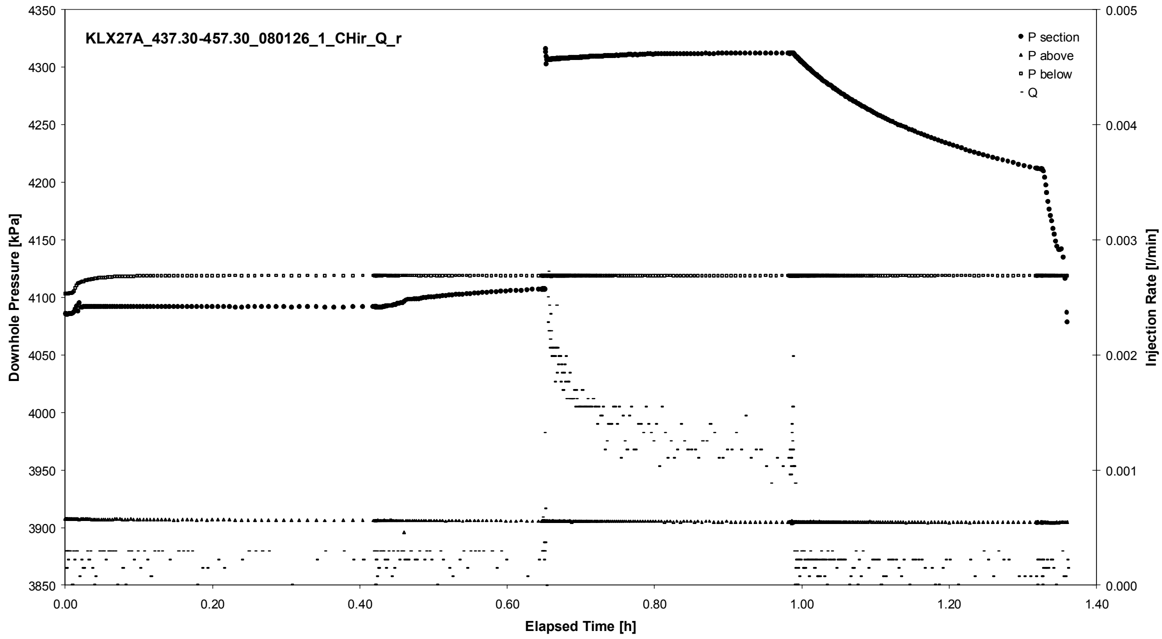
Not analysed

CHIR phase; HORNER match

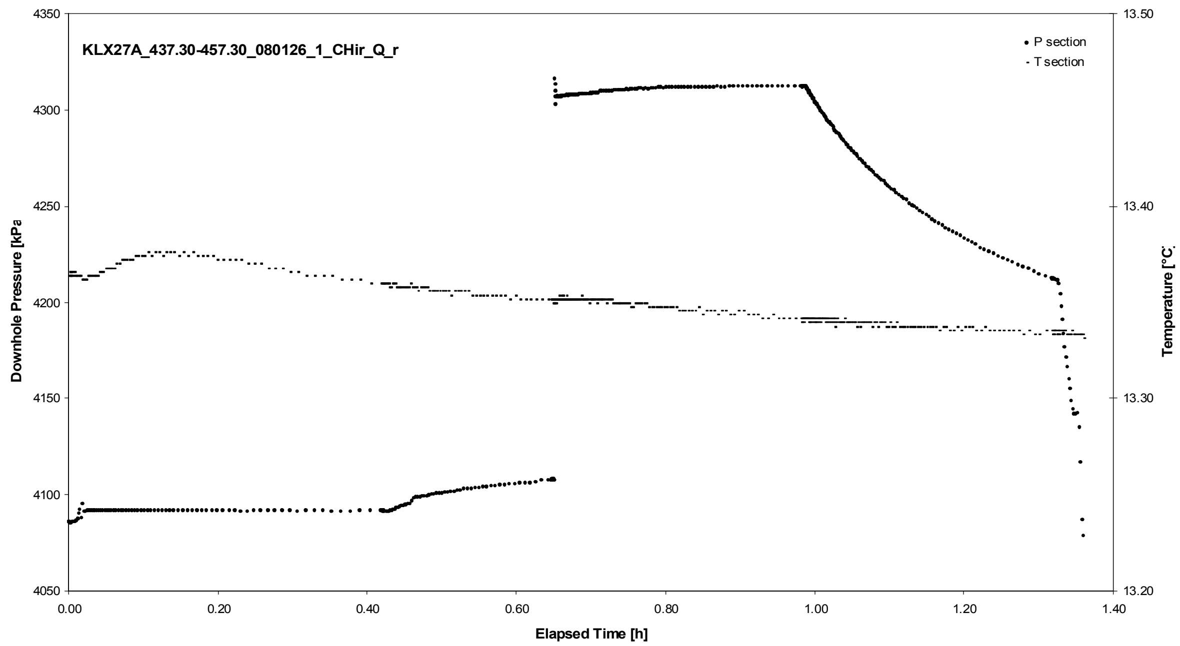
APPENDIX 2-25

Test 437.30 – 457.30 m

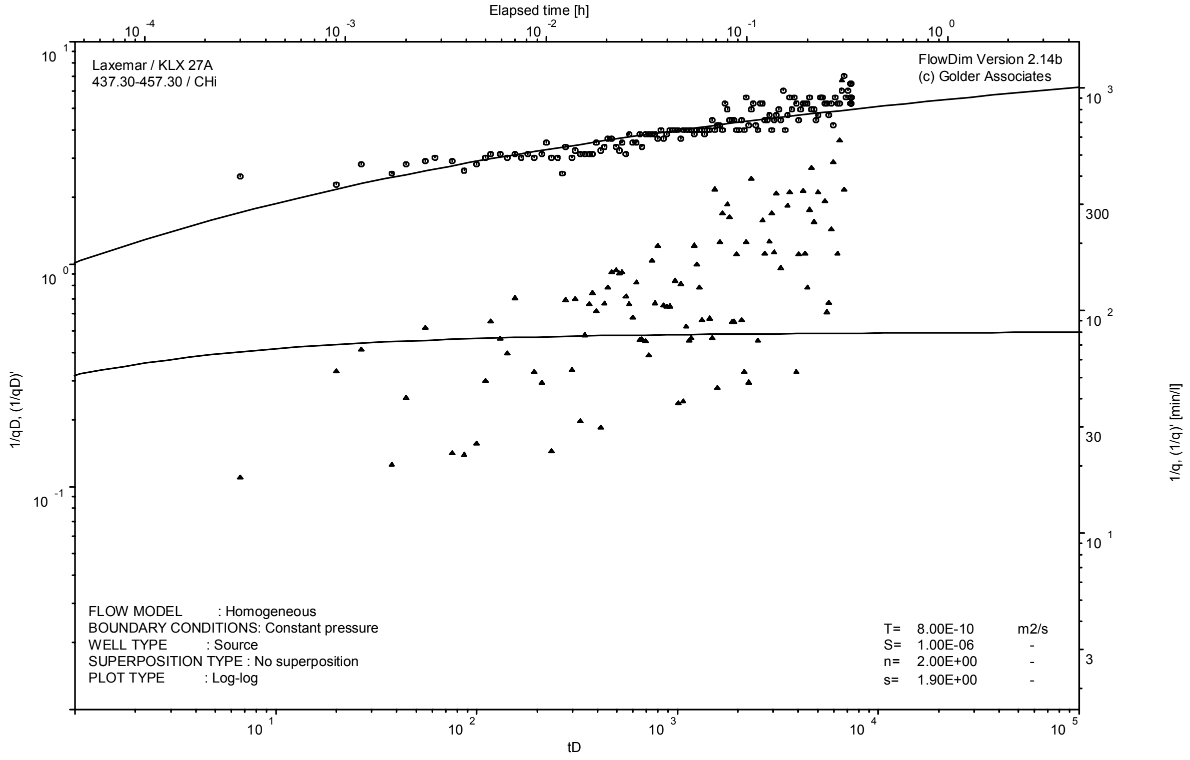
Analysis diagrams



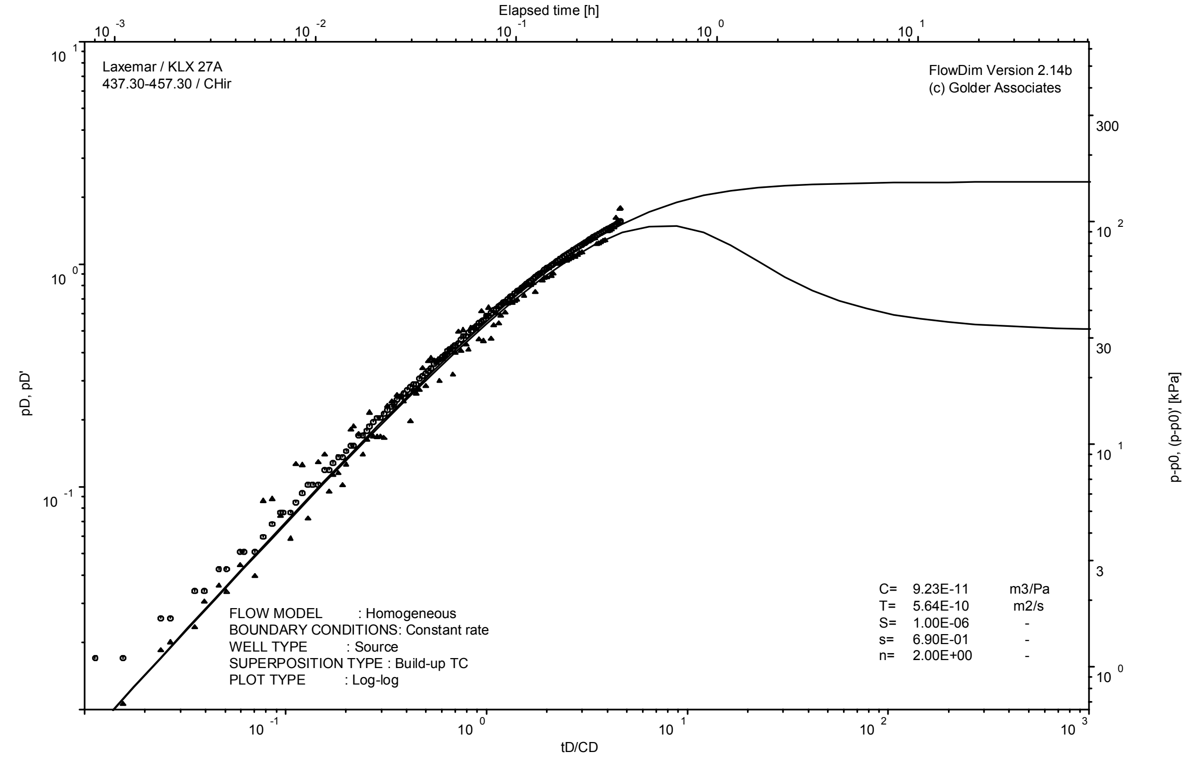
Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

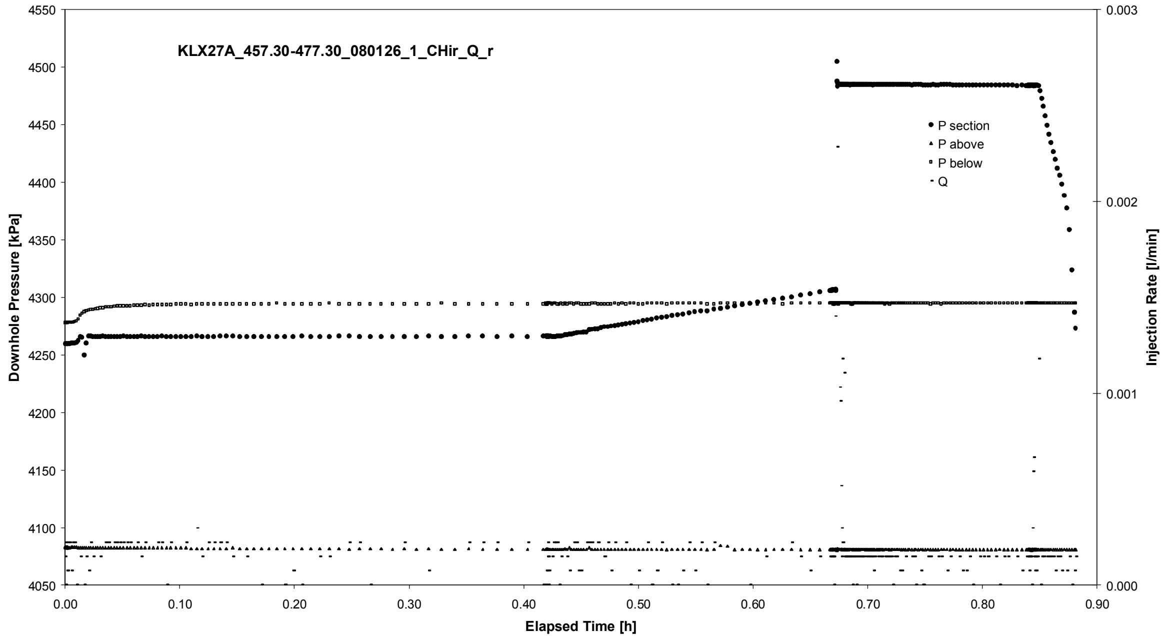
Not analysed

CHIR phase; HORNER match

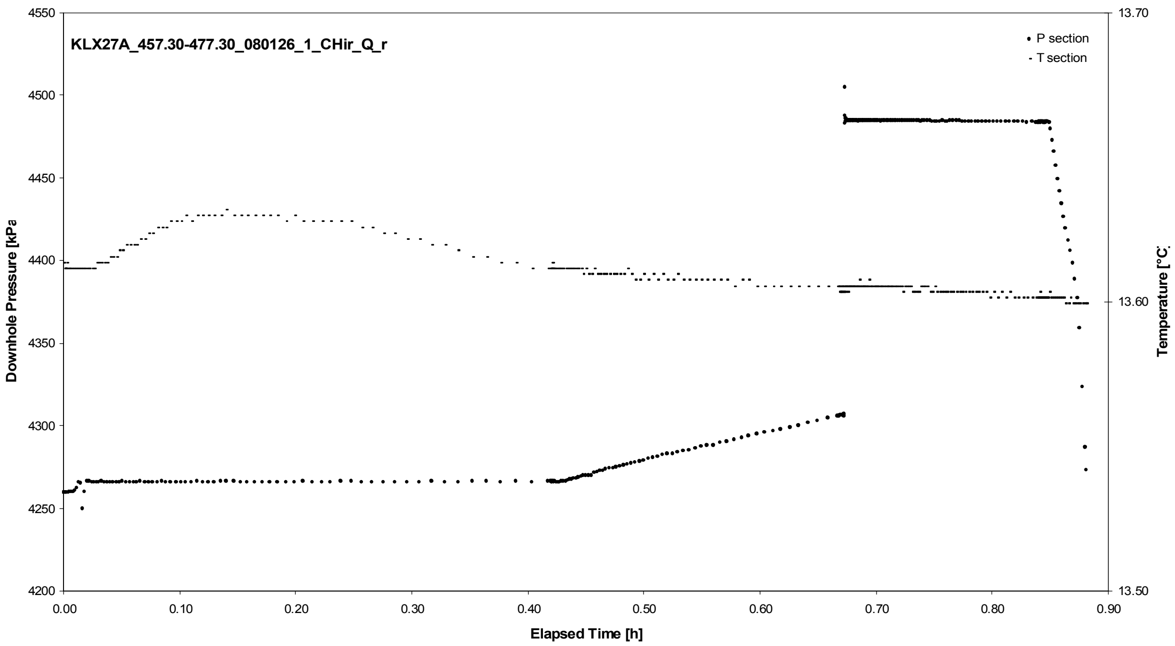
APPENDIX 2-26

Test 457.30 – 477.30 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

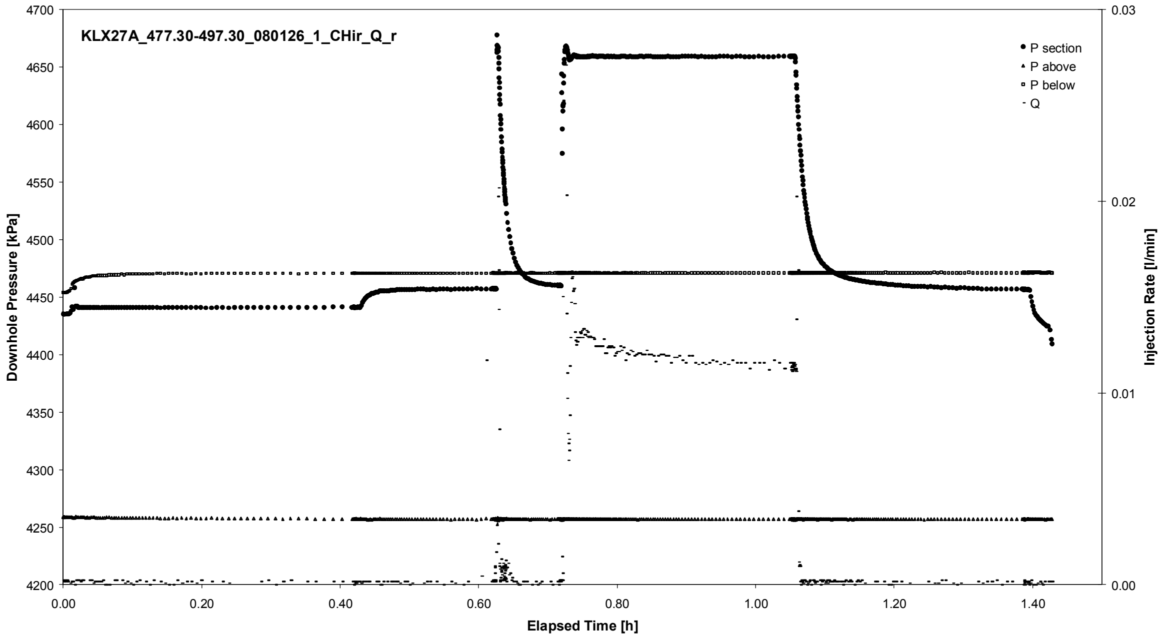
Not analysed

CHIR phase; HORNER match

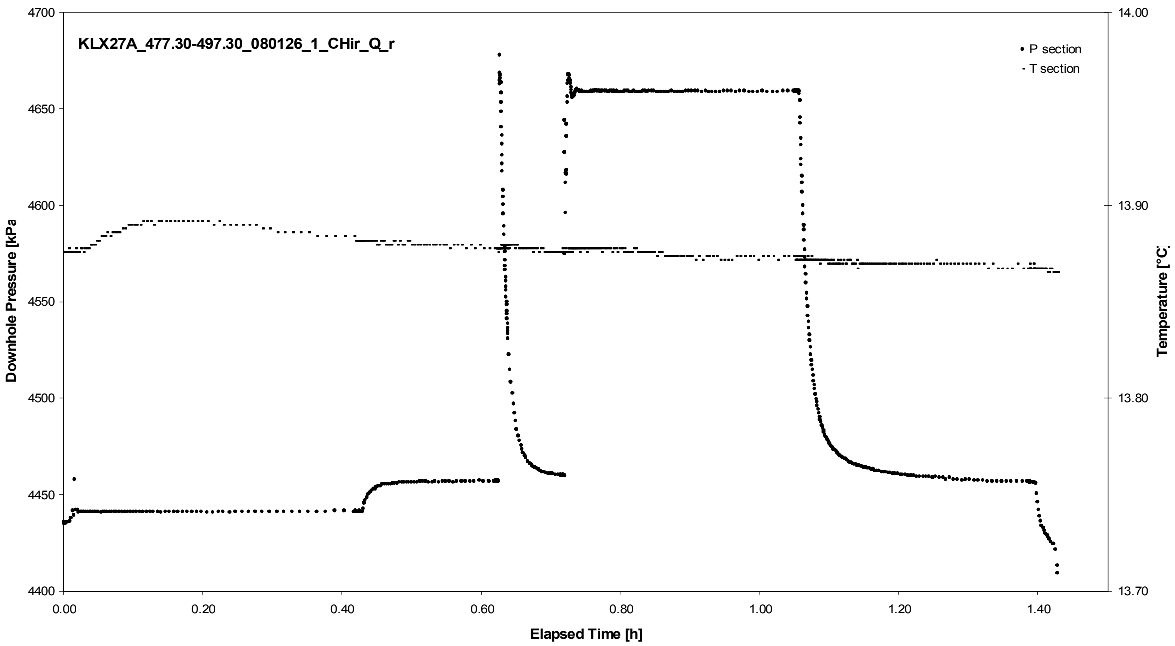
APPENDIX 2-27

Test 477.30 – 497.30 m

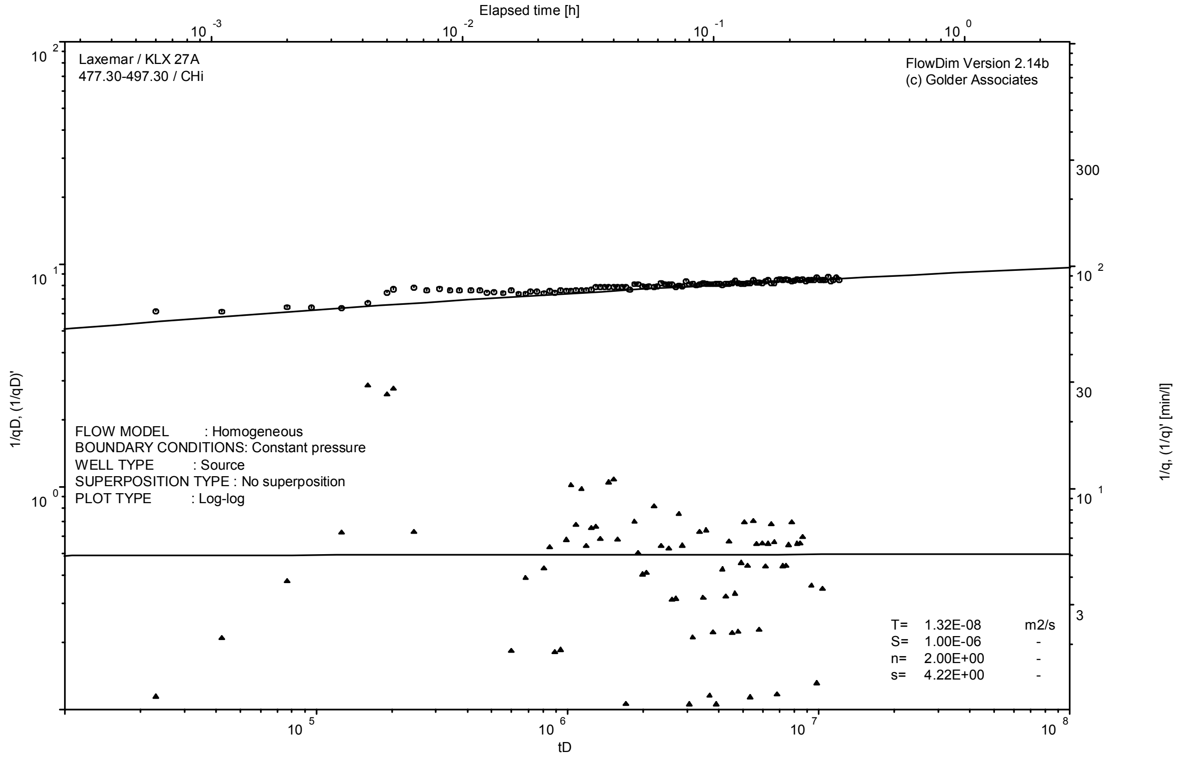
Analysis diagrams



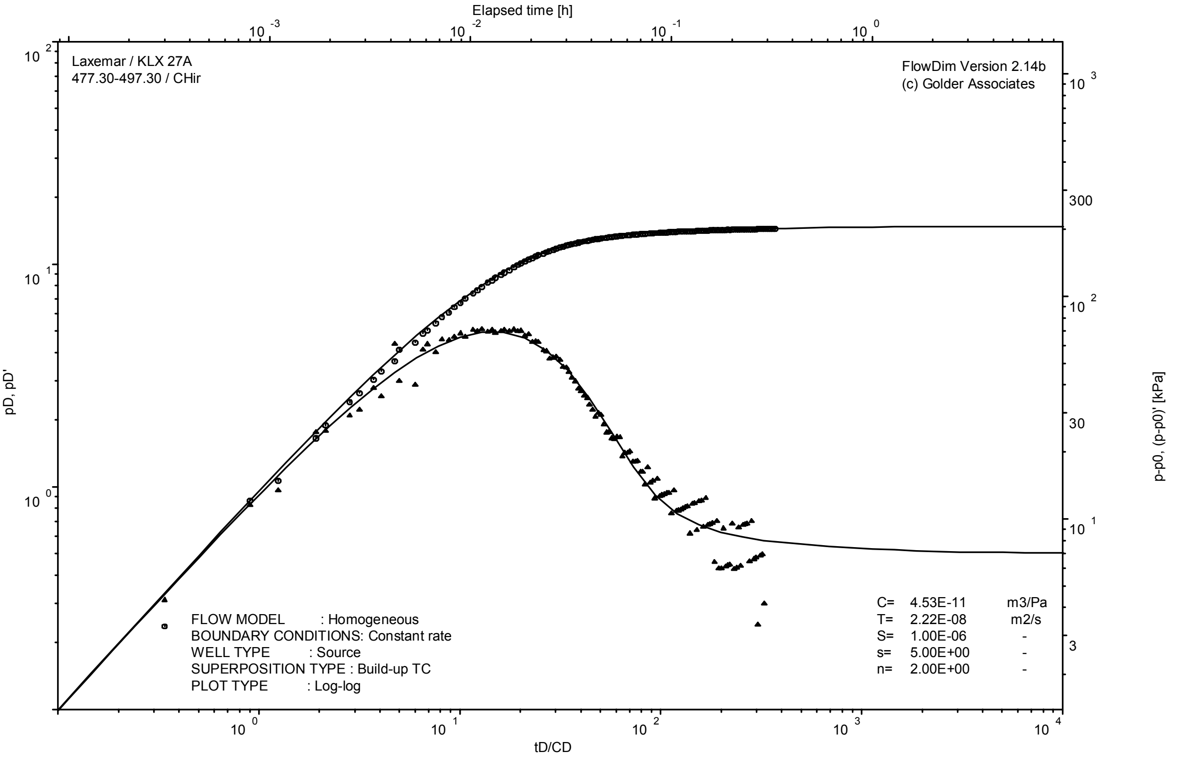
Pressure and flow rate vs. time; cartesian plot



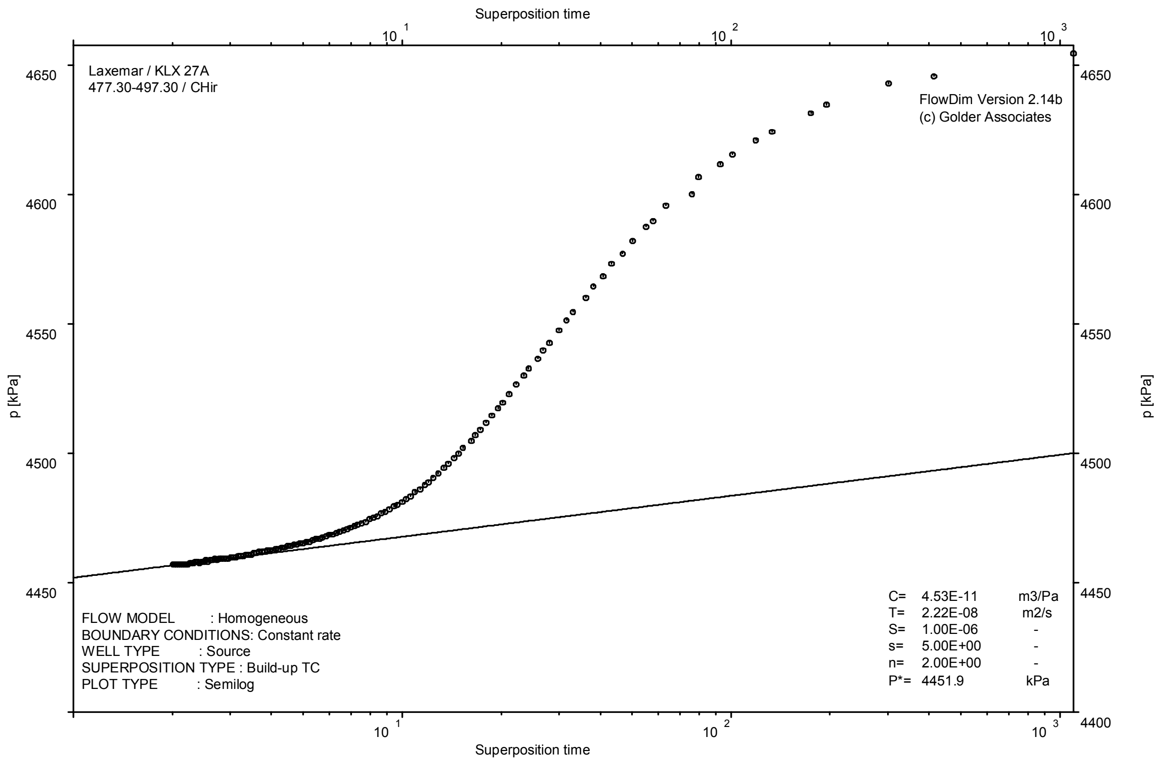
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

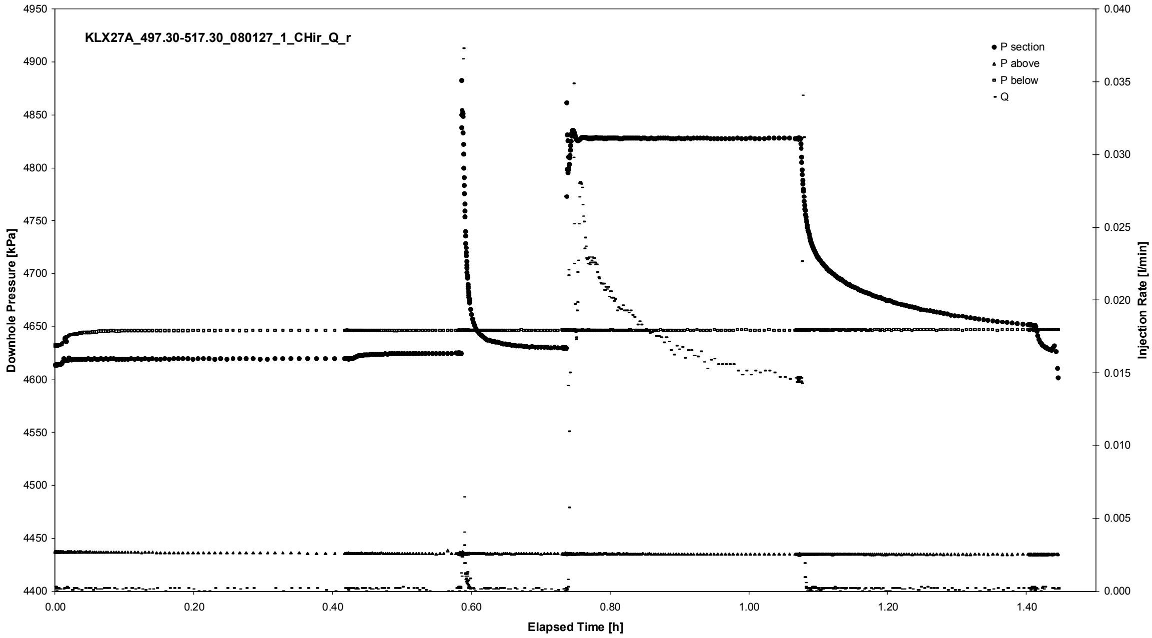


CHIR phase; HORNER match

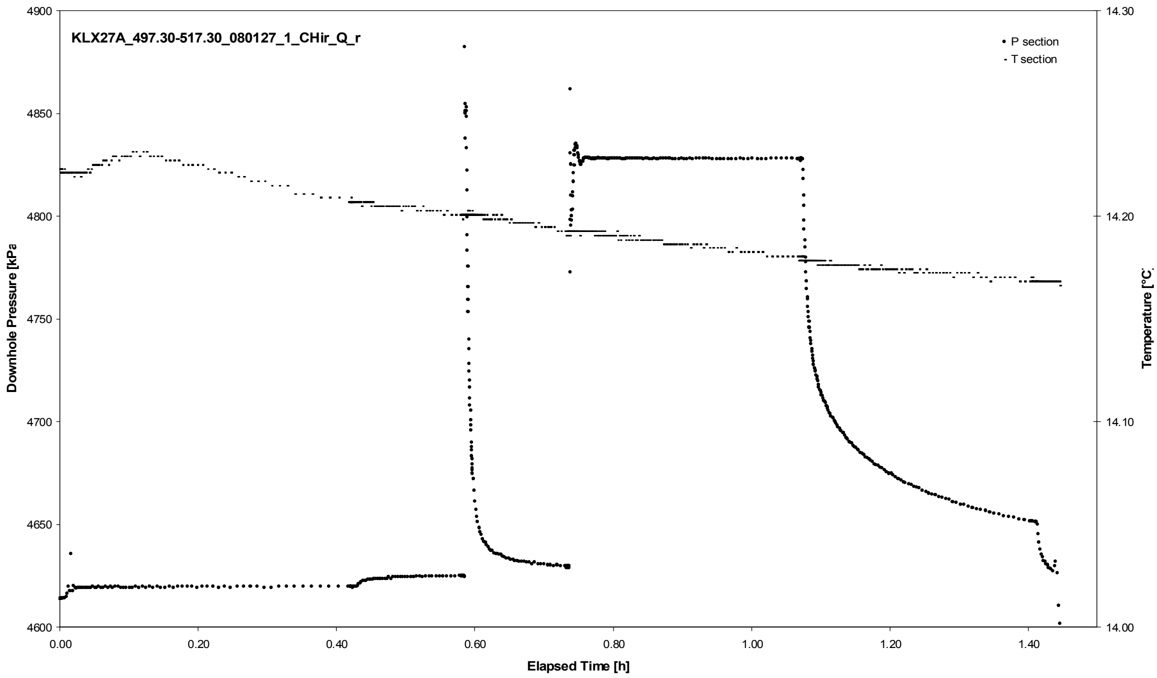
APPENDIX 2-28

Test 497.30 – 517.30 m

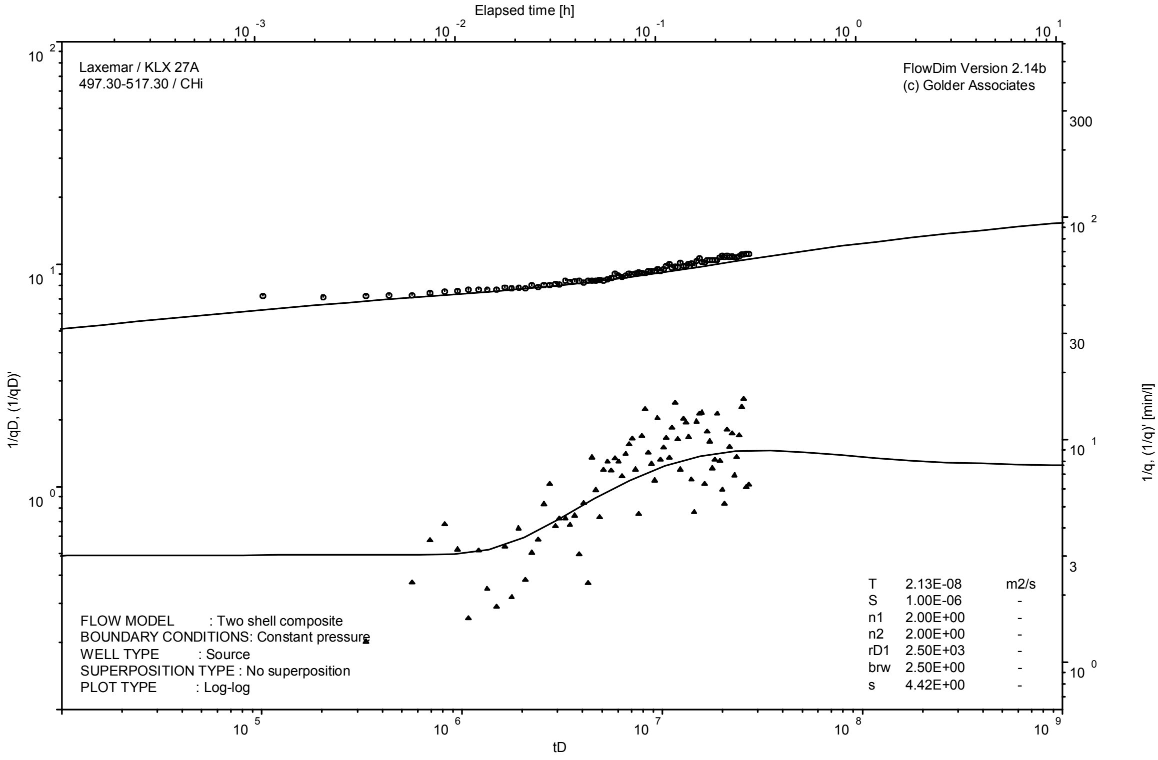
Analysis diagrams



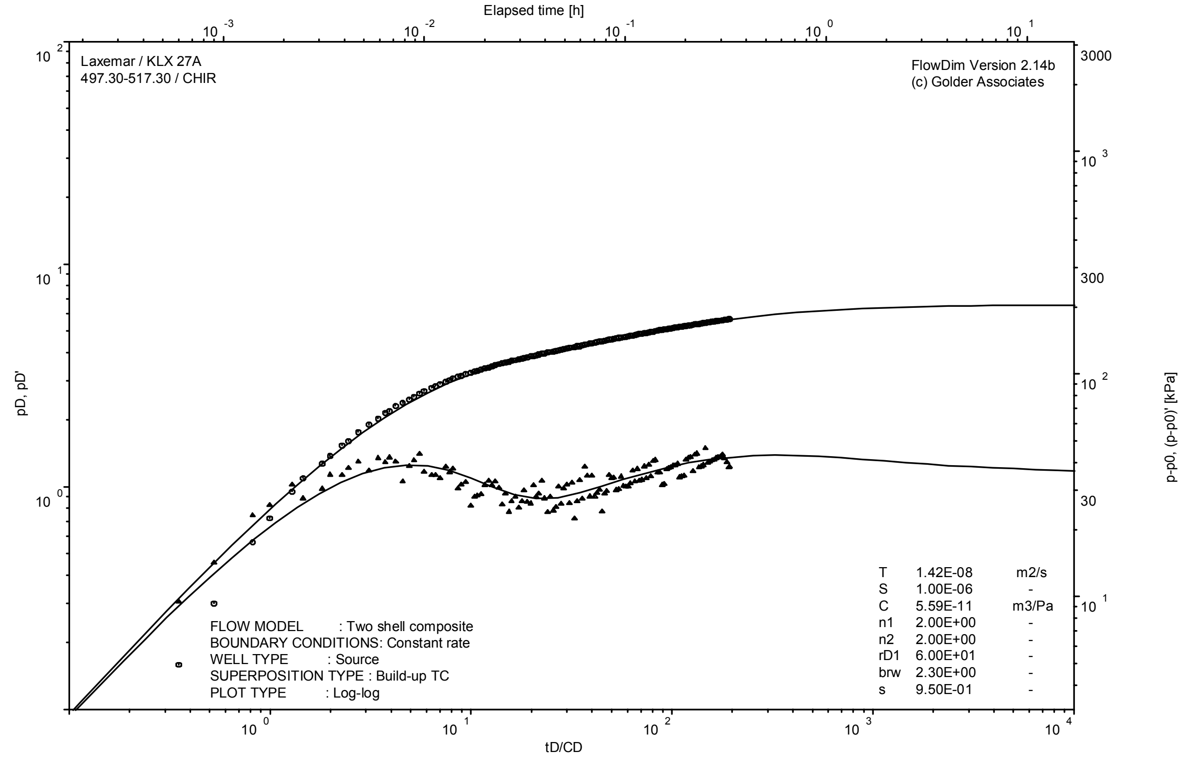
Pressure and flow rate vs. time; cartesian plot



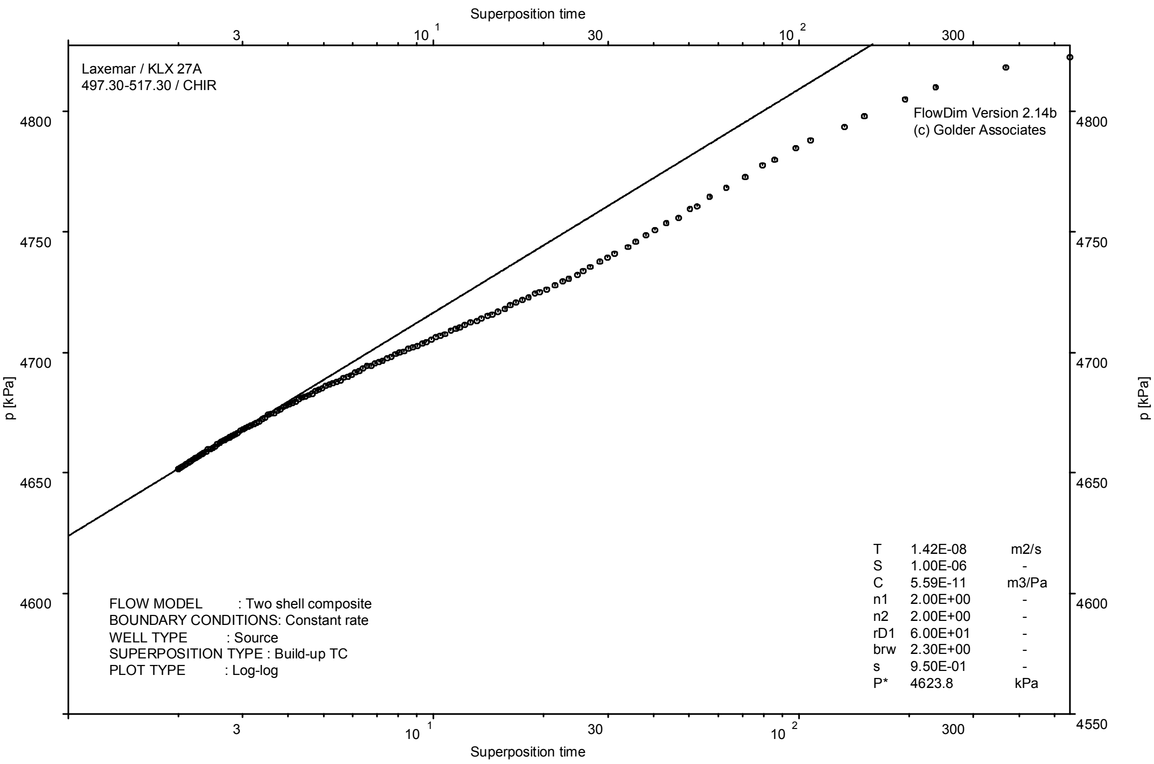
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

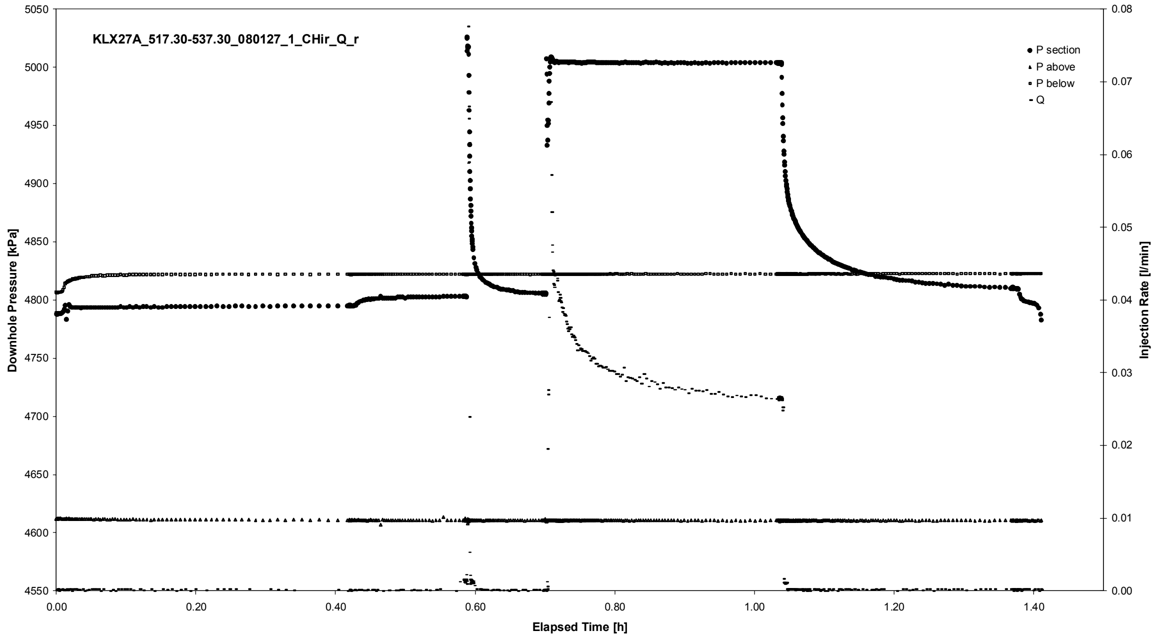


CHIR phase; HORNER match

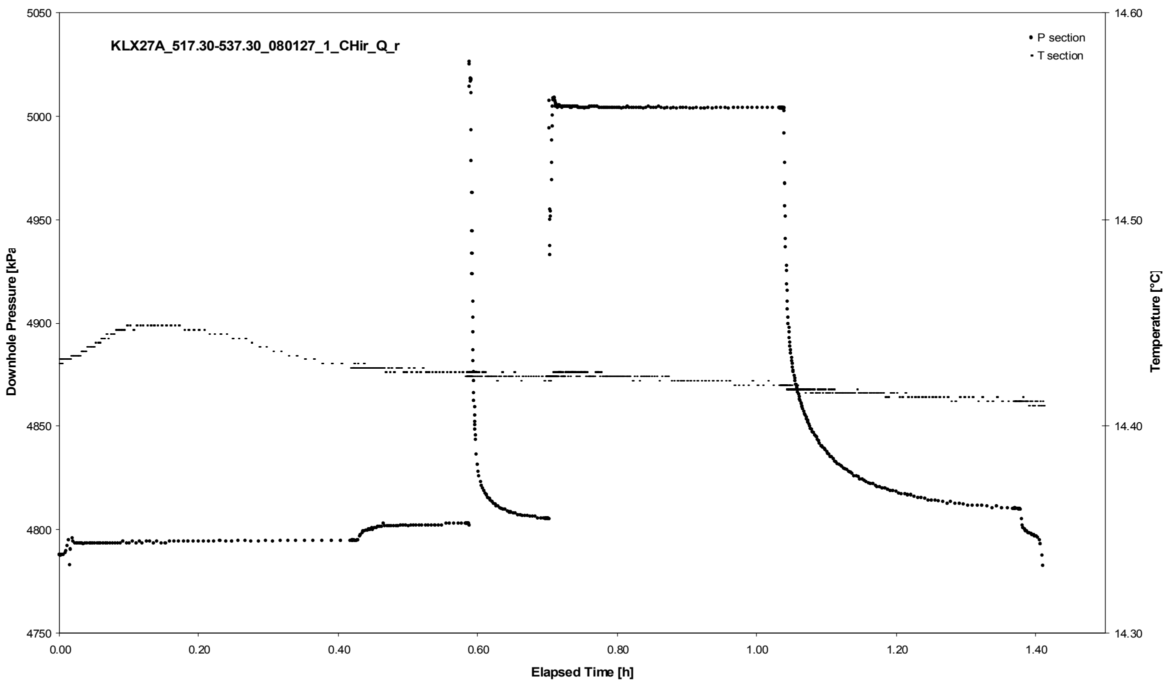
APPENDIX 2-29

Test 517.30 – 537.30 m

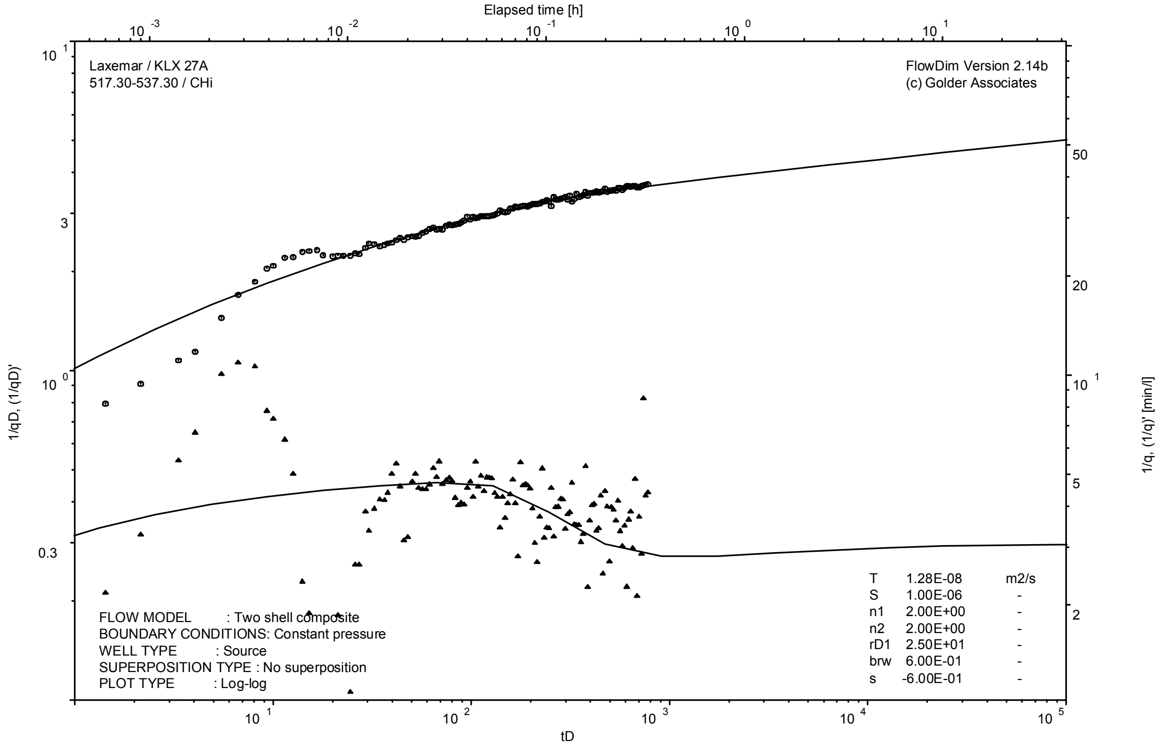
Analysis diagrams



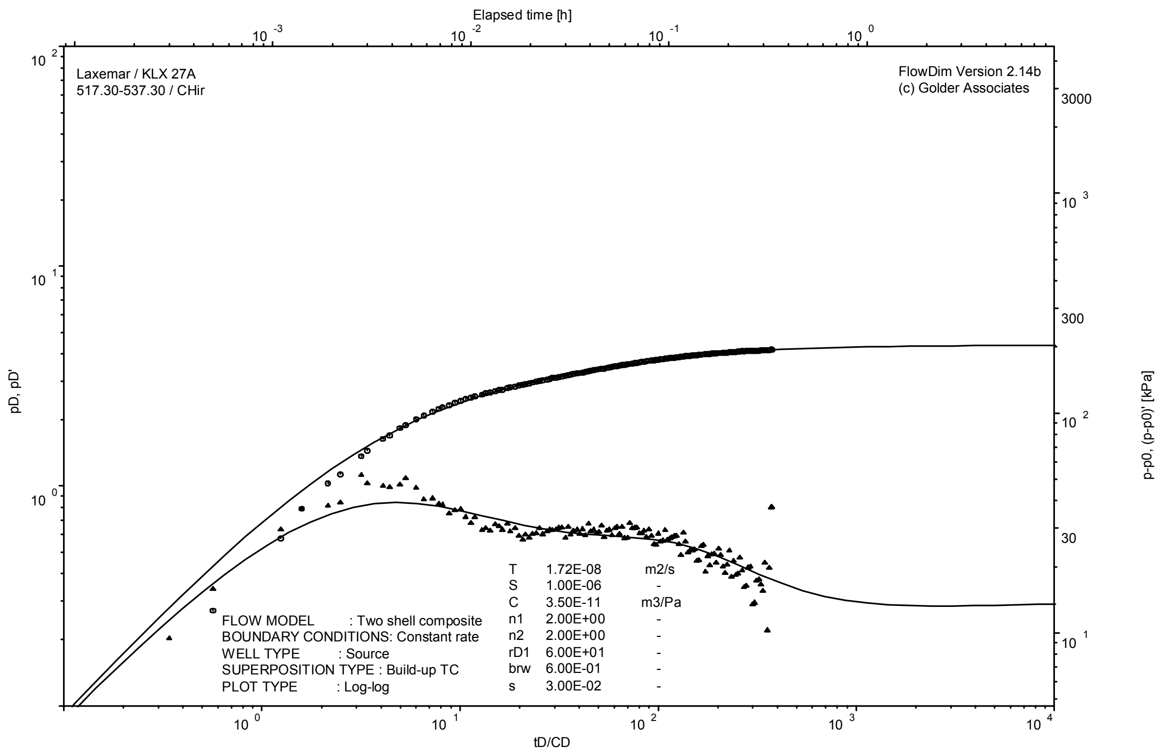
Pressure and flow rate vs. time; cartesian plot



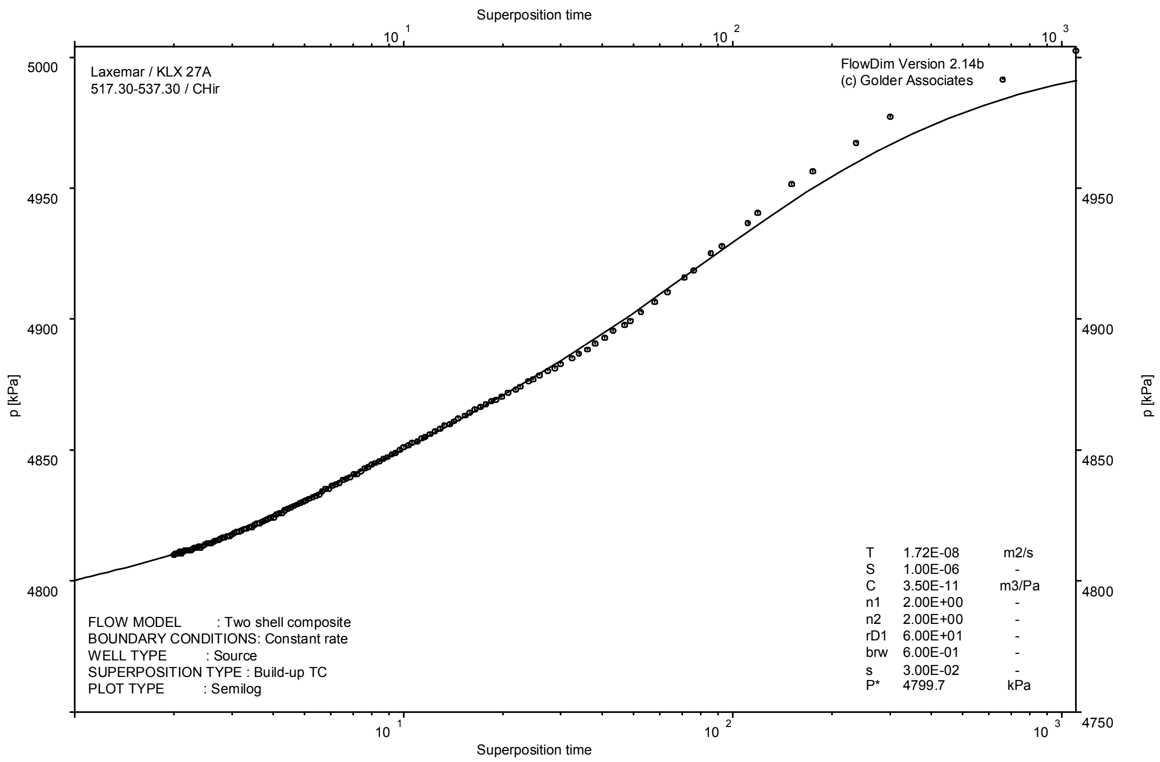
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

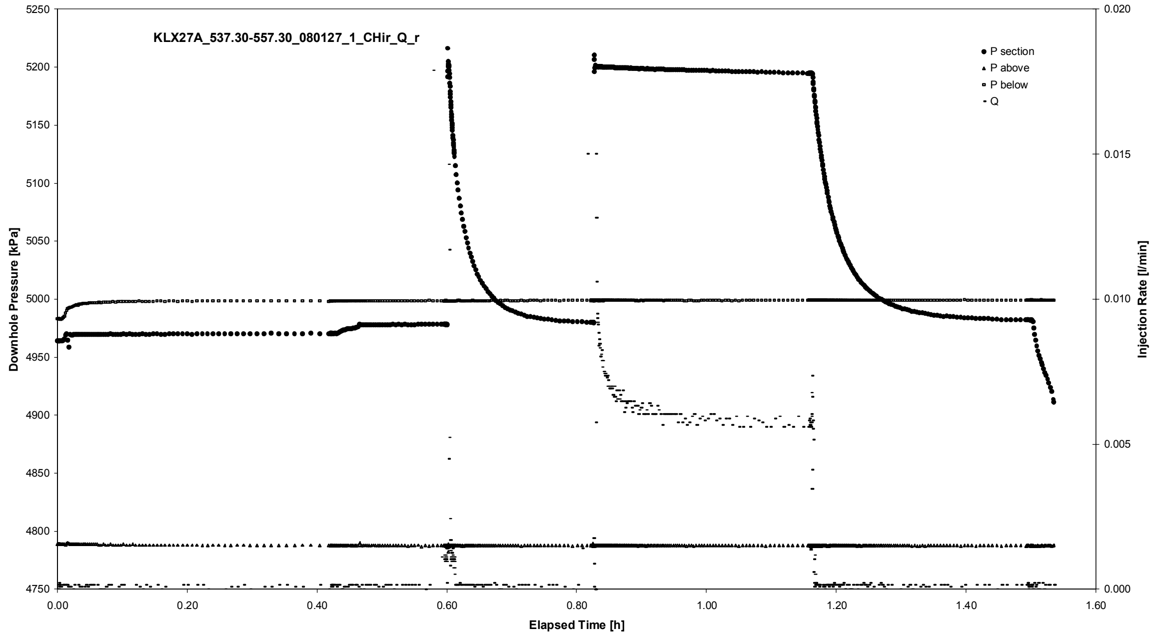


CHIR phase; HORNER match

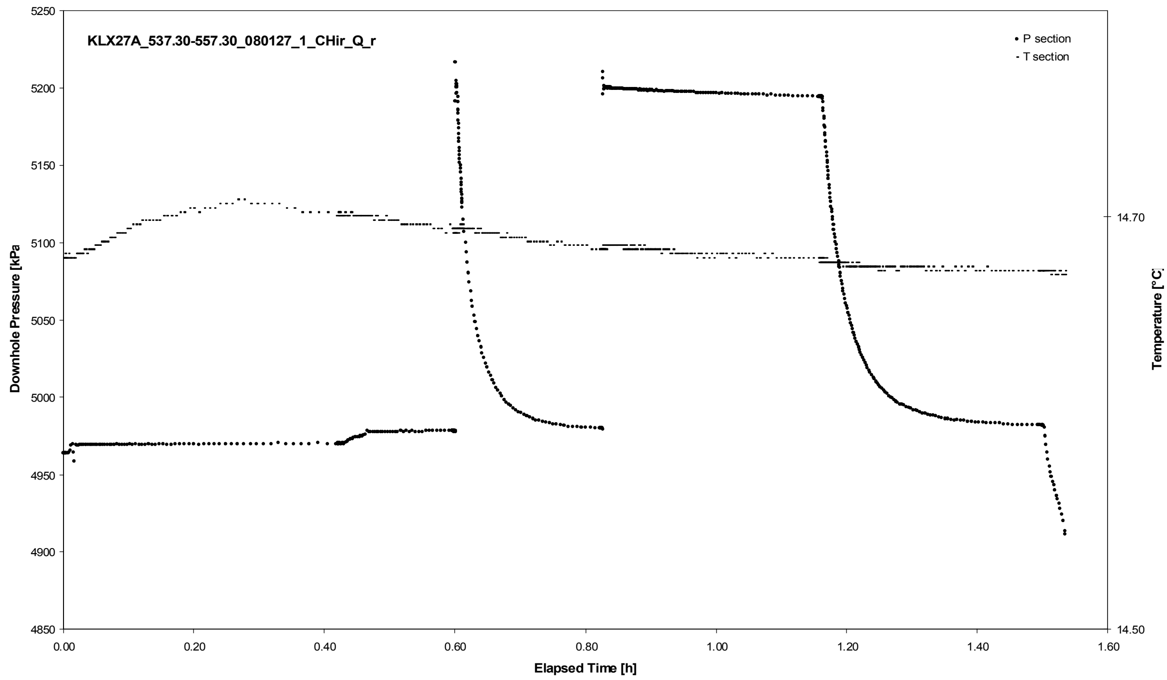
APPENDIX 2-30

Test 537.30 – 557.30 m

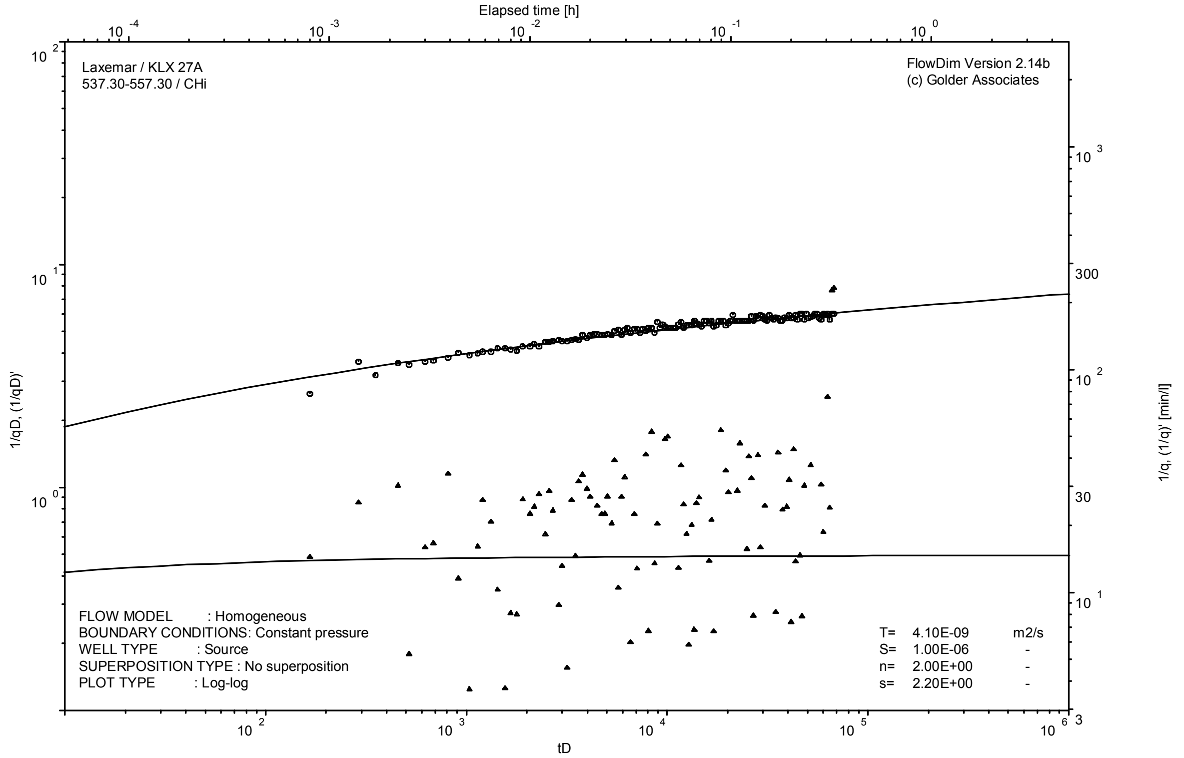
Analysis diagrams



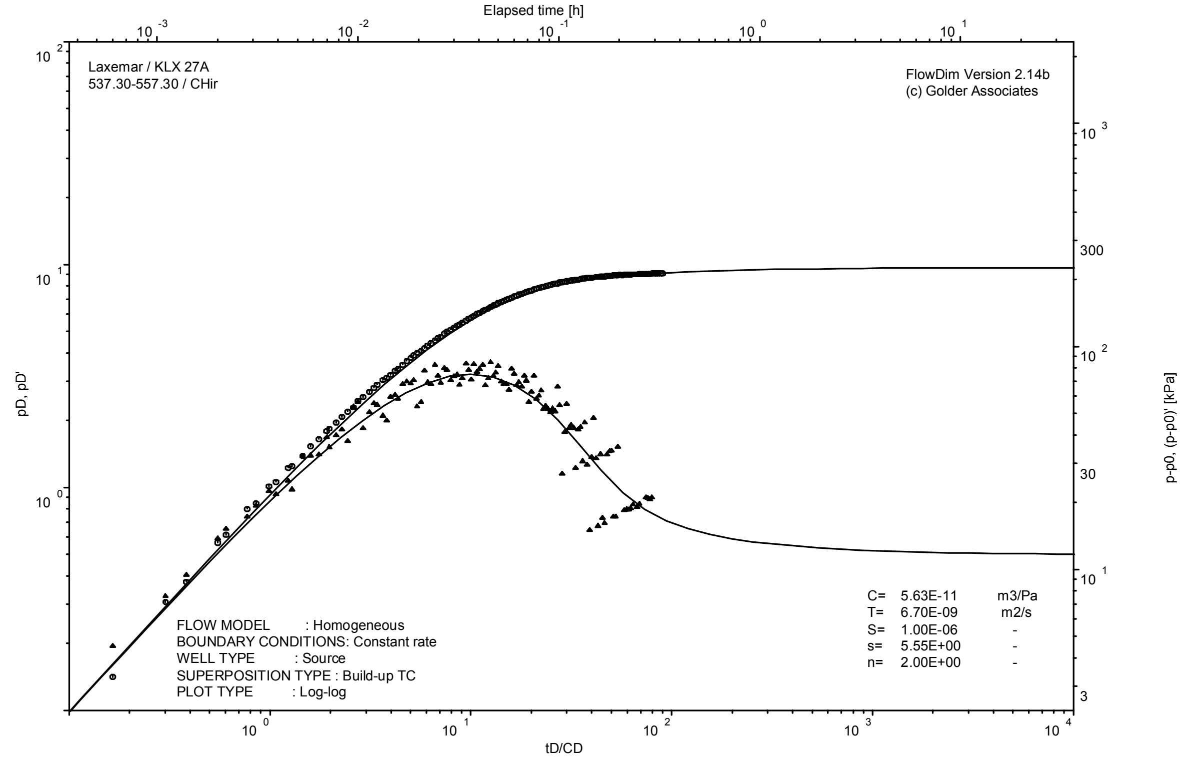
Pressure and flow rate vs. time; cartesian plot



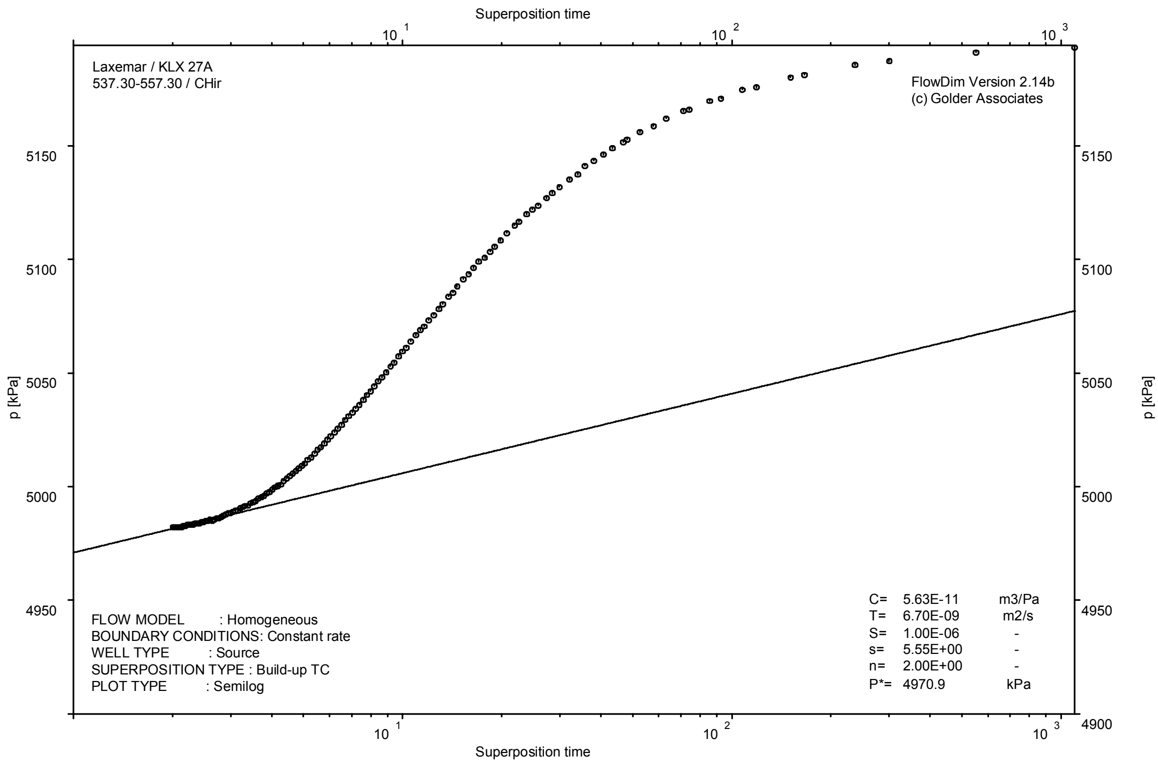
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

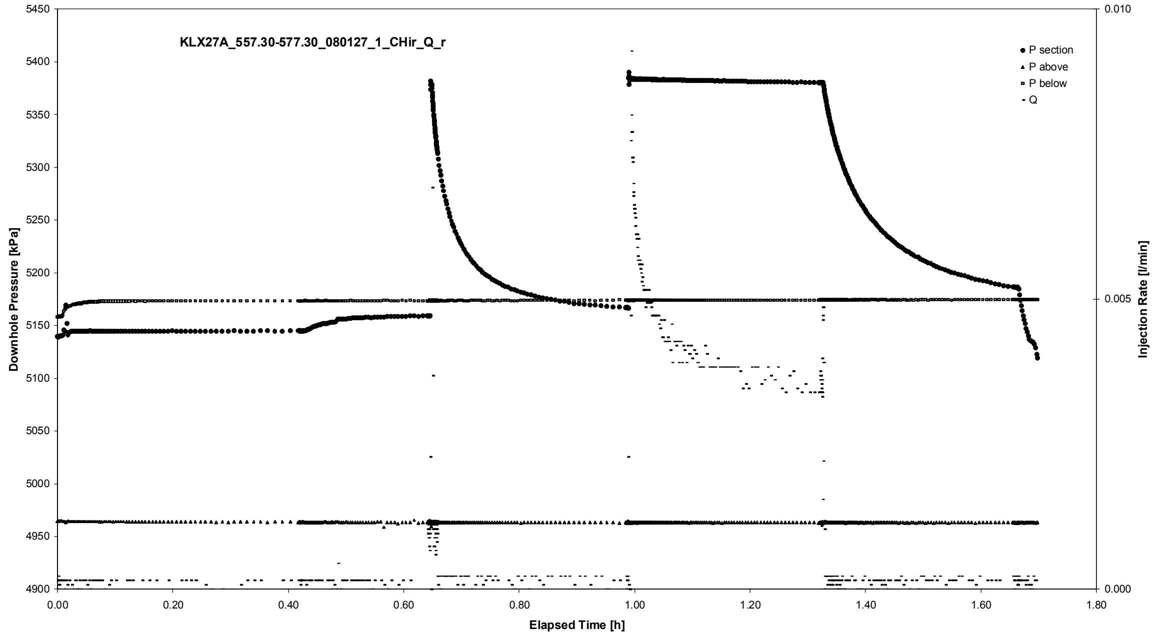


CHIR phase; HORNER match

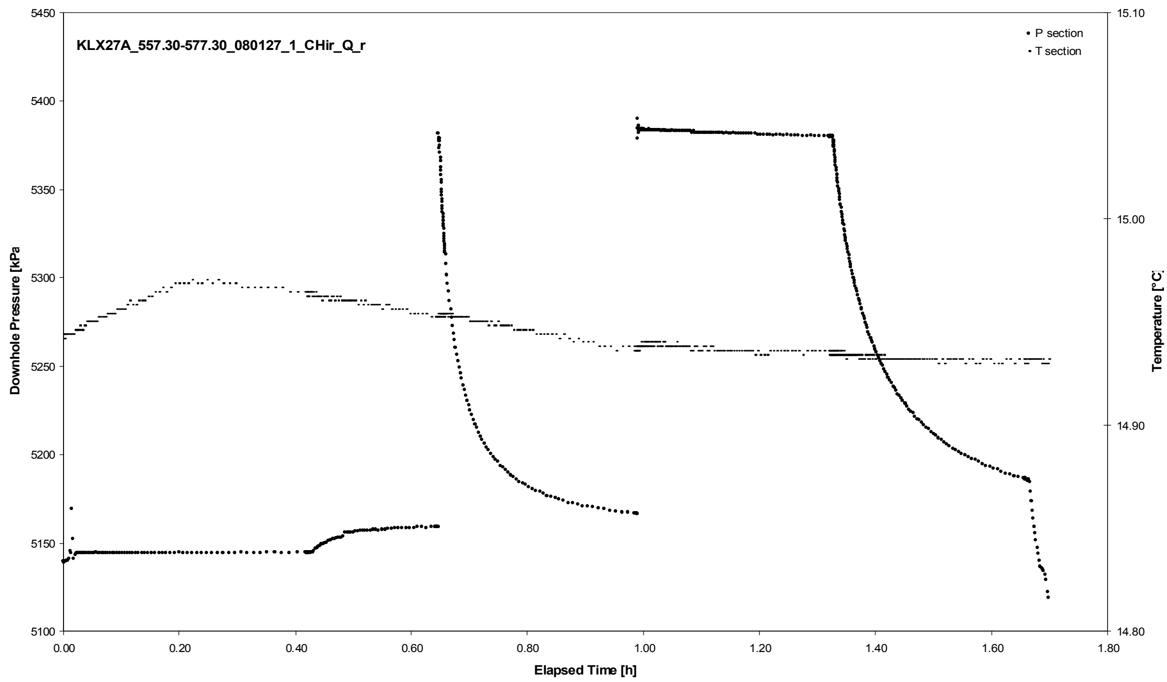
APPENDIX 2-31

Test 557.30 – 577.30 m

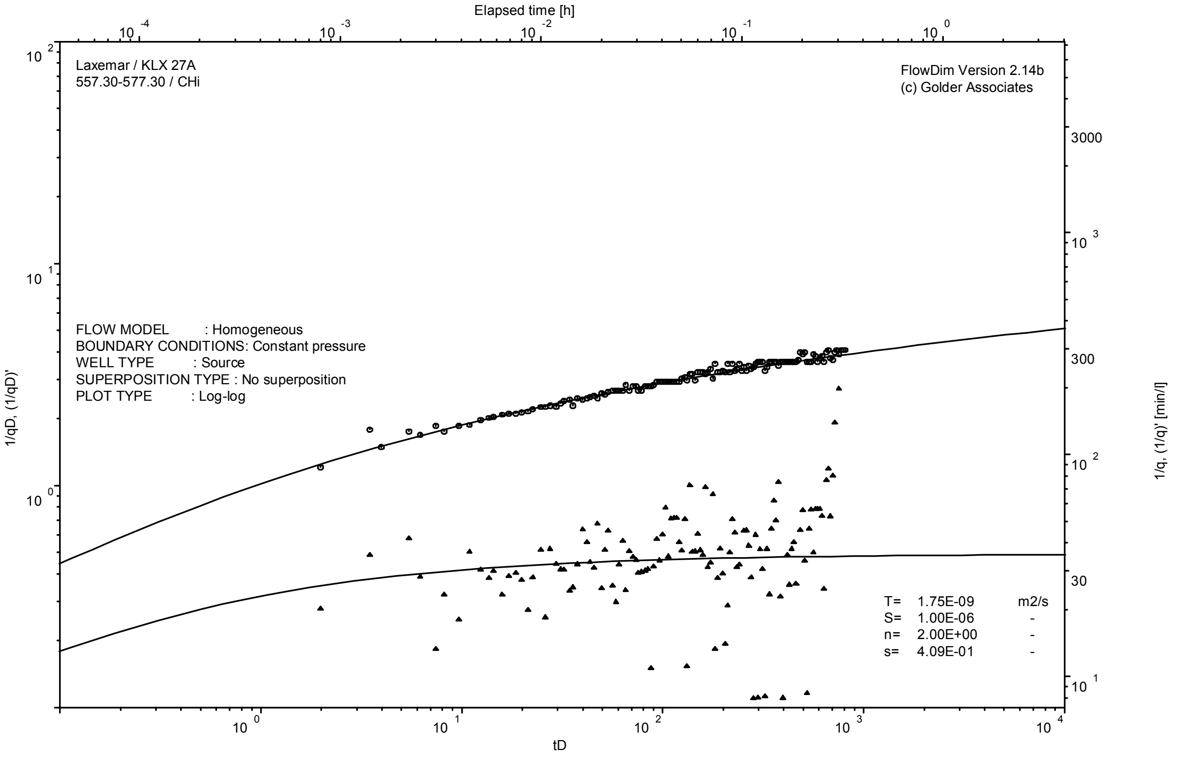
Analysis diagrams



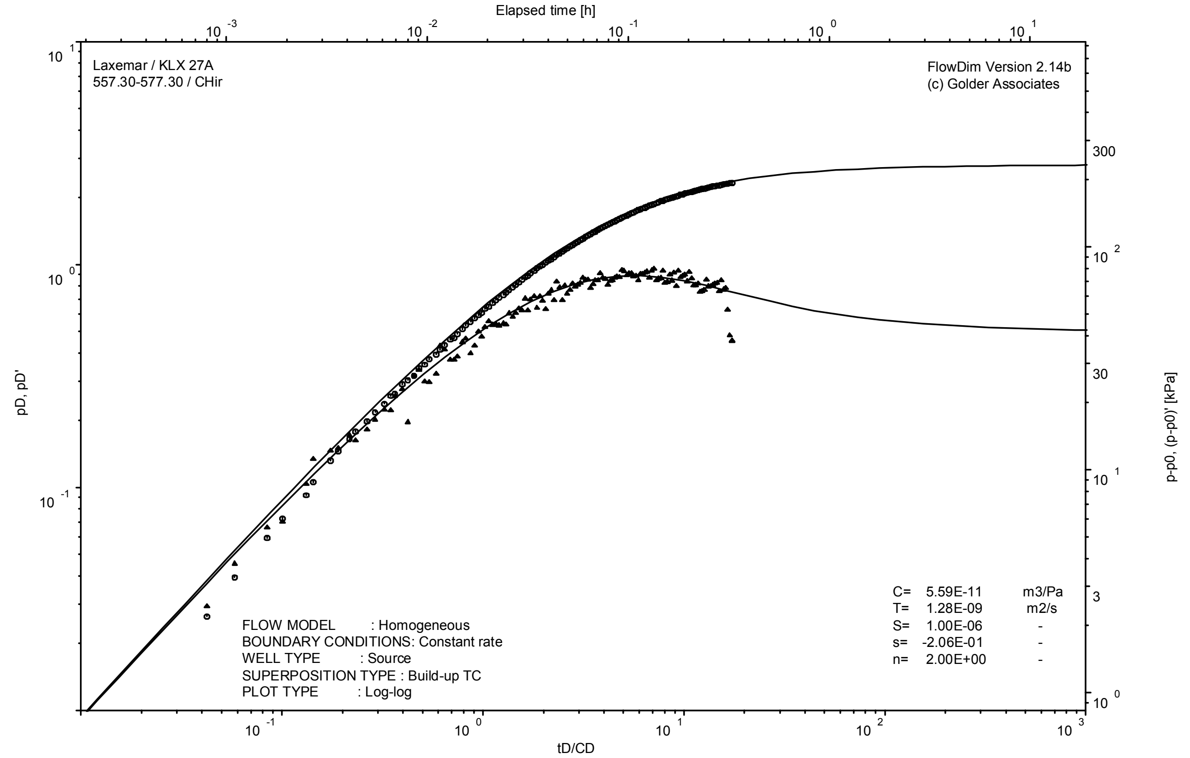
Pressure and flow rate vs. time; cartesian plot



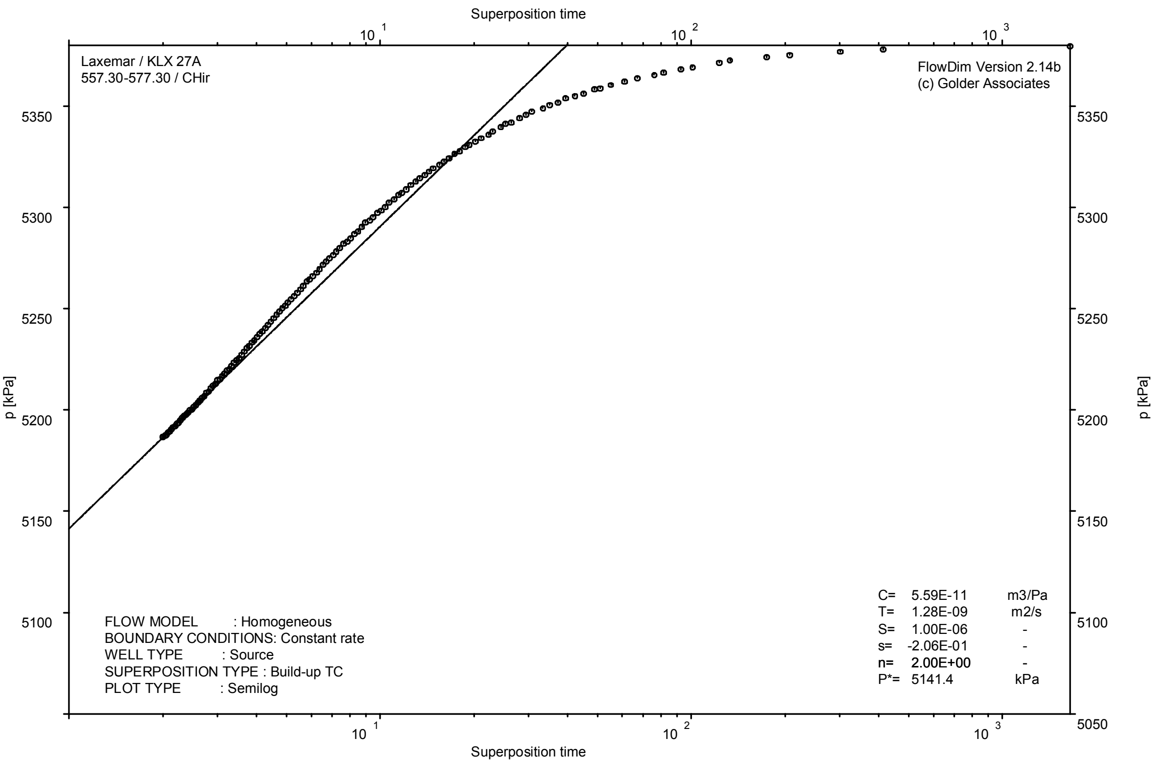
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

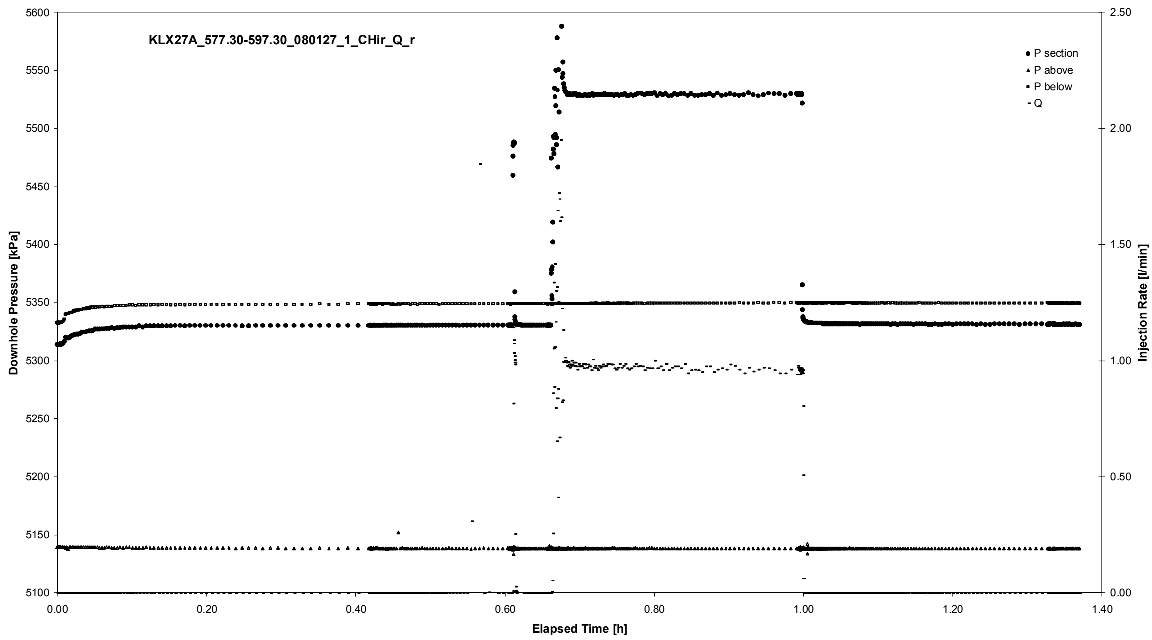


CHIR phase; HORNER match

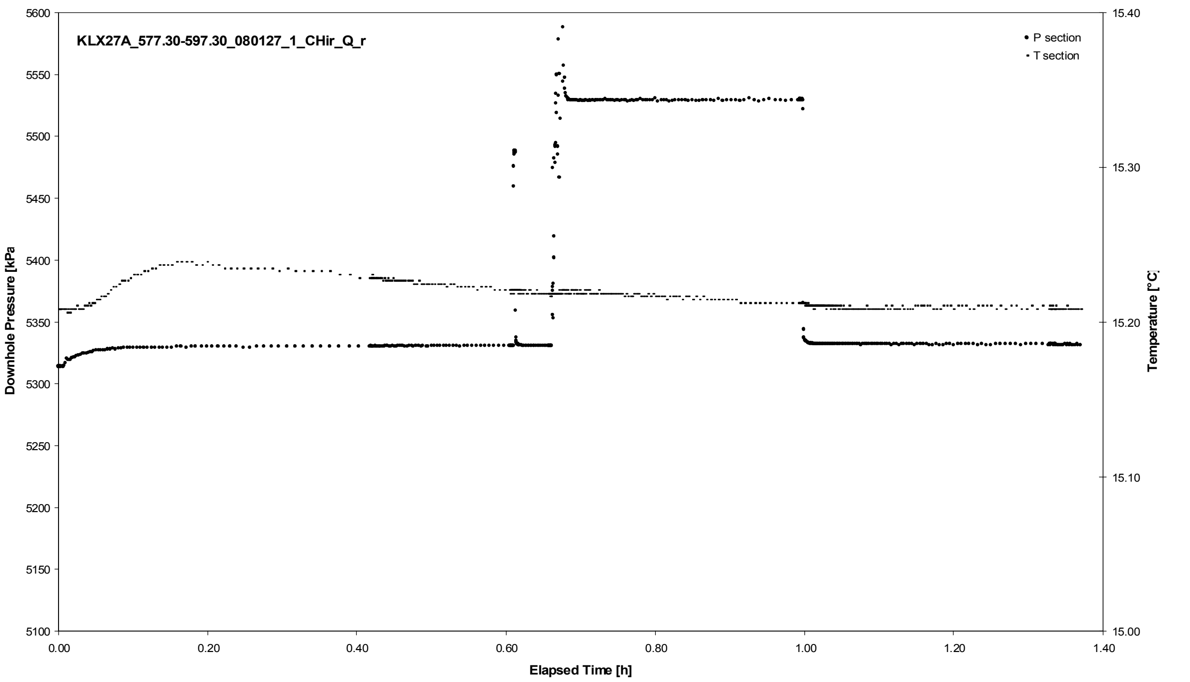
APPENDIX 2-32

Test 577.30 – 597.30 m

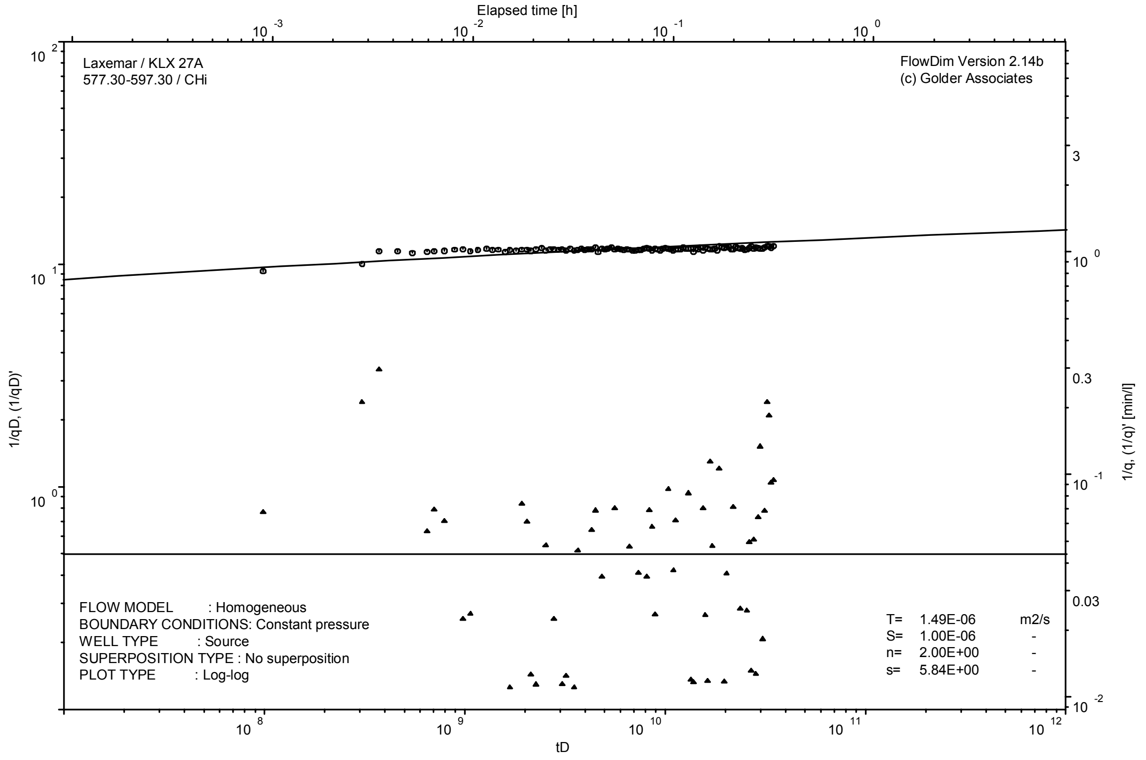
Analysis diagrams



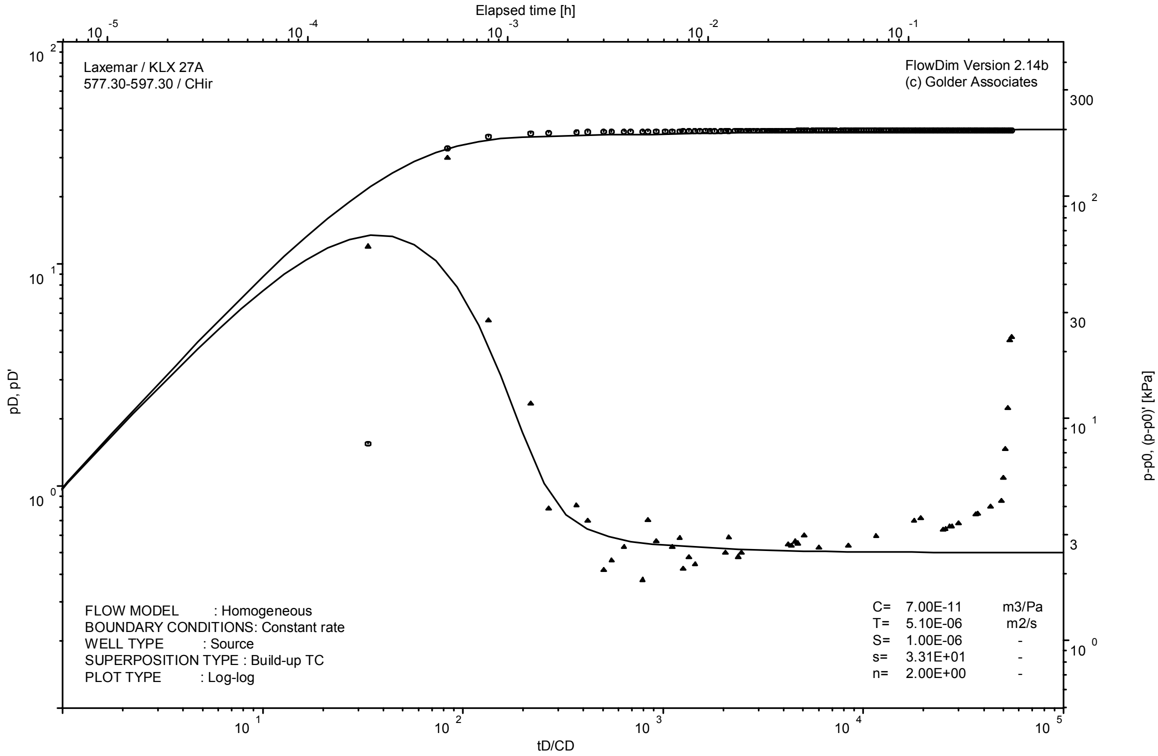
Pressure and flow rate vs. time; cartesian plot



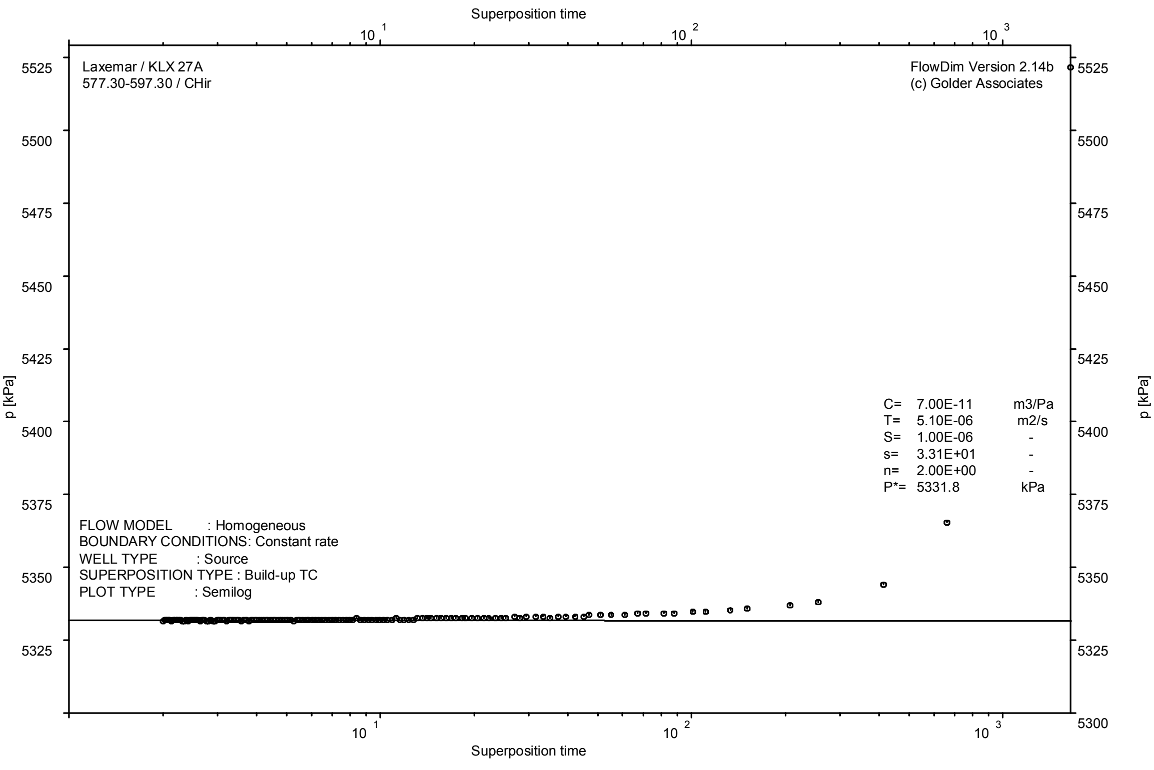
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

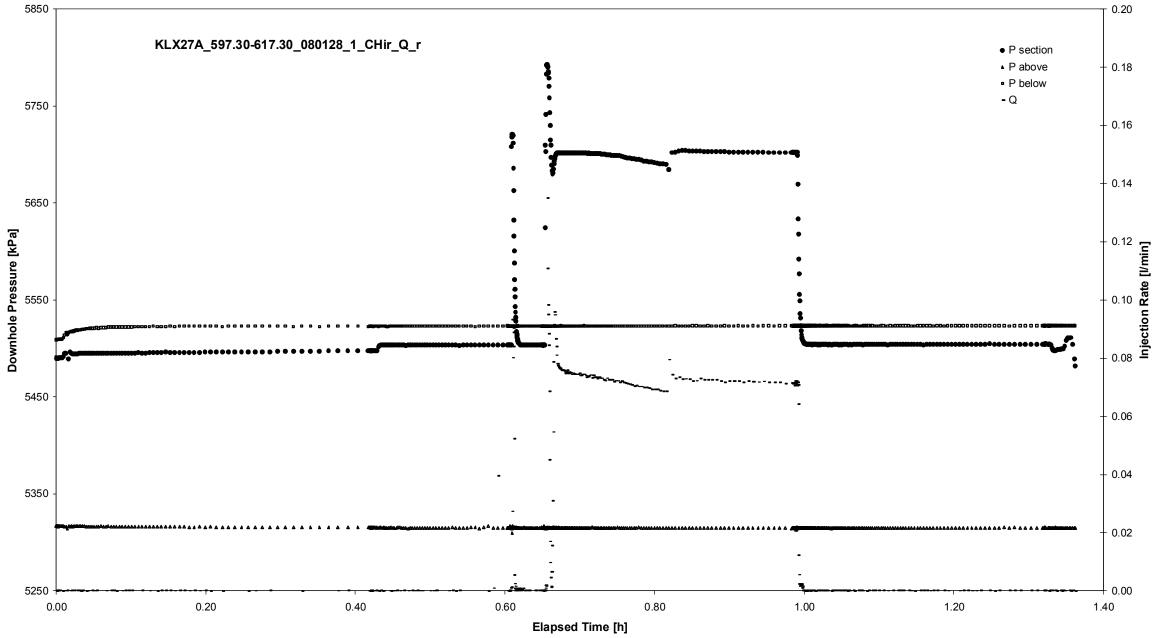


CHIR phase; HORNER match

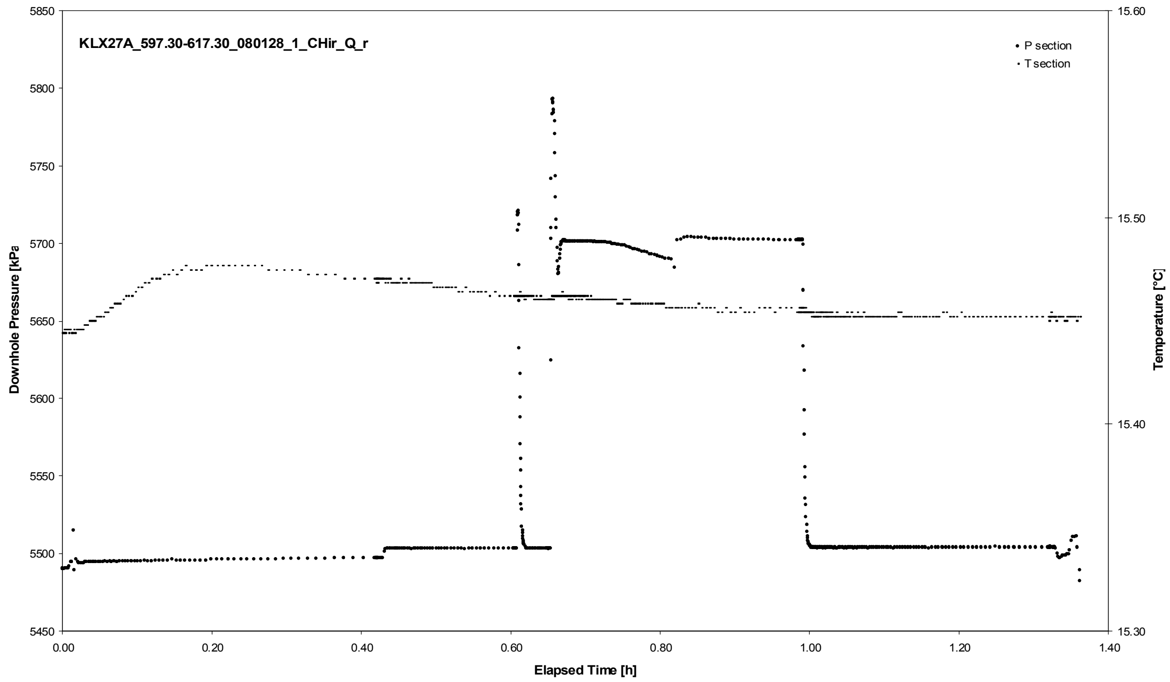
APPENDIX 2-33

Test 597.30 – 617.30 m

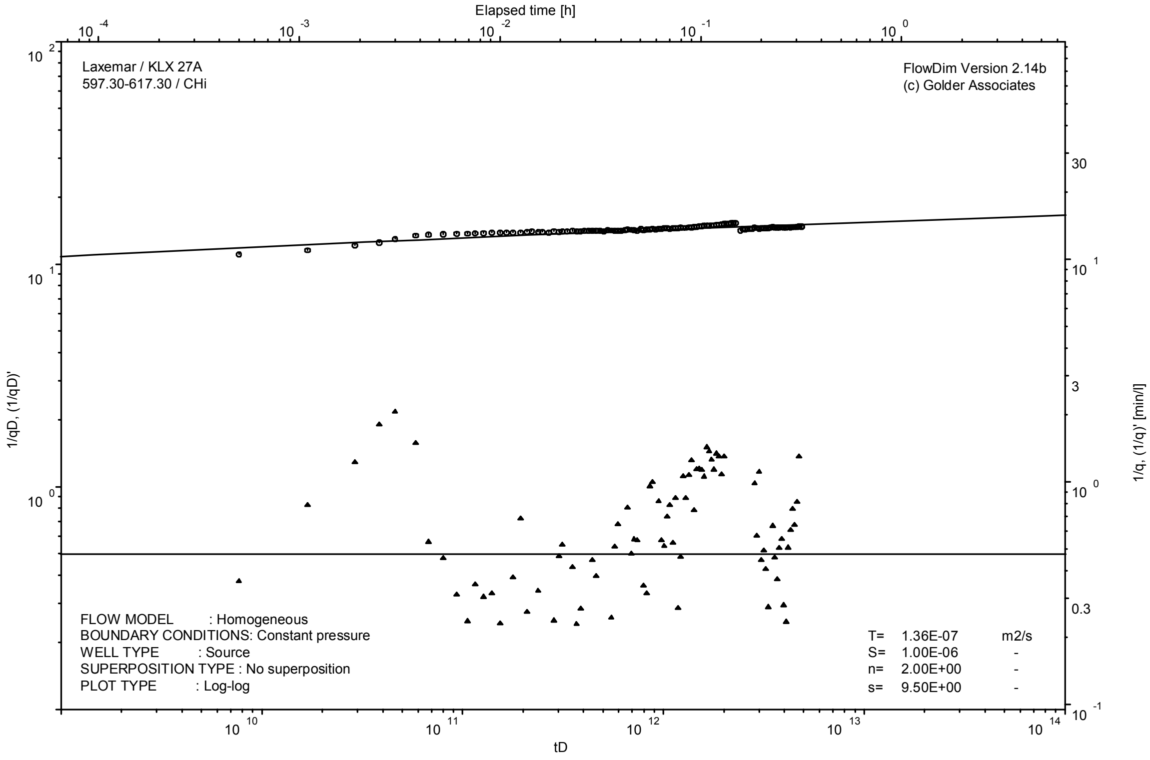
Analysis diagrams



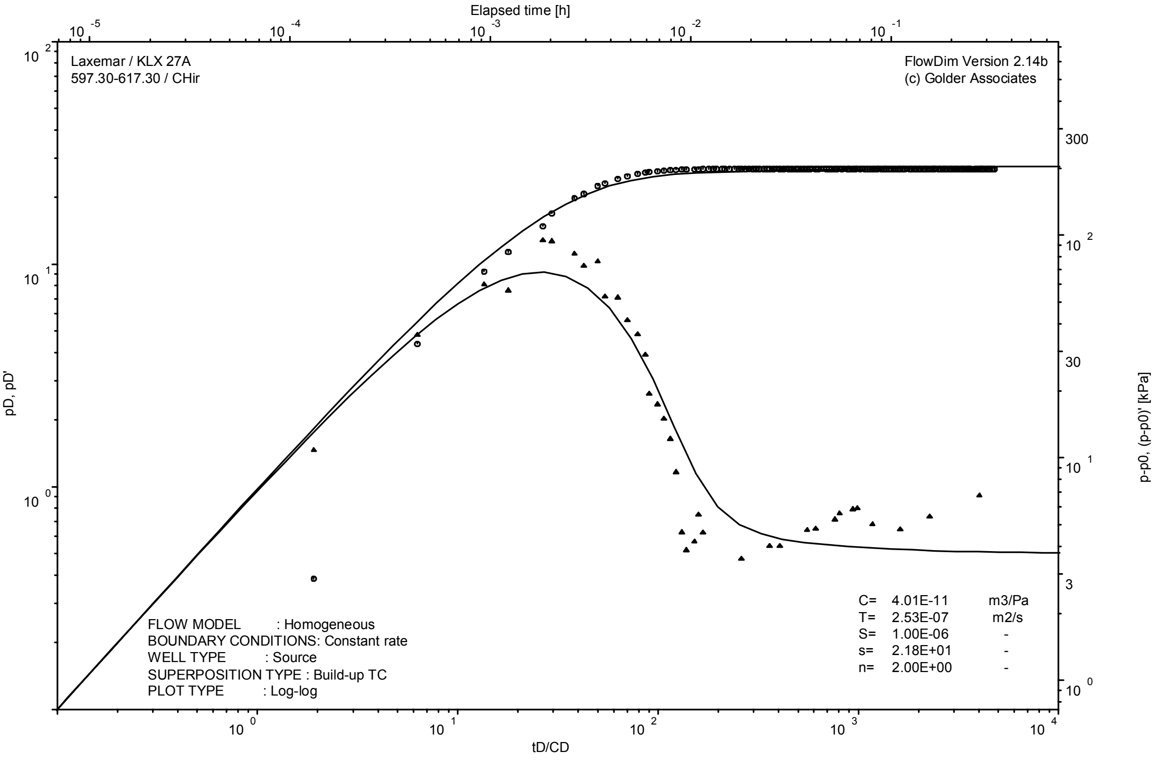
Pressure and flow rate vs. time; cartesian plot



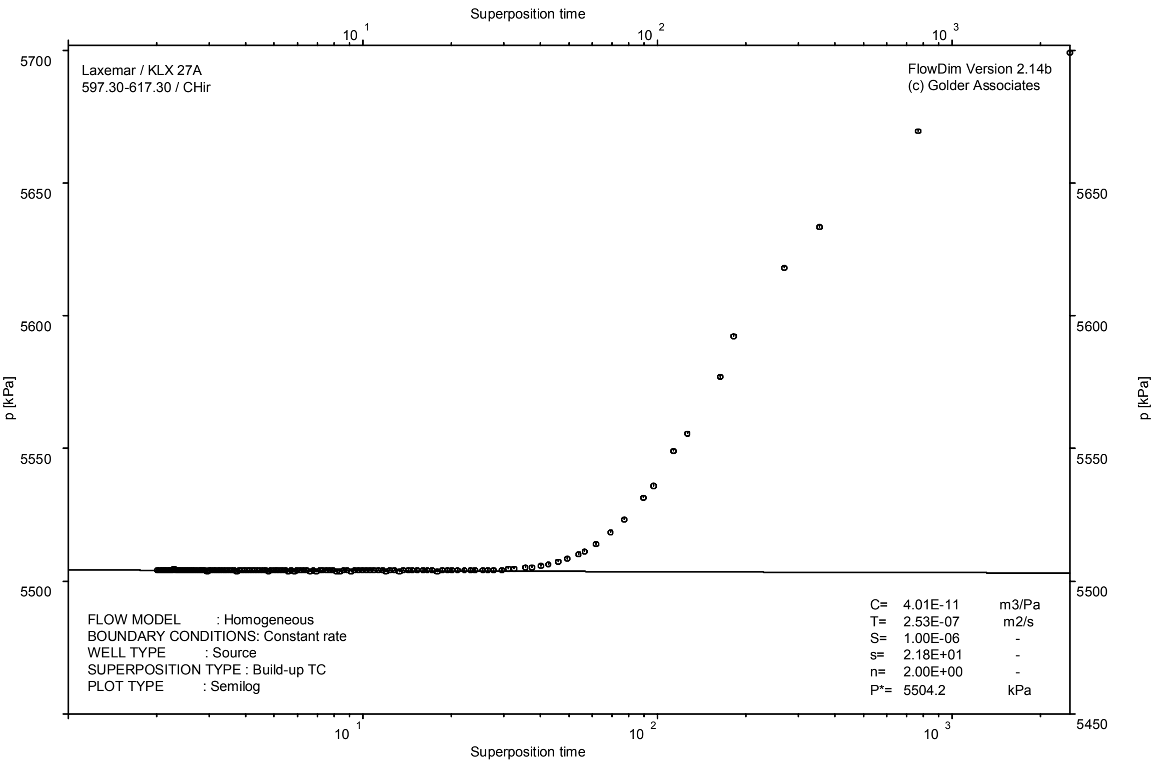
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

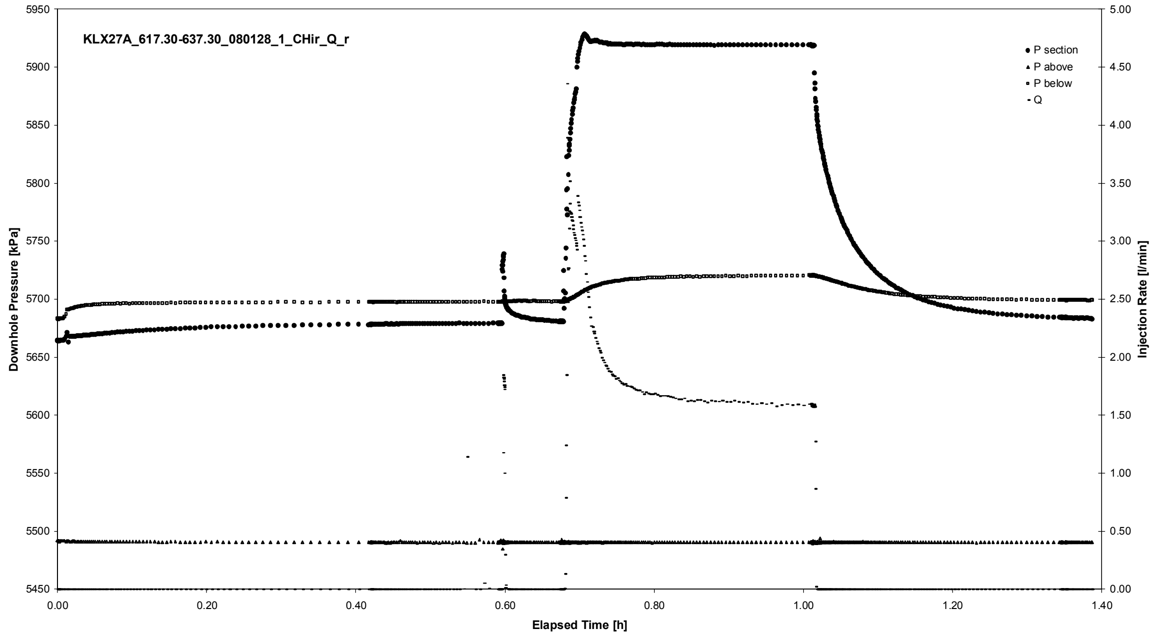


CHIR phase; HORNER match

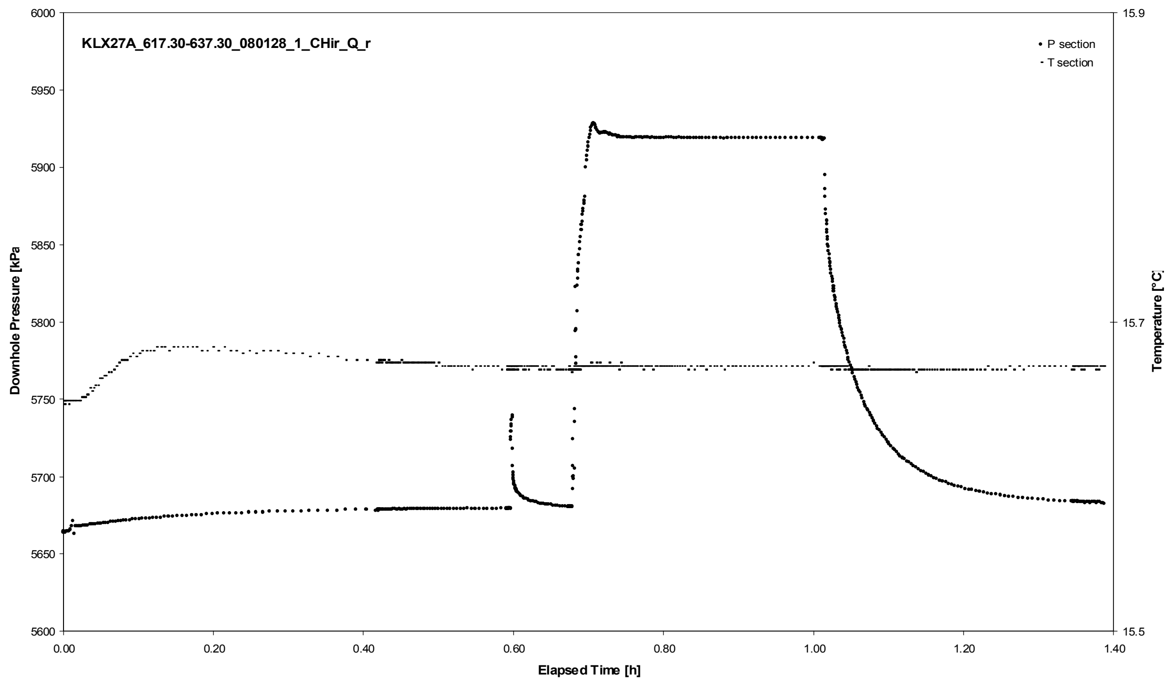
APPENDIX 2-34

Test 617.30 – 637.30 m

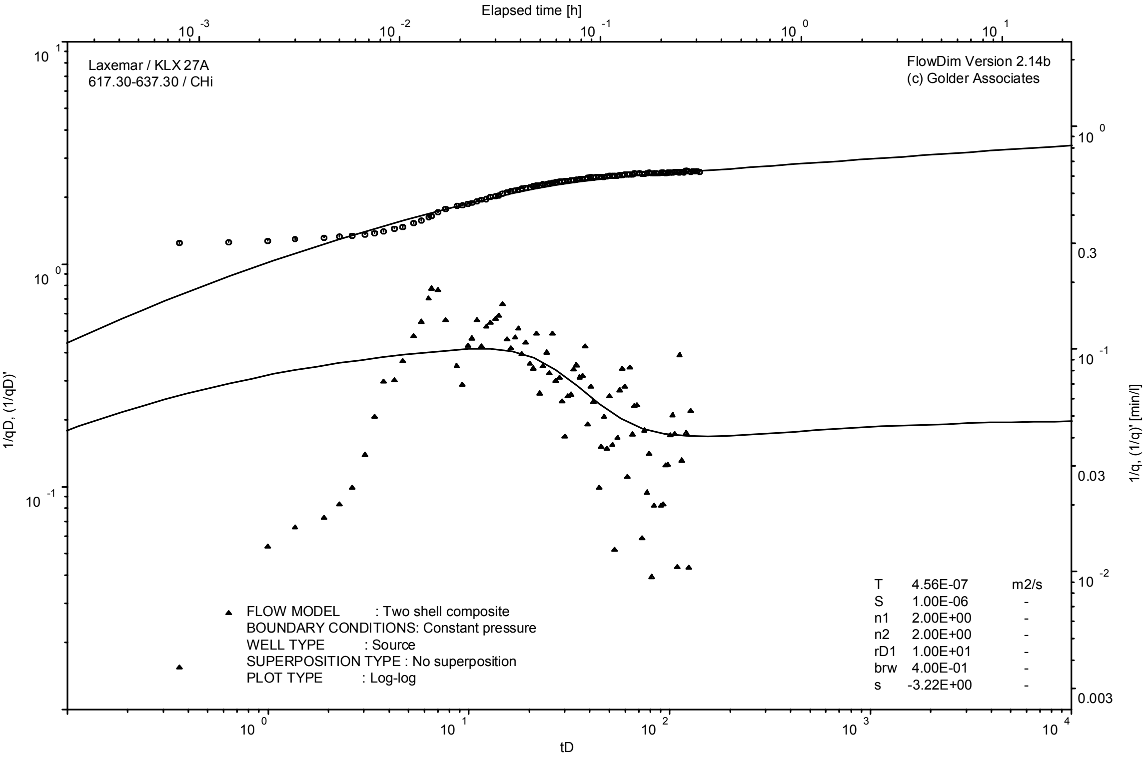
Analysis diagrams



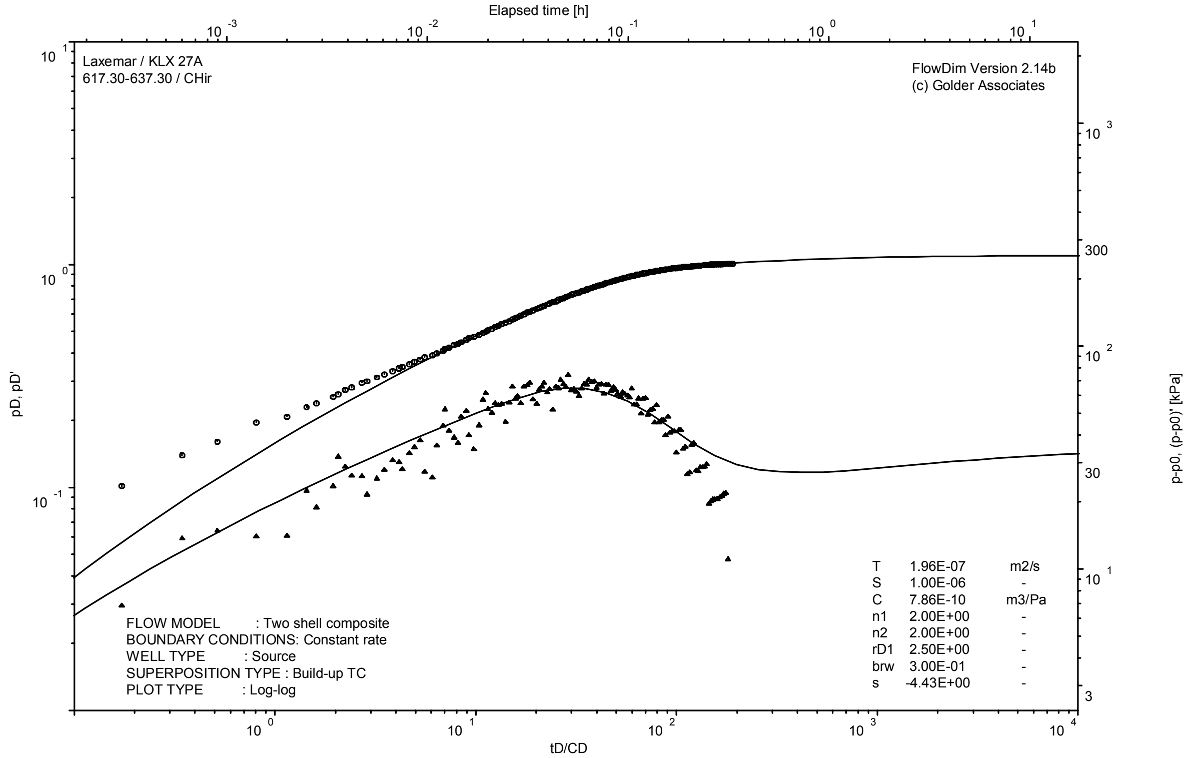
Pressure and flow rate vs. time; cartesian plot



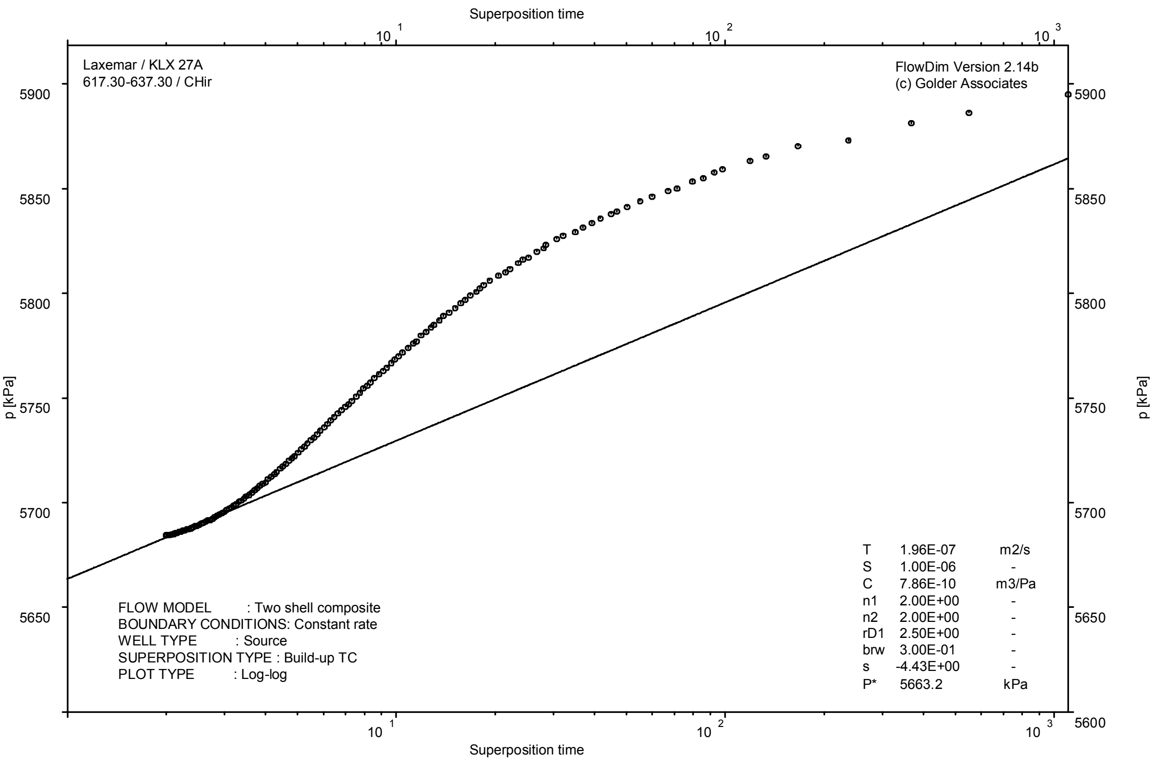
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

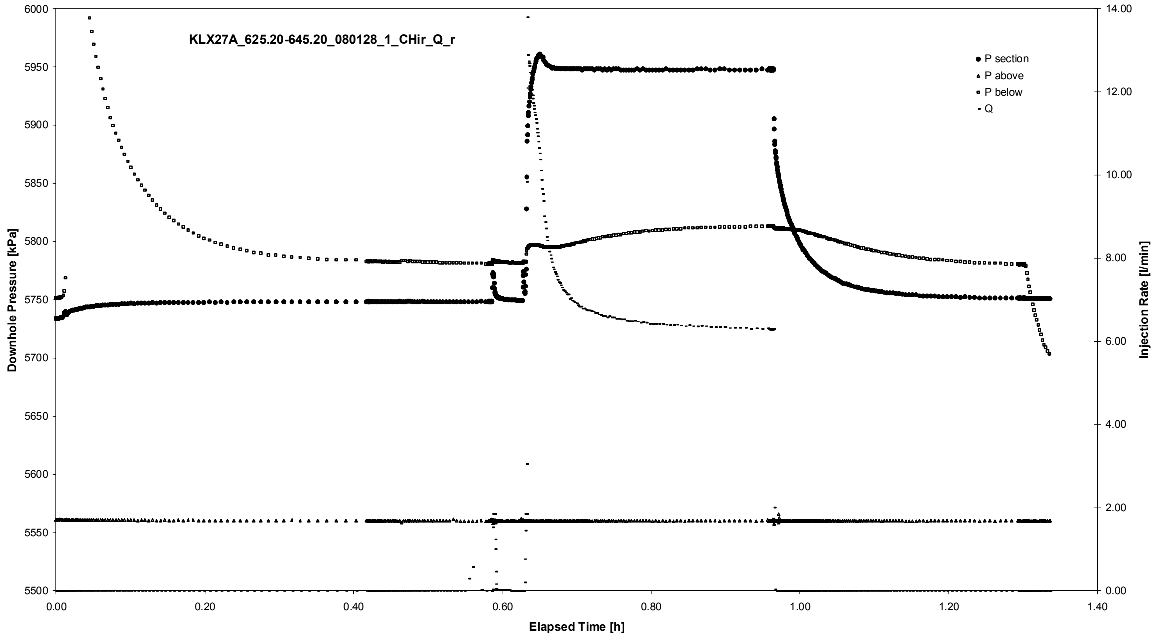


CHIR phase; HORNER match

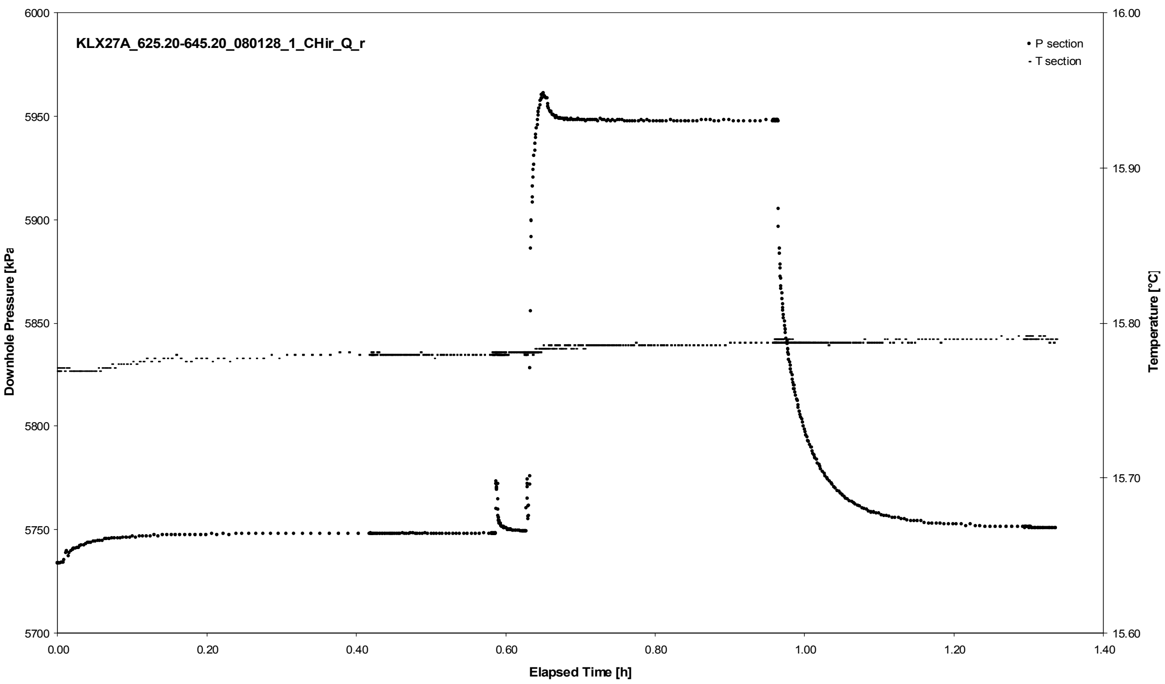
APPENDIX 2-35

Test 625.20 – 645.20 m

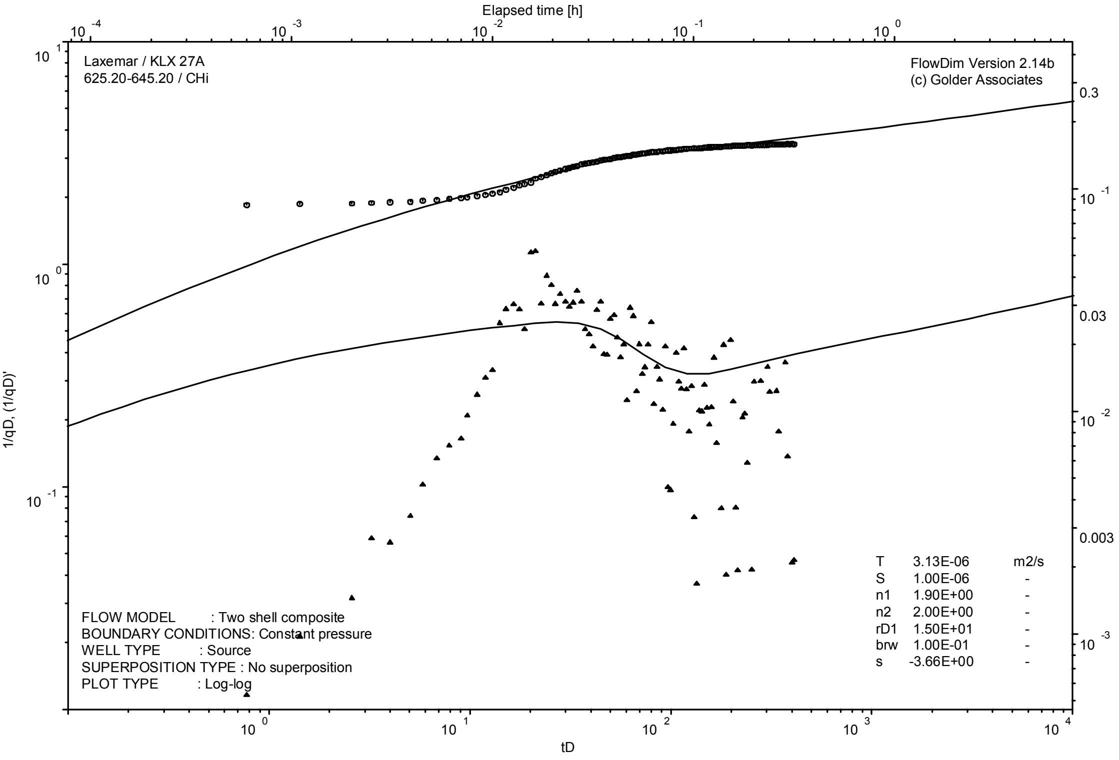
Analysis diagrams



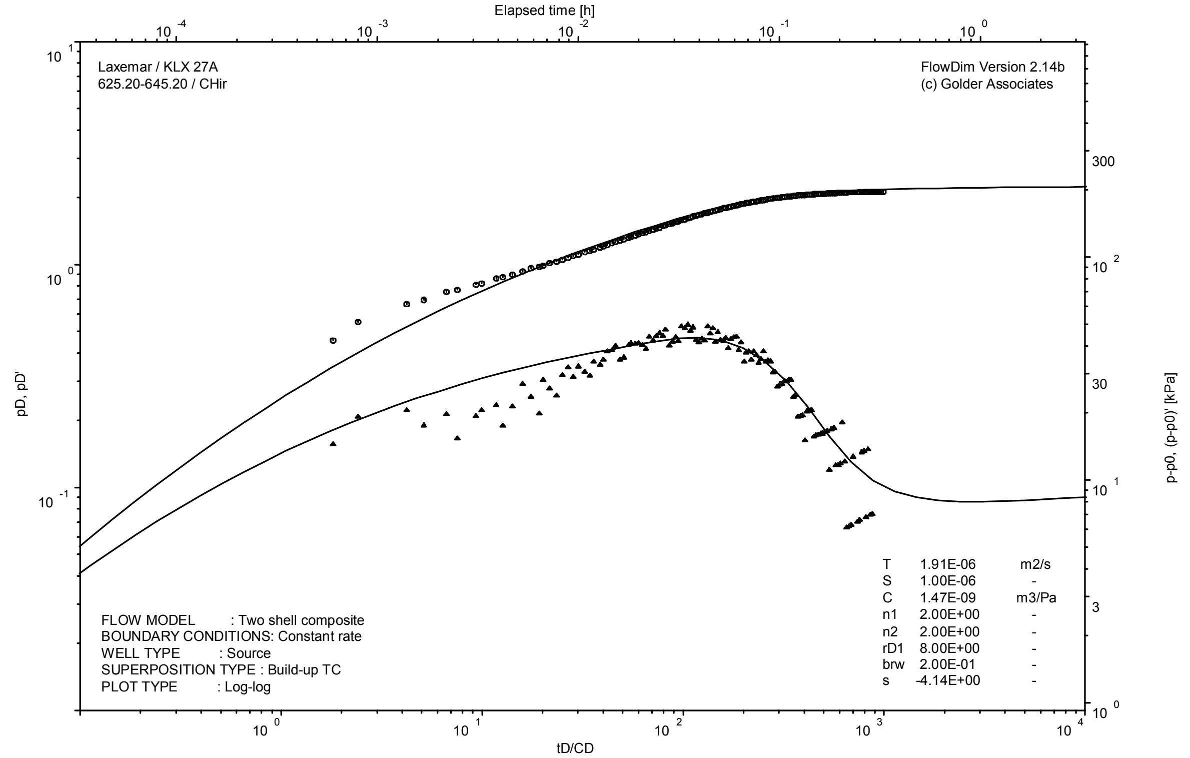
Pressure and flow rate vs. time; cartesian plot



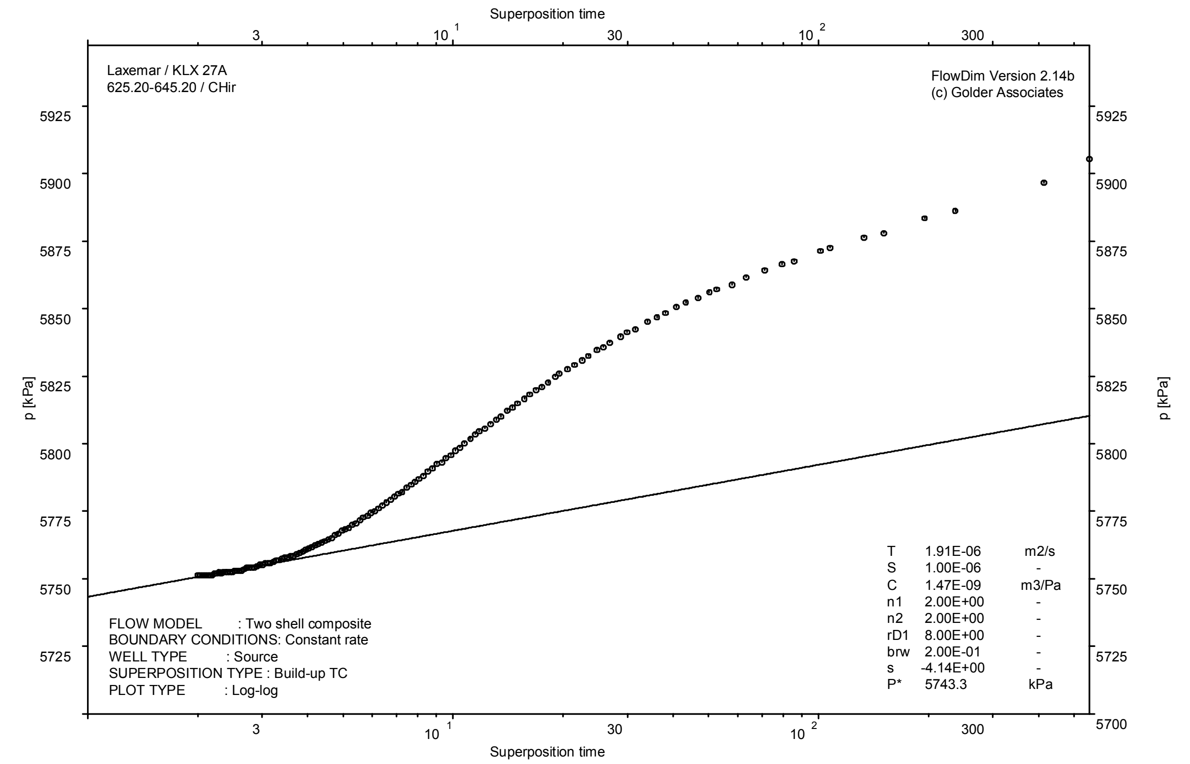
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

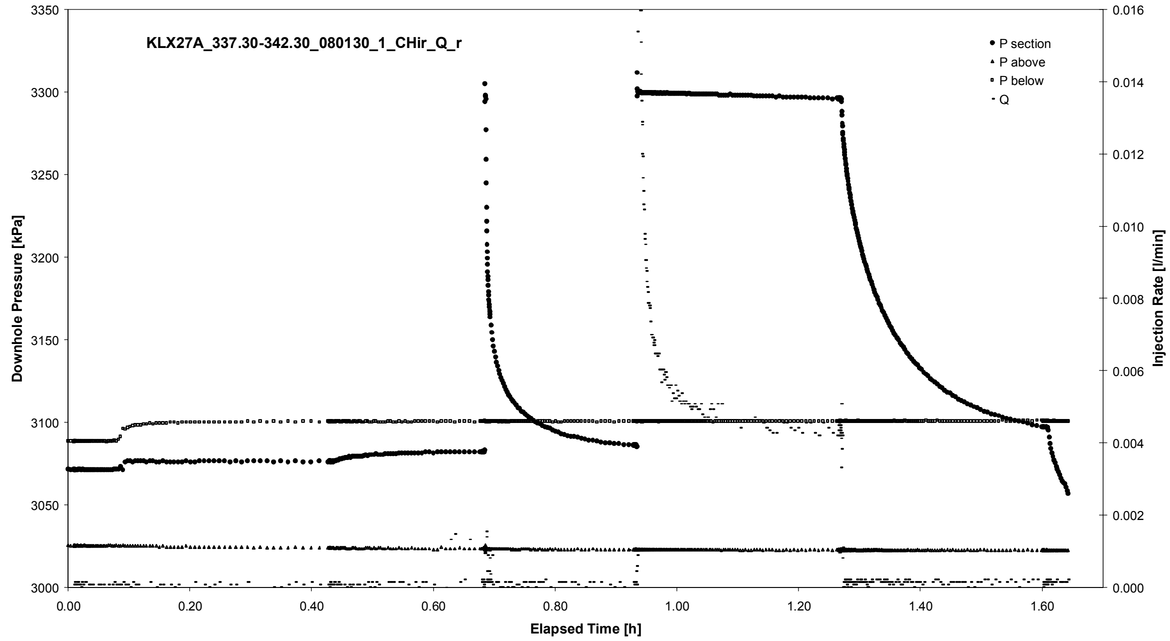


CHIR phase; HORNER match

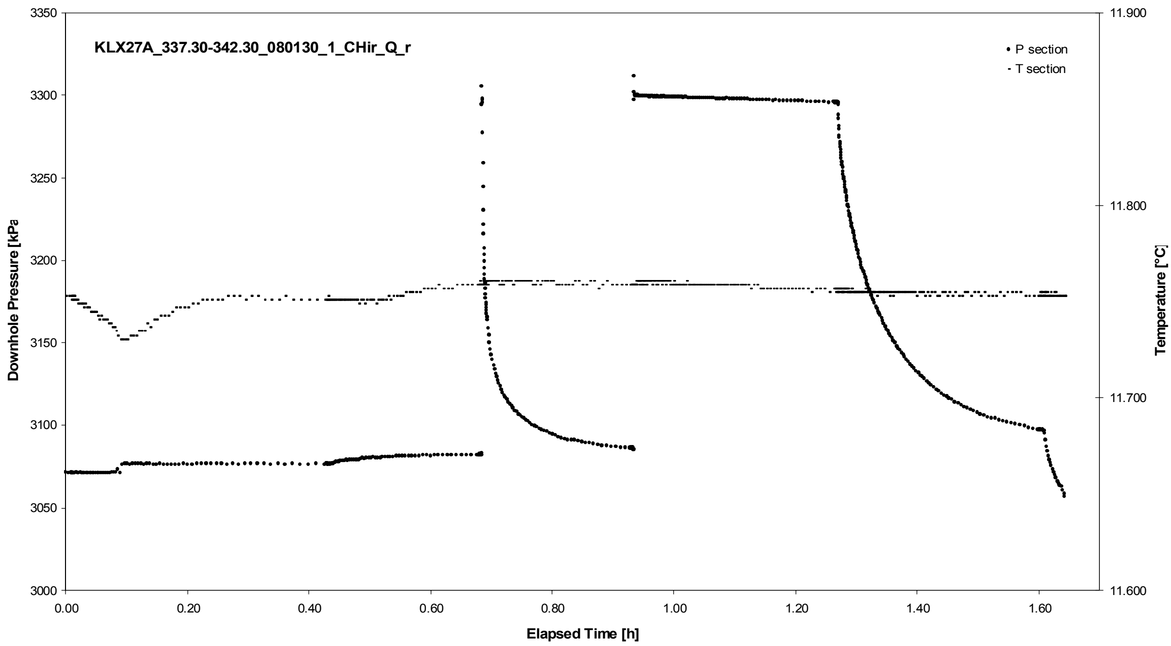
APPENDIX 2-36

Test 337.30 – 342.30 m

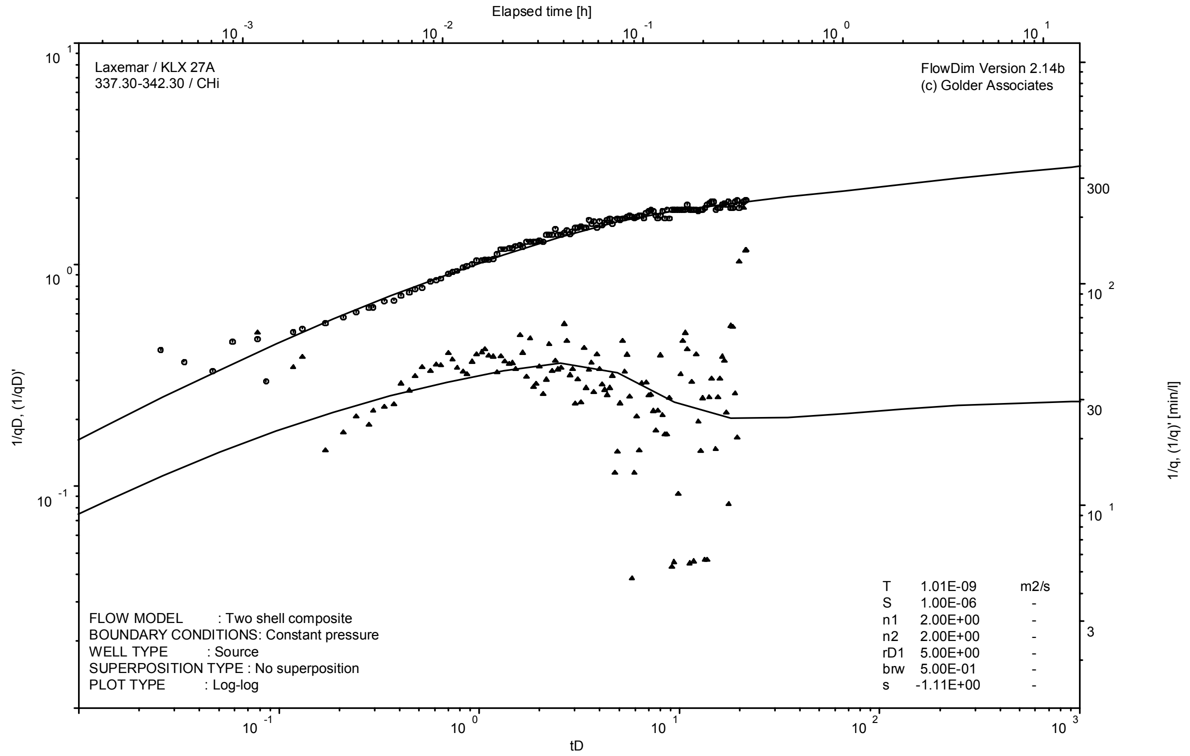
Analysis diagrams



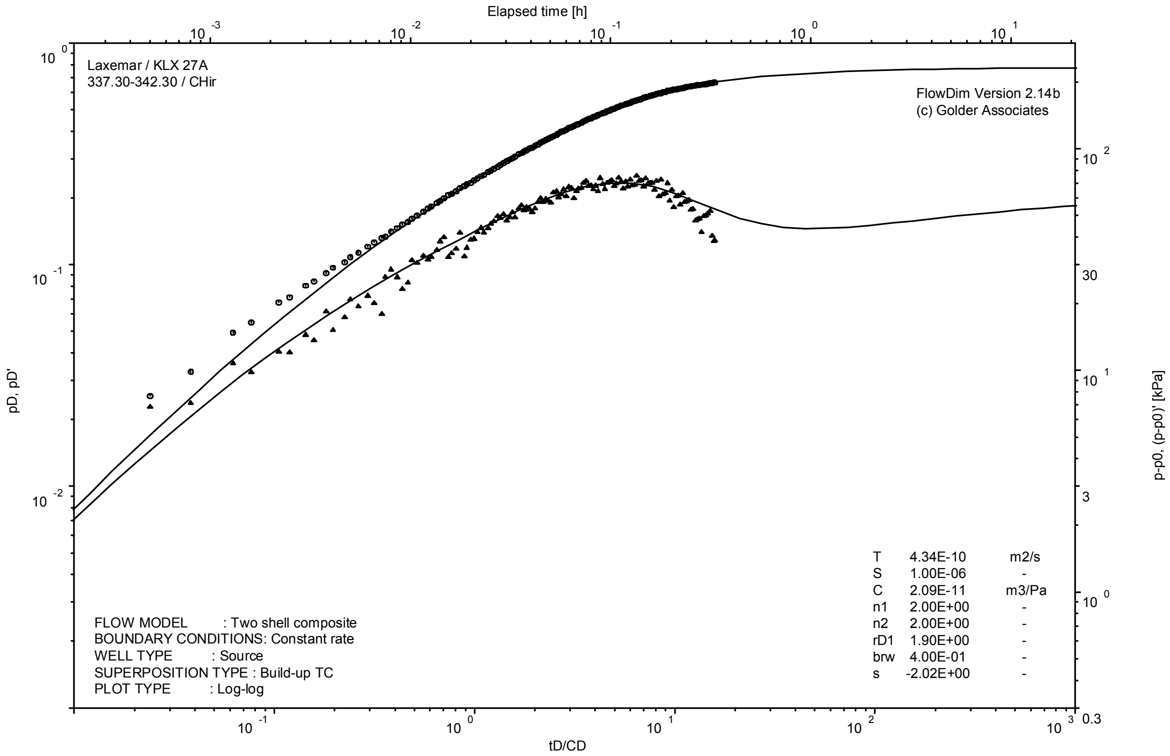
Pressure and flow rate vs. time; cartesian plot



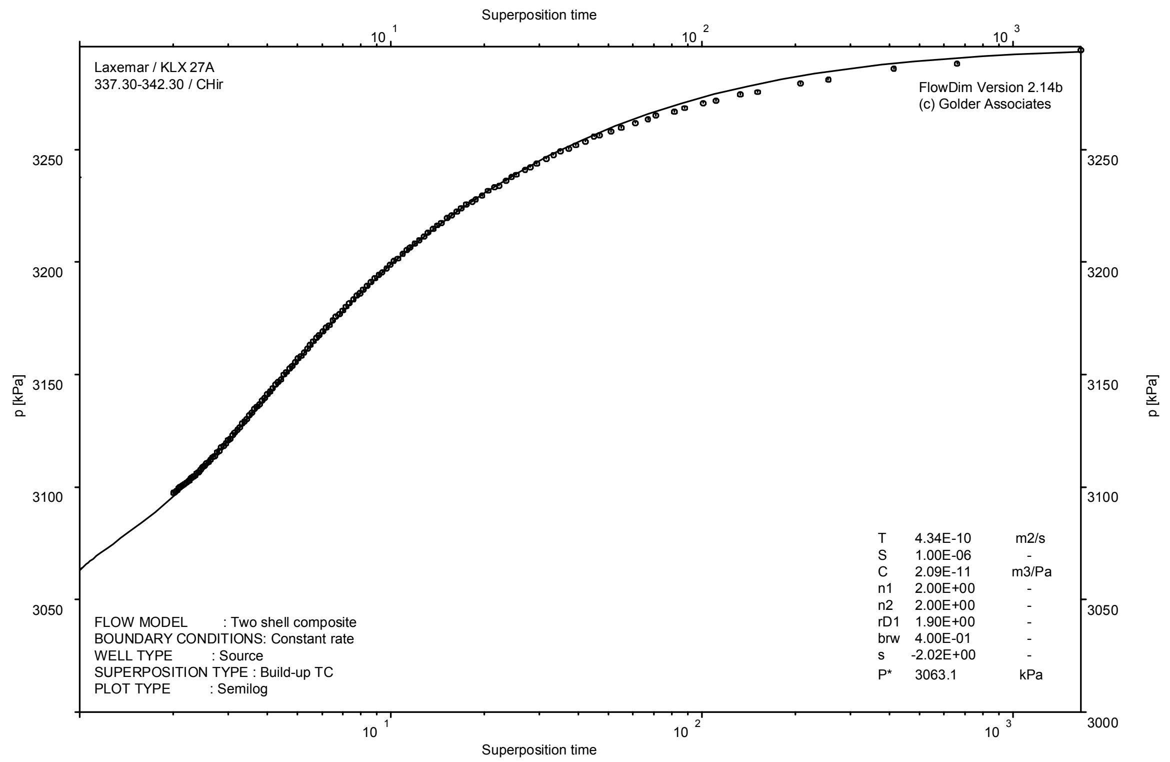
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

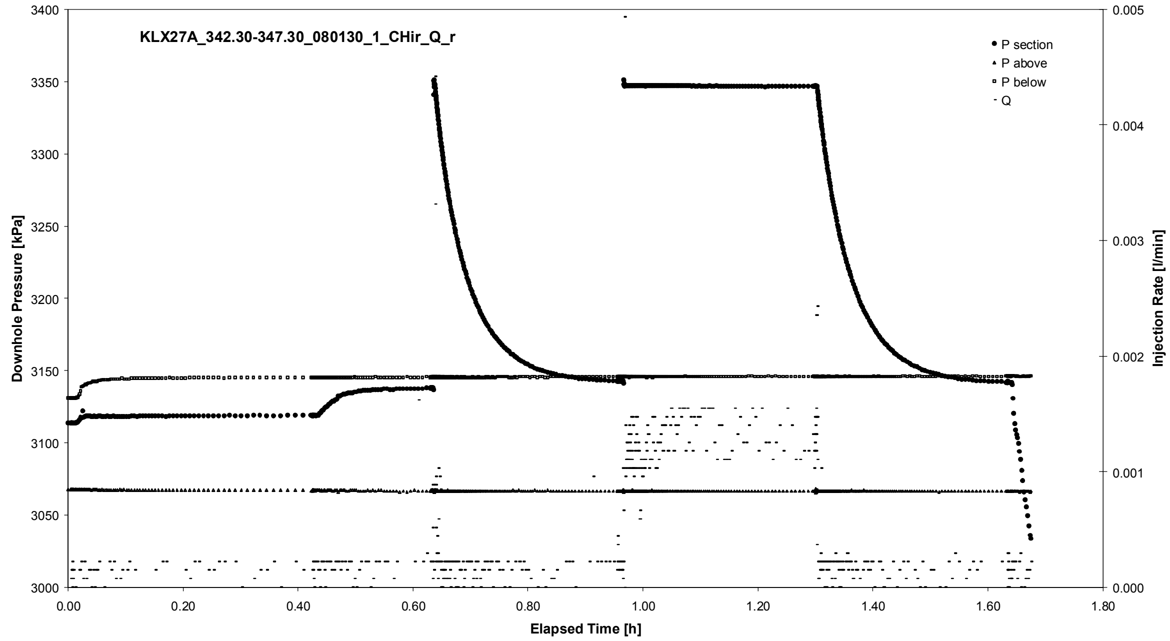


CHIR phase; HORNER match

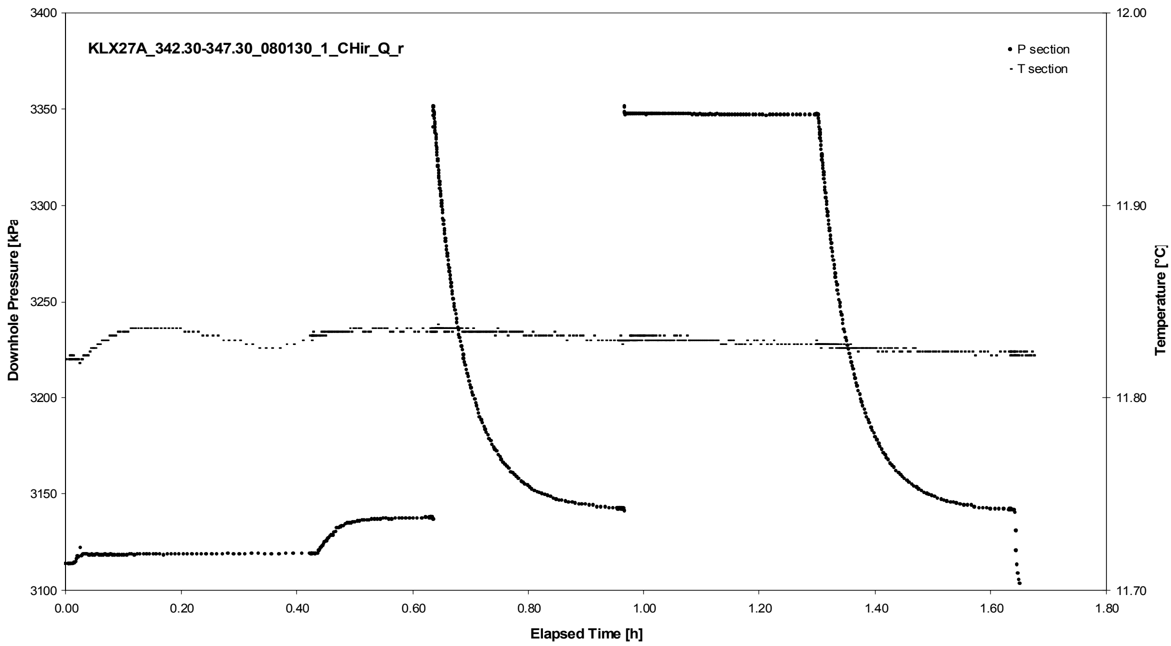
APPENDIX 2-37

Test 342.30 – 347.30 m

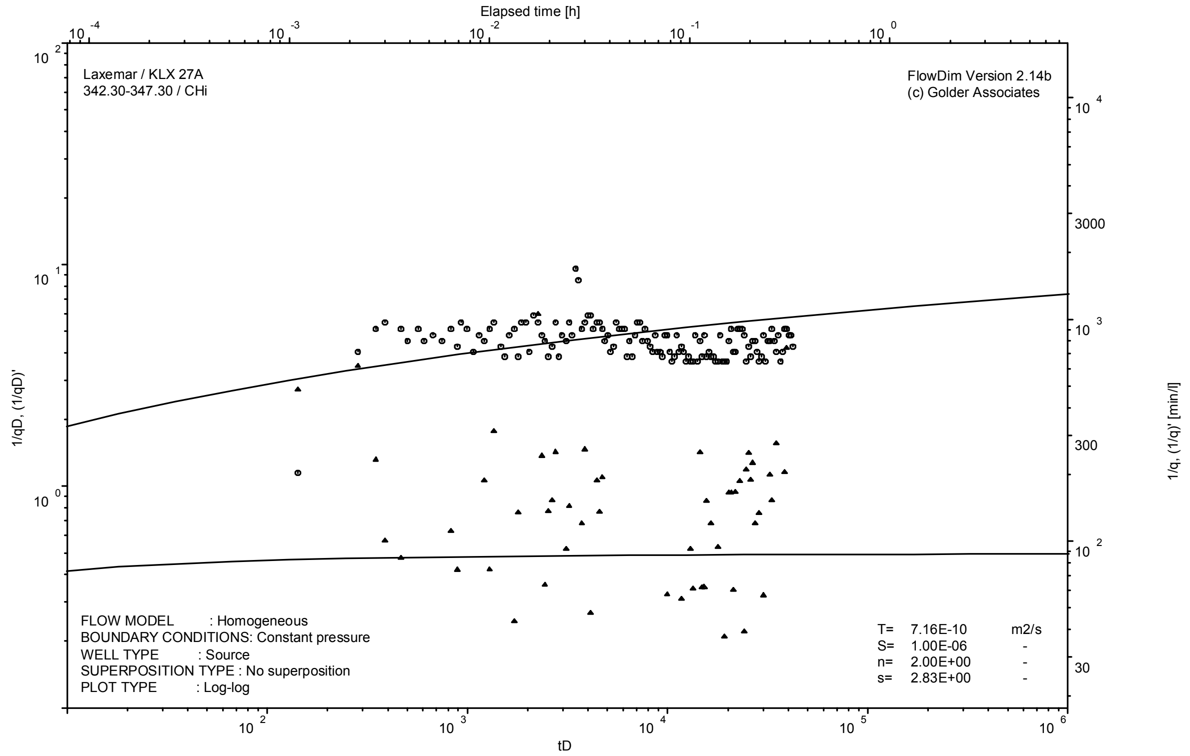
Analysis diagrams



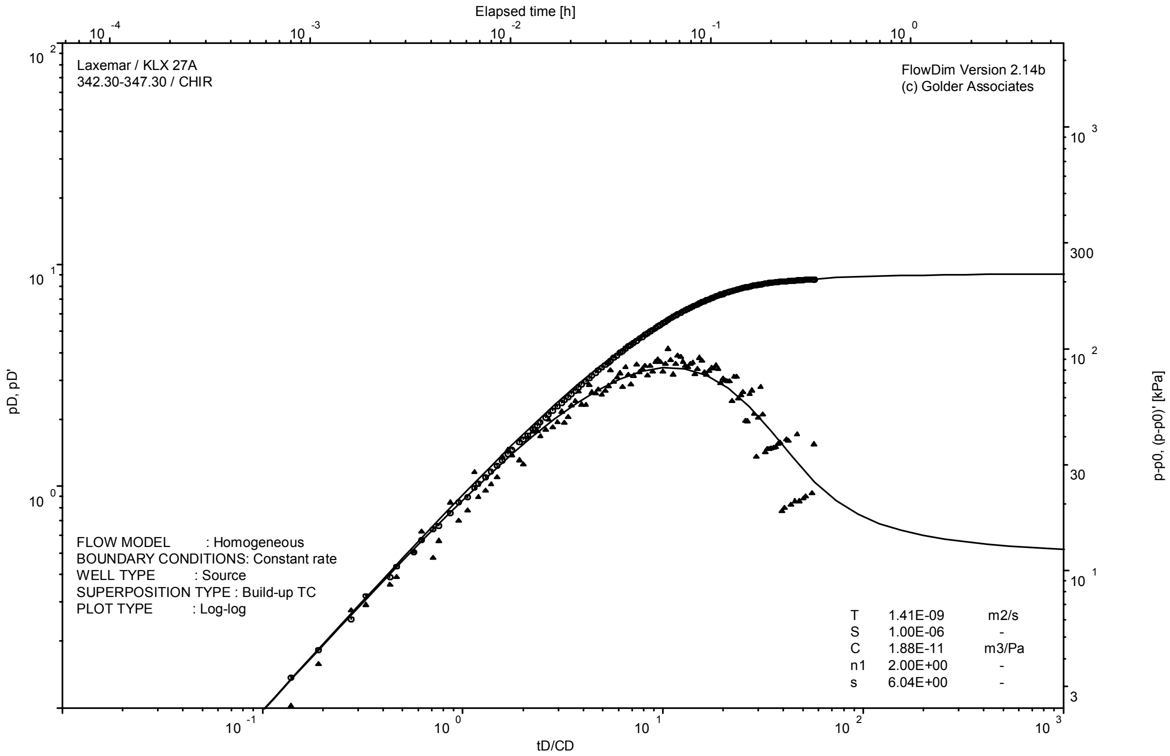
Pressure and flow rate vs. time; cartesian plot



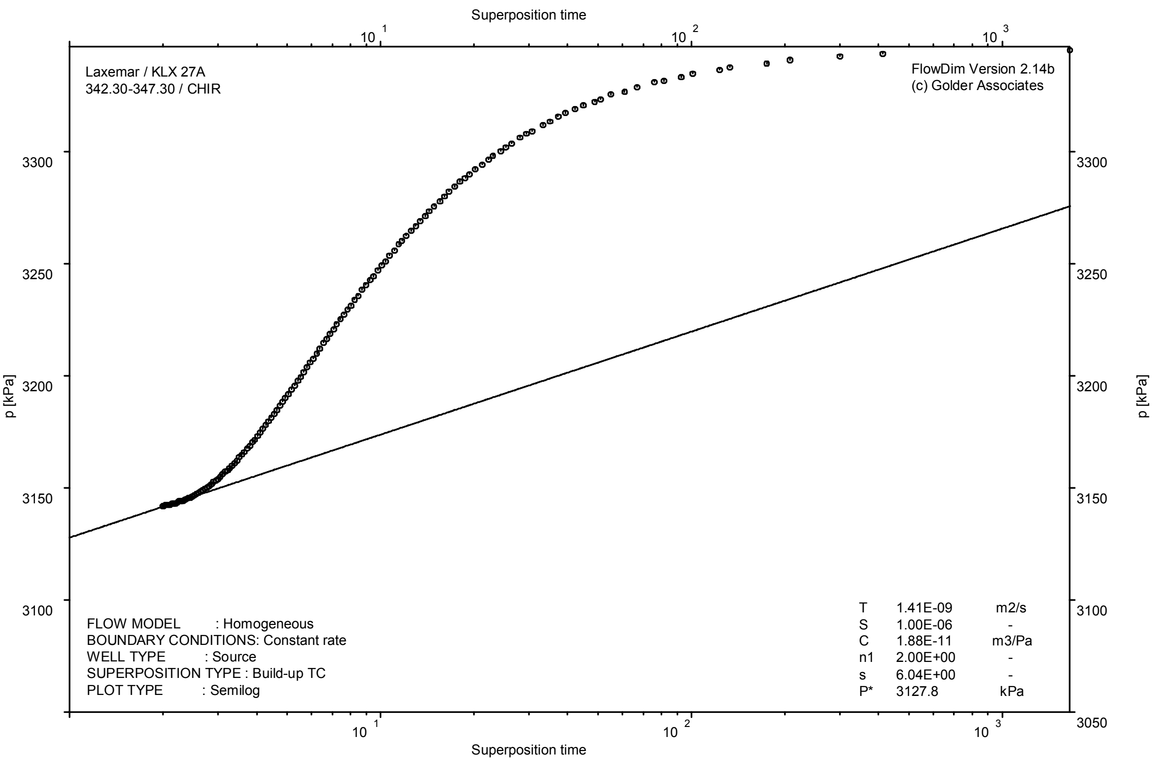
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

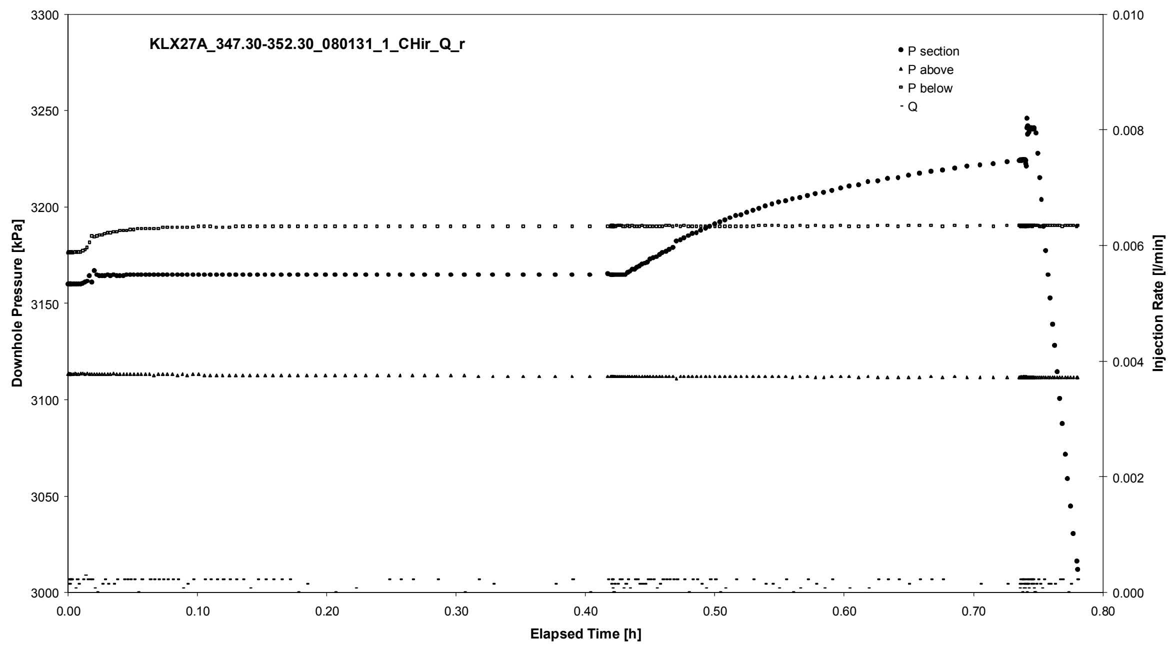


CHIR phase; HORNER match

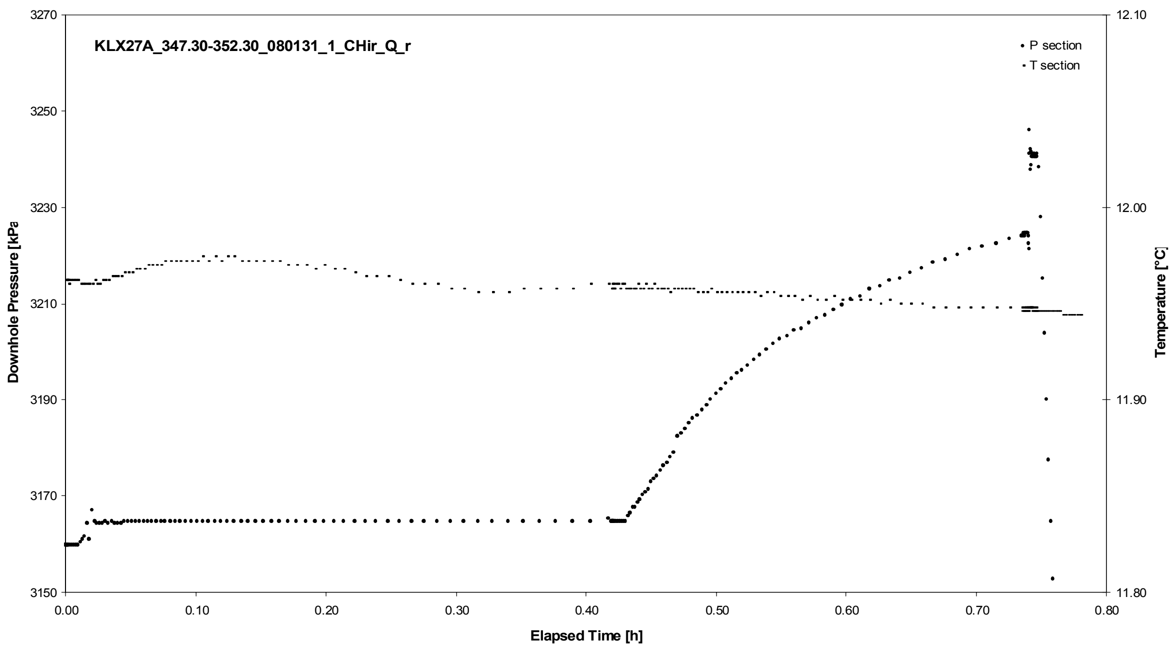
APPENDIX 2-38

Test 347.30 – 352.30 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

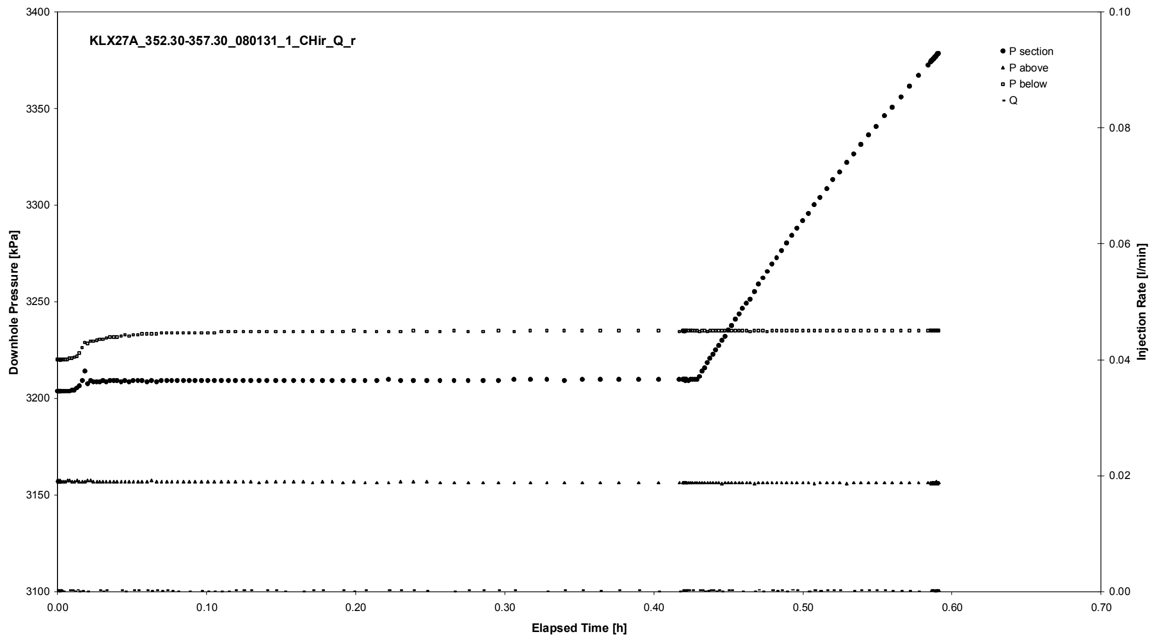
Not analysed

CHIR phase; HORNER match

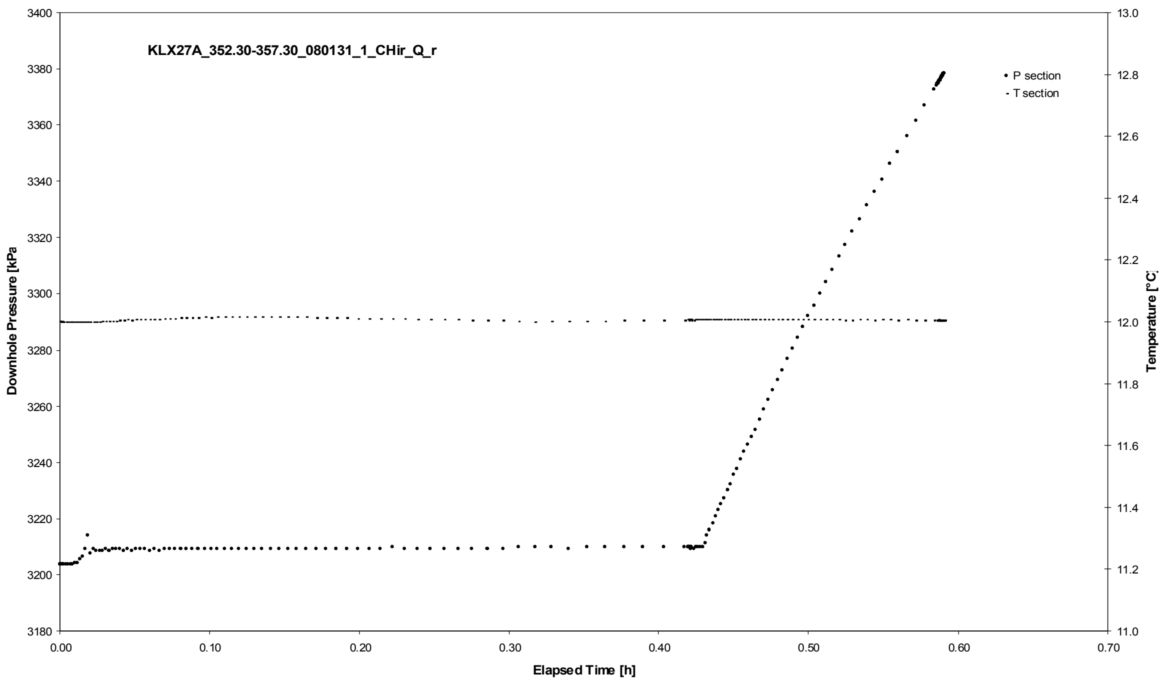
APPENDIX 2-39

Test 352.30 – 357.30 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

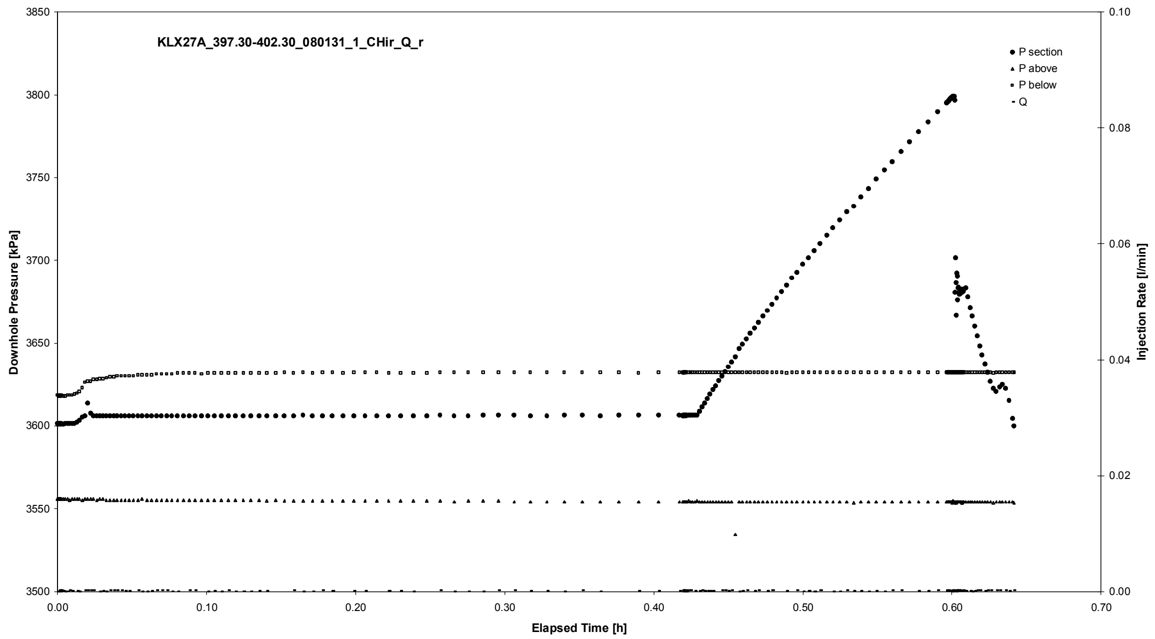
Not analysed

CHIR phase; HORNER match

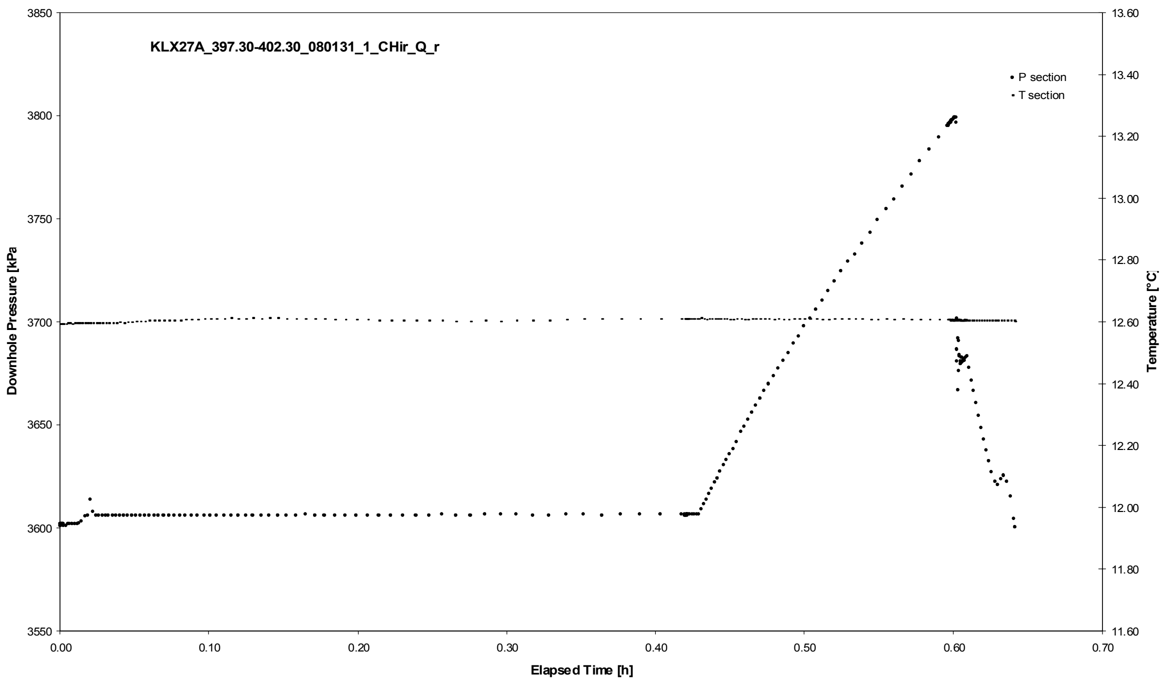
APPENDIX 2-40

Test 397.30 – 402.30 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

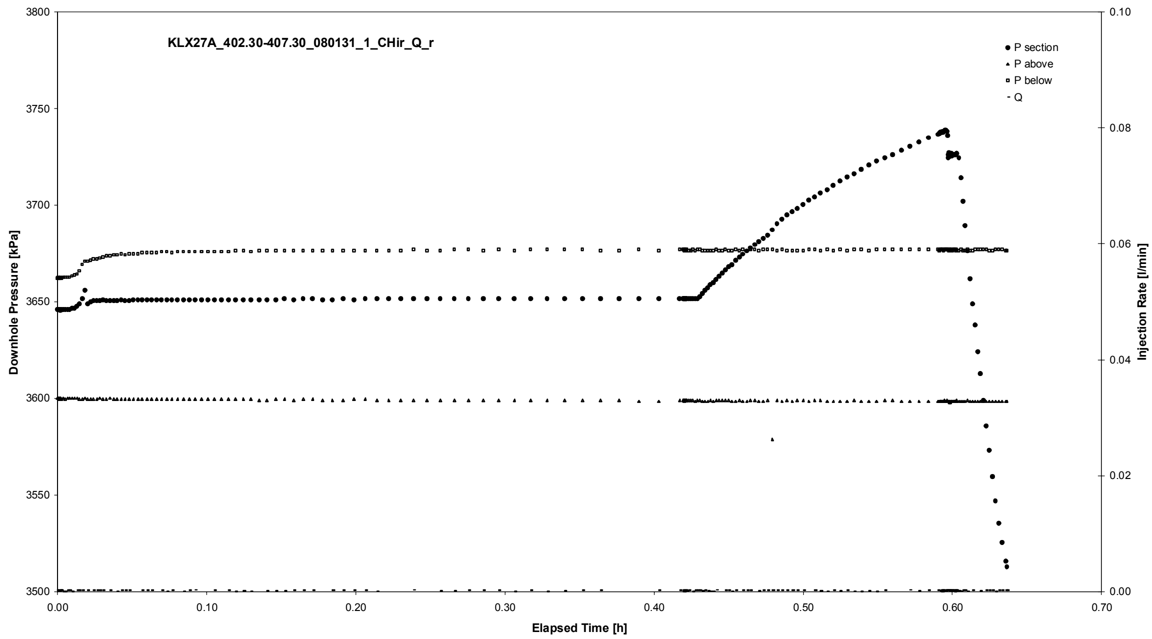
Not analysed

CHIR phase; HORNER match

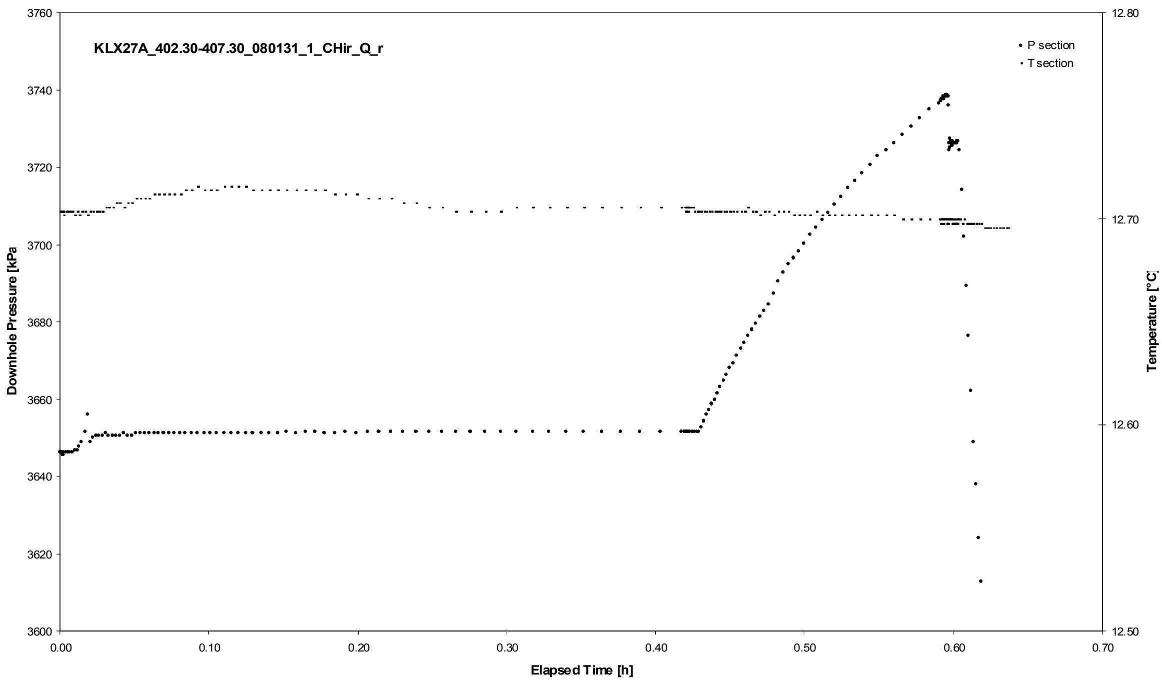
APPENDIX 2-41

Test 402.30 – 407.30 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

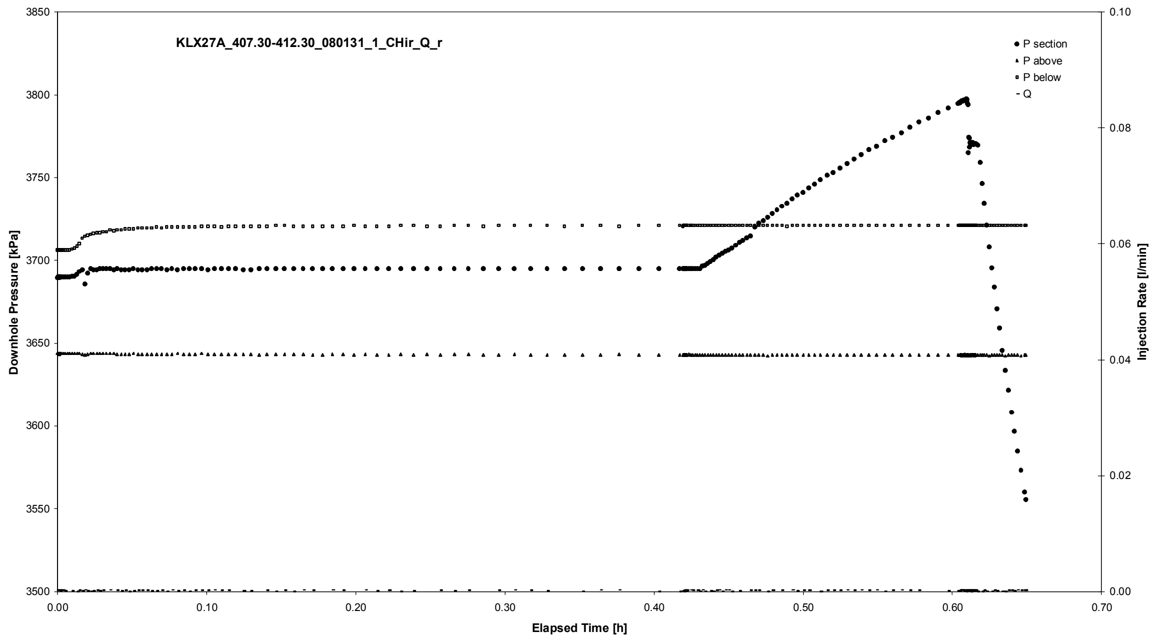
Not analysed

CHIR phase; HORNER match

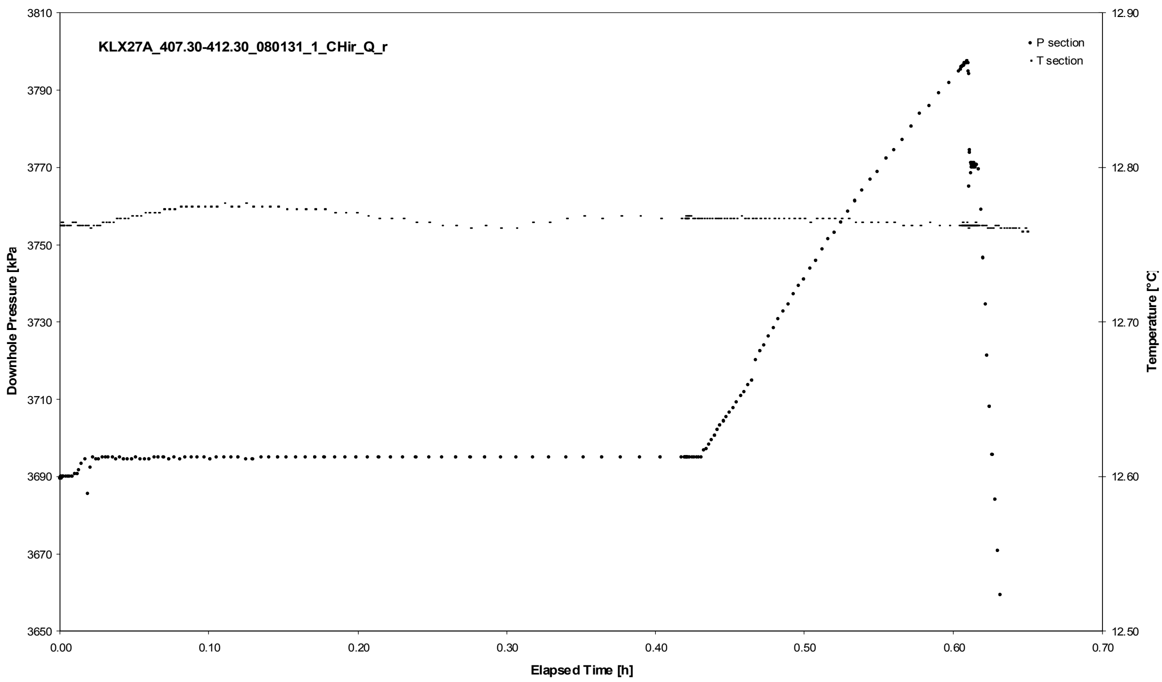
APPENDIX 2-42

Test 407.30 – 412.30 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

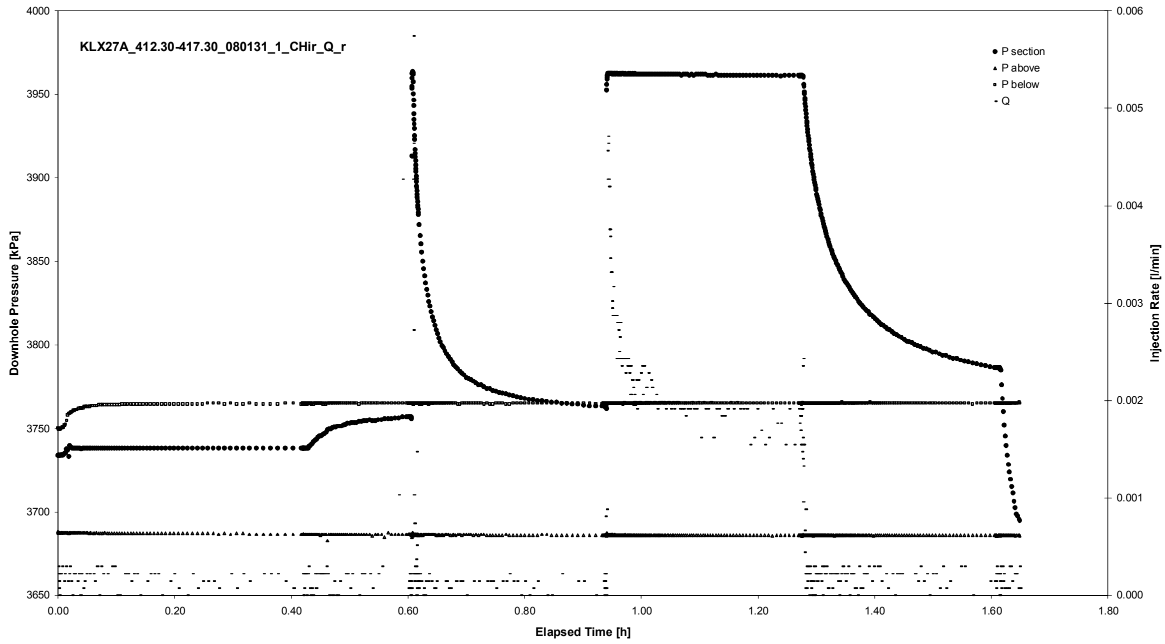
Not analysed

CHIR phase; HORNER match

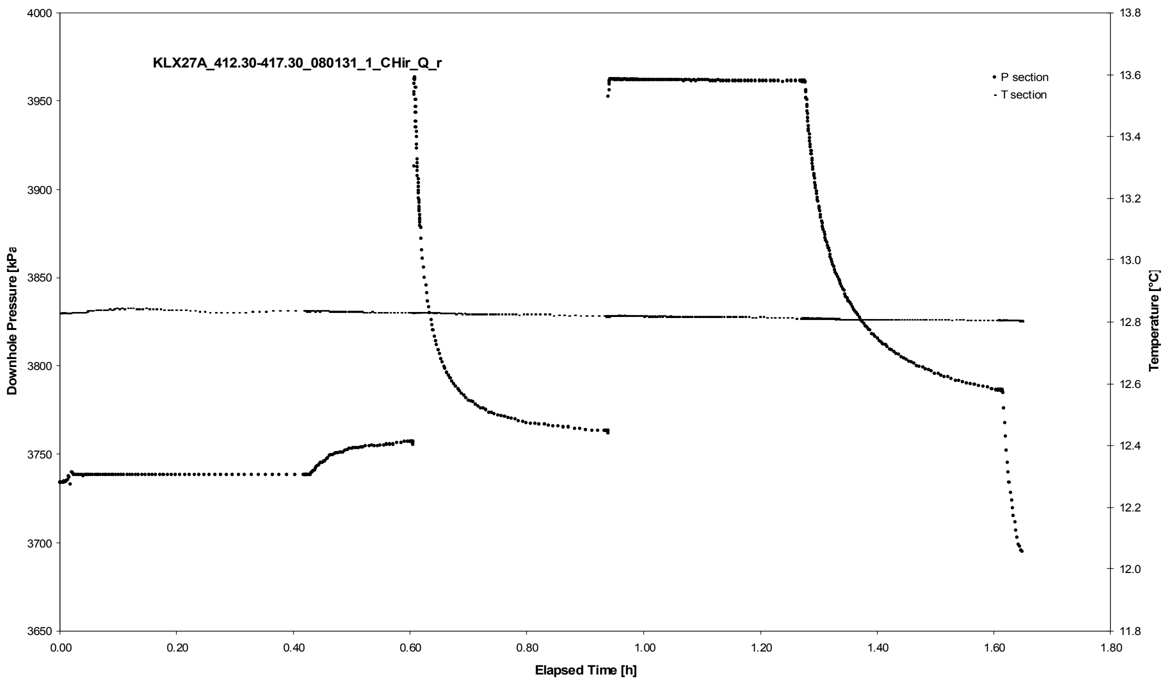
APPENDIX 2-43

Test 412.30 – 417.30 m

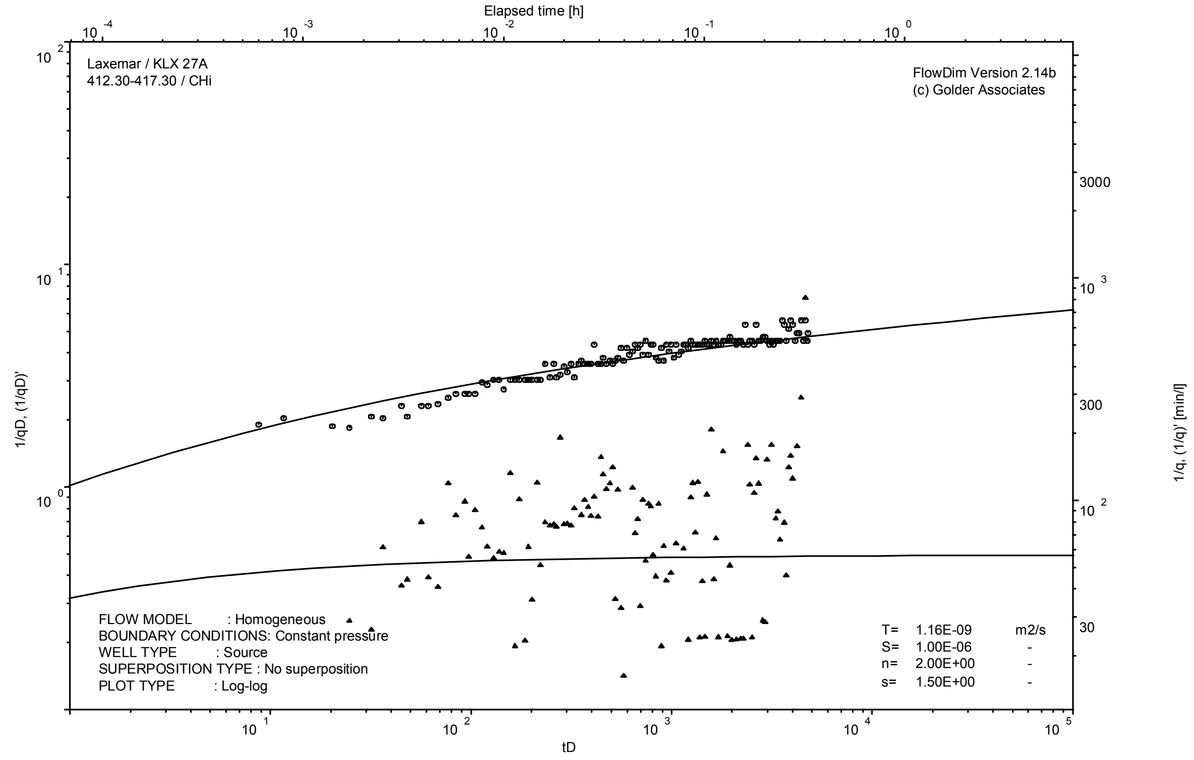
Analysis diagrams



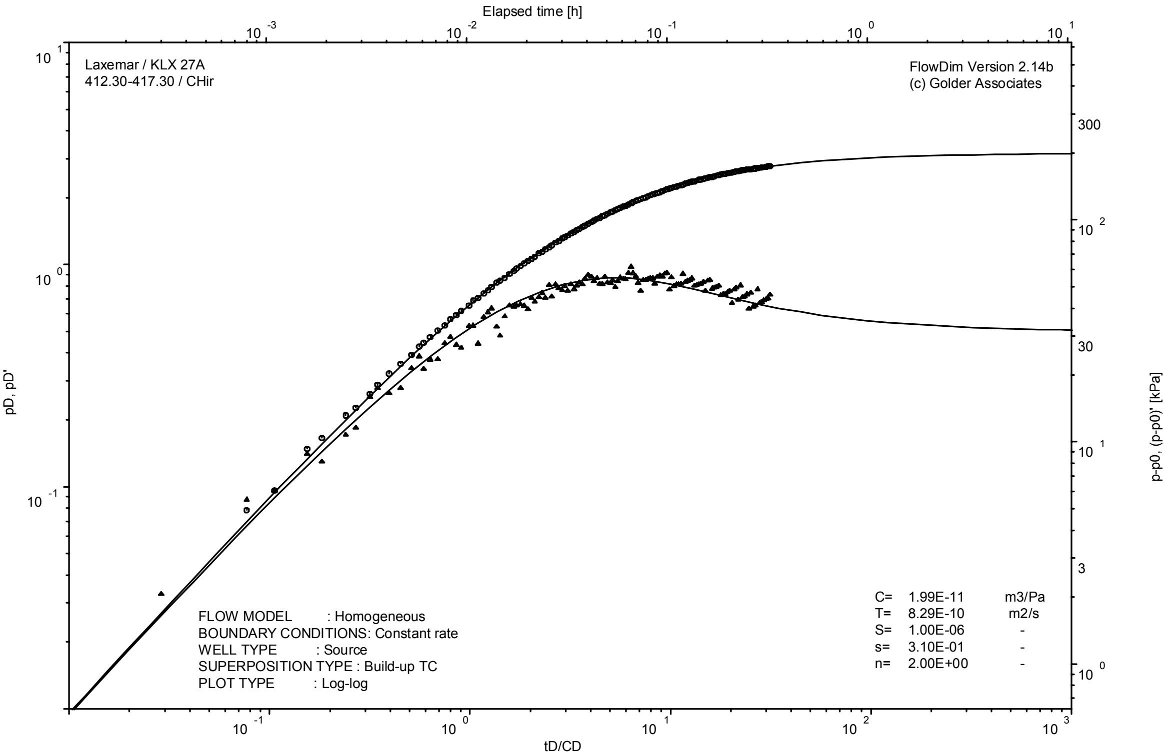
Pressure and flow rate vs. time; cartesian plot



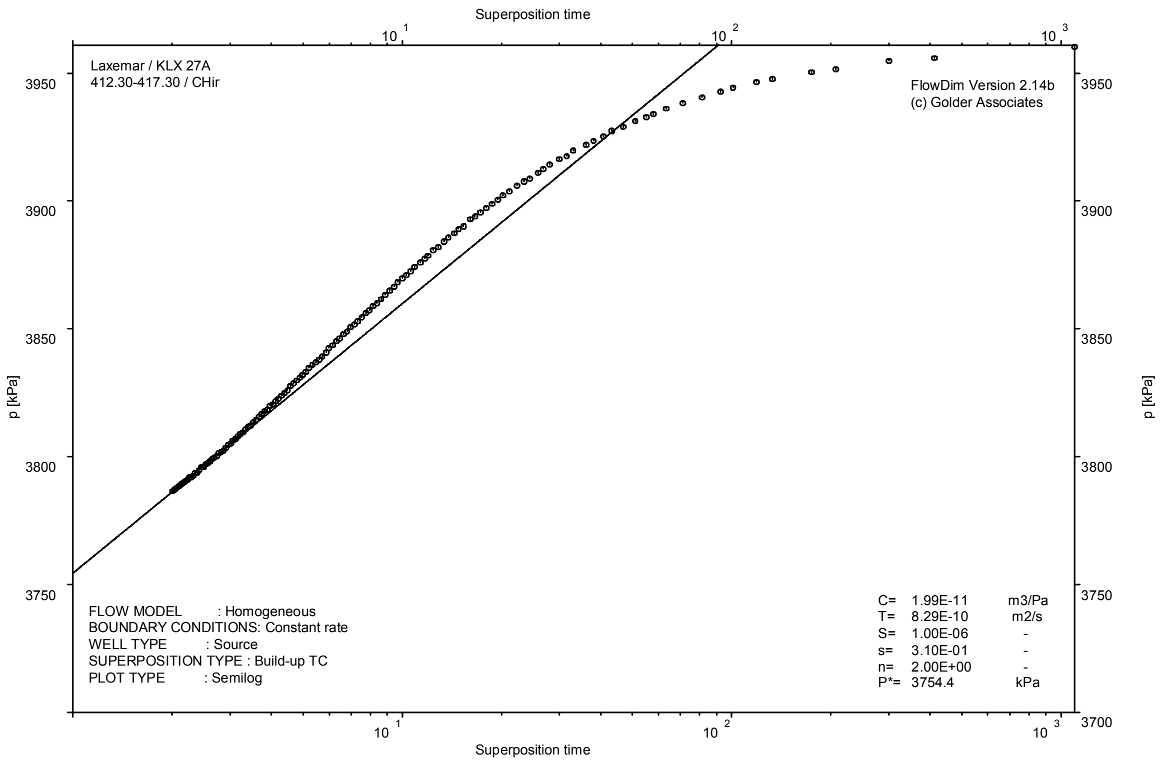
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

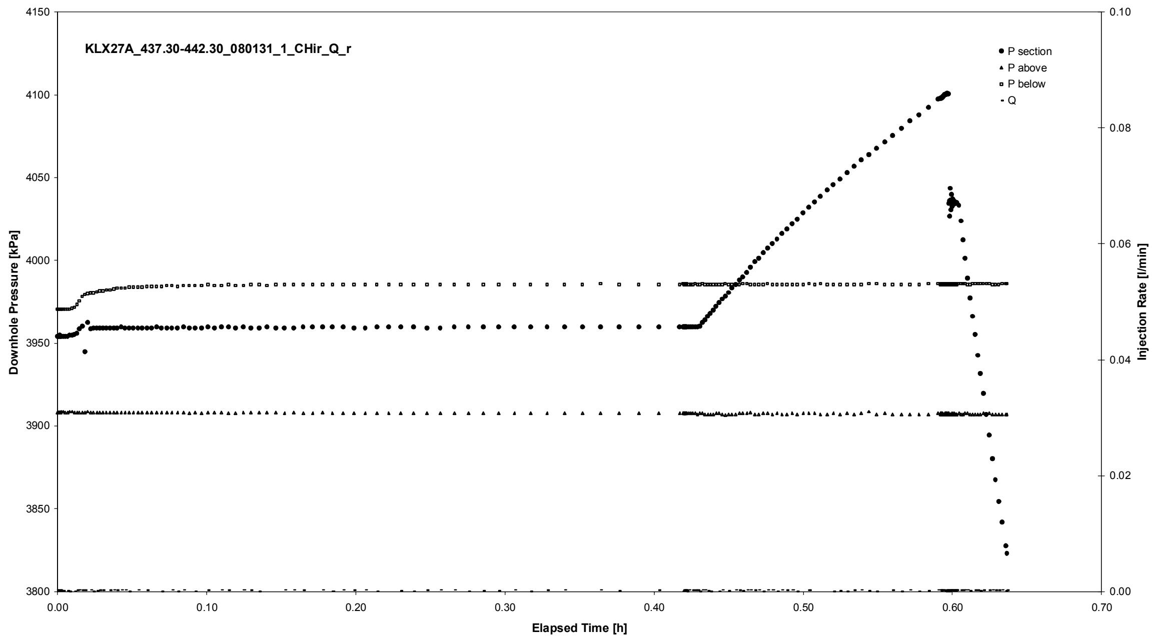


CHIR phase; HORNER match

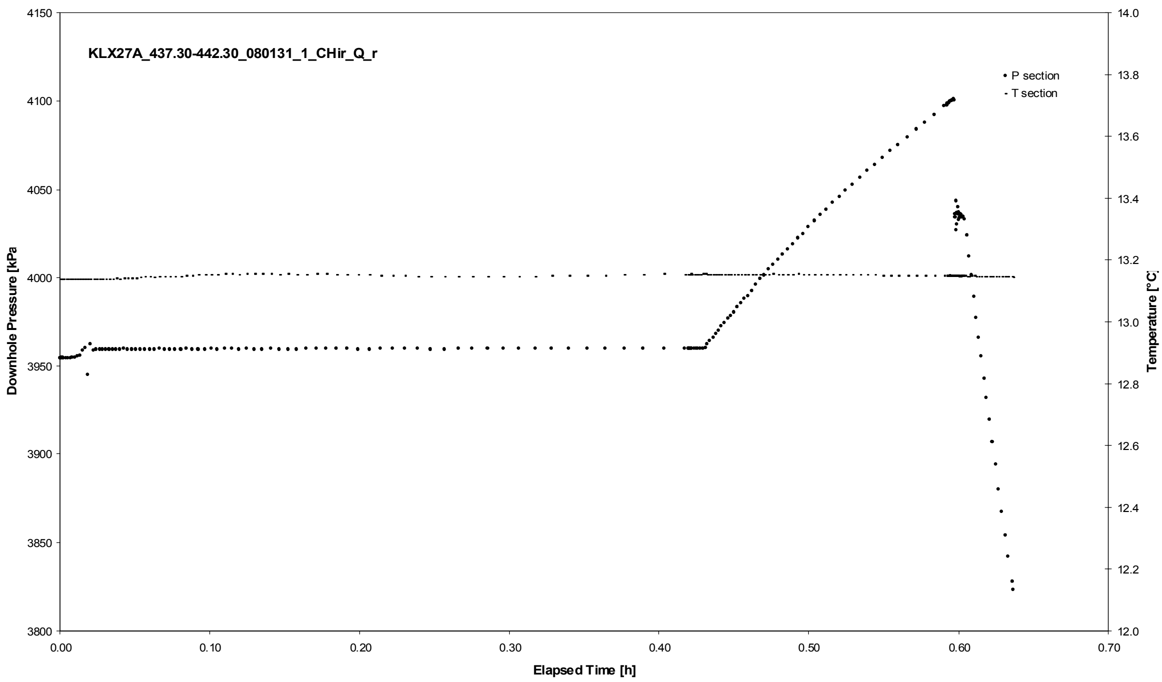
APPENDIX 2-44

Test 437.30 – 442.30 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

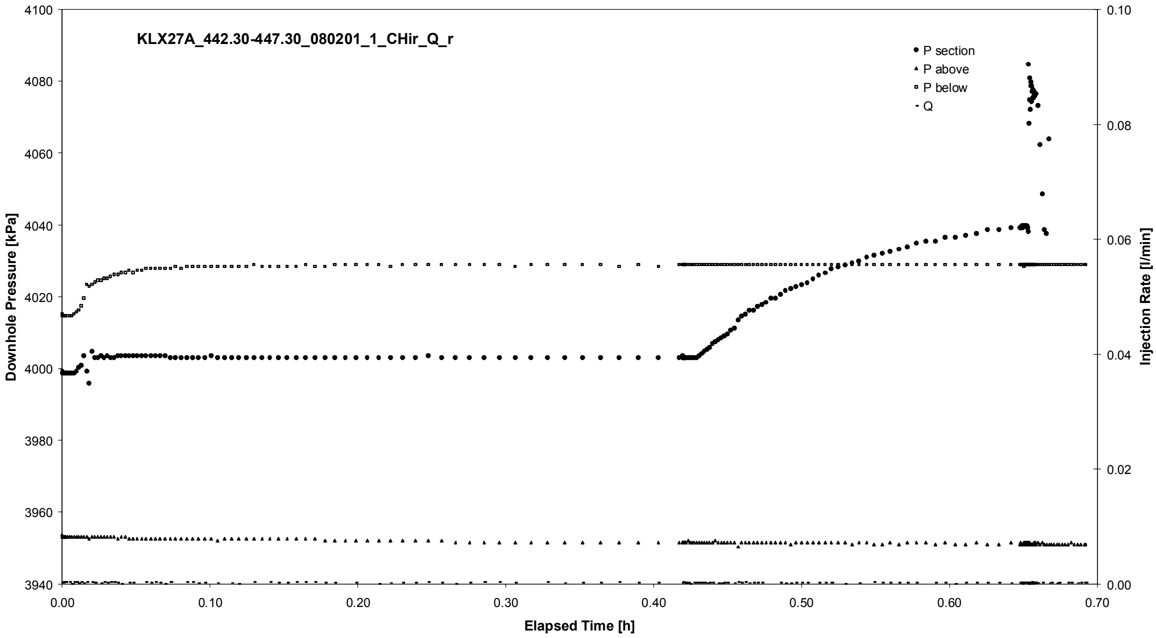
Not analysed

CHIR phase; HORNER match

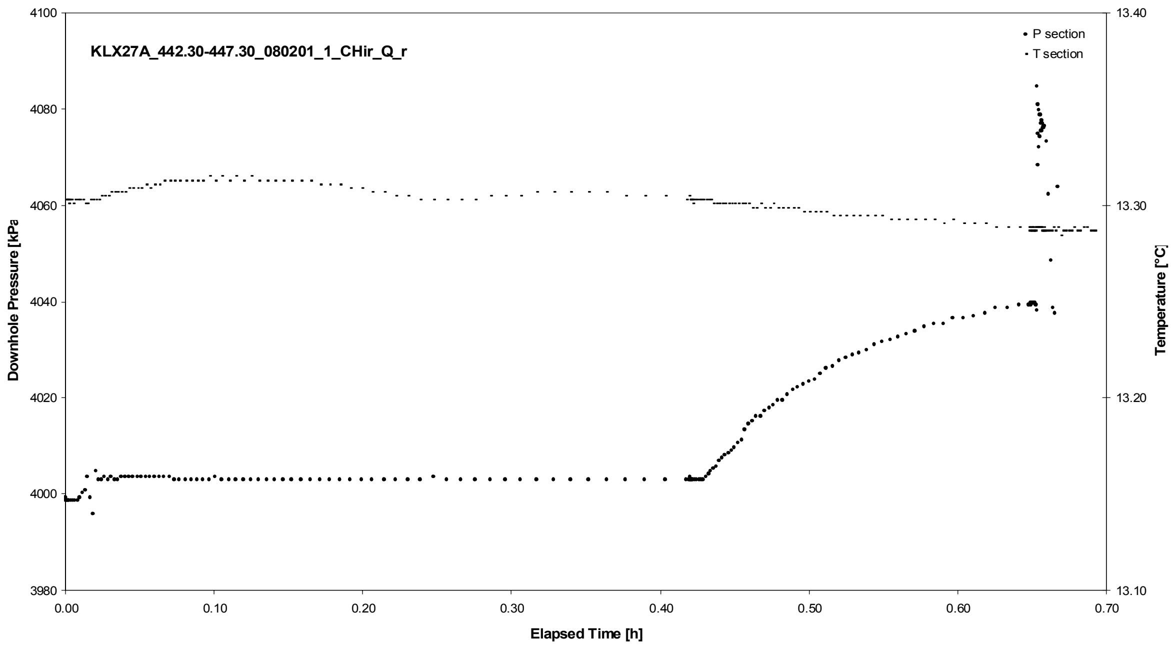
APPENDIX 2-45

Test 442.30 – 447.30 m

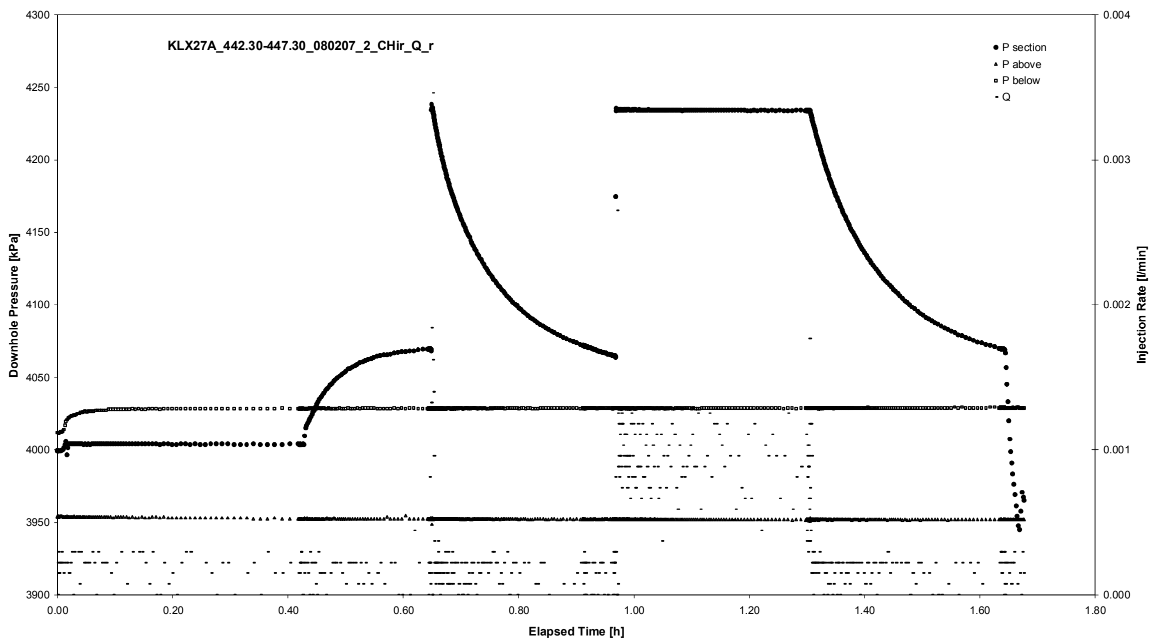
Analysis diagrams



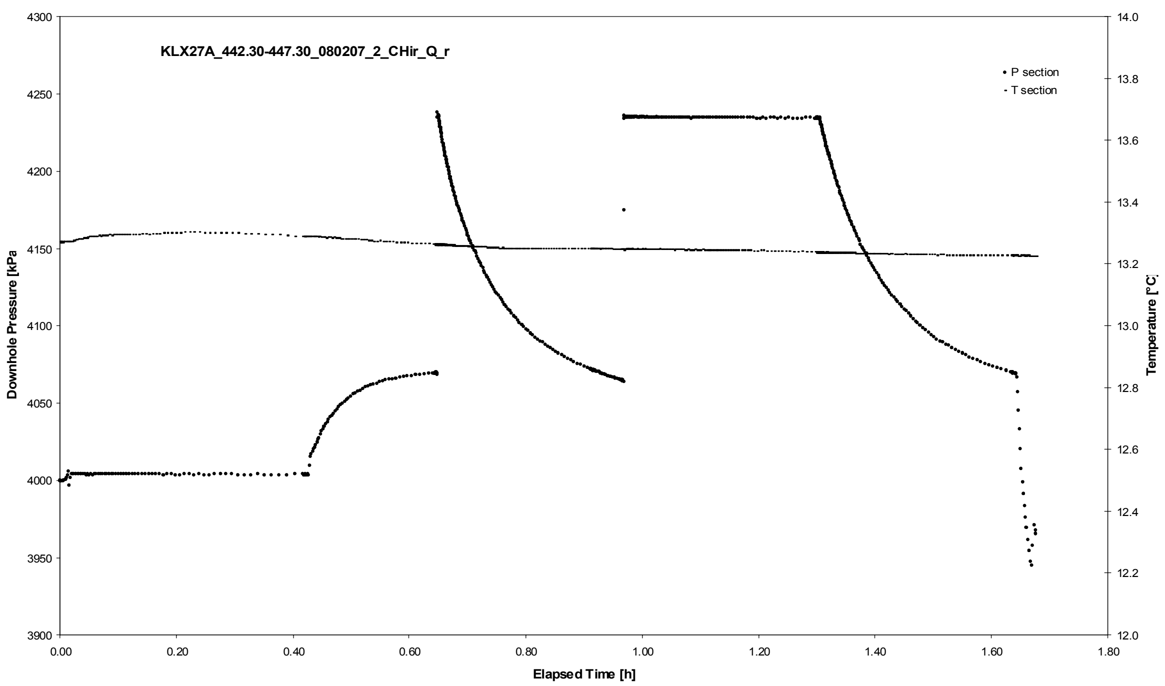
Pressure and flow rate vs. time; cartesian plot (repeated)



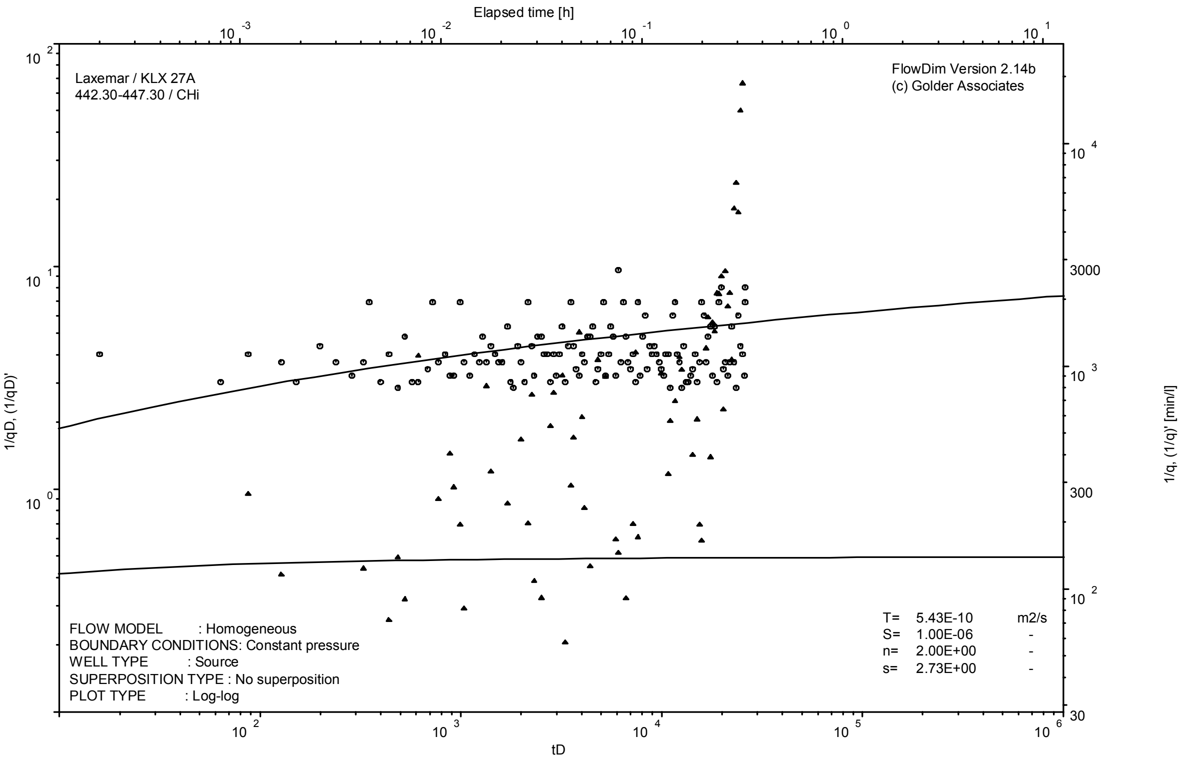
Interval pressure and temperature vs. time; cartesian plot (repeated)



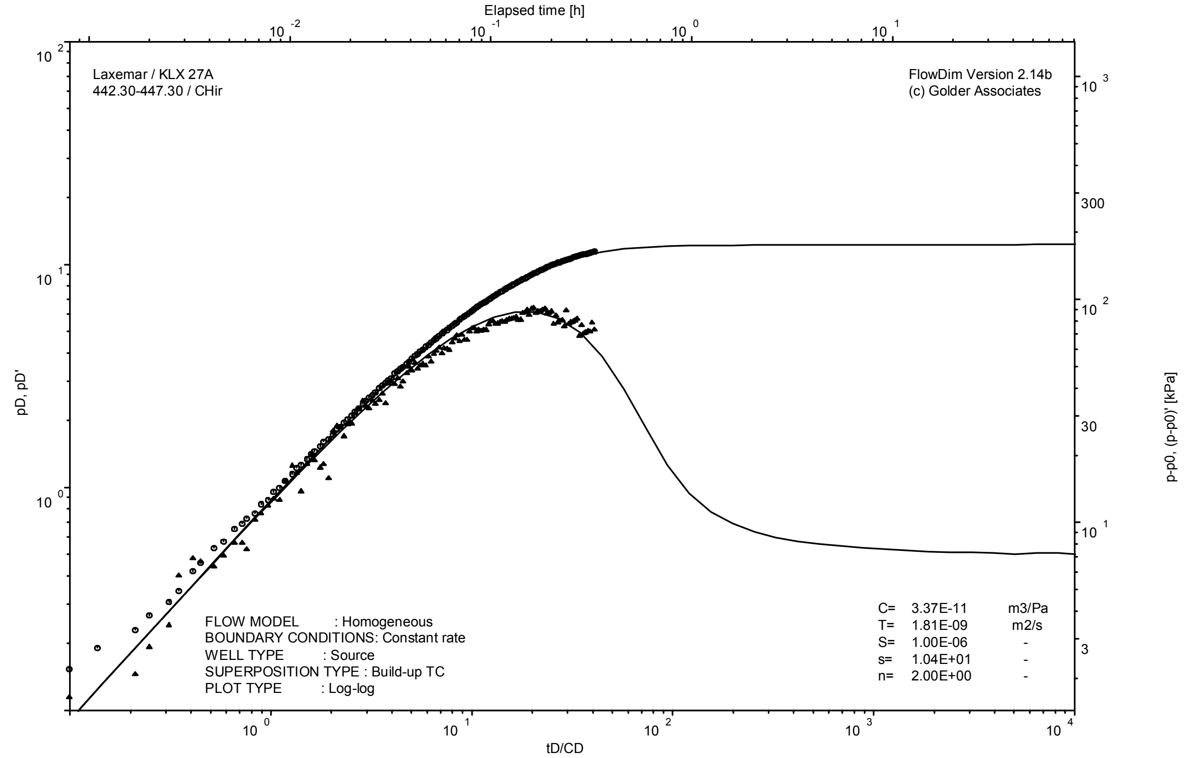
Pressure and flow rate vs. time; cartesian plot



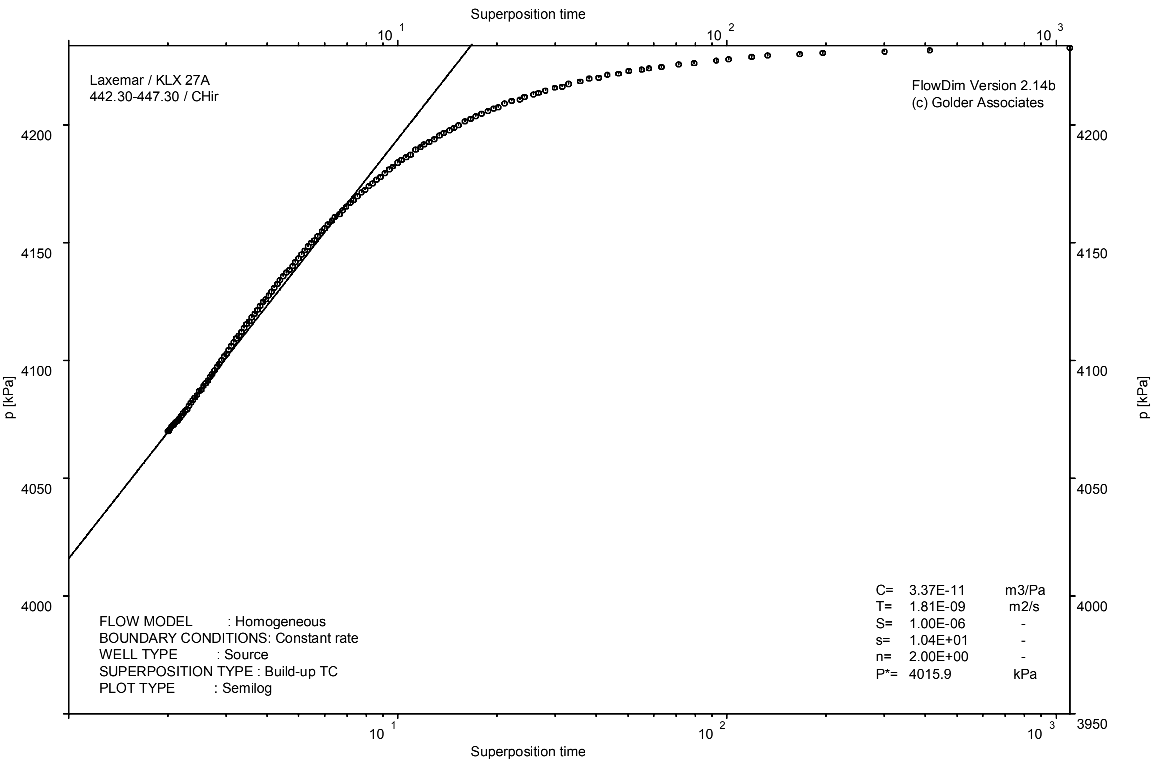
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

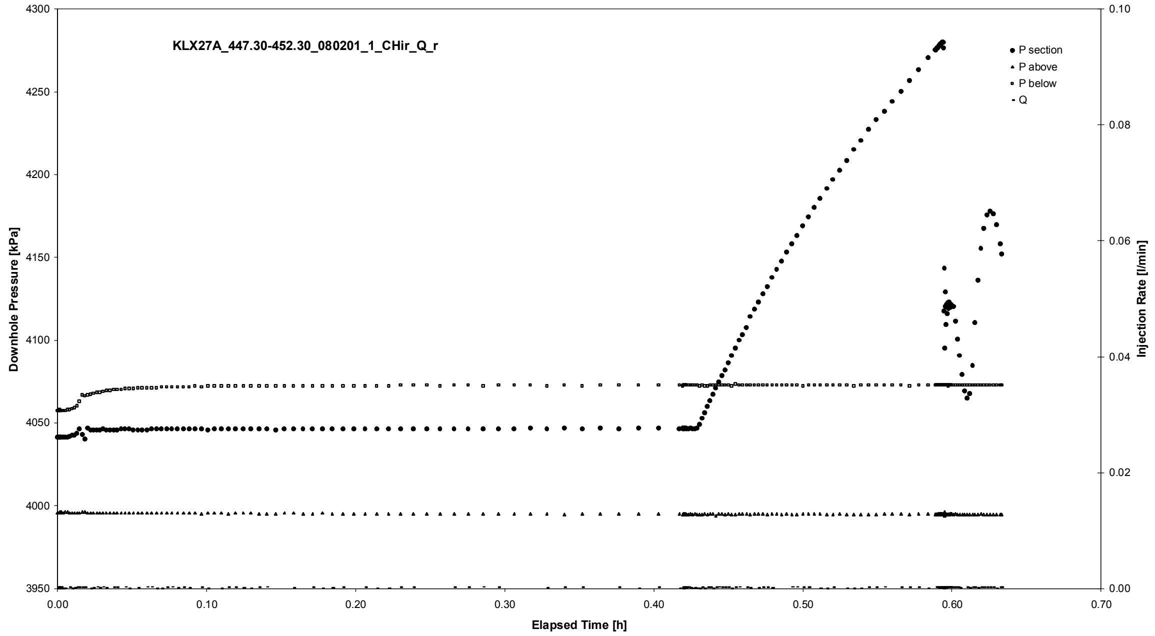


CHIR phase; HORNER match

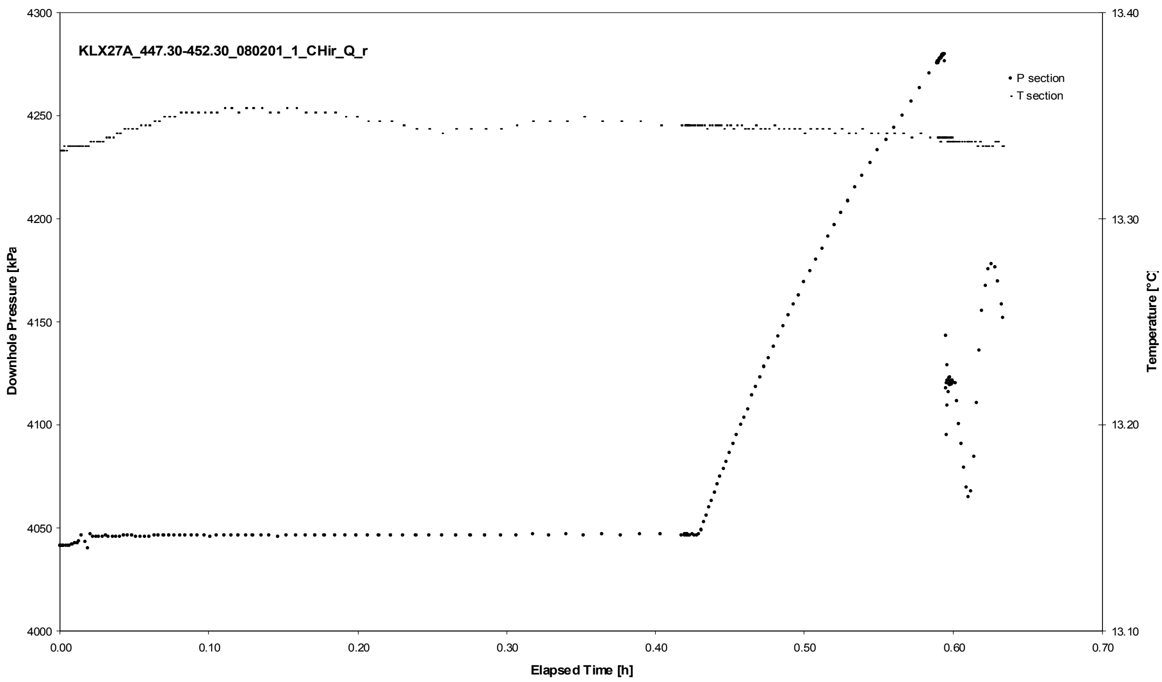
APPENDIX 2-46

Test 447.30 – 452.30 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

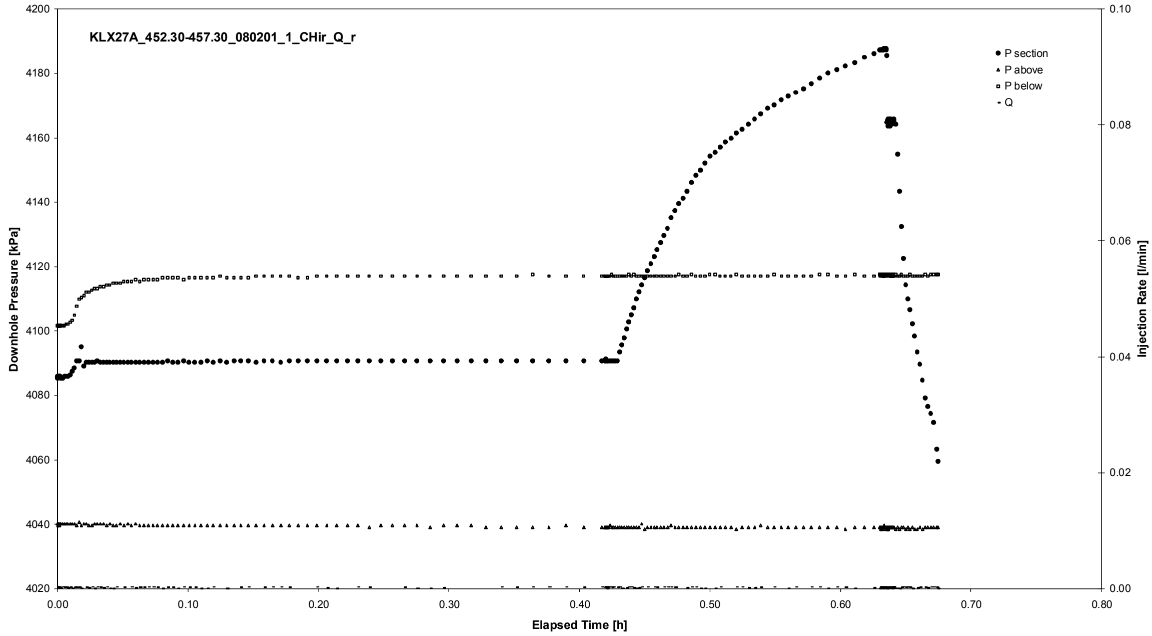
Not analysed

CHIR phase; HORNER match

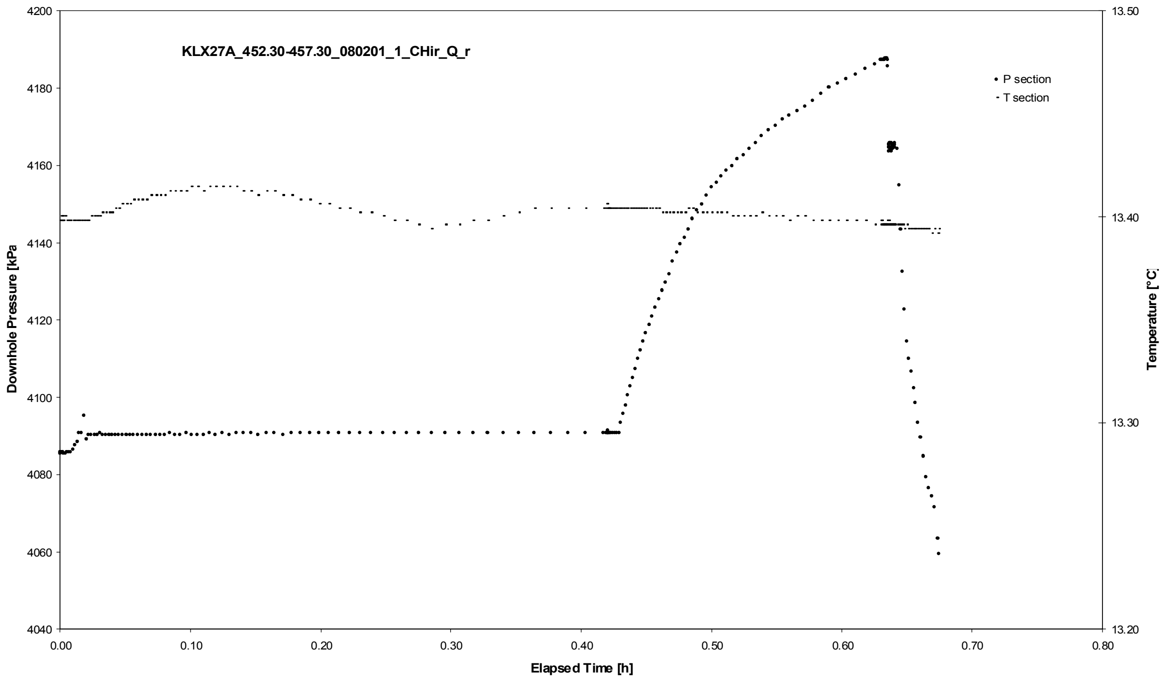
APPENDIX 2-47

Test 452.30 – 457.30 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

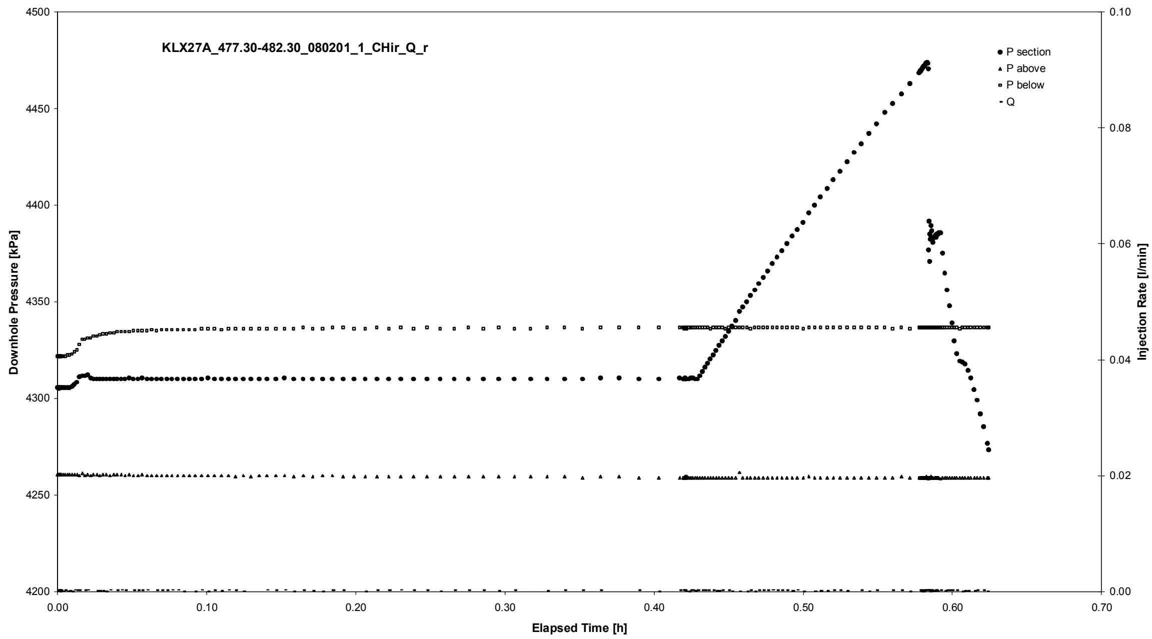
Not analysed

CHIR phase; HORNER match

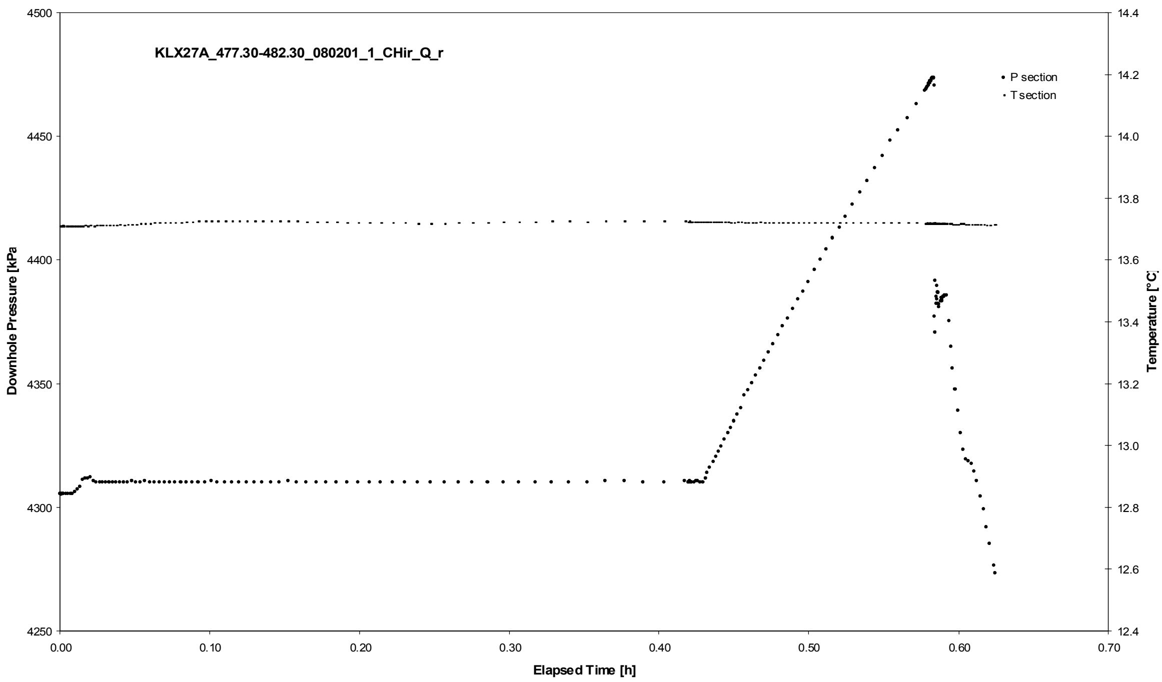
APPENDIX 2-48

Test 477.30 – 482.30 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

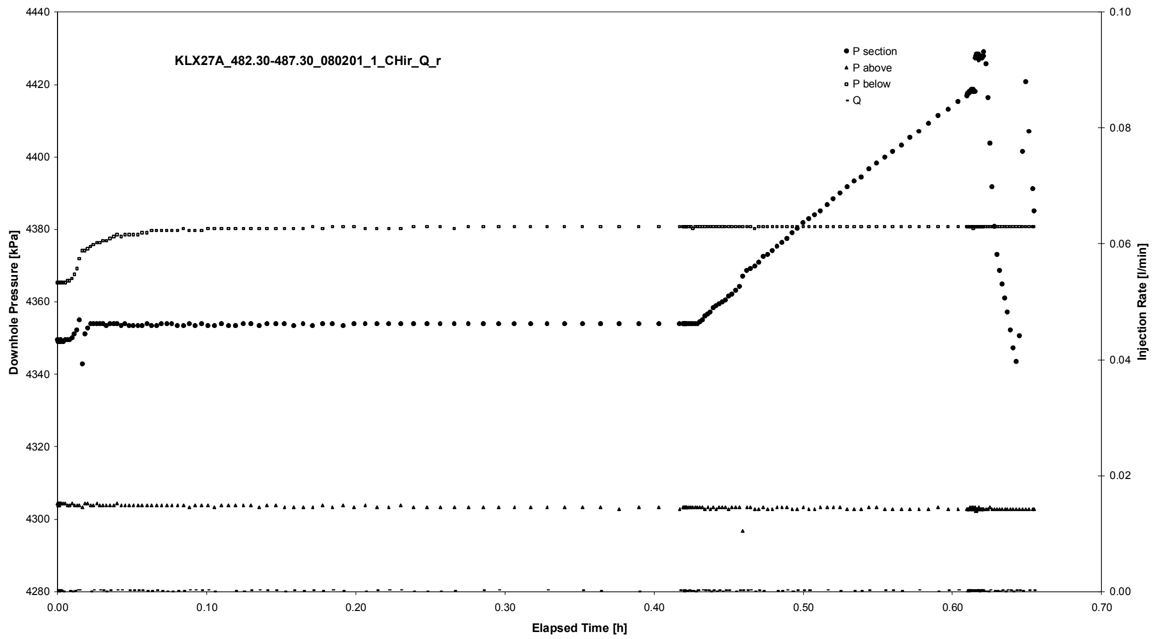
Not analysed

CHIR phase; HORNER match

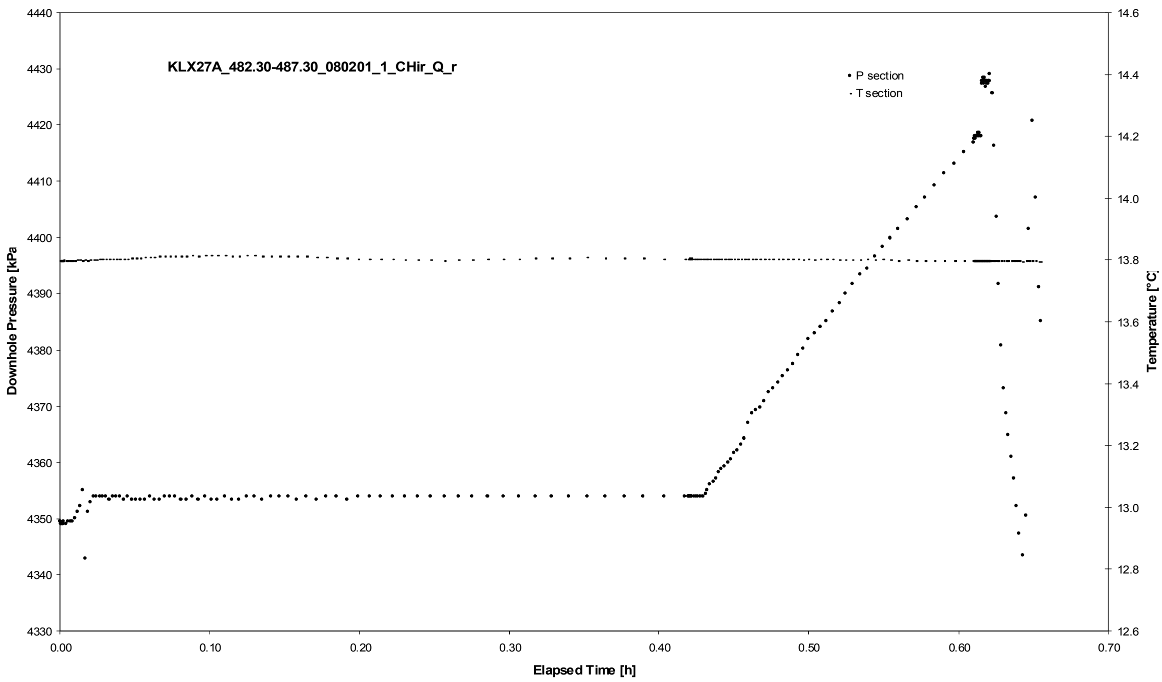
APPENDIX 2-49

Test 482.30 – 487.30 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

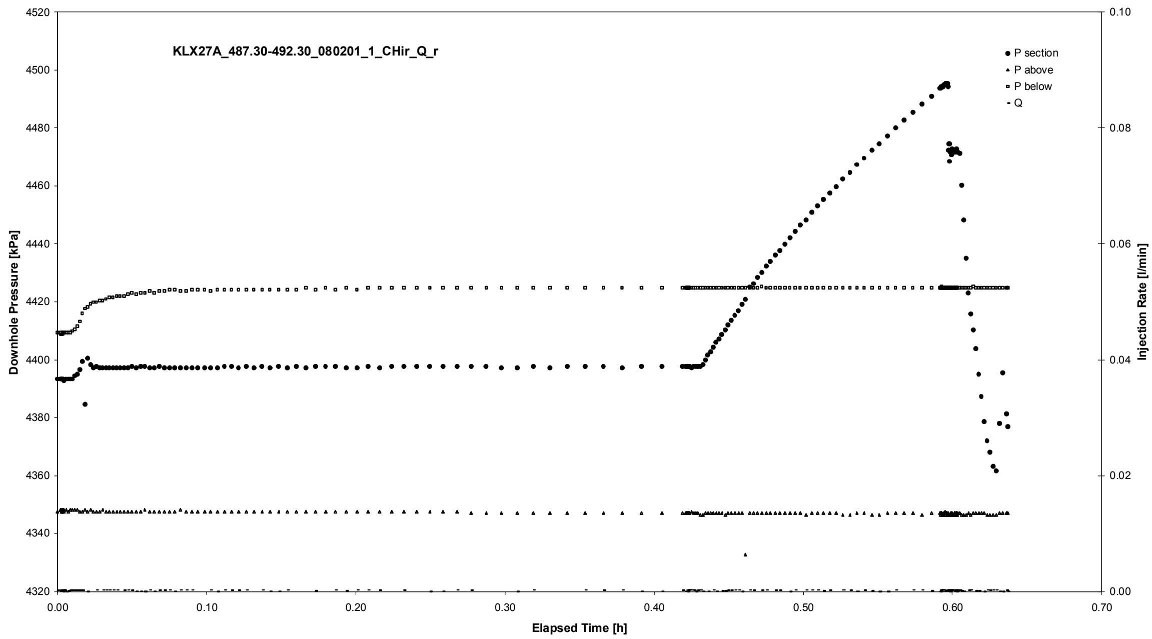
Not analysed

CHIR phase; HORNER match

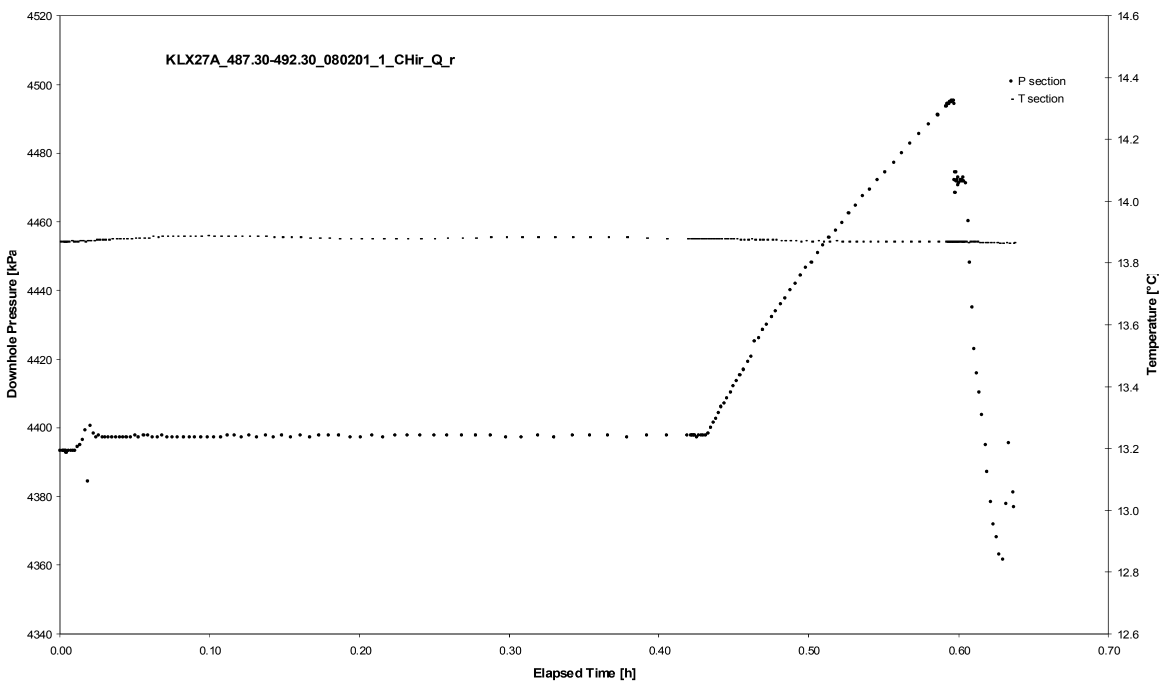
APPENDIX 2-50

Test 487.30 – 492.30 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

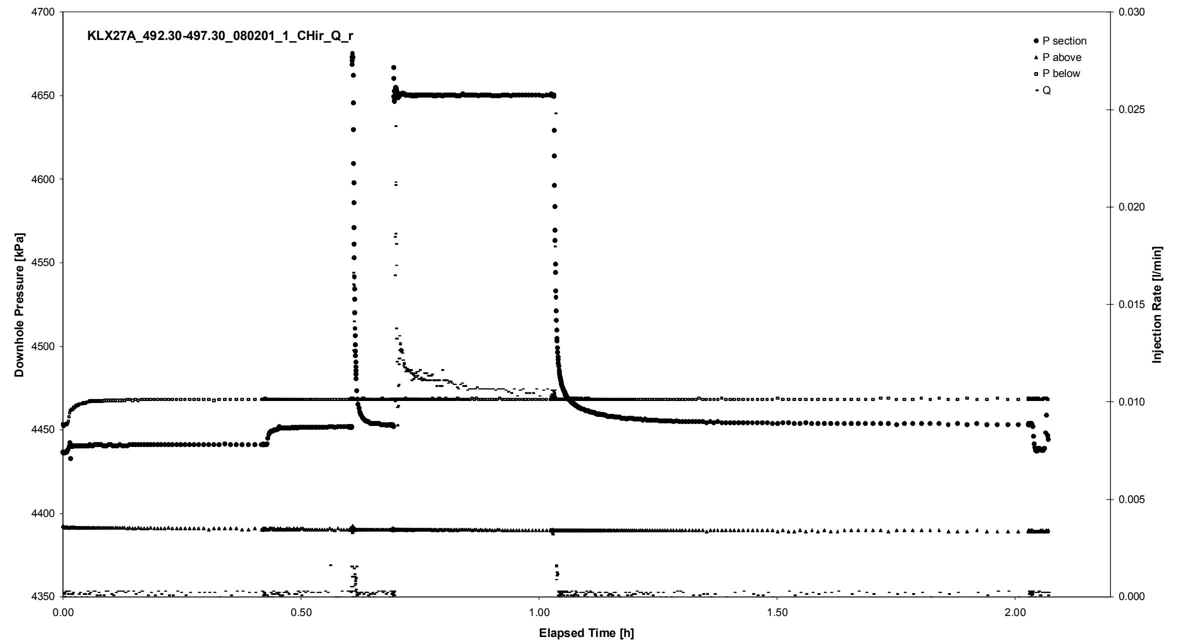
Not analysed

CHIR phase; HORNER match

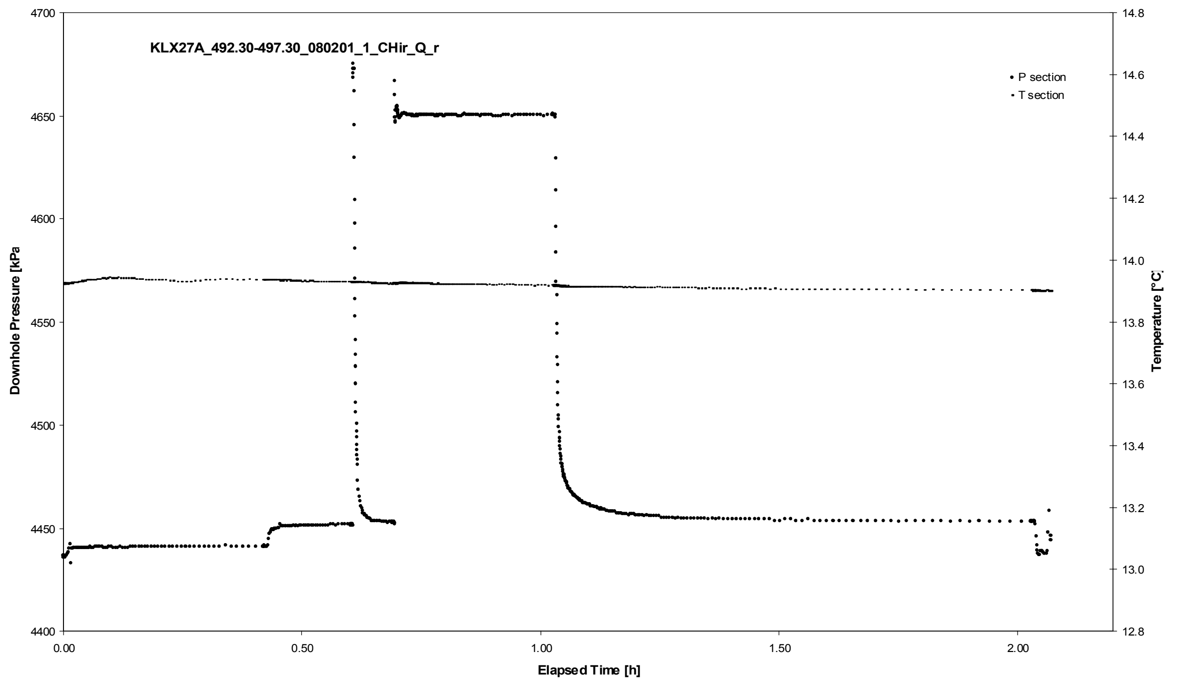
APPENDIX 2-51

Test 492.30 – 497.30 m

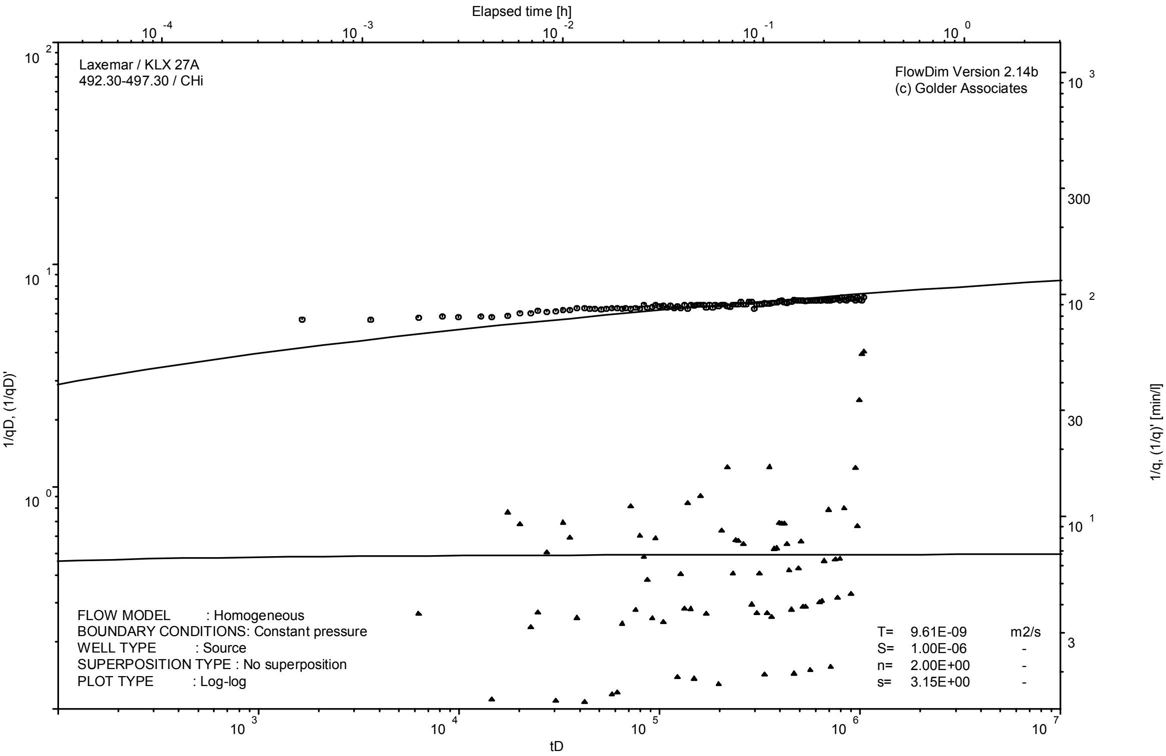
Analysis diagrams



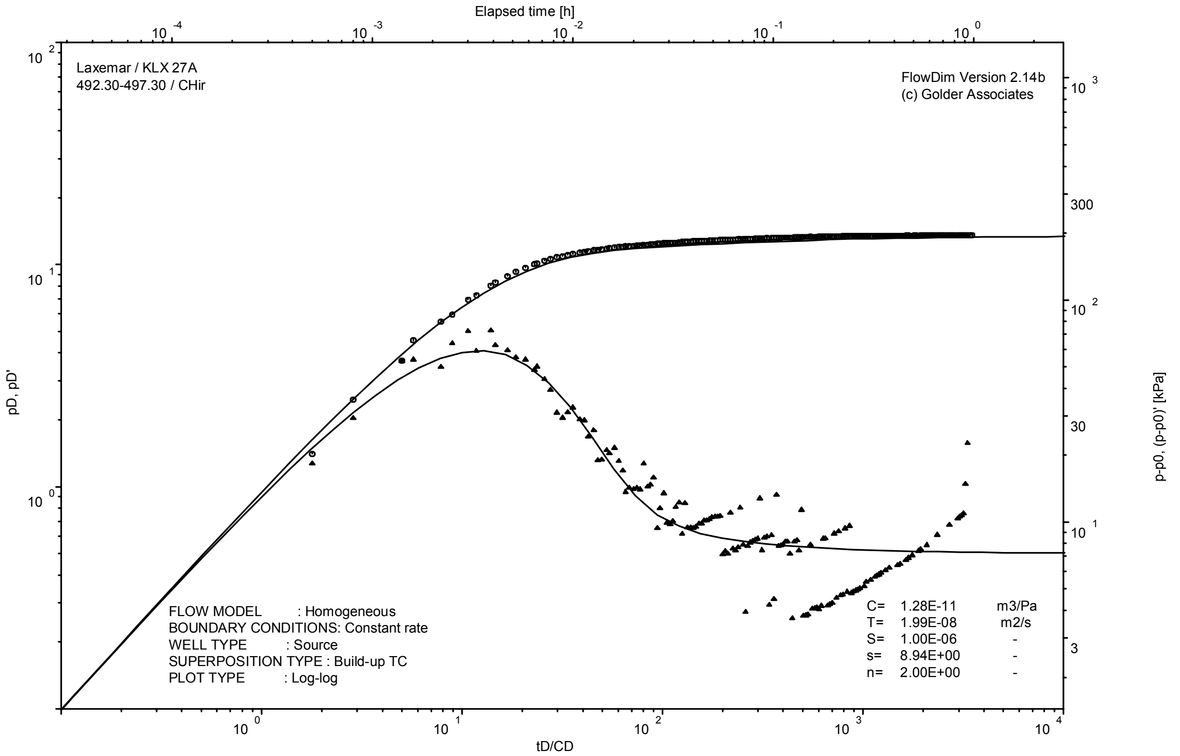
Pressure and flow rate vs. time; cartesian plot



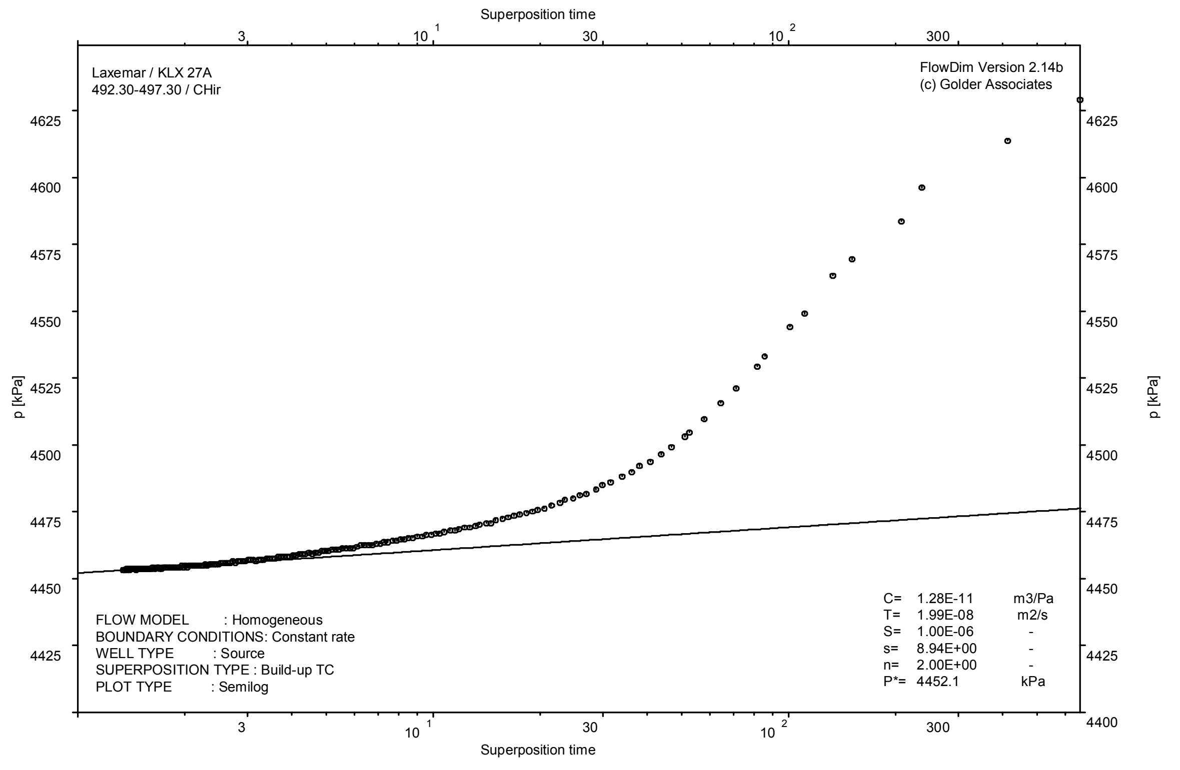
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

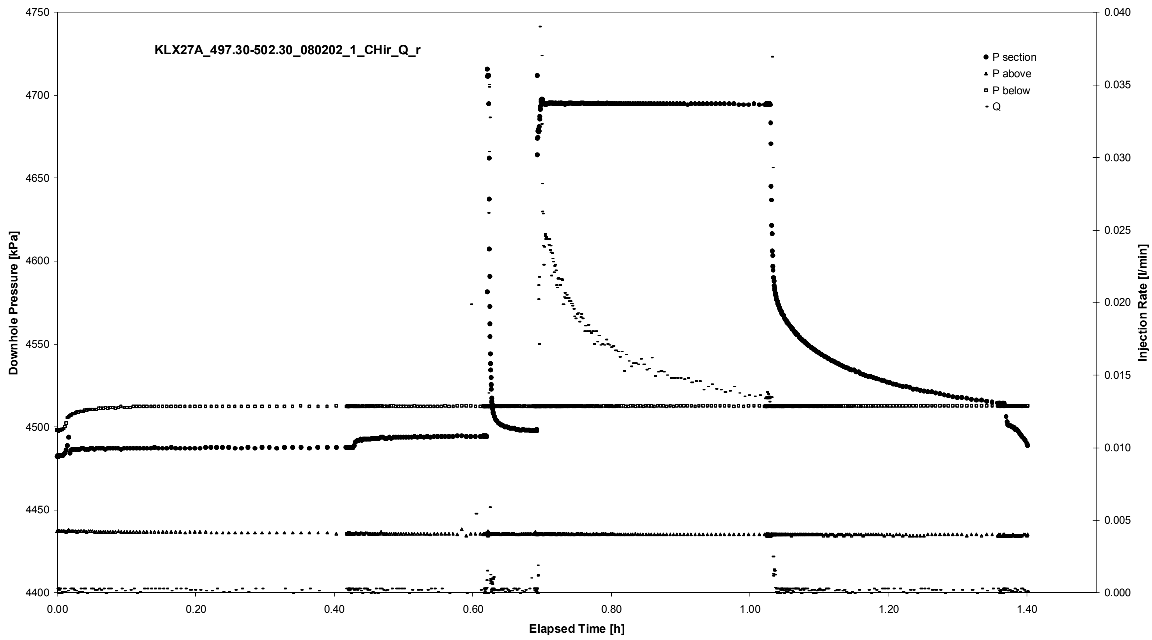


CHIR phase; HORNER match

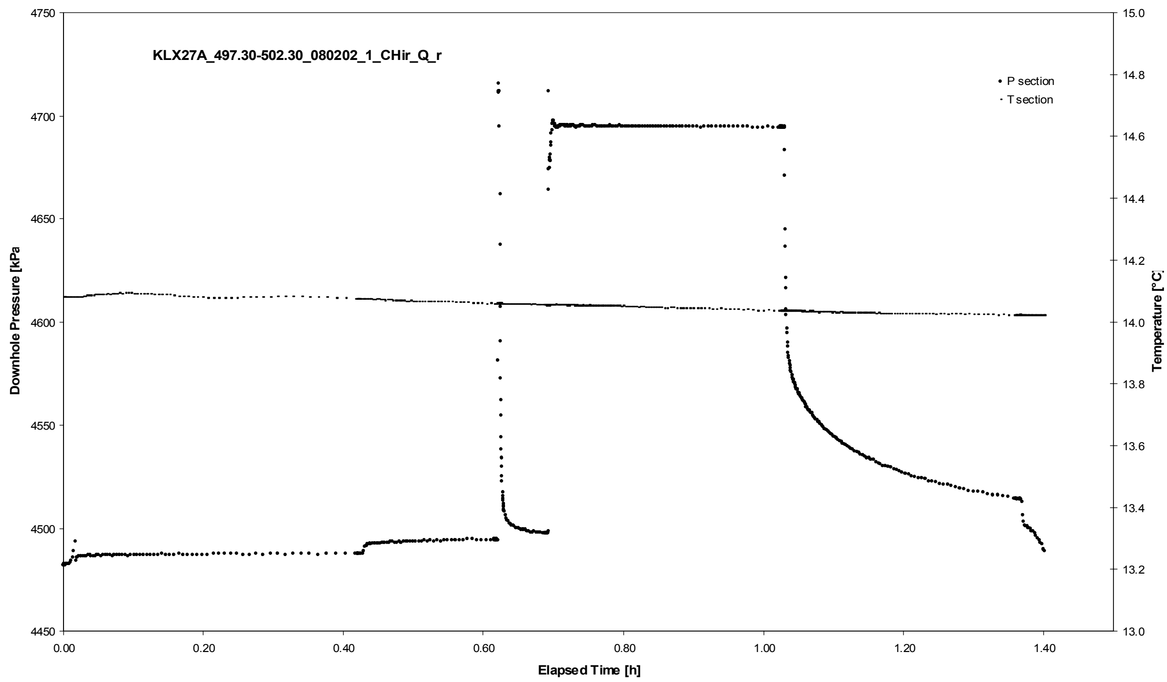
APPENDIX 2-52

Test 497.30 – 502.30 m

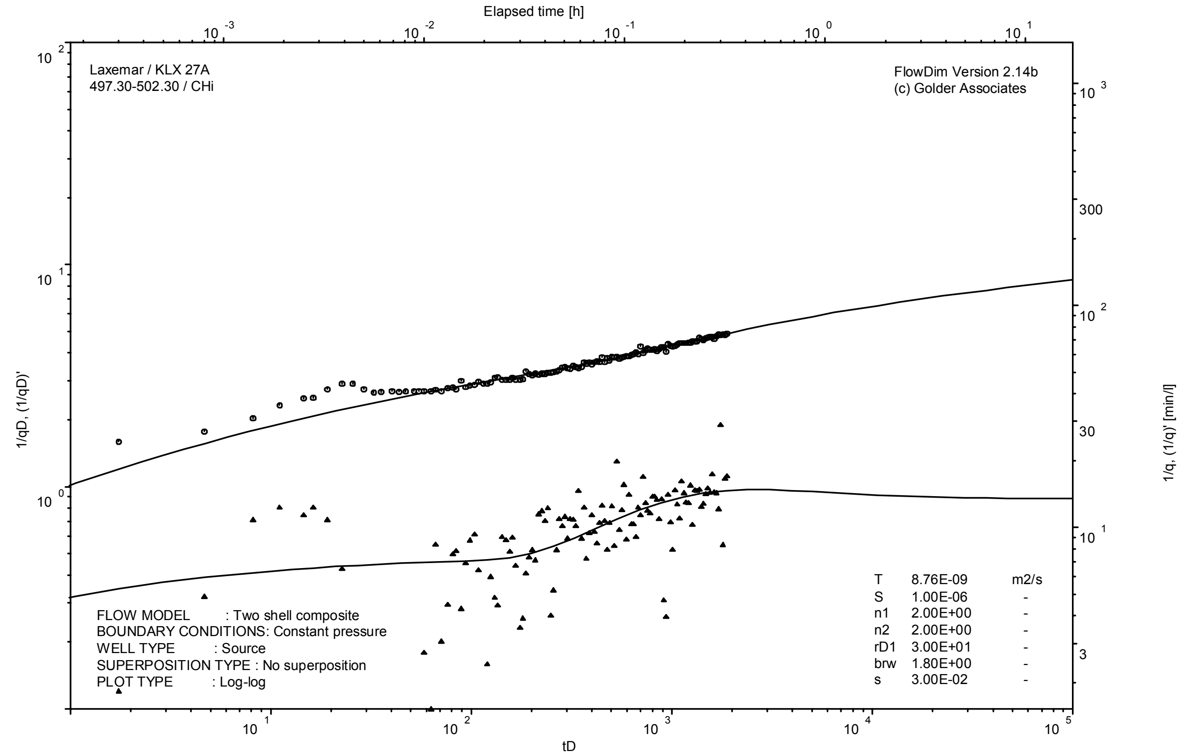
Analysis diagrams



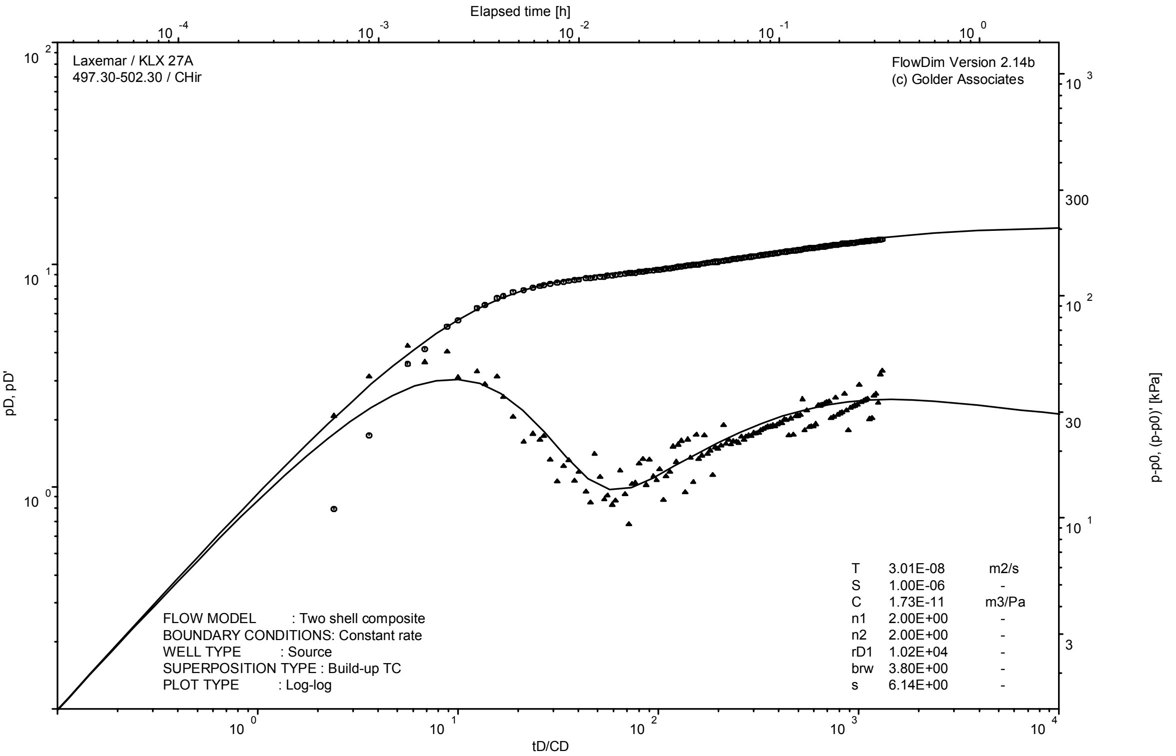
Pressure and flow rate vs. time; cartesian plot



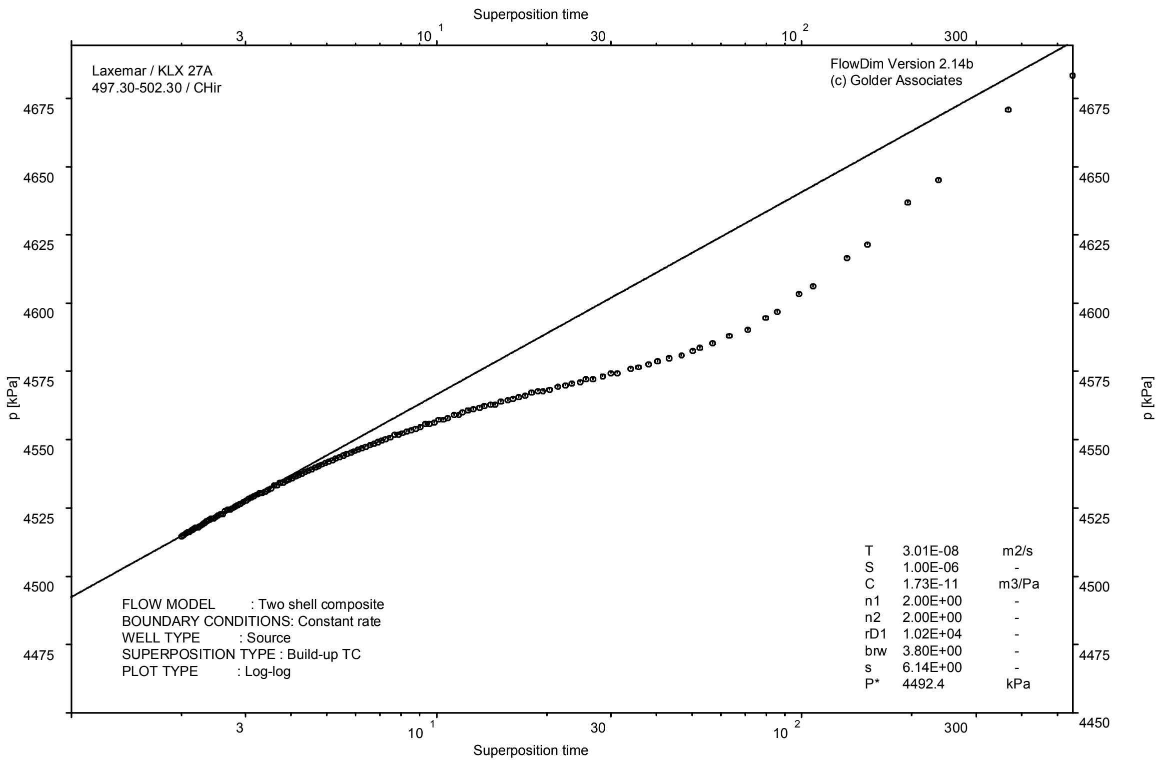
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

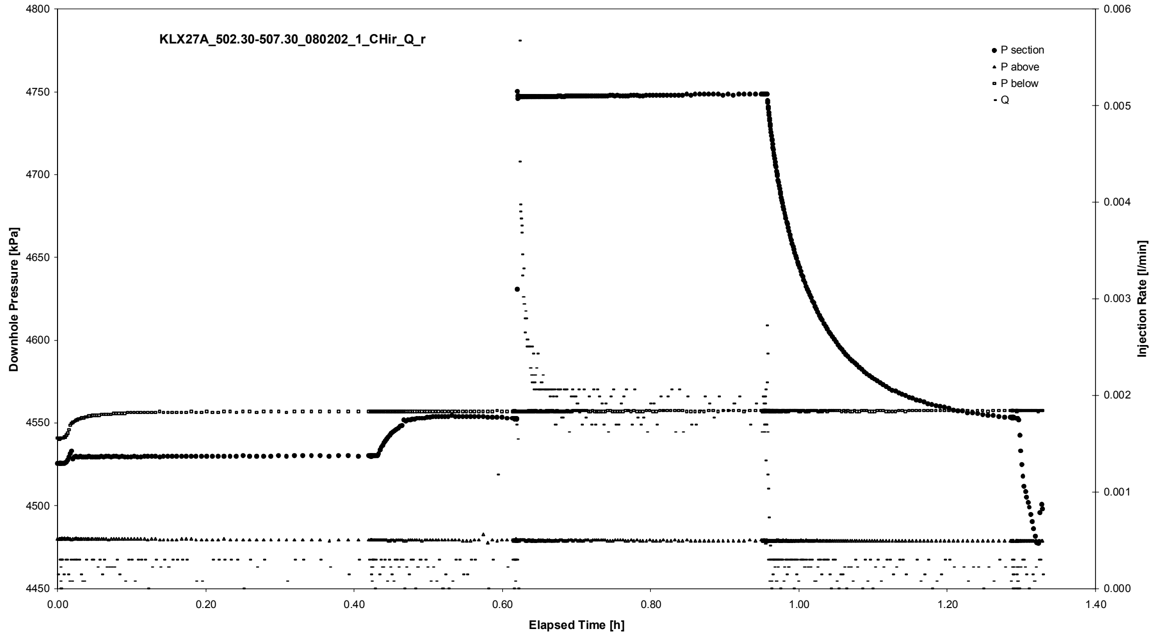


CHIR phase; HORNER match

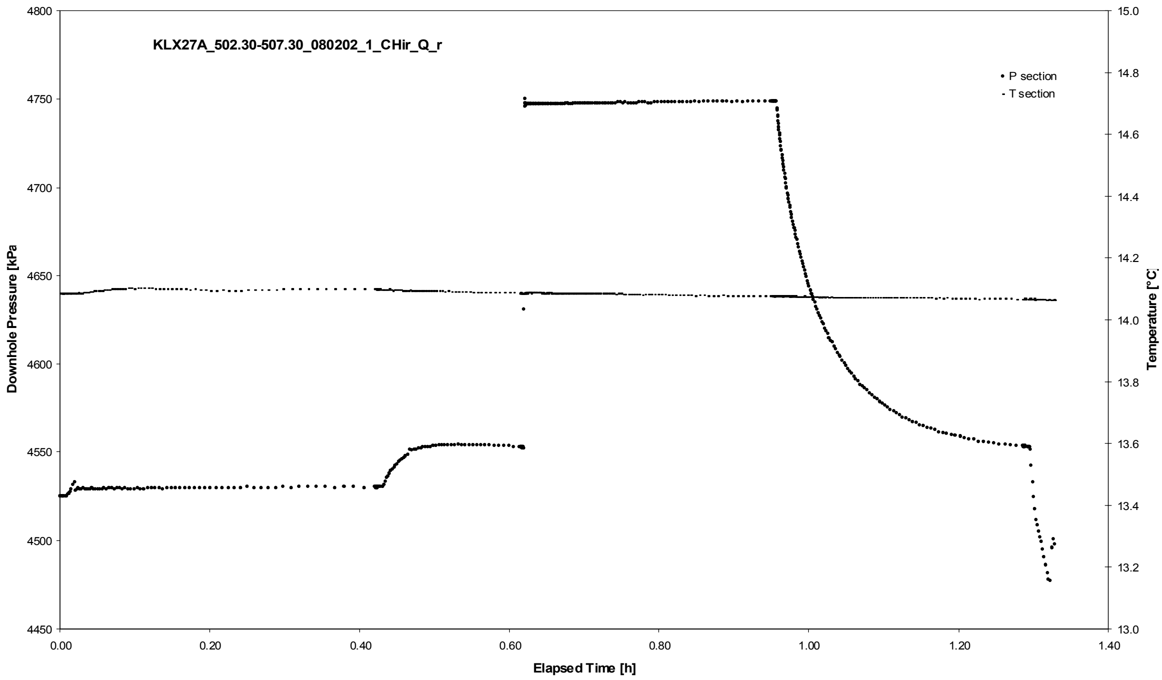
APPENDIX 2-53

Test 502.30 – 507.30 m

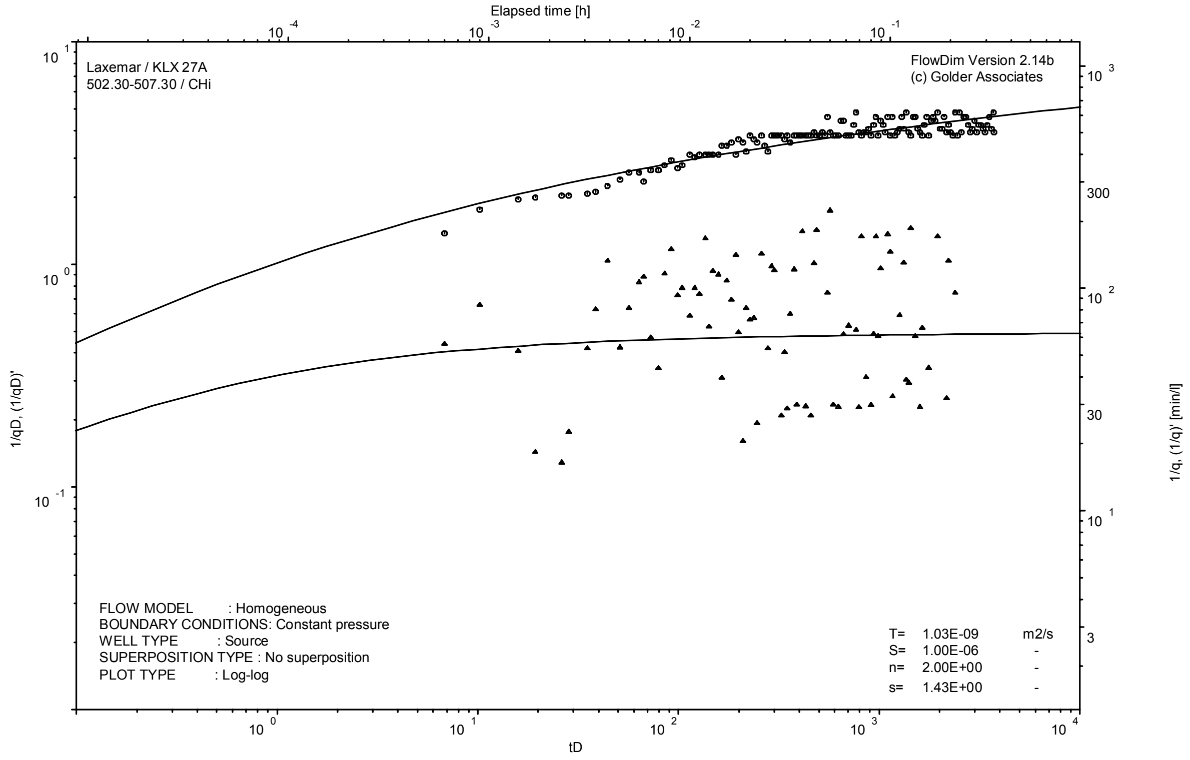
Analysis diagrams



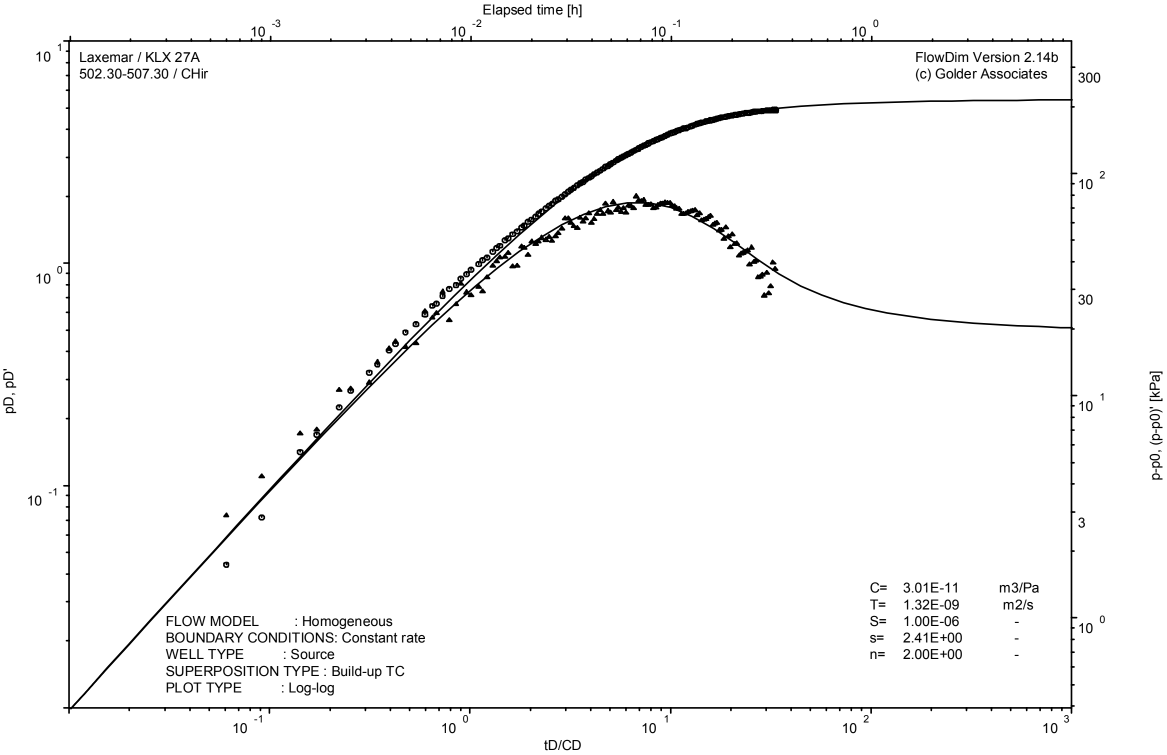
Pressure and flow rate vs. time; cartesian plot



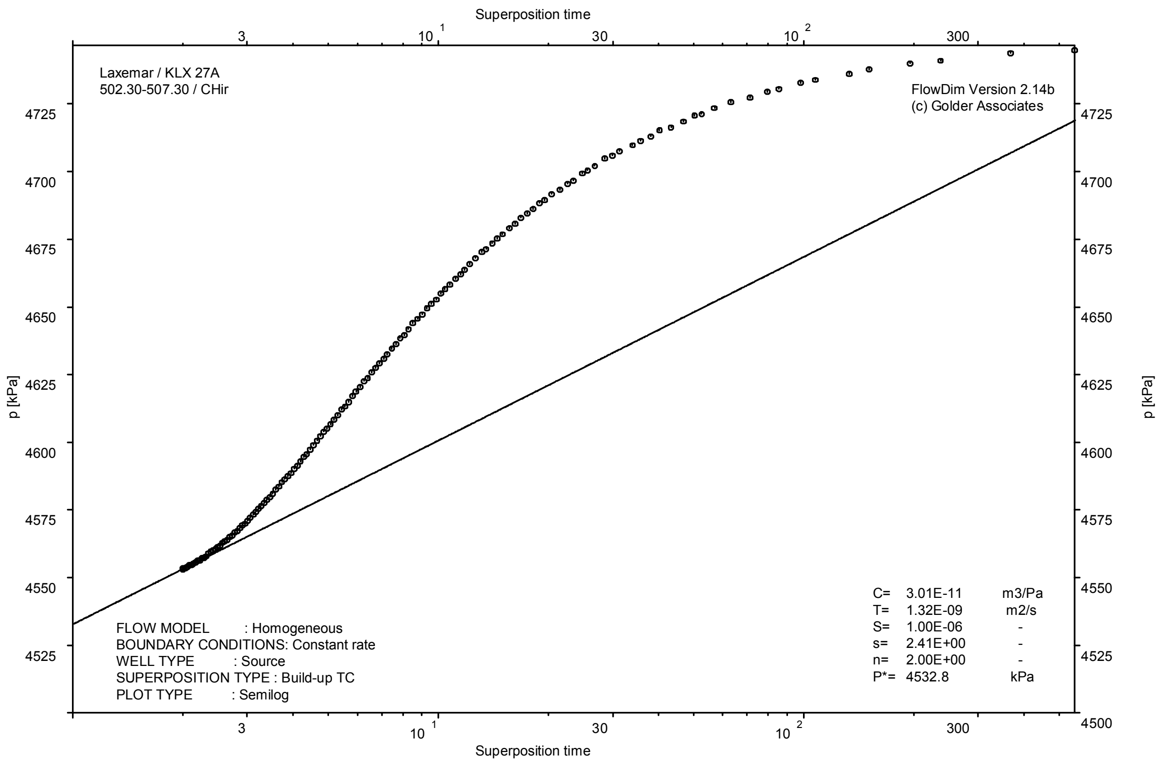
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

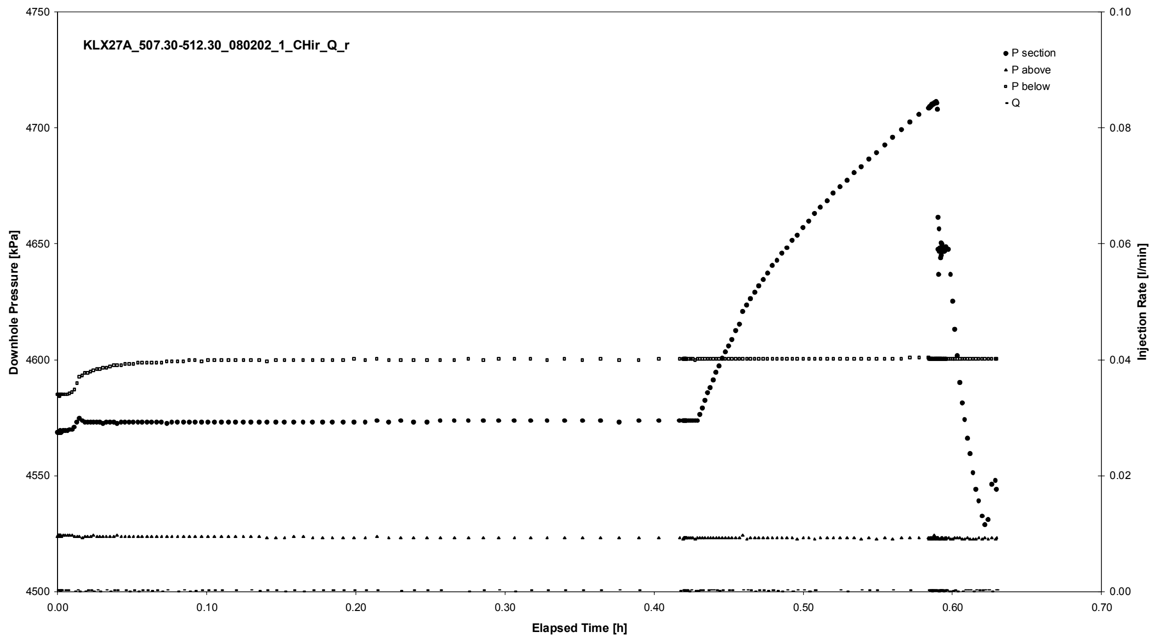


CHIR phase; HORNER match

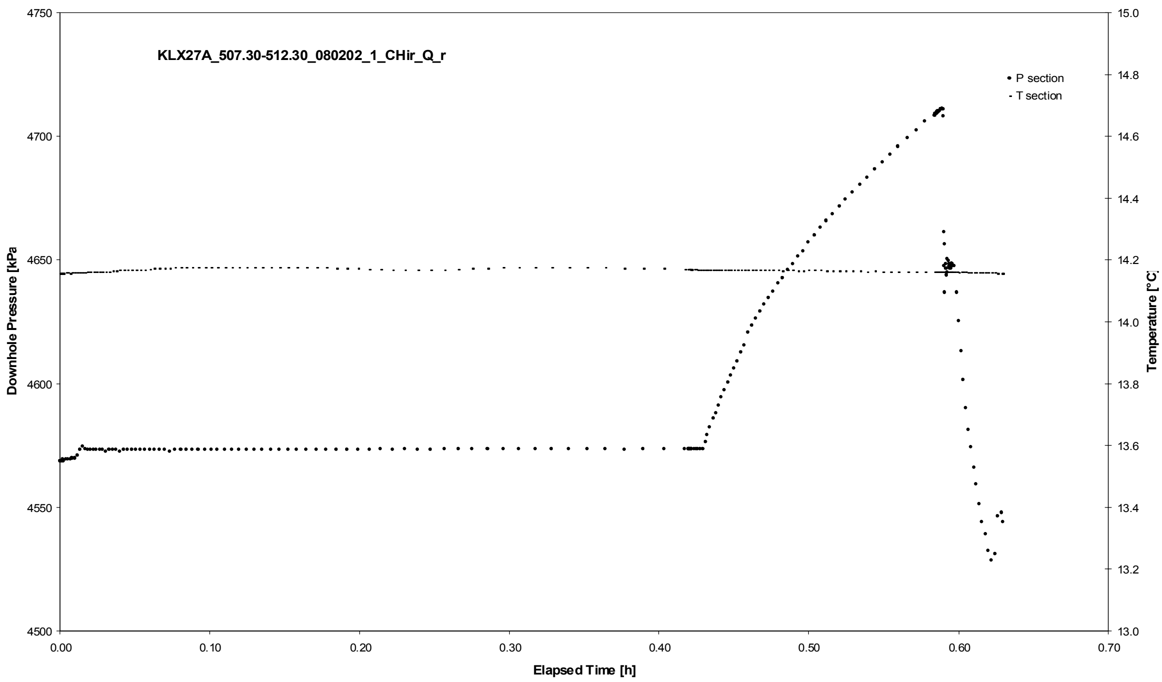
APPENDIX 2-54

Test 507.30 – 512.30 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

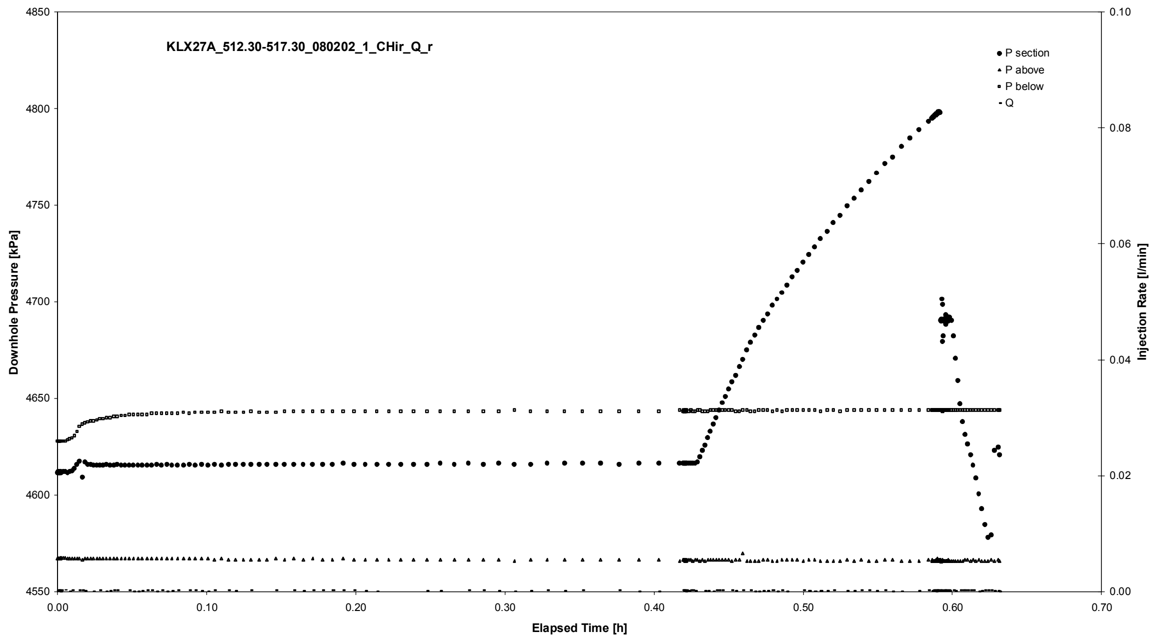
Not analysed

CHIR phase; HORNER match

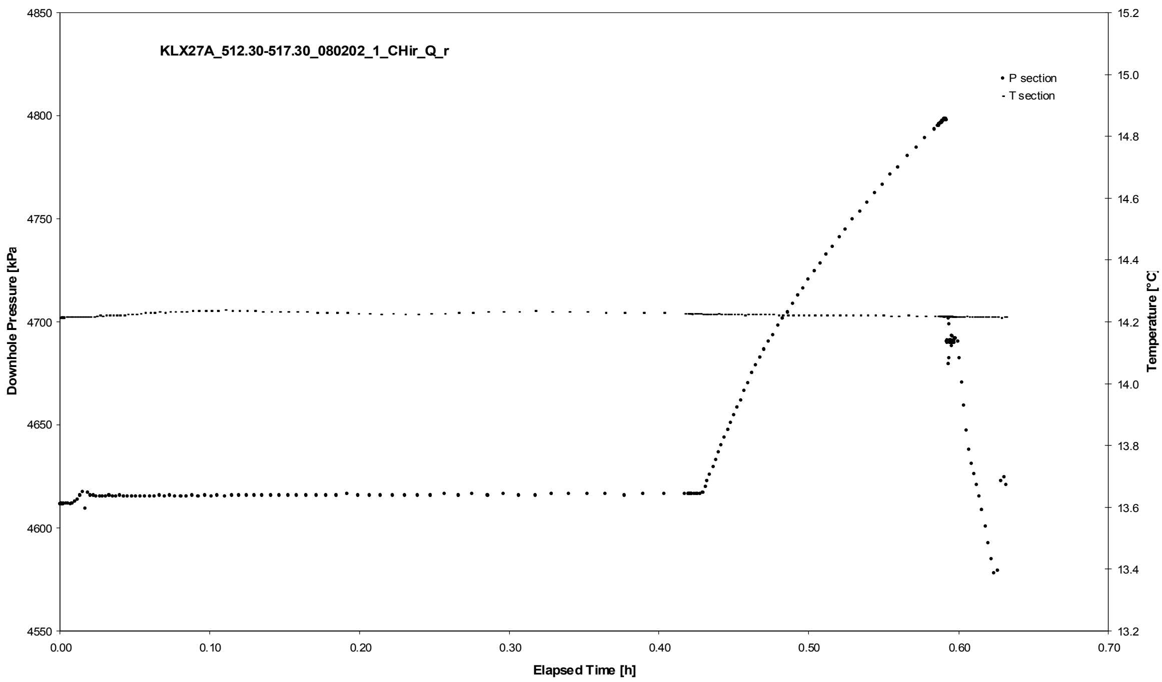
APPENDIX 2-55

Test 512.30 – 517.30 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

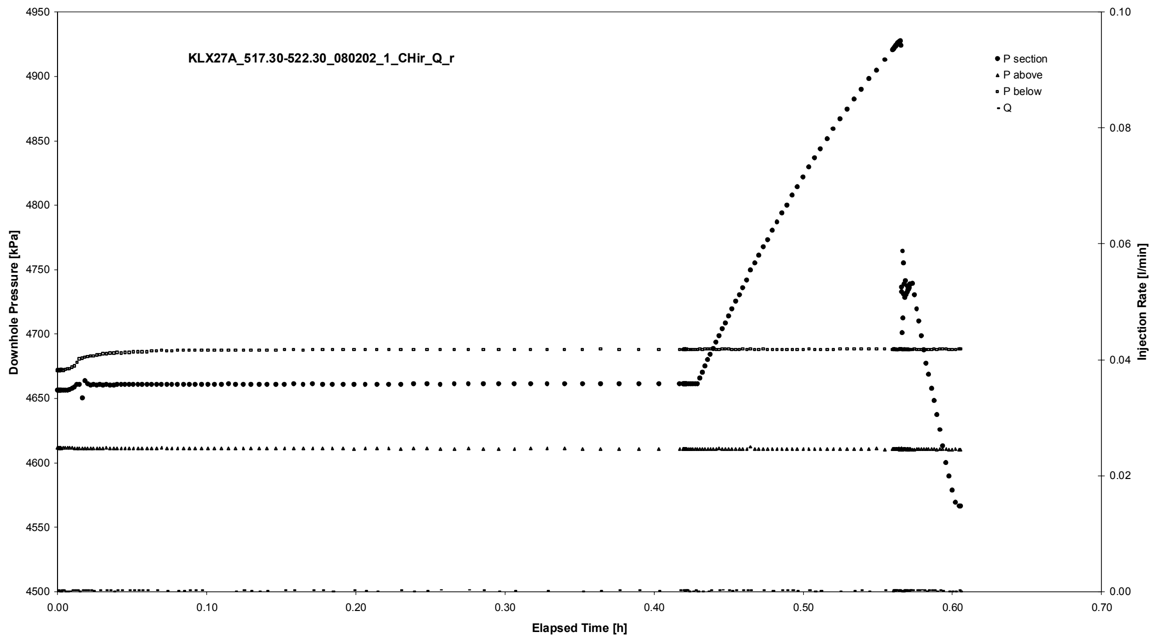
Not analysed

CHIR phase; HORNER match

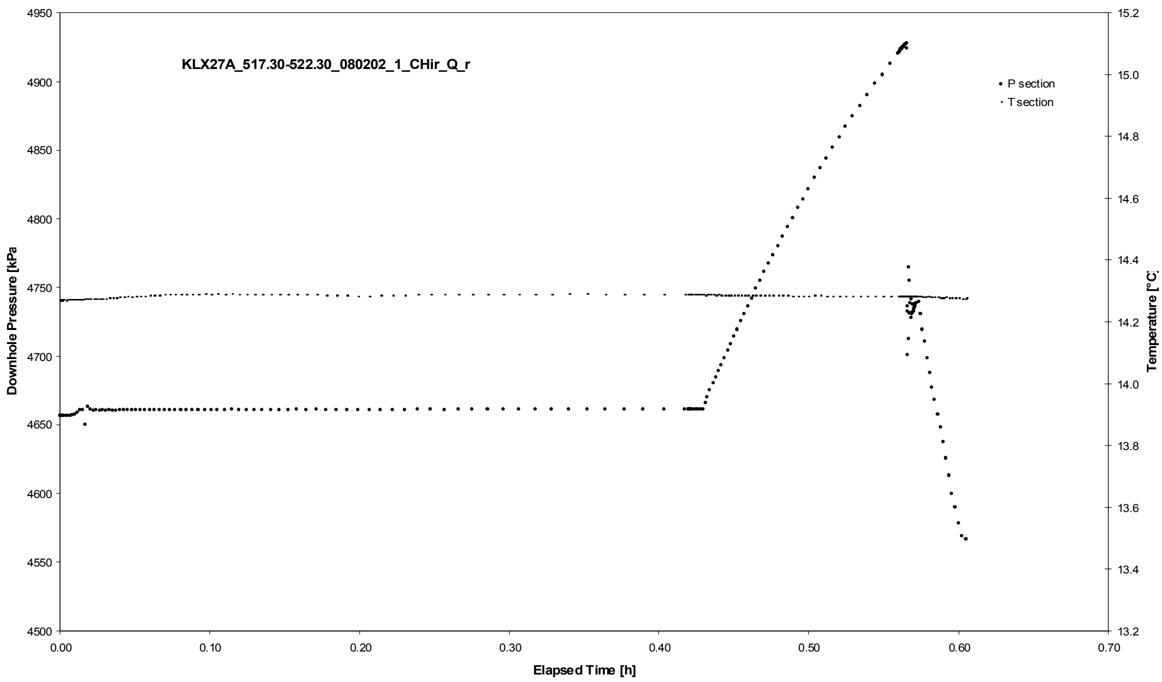
APPENDIX 2-56

Test 517.30 – 522.30 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

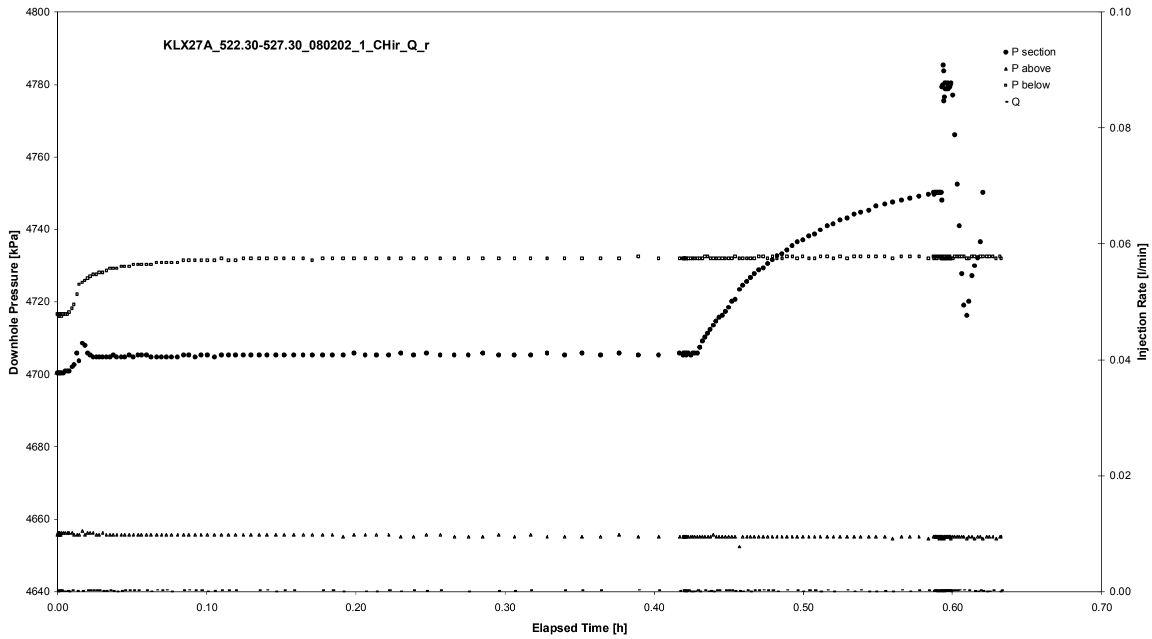
Not analysed

CHIR phase; HORNER match

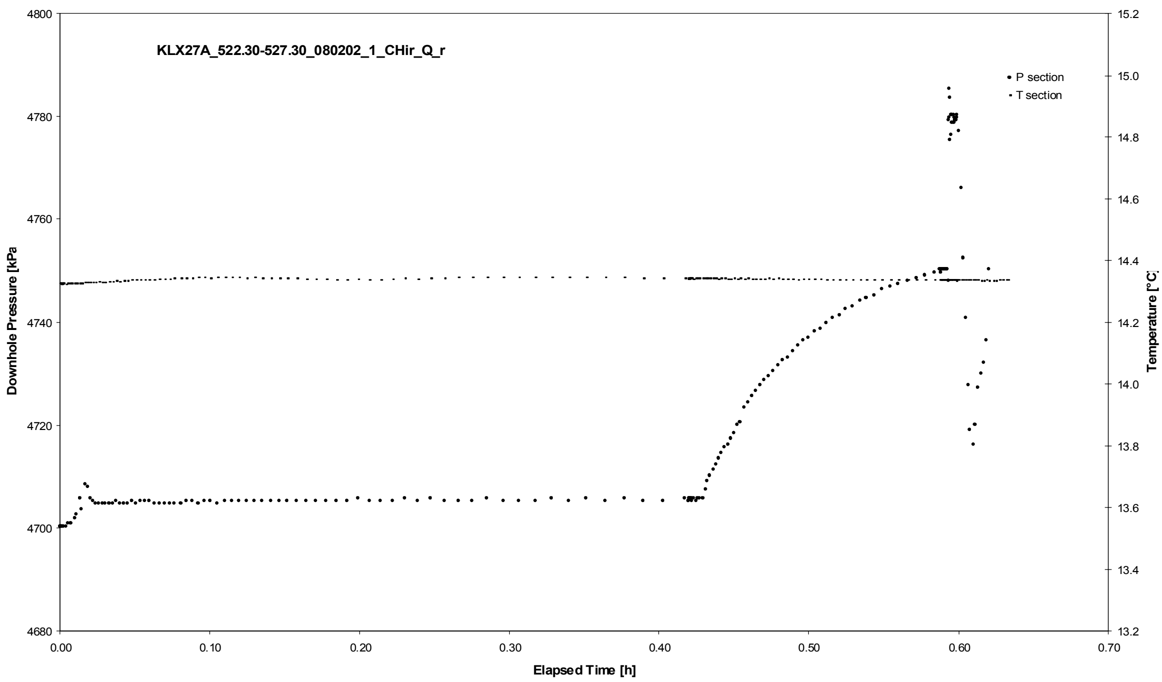
APPENDIX 2-57

Test 522.30 – 527.30 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

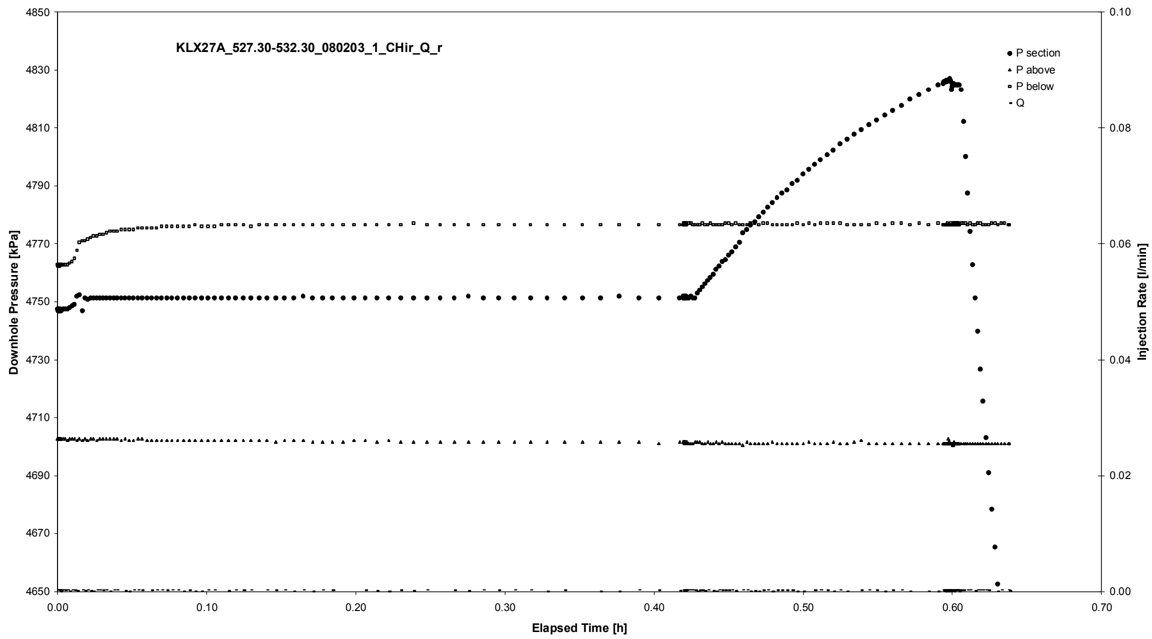
Not analysed

CHIR phase; HORNER match

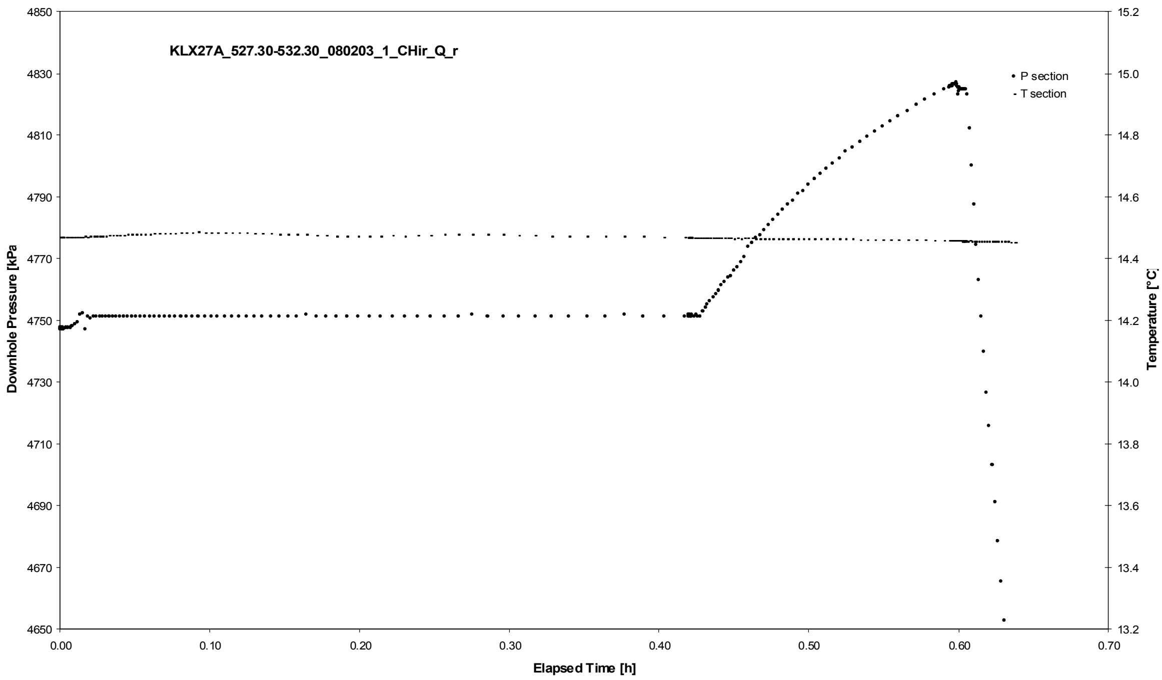
APPENDIX 2-58

Test 527.30 – 532.30 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

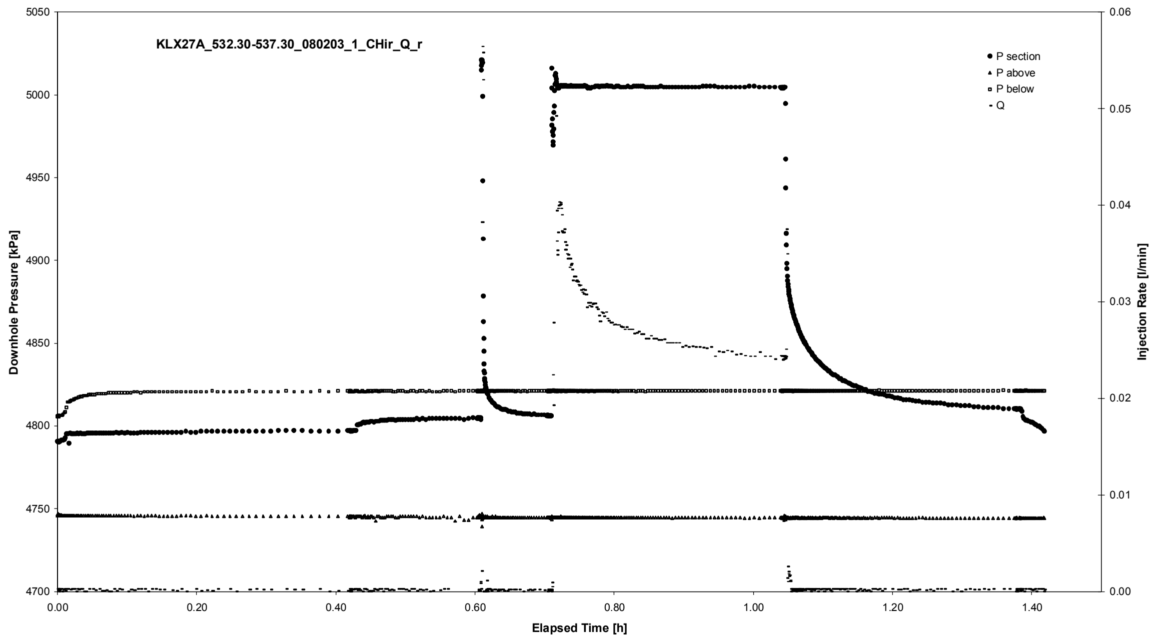
Not analysed

CHIR phase; HORNER match

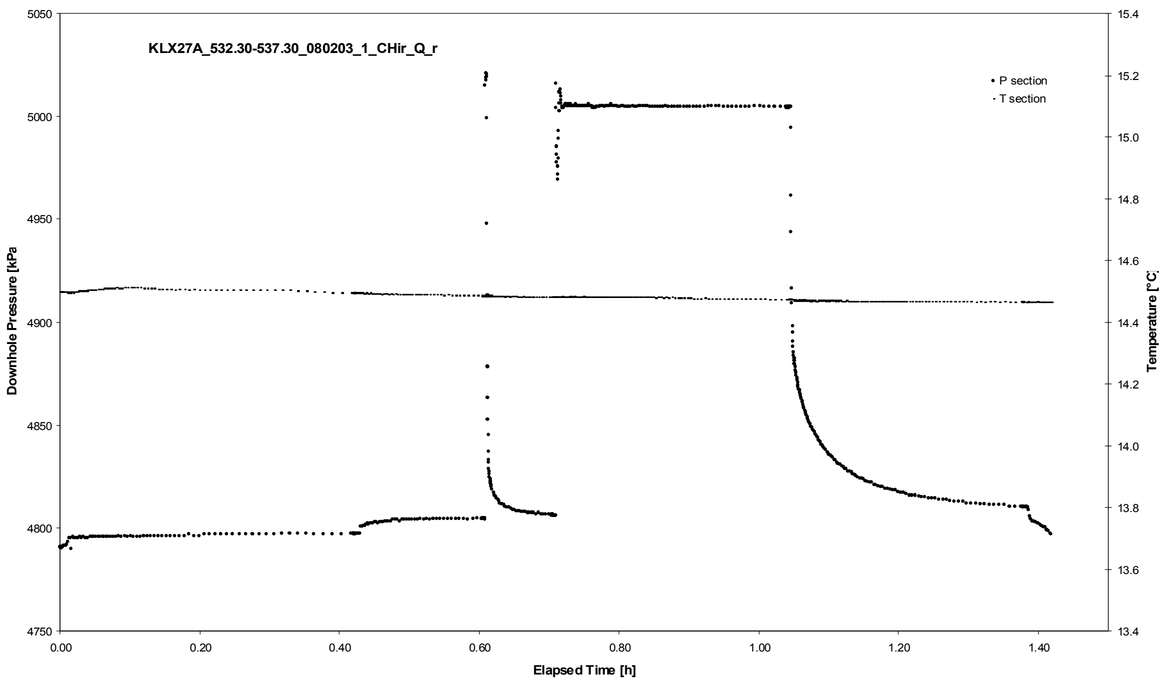
APPENDIX 2-59

Test 532.30 – 537.30 m

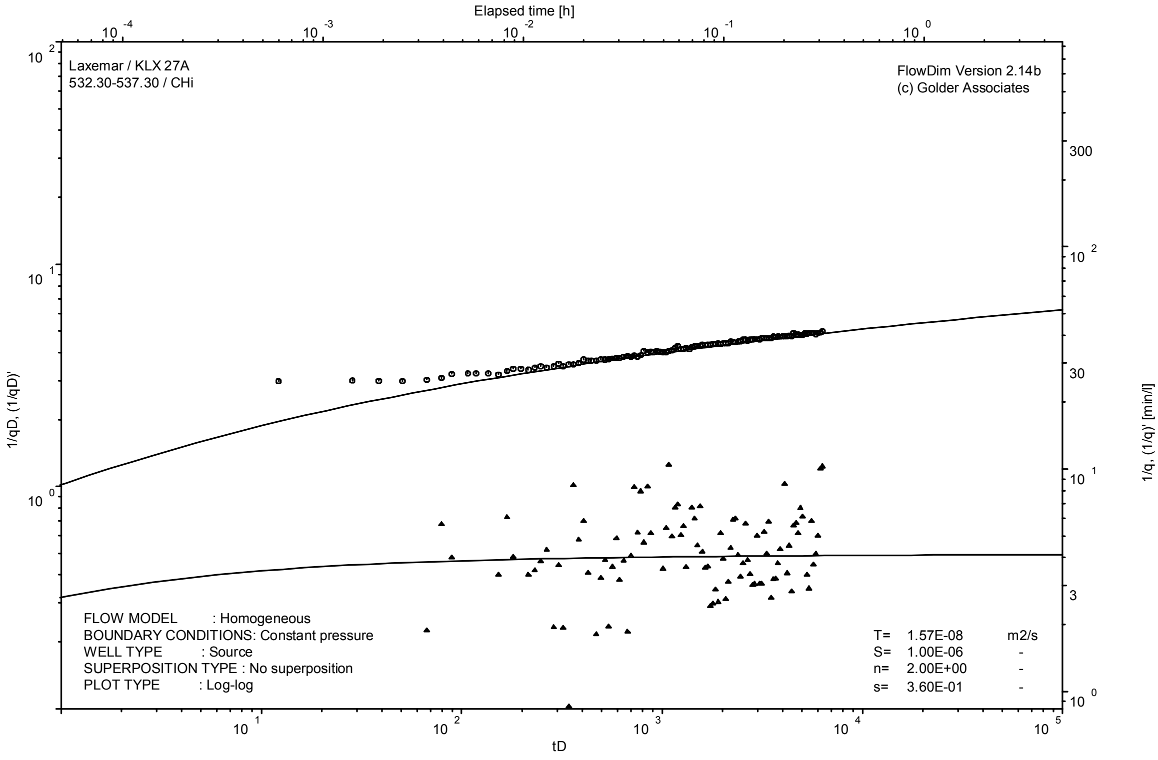
Analysis diagrams



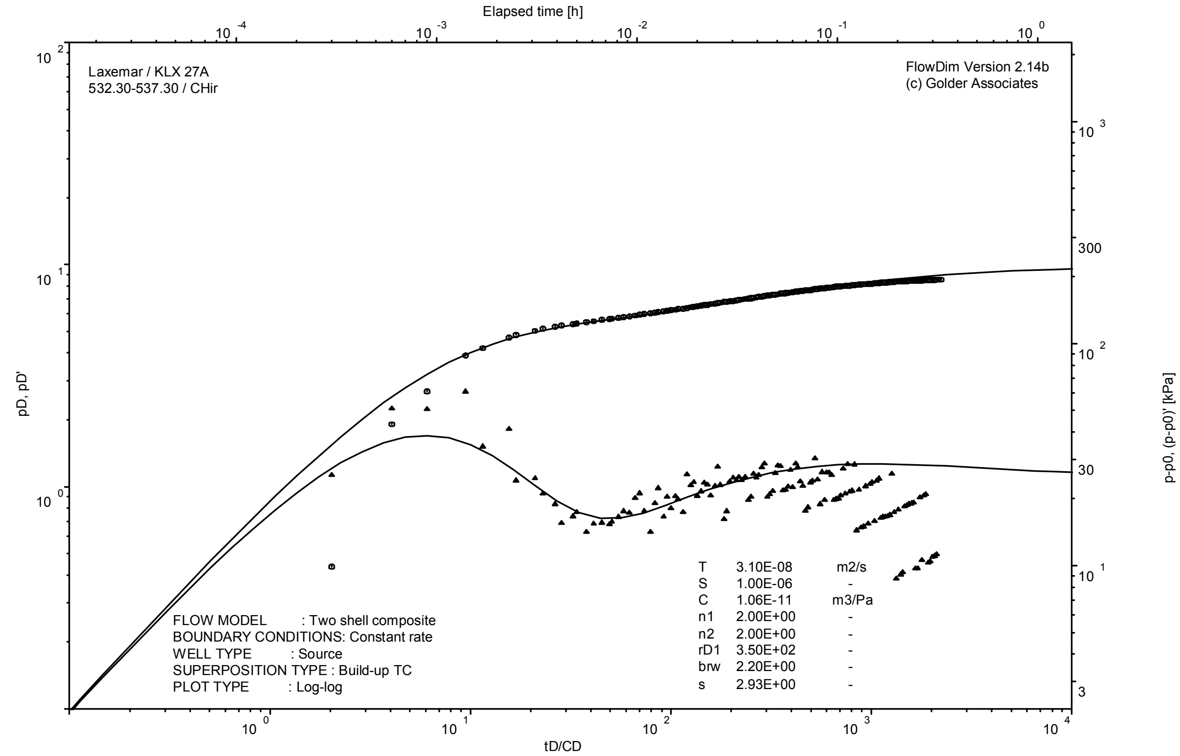
Pressure and flow rate vs. time; cartesian plot



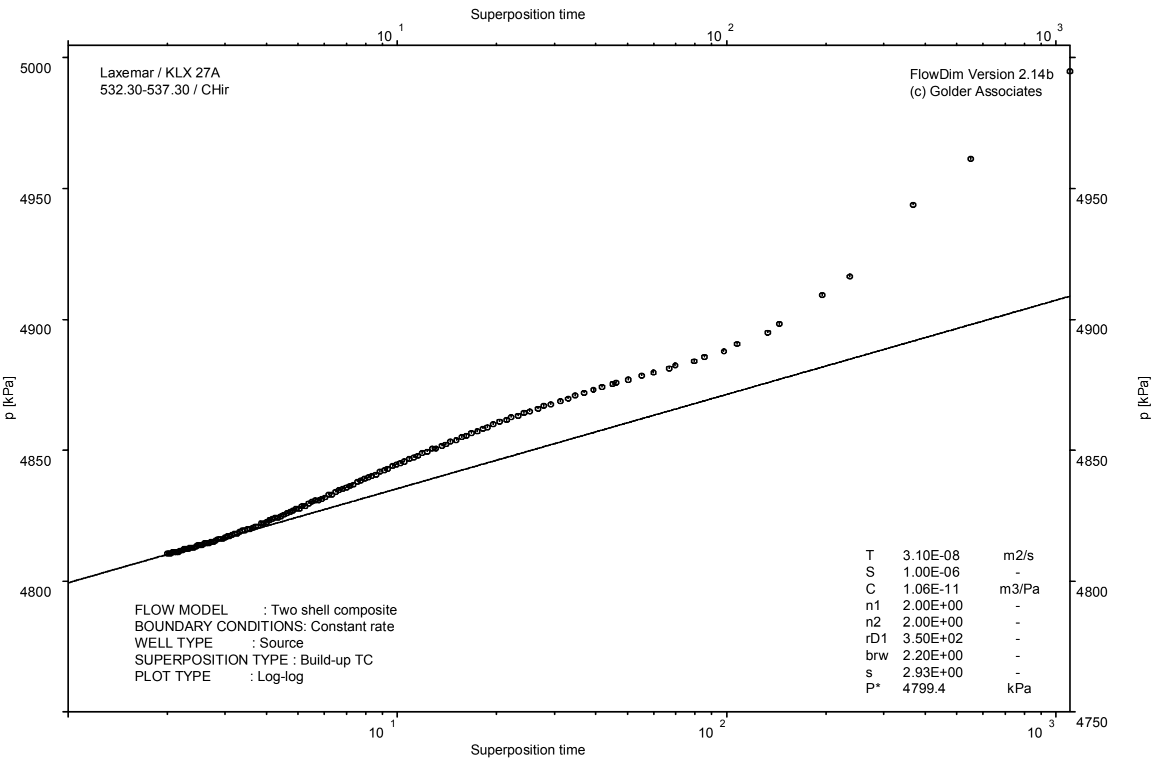
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

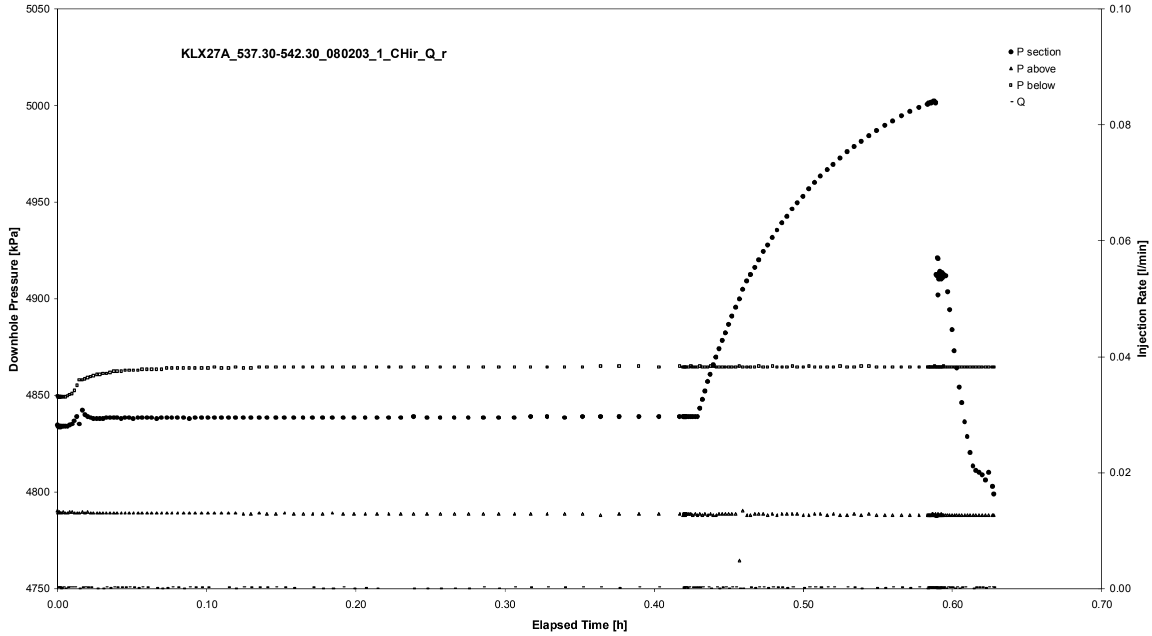


CHIR phase; HORNER match

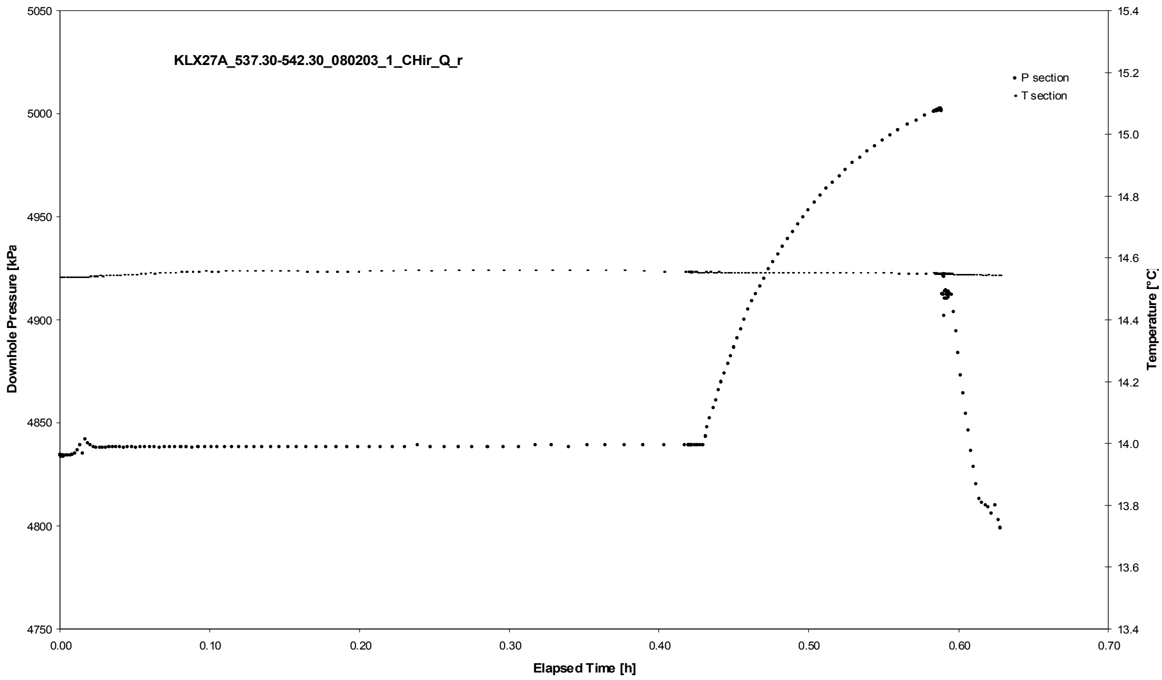
APPENDIX 2-60

Test 537.30 – 542.30 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

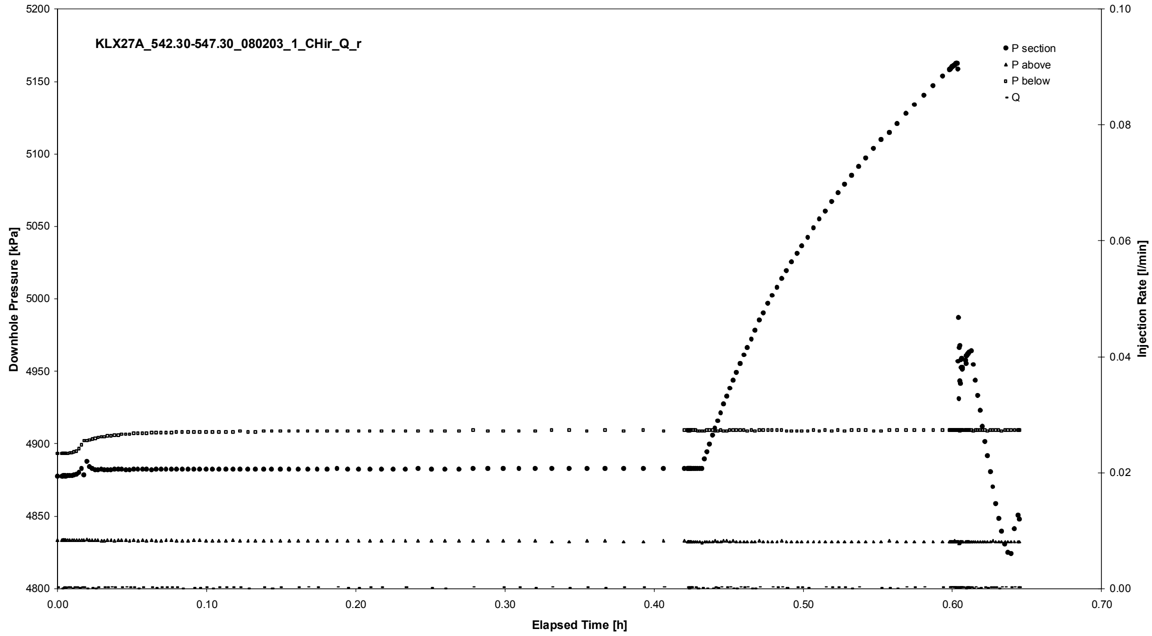
Not analysed

CHIR phase; HORNER match

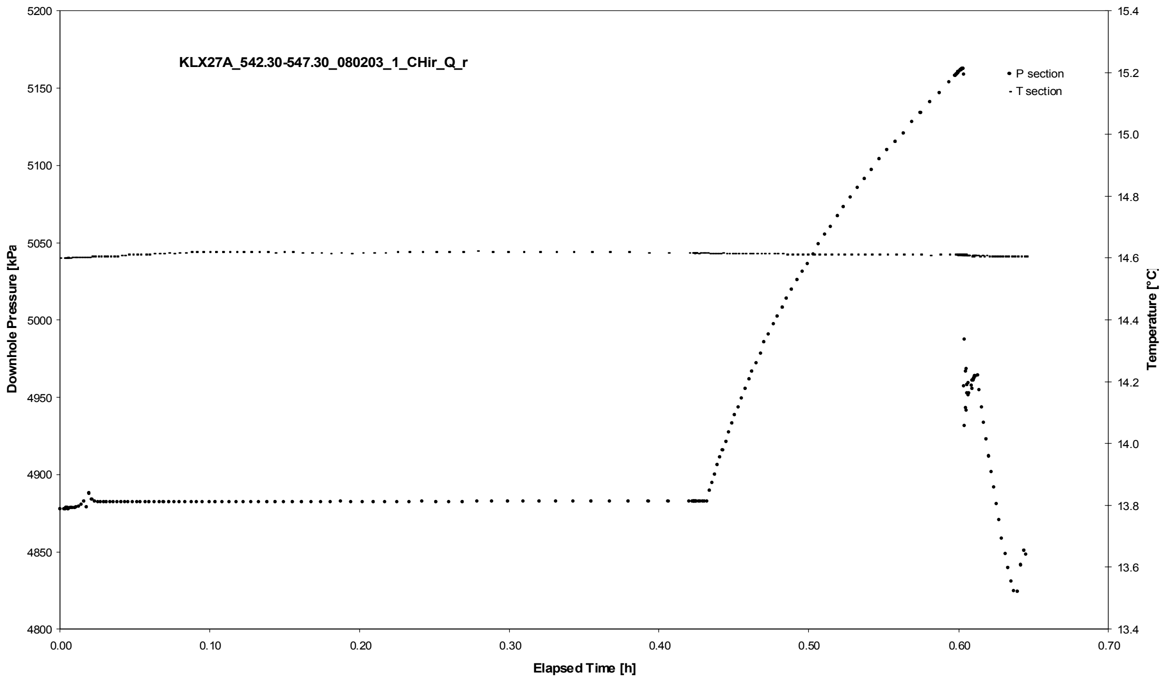
APPENDIX 2-61

Test 542.30 – 547.30 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

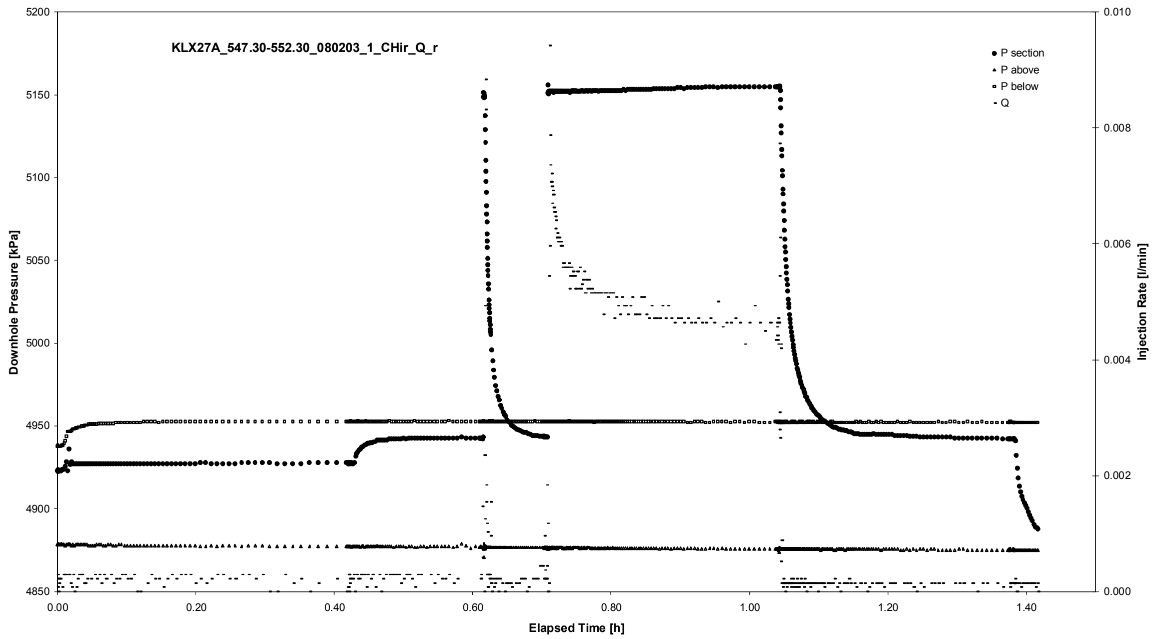
Not analysed

CHIR phase; HORNER match

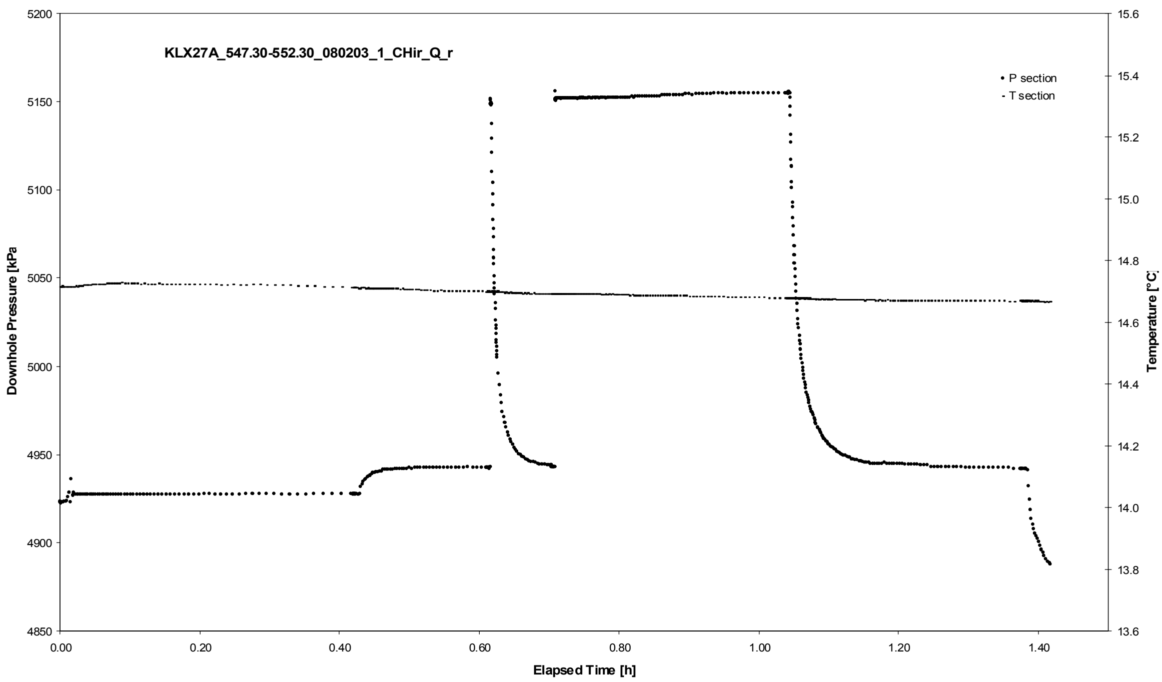
APPENDIX 2-62

Test 547.30 – 552.30 m

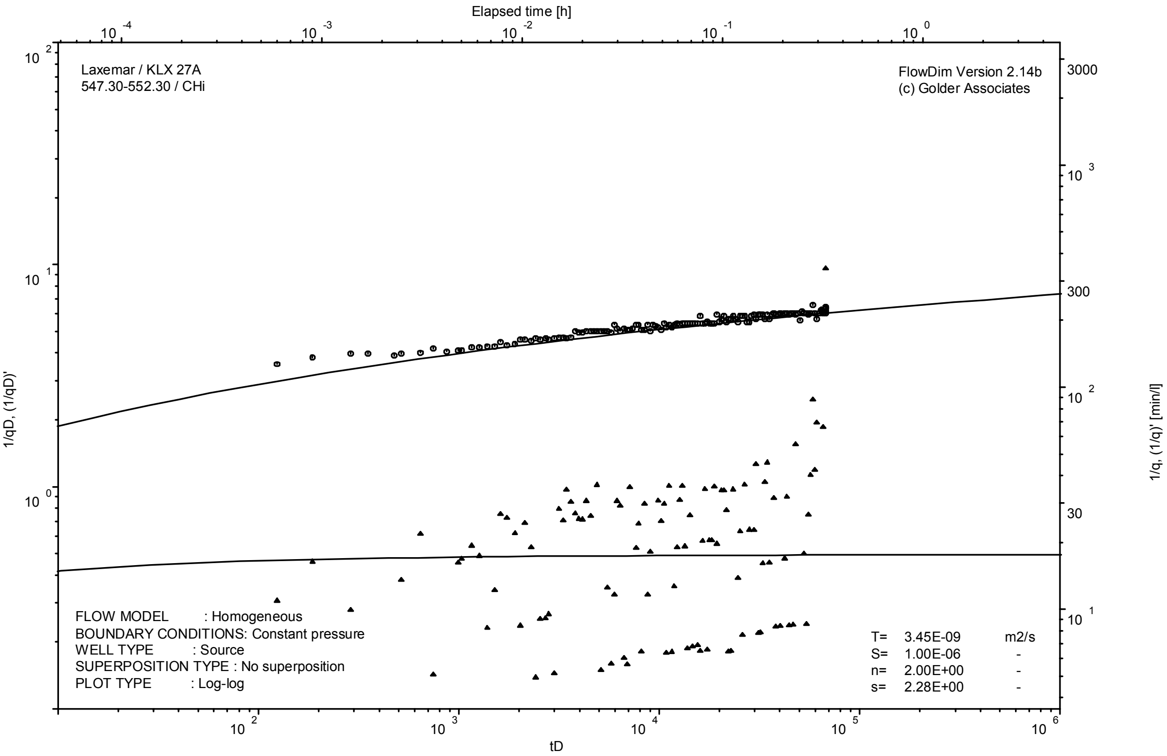
Analysis diagrams



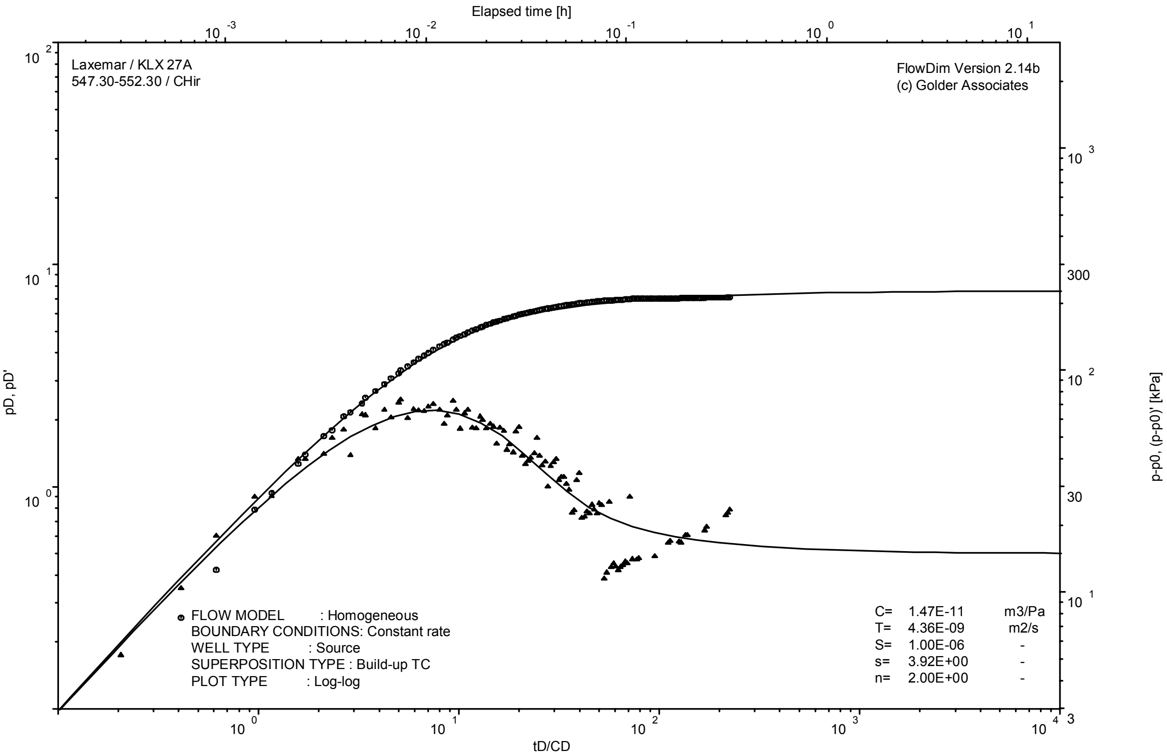
Pressure and flow rate vs. time; cartesian plot



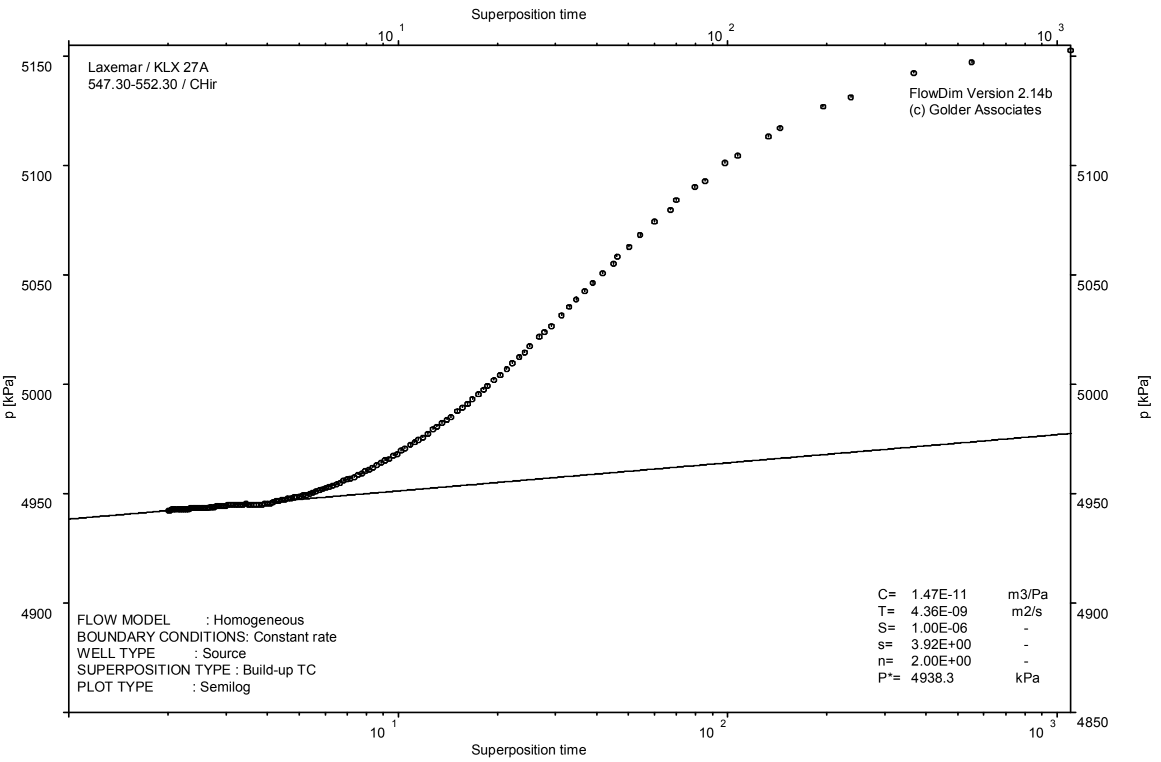
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

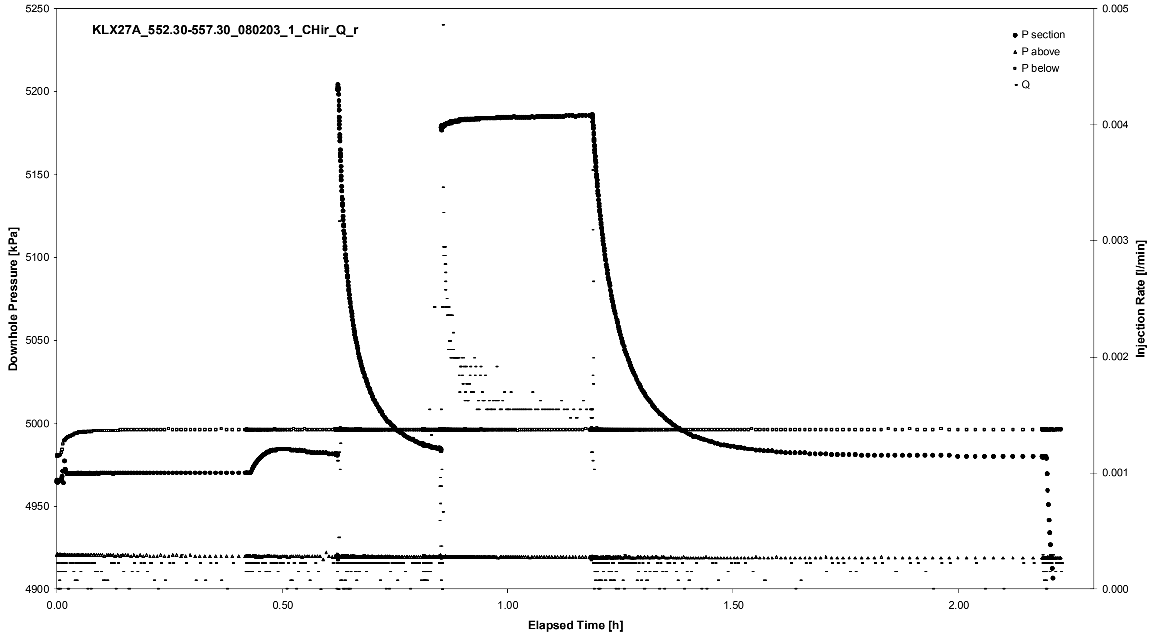


CHIR phase; HORNER match

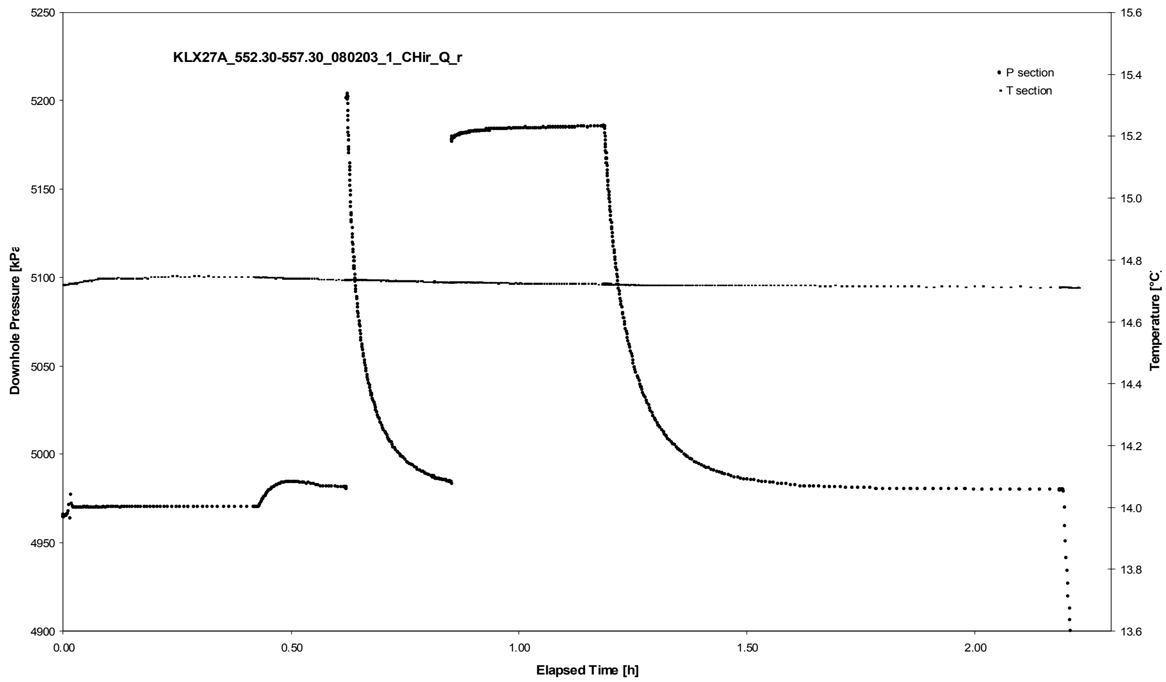
APPENDIX 2-63

Test 552.30 – 557.30 m

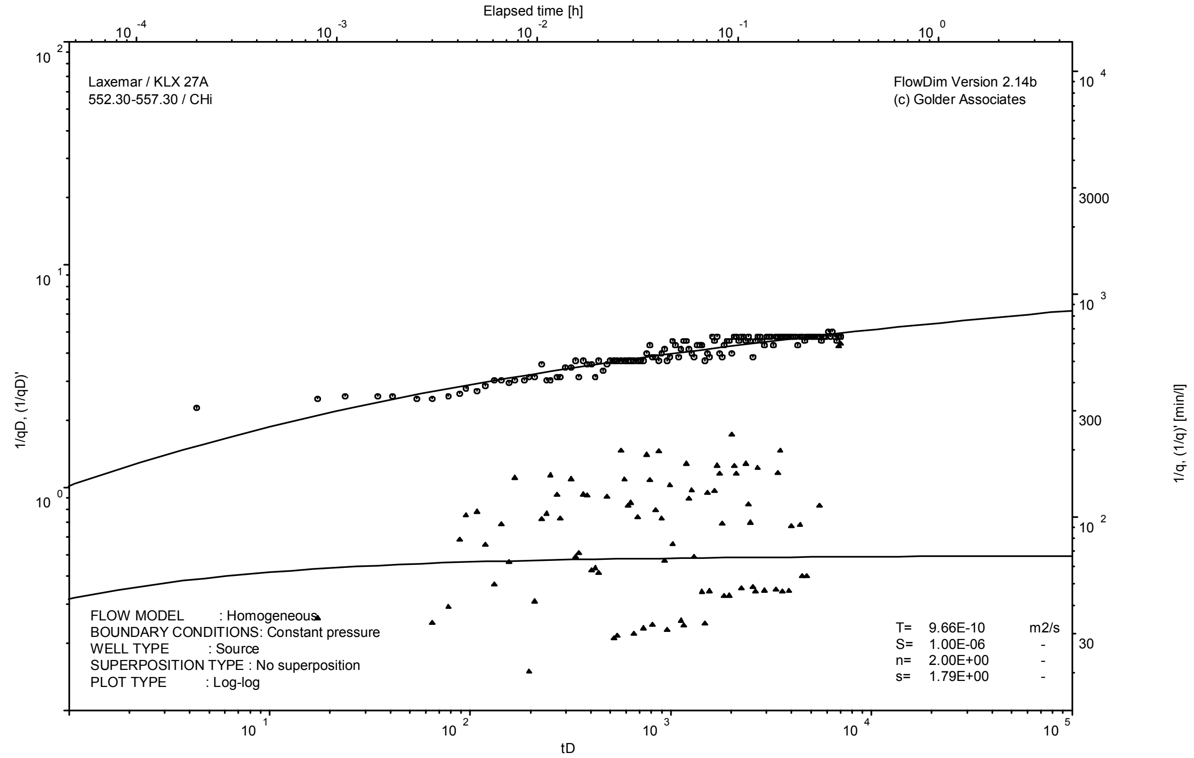
Analysis diagrams



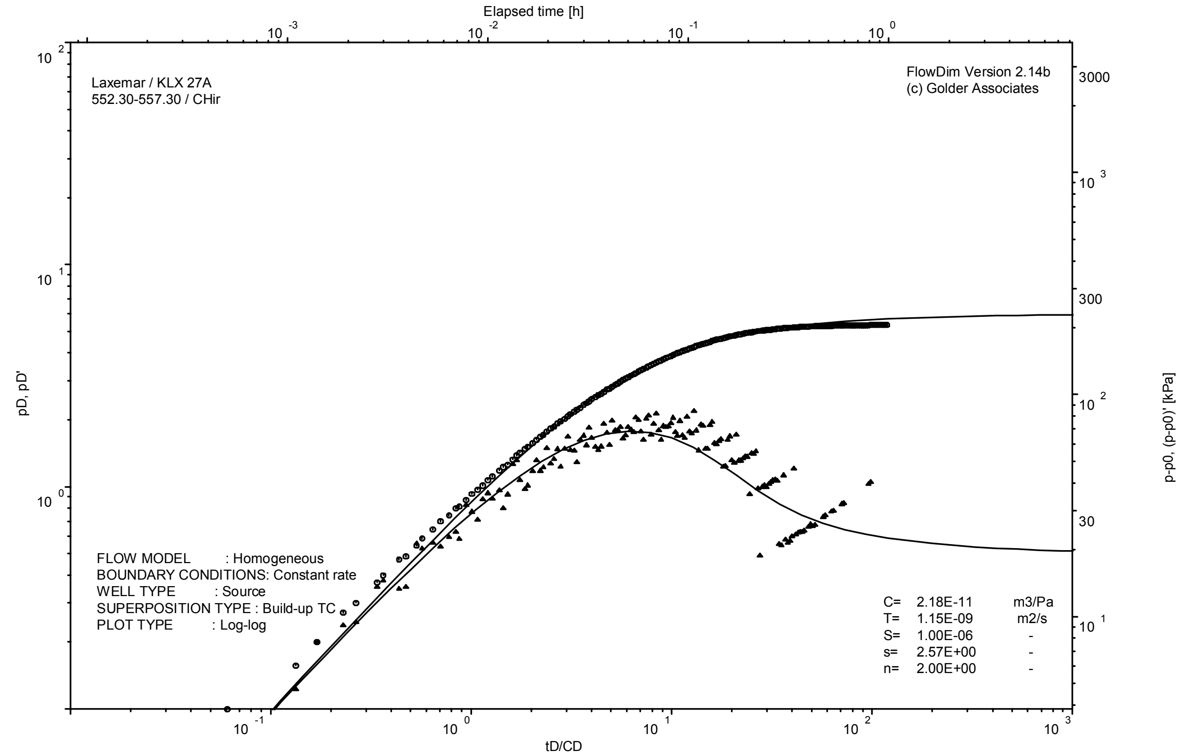
Pressure and flow rate vs. time; cartesian plot



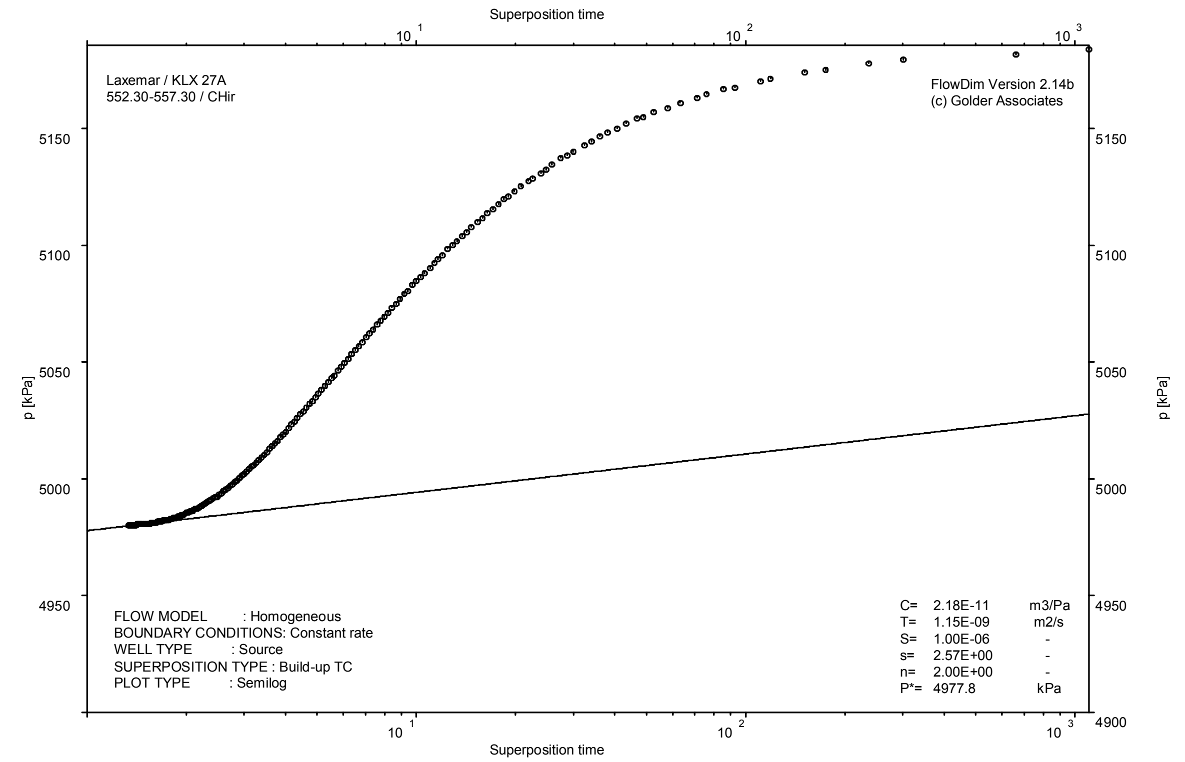
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

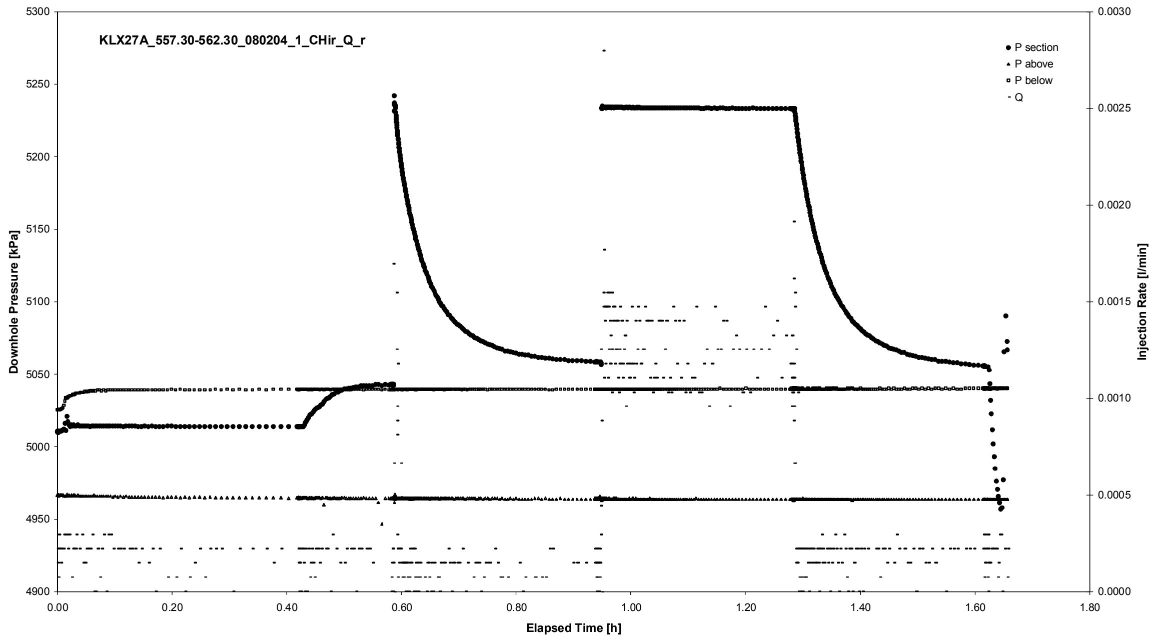


CHIR phase; HORNER match

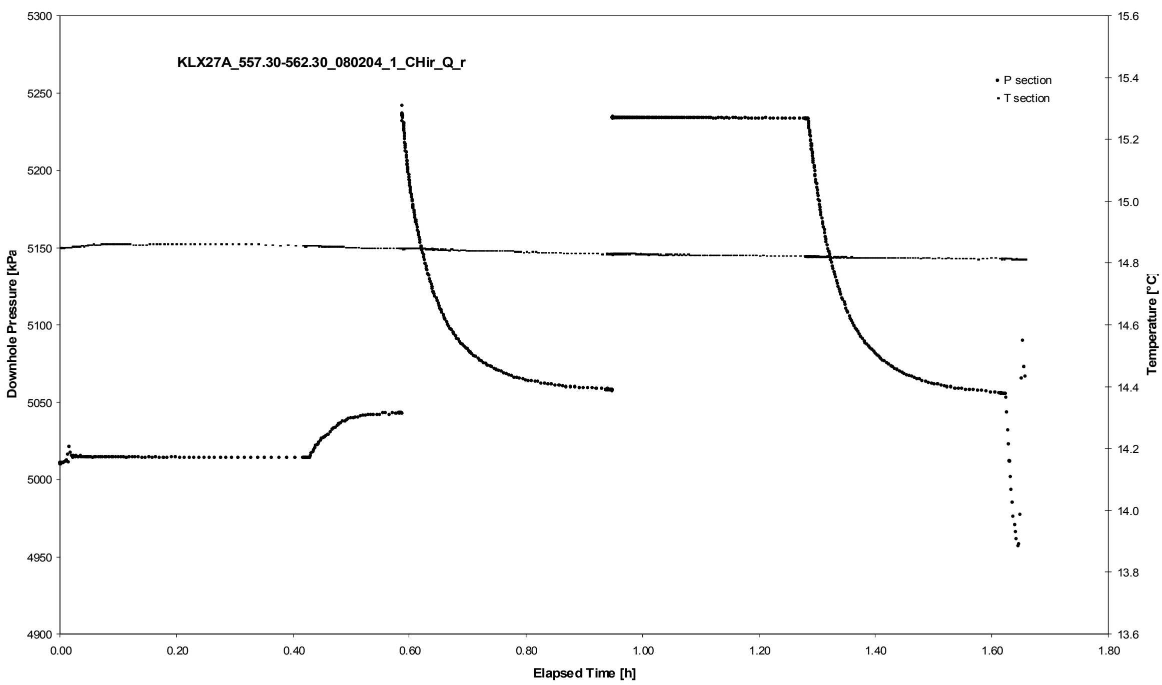
APPENDIX 2-64

Test 557.30 – 562.30 m

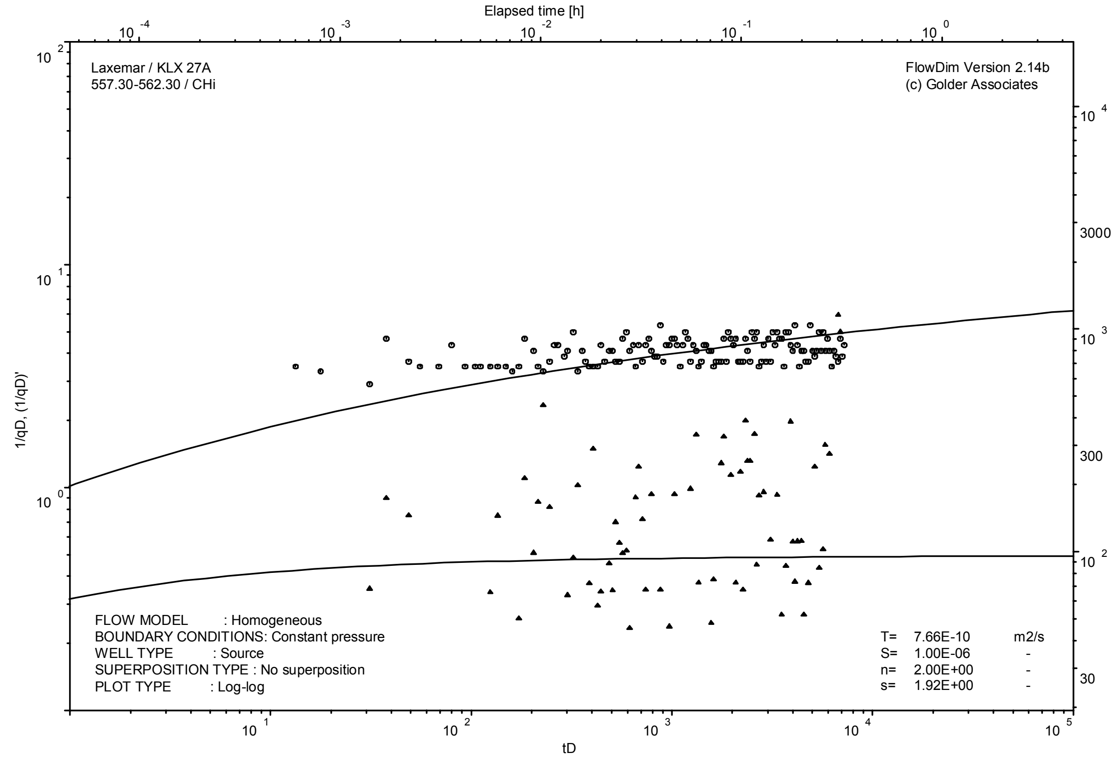
Analysis diagrams



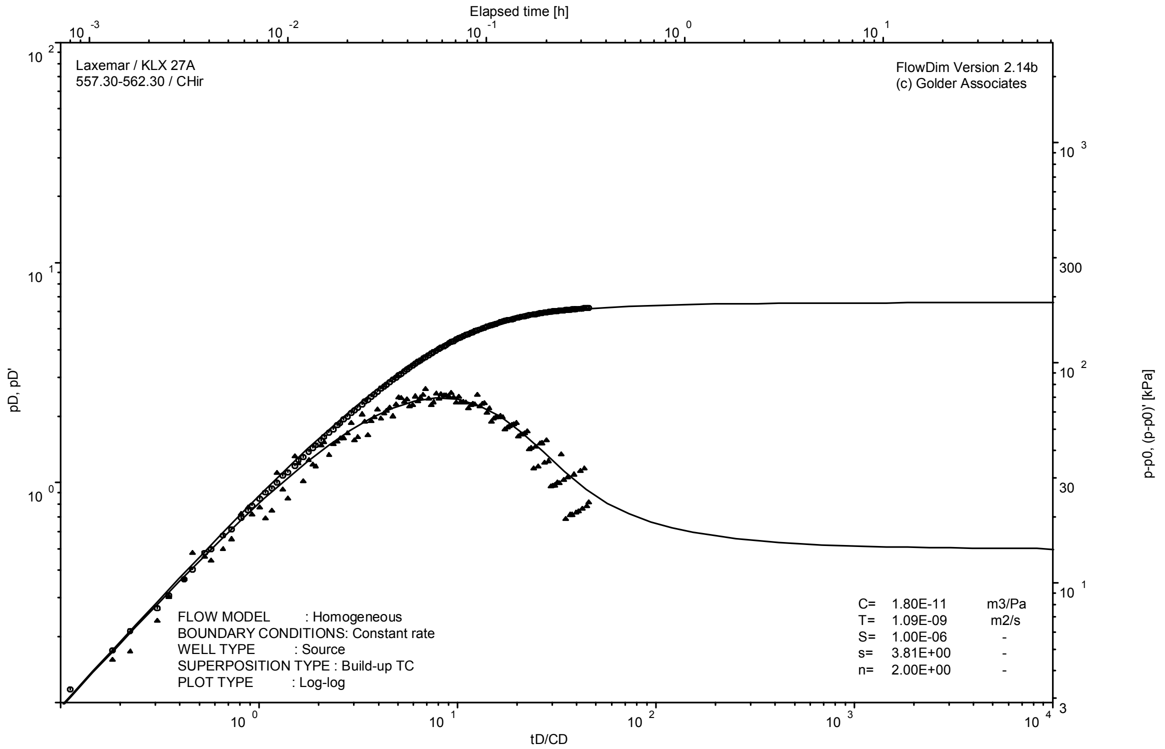
Pressure and flow rate vs. time; cartesian plot



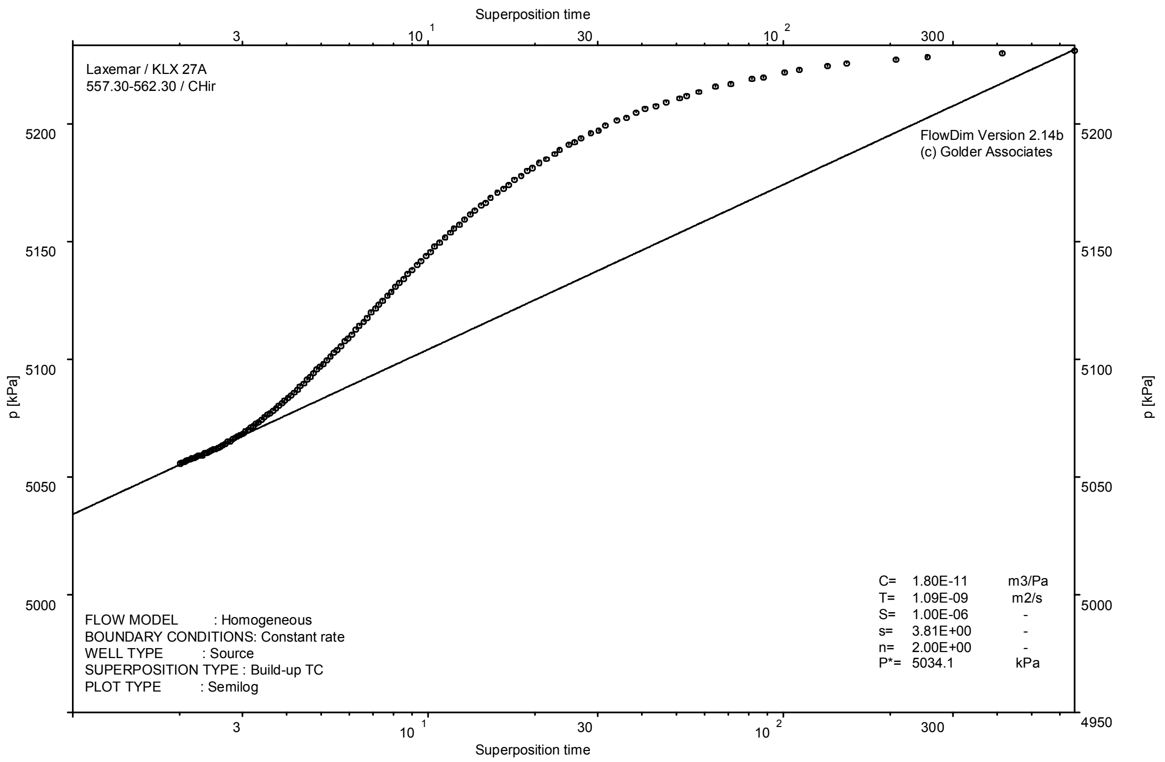
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

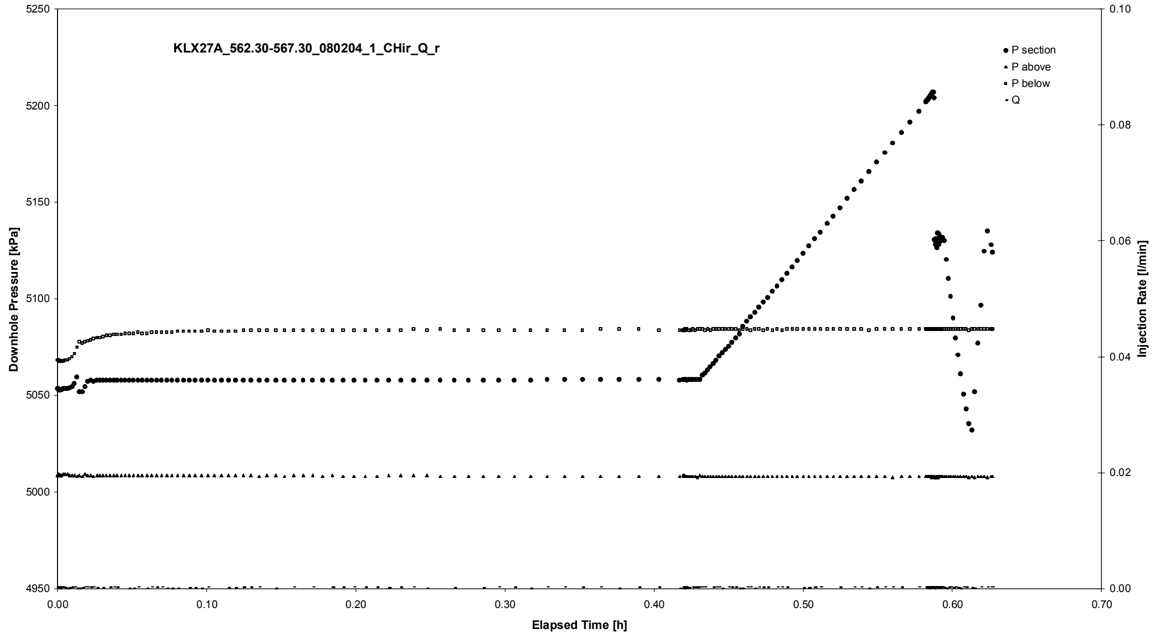


CHIR phase; HORNER match

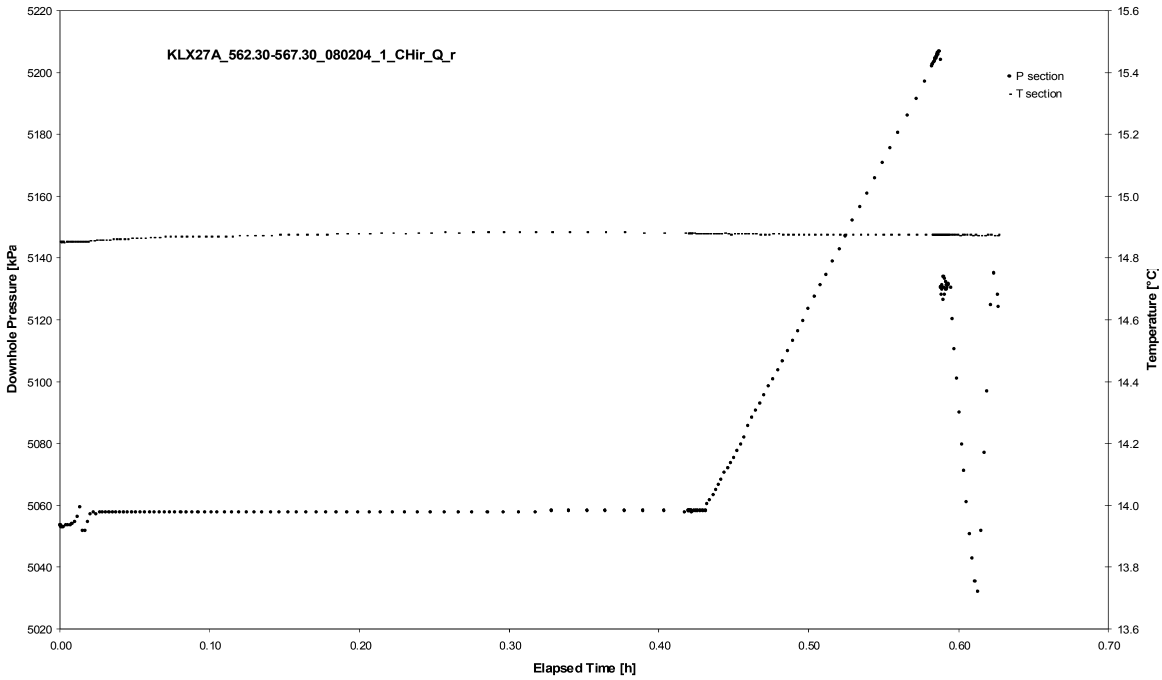
APPENDIX 2-65

Test 562.30 – 567.30 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

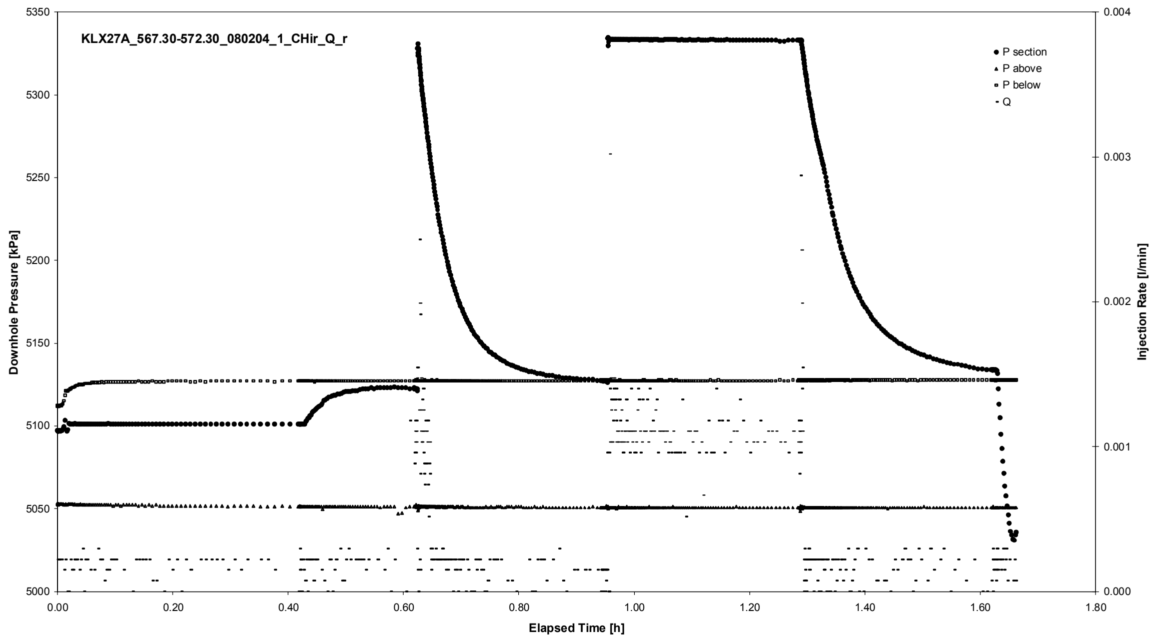
Not analysed

CHIR phase; HORNER match

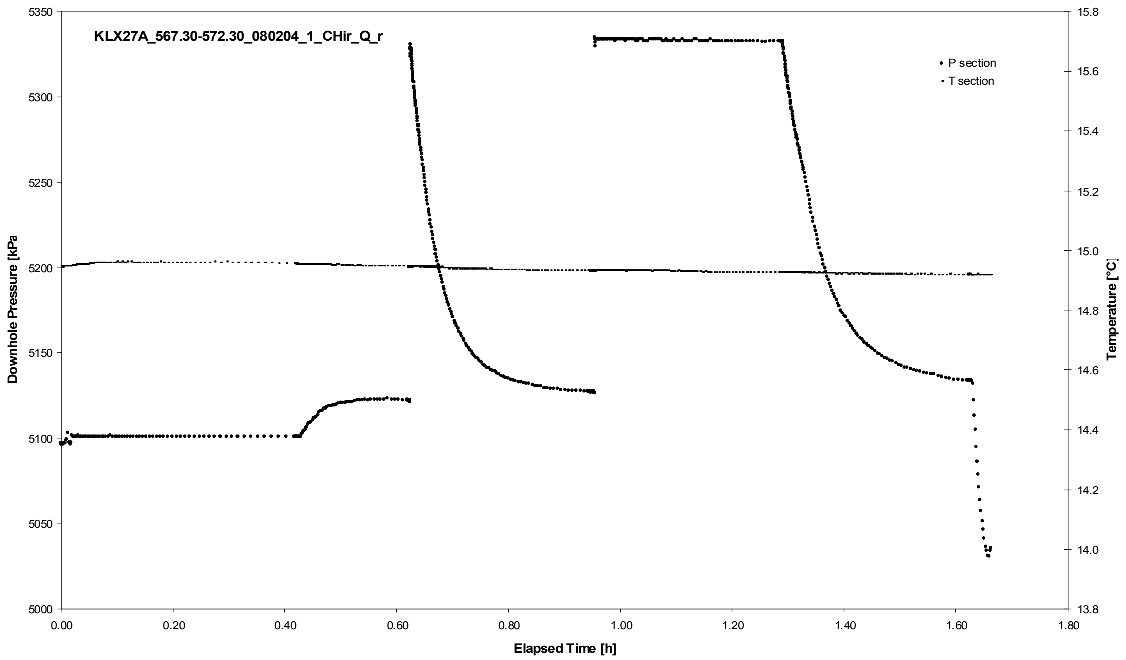
APPENDIX 2-66

Test 567.30 – 572.30 m

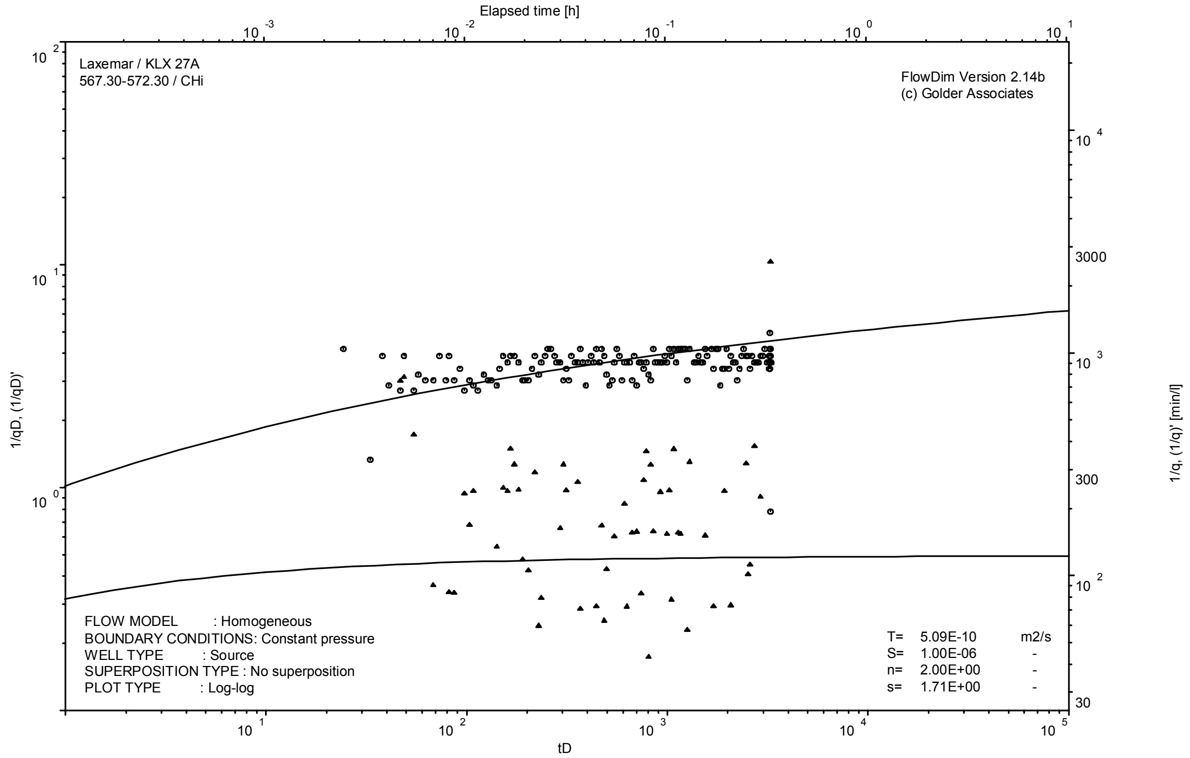
Analysis diagrams



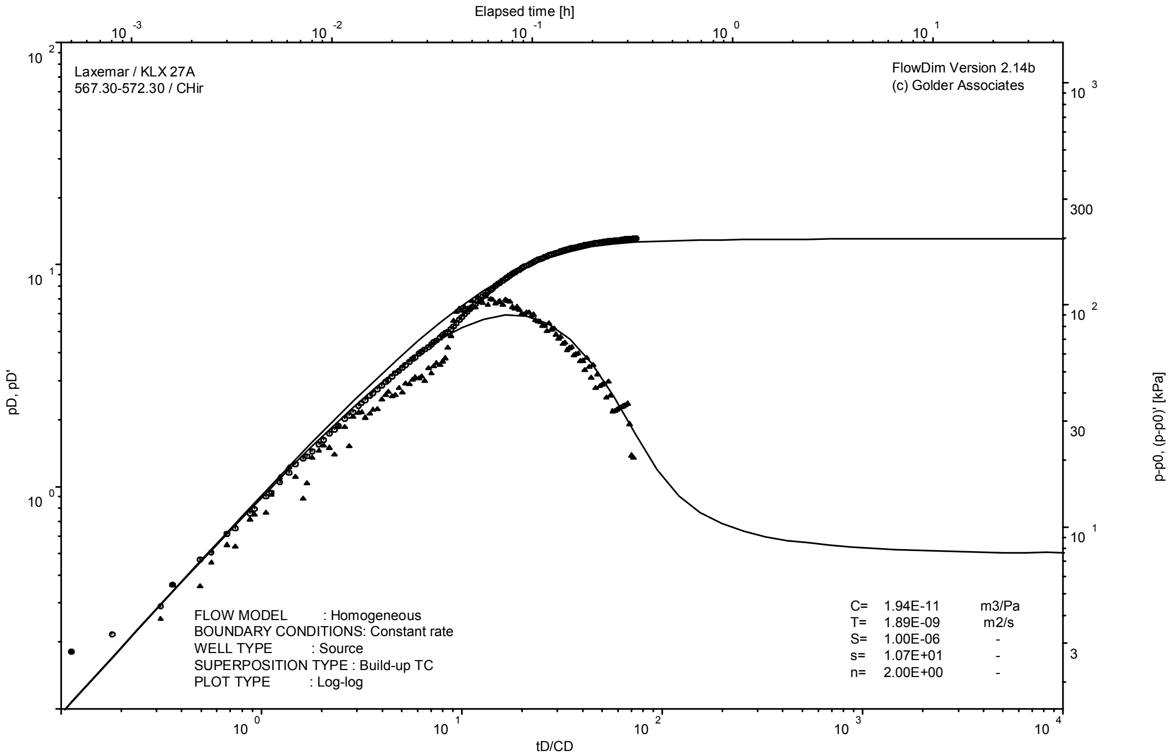
Pressure and flow rate vs. time; cartesian plot



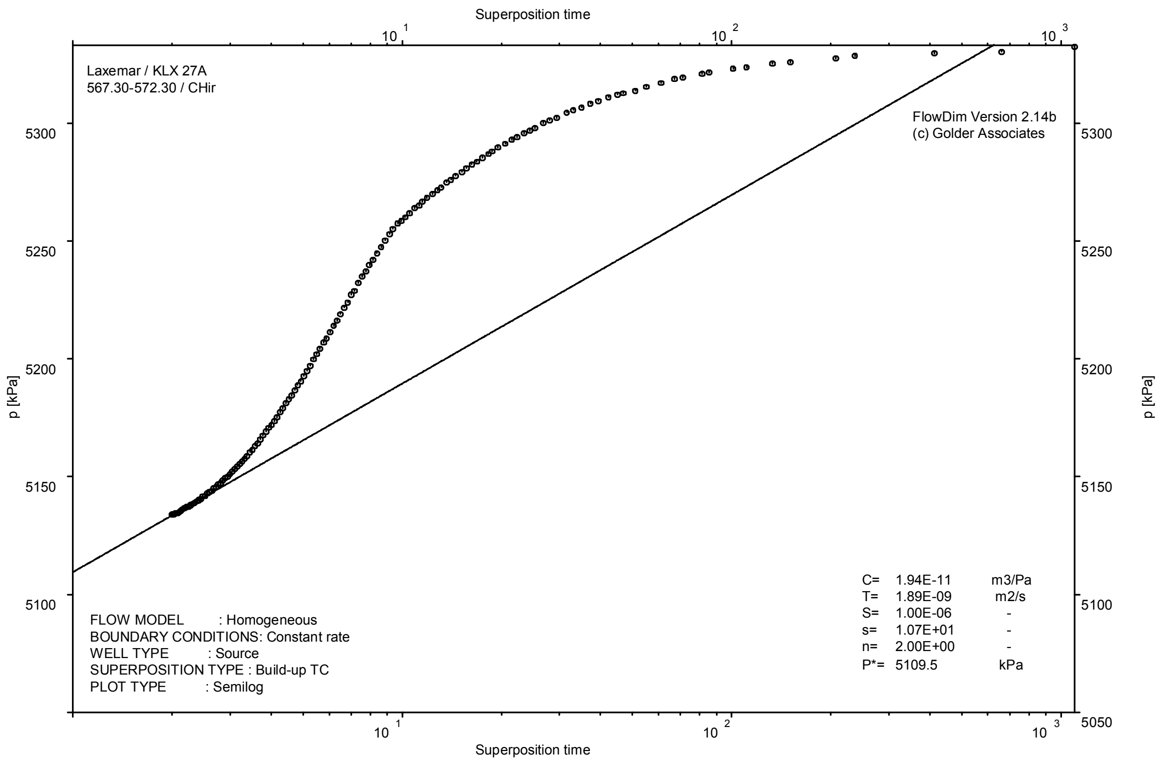
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

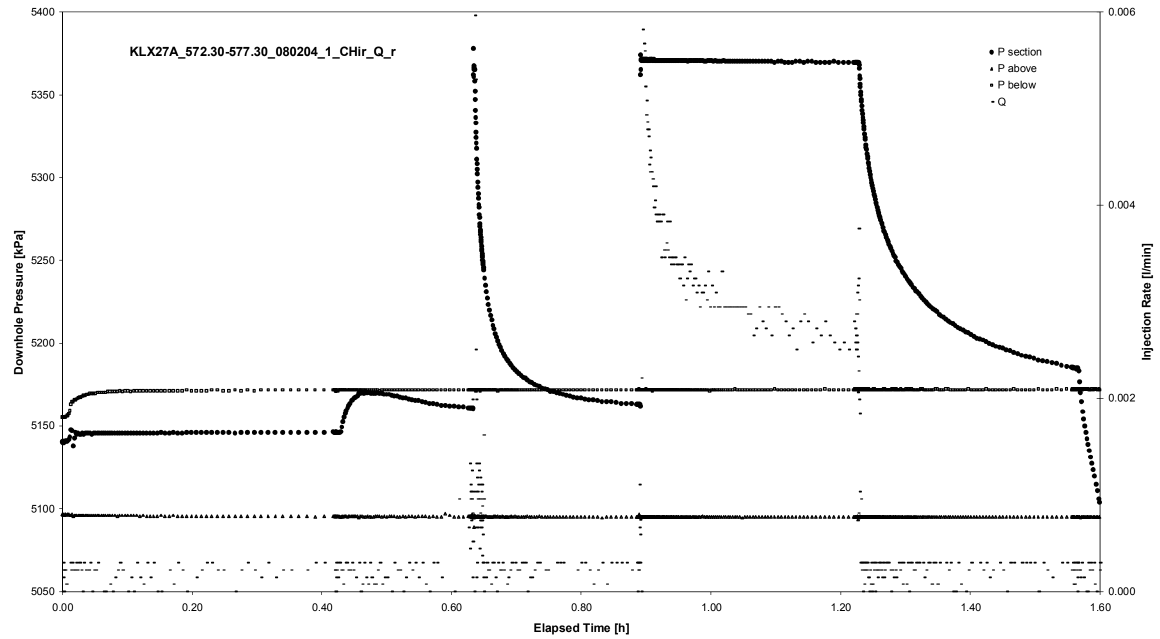


CHIR phase; HORNER match

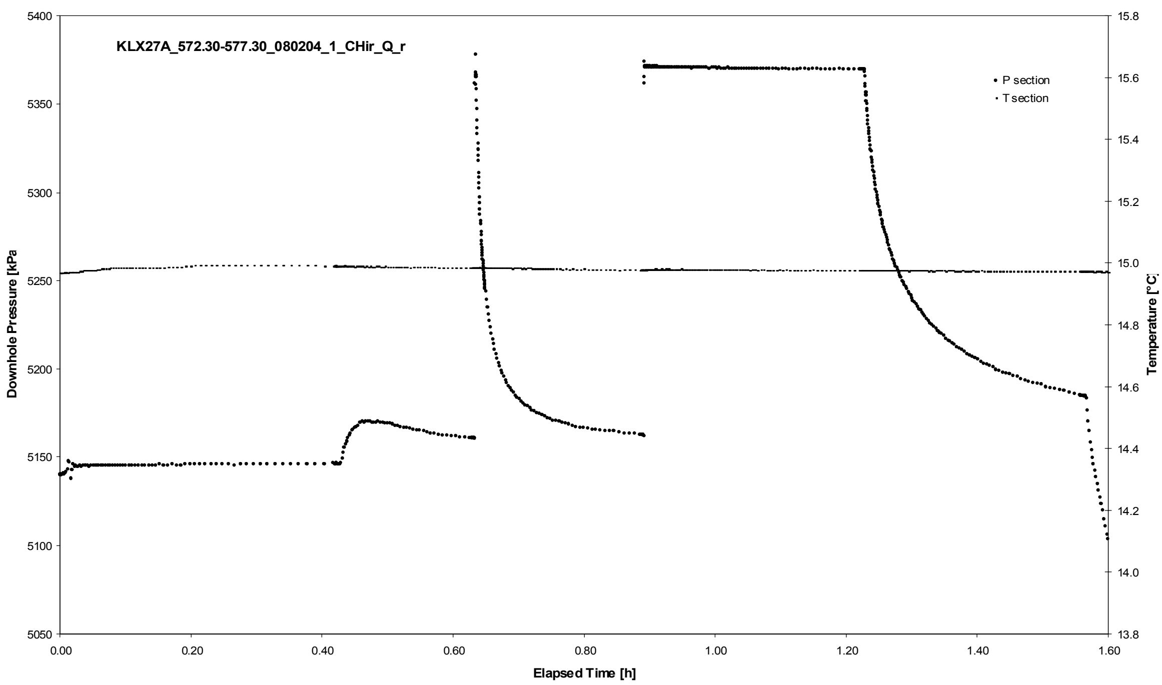
APPENDIX 2-67

Test 572.30 – 577.30 m

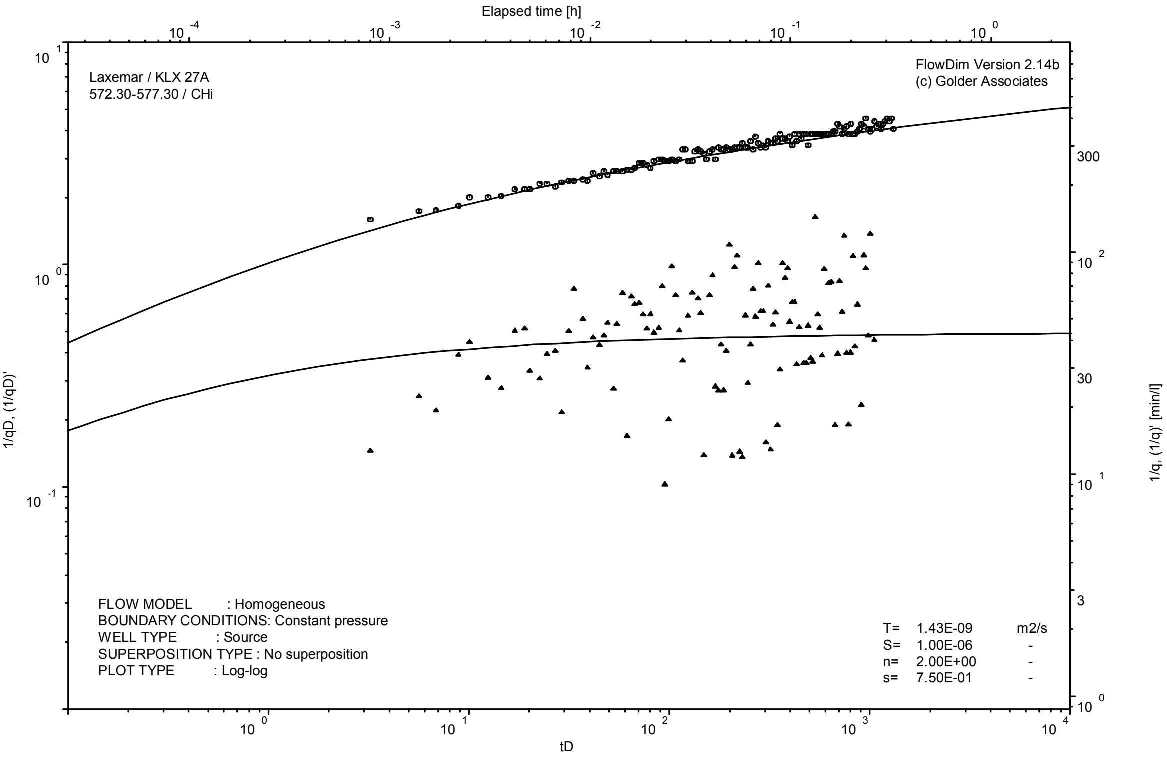
Analysis diagrams



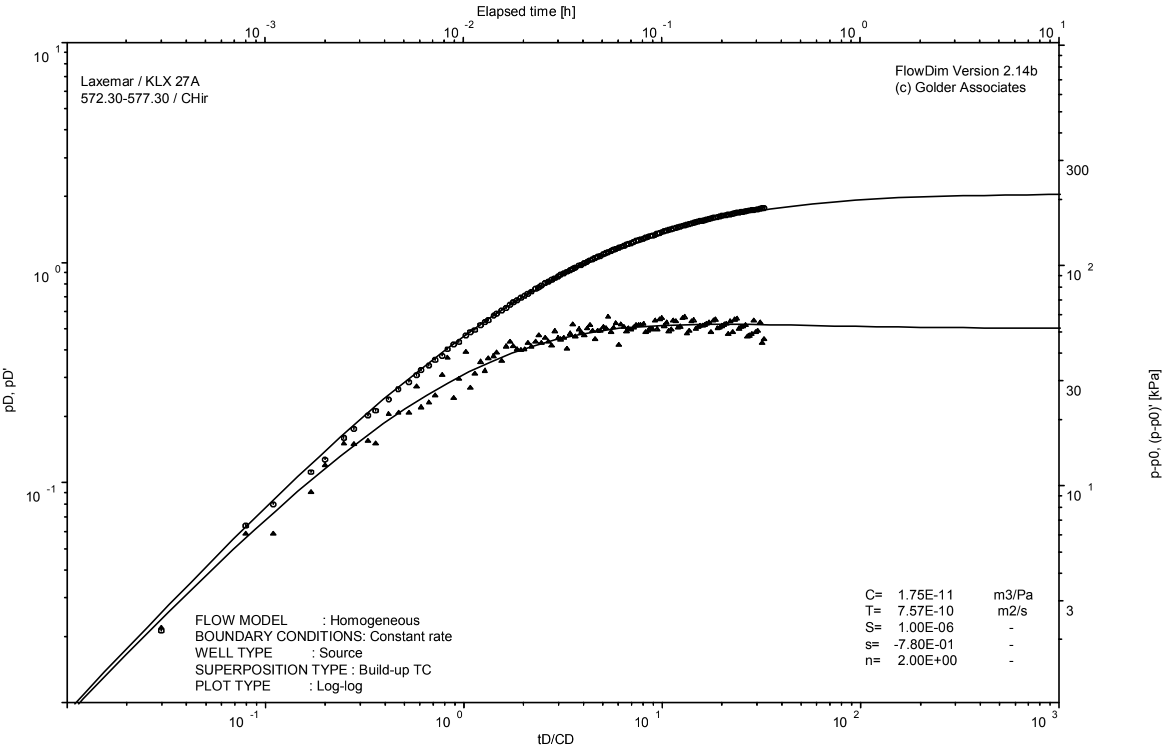
Pressure and flow rate vs. time; cartesian plot



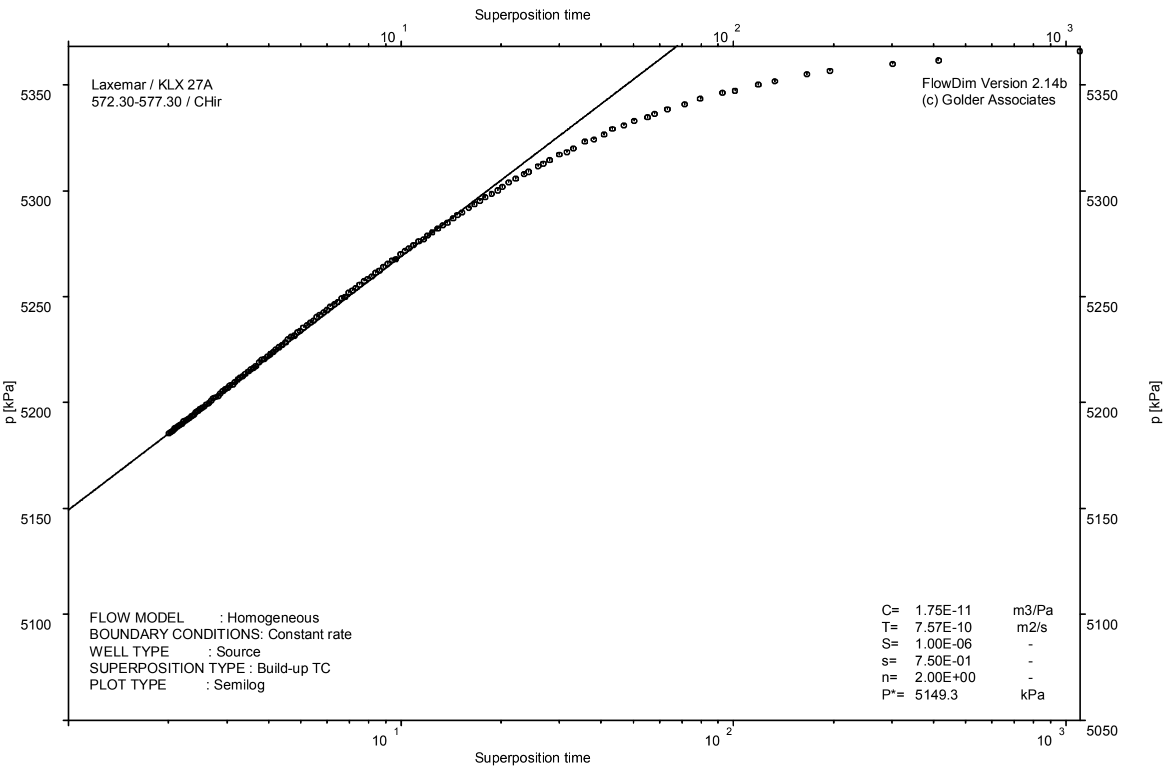
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

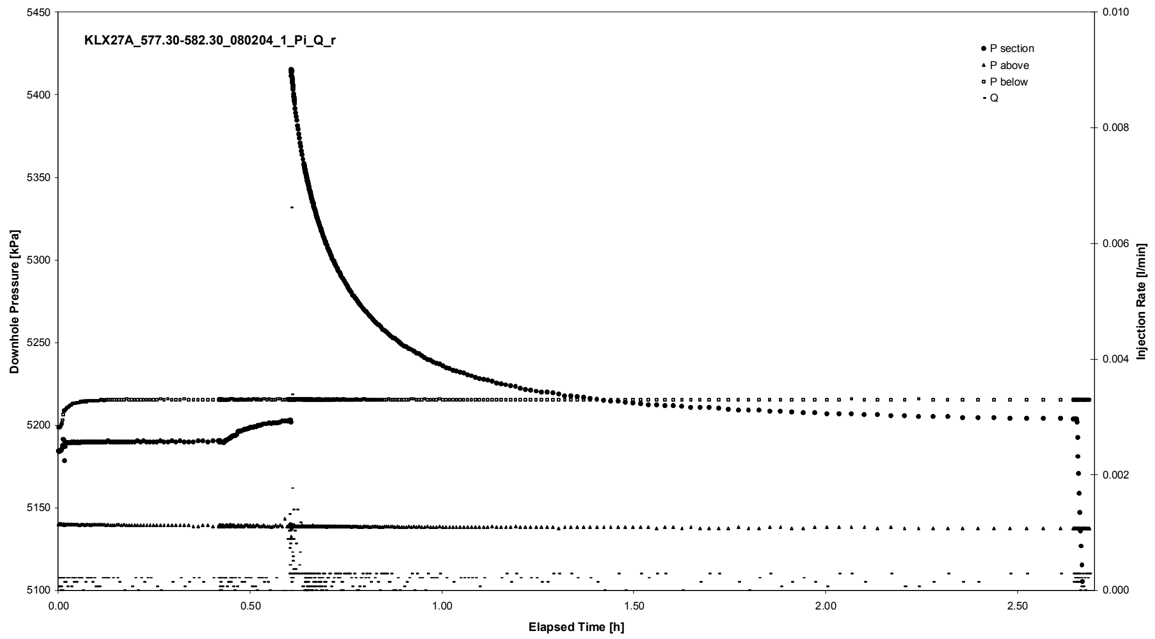


CHIR phase; HORNER match

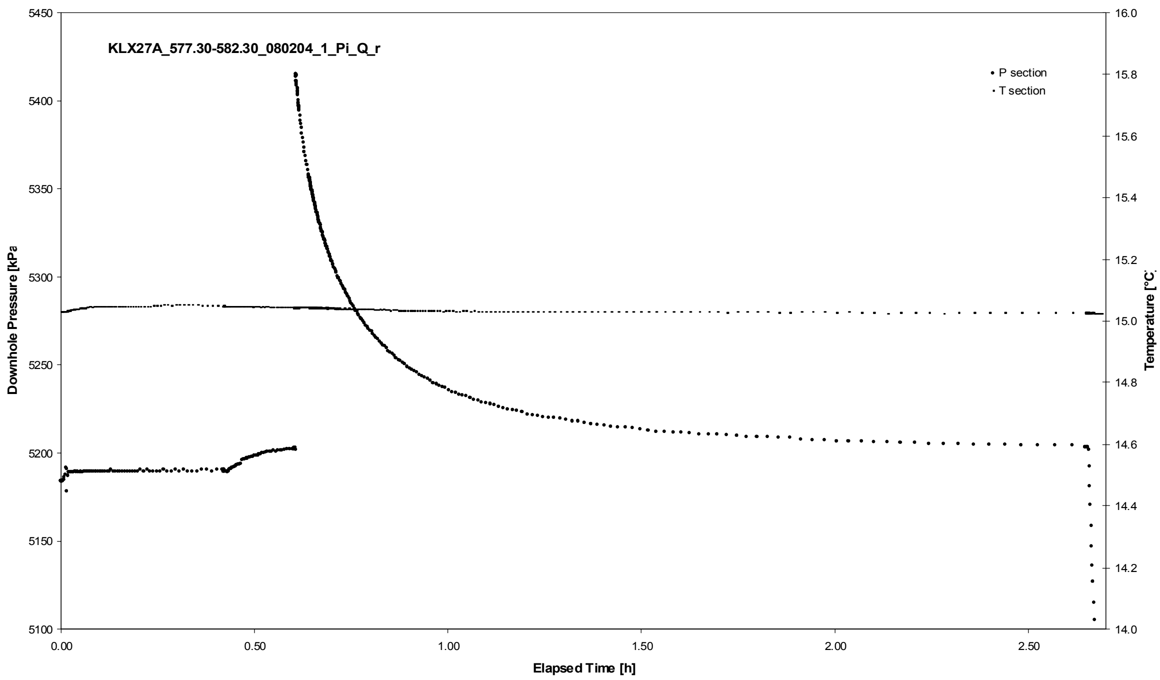
APPENDIX 2-68

Test 577.30 – 582.30 m

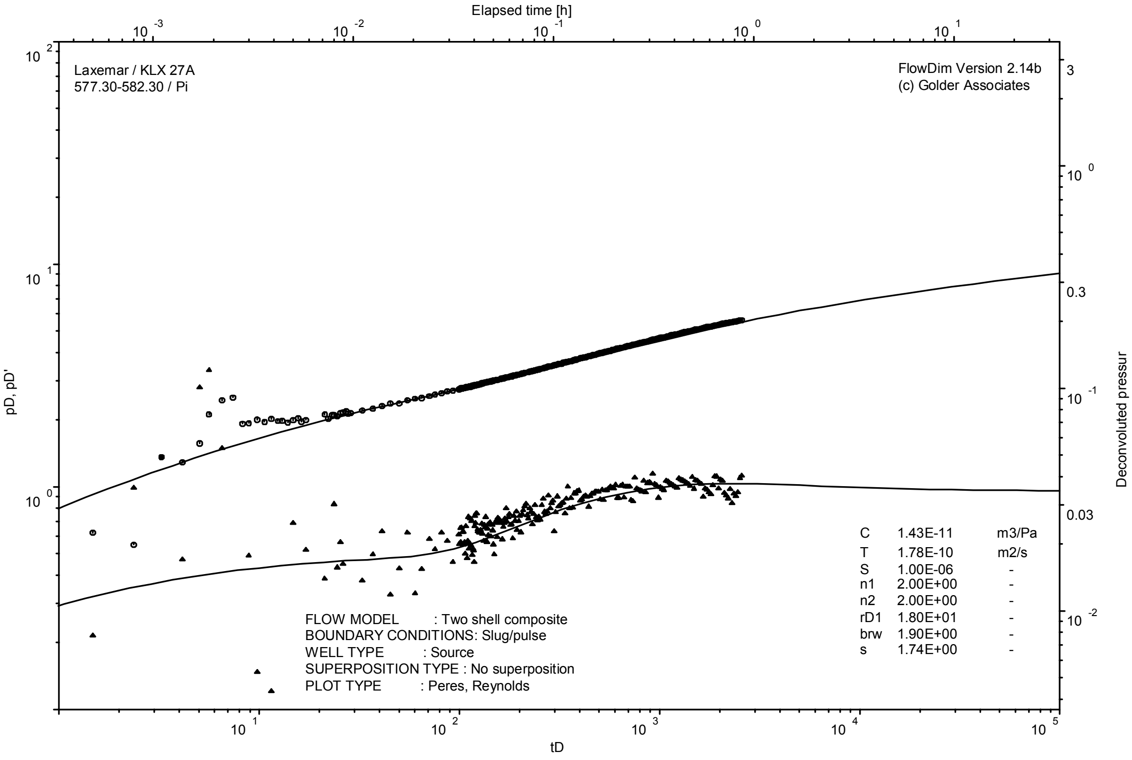
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

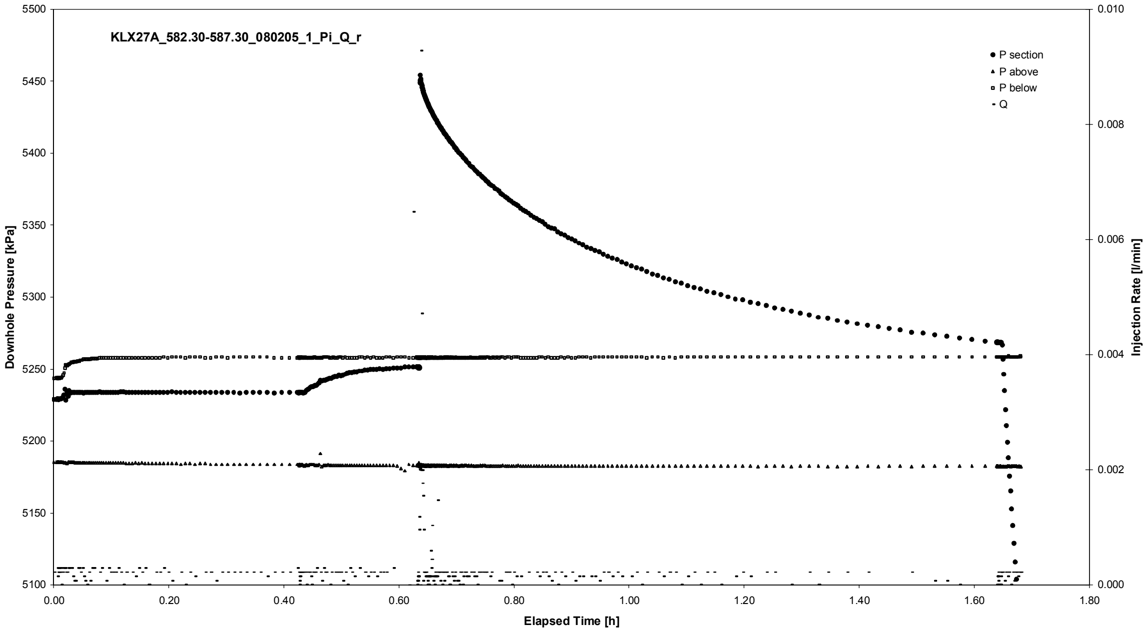


Pulse injection; deconvolution match

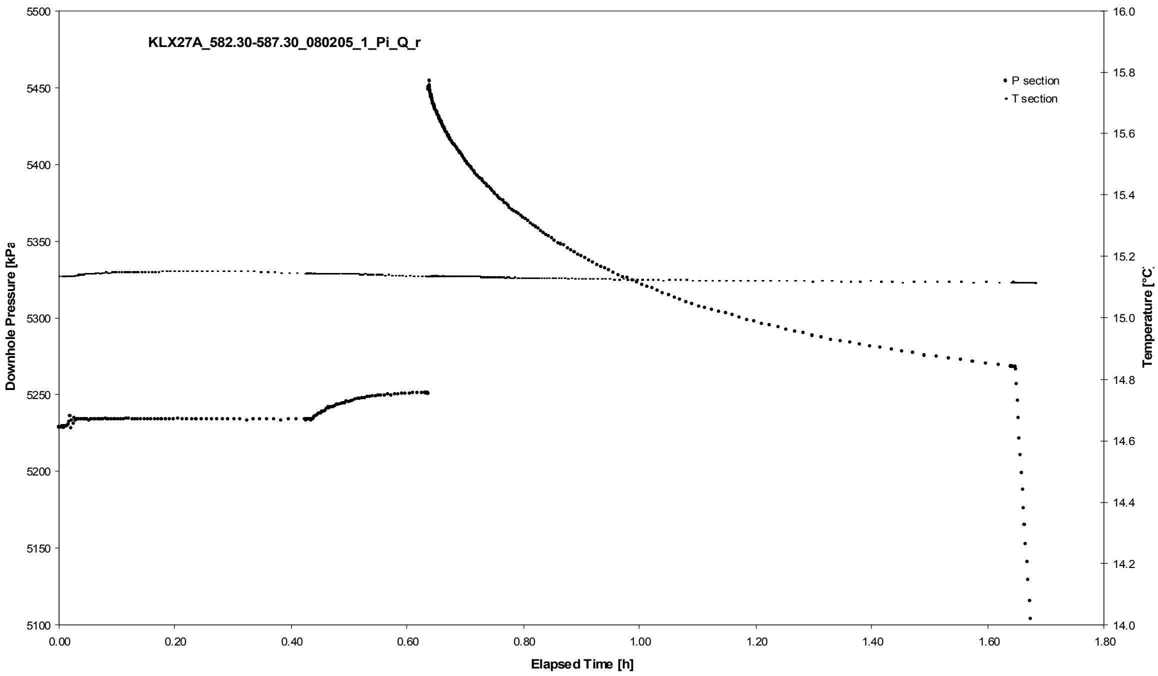
APPENDIX 2-69

Test 582.30 – 587.30 m

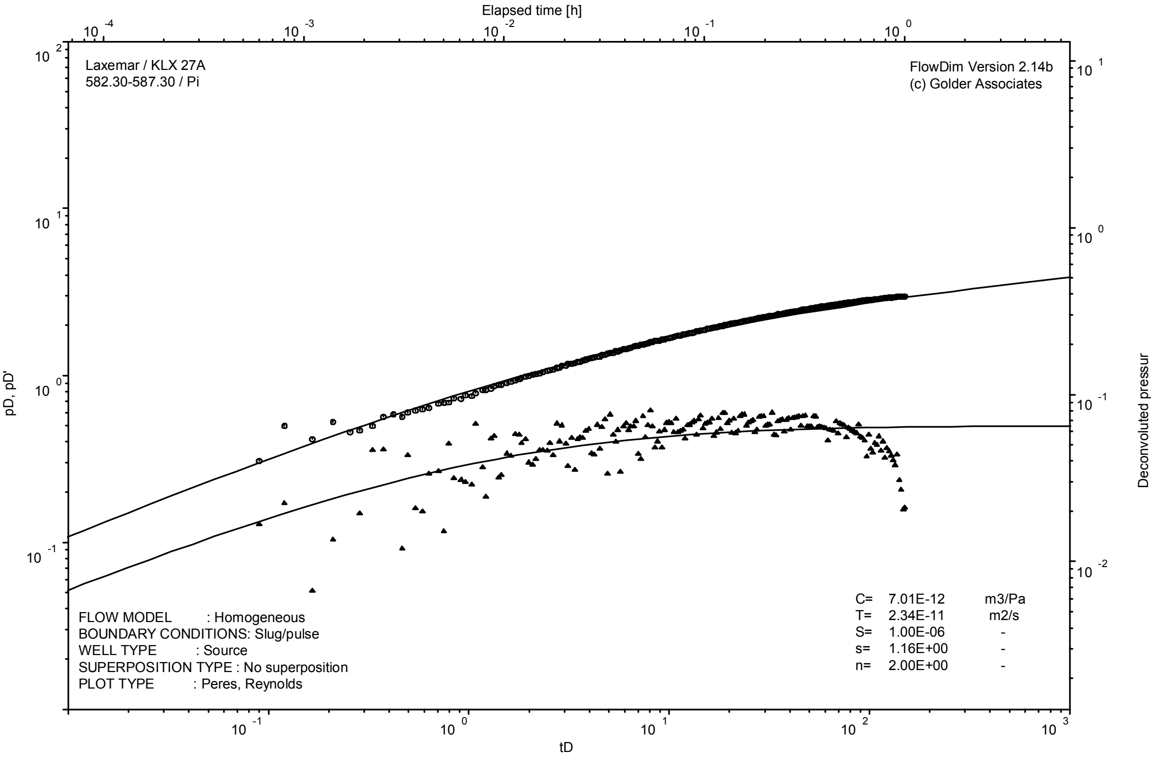
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

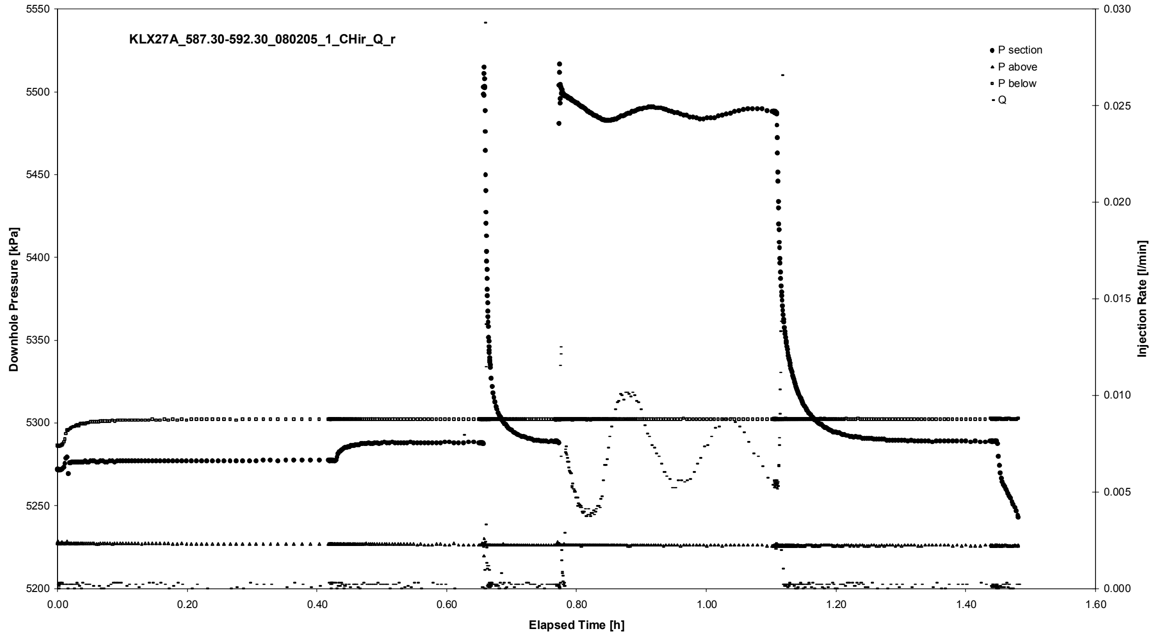


Pulse injection; deconvolution match

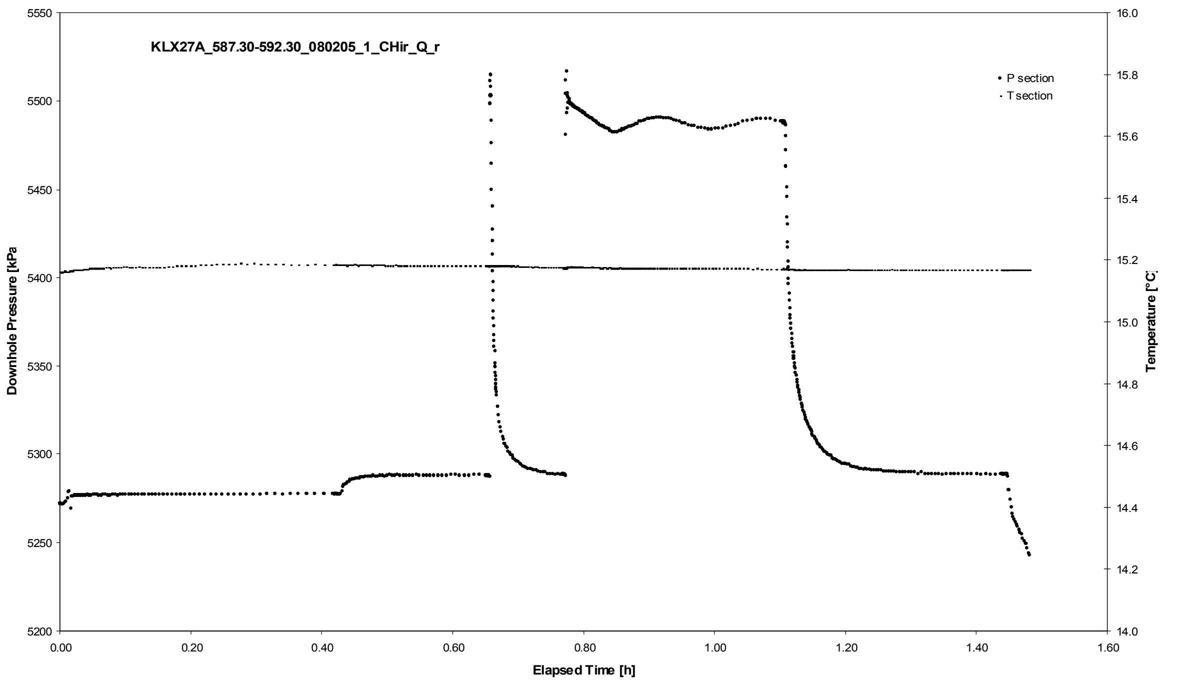
APPENDIX 2-70

Test 587.30 – 592.30 m

Analysis diagrams



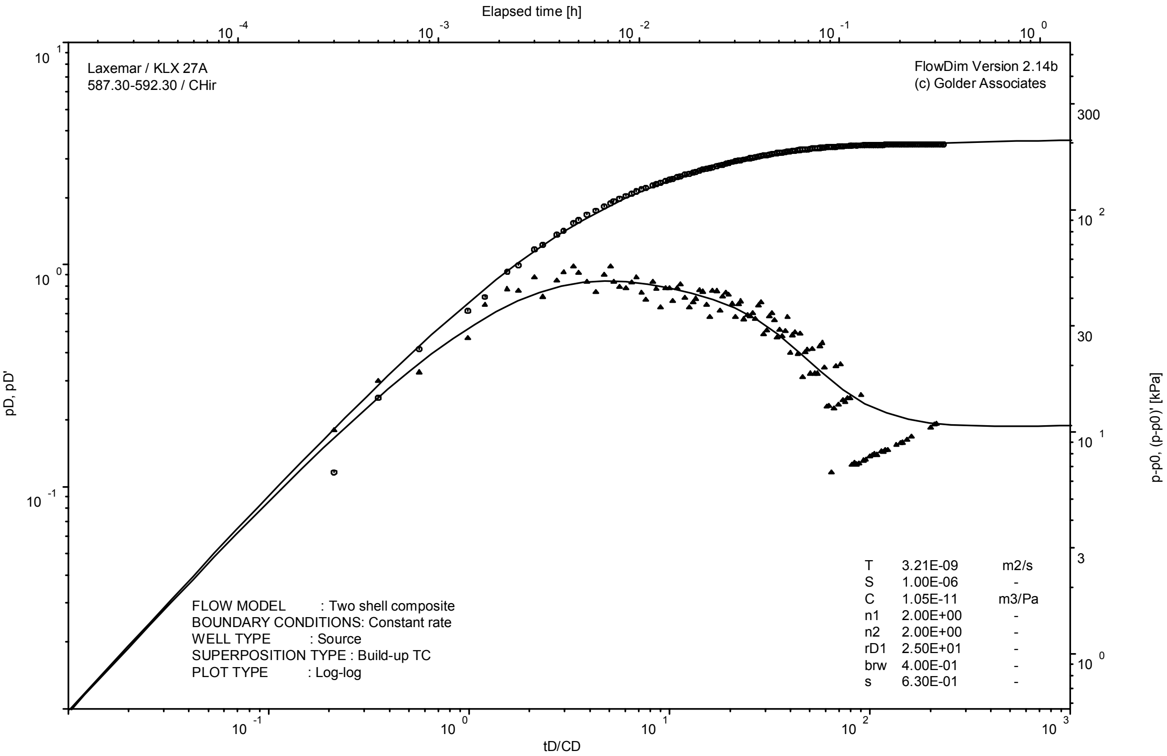
Pressure and flow rate vs. time; cartesian plot



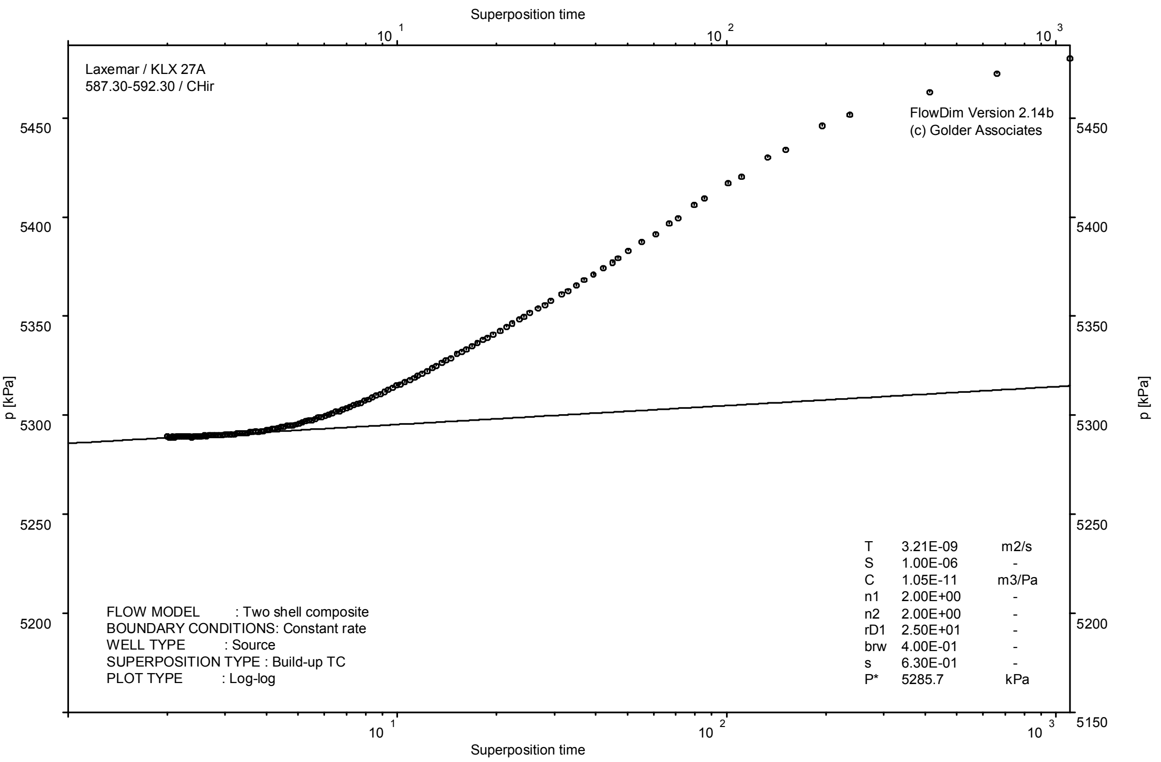
Interval pressure and temperature vs. time; cartesian plot

Not analysable

CHI phase; log-log match



CHIR phase; log-log match

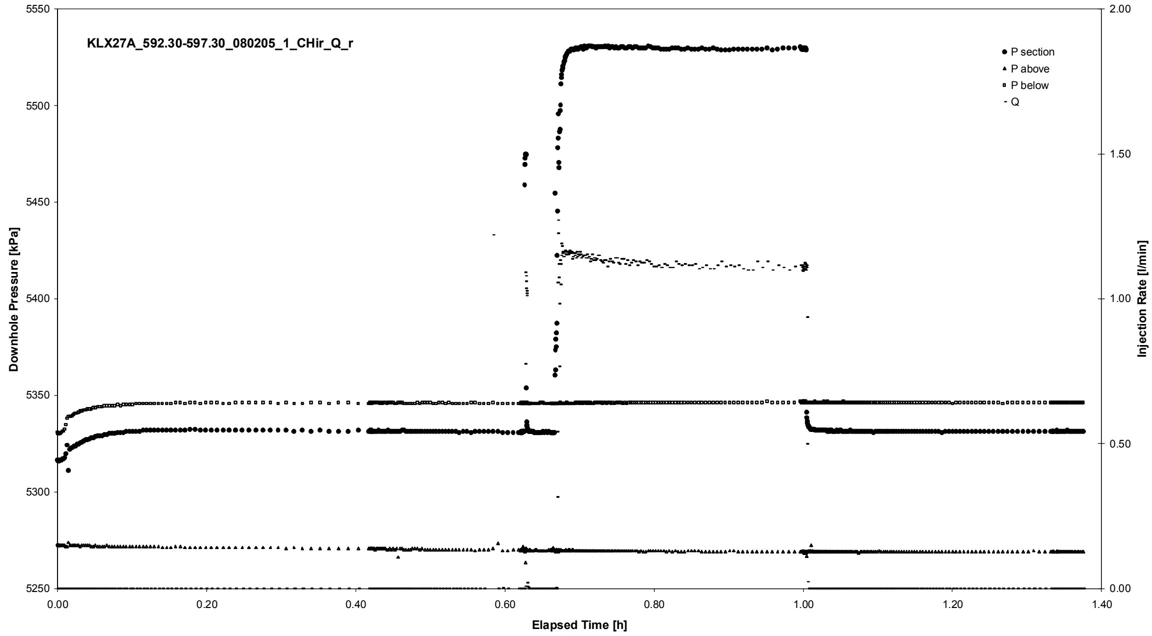


CHIR phase; HORNER match

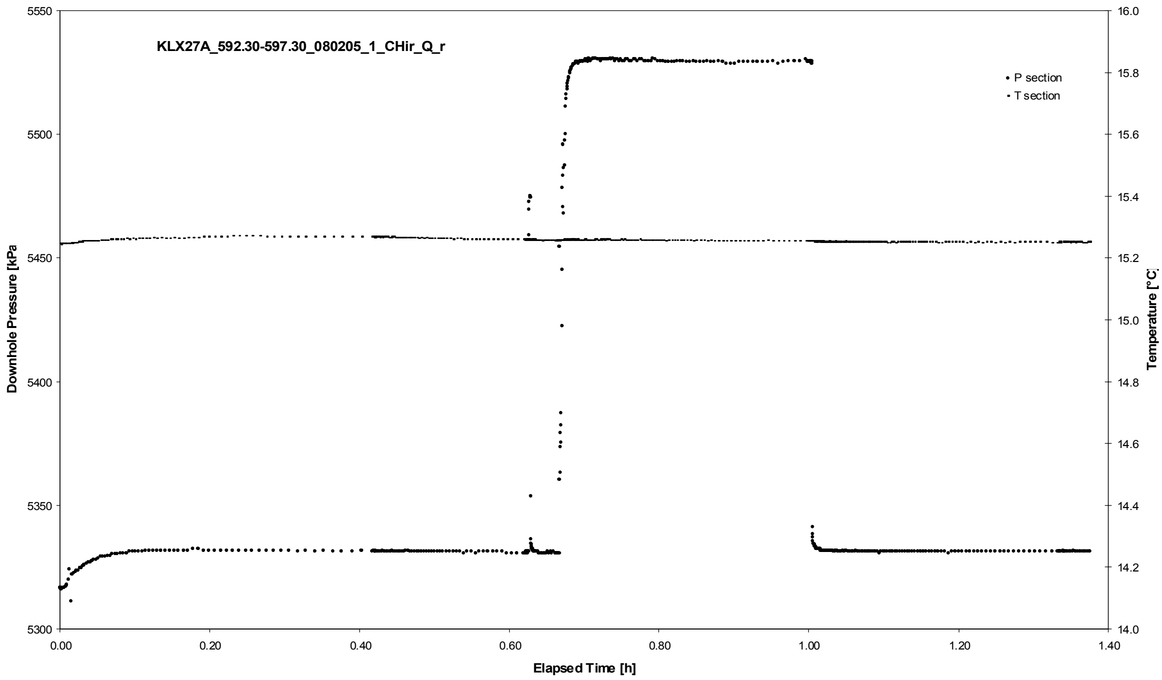
APPENDIX 2-71

Test 592.30 – 597.30 m

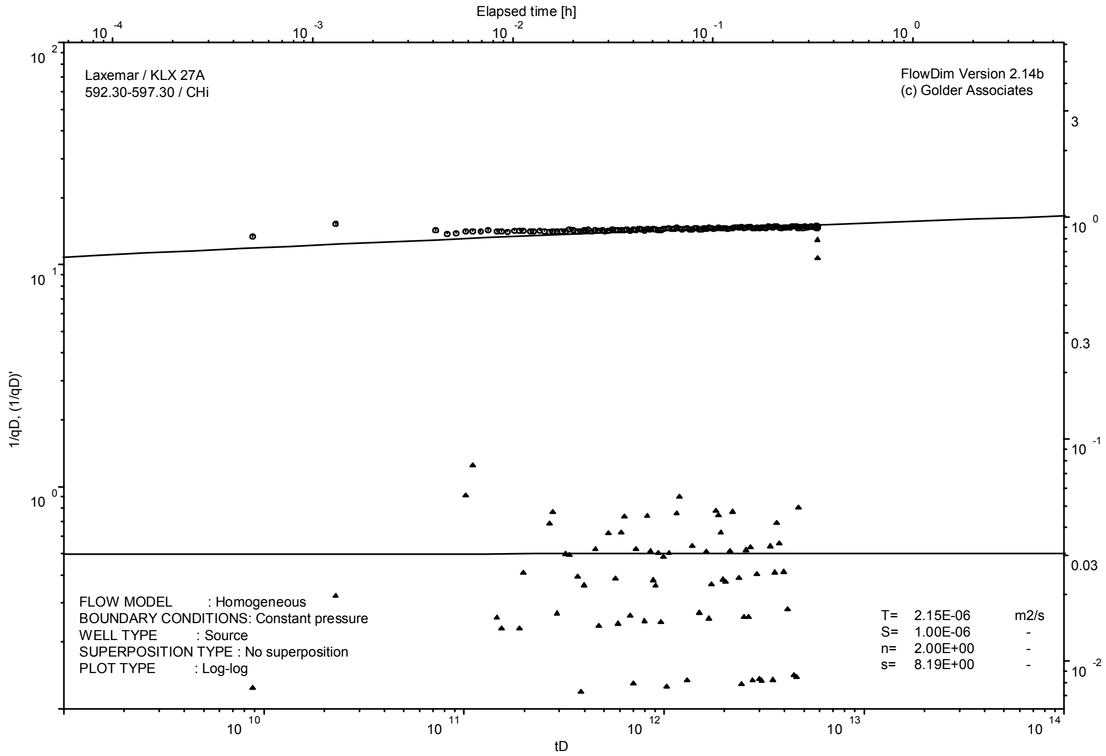
Analysis diagrams



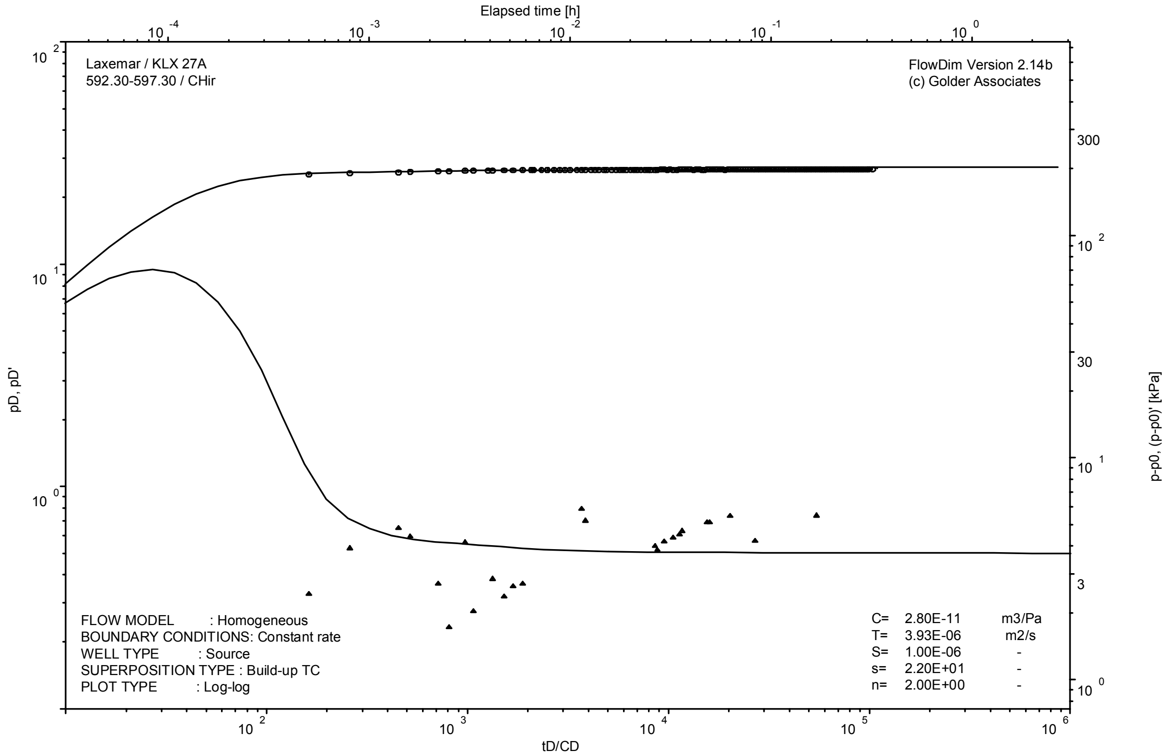
Pressure and flow rate vs. time; cartesian plot



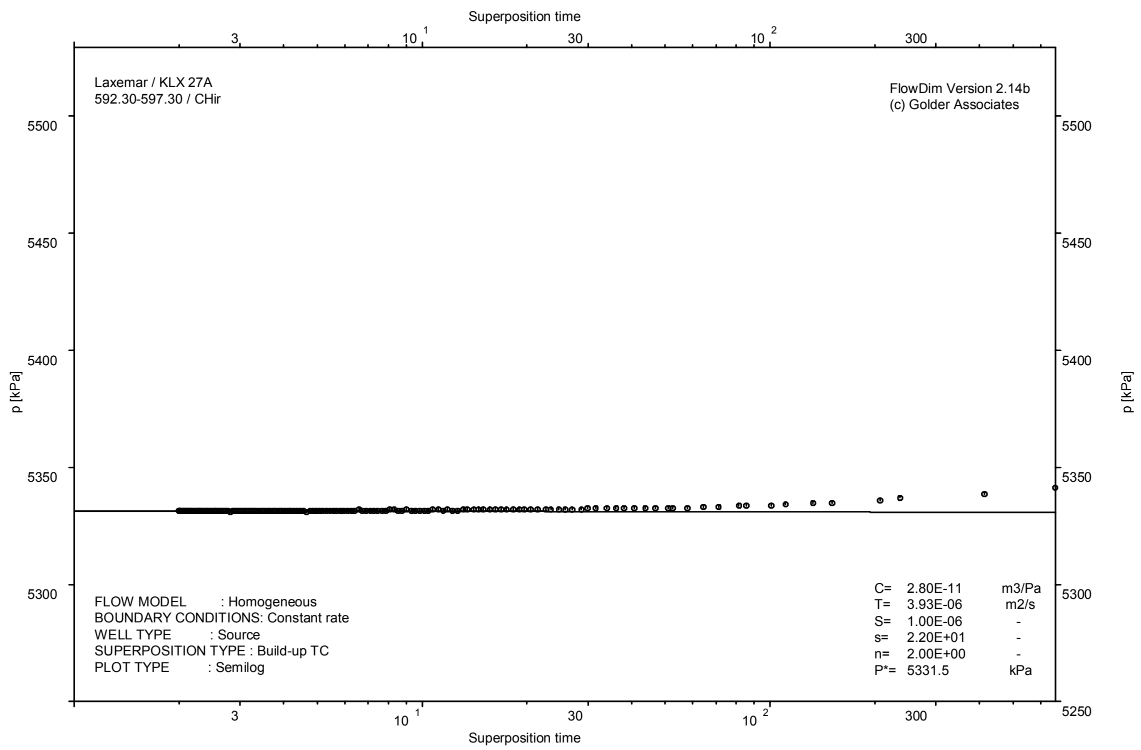
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

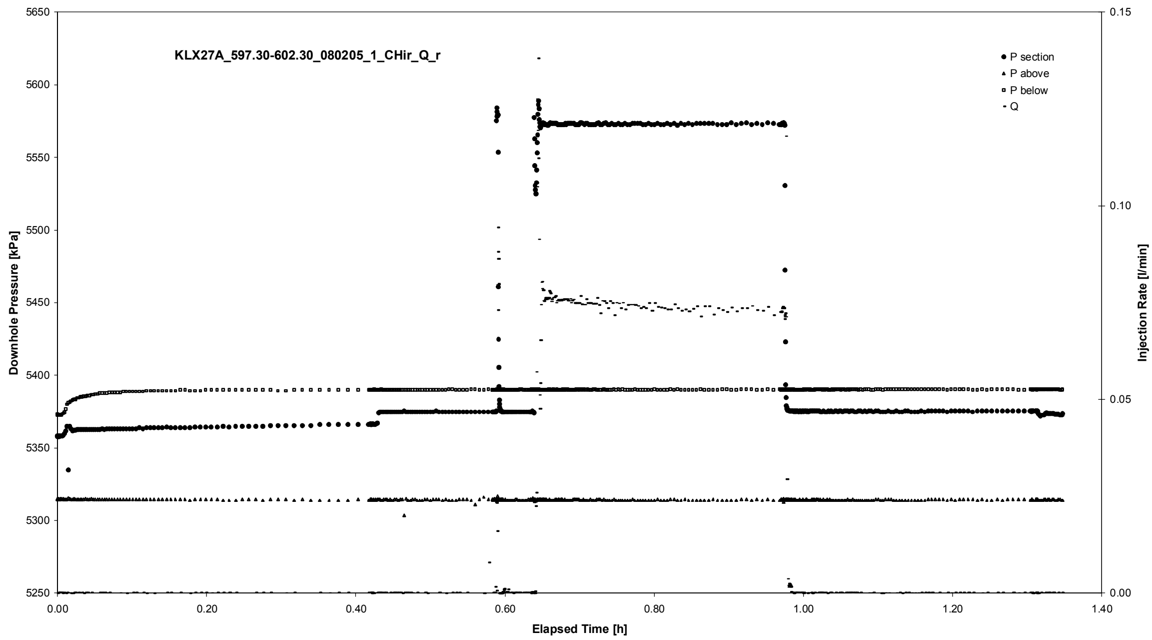


CHIR phase; HORNER match

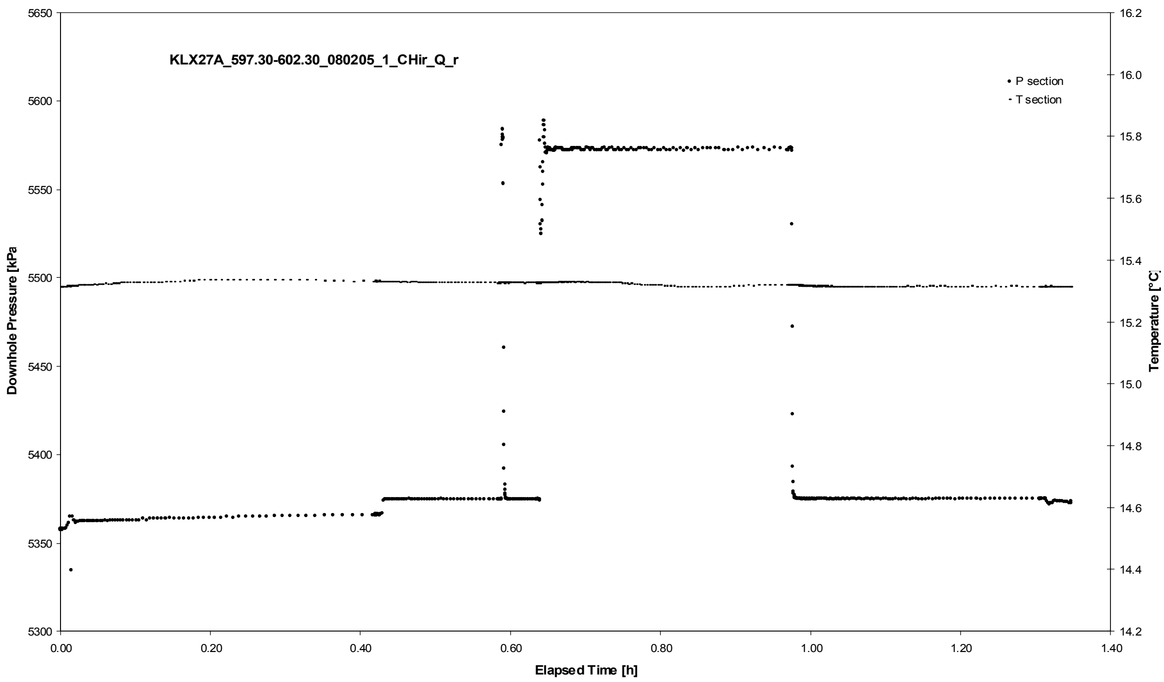
APPENDIX 2-72

Test 597.30 – 602.30 m

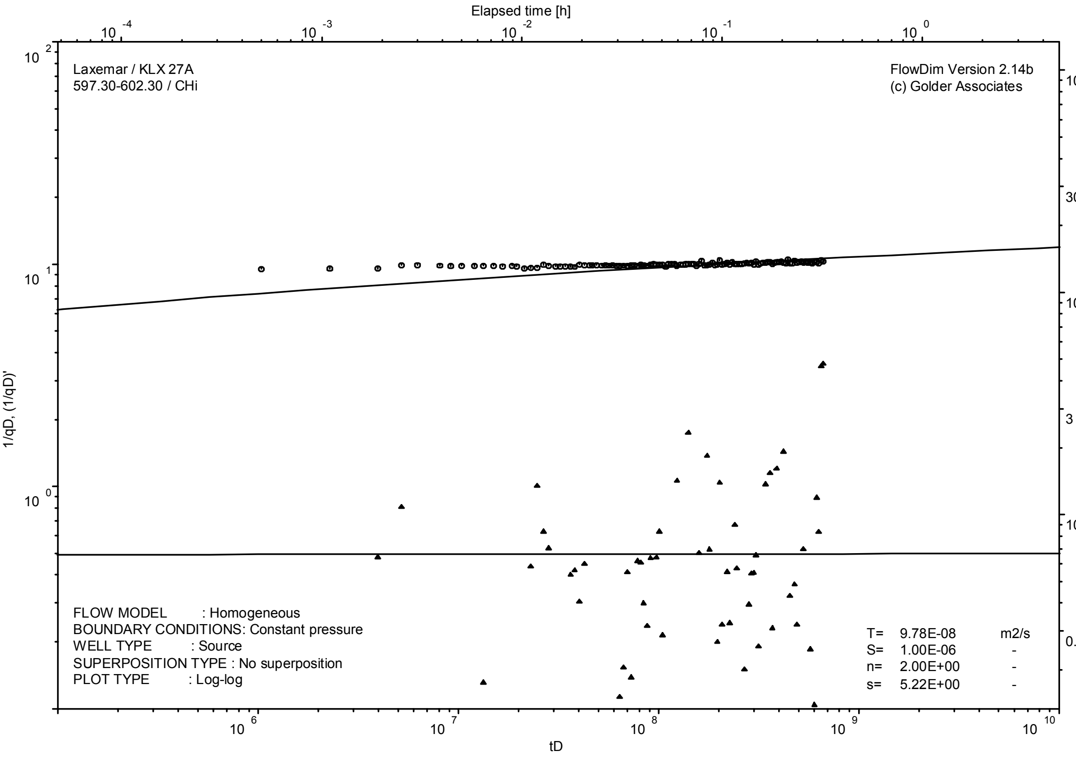
Analysis diagrams



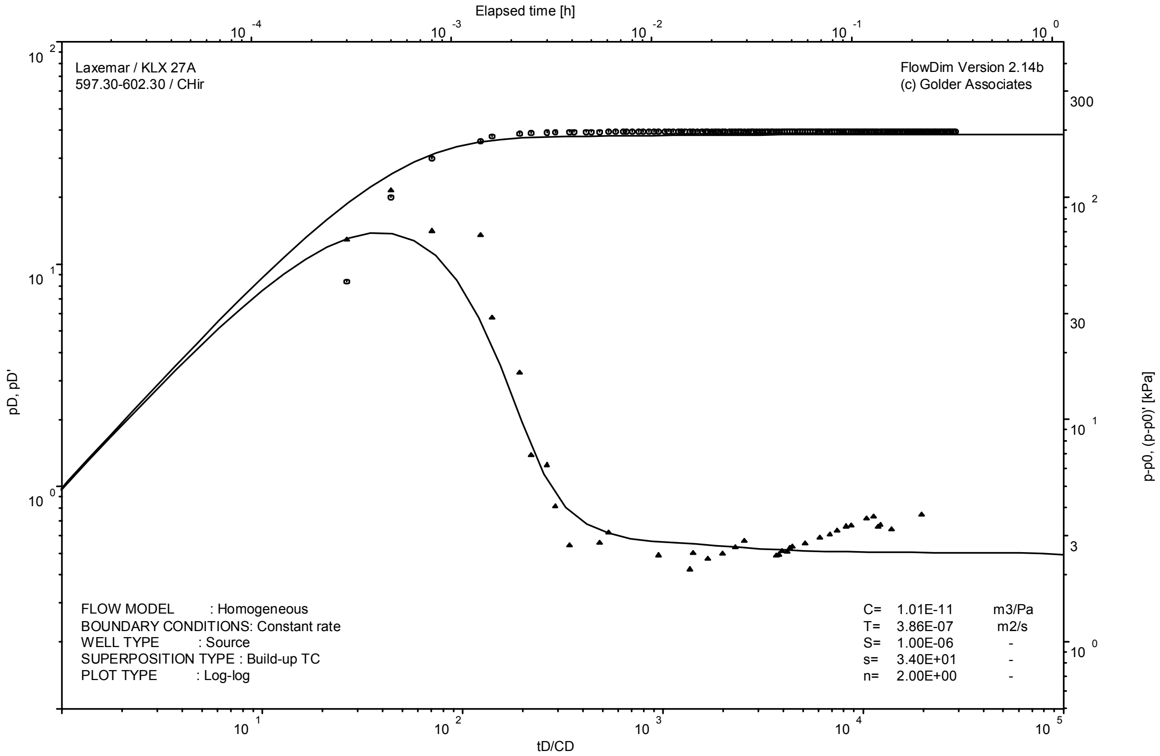
Pressure and flow rate vs. time; cartesian plot



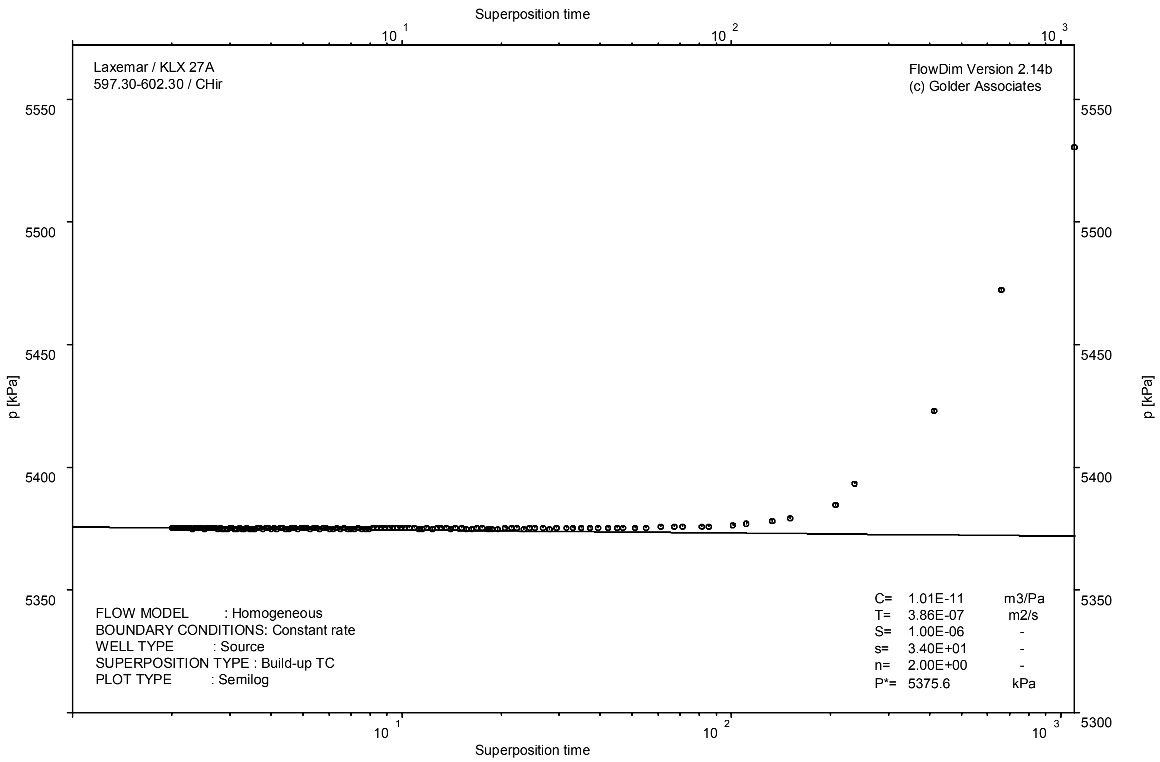
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

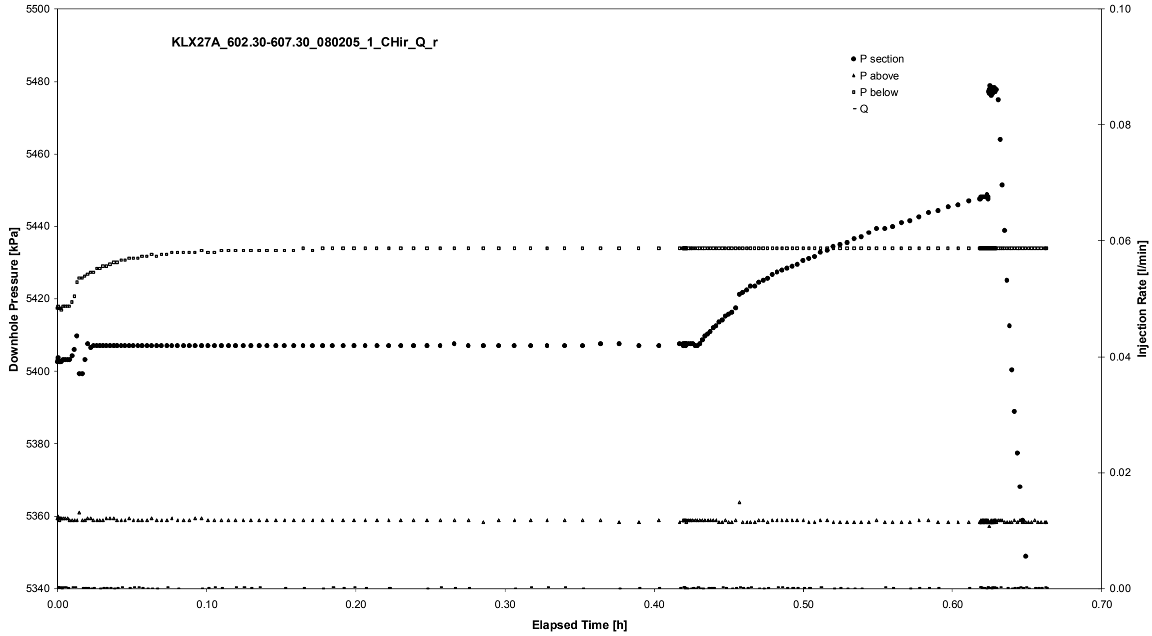


CHIR phase; HORNER match

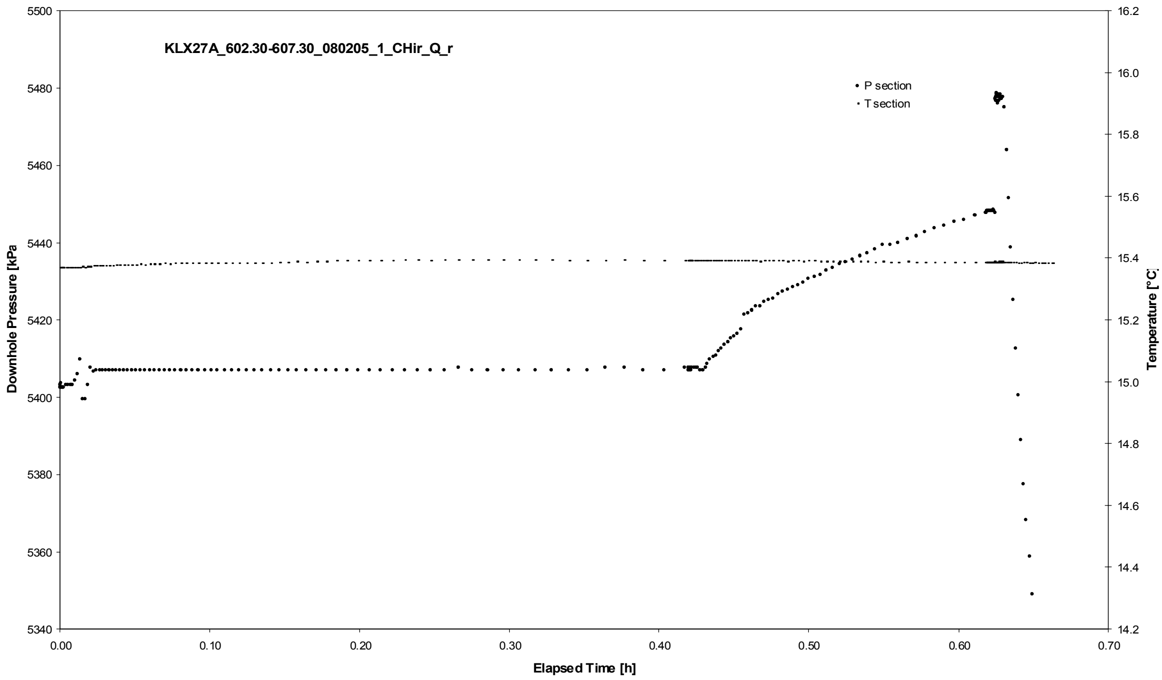
APPENDIX 2-73

Test 602.30 – 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

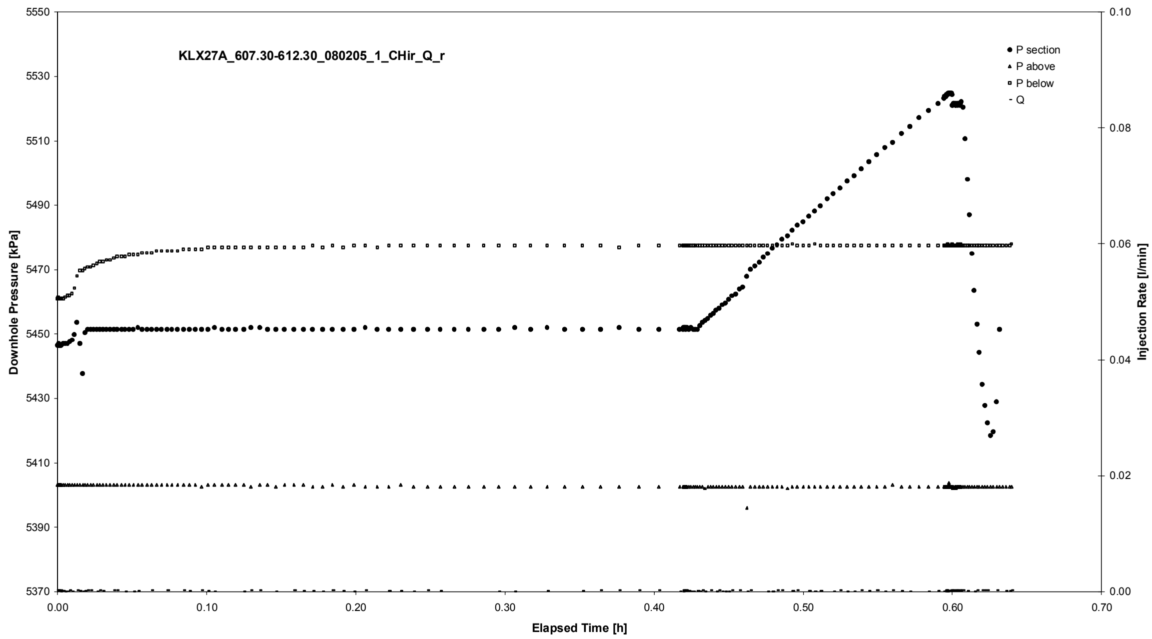
Not analysed

CHIR phase; HORNER match

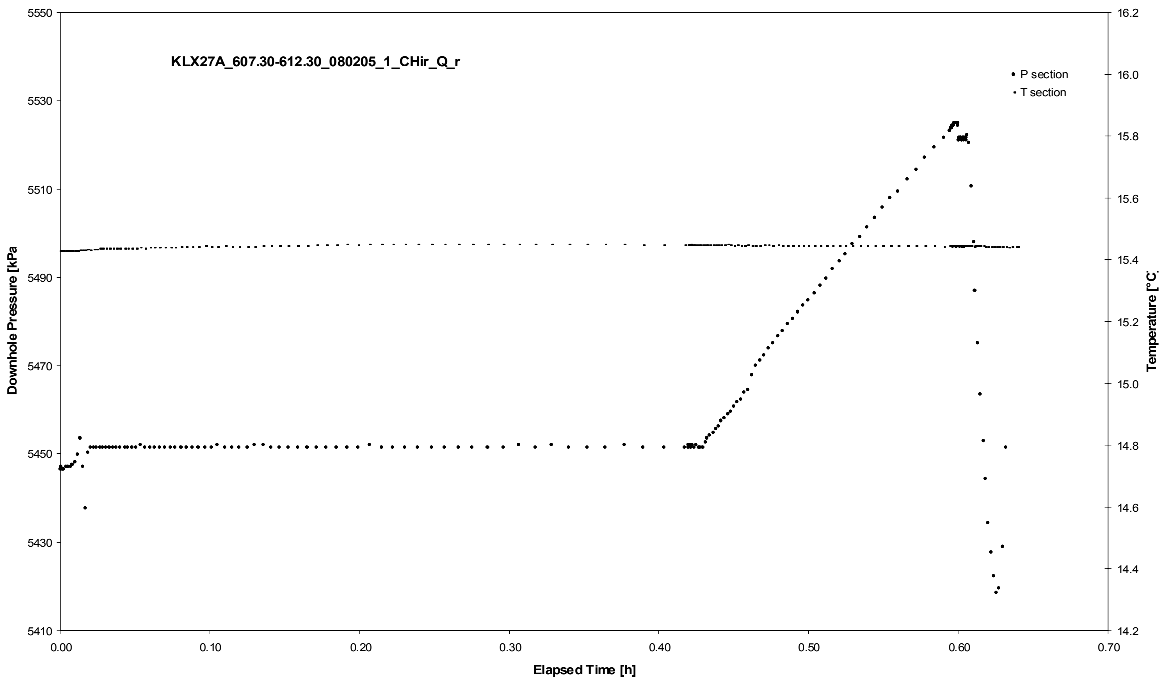
APPENDIX 2-74

Test 607.30 – 612.30 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

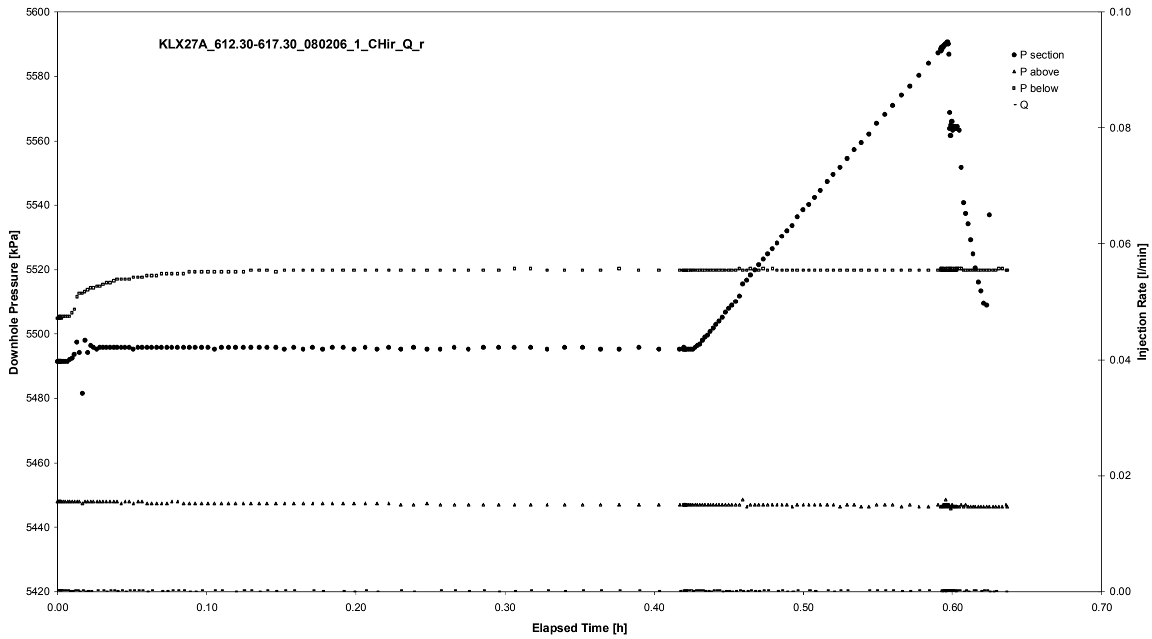
Not analysed

CHIR phase; HORNER match

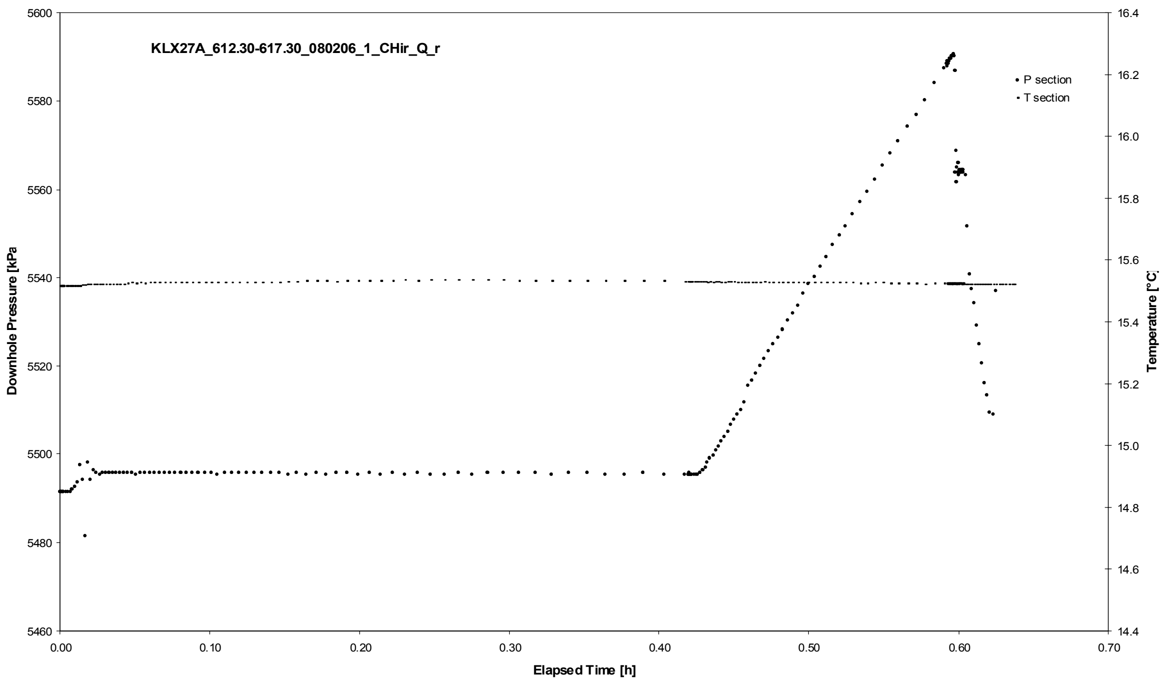
APPENDIX 2-75

Test 612.30 – 617.30 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

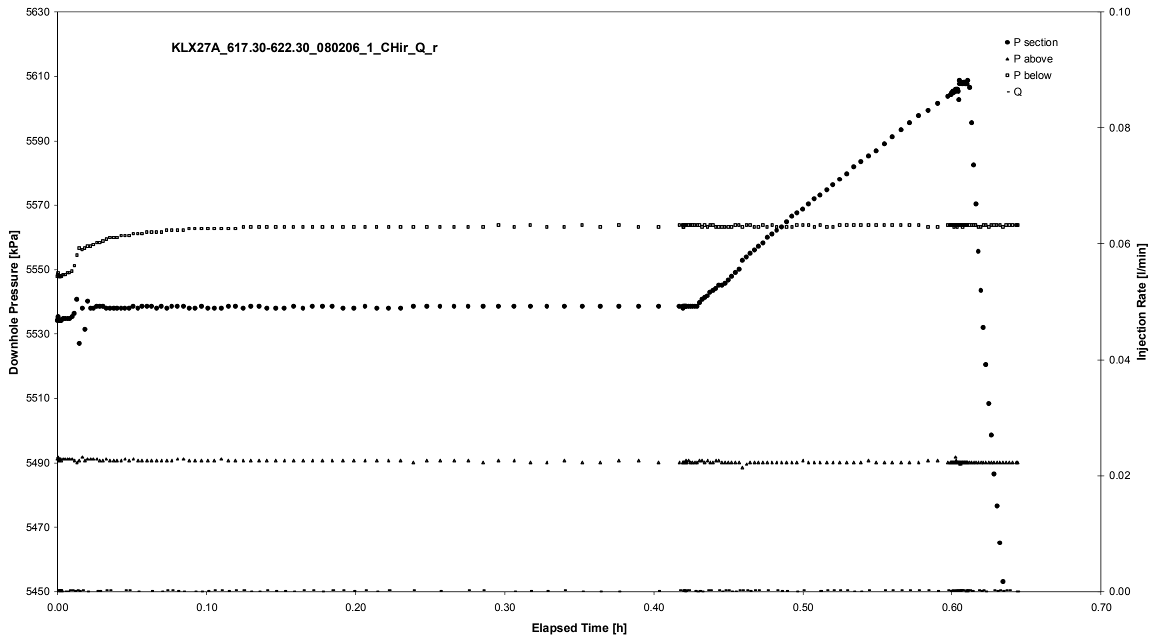
Not analysed

CHIR phase; HORNER match

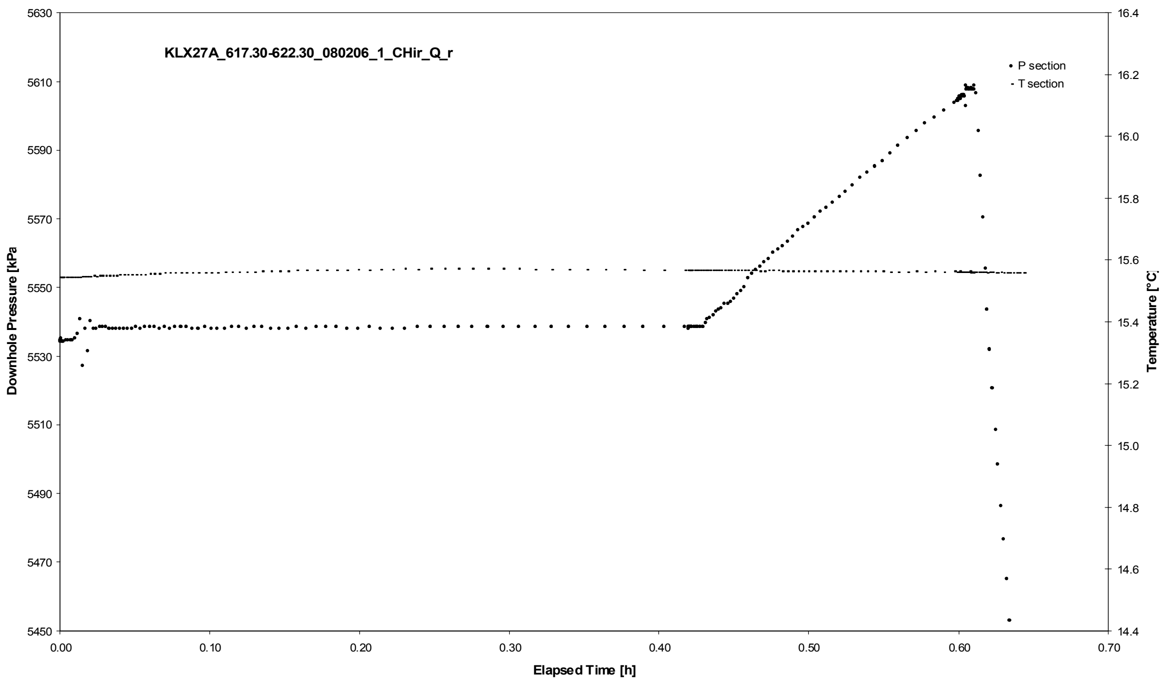
APPENDIX 2-76

Test 617.30 – 622.30 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

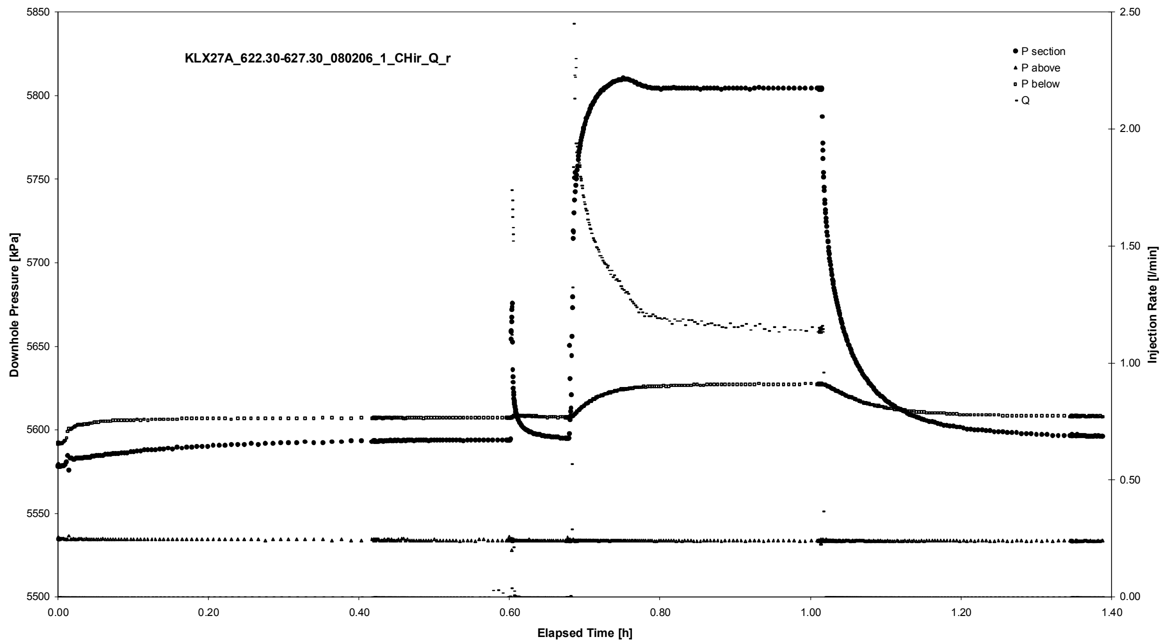
Not analysed

CHIR phase; HORNER match

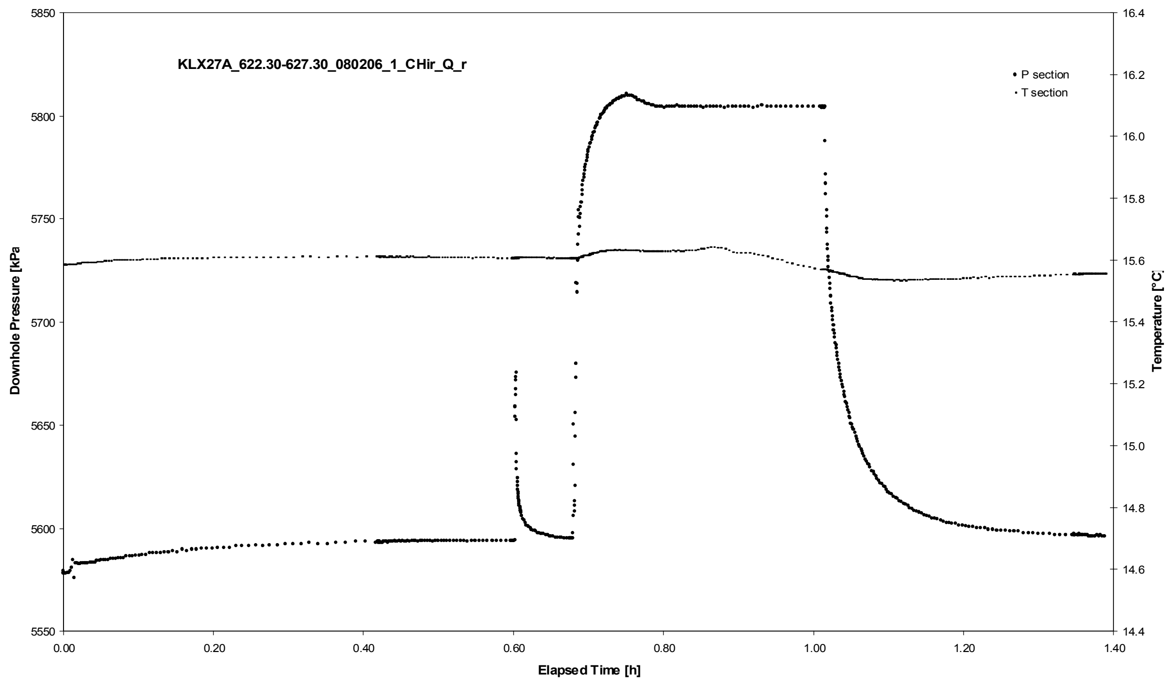
APPENDIX 2-77

Test 622.30 – 627.30 m

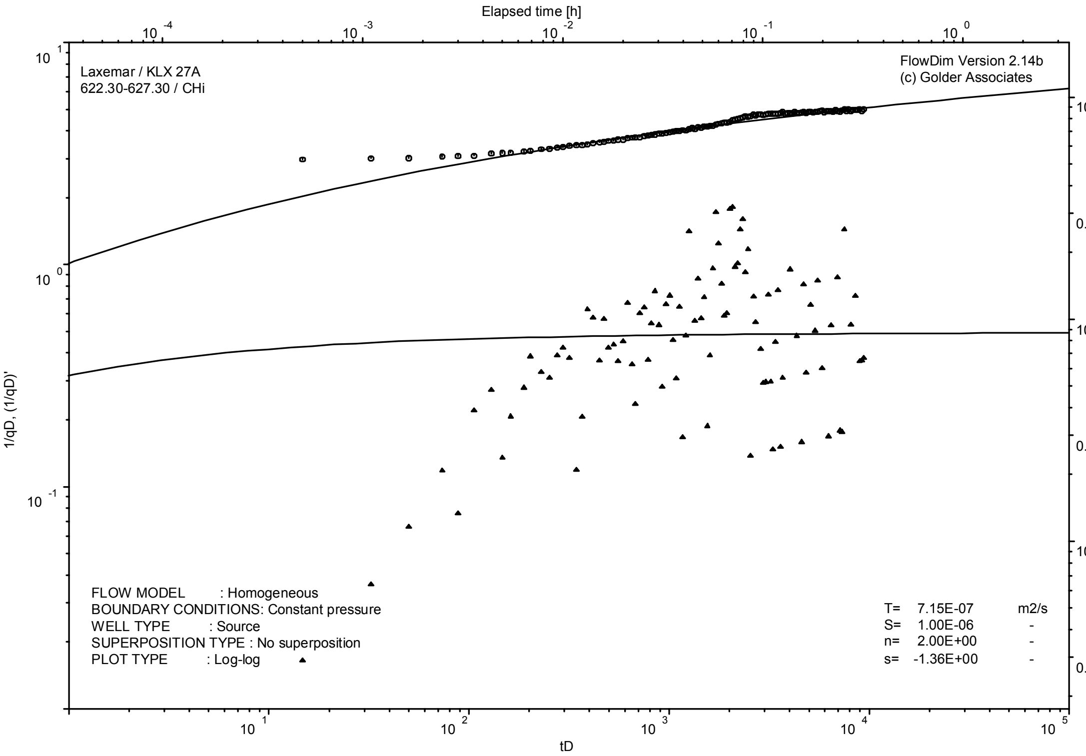
Analysis diagrams



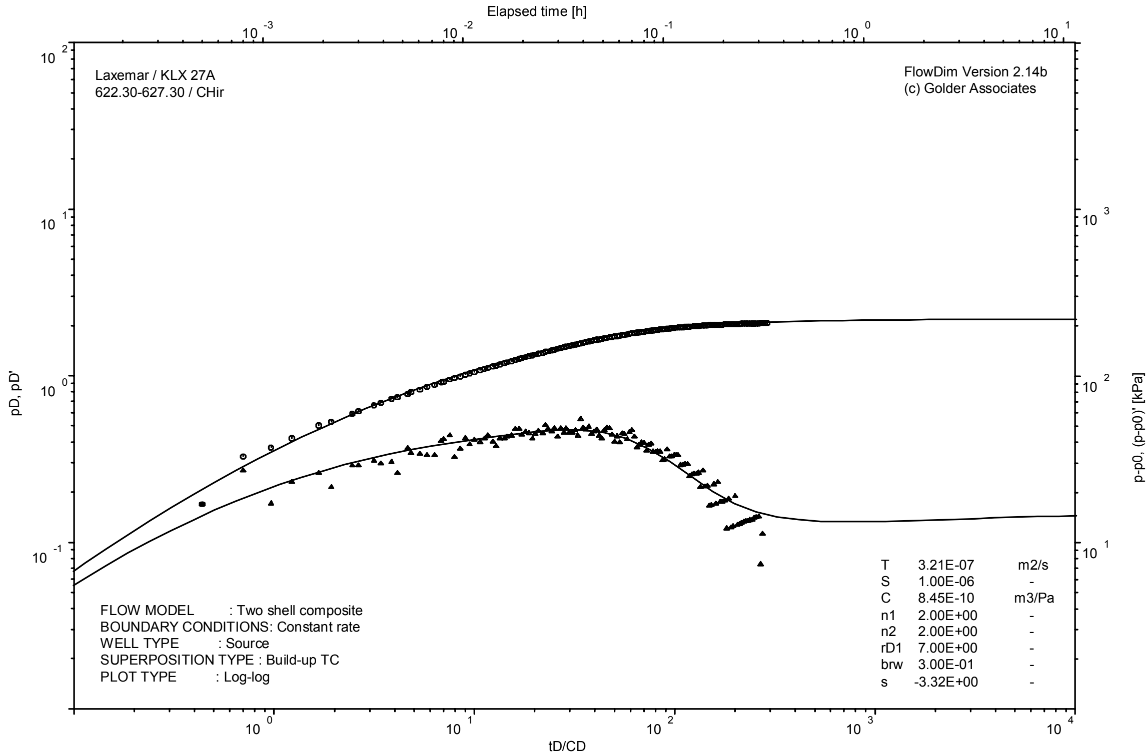
Pressure and flow rate vs. time; cartesian plot



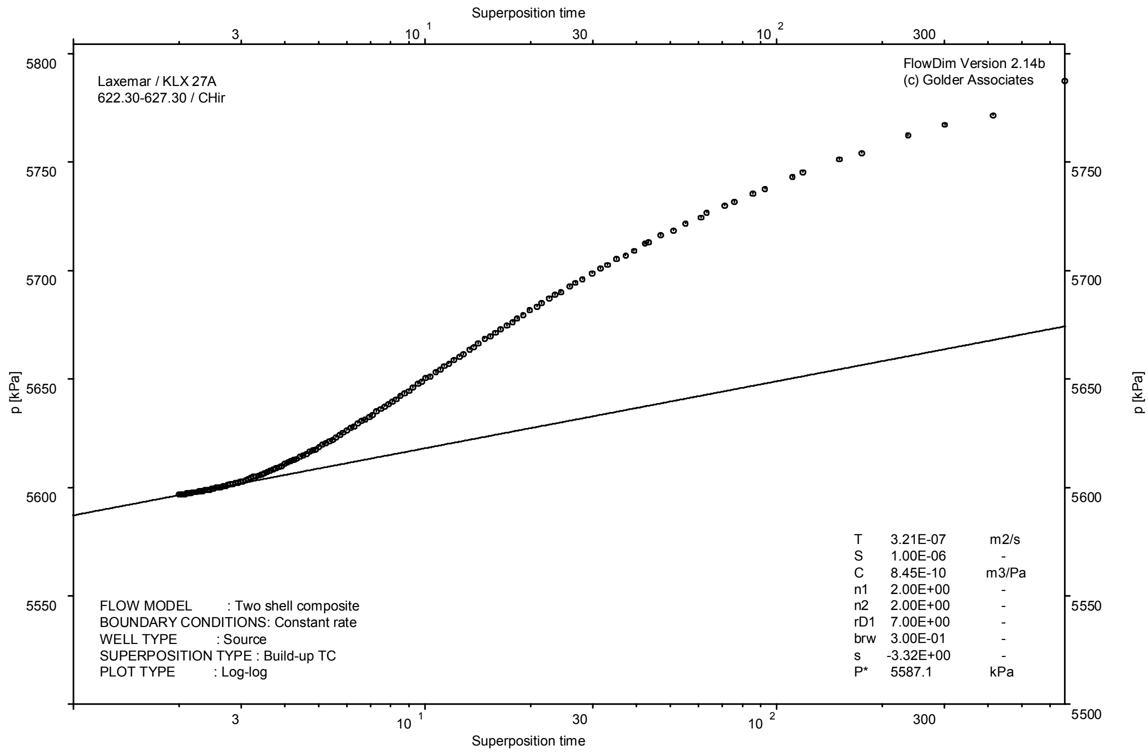
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

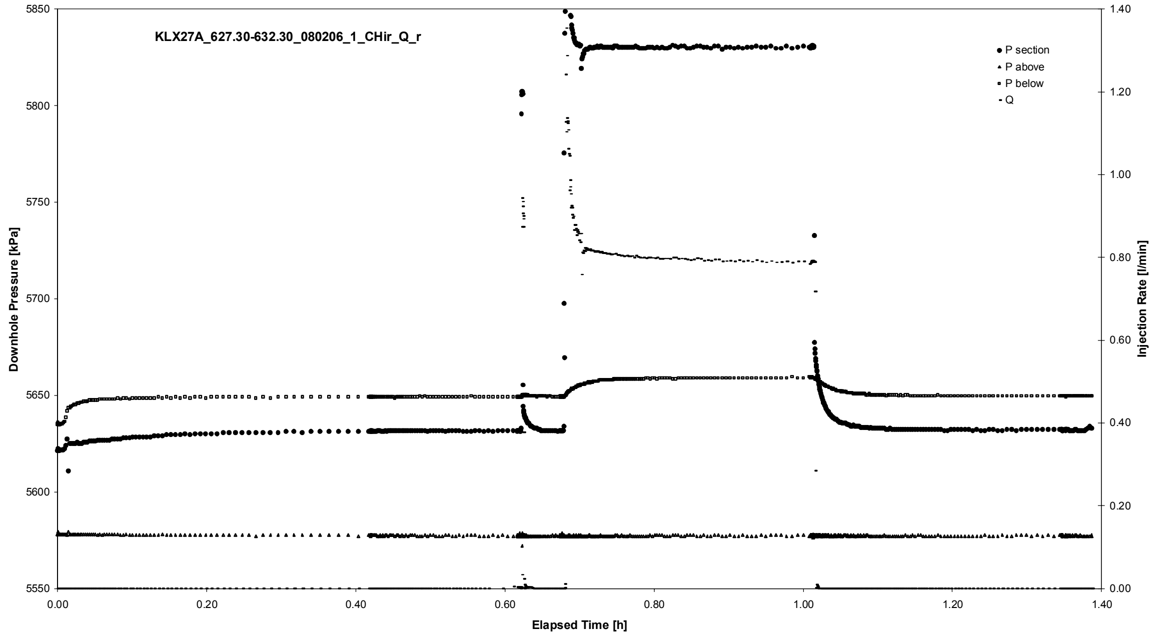


CHIR phase; HORNER match

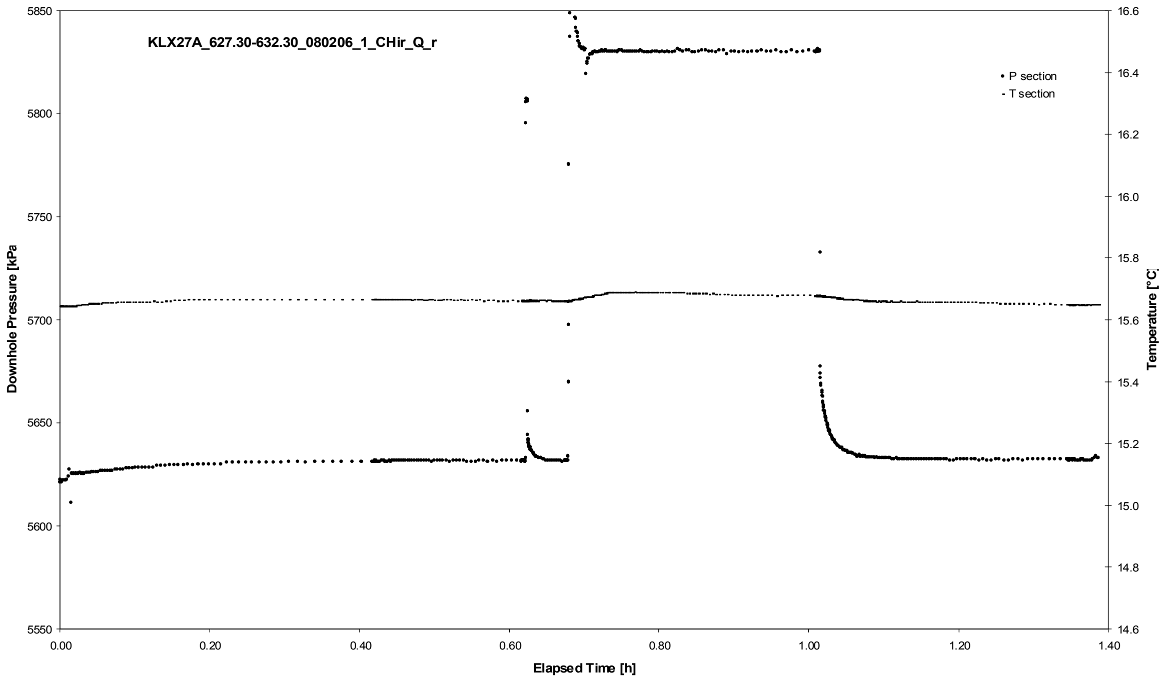
APPENDIX 2-78

Test 627.30 – 632.30 m

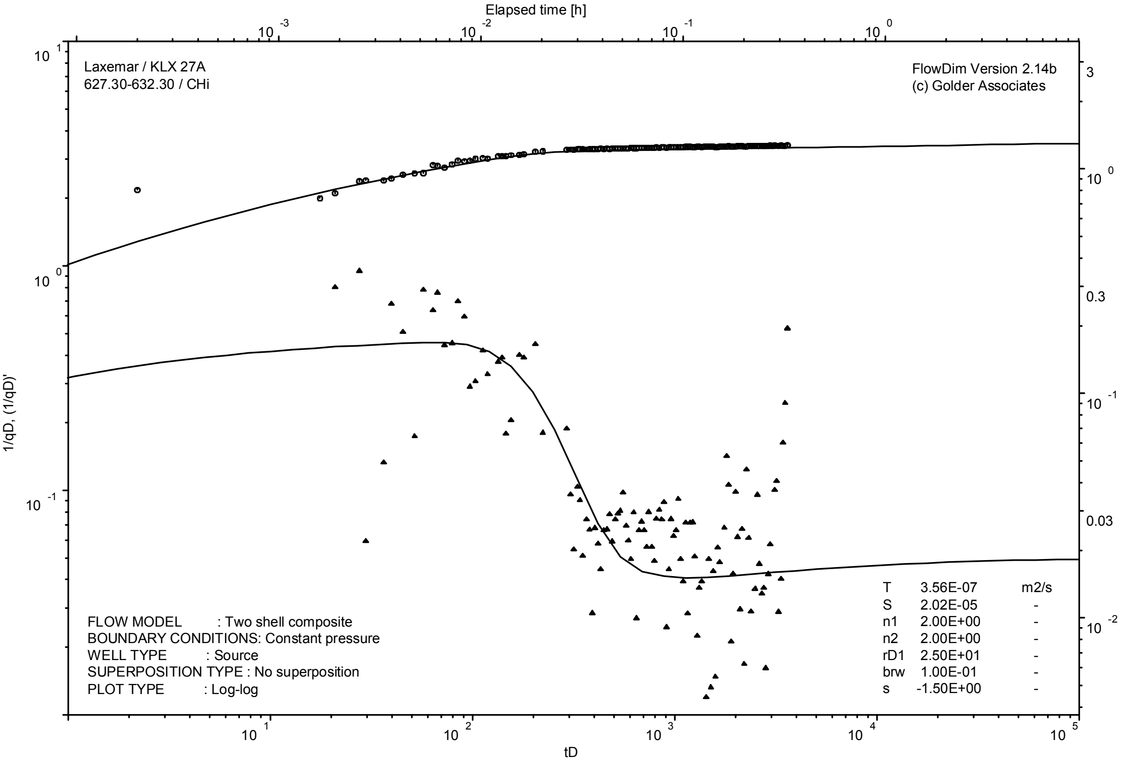
Analysis diagrams



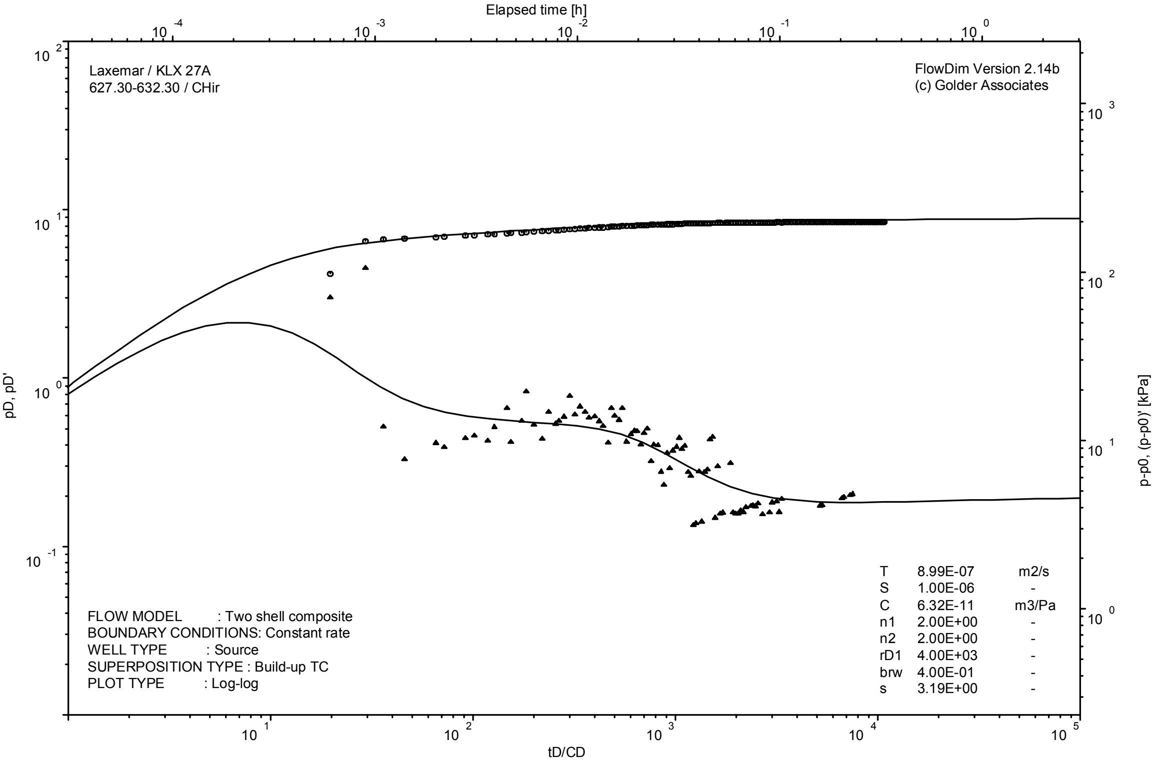
Pressure and flow rate vs. time; cartesian plot



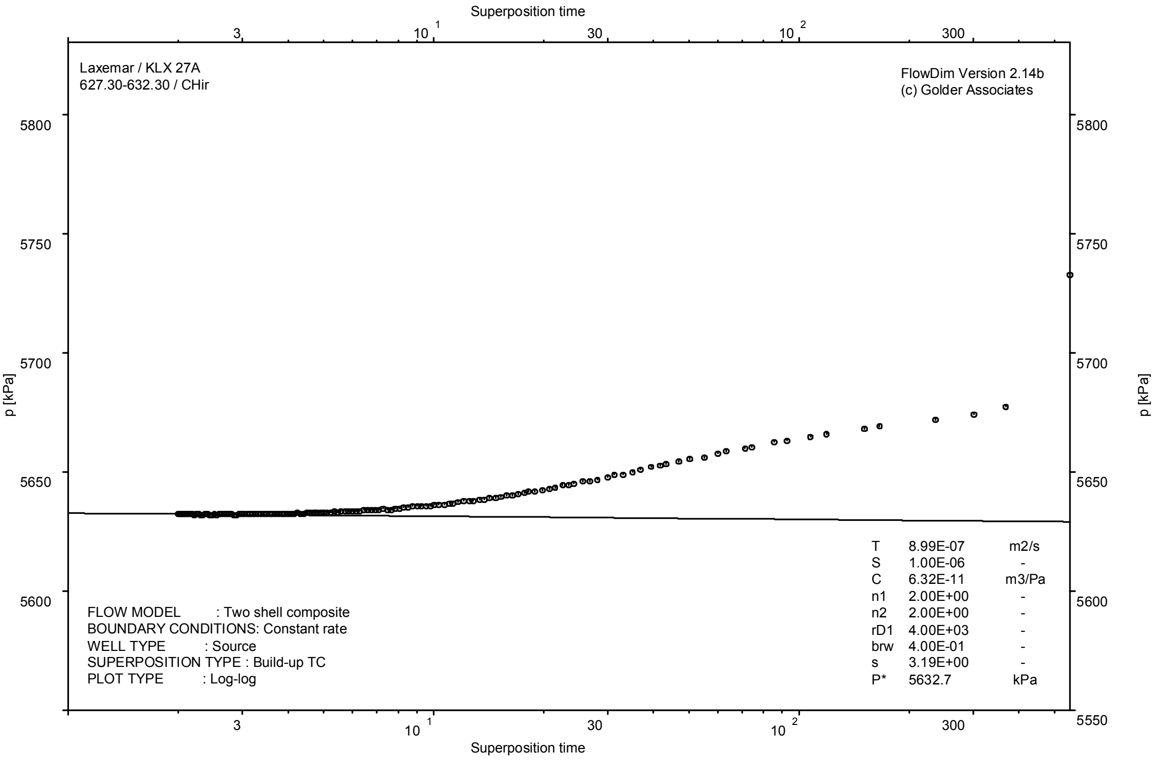
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

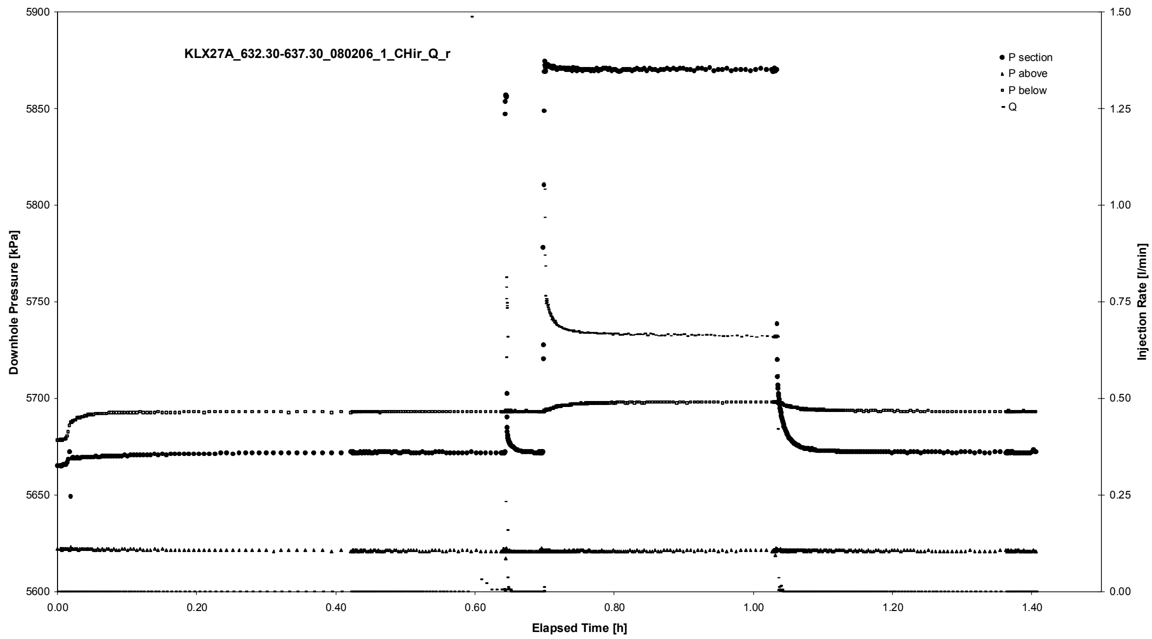


CHIR phase; HORNER match

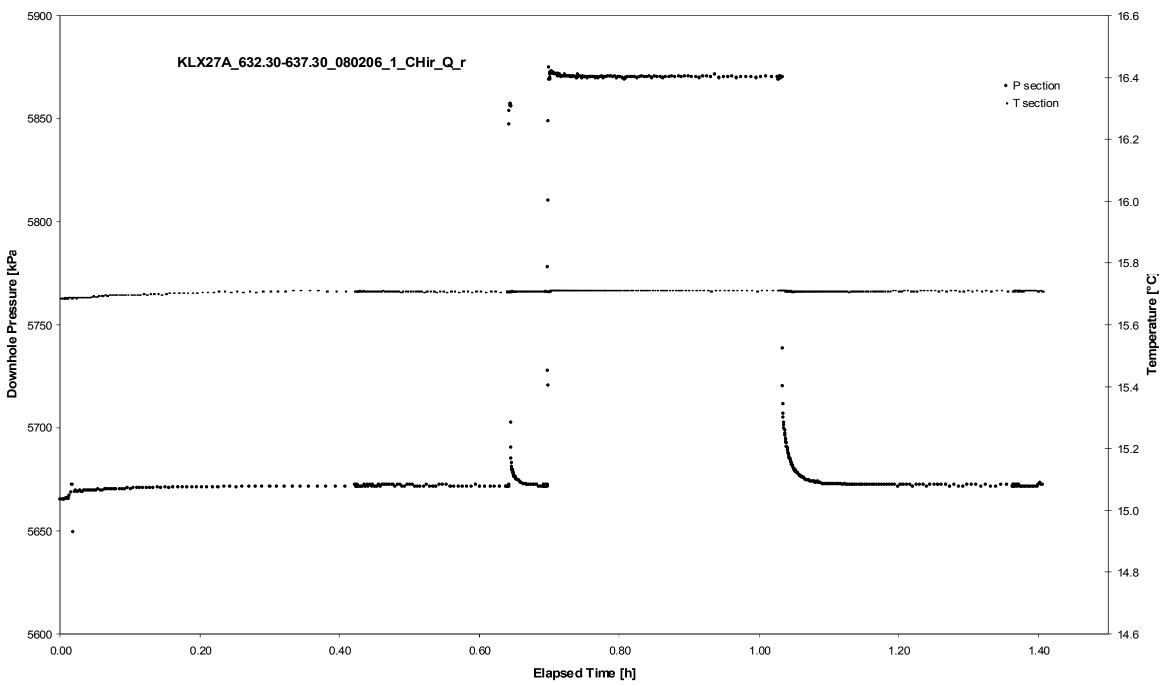
APPENDIX 2-79

Test 632.30 – 637.30 m

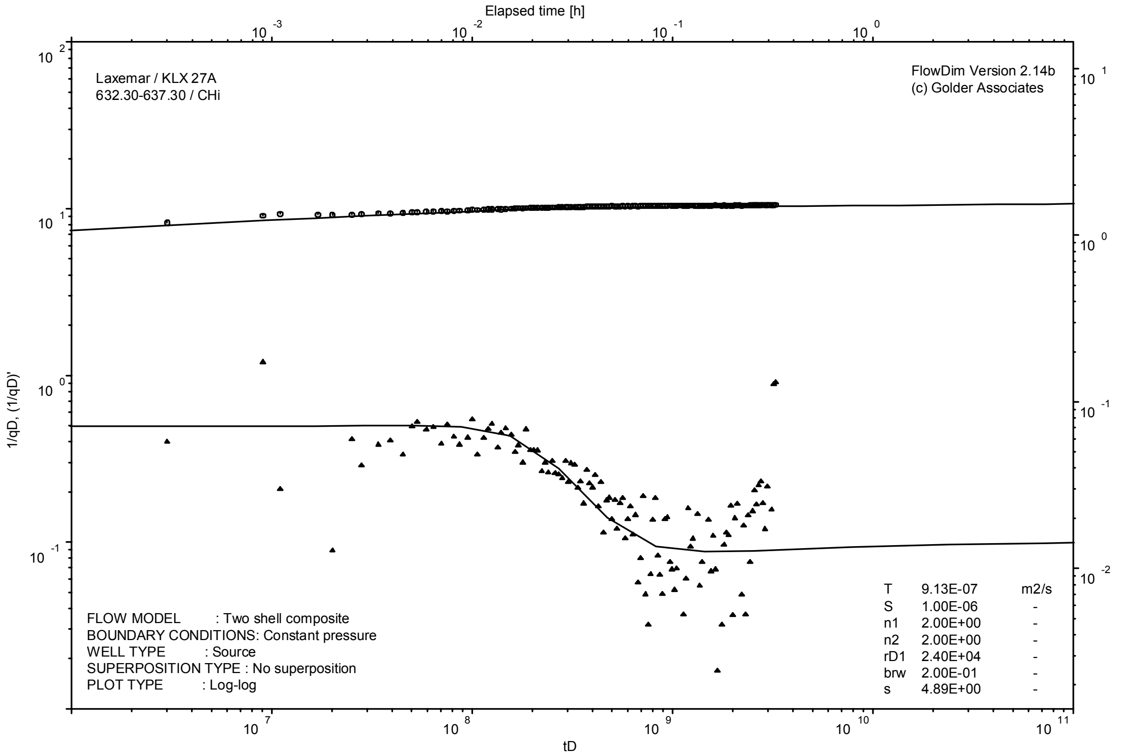
Analysis diagrams



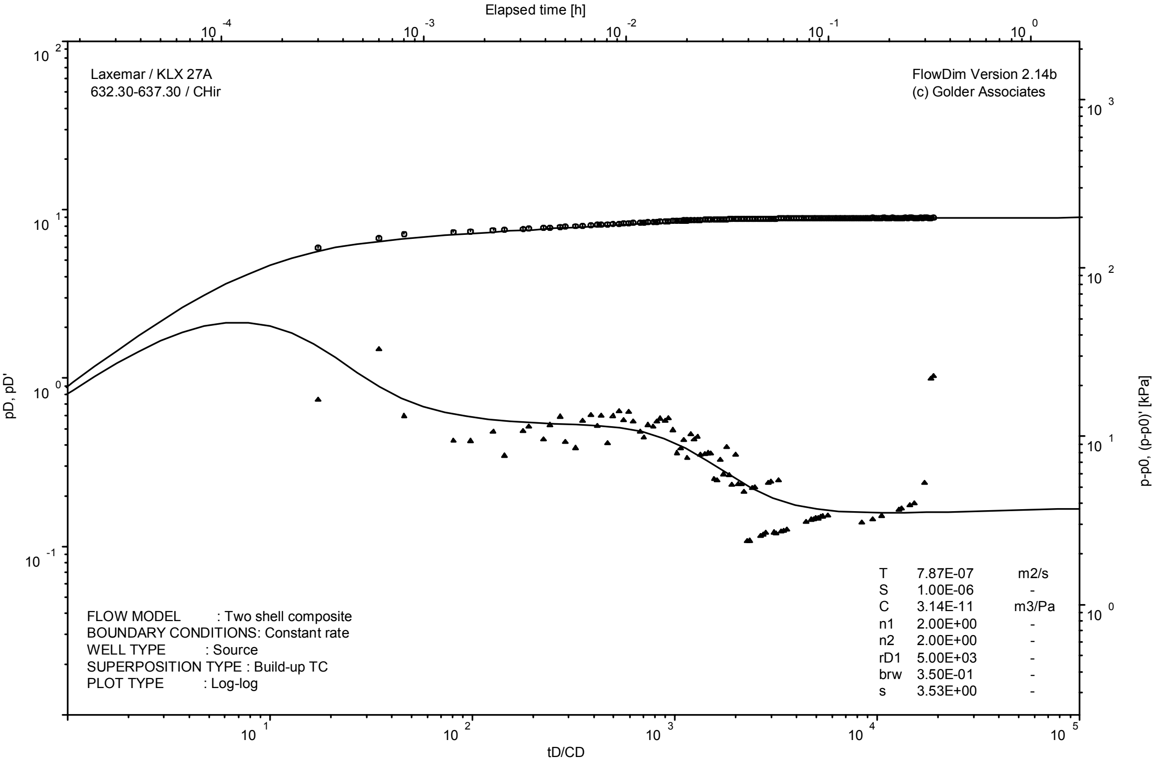
Pressure and flow rate vs. time; cartesian plot



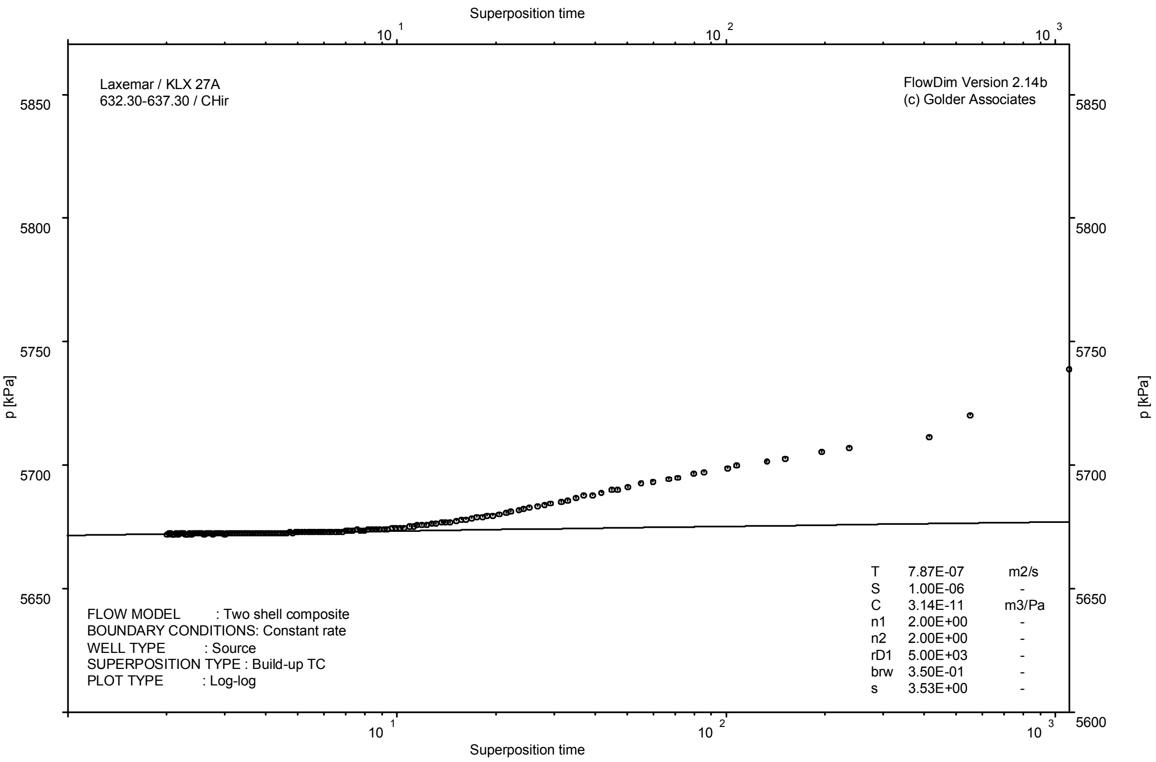
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

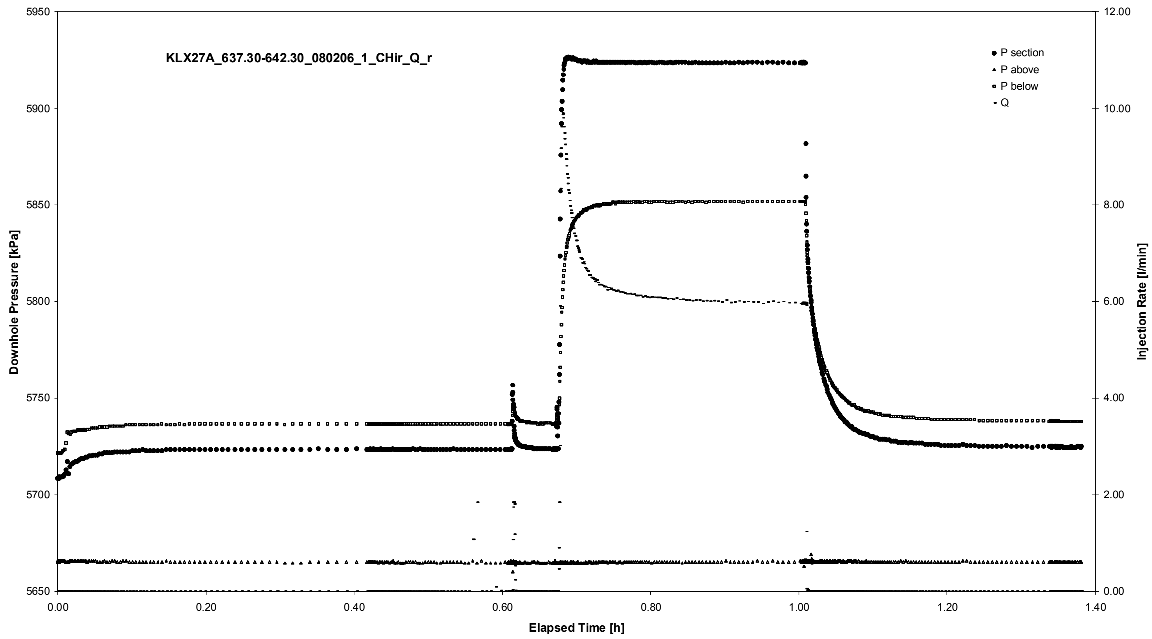


CHIR phase; HORNER match

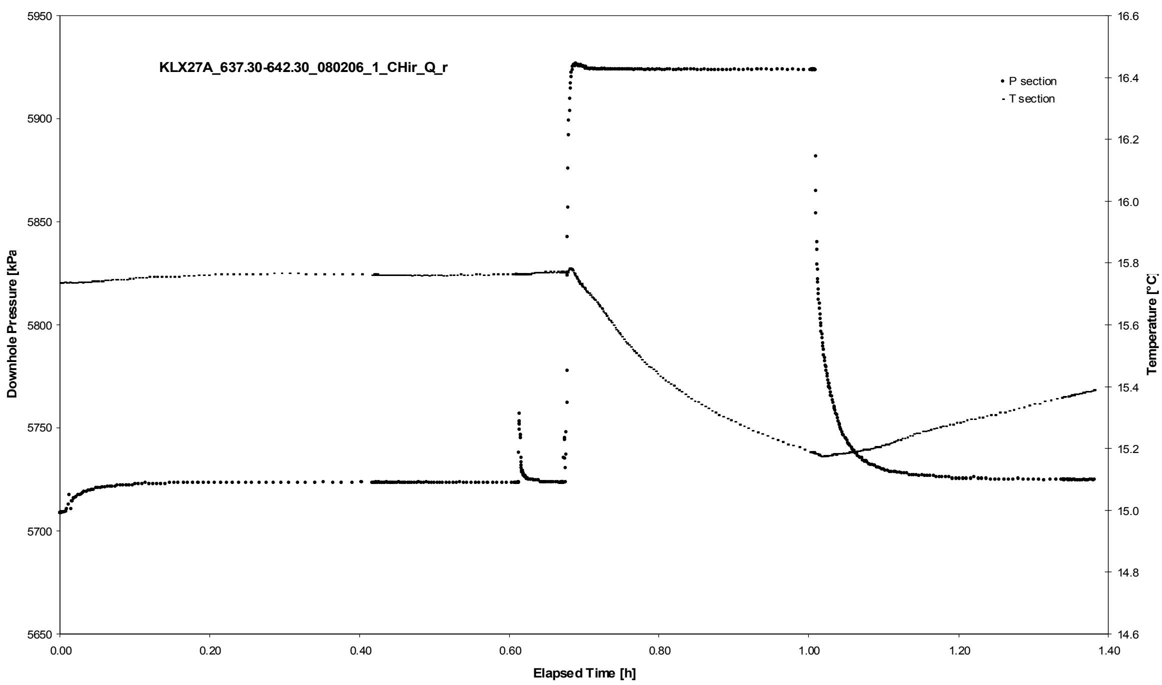
APPENDIX 2-80

Test 637.30 – 642.30 m

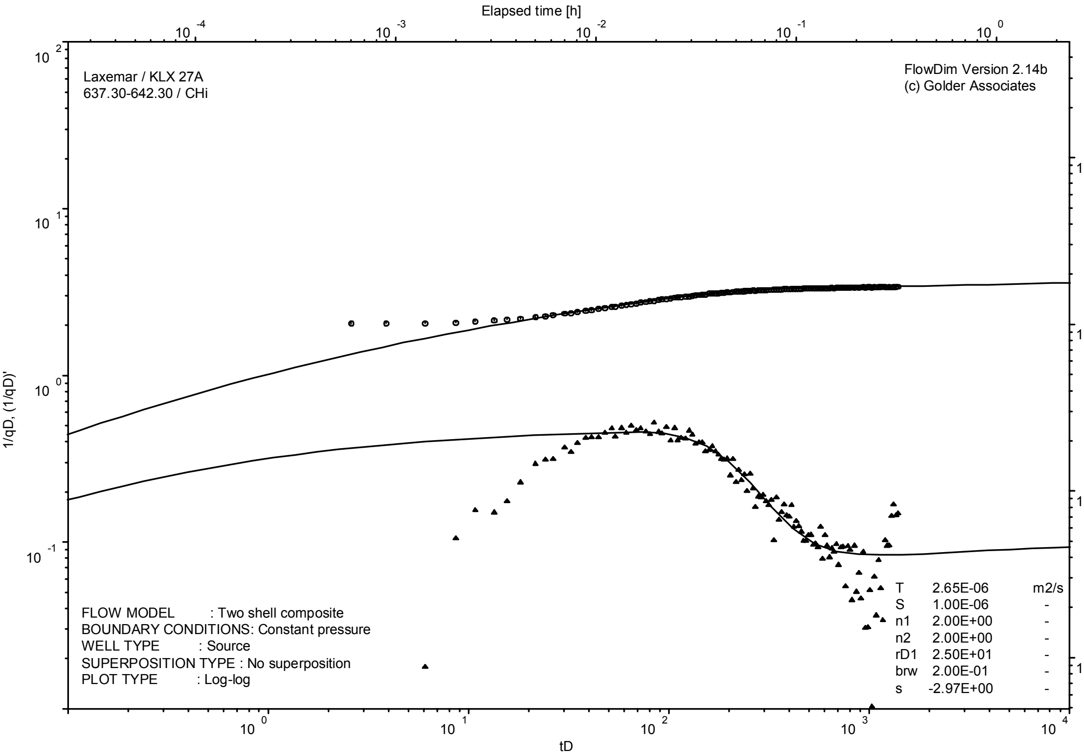
Analysis diagrams



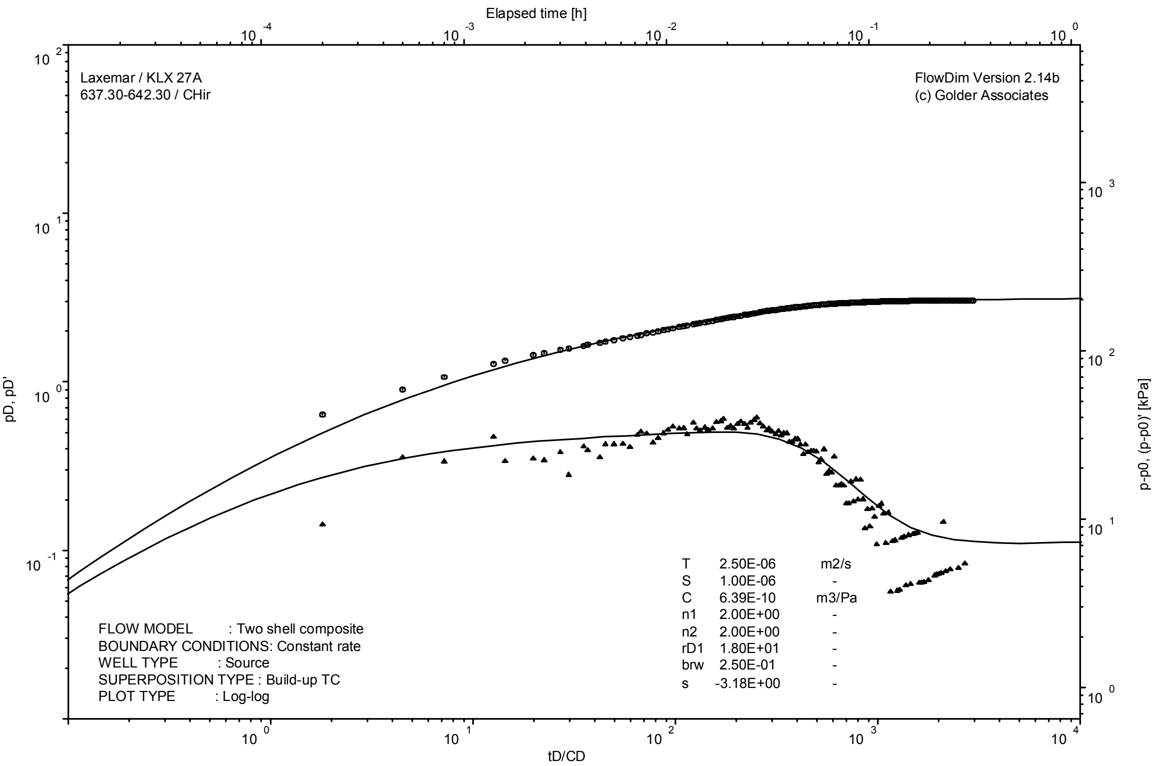
Pressure and flow rate vs. time; cartesian plot



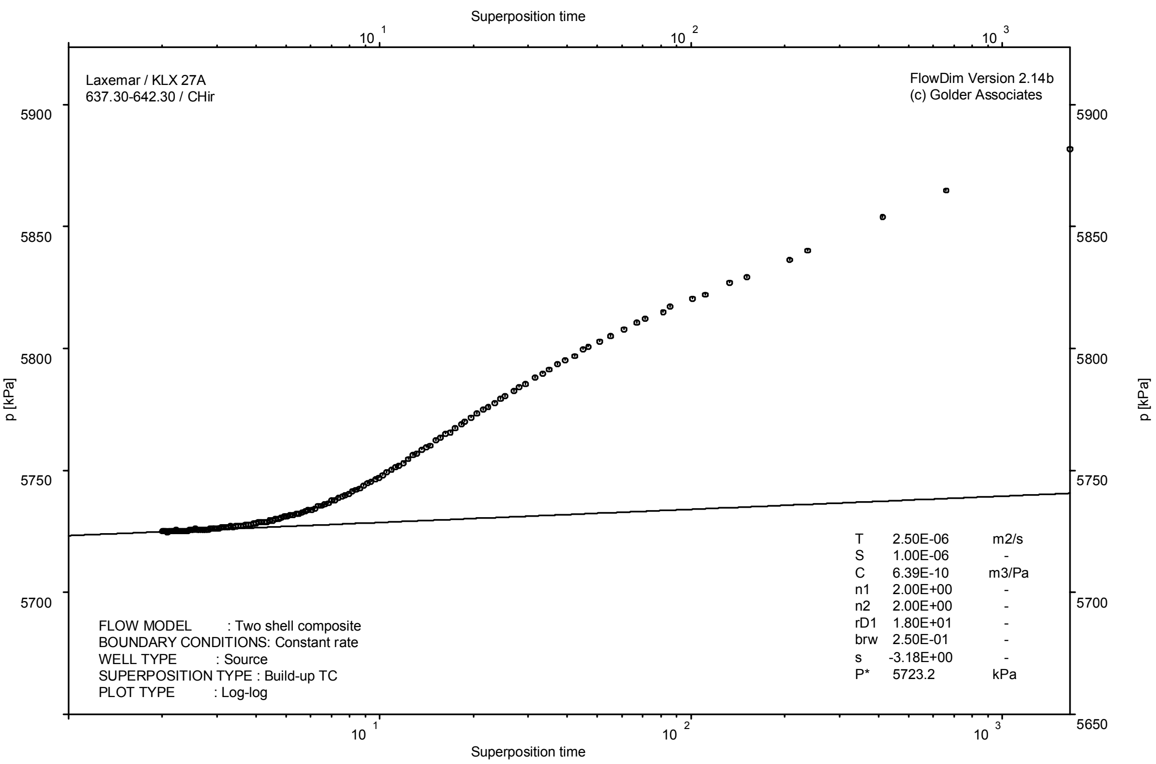
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

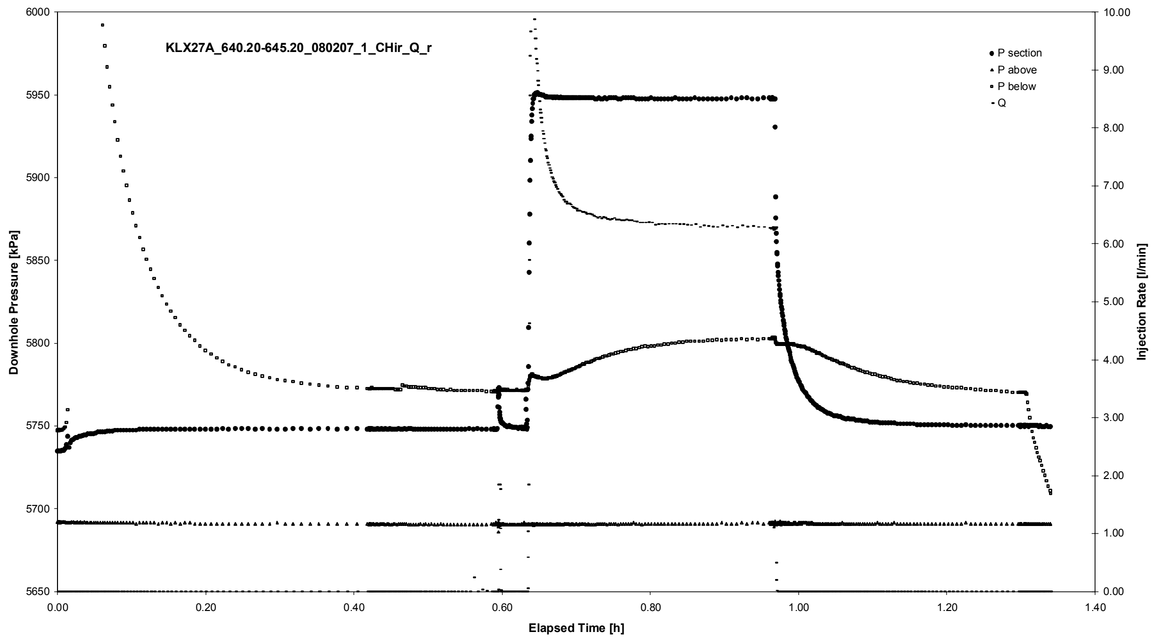


CHIR phase; HORNER match

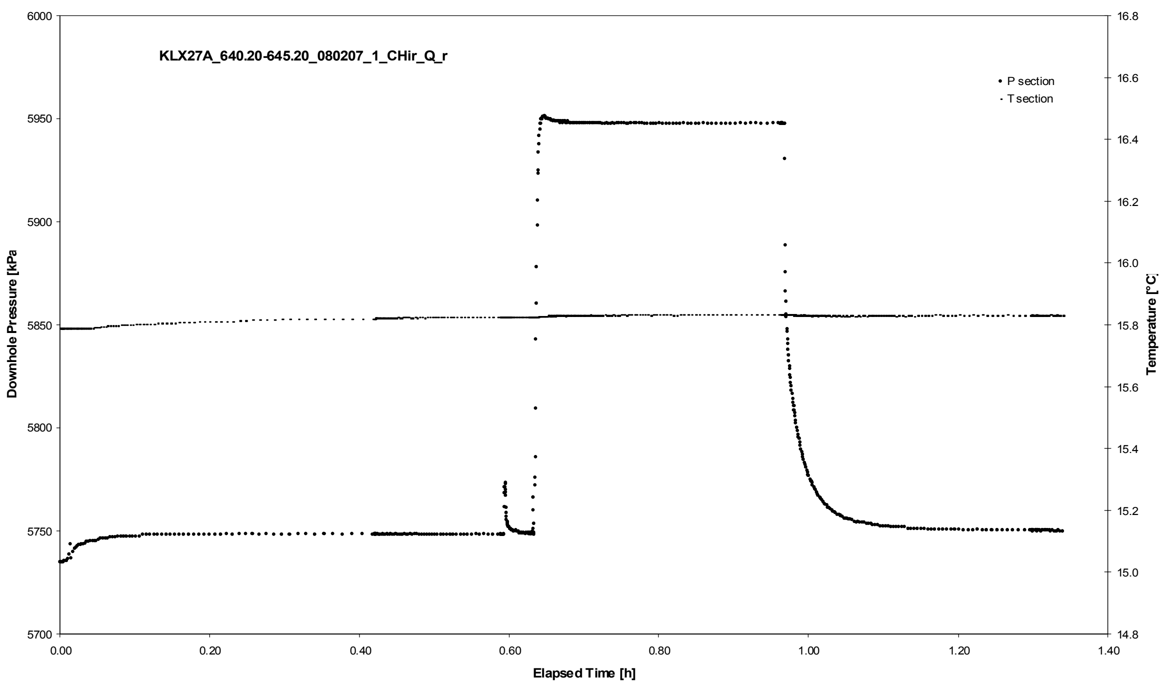
APPENDIX 2-81

Test 640.20 – 645.20 m

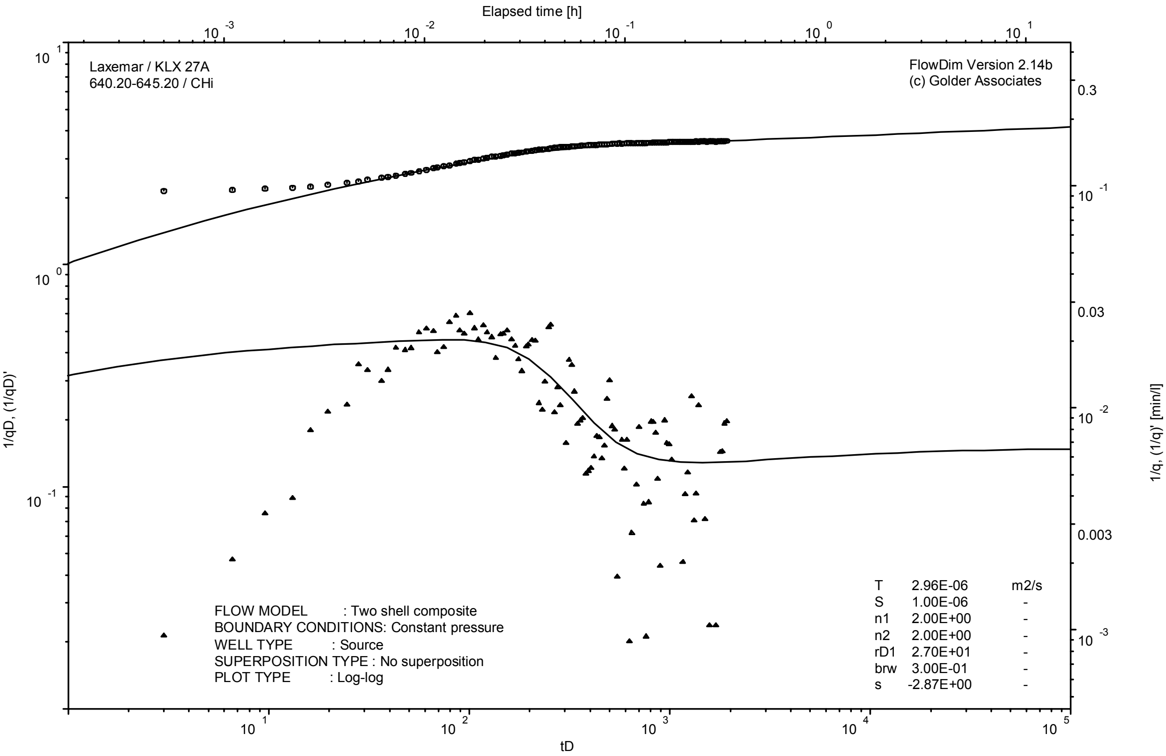
Analysis diagrams



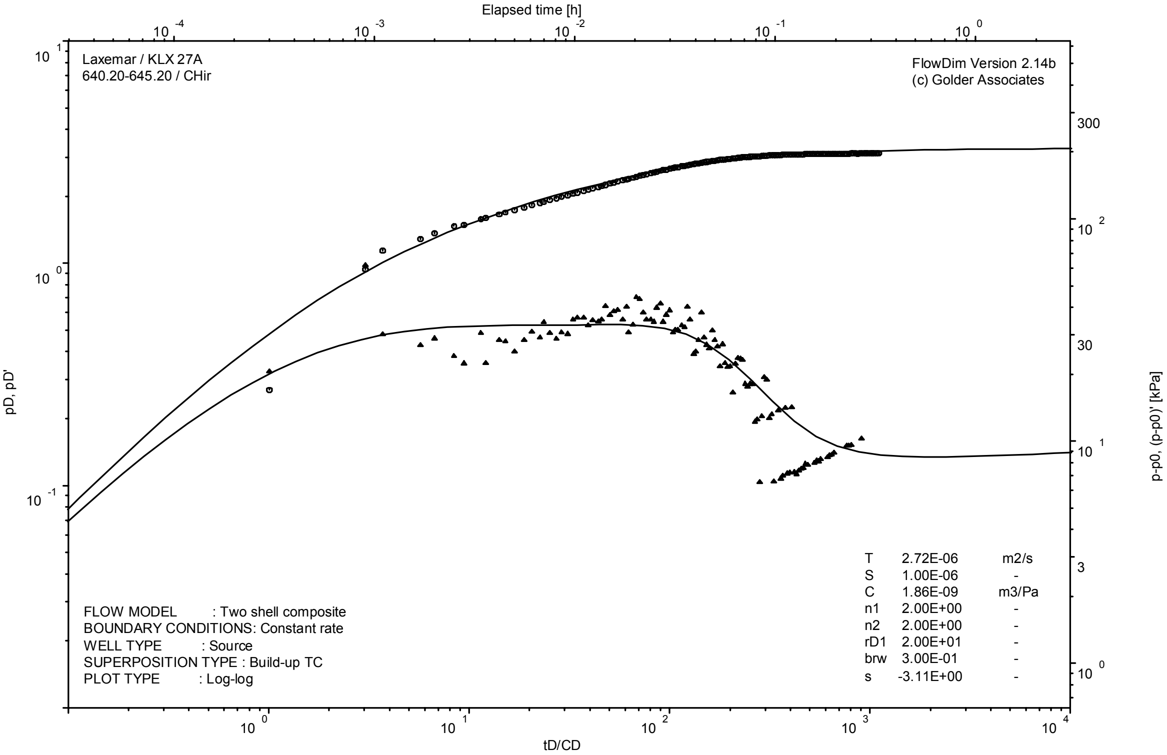
Pressure and flow rate vs. time; cartesian plot



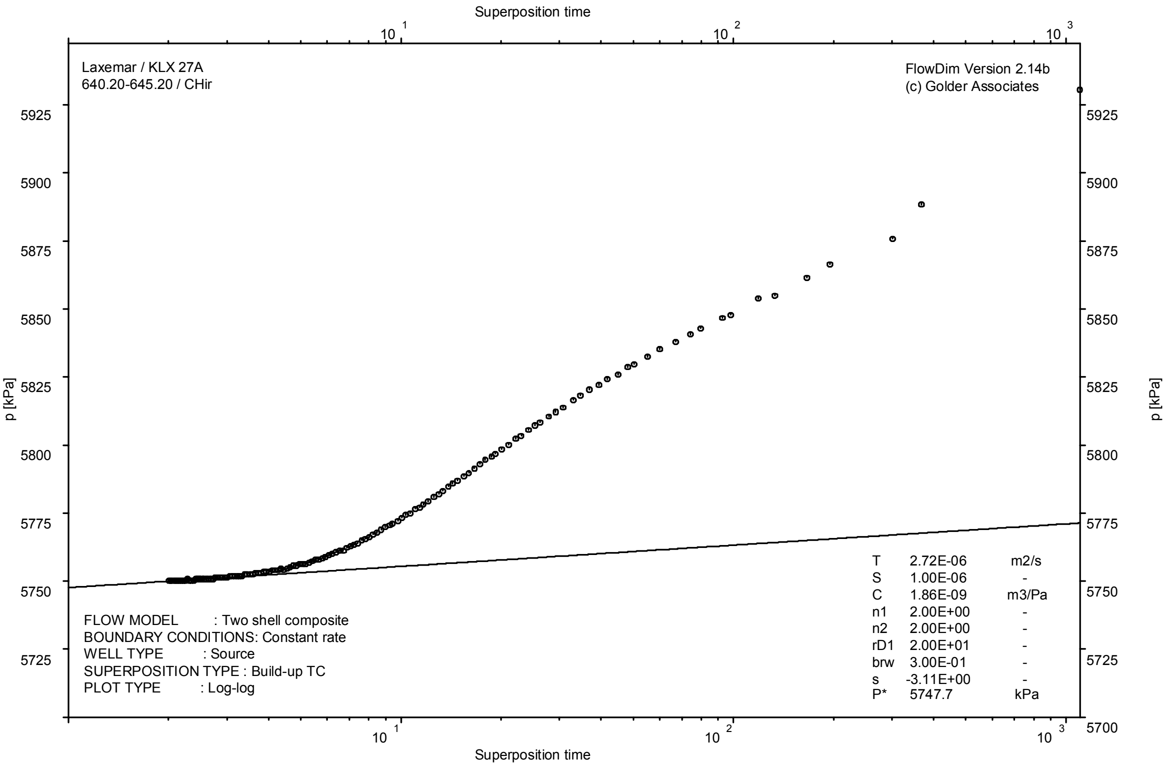
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

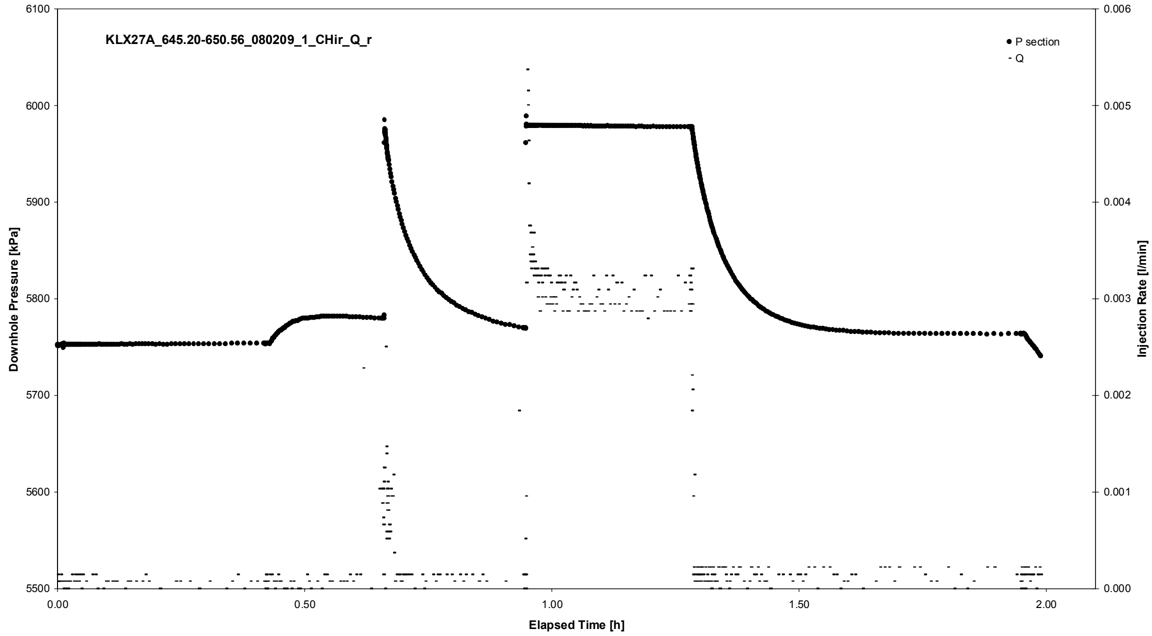


CHIR phase; HORNER match

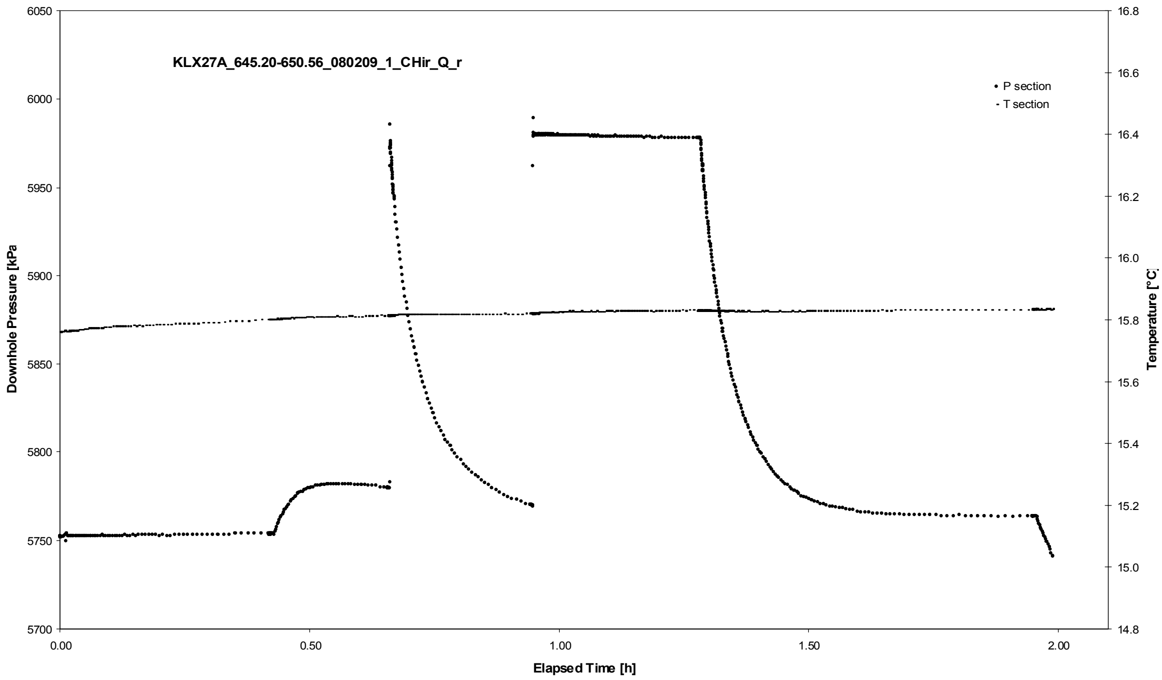
APPENDIX 2-82

Test 645.20 – 650.56 m

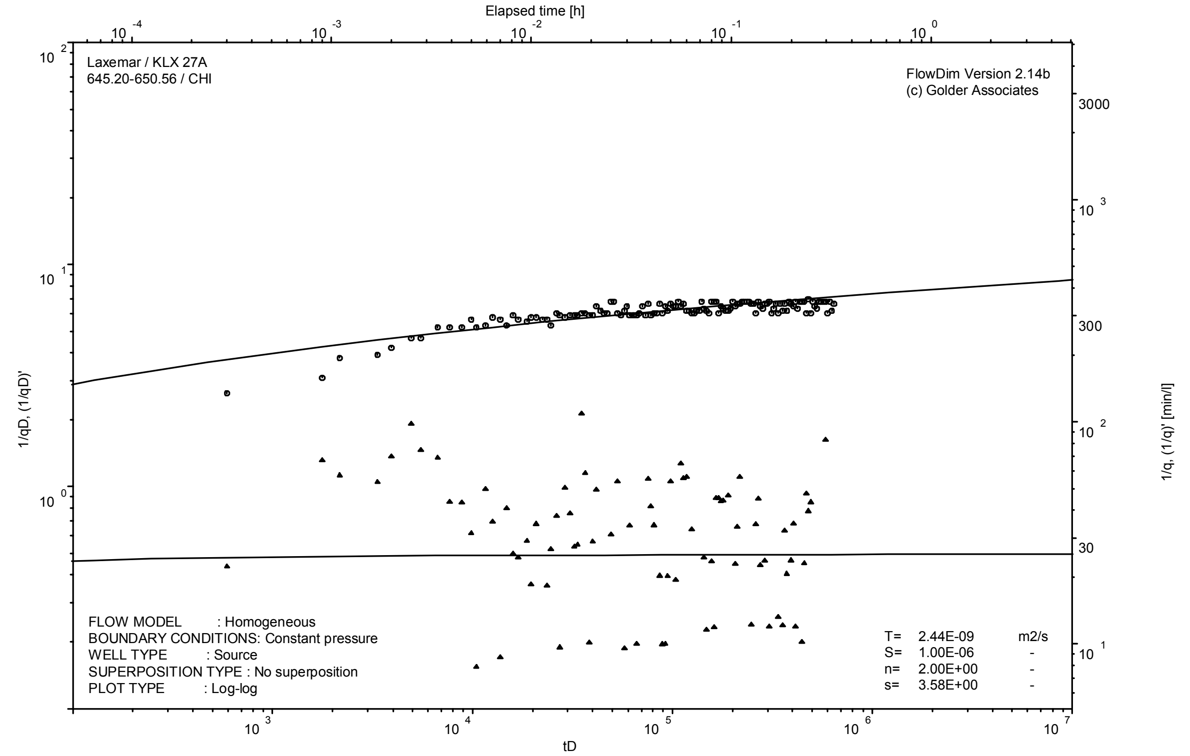
Analysis diagrams



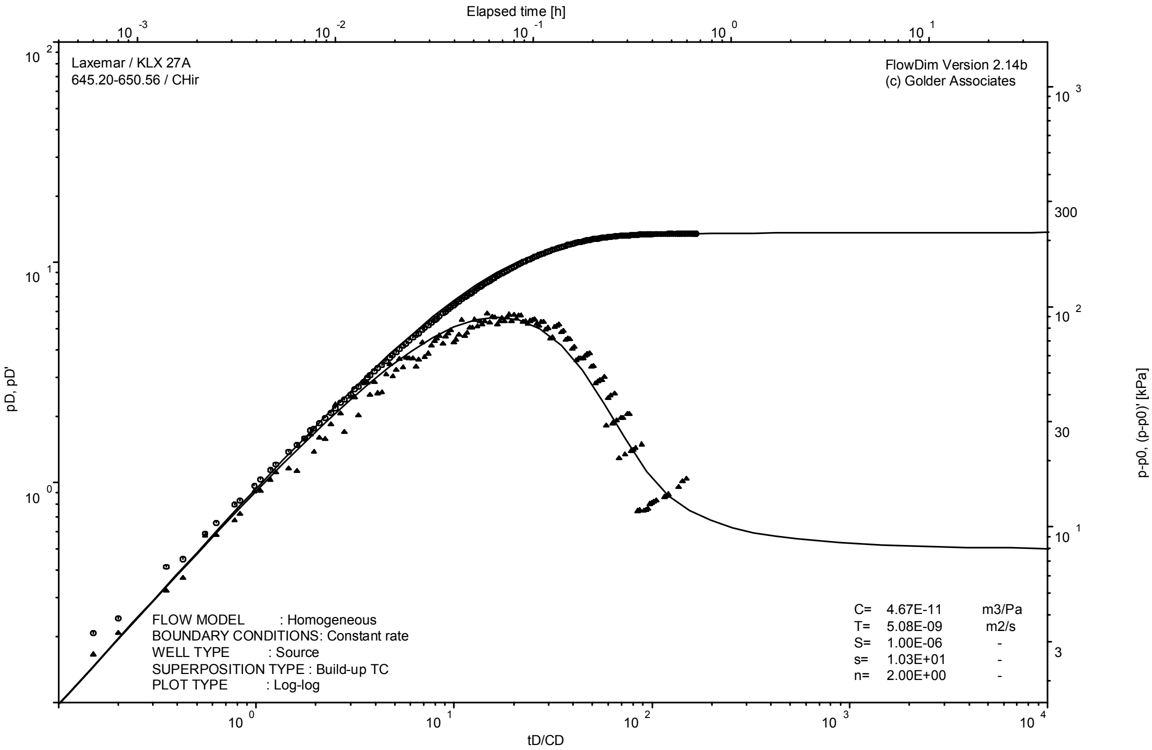
Pressure and flow rate vs. time; cartesian plot



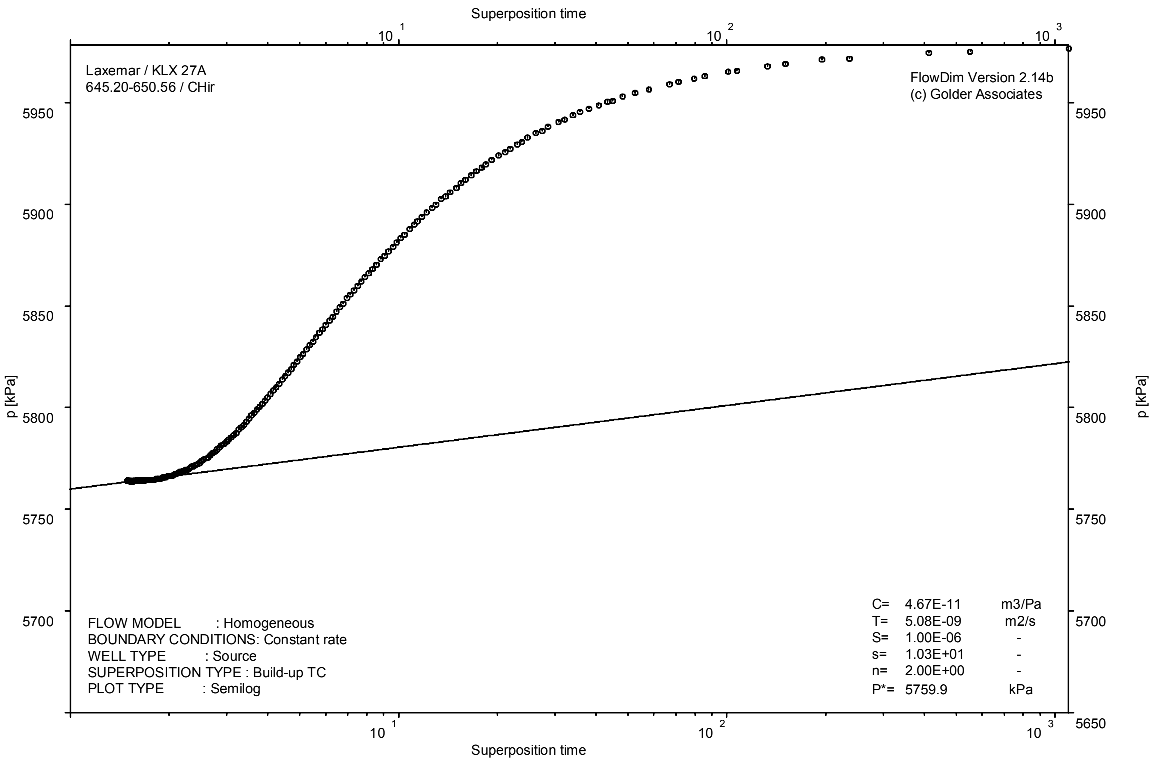
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

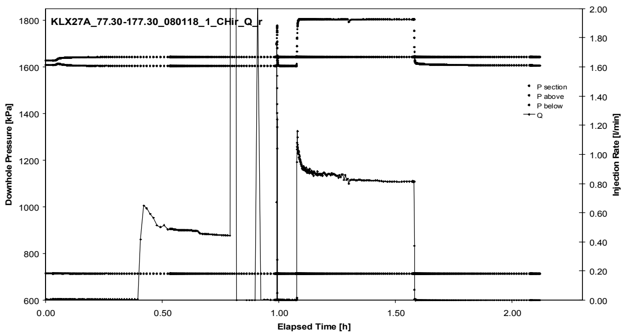
APPENDIX 3

Test Summary Sheets

Test Summary Sheet

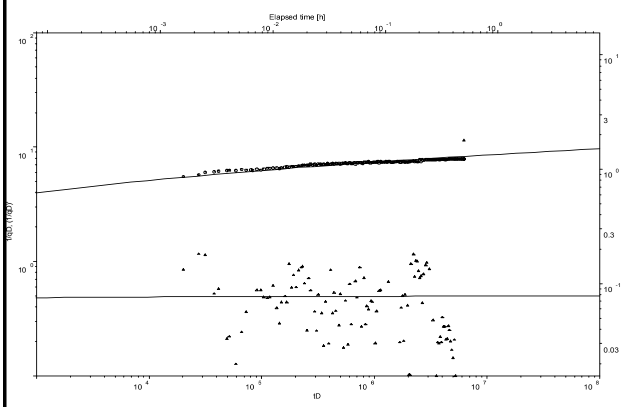
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080118 08:23
Test section from - to (m):	77.30-177.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

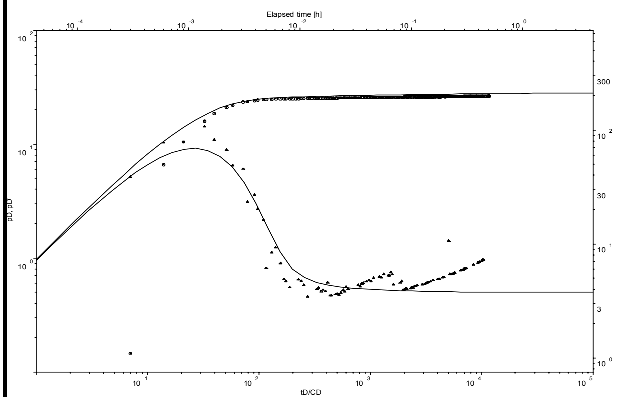


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1608		
p_i (kPa) =	1605		
p_p(kPa) =	1803	p_F (kPa) =	1605
Q_p (m^3/s)=	1.35E-05		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.5		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	6.7E-07		
T_M (m^2/s)=	8.7E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.43	dt_1 (min) =	0.08
dt_2 (min) =	12.58	dt_2 (min) =	9.29
T (m^2/s) =	8.4E-07	T (m^2/s) =	2.9E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.4E-09	K_s (m/s) =	2.9E-08
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.9E-10
C_D (-) =	NA	C_D (-) =	3.2E-02
ξ (-) =	1.1	ξ (-) =	20.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.43	C (m^3/Pa) =	2.9E-10
dt_2 (min) =	12.58	C_D (-) =	3.2E-02
T_T (m^2/s) =	8.4E-07	ξ (-) =	1.1
S (-) =	1.0E-06		
K_s (m/s) =	8.4E-09		
S_s (1/m) =	1.0E-08		

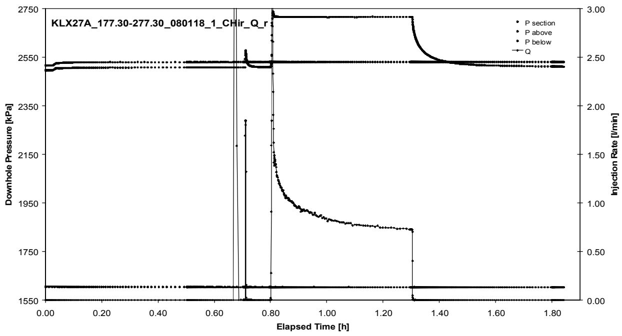
Comments:

The recommended transmissivity of 8.4E-7 m2/s was derived from the analysis of the CHi phase, which shows slight better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2E-7 m2/s to 4E-6 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,604.4 kPa.

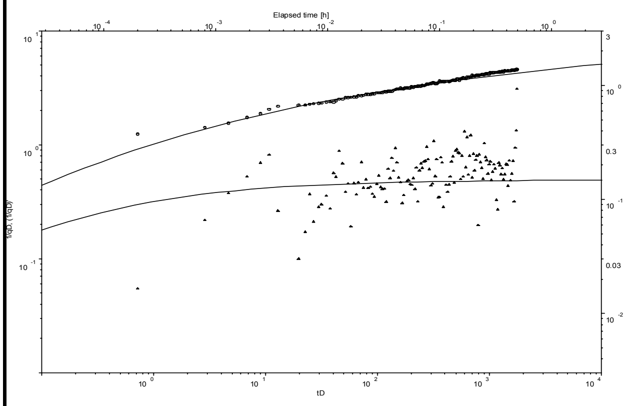
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080118 13:33
Test section from - to (m):	177.30-277.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

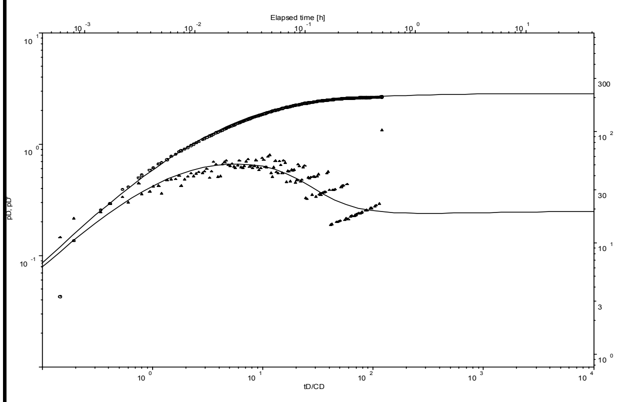
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2495		
p_i (kPa) =	2513		
p_p(kPa) =	2715	p_F (kPa) =	2511
Q_p (m^3/s)=	1.20E-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)=	10.8		
Derivative fact.=	0.04	Derivative fact.=	0
Results		**Results**	
Q/s (m^2/s)=	5.8E-07		
T_M (m^2/s)=	7.6E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.81	dt_1 (min) =	0.85
dt_2 (min) =	24.62	dt_2 (min) =	3.83
T (m^2/s) =	4.3E-07	T (m^2/s) =	2.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.3E-09	K_s (m/s) =	2.9E-09
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.8E-09
C_D (-) =	NA	C_D (-) =	3.1E-01
ξ (-) =	-2.2	ξ (-) =	-2.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	0.85	C (m^3/Pa) =	2.8E-09
dt_2 (min) =	3.83	C_D (-) =	3.1E-01
T_T (m^2/s) =	2.9E-07	ξ (-) =	-2.8
S (-) =	1.0E-06		
K_s (m/s) =	2.9E-09		
S_s (1/m) =	1.0E-08		

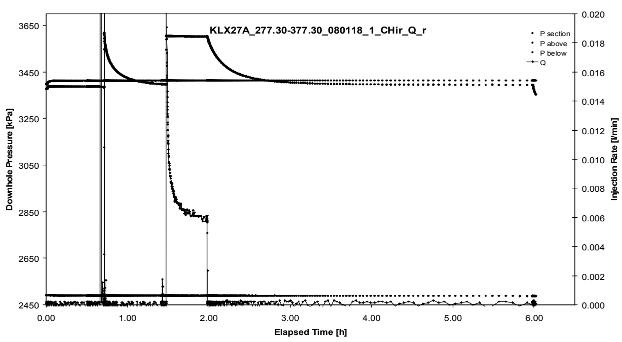
Comments:

The recommended transmissivity of 2.9E-7 m2/s was derived from the analysis of the CHir phase, which shows slight better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8E-8 m2/s to 7E-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 2,503.9 kPa.

Test Summary Sheet

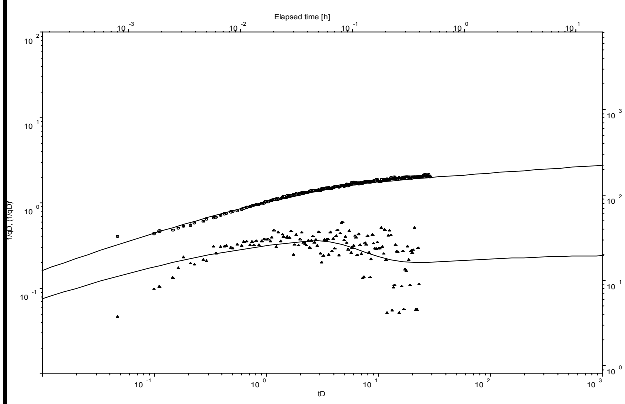
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080118 17:05
Test section from - to (m):	277.30-377.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

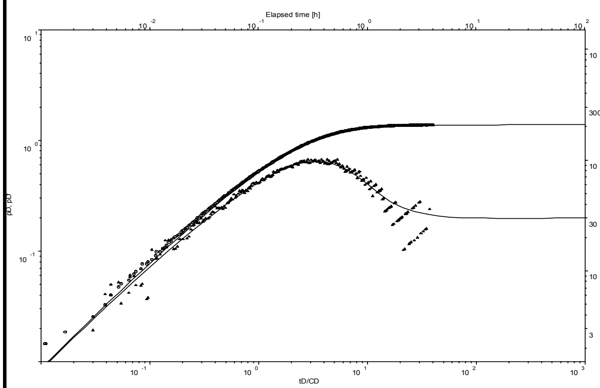


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3385		
p_i (kPa) =	3396		
p_p(kPa) =	3602	p_F (kPa) =	3390
Q_p (m^3/s)=	1.00E-07		
tp (s) =	1800	t_F (s) =	14400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.2		
Derivative fact.=	0.08	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	4.8E-09		
T_M (m^2/s)=	6.2E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.28	dt_1 (min) =	14.89
dt_2 (min) =	3.82	dt_2 (min) =	28.43
T (m^2/s) =	1.6E-09	T (m^2/s) =	1.2E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.6E-11	K_s (m/s) =	1.2E-11
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.8E-10
C_D (-) =	NA	C_D (-) =	3.1E-02
ξ (-) =	-1.4	ξ (-) =	-1.6
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	1.28	C (m^3/Pa) =	2.8E-10
dt_2 (min) =	3.82	C_D (-) =	3.1E-02
T_T (m^2/s) =	1.6E-09	ξ (-) =	-1.4
S (-) =	1.0E-06		
K_s (m/s) =	1.6E-11		
S_s (1/m) =	1.0E-08		

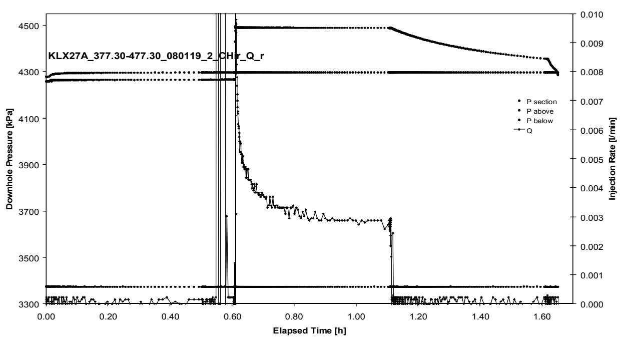
Comments:

The recommended transmissivity of 1.6E-9 m2/s was derived from the analysis of the CHi phase (inner zone), which shows a good horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be 8E-10 m2/s to 5E-9 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,388.5 kPa.

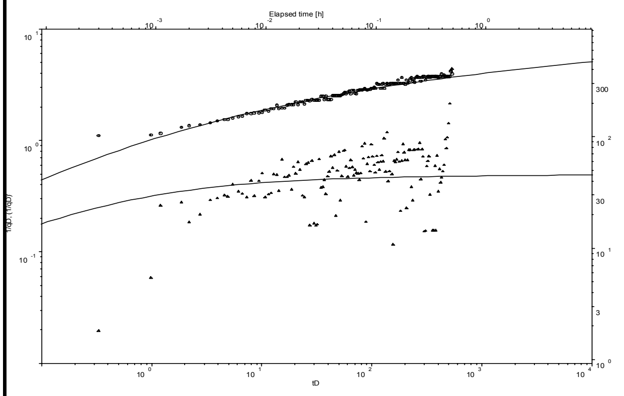
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX27A	Test start:	080119 12:09
Test section from - to (m):	377.30-477.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

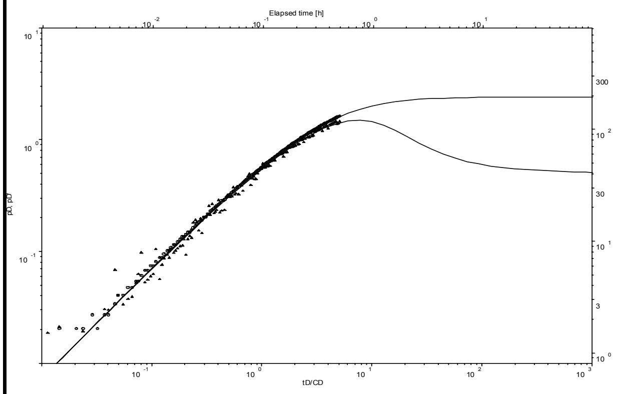
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4257		
p_i (kPa) =	4265		
p_p(kPa) =	4487	p_F (kPa) =	4355
Q_p (m^3/s)=	4.83E-08		
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)=	13.6		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.1E-09		
T_M (m^2/s)=	2.8E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.83	dt_1 (min) =	#NV
dt_2 (min) =	21.14	dt_2 (min) =	#NV
T (m^2/s) =	1.3E-09	T (m^2/s) =	1.1E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.3E-11	K_s (m/s) =	1.1E-11
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.4E-10
C_D (-) =	NA	C_D (-) =	2.6E-02
ξ (-) =	0.2	ξ (-) =	0.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.			
dt_1 (min) =	0.83	C (m^3/Pa) =	2.4E-10
dt_2 (min) =	21.14	C_D (-) =	2.6E-02
T_T (m^2/s) =	1.3E-09	ξ (-) =	0.2
S (-) =	1.0E-06		
K_s (m/s) =	1.3E-11		
S_s (1/m) =	1.0E-08		

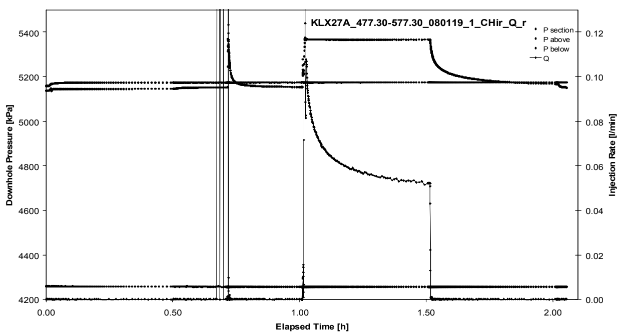
Comments:

The recommended transmissivity of 1.3E-9 m2/s was derived from the analysis of the CHi phase, which shows a good horizontal stabilisation of the derivative despite of the noisy data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8E-10 m2/s to 6E-9 m2/s. The flow dimension displayed during the test is 2. According to a too short recovery phase which implied a too high level of uncertainty, a straight line extrapolation in a Horner plot was not performed. Therefore, no static pressure measured at transducer

Test Summary Sheet

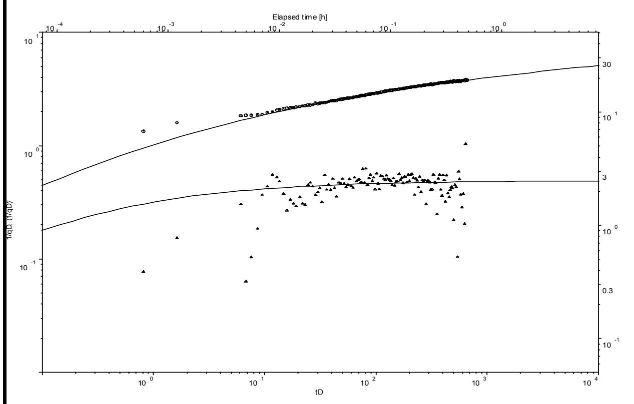
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080119 15:26
Test section from - to (m):	477.30-577.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

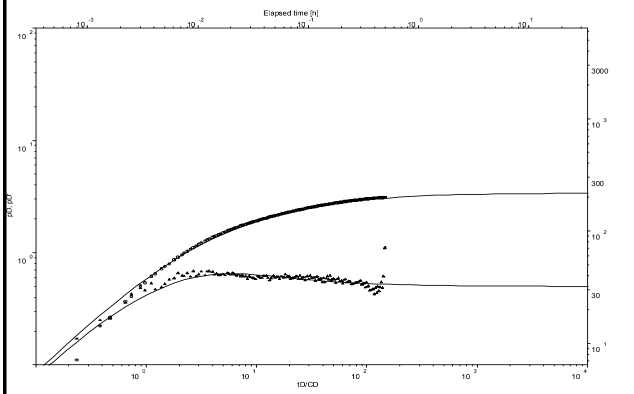


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5136		
p_i (kPa) =	5153		
p_p(kPa) =	5359	p_F (kPa) =	5174
Q_p (m^3/s)=	8.33E-07		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.9		
Derivative fact.=	0.05	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	4.0E-08		
T_M (m^2/s)=	5.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.10	dt_1 (min) =	3.02
dt_2 (min) =	17.06	dt_2 (min) =	15.39
T (m^2/s) =	2.5E-08	T (m^2/s) =	2.5E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.5E-10	K_s (m/s) =	2.5E-10
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.9E-10
C_D (-) =	NA	C_D (-) =	2.1E-02
ξ (-) =	-1.2	ξ (-) =	-1.4
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	3.02	C (m^3/Pa) =	1.9E-10
dt_2 (min) =	15.39	C_D (-) =	2.1E-02
T_T (m^2/s) =	2.5E-08	ξ (-) =	-1.4
S (-) =	1.0E-06		
K_s (m/s) =	2.5E-10		
S_s (1/m) =	1.0E-08		

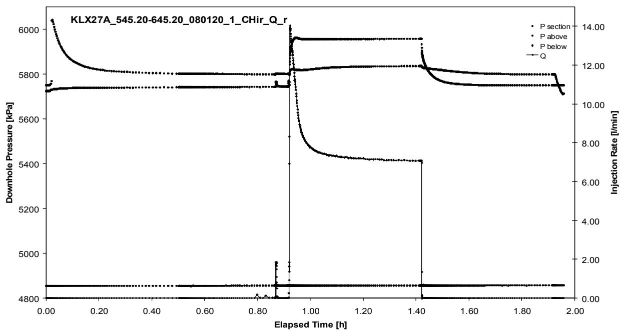
Comments:

The recommended transmissivity of 2.5E-8 m2/s was derived from the analysis of the CHir phase, which shows slight better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9E-9 m2/s to 6E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,145.7 kPa.

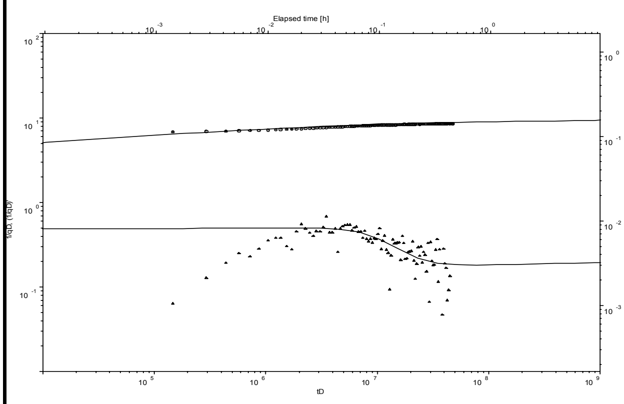
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080120 09:30
Test section from - to (m):	545.20-645.20	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

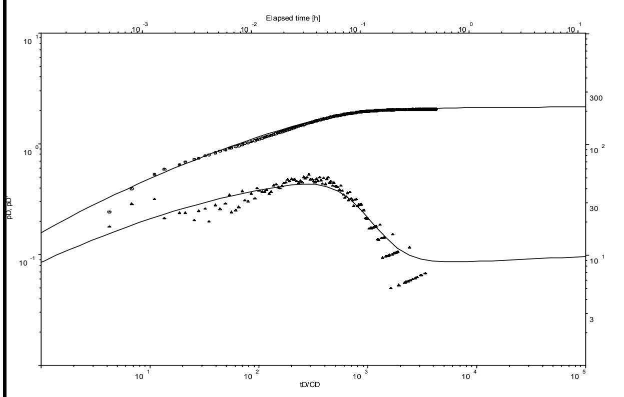
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5723		
p_i (kPa) =	5749		
p_p(kPa) =	5956	p_F (kPa) =	5749
Q_p (m^3/s)=	1.18E-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)=	15.8		
Derivative fact.=	0.04	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	5.6E-06		
T_M (m^2/s)=	7.3E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.01	dt_1 (min) =	1.23
dt_2 (min) =	3.69	dt_2 (min) =	3.07
T (m^2/s) =	7.6E-06	T (m^2/s) =	1.9E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.6E-08	K_s (m/s) =	1.9E-08
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.3E-10
C_D (-) =	NA	C_D (-) =	5.8E-02
ξ (-) =	1.6	ξ (-) =	-4.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	1.23	C (m^3/Pa) =	5.3E-10
dt_2 (min) =	3.07	C_D (-) =	5.8E-02
T_T (m^2/s) =	1.9E-06	ξ (-) =	-4.2
S (-) =	1.0E-06		
K_s (m/s) =	1.9E-08		
S_s (1/m) =	1.0E-08		

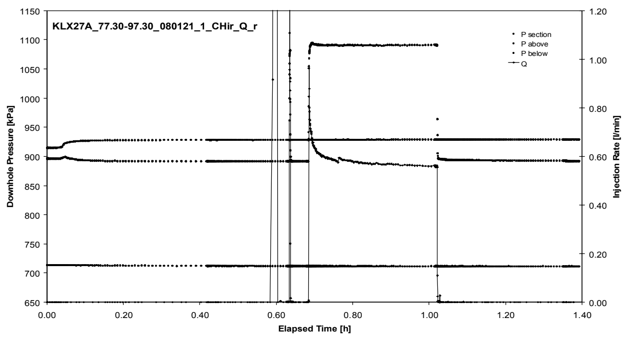
Comments:

The recommended transmissivity of 1.9E-6 m2/s was derived from the analysis of the CHir phase (inner zone), which shows slight better data and derivative quality. The confidence range for the interval transmissivity is estimated with a relative wide range to be 9E-7 m2/s to 2E-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 5,746.3 kPa.

Test Summary Sheet

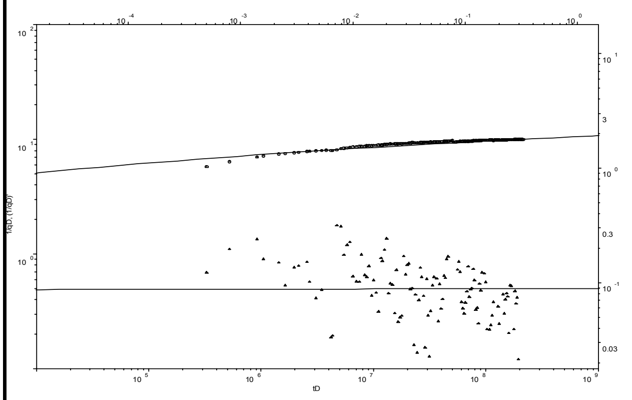
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080121 17:33
Test section from - to (m):	77.30-97.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

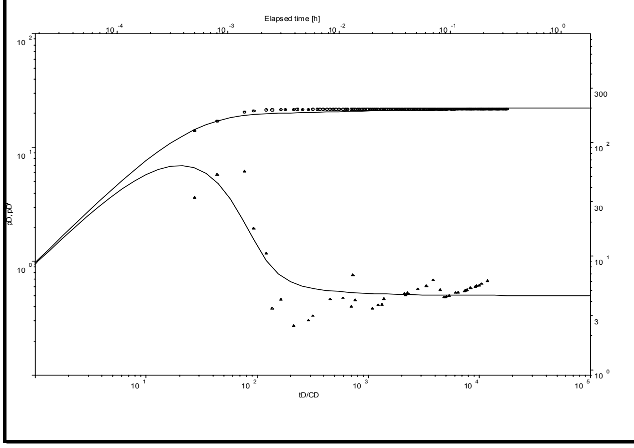


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	896		
p_i (kPa) =	891		
p_p(kPa) =	1090	p_F (kPa) =	892
Q_p (m^3/s)=	9.32E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	8.2		
Derivative fact.=	0.03	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.6E-07		
T_M (m^2/s)=	4.8E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.51	dt_1 (min) =	0.57
dt_2 (min) =	8.81	dt_2 (min) =	6.04
T (m^2/s) =	7.4E-07	T (m^2/s) =	1.7E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.7E-08	K_s (m/s) =	8.4E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.1E-11
C_D (-) =	NA	C_D (-) =	7.8E-03
ξ (-) =	3.6	ξ (-) =	15.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.51	C (m^3/Pa) =	7.1E-11
dt_2 (min) =	8.81	C_D (-) =	7.8E-03
T_T (m^2/s) =	7.4E-07	ξ (-) =	3.6
S (-) =	1.0E-06		
K_s (m/s) =	3.7E-08		
S_s (1/m) =	5.0E-08		

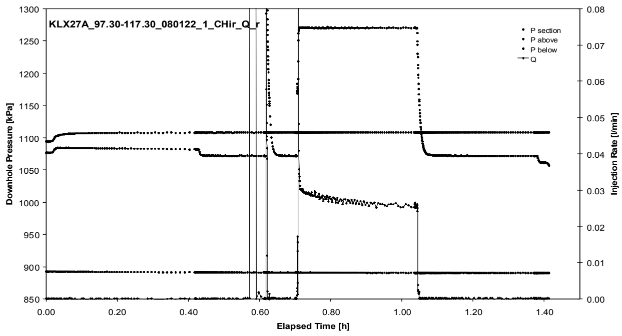
Comments:

The recommended transmissivity of 7.4E-7 m2/s was derived from the analysis of the CHi phase, which shows slight better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1E-7 m2/s to 3E-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 891.6 kPa.

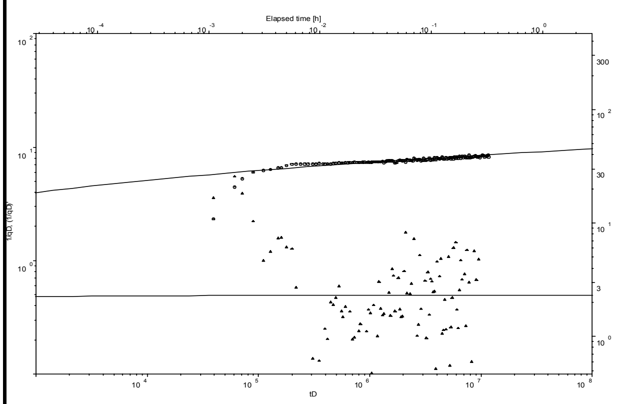
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080122 08:37
Test section from - to (m):	97.30-117.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

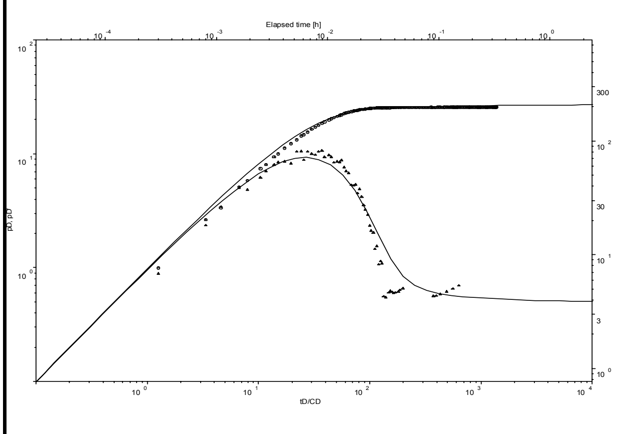
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1076		
p_i (kPa) =	1072		
p_p(kPa) =	1270	p_F (kPa) =	1072
Q_p (m^3/s)=	4.17E-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)=	8.5		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.1E-08		
T_M (m^2/s)=	2.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.70	dt_1 (min) =	#NV
dt_2 (min) =	11.06	dt_2 (min) =	#NV
T (m^2/s) =	2.8E-08	T (m^2/s) =	9.1E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.4E-09	K_s (m/s) =	4.6E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.1E-11
C_D (-) =	NA	C_D (-) =	5.6E-03
ξ (-) =	3.8	ξ (-) =	21.7
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	1.70	C (m^3/Pa) =	5.1E-11
dt_2 (min) =	11.06	C_D (-) =	5.6E-03
T_T (m^2/s) =	2.8E-08	ξ (-) =	3.8
S (-) =	1.0E-06		
K_s (m/s) =	1.4E-09		
S_s (1/m) =	5.0E-08		

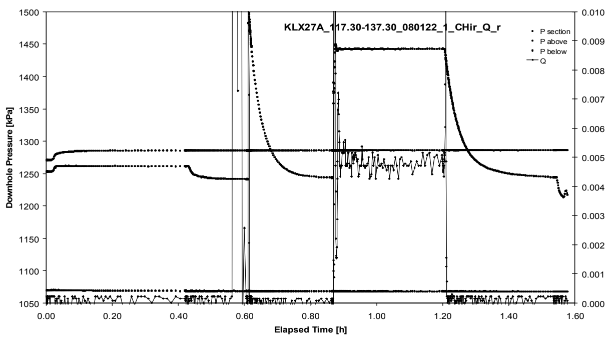
Comments:

The recommended transmissivity of 2.8E-8 m2/s was derived from the analysis of the CHi phase, which shows horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 8E-9 m2/s to 6E-8 m2/s. A flow dimension of 2 was assumed for the test. 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 1,071.1 kPa.

Test Summary Sheet

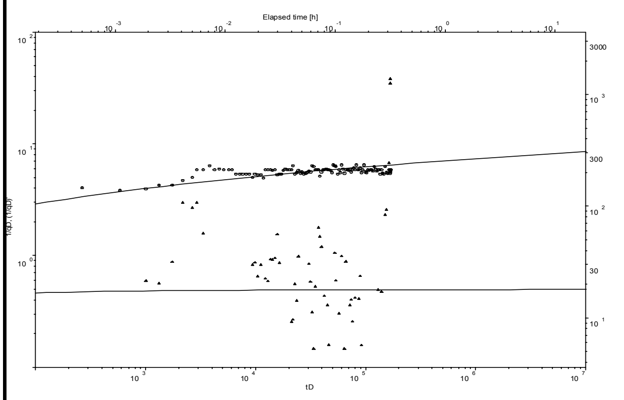
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080122 10:43
Test section from - to (m):	117.30-137.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

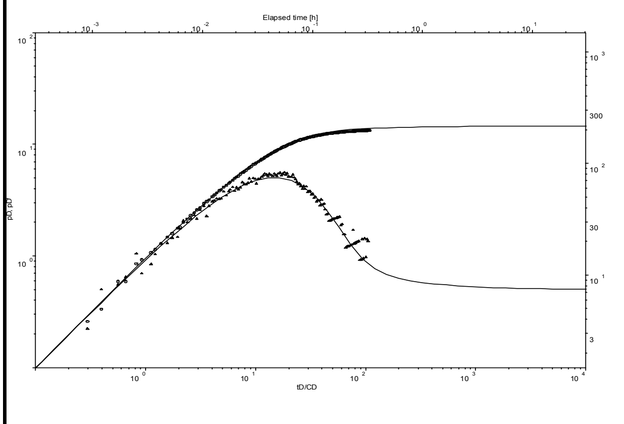


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1253		
p_i (kPa) =	1244		
p_p(kPa) =	1442	p_F (kPa) =	1244
Q_p (m^3/s)=	8.33E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	8.8		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.1E-09		
T_M (m^2/s)=	4.3E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.51	dt_1 (min) =	#NV
dt_2 (min) =	11.21	dt_2 (min) =	#NV
T (m^2/s) =	3.6E-09	T (m^2/s) =	8.5E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-10	K_s (m/s) =	4.2E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.9E-11
C_D (-) =	NA	C_D (-) =	6.5E-03
ξ (-) =	2.7	ξ (-) =	10.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	#NV	C (m^3/Pa) =	5.9E-11
dt_2 (min) =	#NV	C_D (-) =	6.5E-03
T_T (m^2/s) =	8.5E-09	ξ (-) =	10.1
S (-) =	1.0E-06		
K_s (m/s) =	4.2E-10		
S_s (1/m) =	5.0E-08		

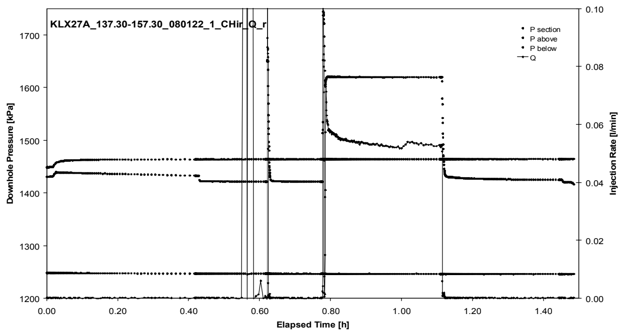
Comments:

The recommended transmissivity of 8.5•10-9 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 2E-9 m2/s to 2E-8 m2/s. A flow dimension of 2 was assumed for the test. 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 1,237.6 kPa.

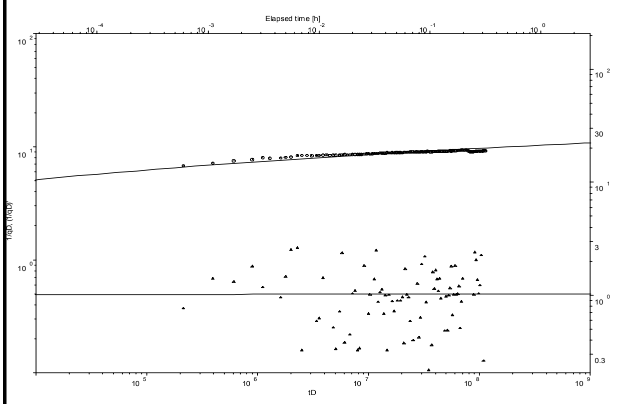
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080122 13:38
Test section from - to (m):	137.30-157.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

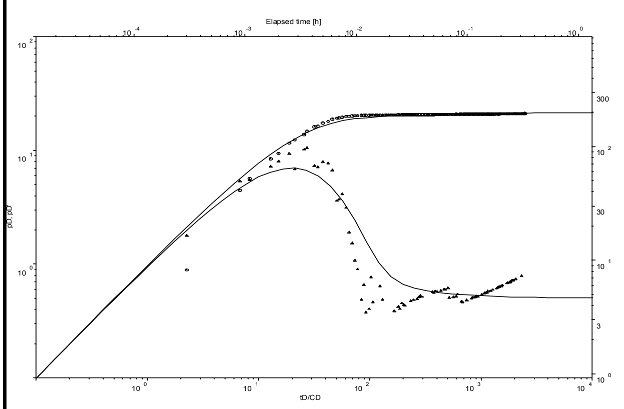
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1431		
p_i (kPa) =	1421		
p_p(kPa) =	1619	p_F (kPa) =	1424
Q_p (m^3/s)=	8.83E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.2		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.4E-08		
T_M (m^2/s)=	4.6E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.74	dt_1 (min) =	2.39
dt_2 (min) =	13.83	dt_2 (min) =	7.79
T (m^2/s) =	6.4E-08	T (m^2/s) =	1.5E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.2E-09	K_s (m/s) =	7.6E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.6E-11
C_D (-) =	NA	C_D (-) =	5.1E-03
ξ (-) =	4.6	ξ (-) =	16.
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	0.74	C (m^3/Pa) =	4.6E-11
dt_2 (min) =	13.83	C_D (-) =	5.1E-03
T_T (m^2/s) =	6.4E-08	ξ (-) =	4.6
S (-) =	1.0E-06		
K_s (m/s) =	3.2E-09		
S_s (1/m) =	5.0E-08		

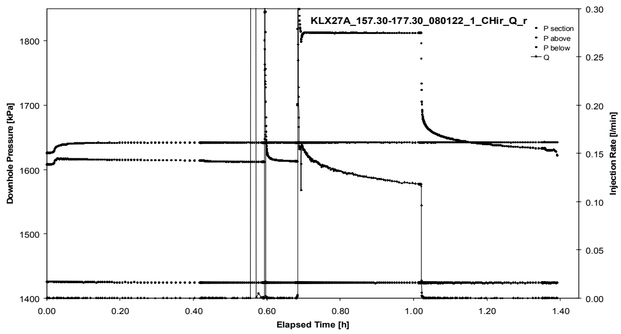
Comments:

The recommended transmissivity of 6.4E-8 m2/s was derived from the analysis of the CHi phase, which shows the clearest radial flow and best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1E-8 m2/s to 2E-7 m2/s. A flow dimension of 2 was assumed for the test. 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 1,422.5 kPa.

Test Summary Sheet

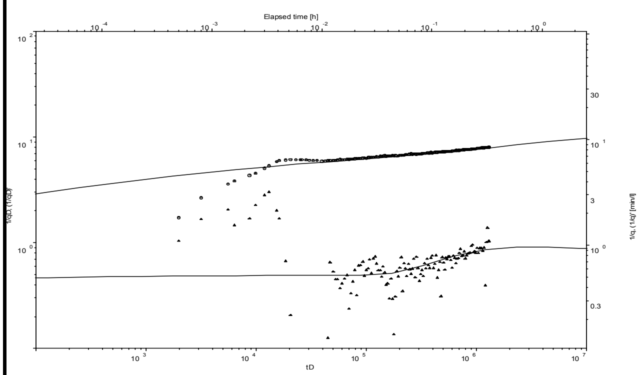
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080122 15:44
Test section from - to (m):	157.30-177.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

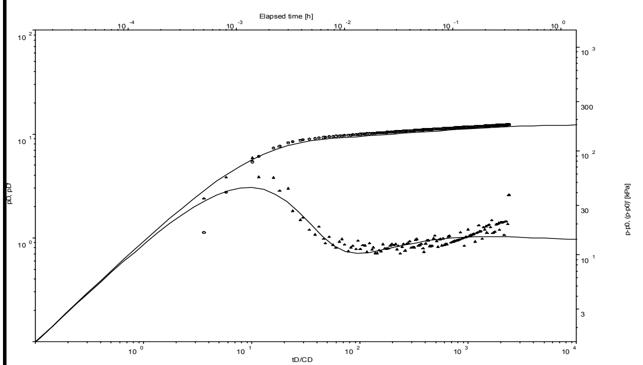


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1608		
p_i (kPa) =	1612		
p_p(kPa) =	1812	p_F (kPa) =	1630
Q_p (m^3/s)=	1.97E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.4		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.6E-08		
T_M (m^2/s)=	1.0E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.94	dt_1 (min) =	0.49
dt_2 (min) =	2.80	dt_2 (min) =	1.28
T (m^2/s) =	1.2E-07	T (m^2/s) =	2.4E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.2E-09	K_s (m/s) =	1.2E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.5E-11
C_D (-) =	NA	C_D (-) =	8.3E-03
ξ (-) =	2.	ξ (-) =	5.4
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.49	C (m^3/Pa) =	7.5E-11
dt_2 (min) =	1.28	C_D (-) =	8.3E-03
T_T (m^2/s) =	2.4E-07	ξ (-) =	5.4
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-08		
S_s (1/m) =	5.0E-08		

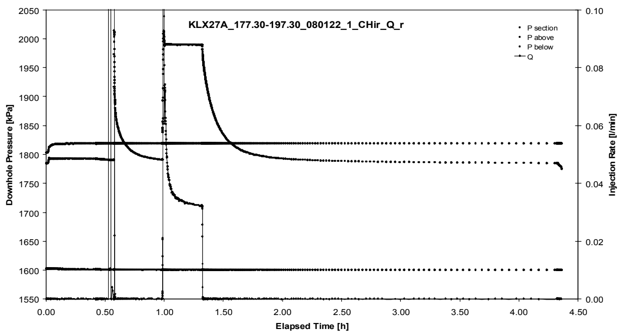
Comments:

The recommended transmissivity of 2.4E-7 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7E-8 m2/s to 4E-7 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,619.8 kPa.

Test Summary Sheet

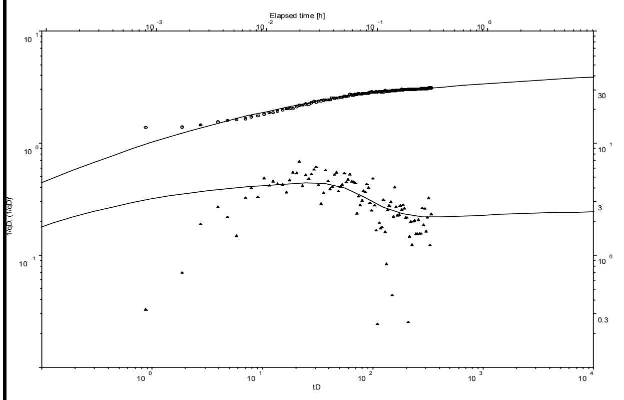
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080122 17:51
Test section from - to (m):	177.30-197.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

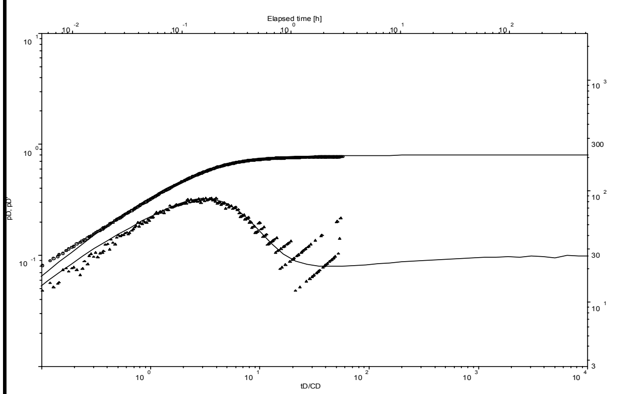


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1790		
p_i (kPa) =	1791		
p_p(kPa) =	1989	p_F (kPa) =	1784
Q_p (m^3/s)=	5.33E-07		
tp (s) =	1200	t_F (s) =	10800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.7		
Derivative fact.=	0.05	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	2.6E-08		
T_M (m^2/s)=	2.8E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.76	dt_1 (min) =	#NV
dt_2 (min) =	2.59	dt_2 (min) =	#NV
T (m^2/s) =	1.3E-08	T (m^2/s) =	1.8E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.6E-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) =	4.3E-10
C_D (-) =	NA	C_D (-) =	4.7E-02
ξ (-) =	-1.	ξ (-) =	-3.
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.76	C (m^3/Pa) =	4.3E-10
dt_2 (min) =	2.59	C_D (-) =	4.7E-02
T_T (m^2/s) =	1.3E-08	ξ (-) =	-1.
S (-) =	1.0E-06		
K_s (m/s) =	6.6E-10		
S_s (1/m) =	5.0E-08		

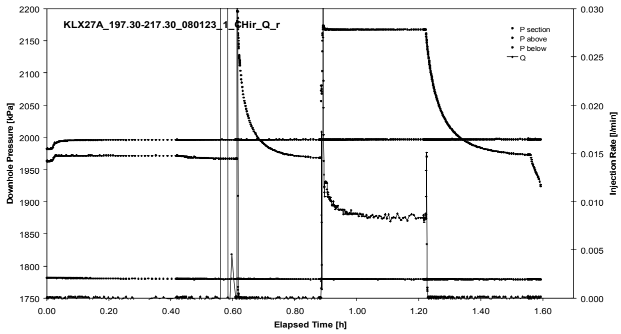
Comments:

The recommended transmissivity of 1.3E-8 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 8E-9 m2/s to 5E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,782.0 kPa.

Test Summary Sheet

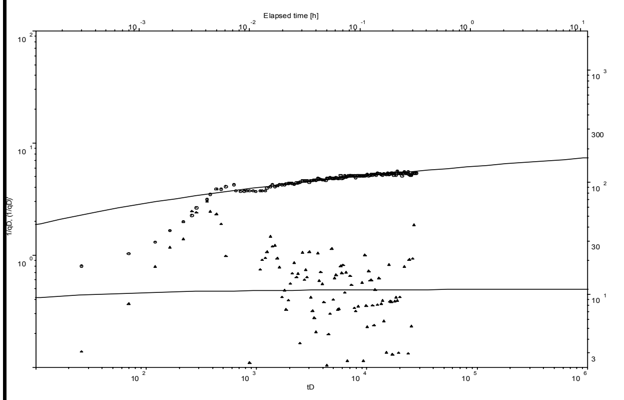
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080123 08:45
Test section from - to (m):	197.30-217.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

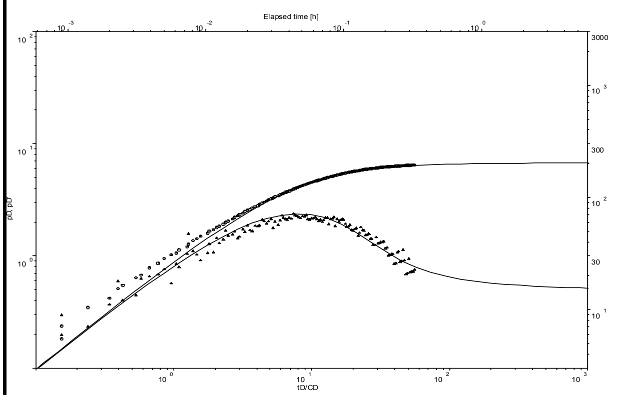


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1963		
p_i (kPa) =	1968		
p_p(kPa) =	2167	p_F (kPa) =	1973
Q_p (m^3/s)=	1.33E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.0		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	6.6E-09		
T_M (m^2/s)=	6.9E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.19	dt_1 (min) =	#NV
dt_2 (min) =	13.64	dt_2 (min) =	#NV
T (m^2/s) =	5.8E-09	T (m^2/s) =	7.8E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.9E-10	K_s (m/s) =	3.9E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-10
C_D (-) =	NA	C_D (-) =	1.2E-02
ξ (-) =	1.6	ξ (-) =	2.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.19	C (m^3/Pa) =	1.1E-10
dt_2 (min) =	13.64	C_D (-) =	1.2E-02
T_T (m^2/s) =	7.8E-09	ξ (-) =	2.9
S (-) =	1.0E-06		
K_s (m/s) =	3.9E-10		
S_s (1/m) =	5.0E-08		

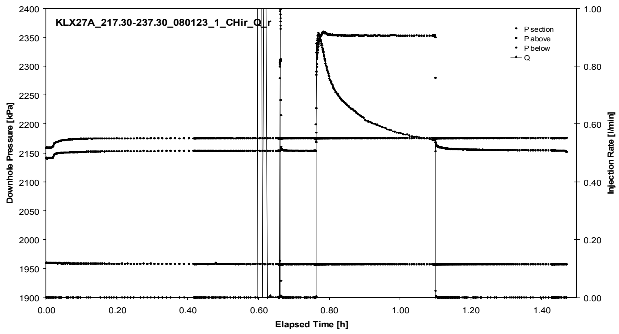
Comments:

The recommended transmissivity of 7.8E-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 3E-9 m2/s to 5E-8 m2/s. A flow dimension of 2 was assumed for the test. 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 1,960.1 kPa.

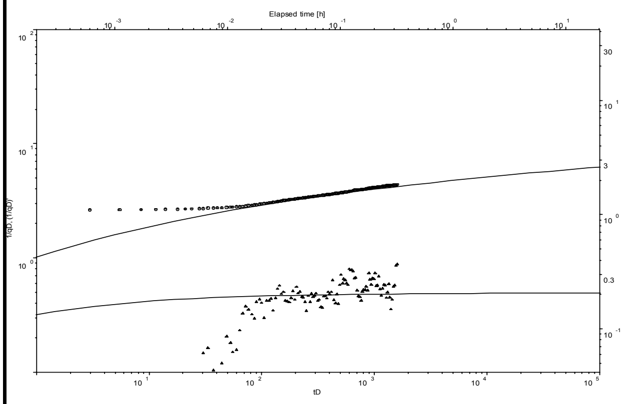
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080123 10:54
Test section from - to (m):	217.30-237.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

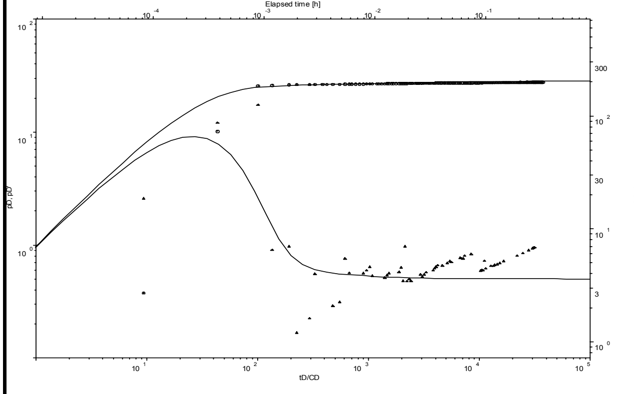
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2141		
p_i (kPa) =	2154		
p_p(kPa) =	2353	p_F (kPa) =	2154
Q_p (m^3/s)=	9.13E-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)=	10.3		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.5E-07		
T_M (m^2/s)=	4.7E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.46	dt_1 (min) =	0.32
dt_2 (min) =	15.90	dt_2 (min) =	3.03
T (m^2/s) =	3.1E-07	T (m^2/s) =	2.3E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.6E-08	K_s (m/s) =	1.1E-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-11
C_D (-) =	NA	C_D (-) =	5.1E-03
ξ (-) =	.6	ξ (-) =	21.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	1.46	C (m^3/Pa) =	4.6E-11
dt_2 (min) =	15.90	C_D (-) =	5.1E-03
T_T (m^2/s) =	3.1E-07	ξ (-) =	.6
S (-) =	1.0E-06		
K_s (m/s) =	1.6E-08		
S_s (1/m) =	5.0E-08		

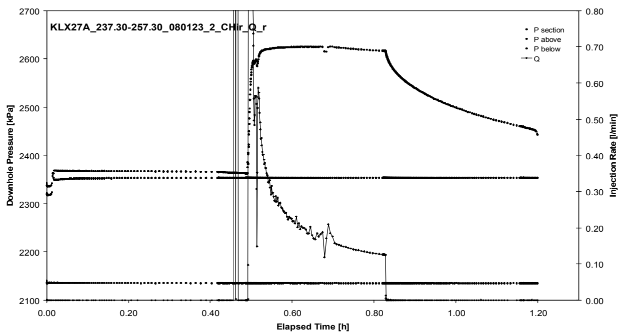
Comments:

The recommended transmissivity of 3.1E-7 m2/s was derived from the analysis of the CHi phase, which shows better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9E-8 m2/s to 5E-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 2,153.2 kPa.

Test Summary Sheet

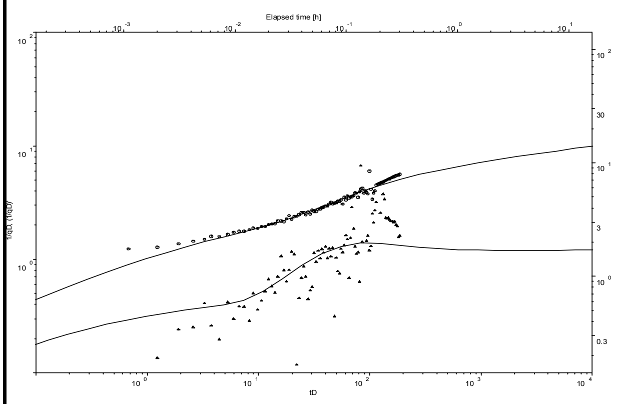
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX27A	Test start:	080123 14:51
Test section from - to (m):	237.30-257.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

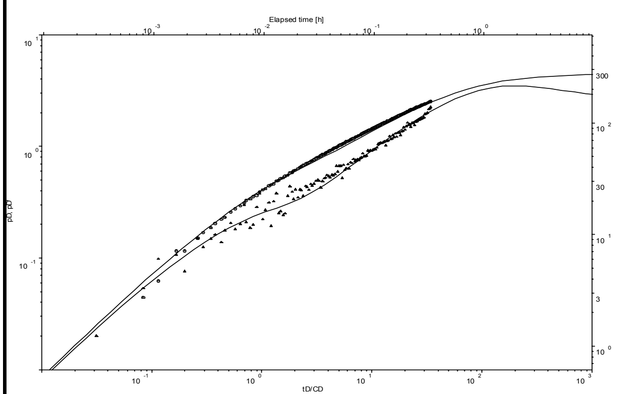


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2321		
p_i (kPa) =	2362		
p_p(kPa) =	2616	p_F (kPa) =	2452
Q_p (m^3/s)=	2.12E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.6		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	8.2E-08		
T_M (m^2/s)=	8.6E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	#NV	dt_1 (min) =	#NV
dt_2 (min) =	#NV	dt_2 (min) =	#NV
T (m^2/s) =	7.3E-08	T (m^2/s) =	8.5E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.6E-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) =	1.9E-09
C_D (-) =	NA	C_D (-) =	2.1E-01
ξ (-) =	-2.2	ξ (-) =	-3.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	#NV	C (m^3/Pa) =	1.9E-09
dt_2 (min) =	#NV	C_D (-) =	2.1E-01
T_T (m^2/s) =	8.5E-08	ξ (-) =	-3.1
S (-) =	1.0E-06		
K_s (m/s) =	4.3E-09		
S_s (1/m) =	5.0E-08		

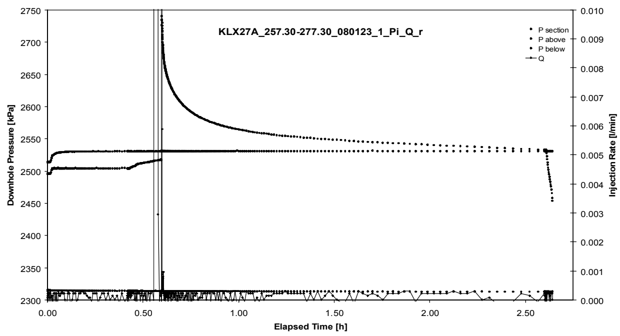
Comments:

The recommended transmissivity of 8.5E-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 1E-8 m2/s to 2E-7 m2/s. The flow dimension used for the analysis is 2. The static pressure could not be extrapolated.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080123 16:42
Test section from - to (m):	257.30-277.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

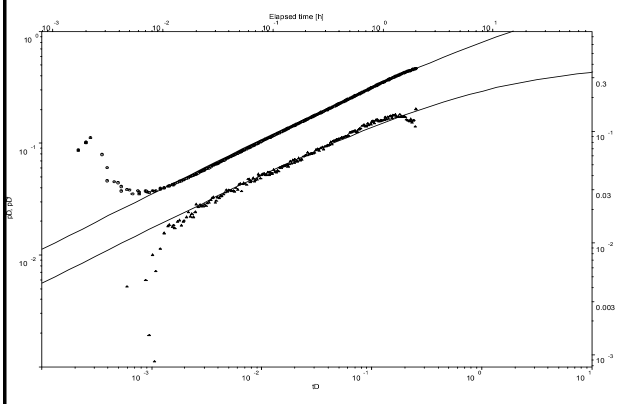
Linear plot Q and p



Log-Log plot incl. derivates- flow period

Not analysed

Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2496		
p_i (kPa) =	2517		
p_p(kPa) =	2741	p_F (kPa) =	2532
Q_p (m^3/s)=	NA		
tp (s) =	10	t_F (s) =	7200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.8		
Derivative fact.=	NA	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	NA
dt_2 (min) =	NA	dt_2 (min) =	NA
T (m^2/s) =	NA	T (m^2/s) =	2.7E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	1.4E-12
S_s (1/m) =	NA	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.9E-11
C_D (-) =	NA	C_D (-) =	5.4E-03
ξ (-) =	NA	ξ (-) =	-2.5
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	4.9E-11
dt_2 (min) =	NA	C_D (-) =	5.4E-03
T_T (m^2/s) =	2.7E-11	ξ (-) =	-2.5
S (-) =	1.0E-06		
K_s (m/s) =	1.4E-12		
S_s (1/m) =	5.0E-08		

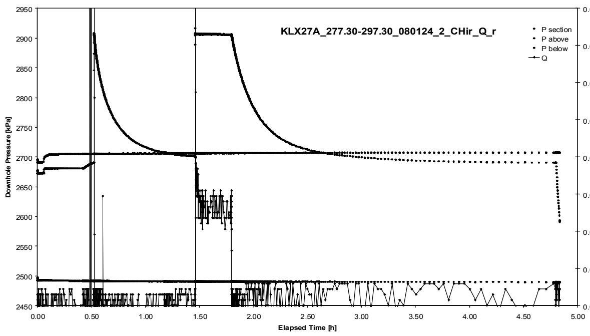
Comments:

The recommended transmissivity of 2.7E-11 m2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 7E-12 to 5E-11 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure could not be extrapolated due to the very low transmissivity.

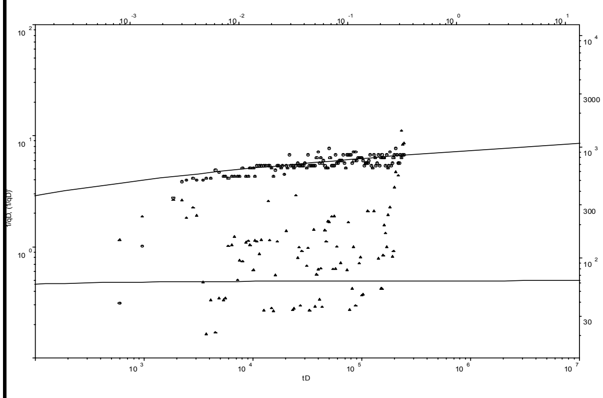
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX27A	Test start:	080124 15:06
Test section from - to (m):	277.30-297.30	Responsible for test execution:	Stephan Rohs Reinder van der Wall
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

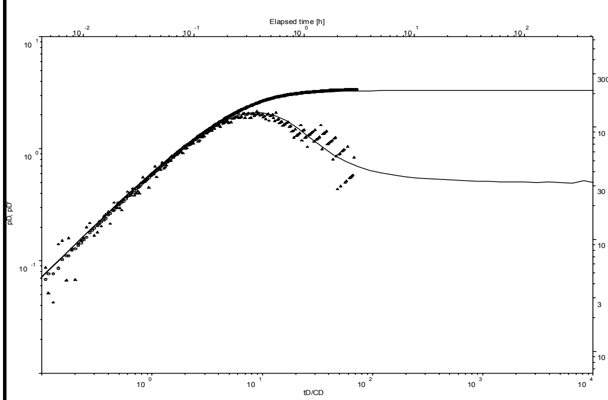
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	2675		
p_i (kPa) =	2701		
p_p(kPa) =	2902	p_F (kPa) =	2689
Q_p (m^3/s)=	2.17E-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)=	11.1		
Derivative fact.=	0.2	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.1E-09		
T_M (m^2/s)=	1.1E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.98	dt_1 (min) =	NA
dt_2 (min) =	11.66	dt_2 (min) =	NA
T (m^2/s) =	1.0E-09	T (m^2/s) =	5.9E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.2E-11	K_s (m/s) =	2.9E-11
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.7E-11
C_D (-) =	NA	C_D (-) =	6.2E-03
ξ (-) =	3.5	ξ (-) =	2.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	5.7E-11
dt_2 (min) =	NA	C_D (-) =	6.2E-03
T_T (m^2/s) =	5.9E-10	ξ (-) =	2.1
S (-) =	1.0E-06		
K_s (m/s) =	2.9E-11		
S_s (1/m) =	5.0E-08		

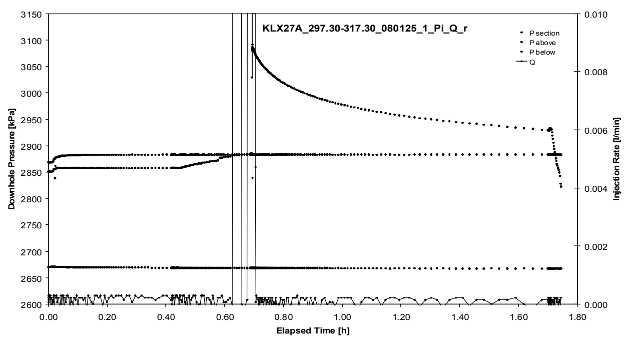
Comments:

The recommended transmissivity of 5.9E10 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 1E-10 m2/s to 2E-9 m2/s. The flow dimension used for the analysis 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 2,684.0 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080125 08:42
Test section from - to (m):	297.30-317.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

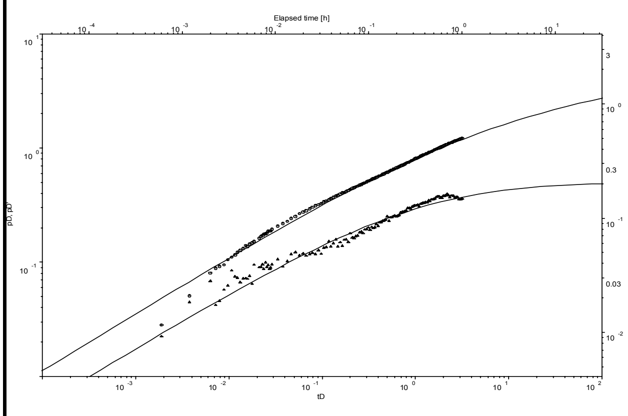


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2851		
p_i (kPa) =	2883		
p_p(kPa) =	3091	p_F (kPa) =	2929
Q_p (m^3/s)=	NA		
tp (s) =	10	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.4		
Derivative fact.=	NA	Derivative fact.=	0.06
Results		**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) =	6.1E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	3.1E-12
S_s (1/m) =	NA	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.8E-11
C_D (-) =	NA	C_D (-) =	6.4E-03
ξ (-) =	NA	ξ (-) =	-1.3
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	5.8E-11
dt_2 (min) =	NA	C_D (-) =	6.4E-03
T_T (m^2/s) =	6.1E-11	ξ (-) =	-1.3
S (-) =	1.0E-06		
K_s (m/s) =	3.1E-12		
S_s (1/m) =	5.0E-08		

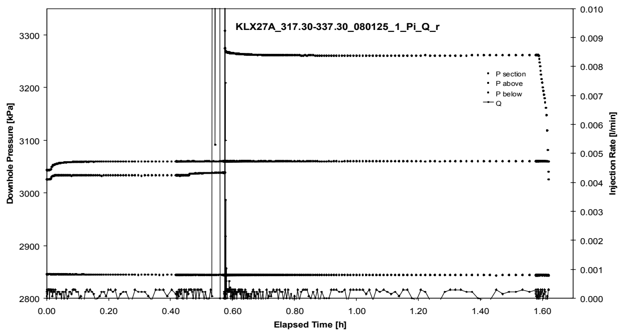
Comments:

The recommended transmissivity of 6.1E-11 m2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 1E-11 to 1E-10 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure could not be extrapolated due to the very low transmissivity.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080125 11:05
Test section from - to (m):	317.30-337.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
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) =	3026		
p_i (kPa) =	NA		
p_p(kPa) =	NA	p_F (kPa) =	NA
Q_p (m^3/s)=	NA		
tp (s) =	10	t_F (s) =	NA
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.7		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	5.0E-13		
S_s (1/m) =	5.0E-08		

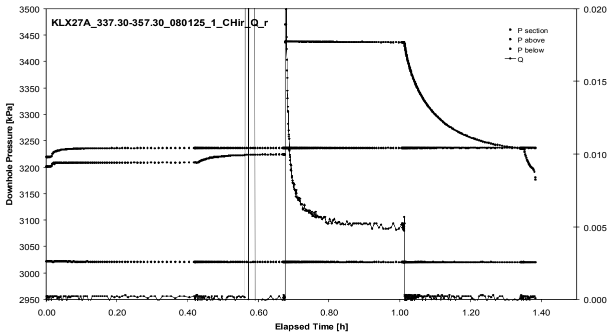
Comments:

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

Test Summary Sheet

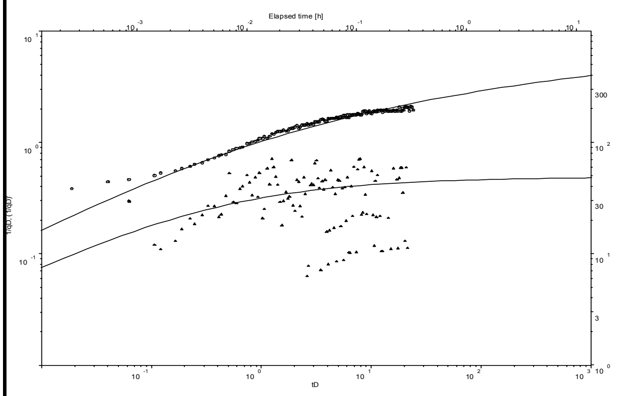
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080125 13:24
Test section from - to (m):	337.30-357.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

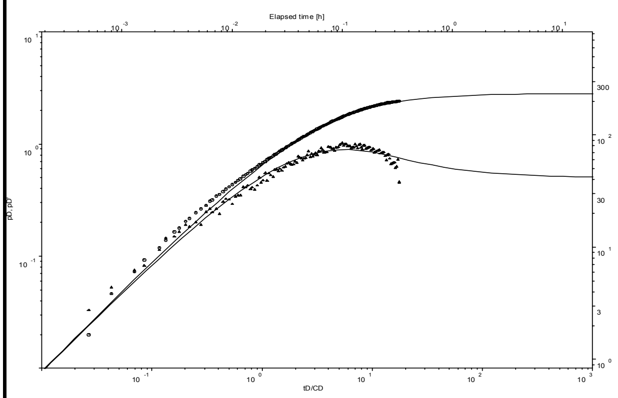


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3201		
p_i (kPa) =	3223		
p_p(kPa) =	3436	p_F (kPa) =	3236
Q_p (m^3/s)=	8.33E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12		
Derivative fact.=	0.04	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.8E-09		
T_M (m^2/s)=	4.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.95	dt_1 (min) =	NA
dt_2 (min) =	14.68	dt_2 (min) =	NA
T (m^2/s) =	1.2E-09	T (m^2/s) =	1.9E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.2E-11	K_s (m/s) =	9.7E-11
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.4E-11
C_D (-) =	NA	C_D (-) =	9.2E-03
ξ (-) =	-1.2	ξ (-) =	-.4
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	8.4E-11
dt_2 (min) =	NA	C_D (-) =	9.2E-03
T_T (m^2/s) =	1.9E-09	ξ (-) =	-.4
S (-) =	1.0E-06		
K_s (m/s) =	9.7E-11		
S_s (1/m) =	5.0E-08		

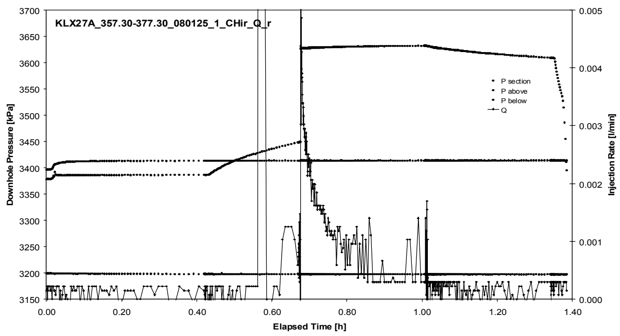
Comments:

The recommended transmissivity of 1.9E-9 m2/s was derived from the analysis of the CHir phase, which shows a better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5E-10 m2/s to 5E-9 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3203.5 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080125 15:31
Test section from - to (m):	357.30-377.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
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) =	3379		
p_i (kPa) =	3449		
p_p(kPa) =	3631	p_F (kPa) =	3608
Q_p (m^3/s)=	1.67E-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)=	12.2		
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) =	1.0E-10
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-10	ξ (-) =	NA
S (-) =	NA		
K_s (m/s) =	NA		
S_s (1/m) =	NA		

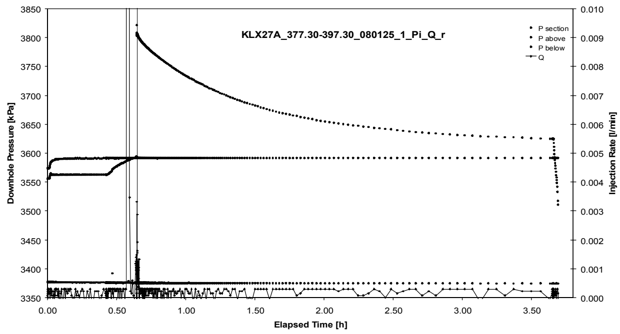
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1E-10 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080125 17:35
Test section from - to (m):	377.30-397.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

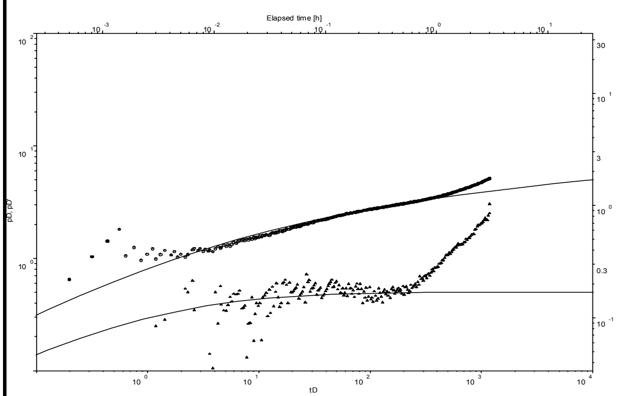


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3560		
p_i (kPa) =	3591		
p_p(kPa) =	3799	p_F (kPa) =	3624
Q_p (m^3/s)=	NA		
tp (s) =	10	t_F (s) =	10800
S el S* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.5		
Derivative fact.=	#NV	Derivative fact.=	NA
Results		**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) =	1.68
dt_2 (min) =	NA	dt_2 (min) =	30.60
T (m^2/s) =	NA	T (m^2/s) =	6.4E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	3.2E-12
S_s (1/m) =	NA	S_s (1/m) =	3.2E-12
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.0E-11
C_D (-) =	NA	C_D (-) =	5.5E-03
ξ (-) =	NA	ξ (-) =	1.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	5.0E-11
dt_2 (min) =	NA	C_D (-) =	5.5E-03
T_T (m^2/s) =	6.4E-11	ξ (-) =	1.2
S (-) =	1.0E-06		
K_s (m/s) =	3.2E-12		
S_s (1/m) =	3.2E-12		

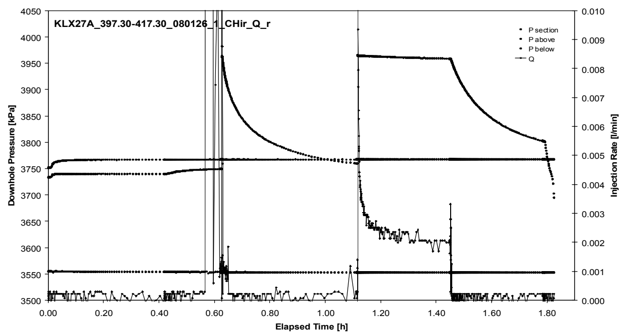
Comments:

The recommended transmissivity of 6.4E-11 m2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 1E-11 to 1E-10 m2/s. The analysis was conducted using a flow dimension of 2. The static pressure could not be extrapolated due to the very low transmissivity.

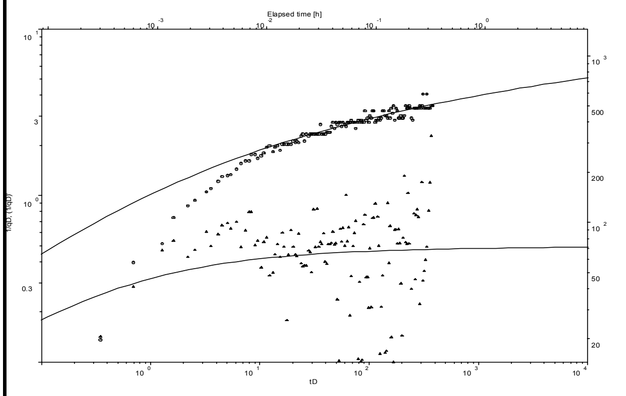
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080126 08:39
Test section from - to (m):	397.30-417.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

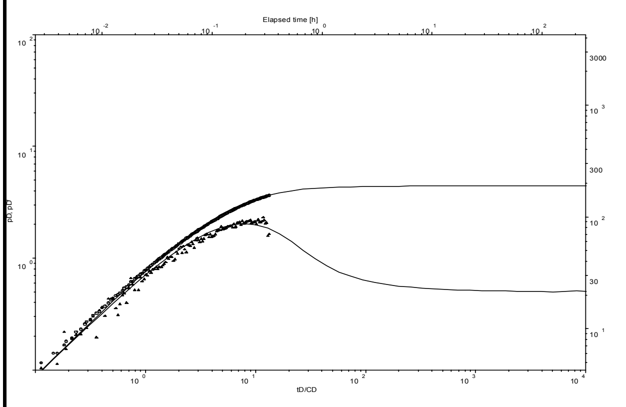
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3734		
p_i (kPa) =	3759		
p_p(kPa) =	3957	p_F (kPa) =	3801
Q_p (m^3/s)=	3.33E-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)=	12.8		
Derivative fact.=	0.17	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.7E-09		
T_M (m^2/s)=	1.7E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.92	dt_1 (min) =	NA
dt_2 (min) =	14.98	dt_2 (min) =	NA
T (m^2/s) =	9.1E-10	T (m^2/s) =	1.5E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.5E-11	K_s (m/s) =	7.6E-11
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 (-) =	9.5E-03
ξ (-) =	0.4	ξ (-) =	1.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	8.6E-11
dt_2 (min) =	NA	C_D (-) =	9.5E-03
T_T (m^2/s) =	1.5E-09	ξ (-) =	1.9
S (-) =	1.0E-06		
K_s (m/s) =	7.6E-11		
S_s (1/m) =	5.0E-08		

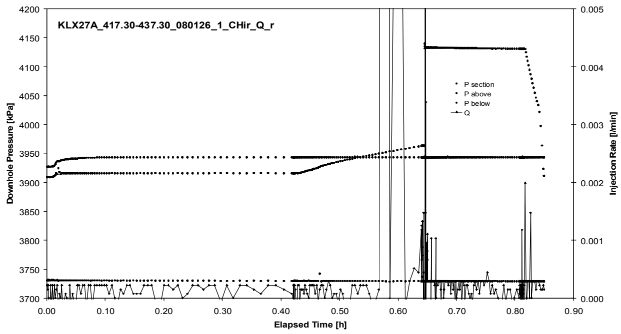
Comments:

The recommended transmissivity of 1.5E-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 5E-10 m2/s to 6E-9 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 3,738.4 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080126 11:10
Test section from - to (m):	417.30-437.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
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) =	3910		
p_i (kPa) =	NA		
p_p(kPa) =	NA	p_F (kPa) =	NA
Q_p (m^3/s)=	NA		
tp (s) =	NA	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.1		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	5.0E-13
S_s (1/m) =	NA	S_s (1/m) =	5.0E-08
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	5.0E-13		
S_s (1/m) =	5.0E-08		

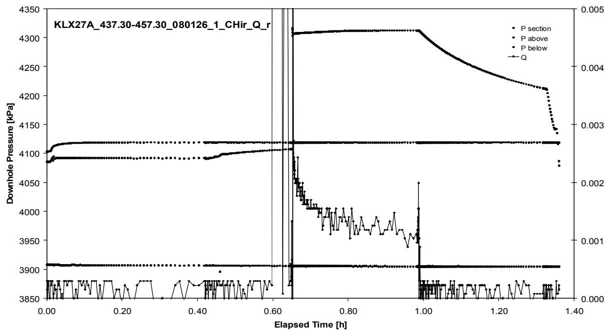
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

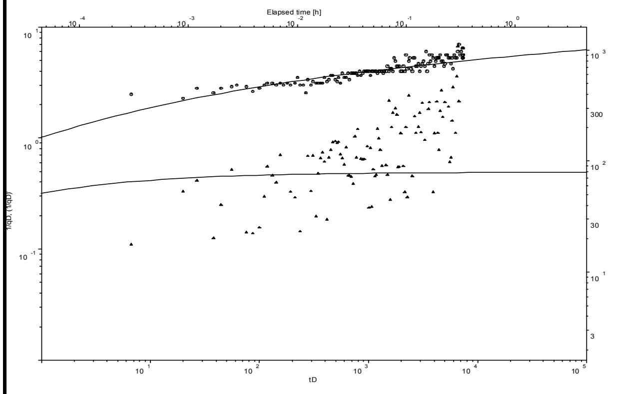
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080126 13:38
Test section from - to (m):	437.30-457.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

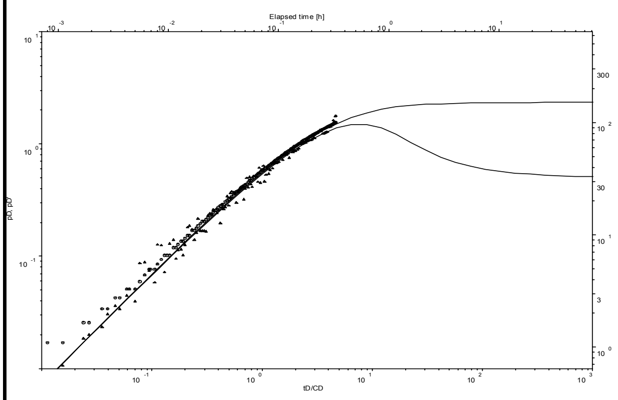
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4086		
p_i (kPa) =	4107		
p_p(kPa) =	4309	p_F (kPa) =	4211
Q_p (m^3/s)=	1.83E-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)=	13.4		
Derivative fact.=	0.15	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	8.9E-10		
T_M (m^2/s)=	9.3E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.35	dt_1 (min) =	#NV
dt_2 (min) =	7.11	dt_2 (min) =	#NV
T (m^2/s) =	8.0E-10	T (m^2/s) =	5.6E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.0E-11	K_s (m/s) =	2.8E-11
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	9.2E-11
C_D (-) =	NA	C_D (-) =	1.0E-02
ξ (-) =	1.9	ξ (-) =	0.7
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	9.2E-11
dt_2 (min) =	NA	C_D (-) =	1.0E-02
T_T (m^2/s) =	5.6E-10	ξ (-) =	0.7
S (-) =	1.0E-06		
K_s (m/s) =	2.8E-11		
S_s (1/m) =	5.0E-08		

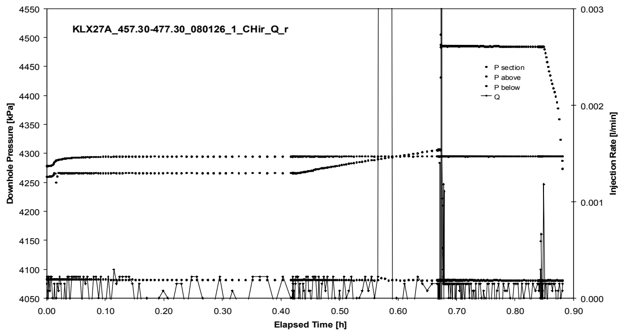
Comments:

The recommended transmissivity of 5.6E-10 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 1E-10 m2/s to 5E-9 m2/s. A flow dimension of 2 was assumed. Due to the low formation transmissivity no static pressure was derived.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080126 15:37
Test section from - to (m):	457.30-477.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
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) =	4260		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.6		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	5.0E-13
S_s (1/m) =	NA	S_s (1/m) =	5.0E-08
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	5.0E-13		
S_s (1/m) =	5.0E-08		

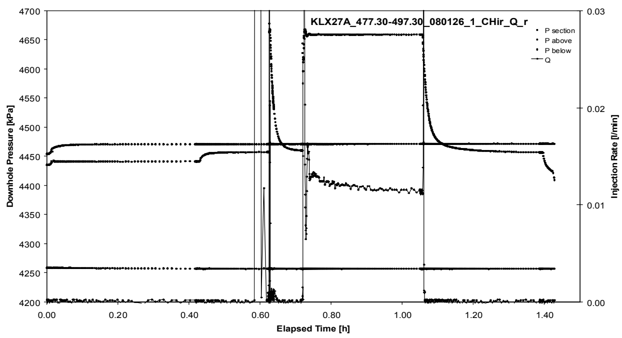
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

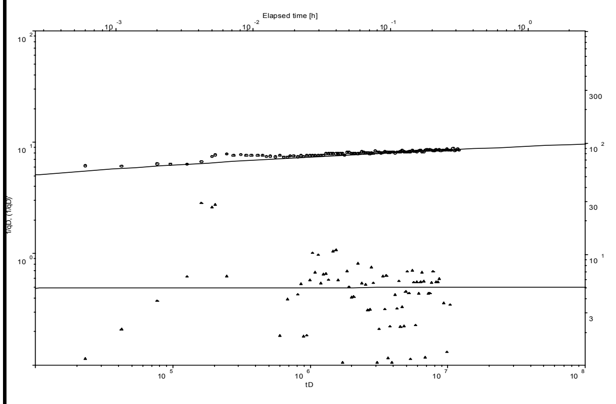
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080126 17:13
Test section from - to (m):	477.30-497.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

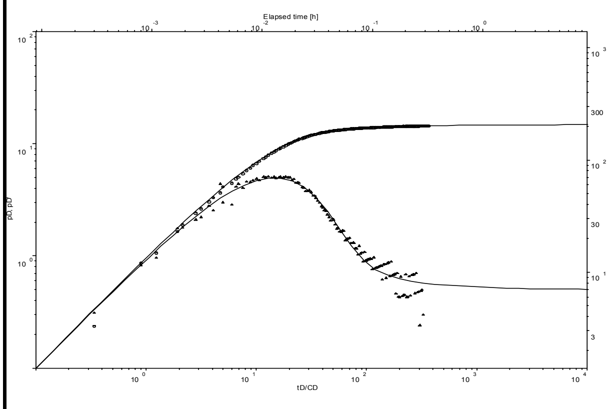
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4436		
p_i (kPa) =	4460		
p_p(kPa) =	4654	p_F (kPa) =	4456
Q_p (m^3/s)=	1.85E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.9		
Derivative fact.=	0.09	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	9.4E-09		
T_M (m^2/s)=	9.8E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.36	dt_1 (min) =	NA
dt_2 (min) =	12.64	dt_2 (min) =	NA
T (m^2/s) =	1.3E-08	T (m^2/s) =	2.2E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.6E-10	K_s (m/s) =	1.1E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.5E-11
C_D (-) =	NA	C_D (-) =	5.0E-03
ξ (-) =	4.2	ξ (-) =	5.
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	4.5E-11
dt_2 (min) =	NA	C_D (-) =	5.0E-03
T_T (m^2/s) =	2.2E-08	ξ (-) =	5.
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-09		
S_s (1/m) =	5.0E-08		

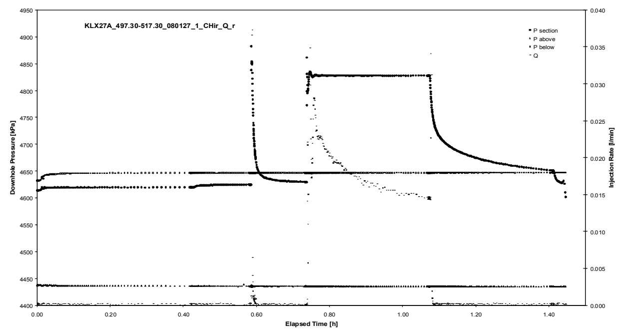
Comments:

The recommended transmissivity of 2.2E-8 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6E-9 m2/s to 7E-8 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 4,451.9 kPa.

Test Summary Sheet

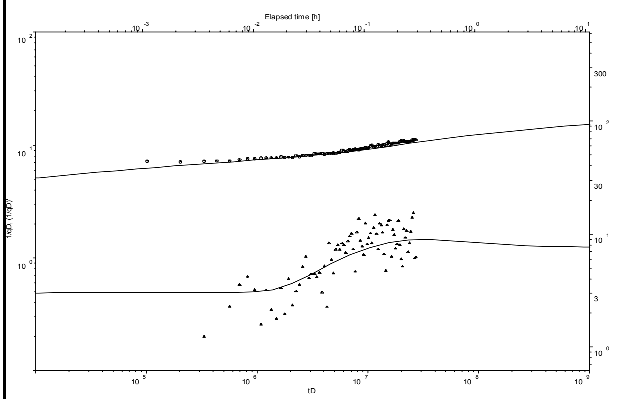
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080127 08:40
Test section from - to (m):	497.30-517.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

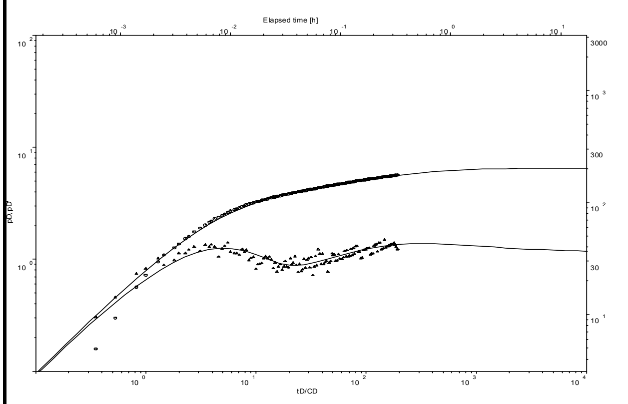


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4614		
p_i (kPa) =	4629		
p_p(kPa) =	4828	p_F (kPa) =	4651
Q_p (m^3/s)=	2.50E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.2		
Derivative fact.=	0.11	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.2E-08		
T_M (m^2/s)=	1.3E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.37	dt_1 (min) =	1.09
dt_2 (min) =	1.26	dt_2 (min) =	3.62
T (m^2/s) =	2.1E-08	T (m^2/s) =	1.4E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-09	K_s (m/s) =	7.1E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.6E-11
C_D (-) =	NA	C_D (-) =	6.2E-03
ξ (-) =	4.4	ξ (-) =	1.
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.09	C (m^3/Pa) =	5.6E-11
dt_2 (min) =	3.62	C_D (-) =	6.2E-03
T_T (m^2/s) =	1.4E-08	ξ (-) =	1.
S (-) =	1.0E-06		
K_s (m/s) =	7.1E-10		
S_s (1/m) =	5.0E-08		

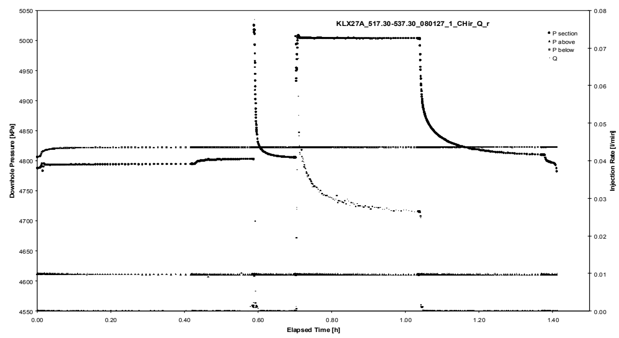
Comments:

The recommended transmissivity of 1.4E-8 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6E-9 m2/s to 5E-8 m2/s. The flow dimension 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 4,623.8 kPa.

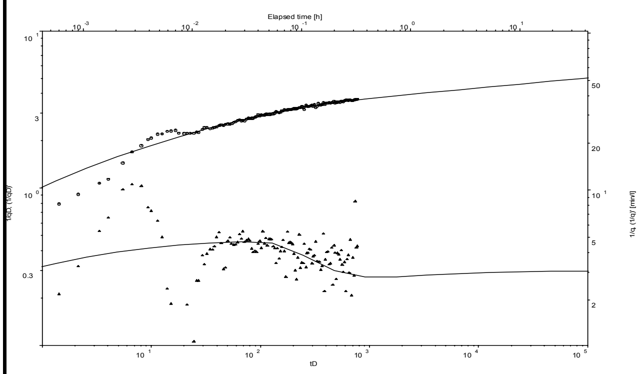
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080127 10:48
Test section from - to (m):	517.30-537.30	Responsible for test execution:	Pilipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

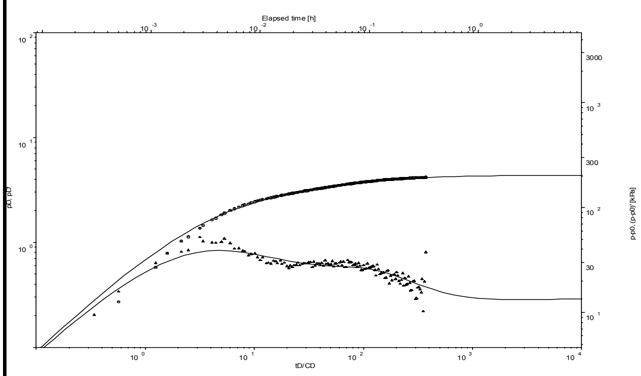
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4788		
p_i (kPa) =	4805		
p_p(kPa) =	5002	p_F (kPa) =	4810
Q_p (m^3/s)=	4.50E-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)=	14.4		
Derivative fact.=	0.06	Derivative fact.=	0.02
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) =	1.00	dt_1 (min) =	1.03
dt_2 (min) =	3.19	dt_2 (min) =	5.47
T (m^2/s) =	1.3E-08	T (m^2/s) =	1.7E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.4E-10	K_s (m/s) =	8.6E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.5E-11
C_D (-) =	NA	C_D (-) =	3.9E-03
ξ (-) =	-.6	ξ (-) =	.
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	1.03	C (m^3/Pa) =	3.5E-11
dt_2 (min) =	5.47	C_D (-) =	3.9E-03
T_T (m^2/s) =	1.7E-08	ξ (-) =	.
S (-) =	1.0E-06		
K_s (m/s) =	8.6E-10		
S_s (1/m) =	5.0E-08		

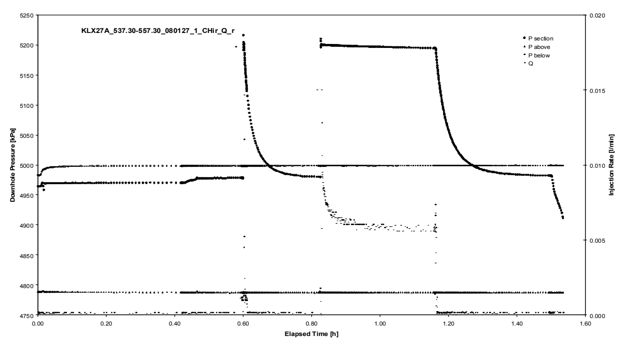
Comments:

The recommended transmissivity of 1.7E-8 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the best horizontal stabilization and derivative quality. The confidence range for the interval transmissivity is estimated to be 8E-9 m2/s to 7E-8 m2/s. The flow dimension 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 4,798.9 kPa

Test Summary Sheet

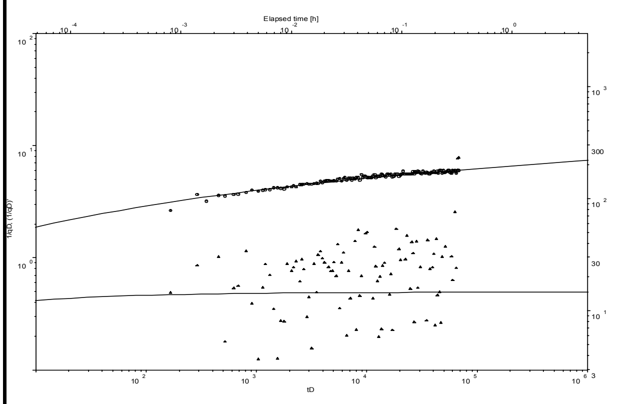
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080127 12:56
Test section from - to (m):	537.30-577.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

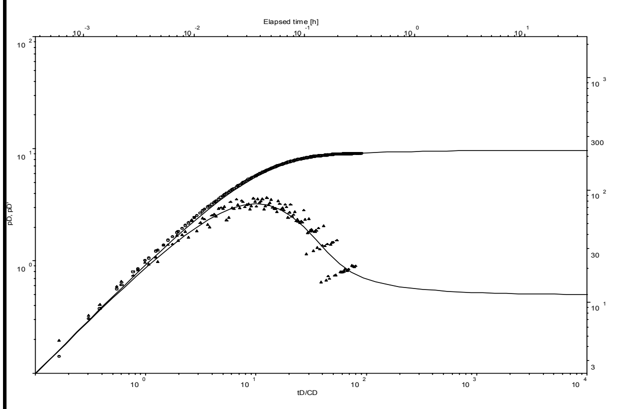


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4964		
p_i (kPa) =	4980		
p_p(kPa) =	5194	p_F (kPa) =	4982
Q_p (m^3/s)=	1.00E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.7		
Derivative fact.=	0.05	Derivative fact.=	0
Results		**Results**	
Q/s (m^2/s)=	4.6E-09		
T_M (m^2/s)=	4.8E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.49	dt_1 (min) =	NA
dt_2 (min) =	12.74	dt_2 (min) =	NA
T (m^2/s) =	4.1E-09	T (m^2/s) =	6.7E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.1E-10	K_s (m/s) =	3.4E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.6E-11
C_D (-) =	NA	C_D (-) =	6.2E-03
ξ (-) =	2.2	ξ (-) =	5.6
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	5.6E-11
dt_2 (min) =	NA	C_D (-) =	6.2E-03
T_T (m^2/s) =	6.7E-09	ξ (-) =	5.6
S (-) =	1.0E-06		
K_s (m/s) =	3.4E-10		
S_s (1/m) =	5.0E-08		

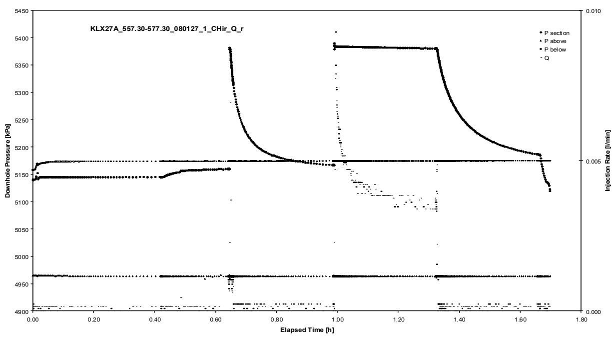
Comments:

The recommended transmissivity of 6.7E-9 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2E-9 m2/s to 3E-7 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 4,907.9 kPa.

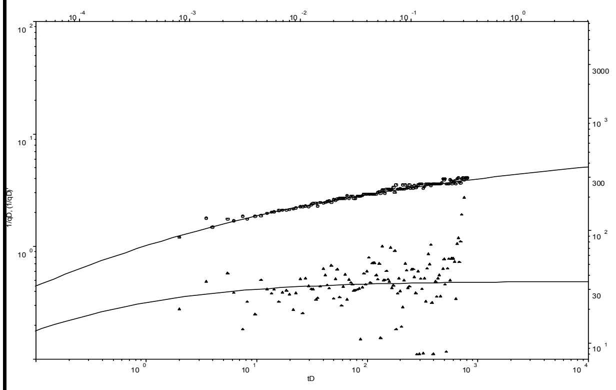
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080127 15:38
Test section from - to (m):	557.30-577.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

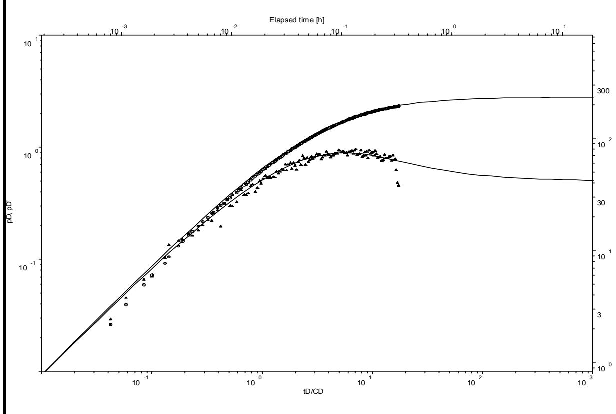
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5140		
p_i (kPa) =	5173		
p_p(kPa) =	5378	p_F (kPa) =	5184
Q_p (m^3/s)=	5.67E-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)=	14.9		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.7E-09		
T_M (m^2/s)=	2.8E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.56	dt_1 (min) =	NA
dt_2 (min) =	12.45	dt_2 (min) =	NA
T (m^2/s) =	1.8E-09	T (m^2/s) =	1.3E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.8E-11	K_s (m/s) =	6.4E-11
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.6E-11
C_D (-) =	NA	C_D (-) =	6.2E-03
ξ (-) =	.4	ξ (-) =	-.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	5.6E-11
dt_2 (min) =	NA	C_D (-) =	6.2E-03
T_T (m^2/s) =	1.3E-09	ξ (-) =	-.2
S (-) =	1.0E-06		
K_s (m/s) =	6.4E-11		
S_s (1/m) =	5.0E-08		

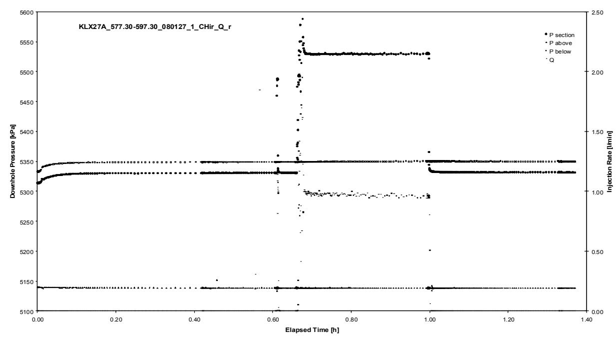
Comments:

The recommended transmissivity of 1.3E-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 8E-10 m2/s to 6E-9 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 4,141.4 kPa.

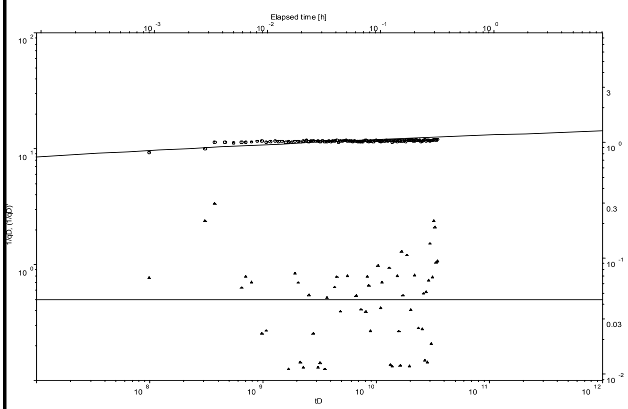
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080127 18:07
Test section from - to (m):	577.30-597.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2\cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

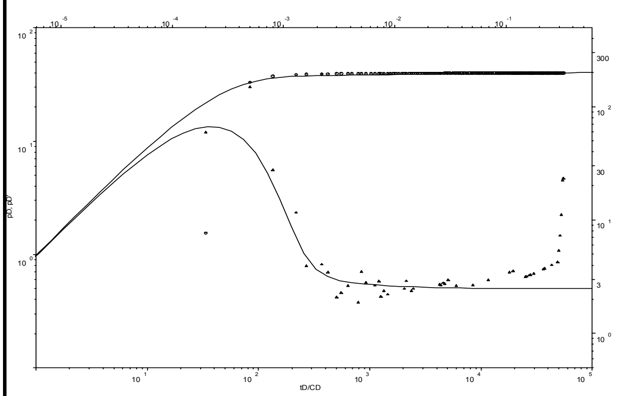
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5315		
p_i (kPa) =	5331		
p_p(kPa) =	5529	p_F (kPa) =	5531
Q_p (m^3/s)=	1.60E-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)=	15.2		
Derivative fact.=	0.07	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	7.9E-07		
T_M (m^2/s)=	8.3E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.32	dt_1 (min) =	0.22
dt_2 (min) =	14.69	dt_2 (min) =	6.86
T (m^2/s) =	1.5E-06	T (m^2/s) =	5.1E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.5E-08	K_s (m/s) =	2.6E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.0E-11
C_D (-) =	NA	C_D (-) =	7.7E-03
ξ (-) =	5.8	ξ (-) =	33.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	1.32	C (m^3/Pa) =	7.0E-11
dt_2 (min) =	14.69	C_D (-) =	7.7E-03
T_T (m^2/s) =	1.5E-06	ξ (-) =	5.8
S (-) =	1.0E-06		
K_s (m/s) =	7.5E-08		
S_s (1/m) =	5.0E-08		

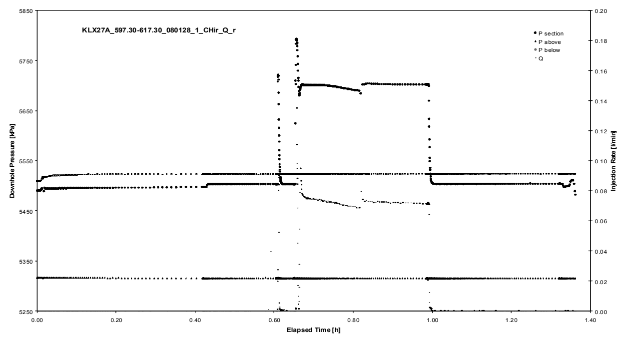
Comments:

The recommended transmissivity of 5.1E-6 m2/s was derived from the analysis of the CHir phase. The confidence range for the interval transmissivity is estimated to be 5E-7 m2/s to 6E-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 5,331.8 kPa.

Test Summary Sheet

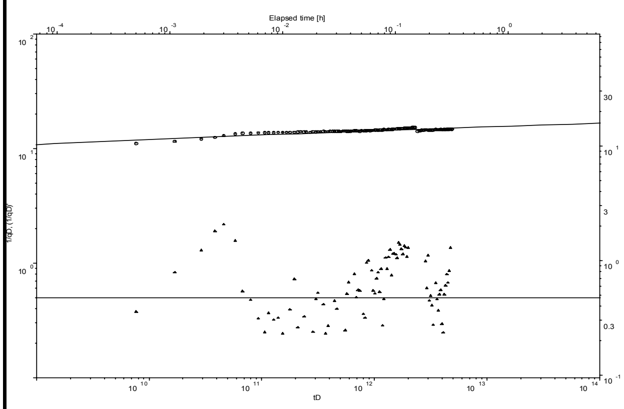
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080128 08:48
Test section from - to (m):	597.30-617.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

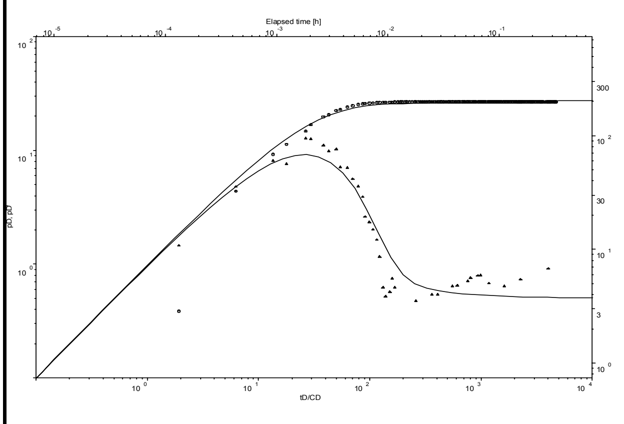


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5490		
p_i (kPa) =	5503		
p_p(kPa) =	5699	p_F (kPa) =	5504
Q_p (m^3/s)=	1.18E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.5		
Derivative fact.=	0.06	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	5.9E-08		
T_M (m^2/s)=	6.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.10	dt_1 (min) =	1.49
dt_2 (min) =	4.72	dt_2 (min) =	6.34
T (m^2/s) =	1.4E-07	T (m^2/s) =	2.5E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.8E-09	K_s (m/s) =	1.3E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.0E-11
C_D (-) =	NA	C_D (-) =	4.4E-03
ξ (-) =	9.5	ξ (-) =	21.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.10	C (m^3/Pa) =	4.0E-11
dt_2 (min) =	4.72	C_D (-) =	4.4E-03
T_T (m^2/s) =	1.4E-07	ξ (-) =	9.5
S (-) =	1.0E-06		
K_s (m/s) =	6.8E-09		
S_s (1/m) =	5.0E-08		

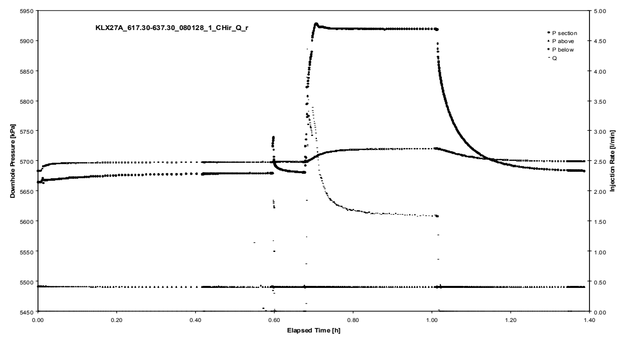
Comments:

The recommended transmissivity of 1.4E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5E-8 m2/s to 6E-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 5,504.2 kPa.

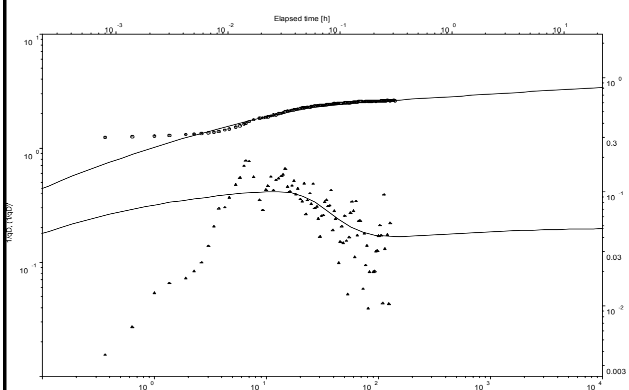
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080128 10:56
Test section from - to (m):	617.30-637.30	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

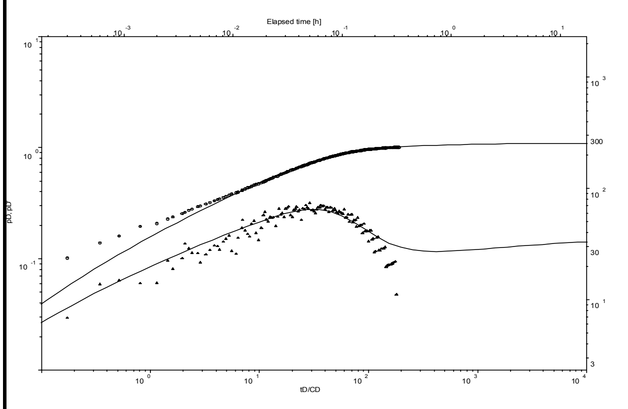
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5665		
p_i (kPa) =	5681		
p_p(kPa) =	5918	p_F (kPa) =	5683
Q_p (m^3/s)=	2.65E-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)=	15.7		
Derivative fact.=	0.02	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	1.1E-06		
T_M (m^2/s)=	1.1E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	1.69
dt_2 (min) =	NA	dt_2 (min) =	4.42
T (m^2/s) =	4.6E-07	T (m^2/s) =	2.0E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.3E-08	K_s (m/s) =	9.8E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.9E-10
C_D (-) =	NA	C_D (-) =	8.7E-02
ξ (-) =	-3.2	ξ (-) =	-4.4
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	1.69	C (m^3/Pa) =	7.9E-10
dt_2 (min) =	4.42	C_D (-) =	8.7E-02
T_T (m^2/s) =	2.0E-07	ξ (-) =	-4.4
S (-) =	1.0E-06		
K_s (m/s) =	9.8E-09		
S_s (1/m) =	5.0E-08		

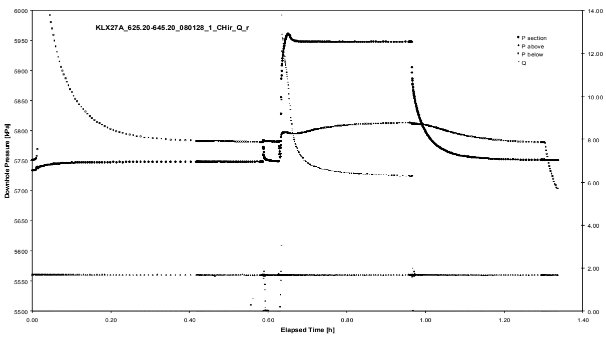
Comments:

The recommended transmissivity of 2.0E-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 9E-8 m2/s to 9E-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 5,663.2 kPa.

Test Summary Sheet

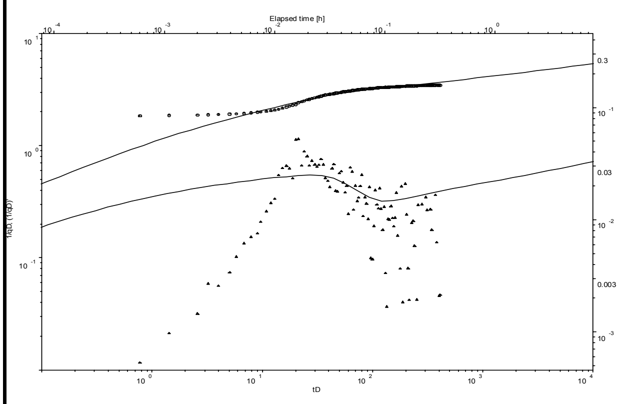
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080128 13:24
Test section from - to (m):	625.20-645.20	Responsible for test execution:	Philipp Wolf Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

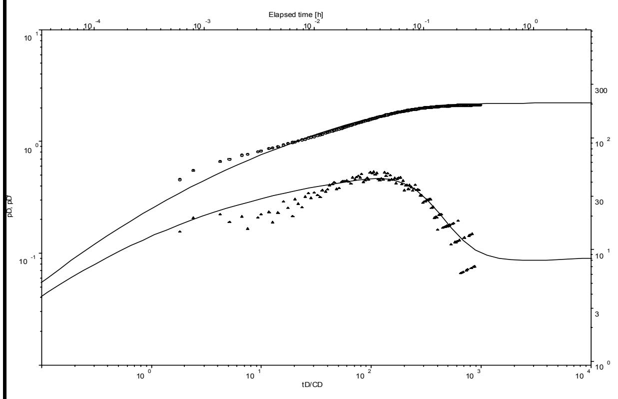


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5735		
p_i (kPa) =	5749		
p_p(kPa) =	5947	p_F (kPa) =	5751
Q_p (m^3/s)=	1.05E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.8		
Derivative fact.=	0	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	5.2E-06		
T_M (m^2/s)=	5.4E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	1.34
dt_2 (min) =	NA	dt_2 (min) =	3.76
T (m^2/s) =	3.1E-06	T (m^2/s) =	1.9E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.6E-07	K_s (m/s) =	9.6E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-09
C_D (-) =	NA	C_D (-) =	1.6E-01
ξ (-) =	-3.7	ξ (-) =	-4.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.34	C (m^3/Pa) =	1.5E-09
dt_2 (min) =	3.76	C_D (-) =	1.6E-01
T_T (m^2/s) =	1.9E-06	ξ (-) =	-4.1
S (-) =	1.0E-06		
K_s (m/s) =	9.6E-08		
S_s (1/m) =	5.0E-08		

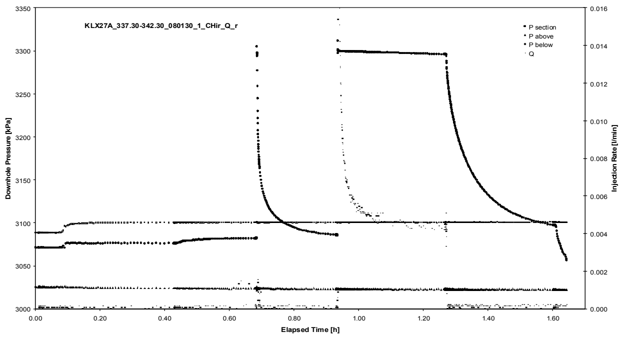
Comments:

The recommended transmissivity of 1.9E-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 9E-7 m2/s to 9E-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 5,743.2 kPa.

Test Summary Sheet

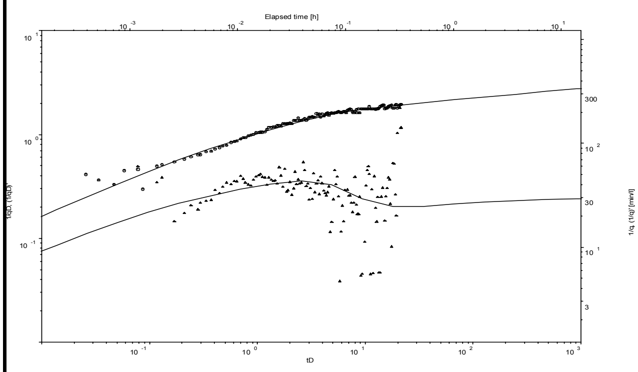
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080130 14:37
Test section from - to (m):	337.30-342.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

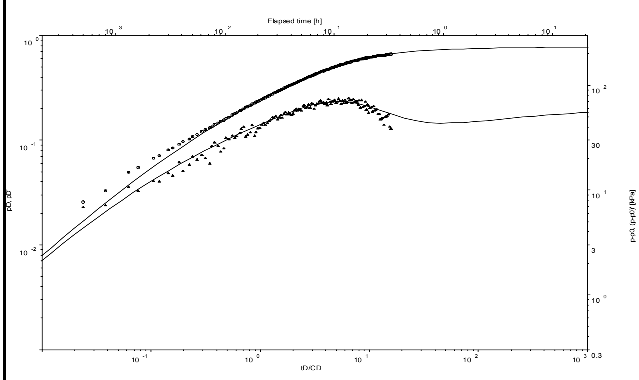


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3071		
p_i (kPa) =	3085		
p_p(kPa) =	3296	p_F (kPa) =	3101
Q_p (m^3/s)=	6.67E-08		
tp (s) =	1200	t_F (s) =	1200
S el S* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.8		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.1E-09		
T_M (m^2/s)=	2.6E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.97	dt_1 (min) =	NA
dt_2 (min) =	3.69	dt_2 (min) =	NA
T (m^2/s) =	1.0E-09	T (m^2/s) =	4.3E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.0E-10	K_s (m/s) =	8.7E-11
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.1E-11
C_D (-) =	NA	C_D (-) =	2.3E-03
ξ (-) =	-1.1	ξ (-) =	-2.0
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.97	C (m^3/Pa) =	2.1E-11
dt_2 (min) =	3.69	C_D (-) =	2.3E-03
T_T (m^2/s) =	1.0E-09	ξ (-) =	-1.1
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-10		
S_s (1/m) =	2.0E-07		

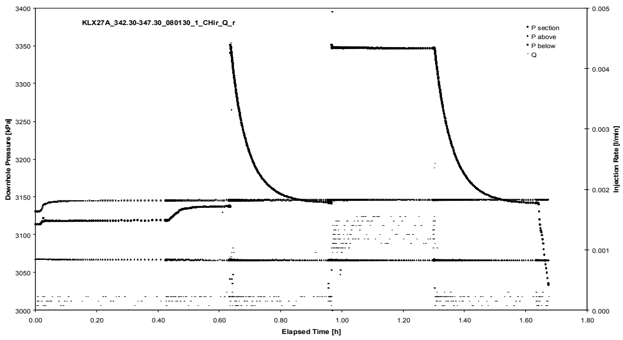
Comments:

The recommended transmissivity of 1.0E-9 m2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 8E-10 m2/s to 7E-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 type curve extrapolation in the Horner plot to a value of 3,063.1 kPa.

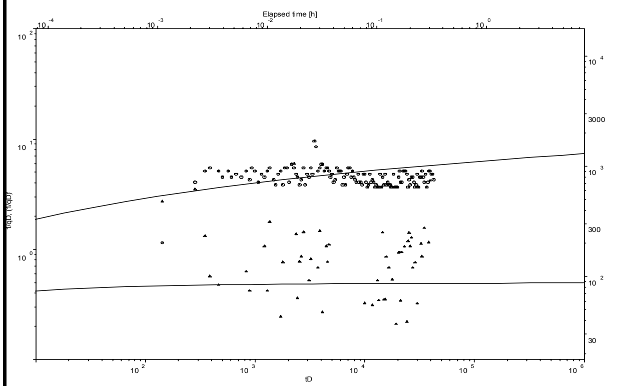
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080130 16:51
Test section from - to (m):	342.30-347.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

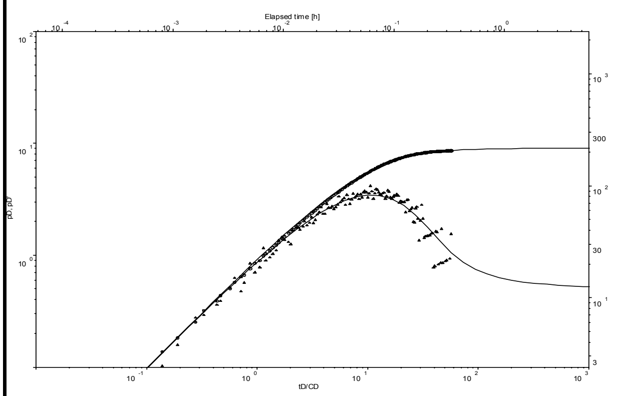
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3114		
p_i (kPa) =	3141		
p_p(kPa) =	3347	p_F (kPa) =	3146
Q_p (m^3/s)=	1.67E-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)=	11.8		
Derivative fact.=	0.19	Derivative fact.=	0
Results		**Results**	
Q/s (m^2/s)=	7.9E-10		
T_M (m^2/s)=	6.6E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.76	dt_1 (min) =	NA
dt_2 (min) =	12.26	dt_2 (min) =	NA
T (m^2/s) =	7.2E-10	T (m^2/s) =	1.4E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.4E-10	K_s (m/s) =	2.8E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.9E-11
C_D (-) =	NA	C_D (-) =	2.1E-03
ξ (-) =	2.8	ξ (-) =	6.0
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	1.9E-11
dt_2 (min) =	NA	C_D (-) =	2.1E-03
T_T (m^2/s) =	1.4E-09	ξ (-) =	6.0
S (-) =	1.0E-06		
K_s (m/s) =	2.8E-10		
S_s (1/m) =	2.0E-07		

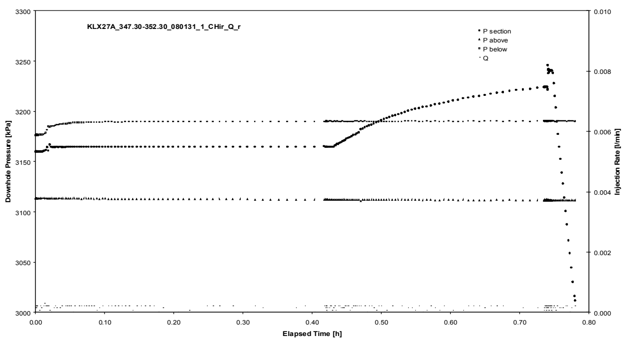
Comments:

The recommended transmissivity of 1.4E-9 m2/s was derived from the analysis of the CHir phase, which shows the best data quality. The confidence range for the interval transmissivity is estimated to be 5E-10 m2/s to 7E-9 m2/s. The flow dimension used for the analysis 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 3,127.8 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	0801301 08:35
Test section from - to (m):	347.30-352.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	3160		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

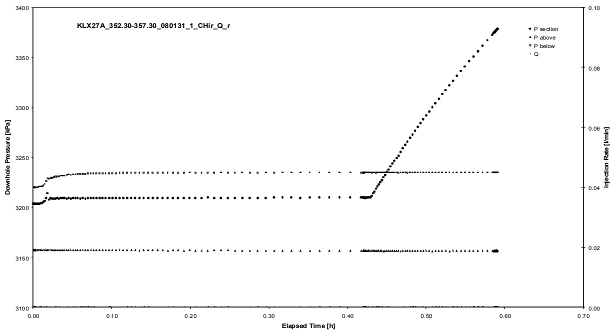
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	0801301 09:56
Test section from - to (m):	352.30-357.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	3203		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

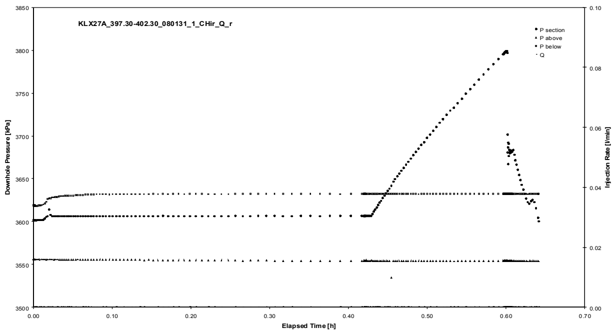
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	0801301 11:31
Test section from - to (m):	397.30-402.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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

Not analysed

Log-Log plot incl. derivatives- recovery period

Not analysed

Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3601		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.6		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	NA
dt_2 (min) =	NA	C_D (-) =	NA
T_T (m^2/s) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

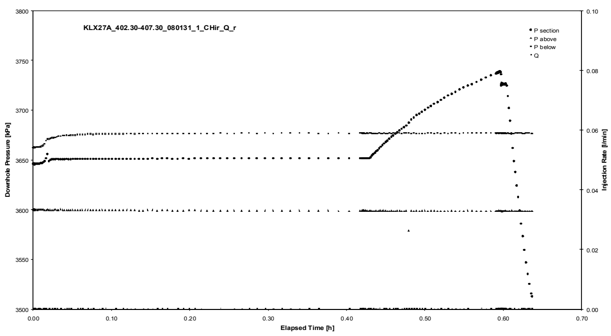
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080131 13:28
Test section from - to (m):	402.30-407.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	3636		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.7		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

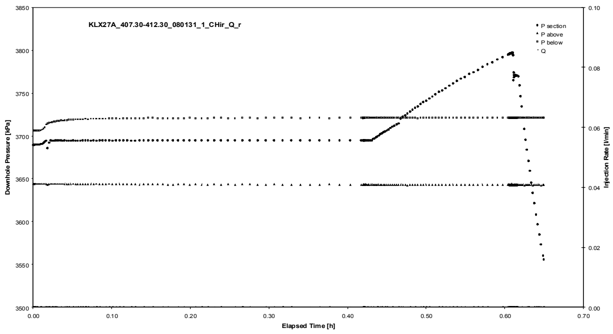
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080131 14:39
Test section from - to (m):	407.30-412.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	3690		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.8		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

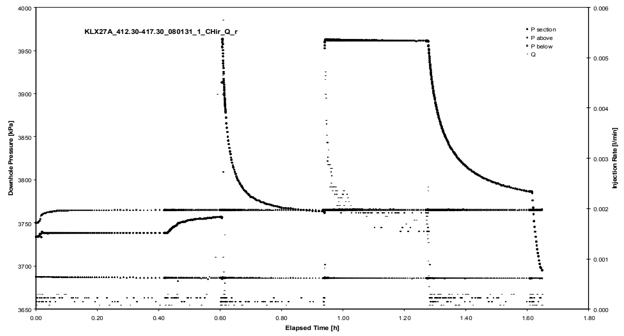
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

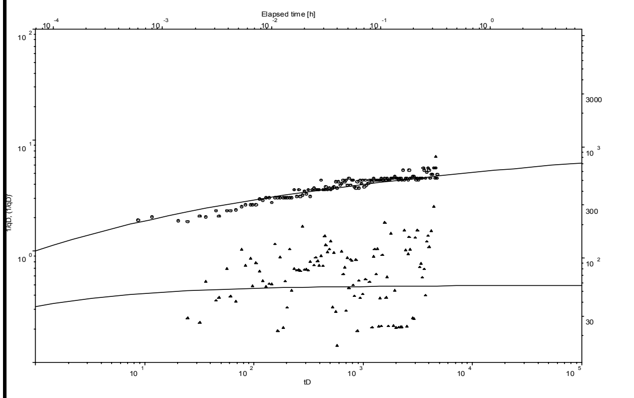
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080131 15:50
Test section from - to (m):	412.30-417.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

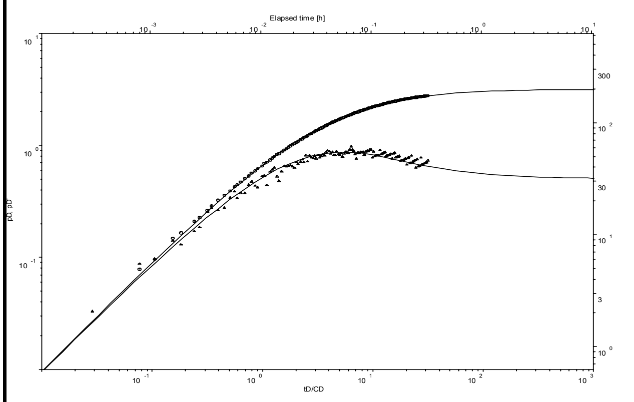
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3734		
p_i (kPa) =	3765		
p_p(kPa) =	3960	p_F (kPa) =	3786
Q_p (m^3/s)=	3.00E-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)=	12.8		
Derivative fact.=	0.11	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.5E-09		
T_M (m^2/s)=	1.2E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.34	dt_1 (min) =	NA
dt_2 (min) =	10.88	dt_2 (min) =	NA
T (m^2/s) =	1.2E-09	T (m^2/s) =	8.3E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.3E-10	K_s (m/s) =	1.7E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.0E-11
C_D (-) =	NA	C_D (-) =	2.2E-03
ξ (-) =	1.5	ξ (-) =	0.3
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	2.0E-11
dt_2 (min) =	NA	C_D (-) =	2.2E-03
T_T (m^2/s) =	8.3E-10	ξ (-) =	0.3
S (-) =	1.0E-06		
K_s (m/s) =	1.7E-10		
S_s (1/m) =	2.0E-07		

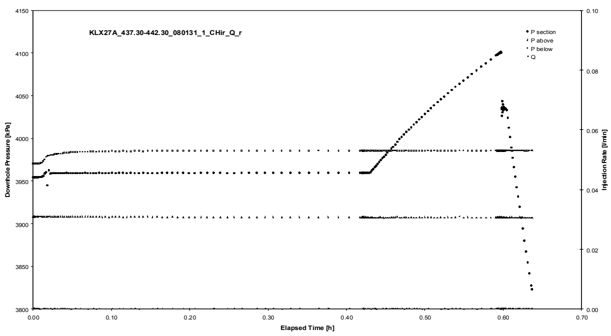
Comments:

The recommended transmissivity of 8.3E-10 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 5E-10 m2/s to 6E-9 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,754.4 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080131 18:13
Test section from - to (m):	437.30-442.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	3954		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.2		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

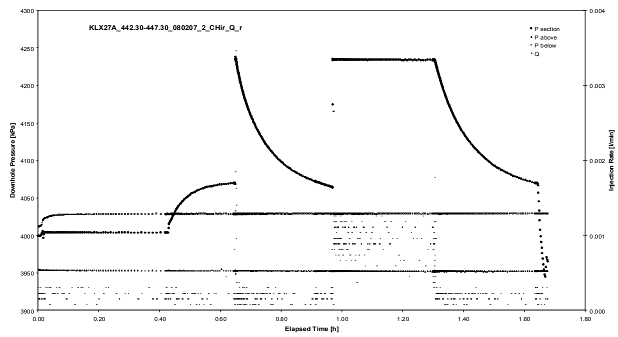
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

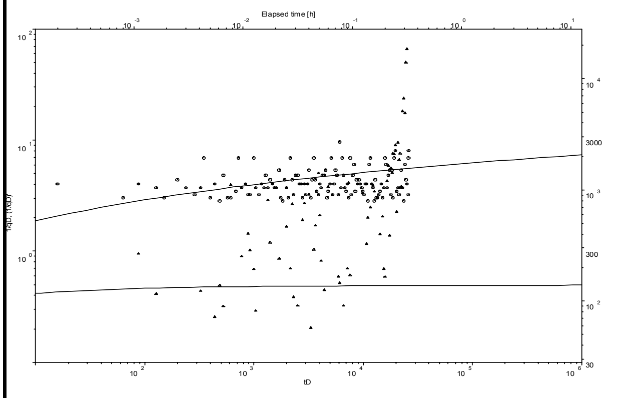
Project:	Oskarshamn site investigation	Test type:[1]	Chir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX27A	Test start:	08027 13:26
Test section from - to (m):	442.30-447.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

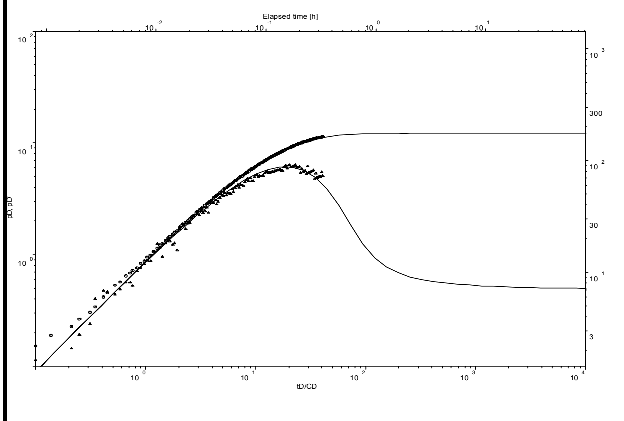


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3400		
p_i (kPa) =	4063		
p_p(kPa) =	4234	p_F (kPa) =	4069
Q_p (m^3/s)=	1.67E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.3		
Derivative fact.=	0.2	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.6E-10		
T_M (m^2/s)=	7.9E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.64	dt_1 (min) =	NA
dt_2 (min) =	8.69	dt_2 (min) =	NA
T (m^2/s) =	5.4E-10	T (m^2/s) =	1.8E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-10	K_s (m/s) =	3.6E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.4E-11
C_D (-) =	NA	C_D (-) =	3.7E-03
ξ (-) =	2.7	ξ (-) =	10.4
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	3.4E-11
dt_2 (min) =	NA	C_D (-) =	3.7E-03
T_T (m^2/s) =	1.8E-09	ξ (-) =	10.4
S (-) =	1.0E-06		
K_s (m/s) =	3.6E-10		
S_s (1/m) =	2.0E-07		

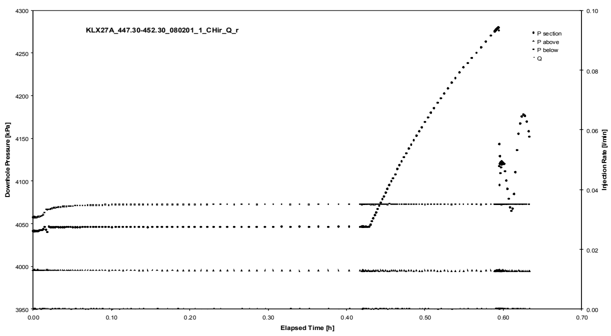
Comments:

The recommended transmissivity of 1.8E-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 5E-10 m2/s to 7E-9 m2/s. The flow dimension used for the analysis 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 4,015.9 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080201 09:43
Test section from - to (m):	447.30-452.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4041		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.3		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

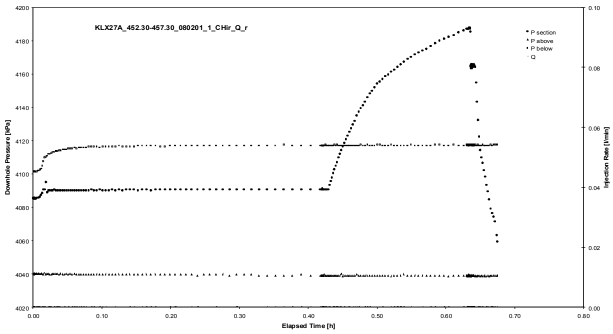
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080201 10:54
Test section from - to (m):	452.30-457.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4086		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.4		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

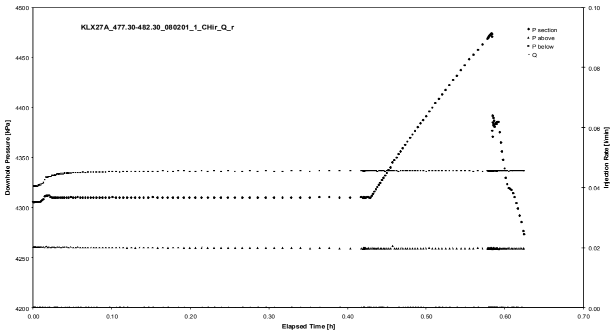
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080201 13:16
Test section from - to (m):	477.30-482.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4306		
p_i (kPa) =	NA		
p_p(kPa) =	NA	p_F (kPa) =	NA
Q_p (m^3/s)=	1.67E-04		
tp (s) =	NA	t_F (s) =	NA
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.7		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

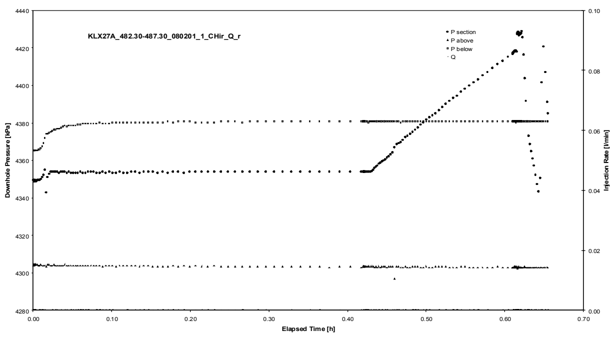
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080201 14:25
Test section from - to (m):	482.30-487.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4350		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.8		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

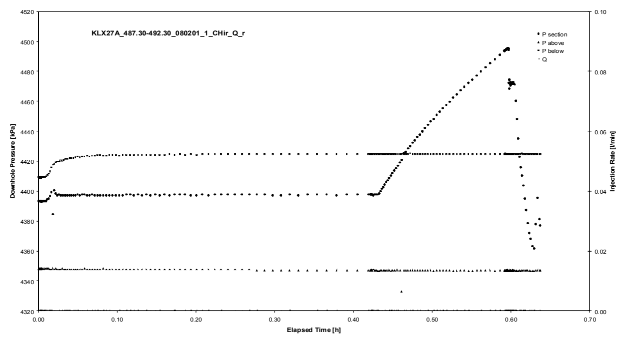
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080201 15:33
Test section from - to (m):	487.30-492.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4393		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.9		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

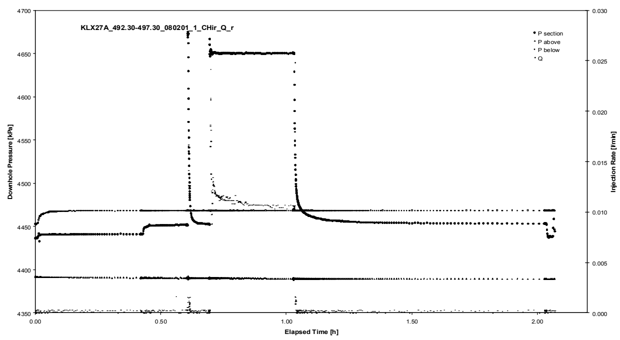
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

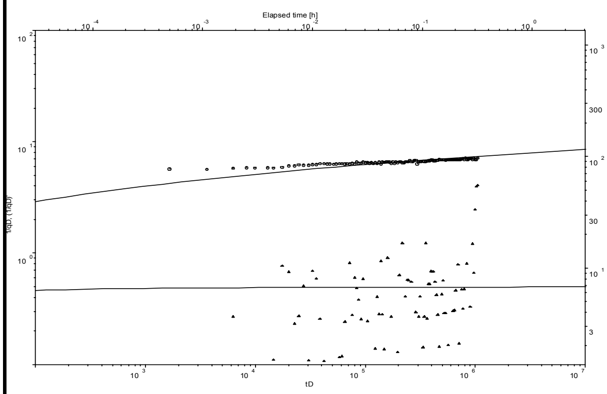
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080201 16:47
Test section from - to (m):	492.30-497.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

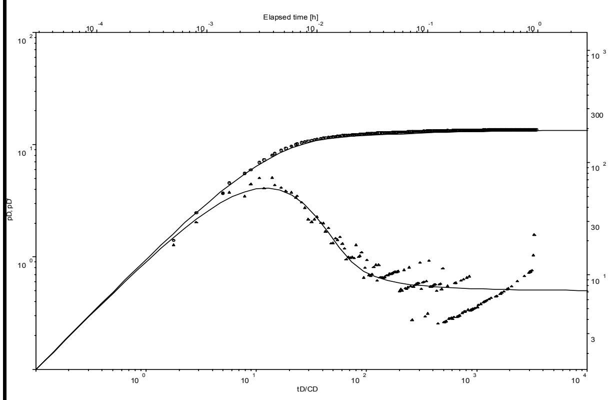


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4437		
p_i (kPa) =	4452		
p_p(kPa) =	4651	p_F (kPa) =	4453
Q_p (m^3/s)=	1.83E-07		
tp (s) =	1200	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.9		
Derivative fact.=	0.06	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	9.0E-09		
T_M (m^2/s)=	7.5E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.49	dt_1 (min) =	2.48
dt_2 (min) =	14.61	dt_2 (min) =	21.08
T (m^2/s) =	9.6E-09	T (m^2/s) =	2.0E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.9E-09	K_s (m/s) =	4.0E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-11
C_D (-) =	NA	C_D (-) =	1.4E-03
ξ (-) =	3.2	ξ (-) =	8.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	2.48	C (m^3/Pa) =	1.3E-11
dt_2 (min) =	21.08	C_D (-) =	1.4E-03
T_T (m^2/s) =	2.0E-08	ξ (-) =	8.9
S (-) =	1.0E-06		
K_s (m/s) =	4.0E-09		
S_s (1/m) =	2.0E-07		

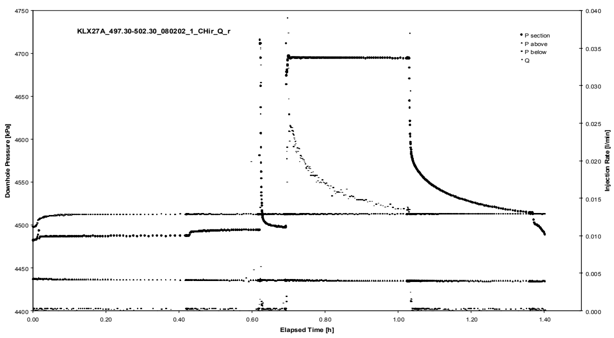
Comments:

The recommended transmissivity of 2.0E-8 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality and a clear horizontal stabilization. The confidence range for the interval transmissivity is estimated to be 5E-9 m2/s to 8E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,452.1 kPa.

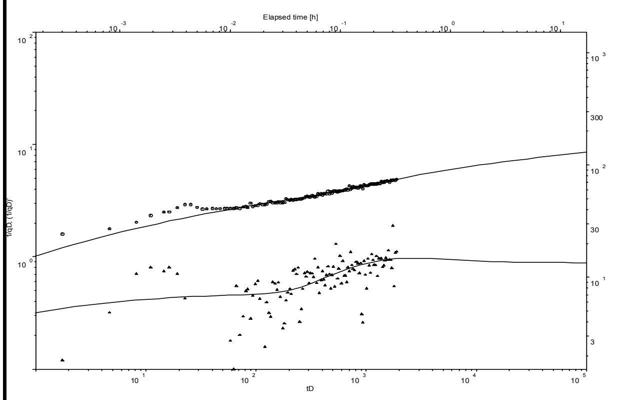
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080202 08:26
Test section from - to (m):	497.30-502.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

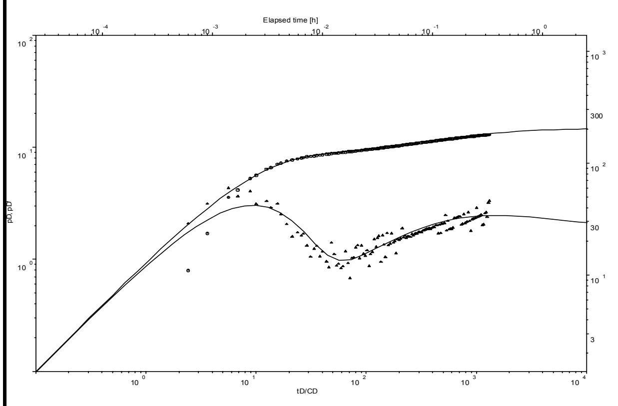
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4483		
p_i (kPa) =	4499		
p_p(kPa) =	4694	p_F (kPa) =	4513
Q_p (m^3/s)=	2.17E-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)=	14.1		
Derivative fact.=	0.11	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.1E-08		
T_M (m^2/s)=	9.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.57	dt_1 (min) =	0.55
dt_2 (min) =	2.23	dt_2 (min) =	1.37
T (m^2/s) =	8.8E-09	T (m^2/s) =	3.0E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-09	K_s (m/s) =	6.0E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.7E-11
C_D (-) =	NA	C_D (-) =	1.9E-03
ξ (-) =	0.0	ξ (-) =	6.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	0.57	C (m^3/Pa) =	1.7E-11
dt_2 (min) =	2.23	C_D (-) =	1.9E-03
T_T (m^2/s) =	8.8E-09	ξ (-) =	0.0
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-09		
S_s (1/m) =	2.0E-07		

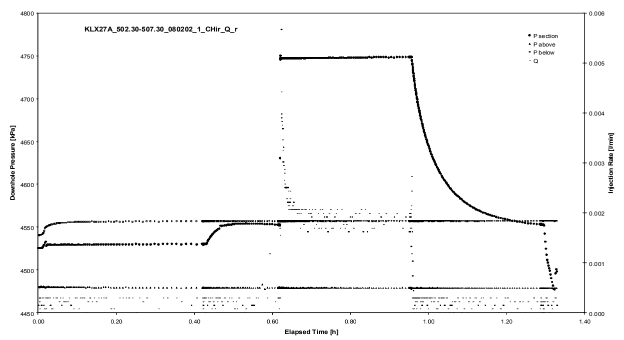
Comments:

The recommended transmissivity of 8.8•10-9 m2/s was derived from the analysis of the CHi phase (inner zone). The confidence range for the interval transmissivity is estimated to be 5.0•10-9 m2/s to 8.0•10-8 m2/s. Though no horizontal stabilization of the derivative was reached, 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 4,492.4 kPa.

Test Summary Sheet

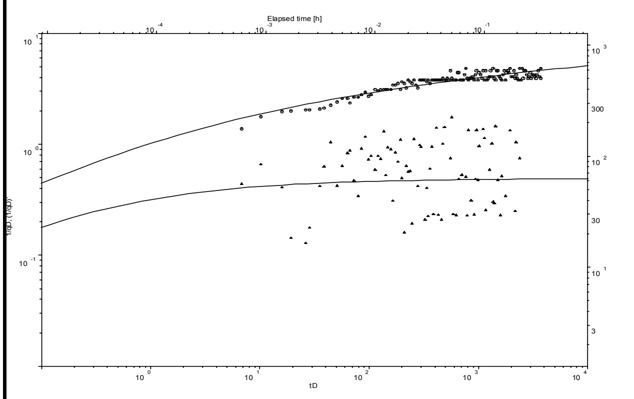
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080202 10:21
Test section from - to (m):	502.30-507.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

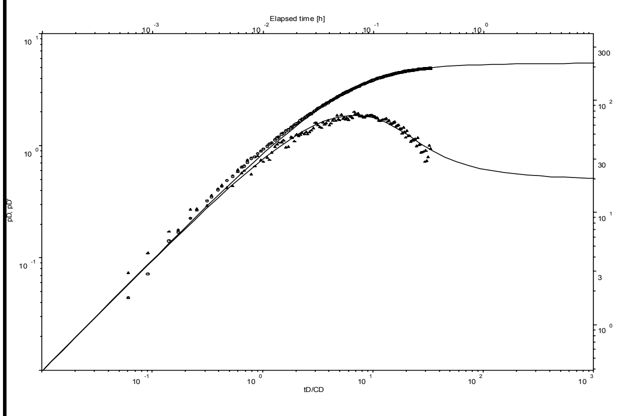


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4526		
p_i (kPa) =	4552		
p_p(kPa) =	4749	p_F (kPa) =	4557
Q_p (m^3/s)=	3.00E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.1		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.5E-09		
T_M (m^2/s)=	1.2E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.22	dt_1 (min) =	NA
dt_2 (min) =	9.47	dt_2 (min) =	NA
T (m^2/s) =	1.0E-09	T (m^2/s) =	1.3E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.1E-10	K_s (m/s) =	2.6E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.0E-11
C_D (-) =	NA	C_D (-) =	3.3E-03
ξ (-) =	1.4	ξ (-) =	2.4
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	3.0E-11
dt_2 (min) =	NA	C_D (-) =	3.3E-03
T_T (m^2/s) =	1.3E-09	ξ (-) =	2.4
S (-) =	1.0E-06		
K_s (m/s) =	2.6E-10		
S_s (1/m) =	2.0E-07		

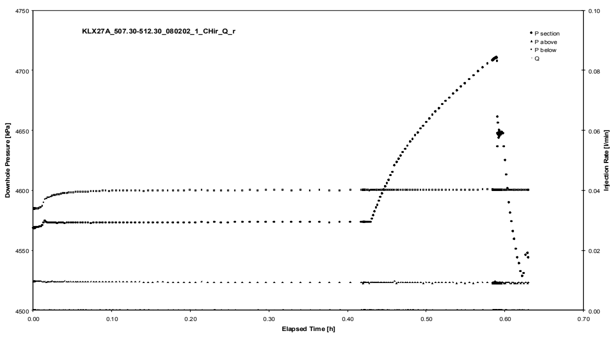
Comments:

The recommended transmissivity of 1.3E-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 9E-10 m2/s to 7E-9 m2/s. Though no horizontal stabilization of the derivative was reached, 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 4,532.8 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080202 13:19
Test section from - to (m):	507.30-512.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4569		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.2		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

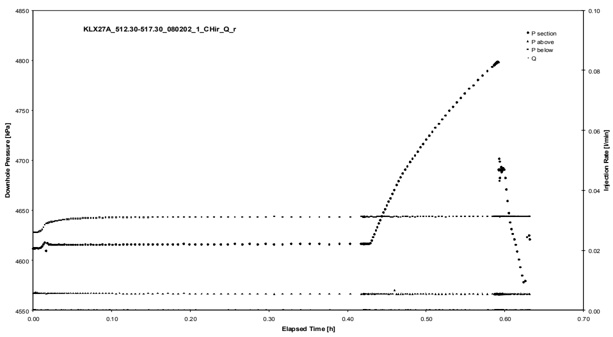
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080202 14:47
Test section from - to (m):	512.30-517.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4612		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.2		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.00E-11	ξ (-) =	NA
S (-) =	1.00E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

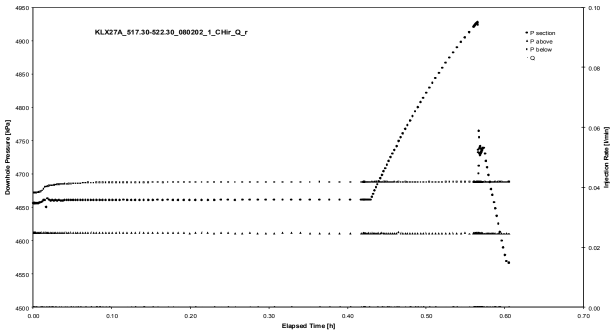
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080202 15:57
Test section from - to (m):	517.30-522.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4657		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.3		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

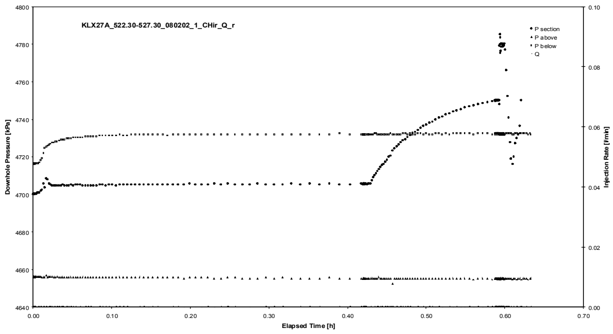
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080202 17:07
Test section from - to (m):	522.30-527.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4700		
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* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.3		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

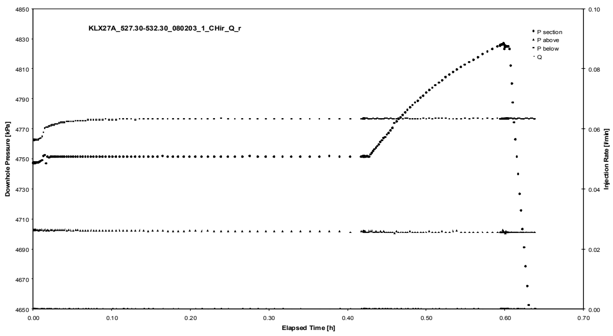
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080203 08:43
Test section from - to (m):	527.30-532.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4748		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.5		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

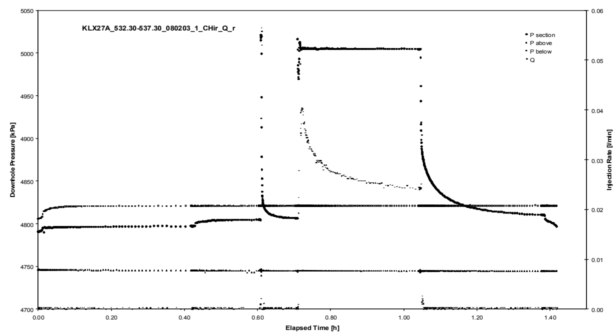
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

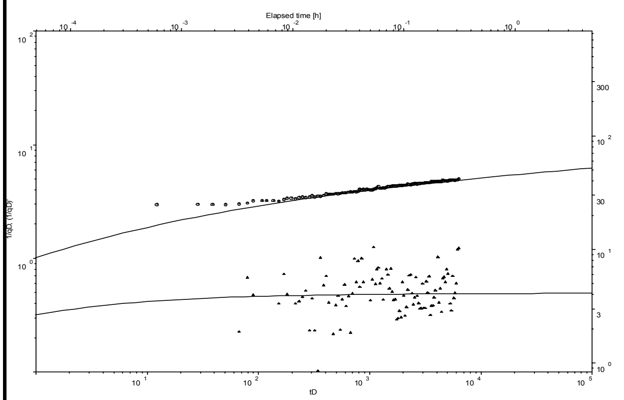
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080203 09:54
Test section from - to (m):	532.30-537.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

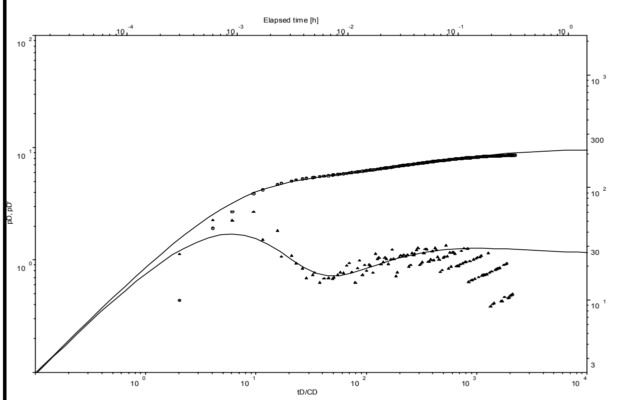
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4791		
p_i (kPa) =	4806		
p_p(kPa) =	5005	p_F (kPa) =	4811
Q_p (m^3/s)=	4.00E-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)=	14.5		
Derivative fact.=	0.04	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	2.0E-08		
T_M (m^2/s)=	1.6E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.62	dt_1 (min) =	0.26
dt_2 (min) =	16.33	dt_2 (min) =	0.80
T (m^2/s) =	1.6E-08	T (m^2/s) =	3.1E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.1E-09	K_s (m/s) =	6.2E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-11
C_D (-) =	NA	C_D (-) =	1.2E-03
ξ (-) =	0.4	ξ (-) =	2.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA
Selected representative parameters.			
dt_1 (min) =	0.62	C (m^3/Pa) =	1.1E-11
dt_2 (min) =	16.33	C_D (-) =	1.2E-03
T_T (m^2/s) =	1.6E-08	ξ (-) =	0.4
S (-) =	1.0E-06		
K_s (m/s) =	3.1E-09		
S_s (1/m) =	2.0E-07		

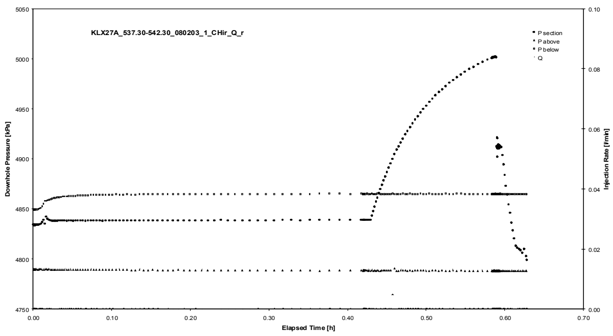
Comments:

The recommended transmissivity of 1.6E-8 m2/s was derived from the analysis of the CHi phase, which shows a clear horizontal stabilization. The confidence range for the interval transmissivity is estimated to be 8E-9 m2/s to 8E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,799.4 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080203 11:51
Test section from - to (m):	537.30-542.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4834		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.6		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

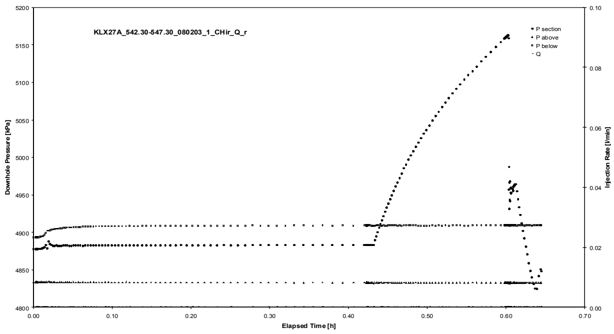
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080203 13:01
Test section from - to (m):	542.30-547.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	4877		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.6		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

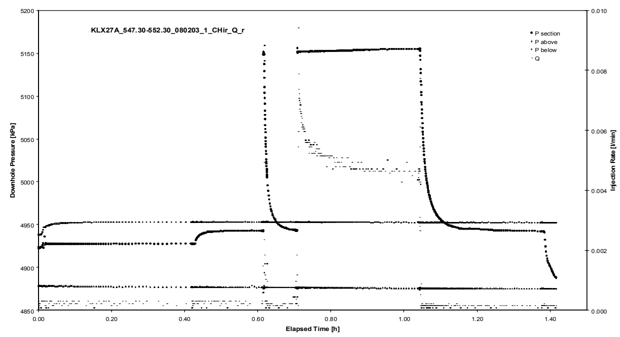
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

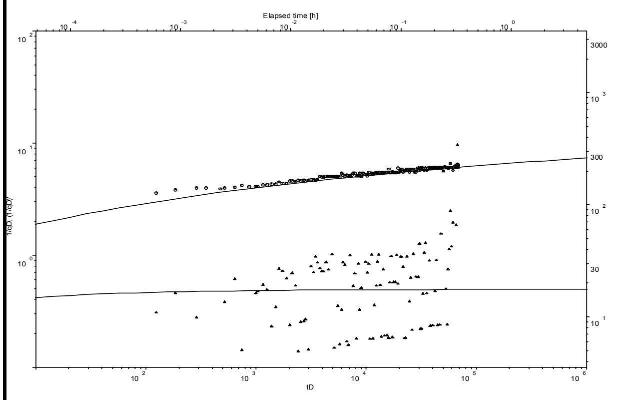
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080203 15:16
Test section from - to (m):	547.30-552.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

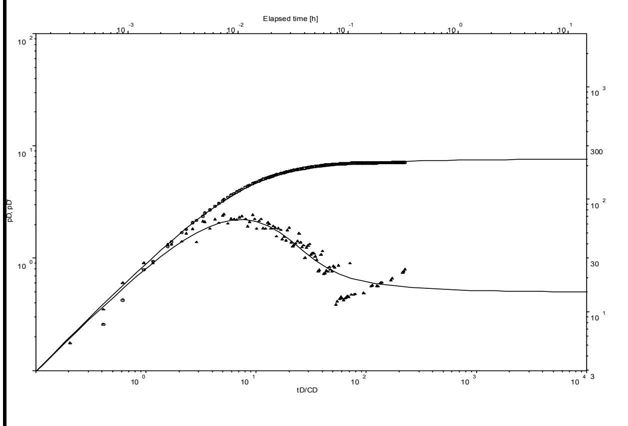
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4926		
p_i (kPa) =	4943		
p_p(kPa) =	5155	p_F (kPa) =	4941
Q_p (m^3/s)=	7.67E-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)=	14.7		
Derivative fact.=	0.08	Derivative fact.=	0
Results		**Results**	
Q/s (m^2/s)=	3.5E-09		
T_M (m^2/s)=	2.9E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.52	dt_1 (min) =	NA
dt_2 (min) =	14.60	dt_2 (min) =	NA
T (m^2/s) =	3.5E-09	T (m^2/s) =	4.4E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.9E-10	K_s (m/s) =	8.7E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	2.3	ξ (-) =	3.9
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	1.5E-11
dt_2 (min) =	NA	C_D (-) =	1.6E-03
T_T (m^2/s) =	4.4E-09	ξ (-) =	3.9
S (-) =	1.0E-06		
K_s (m/s) =	8.7E-10		
S_s (1/m) =	2.0E-07		

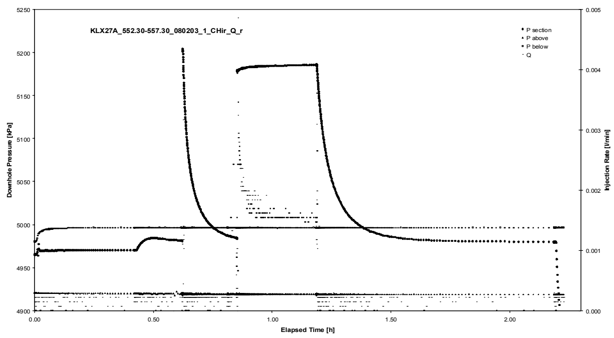
Comments:

The recommended transmissivity of 4.4E-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 1E-9 m2/s to 1E-8 m2/s. The analyses were conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,938.3 kPa.

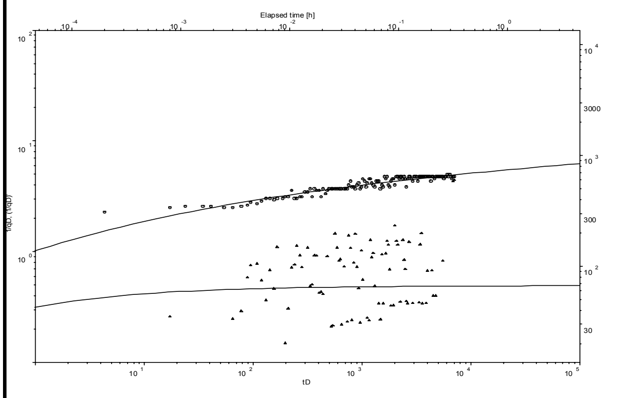
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080203 17:16
Test section from - to (m):	552.30-557.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

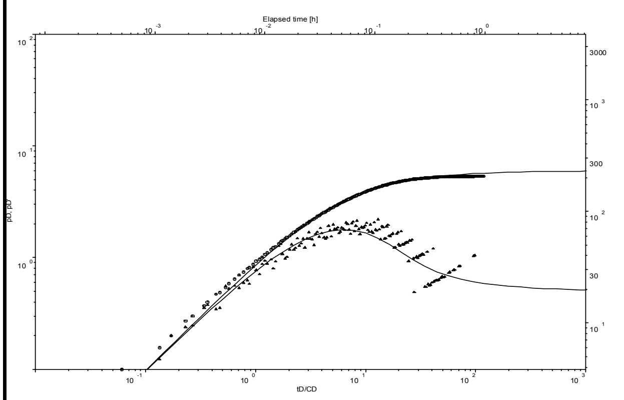
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4965		
p_i (kPa) =	4985		
p_p(kPa) =	5184	p_F (kPa) =	4980
Q_p (m^3/s)=	2.50E-08		
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)=	14.7		
Derivative fact.=	0.12	Derivative fact.=	0
Results		**Results**	
Q/s (m^2/s)=	1.2E-09		
T_M (m^2/s)=	1.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.41	dt_1 (min) =	NA
dt_2 (min) =	12.49	dt_2 (min) =	NA
T (m^2/s) =	9.7E-10	T (m^2/s) =	1.2E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.9E-10	K_s (m/s) =	2.3E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.2E-11
C_D (-) =	NA	C_D (-) =	2.4E-03
ξ (-) =	1.8	ξ (-) =	2.6
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA
Selected representative parameters.			
dt_1 (min) =	NA	C (m^3/Pa) =	2.2E-11
dt_2 (min) =	NA	C_D (-) =	2.4E-03
T_T (m^2/s) =	1.2E-09	ξ (-) =	2.6
S (-) =	1.0E-06		
K_s (m/s) =	2.3E-10		
S_s (1/m) =	2.0E-07		

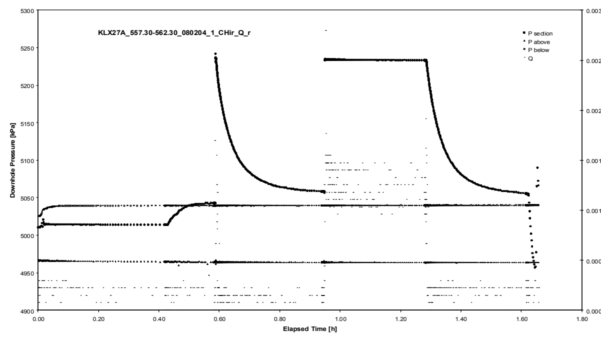
Comments:

The recommended transmissivity of 1.2E-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 9E-10 m2/s to 7E-9 m2/s. The analyses were conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,977.8 kPa.

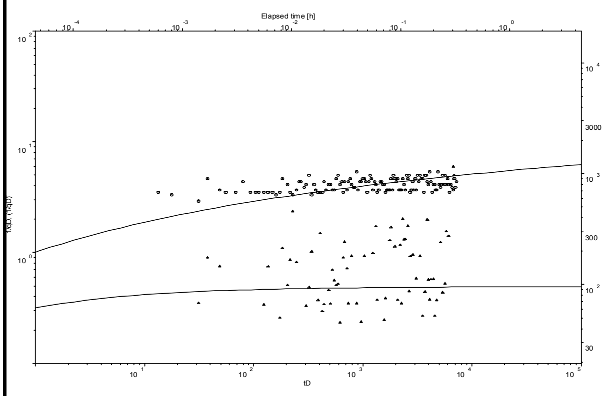
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080204 08:38
Test section from - to (m):	557.30-562.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

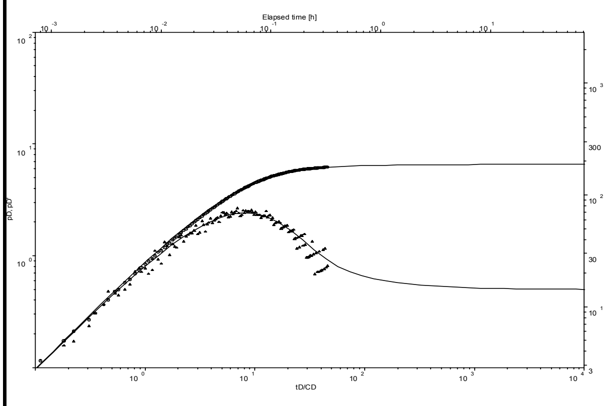
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5011		
p_i (kPa) =	5058		
p_p(kPa) =	5233	p_F (kPa) =	5056
Q_p (m^3/s)=	1.67E-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)=	14.8		
Derivative fact.=	0.13	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.3E-10		
T_M (m^2/s)=	7.7E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.43	dt_1 (min) =	NA
dt_2 (min) =	13.60	dt_2 (min) =	NA
T (m^2/s) =	7.7E-10	T (m^2/s) =	1.1E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.5E-10	K_s (m/s) =	2.2E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.8E-11
C_D (-) =	NA	C_D (-) =	2.0E-03
ξ (-) =	1.9	ξ (-) =	3.8
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	1.8E-11
dt_2 (min) =	NA	C_D (-) =	2.0E-03
T_T (m^2/s) =	1.1E-09	ξ (-) =	3.8
S (-) =	1.0E-06		
K_s (m/s) =	2.2E-10		
S_s (1/m) =	2.0E-07		

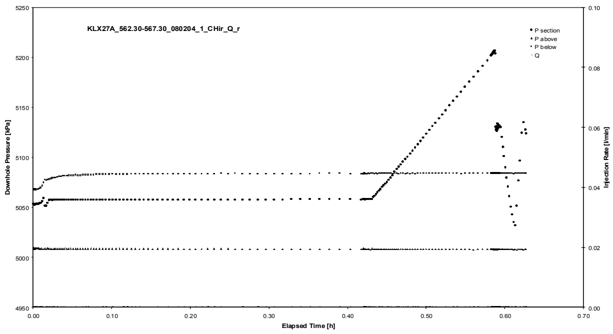
Comments:

The recommended transmissivity of 1.1E-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 6E-10 m2/s to 6E-9 m2/s. The analyses were conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,034.1 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080204 10:40
Test section from - to (m):	562.30-567.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	5053		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.9		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

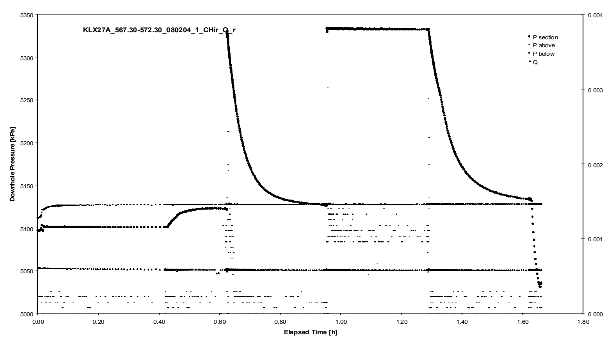
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0E-11 m2/s.

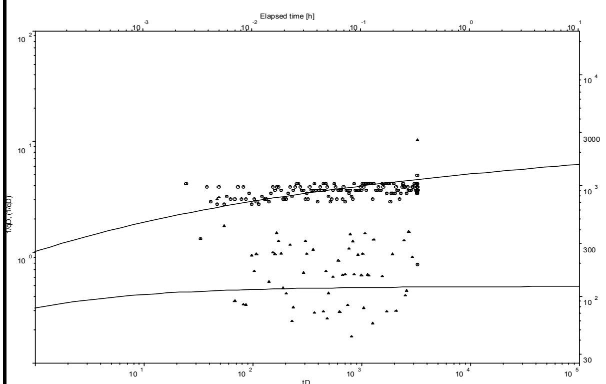
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080204 12:28
Test section from - to (m):	567.30-572.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

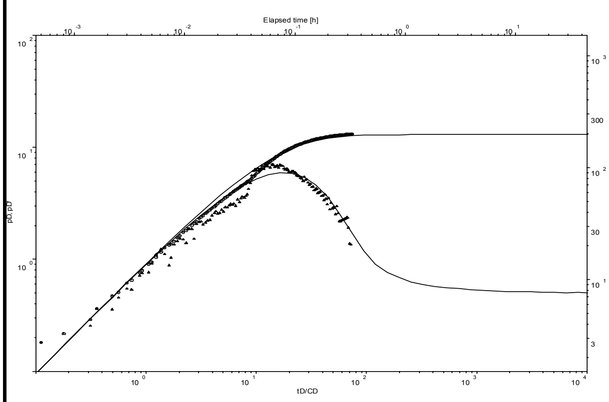
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5097		
p_i (kPa) =	5127		
p_p(kPa) =	5333	p_F (kPa) =	5133
Q_p (m^3/s)=	1.83E-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)=	14.9		
Derivative fact.=	0.19	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	8.7E-10		
T_M (m^2/s)=	7.2E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.71	dt_1 (min) =	NA
dt_2 (min) =	14.21	dt_2 (min) =	NA
T (m^2/s) =	5.1E-10	T (m^2/s) =	1.9E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.0E-10	K_s (m/s) =	3.8E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.9E-11
C_D (-) =	NA	C_D (-) =	2.1E-03
ξ (-) =	1.7	ξ (-) =	10.7
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	1.9E-11
dt_2 (min) =	NA	C_D (-) =	2.1E-03
T_T (m^2/s) =	1.9E-09	ξ (-) =	10.7
S (-) =	1.0E-06		
K_s (m/s) =	3.8E-10		
S_s (1/m) =	2.0E-07		

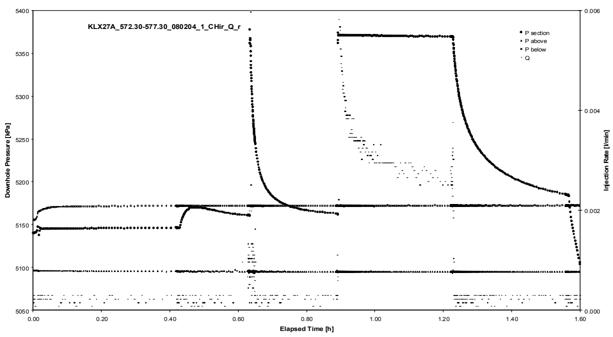
Comments:

The recommended transmissivity of 1.9E-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 6E-10 m2/s to 6E-9 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 5,109.5 kPa.

Test Summary Sheet

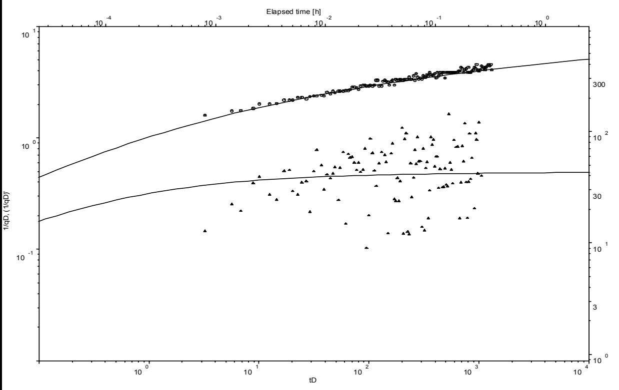
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080204 14:39
Test section from - to (m):	572.30-577.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

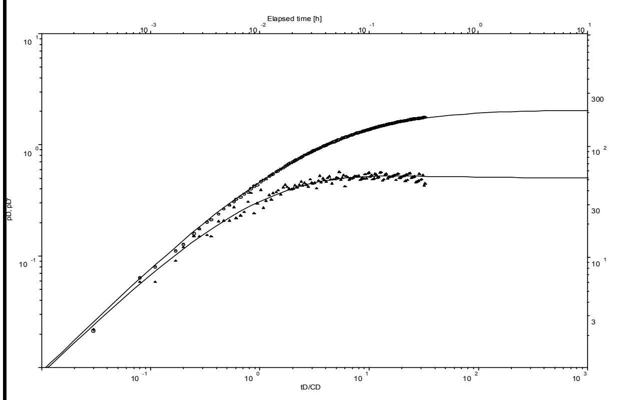


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5141		
p_i (kPa) =	5162		
p_p(kPa) =	5370	p_F (kPa) =	5183
Q_p (m³/s)=	5.00E-08		
tp (s) =	1200	t_F (s) =	1200
S el S* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15		
Derivative fact.=	0.1	Derivative fact.=	0.02
Results		**Results**	
Q/s (m²/s)=	2.4E-09		
T_M (m²/s)=	1.9E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.41	dt_1 (min) =	1.78
dt_2 (min) =	14.00	dt_2 (min) =	15.54
T (m²/s) =	1.4E-09	T (m²/s) =	7.6E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.9E-10	K_s (m/s) =	1.5E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m³/Pa) =	NA	C (m³/Pa) =	1.8E-11
C_D (-) =	NA	C_D (-) =	1.9E-03
ξ (-) =	0.8	ξ (-) =	-0.8
T_{GRF}(m²/s) =	NA	T_{GRF}(m²/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.78	C (m³/Pa) =	1.8E-11
dt_2 (min) =	15.54	C_D (-) =	1.9E-03
T_T (m²/s) =	7.6E-10	ξ (-) =	-0.8
S (-) =	1.0E-06		
K_s (m/s) =	1.5E-10		
S_s (1/m) =	2.0E-07		

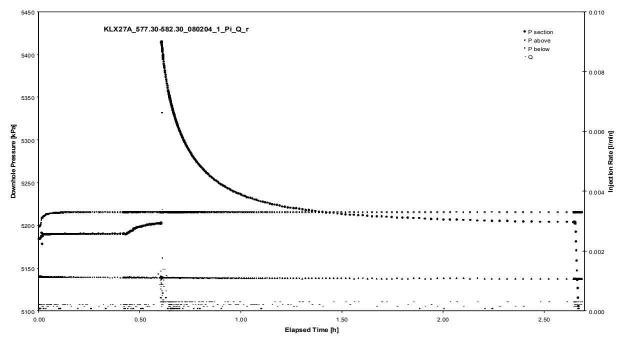
Comments:

The recommended transmissivity of 7.6E-10 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 6E-10 m2/s to 8E-9 m2/s. The analyses were conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,149.3 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080204 16:44
Test section from - to (m):	577.30-582.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

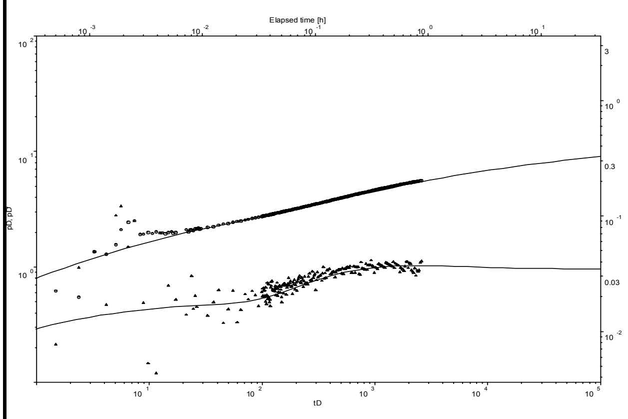


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5185		
p_i (kPa) =	5202		
p_p(kPa) =	5415	p_F (kPa) =	5204
Q_p (m^3/s)=	NA		
tp (s) =	10	t_F (s) =	7200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.0		
Derivative fact.=	NA	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	13.69
dt_2 (min) =	NA	dt_2 (min) =	44.66
T (m^2/s) =	NA	T (m^2/s) =	9.4E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	1.9E-11
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	NA	ξ (-) =	1.7
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	13.69	C (m^3/Pa) =	1.4E-11
dt_2 (min) =	44.66	C_D (-) =	1.6E-03
T_T (m^2/s) =	9.4E-11	ξ (-) =	1.7
S (-) =	1.0E-06		
K_s (m/s) =	1.9E-11		
S_s (1/m) =	2.0E-07		

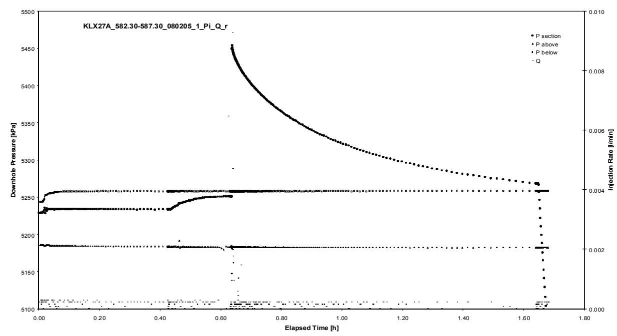
Comments:

The recommended transmissivity of 9.4•10-11 m2/s was derived from the analysis of the Pi phase (outer zone). The confidence range for the interval transmissivity is estimated to be 5.0•10-11 to 4.0•10-10 m2/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the very low transmissivity.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080205 08:24
Test section from - to (m):	582.30-587.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

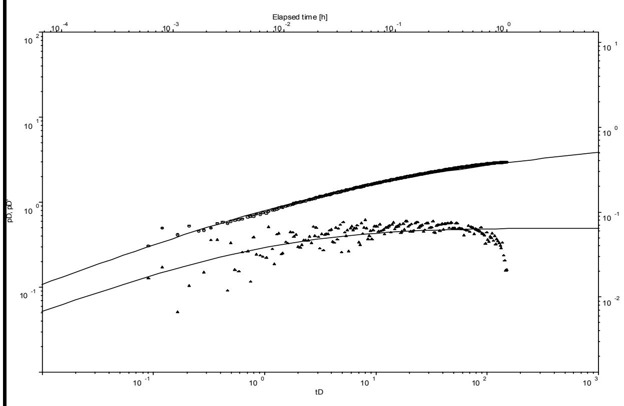


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5229		
p_i (kPa) =	5251		
p_p(kPa) =	5454	p_F (kPa) =	5269
Q_p (m^3/s)=	NA		
tp (s) =	10	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.1		
Derivative fact.=	NA	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	NA		
T_M (m^2/s)=	NA		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	1.77
dt_2 (min) =	NA	dt_2 (min) =	26.30
T (m^2/s) =	NA	T (m^2/s) =	2.3E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	4.7E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	7.0E-12
C_D (-) =	NA	C_D (-) =	7.7E-04
ξ (-) =	NA	ξ (-) =	1.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.77	C (m^3/Pa) =	7.0E-12
dt_2 (min) =	26.30	C_D (-) =	7.7E-04
T_T (m^2/s) =	2.3E-11	ξ (-) =	1.2
S (-) =	1.0E-06		
K_s (m/s) =	4.7E-12		
S_s (1/m) =	2.0E-07		

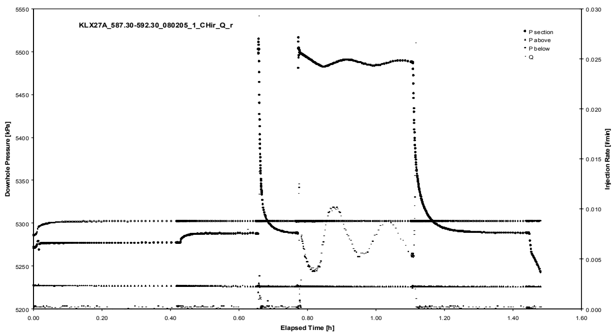
Comments:

The recommended transmissivity of 2.3E-11 m2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 1E-11 to 1E-10 m2/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the very low transmissivity.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080205 10:35
Test section from - to (m):	587.30-592.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

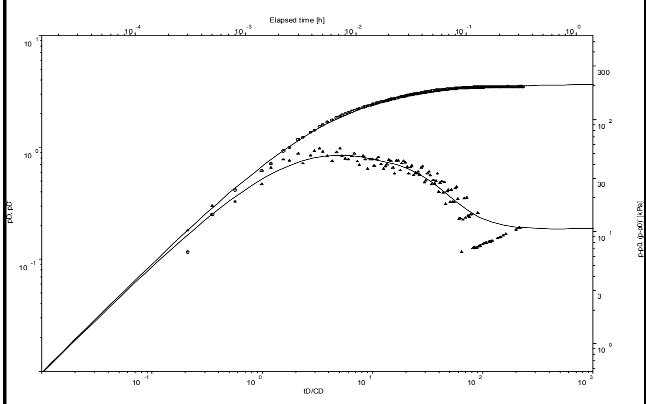


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5273		
p_i (kPa) =	5288		
p_p(kPa) =	5488	p_F (kPa) =	5289
Q_p (m^3/s)=	9.50E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.2		
Derivative fact.=	NA	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	4.7E-09		
T_M (m^2/s)=	3.8E-09		
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) =	3.2E-09
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	6.4E-10
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-11
C_D (-) =	NA	C_D (-) =	1.2E-03
ξ (-) =	NA	ξ (-) =	0.6
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period

Not analysed

Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	NA	C (m^3/Pa) =	1.1E-11
dt_2 (min) =	NA	C_D (-) =	1.2E-03
T_T (m^2/s) =	3.2E-09	ξ (-) =	0.6
S (-) =	1.0E-06		
K_s (m/s) =	6.4E-10		
S_s (1/m) =	2.0E-07		

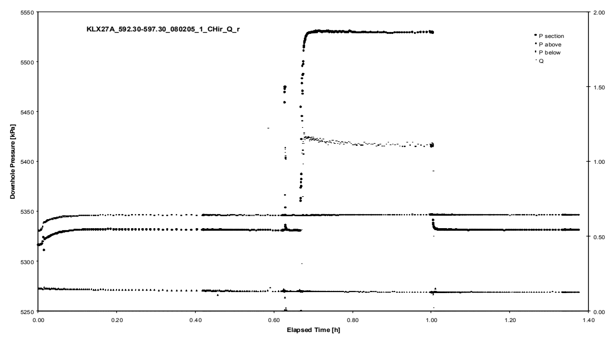
Comments:

The recommended transmissivity of 3.2E-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 9E-10 m2/s to 1E-8 m2/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,285.7 kPa.

Test Summary Sheet

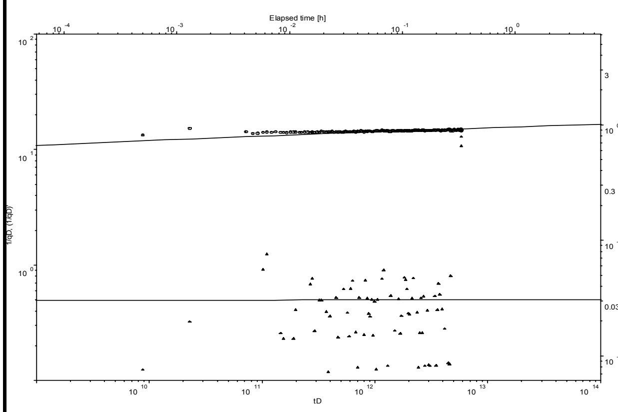
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080205 13:05
Test section from - to (m):	592.30-597.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

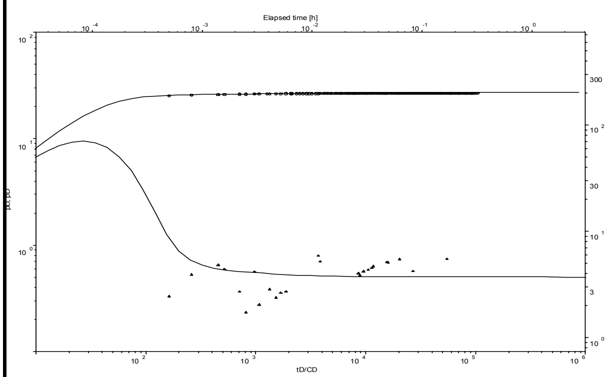


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5317		
p_i (kPa) =	5331		
p_p(kPa) =	5530	p_F (kPa) =	5331
Q_p (m^3/s)=	1.87E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.3		
Derivative fact.=	0.08	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.2E-07		
T_M (m^2/s)=	7.6E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.77	dt_1 (min) =	0.08
dt_2 (min) =	13.76	dt_2 (min) =	5.33
T (m^2/s) =	2.2E-06	T (m^2/s) =	3.9E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.3E-07	K_s (m/s) =	7.9E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.8E-11
C_D (-) =	NA	C_D (-) =	3.1E-03
ξ (-) =	8.2	ξ (-) =	22.0
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.77	C (m^3/Pa) =	2.8E-11
dt_2 (min) =	13.76	C_D (-) =	3.1E-03
T_T (m^2/s) =	2.2E-06	ξ (-) =	8.2
S (-) =	1.0E-06		
K_s (m/s) =	4.3E-07		
S_s (1/m) =	2.0E-07		

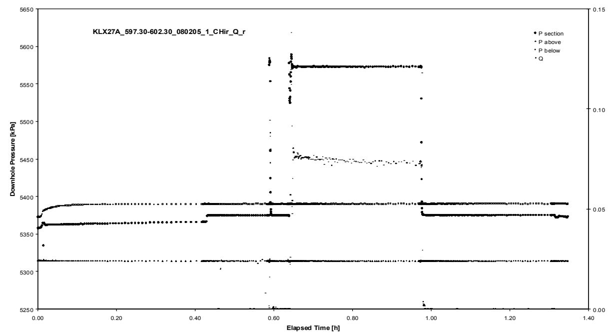
Comments:

The recommended transmissivity of 2.2E-6 m2/s was derived from the analysis of the CHi phase, which shows slight better data quality. The confidence range for the interval transmissivity is estimated to be 7E-7 m2/s to 5E-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 5,331.8 kPa.

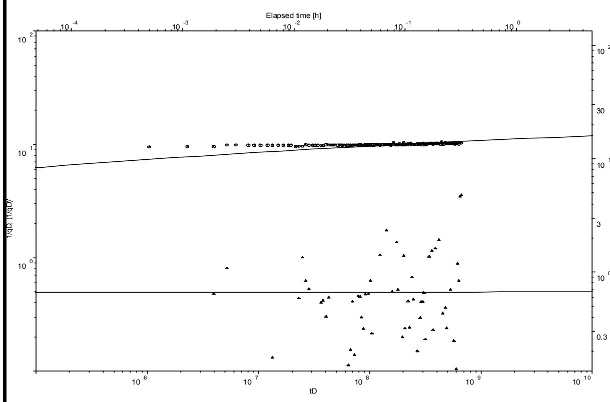
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080205 14:58
Test section from - to (m):	597.30-602.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

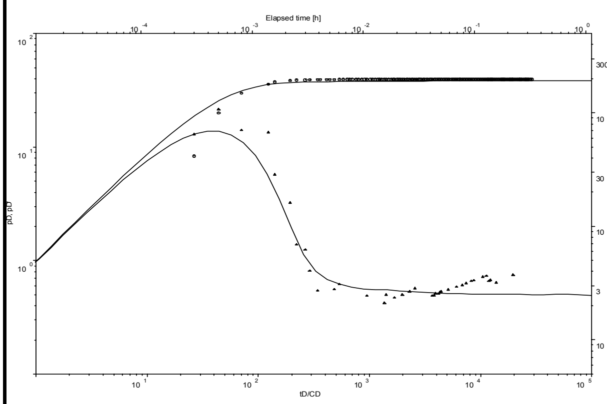
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5358		
p_i (kPa) =	5374		
p_p(kPa) =	5573	p_F (kPa) =	5375
Q_p (m^3/s)=	1.20E-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.=	0.04
Results		**Results**	
Q/s (m^2/s)=	5.9E-08		
T_M (m^2/s)=	4.9E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.80	dt_1 (min) =	0.30
dt_2 (min) =	14.85	dt_2 (min) =	4.10
T (m^2/s) =	9.8E-08	T (m^2/s) =	3.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.0E-08	K_s (m/s) =	7.7E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.0E-11
C_D (-) =	NA	C_D (-) =	1.1E-03
ξ (-) =	5.2	ξ (-) =	34.0
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	0.80	C (m^3/Pa) =	1.0E-11
dt_2 (min) =	14.85	C_D (-) =	1.1E-03
T_T (m^2/s) =	9.8E-08	ξ (-) =	5.2
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-08		
S_s (1/m) =	2.0E-07		

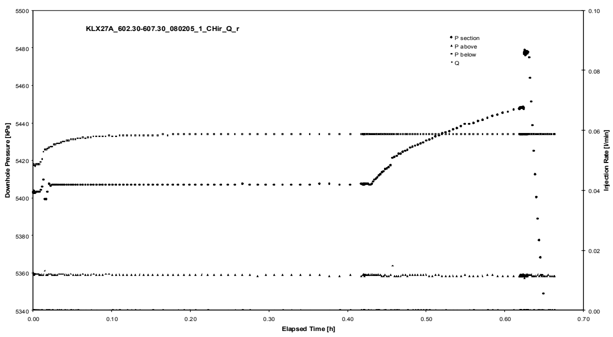
Comments:

The recommended transmissivity of 9.8E-8 m2/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 3E-8 m2/s to 4E-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 5,375.6 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080205 16:55
Test section from - to (m):	602.30-607.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	5403		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.4		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

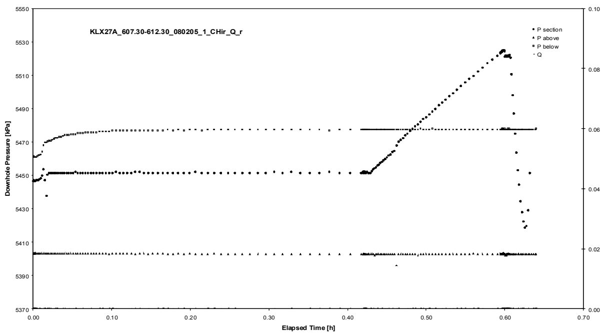
Comments:

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:	KLX27A	Test start:	080205 18:08
Test section from - to (m):	607.30-612.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	5547		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.4		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

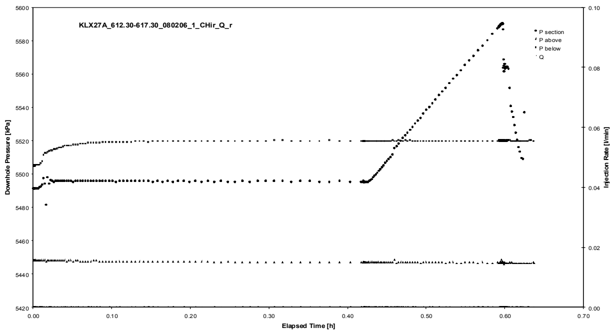
Comments:

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:	KLX27A	Test start:	080206 08:28
Test section from - to (m):	612.30-617.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	5491		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.5		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

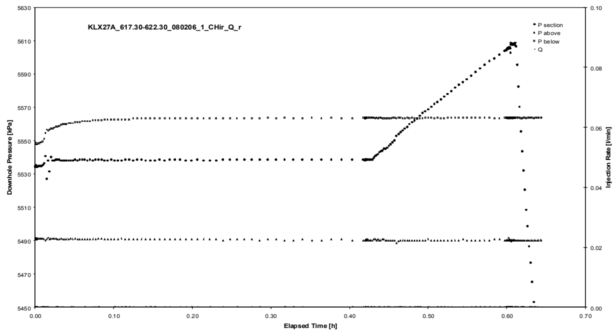
Comments:

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:	KLX27A	Test start:	080206 09:36
Test section from - to (m):	617.30-622.30	Responsible for test execution:	Philipp Wolf Linda Höckert
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) =	5534		
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^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.6		
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) =	1.0E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
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) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

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) =	1.0E-11	ξ (-) =	NA
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-12		
S_s (1/m) =	2.0E-07		

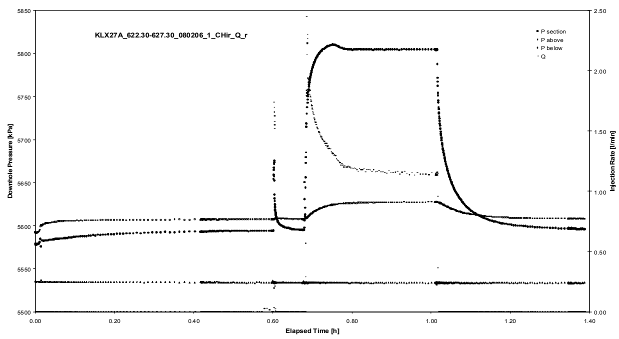
Comments:

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

Test Summary Sheet

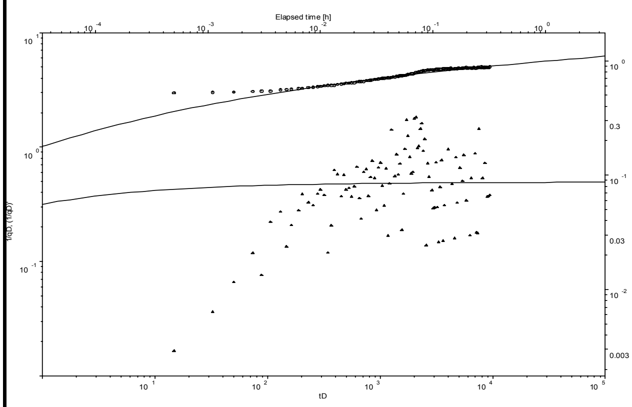
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080206 10:47
Test section from - to (m):	622.30-627.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, 2·r_w (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

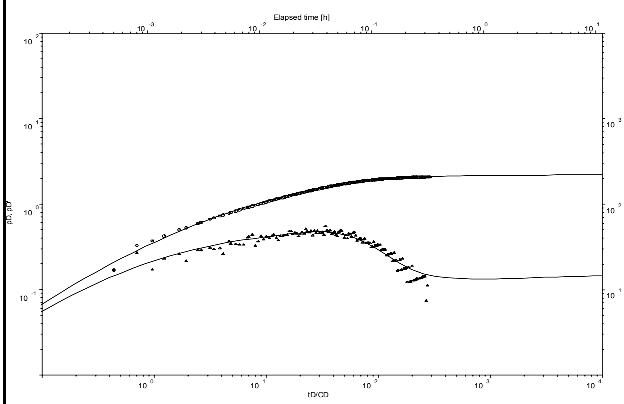


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5578		
p_i (kPa) =	5598		
p_p(kPa) =	5805	p_F (kPa) =	5597
Q_p (m^3/s)=	1.92E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.6		
Derivative fact.=	0.01	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.1E-07		
T_M (m^2/s)=	7.5E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.76	dt_1 (min) =	1.11
dt_2 (min) =	17.15	dt_2 (min) =	3.38
T (m^2/s) =	7.2E-07	T (m^2/s) =	3.2E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.4E-07	K_s (m/s) =	6.4E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.5E-10
C_D (-) =	NA	C_D (-) =	9.3E-02
ξ (-) =	-1.4	ξ (-) =	-3.3
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	1.11	C (m^3/Pa) =	8.5E-10
dt_2 (min) =	3.38	C_D (-) =	9.3E-02
T_T (m^2/s) =	3.2E-07	ξ (-) =	-3.3
S (-) =	1.0E-06		
K_s (m/s) =	6.4E-08		
S_s (1/m) =	2.0E-07		

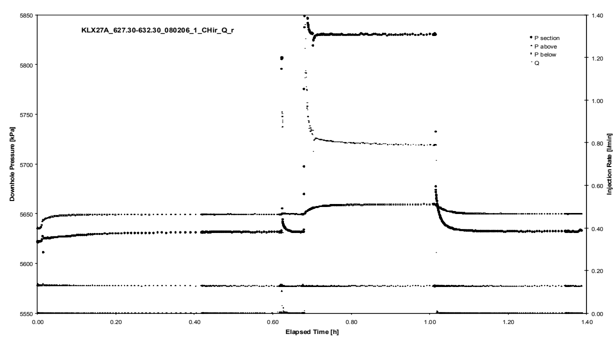
Comments:

The recommended transmissivity of 3.2E-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 1E-7 m2/s to 2E-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 5,587.1 kPa.

Test Summary Sheet

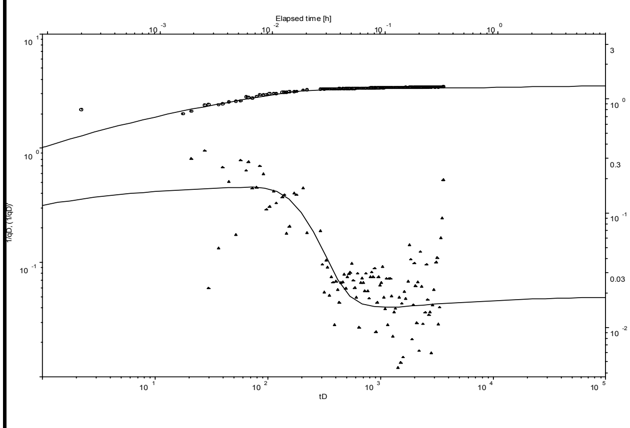
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080206 13:09
Test section from - to (m):	627.30-632.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

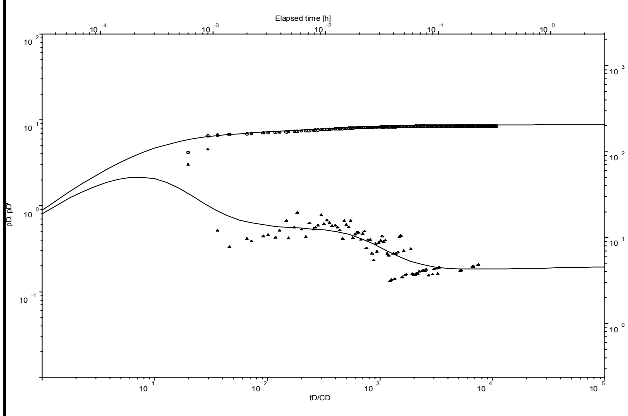


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5622		
p_i (kPa) =	5632		
p_p(kPa) =	5830	p_F (kPa) =	5631
Q_p (m^3/s)=	1.32E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.7		
Derivative fact.=	0.05	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	6.5E-07		
T_M (m^2/s)=	5.4E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	NA	dt_1 (min) =	0.22
dt_2 (min) =	NA	dt_2 (min) =	0.97
T (m^2/s) =	3.6E-07	T (m^2/s) =	9.0E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.1E-08	K_s (m/s) =	1.8E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.3E-11
C_D (-) =	NA	C_D (-) =	7.0E-03
ξ (-) =	-1.5	ξ (-) =	3.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.22	C (m^3/Pa) =	6.3E-11
dt_2 (min) =	0.97	C_D (-) =	7.0E-03
T_T (m^2/s) =	9.0E-07	ξ (-) =	3.2
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-07		
S_s (1/m) =	2.0E-07		

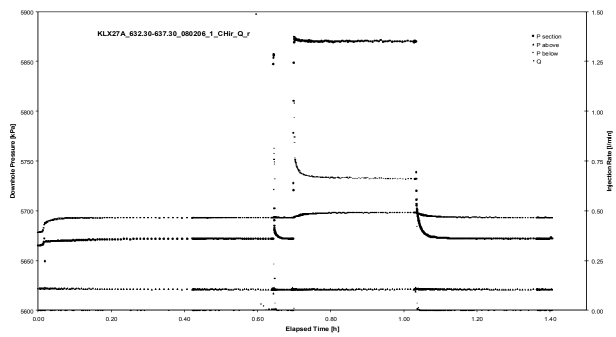
Comments:

The recommended transmissivity of 9.0E-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 5E-7 m2/s to 4E-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 5,632.7 kPa.

Test Summary Sheet

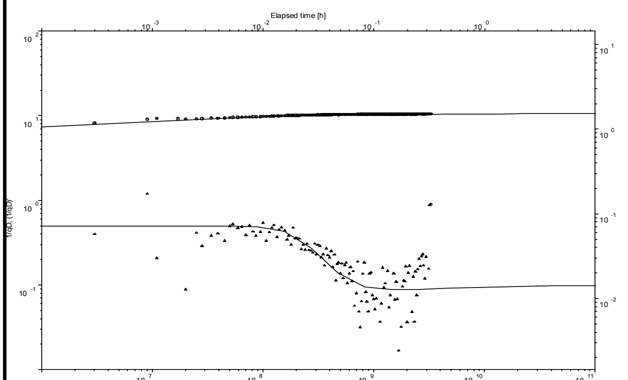
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080206 15:07
Test section from - to (m):	632.30-637.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

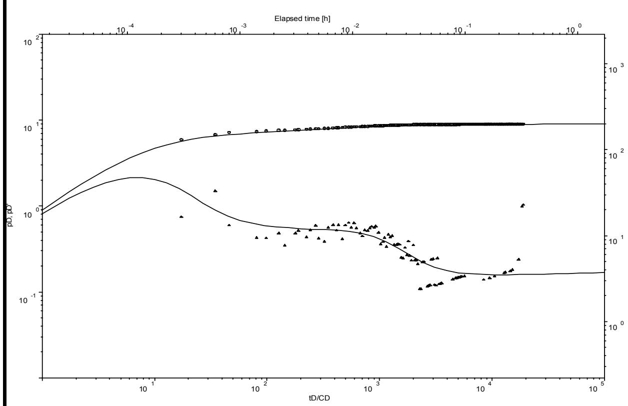


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5665		
p_i (kPa) =	5672		
p_p(kPa) =	5870	p_F (kPa) =	5672
Q_p (m^3/s)=	1.10E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.7		
Derivative fact.=	0.12	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	5.5E-07		
T_M (m^2/s)=	4.5E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.22	dt_1 (min) =	0.14
dt_2 (min) =	1.01	dt_2 (min) =	0.80
T (m^2/s) =	9.1E-07	T (m^2/s) =	7.9E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-07	K_s (m/s) =	1.6E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.1E-11
C_D (-) =	NA	C_D (-) =	3.5E-03
ξ (-) =	4.9	ξ (-) =	3.5
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.14	C (m^3/Pa) =	3.1E-11
dt_2 (min) =	0.80	C_D (-) =	3.5E-03
T_T (m^2/s) =	7.9E-07	ξ (-) =	3.5
S (-) =	1.0E-06		
K_s (m/s) =	1.6E-07		
S_s (1/m) =	2.0E-07		

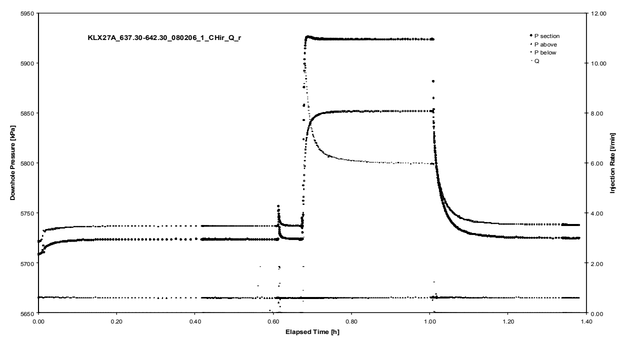
Comments:

The recommended transmissivity of 7.9E-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 5E-7 m2/s to 4E-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 5,671.5 kPa.

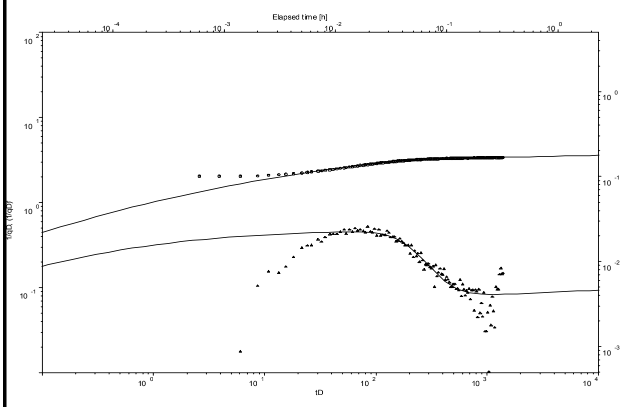
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080206 17:02
Test section from - to (m):	637.30-642.30	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

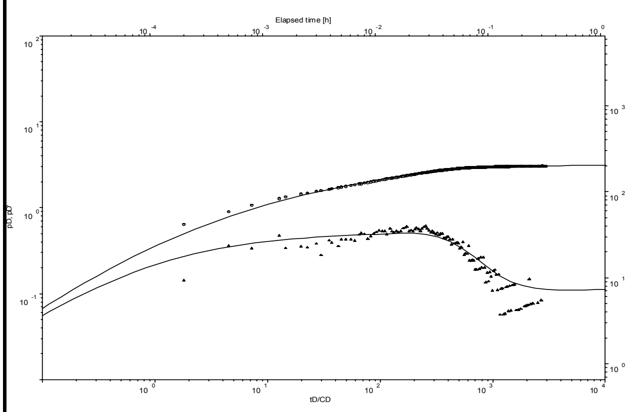
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5709		
p_i (kPa) =	5724		
p_p(kPa) =	5923	p_F (kPa) =	5725
Q_p (m^3/s)=	9.88E-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)=	15.5		
Derivative fact.=	0.09	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	4.9E-06		
T_M (m^2/s)=	4.0E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.58	dt_1 (min) =	0.40
dt_2 (min) =	1.71	dt_2 (min) =	2.09
T (m^2/s) =	2.7E-06	T (m^2/s) =	2.5E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.3E-07	K_s (m/s) =	5.0E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.4E-10
C_D (-) =	NA	C_D (-) =	7.0E-02
ξ (-) =	-2.8	ξ (-) =	-3.2
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	0.40	C (m^3/Pa) =	6.4E-10
dt_2 (min) =	2.09	C_D (-) =	7.0E-02
T_T (m^2/s) =	2.5E-06	ξ (-) =	-3.2
S (-) =	1.0E-06		
K_s (m/s) =	5.0E-07		
S_s (1/m) =	2.0E-07		

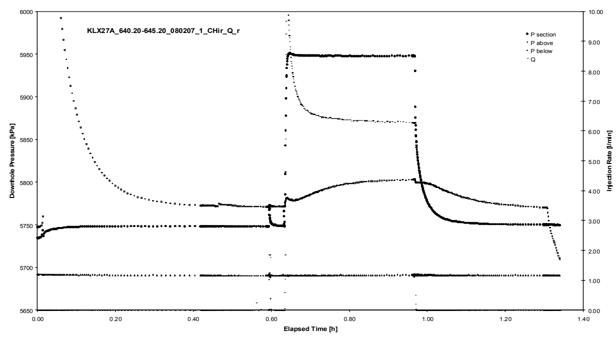
Comments:

The recommended transmissivity of 2.5E-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 9E-7 m2/s to 2E-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 5,723.2 kPa.

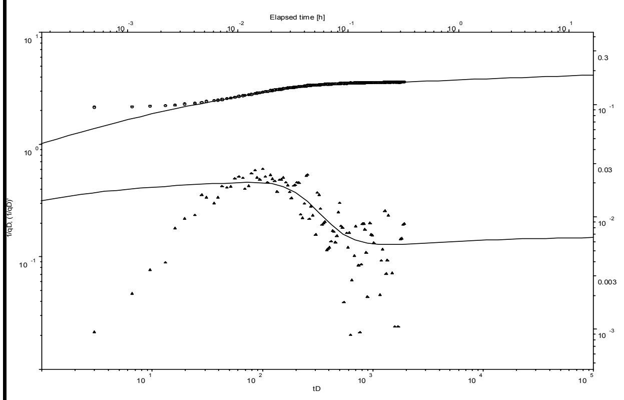
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	08027 08:33
Test section from - to (m):	640.20-645.20	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

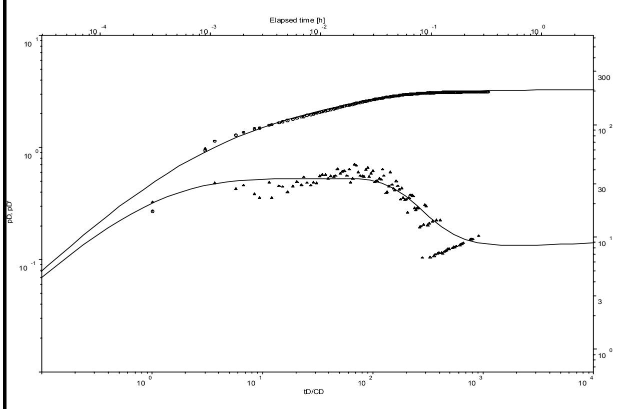
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5735		
p_i (kPa) =	5749		
p_p(kPa) =	5948	p_F (kPa) =	5750
Q_p (m^3/s)=	1.05E-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)=	15.8		
Derivative fact.=	0.01	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	5.2E-06		
T_M (m^2/s)=	4.3E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.53	dt_1 (min) =	0.45
dt_2 (min) =	1.78	dt_2 (min) =	1.93
T (m^2/s) =	3.0E-06	T (m^2/s) =	2.7E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.9E-07	K_s (m/s) =	5.4E-07
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.9E-09
C_D (-) =	NA	C_D (-) =	2.1E-01
ξ (-) =	-2.9	ξ (-) =	-3.1
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Selected representative parameters.

dt_1 (min) =	0.45	C (m^3/Pa) =	1.9E-09
dt_2 (min) =	1.93	C_D (-) =	2.1E-01
T_T (m^2/s) =	2.7E-06	ξ (-) =	-3.1
S (-) =	1.0E-06		
K_s (m/s) =	5.4E-07		
S_s (1/m) =	2.0E-07		

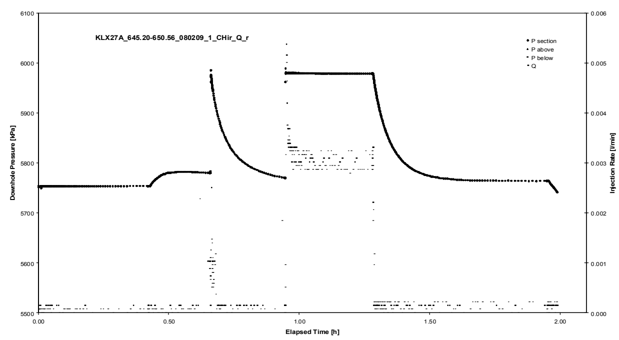
Comments:

The recommended transmissivity of 2.7E-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 1E-6 m2/s to 1E-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 5,747.7 kPa.

Test Summary Sheet

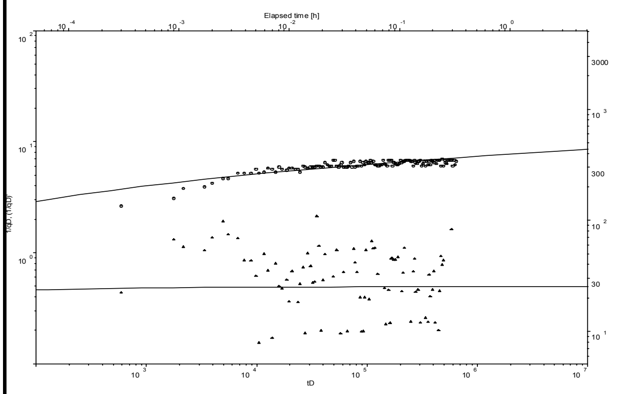
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX27A	Test start:	080209 13:18
Test section from - to (m):	645.20-650.56	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

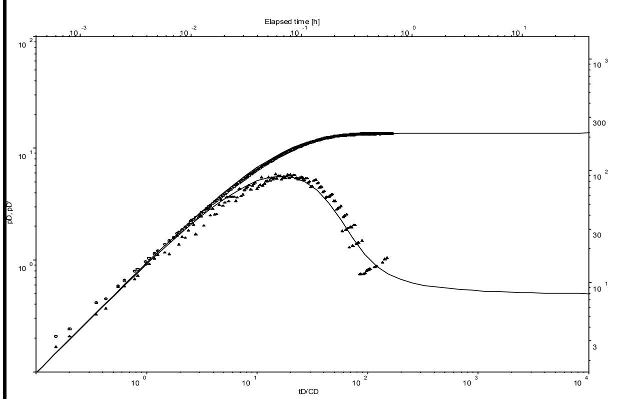


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5752		
p_i (kPa) =	5769		
p_p(kPa) =	5978	p_F (kPa) =	5764
Q_p (m^3/s)=	5.00E-08		
tp (s) =	1190	t_F (s) =	2400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.8		
Derivative fact.=	0.14	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	2.3E-09		
T_M (m^2/s)=	2.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.52	dt_1 (min) =	NA
dt_2 (min) =	13.92	dt_2 (min) =	NA
T (m^2/s) =	2.4E-09	T (m^2/s) =	5.1E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.6E-10	K_s (m/s) =	9.5E-10
S_s (1/m) =	1.9E-07	S_s (1/m) =	1.9E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.7E-11
C_D (-) =	NA	C_D (-) =	5.1E-03
ξ (-) =	3.6	ξ (-) =	10.3
T_{GRF}(m^2/s) =	NA	T_{GRF}(m^2/s) =	NA
S_{GRF}(-) =	NA	S_{GRF}(-) =	NA
D_{GRF} (-) =	NA	D_{GRF} (-) =	NA

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	0.52	C (m^3/Pa) =	4.7E-11
dt_2 (min) =	13.92	C_D (-) =	5.1E-03
T_T (m^2/s) =	5.1E-09	ξ (-) =	10.3
S (-) =	1.0E-06		
K_s (m/s) =	9.5E-10		
S_s (1/m) =	1.9E-07		

Comments:

The recommended transmissivity of 5.1E-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 1E-9 m2/s to 1E-8 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 5,759.9 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

Character	SICADA designation	Explanation	Dimension	Unit
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

Character	SICADA designation	Explanation	Dimension	Unit
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 logging). Temperature		^oC
Te_{w0}		Temperature in the test section during undisturbed conditions (taken from temperature logging).		^oC

Character	SICADA designation	Explanation	Dimension	Unit
Te_o		Temperature in the observation section (taken from temperature logging). Temperature		^oC
EC_w		Electrical conductivity of water in test section.		mS/m
EC_{w0}		Electrical conductivity of water in test section during undisturbed conditions.		mS/m
EC_o		Electrical conductivity of water in observation section		mS/m
TDS_w		Total salinity of water in the test section.	[M/L^3]	mg/L
TDS_{w0}		Total salinity of water in the test section during undisturbed conditions.	[M/L^3]	mg/L
TDS_o		Total salinity of water in the observation section.	[M/L^3]	mg/L
g		Constant of gravitation (9.81 m*s^{-2}) (Acceleration due to gravity)	[L/T^2]	m/s^2
π	pi	Constant (approx 3.1416).	[-]	
r		Residual. r= p_c-p_m , r= h_c-h_m, etc. Difference between measured data (p_m, h_m, etc) and estimated data (p_c, h_c, etc)		
ME		Mean error in residuals. $ME = \frac{1}{n}\sum_{i=1}^{n} r_i$		
NME		Normalized ME. NME=ME/(x_{MAX}-x_{MIN}), x: measured variable considered.		
MAE		Mean absolute error. $MAE = \frac{1}{n}\sum_{i=1}^{n} \lvert r_i \rvert$		
NMAE		Normalized MAE. NMAE=MAE/(x_{MAX}-x_{MIN}), x: measured variable considered.		
RMS		Root mean squared error. $RMS = \left(\frac{1}{n}\sum_{i=1}^{n} r_i^2\right)^{0.5}$		
NRMS		Normalized RMR. NRMR=RMR/(x_{MAX}-x_{MIN}), x: measured variable considered.		
SDR		Standard deviation of residual. $SDR = \left(\frac{1}{n-1}\sum_{i=1}^{n} (r_i - ME)^2\right)^{0.5}$		
SEMR		Standard error of mean residual. $SEMR = \left(\frac{1}{n(n-1)}\sum_{i=1}^{n} (r_i - ME)^2\right)^{0.5}$		
Parameters				
Q/s		Specific capacity s=dp_p or s=s_p=h_0-h_p (open borehole)	[L^2/T]	m^2/s
D		Interpreted flow dimension according to Barker, 1988.	[-]	-
dt_1		Time of starting for semi-log or log-log evaluated characteristic counted from start of flow phase and recovery phase respectively.	[T]	s
dt_2		End of time for semi-log or log-log evaluated characteristic counted from start of flow phase and recovery phase respectively.	[T]	s
dt_L		Response time to obtain 0.1 m (or 1 kPa) drawdown in observation section counted from start of recovery phase.	[T]	s
TB		Flow capacity in a one-dimensional structure of width B and transmissivity T. Transient evaluation of one-dimensional structure	[L^3/T]	m^3/s
T		Transmissivity	[L^2/T]	m^2/s
T_M		Transmissivity according to Moye (1967)	[L^2/T]	m^2/s
T_Q		Evaluation based on Q/s and regression curve between Q/s and T, as example see Rhén et al (1997) p. 190.	[L^2/T]	m^2/s
T_S		Transmissivity evaluated from slug test	[L^2/T]	m^2/s

Character	SICADA designation	Explanation	Dimension	Unit
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	[-]	-

Character	SICADA designation	Explanation	Dimension	Unit
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 of c_t to S_s ; $S_s=FC_S\cdot n\cdot c_t$; $FC_S=\rho_w\cdot g$	$[M/T^2L^2]$	Pa/m
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		
T		Judged best evaluation based on transient evaluation.		

Character	SICADA designation	Explanation	Dimension	Unit
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

APPENDIX 5-1

SICADA data tables (Injection tests)

(Simplified version v1.4)

SICADA/Data Import Template

SKB & Ergodata AB 2004

File Identity	
Created By	
Created	

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Activity Type	KLX 27A KLX 27A - Injection test

Project	AP PS 400-07-056

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**
KLX27A	2008-01-18 08:23	2009-02-08 15:17	77,30	650,56		Golder Associates	Philipp Wolf	Philipp Wolf, Linda Höckert, Erik Löfgren	Philipp Wolf, Reinder van der Wall, Stephan Rohs	Philipp Wolf, Reinder van der Wall, 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_hp	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_pp	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
KLX 27A	2008-01-18 08:23:00	2008-01-18 10:30:00	77,30	177,30		3	1	2008-01-18 09:28:33	2008-01-18 09:58:33	1,35E-05	0	1,41E-05	1,67E-08	8,33E-04	2,53E-02
KLX 27A	2008-01-18 13:33:00	2008-01-18 15:24:00	177,30	277,30		3	1	2008-01-18 14:22:21	2008-01-18 14:52:21	1,20E-05	0	1,44E-05	1,67E-08	8,33E-04	2,59E-02
KLX 27A	2008-01-18 17:05:00	2008-01-18 23:07:00	277,30	377,30		3	1	2008-01-18 18:35:16	2008-01-18 19:05:16	1,00E-07	0	1,17E-07	1,67E-08	8,33E-04	2,10E-04
KLX 27A	2008-01-19 12:09:00	2008-01-19 13:47:00	377,30	477,30		3	1	2008-01-19 12:47:51	2008-01-19 13:15:51	4,83E-08	0	5,50E-08	1,67E-08	8,33E-04	9,90E-05
KLX 27A	2008-01-19 15:26:00	2008-01-19 17:30:00	477,30	577,30		3	1	2008-01-19 16:28:15	2008-01-19 16:58:15	8,33E-07	0	1,02E-06	1,67E-08	8,33E-04	1,83E-03
KLX 27A	2008-01-20 09:30:00	2008-01-20 11:28:00	545,20	645,20		3	1	2008-01-20 10:26:15	2008-01-20 10:56:15	1,18E-04	0	1,27E-04	1,67E-08	8,33E-04	2,28E-01
KLX 27A	2008-01-21 17:33:00	2008-01-21 18:57:00	77,30	97,30		3	1	2008-01-21 18:15:04	2008-01-21 18:35:04	9,32E-06	0	9,68E-06	1,67E-08	8,33E-04	1,16E-02
KLX 27A	2008-01-22 08:37:00	2008-01-22 10:02:00	97,30	117,30		3	1	2008-01-22 09:20:19	2008-01-22 09:40:19	4,17E-07	0	4,50E-07	1,67E-08	8,33E-04	5,40E-04
KLX 27A	2008-01-22 10:43:00	2008-01-22 12:18:00	117,30	137,30		3	1	2008-01-22 11:36:31	2008-01-22 11:56:31	8,33E-08	0	8,03E-08	1,67E-08	8,33E-04	9,64E-05
KLX 27A	2008-01-22 13:38:00	2008-01-22 15:07:00	137,30	157,30		3	1	2008-01-22 14:25:47	2008-01-22 14:45:47	8,83E-07	0	9,00E-07	1,67E-08	8,33E-04	1,08E-03
KLX 27A	2008-01-22 15:44:00	2008-01-22 17:07:00	157,30	177,30		3	1	2008-01-22 16:25:44	2008-01-22 16:45:44	1,97E-06	0	2,20E-06	1,67E-08	8,33E-04	2,63E-03
KLX 27A	2008-01-22 17:51:00	2008-01-22 22:12:00	177,30	197,30		3	1	2008-01-22 18:50:48	2008-01-22 19:10:48	5,33E-07	0	6,00E-07	1,67E-08	8,33E-04	7,20E-04
KLX 27A	2008-01-23 08:45:00	2008-01-23 10:20:00	197,30	217,30		3	1	2008-01-23 09:38:57	2008-01-23 09:58:57	1,33E-07	0	1,50E-07	1,67E-08	8,33E-04	1,80E-04
KLX 27A	2008-01-23 10:54:00	2008-01-23 12:22:00	217,30	237,30		3	1	2008-01-23 11:40:30	2008-01-23 12:00:30	9,13E-06	0	1,05E-05	1,67E-08	8,33E-04	1,26E-02
KLX 27A	2008-01-23 14:51:00	2008-01-23 16:03:00	237,30	257,30		3	1	2008-01-23 15:21:33	2008-01-23 15:41:33	2,12E-06	0	3,37E-06	1,67E-08	8,33E-04	4,04E-03
KLX 27A	2008-01-24 15:06:00	2008-01-24 20:02:00	277,30	297,30		3	1	2008-01-24 16:40:07	2008-01-24 17:00:07	1,30E-03	0	2,42E-08	1,67E-08	8,33E-04	2,90E-05
KLX 27A	2008-01-25 13:24:00	2008-01-25 14:47:00	337,30	357,30		3	1	2008-01-25 14:05:20	2008-01-25 14:25:20	8,33E-08	0	1,03E-07	1,67E-08	8,33E-04	1,24E-04
KLX 27A	2008-01-25 15:31:00	2008-01-25 16:54:00	357,30	377,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-01-26 08:39:00	2008-01-26 10:28:00	397,30	417,30		3	1	2008-01-26 09:46:58	2008-01-26 10:06:58	3,33E-08	0	4,12E-08	1,67E-08	8,33E-04	4,94E-05
KLX 27A	2008-01-26 11:10:00	2008-01-26 12:01:00	417,30	437,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-01-26 13:38:00	2008-01-26 15:00:00	437,30	457,30		3	1	2008-01-26 14:18:45	2008-01-26 14:38:45	1,83E-08	0	2,33E-08	1,67E-08	8,33E-04	2,80E-05
KLX 27A	2008-01-26 15:37:00	2008-01-26 16:30:00	457,30	477,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-01-26 17:13:00	2008-01-26 18:43:00	477,30	497,30		3	1	2008-01-26 17:56:54	2008-01-26 18:16:54	1,85E-07	0	1,98E-07	1,67E-08	8,33E-04	2,38E-04
KLX 27A	2008-01-27 08:40:00	2008-01-27 10:07:00	497,30	517,30		3	1	2008-01-27 09:25:28	2008-01-27 09:45:28	2,50E-07	0	2,83E-07	1,67E-08	8,33E-04	3,40E-04
KLX 27A	2008-01-27 10:48:00	2008-01-27 12:13:00	517,30	537,30		3	1	2008-01-27 11:31:13	2008-01-27 11:51:13	4,50E-07	0	6,33E-07	1,67E-08	8,33E-04	7,60E-04
KLX 27A	2008-01-27 12:56:00	2008-01-27 14:28:00	537,30	557,30		3	1	2008-01-27 13:46:57	2008-01-27 14:06:57	1,00E-07	0	1,00E-07	1,67E-08	8,33E-04	1,20E-04
KLX 27A	2008-01-27 15:38:00	2008-01-27 17:20:00	557,30	577,30		3	1	2008-01-27 16:38:41	2008-01-27 16:58:41	5,67E-08	0	6,83E-08	1,67E-08	8,33E-04	8,20E-05
KLX 27A	2008-01-27 18:07:00	2008-01-27 19:30:00	577,30	597,30		3	1	2008-01-27 18:48:04	2008-01-27 19:08:04	1,60E-05	0	1,62E-05	1,67E-08	8,33E-04	1,94E-02
KLX 27A	2008-01-28 08:48:00	2008-01-28 10:10:00	597,30	617,30		3	1	2008-01-28 09:28:21	2008-01-28 09:48:21	1,18E-06	0	1,20E-06	1,67E-08	8,33E-04	1,44E-03
KLX 27A	2008-01-28 10:56:00	2008-01-28 12:19:00	617,30	637,30		3	1	2008-01-28 11:37:39	2008-01-28 11:57:39	2,65E-05	0	2,92E-05	1,67E-08	8,33E-04	3,50E-02
KLX 27A	2008-01-28 13:24:00	2008-01-28 14:44:00	625,20	645,20		3	1	2008-01-28 14:02:19	2008-01-28 14:22:19	1,05E-04	0	1,14E-04	1,67E-08	8,33E-04	1,36E-01
KLX 27A	2008-01-30 14:37:00	2008-01-30 16:15:00	337,30	342,30		3	1	2008-01-30 15:33:54	2008-01-30 15:53:54	6,67E-08	0	8,33E-08	1,67E-08	8,33E-04	1,00E-04
KLX 27A	2008-01-30 16:51:00	2008-01-30 18:32:00	342,30	347,30		3	1	2008-01-30 17:50:31	2008-01-30 18:10:31	1,67E-08	0	2,17E-08	1,67E-08	8,33E-04	2,60E-05
KLX 27A	2008-01-31 08:35:00	2008-01-31 09:23:00	347,30	352,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-01-31 09:56:00	2008-01-31 10:33:00	352,30	357,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-01-31 11:31:00	2008-01-31 12:10:00	397,30	402,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-01-31 13:28:00	2008-01-31 14:07:00	402,30	407,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-01-31 14:39:00	2008-01-31 15:18:00	407,30	412,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-01-31 15:50:00	2008-01-31 17:29:00	412,30	417,30		3	1	2008-01-31 16:47:39	2008-01-31 17:07:39	3,00E-08	0	3,33E-08	1,67E-08	8,33E-04	4,00E-05
KLX 27A	2008-01-31 18:13:00	2008-01-31 18:51:00	437,30	442,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-07 13:26:00	2008-02-07 15:07:00	442,30	447,30		3	1	2008-02-07 14:25:04	2008-02-07 14:45:04	1,67E-08	0	1,67E-08	1,67E-08	8,33E-04	2,00E-05
KLX 27A	2008-02-01 09:43:00	2008-02-01 10:22:00	447,30	452,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-01 10:54:00	2008-02-01 11:35:00	452,30	457,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-01 13:16:00	2008-02-01 13:54:00	477,30	482,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-01 14:25:00	2008-02-01 15:04:00	482,30	487,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-01 15:33:00	2008-02-01 16:12:00	487,30	492,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-01 16:47:00	2008-02-01 18:51:00	492,30	497,30		3	1	2008-02-01 17:29:57	2008-02-01 17:29:57	1,83E-07	0	1,83E-07	1,67E-08	8,33E-04	2,20E-04
KLX 27A	2008-02-02 08:26:00	2008-02-02 09:50:00	497,30	502,30		3	1	2008-02-02 09:08:03	2008-02-02 09:28:03	2,17E-07	0	2,67E-07	1,67E-08	8,33E-04	3,20E-04
KLX 27A	2008-02-02 10:21:00	2008-02-02 11:41:00	502,30	507,30		3	1	2008-02-02 10:59:17	2008-02-02 11:19:17	3,00E-08	0	3,33E-08	1,67E-08	8,33E-04	4,00E-05
KLX 27A	2008-02-02 13:19:00	2008-02-02 13:57:00	507,30	512,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV

idcode	secup	seclow	dur_flow_phase_tp	dur_rec_phase_tf	initial_head_hi	ow_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
KLX 27A	77,30	177,30	1800	1800			10,36	1605	1803	1605	9,5						127,3
KLX 27A	177,30	277,30	1800	1800			11,87	2513	2715	2511	10,8						227,3
KLX 27A	277,30	377,30	1800	14400			12,19	3396	3602	3390	12,2						327,3
KLX 27A	377,30	477,30	1800	1800			#NV	4265	4487	4355	13,6						427,3
KLX 27A	477,30	577,30	1800	1800			12,75	5153	5359	5174	14,9						527,3
KLX 27A	545,20	645,20	1800	1800			13,90	5749	5956	5749	14,8						595,2
KLX 27A	77,30	97,30	1200	1200			10,01	891	1090	892	8,2						87,3
KLX 27A	97,30	117,30	1200	1200			10,21	1072	1270	1072	8,5						107,3
KLX 27A	117,30	137,30	1200	1200			9,09	1244	1442	1244	8,8						127,3
KLX 27A	137,30	157,30	1200	1200			9,85	1421	1619	1424	9,2						147,3
KLX 27A	157,30	177,30	1200	1200			12,20	1612	1812	1630	9,4						167,3
KLX 27A	177,30	197,30	1200	10800			10,39	1791	1989	1784	9,7						187,3
KLX 27A	197,30	217,30	1200	1200			10,48	1968	2167	1973	10,0						207,3
KLX 27A	217,30	237,30	1200	1200			12,13	2154	2353	2154	10,3						227,3
KLX 27A	237,30	257,30	1200	1200			#NV	2362	2616	2452	10,6						247,3
KLX 27A	277,30	297,30	1200	10800			12,25	2701	2902	2689	11,1						287,3
KLX 27A	337,30	357,30	1200	1200			11,30	3223	3436	3236	12,0						347,3
KLX 27A	357,30	377,30	#NV	#NV			#NV	#NV	#NV	#NV	12,2						367,3
KLX 27A	397,30	417,30	1200	1200			11,98	3759	3957	3801	12,8						407,3
KLX 27A	417,30	437,30	#NV	#NV			#NV	#NV	#NV	#NV	13,1						427,3
KLX 27A	437,30	457,30	1200	1200			#NV	4107	4309	4211	13,4						447,3
KLX 27A	457,30	477,30	#NV	#NV			#NV	#NV	#NV	#NV	13,6						467,3
KLX 27A	477,30	497,30	1200	1200			13,20	4460	4654	4456	13,9						487,3
KLX 27A	497,30	517,30	1200	1200			12,89	4629	4828	4651	14,2						507,3
KLX 27A	517,30	537,30	1200	1200			12,92	4805	5002	4810	14,4						527,3
KLX 27A	537,30	557,30	1200	1200			12,7	4980	5194	4982	14,7						547,3
KLX 27A	557,30	577,30	1200	1200			12,32	5173	5378	5184	15,0						567,3
KLX 27A	577,30	597,30	1200	1200			13,97	5331	5529	5531	15,2						587,3
KLX 27A	597,30	617,30	1200	1200			13,84	5503	5699	5504	15,5						607,3
KLX 27A	617,30	637,30	1200	1200			12,42	5681	5918	5683	15,7						627,3
KLX 27A	625,20	645,20	1200	1200			13,59	5749	5947	5751	15,8						635,2
KLX 27A	337,30	342,30	1200	1200			10,27	3085	3296	3101	11,8						339,8
KLX 27A	342,30	347,30	1200	1200			12,56	3141	3347	3146	11,8						344,8
KLX 27A	347,30	352,30	#NV	#NV			#NV	#NV	#NV	#NV	12,0						349,8
KLX 27A	352,30	357,30	#NV	#NV			#NV	#NV	#NV	#NV	12,0						354,8
KLX 27A	397,30	402,30	#NV	#NV			#NV	#NV	#NV	#NV	12,6						399,8
KLX 27A	402,30	407,30	#NV	#NV			#NV	#NV	#NV	#NV	12,7						404,8
KLX 27A	407,30	412,30	#NV	#NV			#NV	#NV	#NV	#NV	12,8						409,8
KLX 27A	412,30	417,30	1200	1200			13,61	3765	3960	3786	12,8						414,8
KLX 27A	437,30	442,30	#NV	#NV			#NV	#NV	#NV	#NV	13,2						439,8
KLX 27A	442,30	447,30	1200	1200			13,42	4063	4234	4069	13,3						444,8
KLX 27A	447,30	452,30	#NV	#NV			#NV	#NV	#NV	#NV	13,3						449,8
KLX 27A	452,30	457,30	#NV	#NV			#NV	#NV	#NV	#NV	13,4						454,8
KLX 27A	477,30	482,30	#NV	#NV			#NV	#NV	#NV	#NV	13,7						479,8
KLX 27A	482,30	487,30	#NV	#NV			#NV	#NV	#NV	#NV	13,8						484,8
KLX 27A	487,30	492,30	#NV	#NV			#NV	#NV	#NV	#NV	13,9						489,8
KLX 27A	492,30	497,30	1200	3600			13,22	4452	4651	4453	13,9						494,8
KLX 27A	497,30	502,30	1200	1200			12,88	4499	4694	4513	14,1						499,8
KLX 27A	502,30	507,30	1200	1200			12,52	4552	4749	4557	14,1						504,8
KLX 27A	507,30	512,30	#NV	#NV			#NV	#NV	#NV	#NV	14,2						509,8

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
KLX 27A	2008-02-02 14:47:00	2008-02-02 15:26:00	512,30	517,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-02 15:57:00	2008-02-02 16:34:00	517,30	522,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-02 17:07:00	2008-02-02 17:45:00	522,30	527,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-03 08:43:00	2008-02-03 09:22:00	527,30	532,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-03 09:54:00	2008-02-03 11:19:00	532,30	537,30		3	1	2008-02-03 10:37:13	2008-02-03 10:57:13	4,00E-07	0	4,50E-07	1,67E-08	8,33E-04	5,40E-04
KLX 27A	2008-02-03 11:51:00	2008-02-03 12:29:00	537,30	542,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-03 13:01:00	2008-02-03 13:41:00	542,30	547,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-03 15:16:00	2008-02-03 16:41:00	547,30	552,30		3	1	2008-02-03 15:59:19	2008-02-03 16:19:19	7,67E-08	0	8,33E-08	1,67E-08	8,33E-04	1,00E-04
KLX 27A	2008-02-03 17:16:00	2008-02-03 19:29:00	552,30	557,30		3	1	2008-02-03 18:07:35	2008-02-03 18:27:35	2,50E-08	0	2,83E-08	1,67E-08	8,33E-04	3,40E-05
KLX 27A	2008-02-04 08:38:00	2008-02-04 10:17:00	557,30	562,30		3	1	2008-02-04 09:35:29	2008-02-04 09:55:29	1,67E-08	0	2,00E-08	1,67E-08	8,33E-04	2,40E-05
KLX 27A	2008-02-04 10:40:00	2008-02-04 11:18:00	562,30	567,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-04 12:28:00	2008-02-04 14:07:00	567,30	572,30		3	1	2008-02-04 13:25:40	2008-02-04 13:45:40	1,83E-08	0	1,83E-08	1,67E-08	8,33E-04	2,20E-05
KLX 27A	2008-02-04 14:39:00	2008-02-04 16:15:00	572,30	577,30		3	1	2008-02-04 15:33:19	2008-02-04 15:53:19	5,00E-08	0	5,00E-08	1,67E-08	8,33E-04	6,00E-05
KLX 27A	2008-02-05 10:35:00	2008-02-05 12:03:00	587,30	592,30		3	1	2008-02-05 11:21:54	2008-02-05 11:41:54	9,50E-08	0	1,17E-07	1,67E-08	8,33E-04	1,40E-04
KLX 27A	2008-02-05 13:05:00	2008-02-05 14:27:00	592,30	597,30		3	1	2008-02-05 13:45:34	2008-02-05 14:05:34	1,87E-05	0	1,87E-05	1,67E-08	8,33E-04	2,24E-02
KLX 27A	2008-02-05 14:58:00	2008-02-05 16:19:00	597,30	602,30		3	1	2008-02-05 15:37:21	2008-02-05 15:57:21	1,20E-06	0	1,23E-06	1,67E-08	8,33E-04	1,48E-03
KLX 27A	2008-02-05 16:55:00	2008-02-05 17:35:00	602,30	607,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-05 18:08:00	2008-02-05 18:47:00	607,30	612,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-06 08:28:00	2008-02-06 09:06:00	612,30	617,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-06 09:36:00	2008-02-06 10:16:00	617,30	622,30		3	1	#NV	#NV	#NV	-1	#NV	1,67E-08	8,33E-04	#NV
KLX 27A	2008-02-06 10:47:00	2008-02-06 12:10:00	622,30	627,30		3	1	2008-02-06 11:28:22	2008-02-06 11:48:22	1,92E-05	0	2,07E-05	1,67E-08	8,33E-04	2,48E-02
KLX 27A	2008-02-06 13:09:00	2008-02-06 14:32:00	627,30	632,30		3	1	2008-02-06 13:50:22	2008-02-06 14:10:22	1,32E-05	0	1,35E-05	1,67E-08	8,33E-04	1,62E-02
KLX 27A	2008-02-06 15:07:00	2008-02-06 16:31:00	632,30	637,30		3	1	2008-02-06 15:49:45	2008-02-06 16:09:45	1,10E-05	0	1,12E-05	1,67E-08	8,33E-04	1,34E-02
KLX 27A	2008-02-06 17:02:00	2008-02-06 18:25:00	637,30	642,30		3	1	2008-02-06 17:43:20	2008-02-06 18:03:20	9,88E-05	0	1,04E-04	1,67E-08	8,33E-04	1,25E-01
KLX 27A	2008-02-07 08:33:00	2008-02-07 09:54:00	640,20	645,20		3	1	2008-02-07 09:12:28	2008-02-07 09:32:28	1,05E-04	0	1,10E-04	1,67E-08	8,33E-04	1,32E-01
KLX 27A	2008-02-09 13:18:00	2008-02-09 15:17:00	645,20	650,56		3	1	2008-02-09 14:15:27	2008-02-09 14:35:27	5,00E-08	0	5,17E-08	1,67E-08	8,33E-04	6,20E-05

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
KLX 27A	512,30	517,30	#NV	#NV			#NV	#NV	#NV	#NV	14,2						514,8
KLX 27A	517,30	522,30	#NV	#NV			#NV	#NV	#NV	#NV	14,3						519,8
KLX 27A	522,30	527,30	#NV	#NV			#NV	#NV	#NV	#NV	14,3						524,8
KLX 27A	527,30	532,30	#NV	#NV			#NV	#NV	#NV	#NV	14,5						529,8
KLX 27A	532,30	537,30	1200	1200			12,97	4806	5005	4811	14,5						534,8
KLX 27A	537,30	542,30	#NV	#NV			#NV	#NV	#NV	#NV	14,6						539,8
KLX 27A	542,30	547,30	#NV	#NV			#NV	#NV	#NV	#NV	14,6						544,8
KLX 27A	547,30	552,30	1200	1200			13,79	4943	5155	4941	14,7						549,8
KLX 27A	552,30	557,30	1200	3600			13,38	4985	5184	4980	14,7						554,8
KLX 27A	557,30	562,30	1200	1200			14,69	5058	5233	5056	14,8						559,8
KLX 27A	562,30	567,30	#NV	#NV			#NV	#NV	#NV	#NV	14,9						564,8
KLX 27A	567,30	572,30	1200	1200			13,49	5127	5333	5133	14,9						569,8
KLX 27A	572,30	577,30	1200	1200			13,12	5162	5370	5183	15,0						574,8
KLX 27A	587,30	592,30	1200	1200			13,72	5288	5488	5289	15,2						589,8
KLX 27A	592,30	597,30	1200	1200			13,94	5331	5530	5331	15,3						594,8
KLX 27A	597,30	602,30	1200	1200			14,02	5374	5573	5375	15,3						599,8
KLX 27A	602,30	607,30	#NV	#NV			#NV	#NV	#NV	#NV	15,4						604,8
KLX 27A	607,30	612,30	#NV	#NV			#NV	#NV	#NV	#NV	15,4						609,8
KLX 27A	612,30	617,30	#NV	#NV			#NV	#NV	#NV	#NV	15,5						614,8
KLX 27A	617,30	622,30	#NV	#NV			#NV	#NV	#NV	#NV	15,6						619,8
KLX 27A	622,30	627,30	1200	1200			13,44	5598	5805	5597	15,6						624,8
KLX 27A	627,30	632,30	1200	1200			13,69	5632	5830	5631	15,7						629,8
KLX 27A	632,30	637,30	1200	1200			13,26	5672	5870	5672	15,7						634,8
KLX 27A	637,30	642,30	1200	1200			14,10	5724	5923	5725	15,5						639,8
KLX 27A	640,20	645,20	1200	1200			14,04	5749	5948	5750	15,8						642,7
KLX 27A	645,20	650,56	1200	2400			10,59	5769	5978	5764	15,8						647,9

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
KLX 27A	2008-01-18 08:23:00	2008-01-18 10:30:00	77,30	177,30		3	1	127,30	100	6,69E-07	0				8,71E-07
KLX 27A	2008-01-18 13:33:00	2008-01-18 15:24:00	177,30	277,30		3	1	227,30	100	5,83E-07	0				7,59E-07
KLX 27A	2008-01-18 17:05:00	2008-01-18 23:07:00	277,30	377,30		3	1	327,30	100	4,76E-09	0				6,20E-09
KLX 27A	2008-01-19 12:09:00	2008-01-19 13:47:00	377,30	477,30		3	1	427,30	100	2,14E-09	0				2,78E-09
KLX 27A	2008-01-19 15:26:00	2008-01-19 17:30:00	477,30	577,30		3	1	527,30	100	3,97E-08	0				5,17E-08
KLX 27A	2008-01-20 09:30:00	2008-01-20 11:28:00	545,20	645,20		3	1	595,20	100	5,59E-06	0				7,28E-06
KLX 27A	2008-01-21 17:33:00	2008-01-21 18:57:00	77,30	97,30		3	1	87,30	20	4,59E-07	0				4,80E-07
KLX 27A	2008-01-22 08:37:00	2008-01-22 10:02:00	97,30	117,30		3	1	107,30	20	2,06E-08	0				2,16E-08
KLX 27A	2008-01-22 10:43:00	2008-01-22 12:18:00	117,30	137,30		3	1	127,30	20	4,13E-09	0				4,32E-09
KLX 27A	2008-01-22 13:38:00	2008-01-22 15:07:00	137,30	157,30		3	1	147,30	20	4,38E-08	0				4,58E-08
KLX 27A	2008-01-22 15:44:00	2008-01-22 17:07:00	157,30	177,30		3	1	167,30	20	9,65E-08	0				1,01E-07
KLX 27A	2008-01-22 17:51:00	2008-01-22 22:12:00	177,30	197,30		3	1	187,30	20	2,64E-08	0				2,76E-08
KLX 27A	2008-01-23 08:45:00	2008-01-23 10:20:00	197,30	217,30		3	1	207,30	20	6,57E-09	0				6,88E-09
KLX 27A	2008-01-23 10:54:00	2008-01-23 12:22:00	217,30	237,30		3	1	227,30	20	4,50E-07	0				4,71E-07
KLX 27A	2008-01-23 14:51:00	2008-01-23 16:03:00	237,30	257,30		3	1	247,30	20	8,18E-08	0				8,55E-08
KLX 27A	2008-01-24 15:06:00	2008-01-24 20:02:00	277,30	297,30		3	1	287,30	20	1,10E-09	0				1,11E-09
KLX 27A	2008-01-25 13:24:00	2008-01-25 14:47:00	337,30	357,30		3	1	347,30	20	3,84E-09	0				4,01E-09
KLX 27A	2008-01-25 15:31:00	2008-01-25 16:54:00	357,30	377,30		3	1	367,30	20	#NV	-1				#NV
KLX 27A	2008-01-26 08:39:00	2008-01-26 10:28:00	397,30	417,30		3	1	407,30	20	1,65E-09	0				1,73E-09
KLX 27A	2008-01-26 11:10:00	2008-01-26 12:01:00	417,30	437,30		3	1	427,30	20	#NV	-1				#NV
KLX 27A	2008-01-26 13:38:00	2008-01-26 15:00:00	437,30	457,30		3	1	447,30	20	8,90E-10	0				9,31E-10
KLX 27A	2008-01-26 15:37:00	2008-01-26 16:30:00	457,30	477,30		3	1	467,30	20	#NV	-1				#NV
KLX 27A	2008-01-26 17:13:00	2008-01-26 18:43:00	477,30	497,30		3	1	487,30	20	9,35E-09	0				9,79E-09
KLX 27A	2008-01-27 08:40:00	2008-01-27 10:07:00	497,30	517,30		3	1	507,30	20	1,23E-08	0				1,29E-08
KLX 27A	2008-01-27 10:48:00	2008-01-27 12:13:00	517,30	537,30		3	1	527,30	20	2,24E-08	0				2,34E-08
KLX 27A	2008-01-27 12:56:00	2008-01-27 14:28:00	537,30	557,30		3	1	547,30	20	4,58E-09	0				4,80E-09
KLX 27A	2008-01-27 15:38:00	2008-01-27 17:20:00	557,30	577,30		3	1	567,30	20	2,71E-09	0				2,84E-09
KLX 27A	2008-01-27 18:07:00	2008-01-27 19:30:00	577,30	597,30		3	1	587,30	20	7,93E-07	0				8,29E-07
KLX 27A	2008-01-28 08:48:00	2008-01-28 10:10:00	597,30	617,30		3	1	607,30	20	5,92E-08	0				6,20E-08
KLX 27A	2008-01-28 10:56:00	2008-01-28 12:19:00	617,30	637,30		3	1	627,30	20	1,10E-06	0				1,15E-06
KLX 27A	2008-01-28 13:24:00	2008-01-28 14:44:00	625,20	645,20		3	1	635,20	20	5,20E-06	0				5,44E-06
KLX 27A	2008-01-30 14:37:00	2008-01-30 16:15:00	337,30	342,30		3	1	339,80	5	3,10E-09	0				2,56E-09
KLX 27A	2008-01-30 16:51:00	2008-01-30 18:32:00	342,30	347,30		3	1	344,80	5	7,99E-10	0				6,55E-10
KLX 27A	2008-01-31 08:35:00	2008-01-31 09:23:00	347,30	352,30		3	1	349,80	5	#NV	-1				#NV
KLX 27A	2008-01-31 09:56:00	2008-01-31 10:33:00	352,30	357,30		3	1	354,80	5	#NV	-1				#NV
KLX 27A	2008-01-31 11:31:00	2008-01-31 12:10:00	397,30	402,30		3	1	399,80	5	#NV	-1				#NV
KLX 27A	2008-01-31 13:28:00	2008-01-31 14:07:00	402,30	407,30		3	1	404,80	5	#NV	-1				#NV
KLX 27A	2008-01-31 14:39:00	2008-01-31 15:18:00	407,30	412,30		3	1	409,80	5	#NV	-1				#NV
KLX 27A	2008-01-31 15:50:00	2008-01-31 17:29:00	412,30	417,30		3	1	414,80	5	1,51E-09	0				1,25E-09
KLX 27A	2008-01-31 18:13:00	2008-01-31 18:51:00	437,30	442,30		3	1	439,80	5	#NV	-1				#NV
KLX 27A	2008-02-07 13:26:00	2008-02-07 15:07:00	442,30	447,30		3	1	444,80	5	9,56E-10	0				7,89E-10
KLX 27A	2008-02-01 09:43:00	2008-02-01 10:22:00	447,30	452,30		3	1	449,80	5	#NV	-1				#NV
KLX 27A	2008-02-01 10:54:00	2008-02-01 11:35:00	452,30	457,30		3	1	454,80	5	#NV	-1				#NV
KLX 27A	2008-02-01 13:16:00	2008-02-01 13:54:00	477,30	482,30		3	1	479,80	5	#NV	-1				#NV
KLX 27A	2008-02-01 14:25:00	2008-02-01 15:04:00	482,30	487,30		3	1	484,80	5	#NV	-1				#NV
KLX 27A	2008-02-01 15:33:00	2008-02-01 16:12:00	487,30	492,30		3	1	489,80	5	#NV	-1				#NV
KLX 27A	2008-02-01 16:47:00	2008-02-01 18:51:00	492,30	497,30		3	1	494,80	5	9,04E-09	0				7,46E-09
KLX 27A	2008-02-02 08:26:00	2008-02-02 09:50:00	497,30	502,30		3	1	499,80	5	1,09E-08	0				9,00E-09
KLX 27A	2008-02-02 10:21:00	2008-02-02 11:41:00	502,30	507,30		3	1	504,80	5	1,49E-09	0				1,23E-09
KLX 27A	2008-02-02 13:19:00	2008-02-02 13:57:00	507,30	512,30		3	1	509,80	5	#NV	-1				#NV

idcode	secup	seclow	bc_tm	value_type_tm	hydr_cond_moye	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
KLX 27A	77,30	177,30	0	0	8,71E-09									8,41E-07	0	1	2,00E-07	4,00E-06
KLX 27A	177,30	277,30	0	0	7,59E-09									2,92E-07	0	1	8,00E-08	7,00E-07
KLX 27A	277,30	377,30	0	0	6,20E-11									1,57E-09	0	1	8,00E-10	5,00E-09
KLX 27A	377,30	477,30	0	0	2,78E-11									1,27E-09	0	1	8,00E-10	6,00E-09
KLX 27A	477,30	577,30	0	0	5,17E-10									2,50E-08	0	1	9,00E-09	6,00E-08
KLX 27A	545,20	645,20	0	0	7,28E-08									1,94E-06	0	1	9,00E-07	2,00E-05
KLX 27A	77,30	97,30	0	0	2,40E-08									7,36E-07	0	1	1,00E-07	3,00E-06
KLX 27A	97,30	117,30	0	0	1,08E-09									2,82E-08	0	1	8,00E-09	6,00E-08
KLX 27A	117,30	137,30	0	0	2,16E-10									8,46E-09	0	1	2,00E-09	2,00E-08
KLX 27A	137,30	157,30	0	0	2,29E-09									6,39E-08	0	1	1,00E-08	2,00E-07
KLX 27A	157,30	177,30	0	0	5,05E-09									2,35E-07	0	1	7,00E-08	4,00E-07
KLX 27A	177,30	197,30	0	0	1,38E-09									1,31E-08	0	1	8,00E-09	5,00E-08
KLX 27A	197,30	217,30	0	0	3,44E-10									7,80E-09	0	1	3,00E-09	5,00E-08
KLX 27A	217,30	237,30	0	0	2,36E-08									3,13E-07	0	1	9,00E-08	5,00E-07
KLX 27A	237,30	257,30	0	0	4,28E-09									8,53E-08	0	1	1,00E-08	2,00E-07
KLX 27A	277,30	297,30	0	0	5,55E-11									5,89E-10	0	1	1,00E-10	2,00E-09
KLX 27A	337,30	357,30	0	0	2,01E-10									1,94E-09	0	1	5,00E-10	5,00E-09
KLX 27A	357,30	377,30	0	-1	#NV									1,00E-10	-1	1	1,00E-11	5,00E-10
KLX 27A	397,30	417,30	0	0	8,65E-11									1,51E-09	0	1	5,00E-10	6,00E-09
KLX 27A	417,30	437,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	437,30	457,30	0	0	4,66E-11									5,64E-10	0	1	1,00E-10	5,00E-09
KLX 27A	457,30	477,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	477,30	497,30	0	0	4,90E-10									2,22E-08	0	1	6,00E-09	7,00E-08
KLX 27A	497,30	517,30	0	0	6,45E-10									1,42E-08	0	1	6,00E-09	5,00E-08
KLX 27A	517,30	537,30	0	0	1,17E-09									1,72E-08	0	1	8,00E-09	7,00E-08
KLX 27A	537,30	557,30	0	0	2,40E-10									6,70E-09	0	1	2,00E-09	3,00E-07
KLX 27A	557,30	577,30	0	0	1,42E-10									1,28E-09	0	1	8,00E-10	6,00E-09
KLX 27A	577,30	597,30	0	0	4,15E-08									1,49E-06	0	1	5,00E-07	6,00E-06
KLX 27A	597,30	617,30	0	0	3,10E-09									1,36E-07	0	1	5,00E-08	6,00E-07
KLX 27A	617,30	637,30	0	0	5,75E-08									1,96E-07	0	1	9,00E-08	9,00E-07
KLX 27A	625,20	645,20	0	0	2,72E-07									1,91E-06	0	1	9,00E-07	9,00E-06
KLX 27A	337,30	342,30	0	0	5,12E-10									1,01E-09	0	1	8,00E-10	7,00E-09
KLX 27A	342,30	347,30	0	0	1,31E-10									1,41E-09	0	1	5,00E-10	7,00E-09
KLX 27A	347,30	352,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	352,30	357,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	397,30	402,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	402,30	407,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	407,30	412,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	412,30	417,30	0	0	2,50E-10									8,29E-10	0	1	5,00E-10	6,00E-09
KLX 27A	437,30	442,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	442,30	447,30	0	0	1,58E-10									1,81E-09	0	1	5,00E-10	7,00E-09
KLX 27A	447,30	452,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	452,30	457,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	477,30	482,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	482,30	487,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	487,30	492,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	492,30	497,30	0	0	1,49E-09									1,99E-08	0	1	5,00E-09	8,00E-08
KLX 27A	497,30	502,30	0	0	1,80E-09									8,76E-09	0	1	5,00E-09	8,00E-08
KLX 27A	502,30	507,30	0	0	2,46E-10									1,32E-09	0	1	9,00E-10	7,00E-09
KLX 27A	507,30	512,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11

idcode	secup	seclow	storativity_s	assumed_s	bc_s	ri	ri_index	leakage_coeff	hydr_cond_ksf	value_type_ksf	l_measl_ksf	u_measl_ksf	spec_storage_ssf	assumed_ssf	c	cd	skin	dt1	dt2
KLX 27A	77,30	177,30	1,00E-06	1,00E-06		91,78	0								2,90E-10	3,2E-02	1,59	25,8	754,8
KLX 27A	177,30	277,30	1,00E-06	1,00E-06		25,17	-1								2,78E-09	3,1E-01	-2,76	51,0	229,8
KLX 27A	277,30	377,30	1,00E-06	1,00E-06		6,81	-1								2,79E-10	3,1E-02	-1,41	76,8	229,2
KLX 27A	377,30	477,30	1,00E-06	1,00E-06		18,09	0								2,38E-10	2,6E-02	0,16	49,8	1268,4
KLX 27A	477,30	577,30	1,00E-06	1,00E-06		38,11	0								1,94E-10	2,1E-02	-1,43	181,2	923,4
KLX 27A	545,20	645,20	1,00E-06	1,00E-06		36,18	-1								5,30E-10	5,8E-02	-4,24	73,8	184,2
KLX 27A	77,30	97,30	1,00E-06	1,00E-06		72,48	0								7,11E-11	7,8E-03	3,63	30,6	528,6
KLX 27A	97,30	117,30	1,00E-06	1,00E-06		32,07	0								5,05E-11	5,6E-03	3,81	102,0	663,6
KLX 27A	117,30	137,30	1,00E-06	1,00E-06		23,73	0								5,93E-11	6,5E-03	10,13	90,6	#NV
KLX 27A	137,30	157,30	1,00E-06	1,00E-06		39,34	0								4,64E-11	5,1E-03	4,55	44,4	829,8
KLX 27A	157,30	177,30	1,00E-06	1,00E-06		13,78	1								7,51E-11	8,3E-03	5,40	29,4	76,8
KLX 27A	177,30	197,30	1,00E-06	1,00E-06		9,38	-1								4,25E-10	4,7E-02	-1,01	45,6	150,6
KLX 27A	197,30	217,30	1,00E-06	1,00E-06		23,26	0								1,05E-10	1,2E-02	1,59	#NV	#NV
KLX 27A	217,30	237,30	1,00E-06	1,00E-06		58,53	0								4,61E-11	5,1E-03	0,58	87,6	954,0
KLX 27A	237,30	257,30	1,00E-06	1,00E-06		#NV	1								1,88E-09	2,1E-01	-3,12	#NV	#NV
KLX 27A	277,30	297,30	1,00E-06	1,00E-06		36,57	0								5,67E-11	6,2E-03	2,09	#NV	#NV
KLX 27A	337,30	357,30	1,00E-06	1,00E-06		16,42	0								8,37E-11	9,2E-03	-0,41	#NV	#NV
KLX 27A	357,30	377,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	397,30	417,30	1,00E-06	1,00E-06		15,43	0								8,64E-11	9,5E-03	1,88	#NV	#NV
KLX 27A	417,30	437,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	437,30	457,30	1,00E-06	1,00E-06		12,06	0								9,23E-11	1,0E-02	0,69	#NV	#NV
KLX 27A	457,30	477,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	477,30	497,30	1,00E-06	1,00E-06		30,21	0								4,53E-11	5,0E-03	5,00	#NV	#NV
KLX 27A	497,30	517,30	1,00E-06	1,00E-06		11,49	1								5,59E-11	6,2E-03	0,95	65,4	217,2
KLX 27A	517,30	537,30	1,00E-06	1,00E-06		14,82	-1								3,50E-11	3,9E-03	0,03	61,8	328,2
KLX 27A	537,30	557,30	1,00E-06	1,00E-06		22,39	0								5,63E-11	6,2E-03	5,55	#NV	#NV
KLX 27A	557,30	577,30	1,00E-06	1,00E-06		14,80	0								5,59E-11	6,2E-03	-0,21	#NV	#NV
KLX 27A	577,30	597,30	1,00E-06	1,00E-06		86,46	0								7,00E-11	7,7E-03	5,84	79,2	881,4
KLX 27A	597,30	617,30	1,00E-06	1,00E-06		47,52	0								4,01E-11	4,4E-03	9,50	66,0	283,2
KLX 27A	617,30	637,30	1,00E-06	1,00E-06		24,48	-1								7,86E-10	8,7E-02	-4,43	101,4	265,2
KLX 27A	625,20	645,20	1,00E-06	1,00E-06		39,89	-1								1,47E-09	1,6E-01	-4,14	80,4	225,6
KLX 27A	337,30	342,30	1,00E-06	1,00E-06		5,99	-1								2,09E-11	2,3E-03	-1,11	58,2	221,4
KLX 27A	342,30	347,30	1,00E-06	1,00E-06		15,16	0								1,88E-11	2,1E-03	6,04	#NV	#NV
KLX 27A	347,30	352,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	352,30	357,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	397,30	402,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	402,30	407,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	407,30	412,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	412,30	417,30	1,00E-06	1,00E-06		13,3	0								1,99E-11	2,2E-03	0,31	#NV	#NV
KLX 27A	437,30	442,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	442,30	447,30	1,00E-06	1,00E-06		16,1	0								3,37E-11	3,7E-03	10,40	#NV	#NV
KLX 27A	447,30	452,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	452,30	457,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	477,30	482,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	482,30	487,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	487,30	492,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	492,30	497,30	1,00E-06	1,00E-06		30,18	0								1,28E-11	1,4E-03	8,94	148,7	1265,0
KLX 27A	497,30	502,30	1,00E-06	1,00E-06		7,99	1								1,73E-11	1,9E-03	0,03	34,2	133,6
KLX 27A	502,30	507,30	1,00E-06	1,00E-06		14,92	0								3,01E-11	3,3E-03	2,41	#NV	#NV
KLX 27A	507,30	512,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV

idcode	secup	seclow	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
KLX 27A	77,30	177,30					1604,4													
KLX 27A	177,30	277,30					2503,9													
KLX 27A	277,30	377,30					3388,5													
KLX 27A	377,30	477,30					#NV													
KLX 27A	477,30	577,30					5145,7													
KLX 27A	545,20	645,20					5746,3													
KLX 27A	77,30	97,30					891,6													
KLX 27A	97,30	117,30					1071,1													
KLX 27A	117,30	137,30					#NV													
KLX 27A	137,30	157,30					1422,5													
KLX 27A	157,30	177,30					1619,8													
KLX 27A	177,30	197,30					1782,0													
KLX 27A	197,30	217,30					1960,1													
KLX 27A	217,30	237,30					2153,2													
KLX 27A	237,30	257,30					#NV													
KLX 27A	277,30	297,30					2684,0													
KLX 27A	337,30	357,30					3203,5													
KLX 27A	357,30	377,30					#NV													
KLX 27A	397,30	417,30					3738,4													
KLX 27A	417,30	437,30					#NV													
KLX 27A	437,30	457,30					#NV													
KLX 27A	457,30	477,30					#NV													
KLX 27A	477,30	497,30					4451,9													
KLX 27A	497,30	517,30					4623,8													
KLX 27A	517,30	537,30					4799,7													
KLX 27A	537,30	557,30					4907,9													
KLX 27A	557,30	577,30					5141,4													
KLX 27A	577,30	597,30					5331,8													
KLX 27A	597,30	617,30					5504,2													
KLX 27A	617,30	637,30					5663,2													
KLX 27A	625,20	645,20					5743,3													
KLX 27A	337,30	342,30					3063,1													
KLX 27A	342,30	347,30					3127,8													
KLX 27A	347,30	352,30					#NV													
KLX 27A	352,30	357,30					#NV													
KLX 27A	397,30	402,30					#NV													
KLX 27A	402,30	407,30					#NV													
KLX 27A	407,30	412,30					#NV													
KLX 27A	412,30	417,30					3754,4													
KLX 27A	437,30	442,30					#NV													
KLX 27A	442,30	447,30					4015,9													
KLX 27A	447,30	452,30					#NV													
KLX 27A	452,30	457,30					#NV													
KLX 27A	477,30	482,30					#NV													
KLX 27A	482,30	487,30					#NV													
KLX 27A	487,30	492,30					#NV													
KLX 27A	492,30	497,30					4452,1													
KLX 27A	497,30	502,30					4492,4													
KLX 27A	502,30	507,30					4532,8													
KLX 27A	507,30	512,30					#NV													

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
KLX 27A	2008-02-02 14:47:00	2008-02-02 15:26:00	512,30	517,30		3	1	514,80	5	#NV	-1				#NV
KLX 27A	2008-02-02 15:57:00	2008-02-02 16:34:00	517,30	522,30		3	1	519,80	5	#NV	-1				#NV
KLX 27A	2008-02-02 17:07:00	2008-02-02 17:45:00	522,30	527,30		3	1	524,80	5	#NV	-1				#NV
KLX 27A	2008-02-03 08:43:00	2008-02-03 09:22:00	527,30	532,30		3	1	529,80	5	#NV	-1				#NV
KLX 27A	2008-02-03 09:54:00	2008-02-03 11:19:00	532,30	537,30		3	1	534,80	5	1,97E-08	0				1,63E-08
KLX 27A	2008-02-03 11:51:00	2008-02-03 12:29:00	537,30	542,30		3	1	539,80	5	#NV	-1				#NV
KLX 27A	2008-02-03 13:01:00	2008-02-03 13:41:00	542,30	547,30		3	1	544,80	5	#NV	-1				#NV
KLX 27A	2008-02-03 15:16:00	2008-02-03 16:41:00	547,30	552,30		3	1	549,80	5	3,55E-09	0				2,93E-09
KLX 27A	2008-02-03 17:16:00	2008-02-03 19:29:00	552,30	557,30		3	1	554,80	5	1,23E-09	0				1,02E-09
KLX 27A	2008-02-04 08:38:00	2008-02-04 10:17:00	557,30	562,30		3	1	559,80	5	9,34E-10	0				7,71E-10
KLX 27A	2008-02-04 10:40:00	2008-02-04 11:18:00	562,30	567,30		3	1	564,80	5	#NV	-1				#NV
KLX 27A	2008-02-04 12:28:00	2008-02-04 14:07:00	567,30	572,30		3	1	569,80	5	8,73E-10	0				7,21E-10
KLX 27A	2008-02-04 14:39:00	2008-02-04 16:15:00	572,30	577,30		3	1	574,80	5	2,36E-09	0				1,95E-09
KLX 27A	2008-02-05 10:35:00	2008-02-05 12:03:00	587,30	592,30		3	1	589,80	5	4,66E-09	0				3,85E-09
KLX 27A	2008-02-05 13:05:00	2008-02-05 14:27:00	592,30	597,30		3	1	594,80	5	9,20E-07	0				7,60E-07
KLX 27A	2008-02-05 14:58:00	2008-02-05 16:19:00	597,30	602,30		3	1	599,80	5	5,92E-08	0				4,88E-08
KLX 27A	2008-02-05 16:55:00	2008-02-05 17:35:00	602,30	607,30		3	1	604,80	5	#NV	-1				#NV
KLX 27A	2008-02-05 18:08:00	2008-02-05 18:47:00	607,30	612,30		3	1	609,80	5	#NV	-1				#NV
KLX 27A	2008-02-06 08:28:00	2008-02-06 09:06:00	612,30	617,30		3	1	614,80	5	#NV	-1				#NV
KLX 27A	2008-02-06 09:36:00	2008-02-06 10:16:00	617,30	622,30		3	1	619,80	5	#NV	-1				#NV
KLX 27A	2008-02-06 10:47:00	2008-02-06 12:10:00	622,30	627,30		3	1	624,80	5	9,08E-07	0				7,50E-07
KLX 27A	2008-02-06 13:09:00	2008-02-06 14:32:00	627,30	632,30		3	1	629,80	5	6,53E-07	0				5,38E-07
KLX 27A	2008-02-06 15:07:00	2008-02-06 16:31:00	632,30	637,30		3	1	634,80	5	5,45E-07	0				4,50E-07
KLX 27A	2008-02-06 17:02:00	2008-02-06 18:25:00	637,30	642,30		3	1	639,80	5	4,87E-06	0				4,02E-06
KLX 27A	2008-02-07 08:33:00	2008-02-07 09:54:00	640,20	645,20		3	1	642,70	5	5,15E-06	0				4,25E-06
KLX 27A	2008-02-09 13:18:00	2008-02-09 15:17:00	645,20	650,56		3	1	647,88	5,36	2,35E-09	0				1,96E-09

idcode	secup	seclow	bc_tm	value_type_tm	hydr_cond_moye	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
KLX 27A	512,30	517,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	517,30	522,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	522,30	527,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	527,30	532,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	532,30	537,30	0	0	3,26E-09									1,57E-08	0	1	8,00E-09	8,00E-08
KLX 27A	537,30	542,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	542,30	547,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	547,30	552,30	0	0	5,86E-10									4,36E-09	0	1	1,00E-09	1,00E-08
KLX 27A	552,30	557,30	0	0	2,04E-10									1,15E-09	0	1	9,00E-10	7,00E-09
KLX 27A	557,30	562,30	0	0	1,54E-10									1,09E-09	0	1	6,00E-10	6,00E-09
KLX 27A	562,30	567,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	567,30	572,30	0	0	1,44E-10									1,89E-09	0	1	6,00E-10	6,00E-09
KLX 27A	572,30	577,30	0	0	3,90E-10									7,57E-10	0	1	6,00E-10	8,00E-09
KLX 27A	587,30	592,30	0	0	7,70E-10									3,21E-09	0	1	9,00E-10	1,00E-08
KLX 27A	592,30	597,30	0	0	1,52E-07									2,15E-06	0	1	7,00E-07	5,00E-06
KLX 27A	597,30	602,30	0	0	9,76E-09									9,78E-08	0	1	3,00E-08	4,00E-07
KLX 27A	602,30	607,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	607,30	612,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	612,30	617,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	617,30	622,30	0	-1	#NV									1,00E-11	-1	1	1,00E-13	1,00E-11
KLX 27A	622,30	627,30	0	0	1,50E-07									3,21E-07	0	1	1,00E-07	2,00E-06
KLX 27A	627,30	632,30	0	0	1,08E-07									9,00E-07	0	1	5,00E-07	4,00E-06
KLX 27A	632,30	637,30	0	0	9,00E-08									7,87E-07	0	1	5,00E-07	4,00E-06
KLX 27A	637,30	642,30	0	0	8,04E-07									2,50E-06	0	1	9,00E-07	2,00E-05
KLX 27A	640,20	645,20	0	0	8,50E-07									2,72E-06	0	1	1,00E-06	1,00E-05
KLX 27A	645,20	650,56	0	0	3,66E-10									5,08E-09	0	1	1,00E-09	1,00E-08

idcode	secup	seclow	storativity_s	assumed_s	bc_s	ri	ri_index	leakage_coeff	hydr_cond_ksf	value_type_ksf	l_measl_ksf	u_measl_ksf	spec_storage_ssf	assumed_ssf	c	cd	skin	dt1	dt2
KLX 27A	512,30	517,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	517,30	522,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	522,30	527,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	527,30	532,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	532,30	537,30	1,00E-06	1,00E-06		27,70	0								1,06E-11	1,2E-03	0,36	37,4	979,9
KLX 27A	537,30	542,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	542,30	547,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	547,30	552,30	1,00E-06	1,00E-06		20,11	0								1,47E-11	1,6E-03	3,92	#NV	#NV
KLX 27A	552,30	557,30	1,00E-06	1,00E-06		24,96	0								2,18E-11	2,4E-03	2,57	#NV	#NV
KLX 27A	557,30	562,30	1,00E-06	1,00E-06		14,22	0								1,80E-11	2,0E-03	3,81	#NV	#NV
KLX 27A	562,30	567,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	567,30	572,30	1,00E-06	1,00E-06		16,32	0								1,94E-11	2,1E-03	10,70	#NV	#NV
KLX 27A	572,30	577,30	1,00E-06	1,00E-06		12,98	0								1,75E-11	1,9E-03	-0,78	106,9	932,4
KLX 27A	587,30	592,30	1,00E-06	1,00E-06		18,63	-1								1,05E-11	1,2E-03	0,63	#NV	#NV
KLX 27A	592,30	597,30	1,00E-06	1,00E-06		94,76	0								2,80E-11	3,1E-03	8,19	46,4	825,5
KLX 27A	597,30	602,30	1,00E-06	1,00E-06		43,76	0								1,01E-11	1,1E-03	5,22	47,9	891,0
KLX 27A	602,30	607,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	607,30	612,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	612,30	617,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	617,30	622,30	1,00E-06	1,00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 27A	622,30	627,30	1,00E-06	1,00E-06		24,23	-1								8,45E-10	9,3E-02	-3,32	66,6	203,0
KLX 27A	627,30	632,30	1,00E-06	1,00E-06		16,75	-1								6,32E-11	7,0E-03	3,19	13,3	58,0
KLX 27A	632,30	637,30	1,00E-06	1,00E-06		14,78	-1								3,14E-11	3,5E-03	3,53	8,3	48,2
KLX 27A	637,30	642,30	1,00E-06	1,00E-06		31,84	-1								6,39E-10	7,0E-02	-3,18	23,8	125,6
KLX 27A	640,20	645,20	1,00E-06	1,00E-06		31,19	-1								1,86E-09	2,1E-01	-3,11	27,0	115,6
KLX 27A	645,20	650,56	1,00E-06	1,00E-06		29,55	0								4,67E-11	5,1E-03	10,25	31,0	835,2

idcode	secup	seclow	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
KLX 27A	512,30	517,30					#NV													
KLX 27A	517,30	522,30					#NV													
KLX 27A	522,30	527,30					#NV													
KLX 27A	527,30	532,30					#NV													
KLX 27A	532,30	537,30					4799,4													
KLX 27A	537,30	542,30					#NV													
KLX 27A	542,30	547,30					#NV													
KLX 27A	547,30	552,30					4938,3													
KLX 27A	552,30	557,30					4977,8													
KLX 27A	557,30	562,30					5034,1													
KLX 27A	562,30	567,30					#NV													
KLX 27A	567,30	572,30					5109,5													
KLX 27A	572,30	577,30					5149,3													
KLX 27A	587,30	592,30					5285,7													
KLX 27A	592,30	597,30					5331,5													
KLX 27A	597,30	602,30					5375,6													
KLX 27A	602,30	607,30					#NV													
KLX 27A	607,30	612,30					#NV													
KLX 27A	612,30	617,30					#NV													
KLX 27A	617,30	622,30					#NV													
KLX 27A	622,30	627,30					5587,1													
KLX 27A	627,30	632,30					5632,7													
KLX 27A	632,30	637,30					5671,5													
KLX 27A	637,30	642,30					5723,2													
KLX 27A	640,20	645,20					5747,7													
KLX 27A	645,20	650,56					5759,9													

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
KLX 27A	2008-01-18 08:23:00	2008-01-18 10:30:00	77,30	177,30		178,30	650,56	713	713	713	1642	1642	1642	
KLX 27A	2008-01-18 13:33:00	2008-01-18 15:24:00	177,30	277,30		278,30	650,56	1602	1602	1602	2529	2529	2529	
KLX 27A	2008-01-18 17:05:00	2008-01-18 23:07:00	277,30	377,30		378,30	650,56	2489	2489	2489	3413	3413	3413	
KLX 27A	2008-01-19 12:09:00	2008-01-19 13:47:00	377,30	477,30		478,30	650,56	3373	3373	3373	4295	4295	4296	
KLX 27A	2008-01-19 15:26:00	2008-01-19 17:30:00	477,30	577,30		578,30	650,56	4257	4257	4257	5174	5174	5174	
KLX 27A	2008-01-20 09:30:00	2008-01-20 11:28:00	545,20	645,20		646,20	650,56	4855	4856	4856	5800	5835	5798	
KLX 27A	2008-01-21 17:33:00	2008-01-21 18:57:00	77,30	97,30		98,30	650,56	711	711	711	928	928	928	
KLX 27A	2008-01-22 08:37:00	2008-01-22 10:02:00	97,30	117,30		118,30	650,56	891	891	891	1108	1108	1108	
KLX 27A	2008-01-22 10:43:00	2008-01-22 12:18:00	117,30	137,30		138,30	650,56	1068	1068	1068	1286	1286	1286	
KLX 27A	2008-01-22 13:38:00	2008-01-22 15:07:00	137,30	157,30		158,30	650,56	1246	1246	1246	1464	1464	1464	
KLX 27A	2008-01-22 15:44:00	2008-01-22 17:07:00	157,30	177,30		178,30	650,56	1424	1424	1424	1642	1642	1642	
KLX 27A	2008-01-22 17:51:00	2008-01-22 22:12:00	177,30	197,30		198,30	650,56	1601	1601	1601	1819	1819	1819	
KLX 27A	2008-01-23 08:45:00	2008-01-23 10:20:00	197,30	217,30		218,30	650,56	1780	1779	1779	1997	1997	1997	
KLX 27A	2008-01-23 10:54:00	2008-01-23 12:22:00	217,30	237,30		238,30	650,56	1957	1957	1957	2175	2176	2176	
KLX 27A	2008-01-23 14:51:00	2008-01-23 16:03:00	237,30	257,30		258,30	650,56	2135	2135	2135	2353	2354	2354	
KLX 27A	2008-01-24 15:06:00	2008-01-24 20:02:00	277,30	297,30		298,30	650,56	2491	2491	2491	2705	2706	2707	
KLX 27A	2008-01-25 13:24:00	2008-01-25 14:47:00	337,30	357,30		358,30	650,56	3021	3020	3020	3236	3236	3236	
KLX 27A	2008-01-25 15:31:00	2008-01-25 16:54:00	357,30	377,30		378,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-01-26 08:39:00	2008-01-26 10:28:00	397,30	417,30		418,30	650,56	3553	3553	3553	3767	3767	3767	
KLX 27A	2008-01-26 11:10:00	2008-01-26 12:01:00	417,30	437,30		438,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-01-26 13:38:00	2008-01-26 15:00:00	437,30	457,30		458,30	650,56	3905	3905	3905	4119	4119	4119	
KLX 27A	2008-01-26 15:37:00	2008-01-26 16:30:00	457,30	477,30		478,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-01-26 17:13:00	2008-01-26 18:43:00	477,30	497,30		498,30	650,56	4257	4257	4257	4471	4471	4471	
KLX 27A	2008-01-27 08:40:00	2008-01-27 10:07:00	497,30	517,30		518,30	650,56	4436	4436	4436	4647	4647	4647	
KLX 27A	2008-01-27 10:48:00	2008-01-27 12:13:00	517,30	537,30		538,30	650,56	4611	4610	4610	4822	4822	4822	
KLX 27A	2008-01-27 12:56:00	2008-01-27 14:28:00	537,30	557,30		558,30	650,56	4788	4787	4787	4999	4999	4999	
KLX 27A	2008-01-27 15:38:00	2008-01-27 17:20:00	557,30	577,30		578,30	650,56	4963	4963	4963	5174	5174	5174	
KLX 27A	2008-01-27 18:07:00	2008-01-27 19:30:00	577,30	597,30		598,30	650,56	5138	5138	5138	5349	5349	5349	
KLX 27A	2008-01-28 08:48:00	2008-01-28 10:10:00	597,30	617,30		618,30	650,56	5316	5315	5315	5523	5524	5524	
KLX 27A	2008-01-28 10:56:00	2008-01-28 12:19:00	617,30	637,30		638,30	650,56	5491	5491	5491	5698	5720	5699	
KLX 27A	2008-01-28 13:24:00	2008-01-28 14:44:00	625,20	645,20		646,20	650,56	5560	5560	5560	5781	5813	5781	
KLX 27A	2008-01-30 14:37:00	2008-01-30 16:15:00	337,30	342,30		343,30	650,56	3023	3022	3022	3101	3101	3101	
KLX 27A	2008-01-30 16:51:00	2008-01-30 18:32:00	342,30	347,30		348,30	650,56	3067	3067	3067	3146	3146	3146	
KLX 27A	2008-01-31 08:35:00	2008-01-31 09:23:00	347,30	352,30		353,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-01-31 09:56:00	2008-01-31 10:33:00	352,30	357,30		358,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-01-31 11:31:00	2008-01-31 12:10:00	397,30	402,30		403,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-01-31 13:28:00	2008-01-31 14:07:00	402,30	407,30		408,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-01-31 14:39:00	2008-01-31 15:18:00	407,30	412,30		413,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-01-31 15:50:00	2008-01-31 17:29:00	412,30	417,30		418,30	650,56	3686	3686	3686	3765	3765	3765	
KLX 27A	2008-01-31 18:13:00	2008-01-31 18:51:00	437,30	442,30		443,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-07 13:26:00	2008-02-07 15:07:00	442,30	447,30		448,30	650,56	3952	3952	3952	4029	4029	4029	
KLX 27A	2008-02-01 09:43:00	2008-02-01 10:22:00	447,30	452,30		453,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-01 10:54:00	2008-02-01 11:35:00	452,30	457,30		458,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-01 13:16:00	2008-02-01 13:54:00	477,30	482,30		483,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-01 14:25:00	2008-02-01 15:04:00	482,30	487,30		488,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-01 15:33:00	2008-02-01 16:12:00	487,30	492,30		493,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-01 16:47:00	2008-02-01 18:51:00	492,30	497,30		498,30	650,56	4390	4390	4390	4468	4468	4468	
KLX 27A	2008-02-02 08:26:00	2008-02-02 09:50:00	497,30	502,30		503,30	650,56	4436	4435	4435	4512	4513	4513	
KLX 27A	2008-02-02 10:21:00	2008-02-02 11:41:00	502,30	507,30		508,30	650,56	4479	4479	4479	4557	4557	4557	
KLX 27A	2008-02-02 13:19:00	2008-02-02 13:57:00	507,30	512,30		513,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	

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
KLX 27A	2008-02-02 14:47:00	2008-02-02 15:26:00	512,30	517,30		518,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-02 15:57:00	2008-02-02 16:34:00	517,30	522,30		523,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-02 17:07:00	2008-02-02 17:45:00	522,30	527,30		528,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-03 08:43:00	2008-02-03 09:22:00	527,30	532,30		533,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-03 09:54:00	2008-02-03 11:19:00	532,30	537,30		538,30	650,56	4745	4745	4745	4821	4821	4821	
KLX 27A	2008-02-03 11:51:00	2008-02-03 12:29:00	537,30	542,30		543,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-03 13:01:00	2008-02-03 13:41:00	542,30	547,30		548,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-03 15:16:00	2008-02-03 16:41:00	547,30	552,30		553,30	650,56	4877	4876	4875	4953	4952	4952	
KLX 27A	2008-02-03 17:16:00	2008-02-03 19:29:00	552,30	557,30		558,30	650,56	4920	4919	4919	4996	4996	4996	
KLX 27A	2008-02-04 08:38:00	2008-02-04 10:17:00	557,30	562,30		563,30	650,56	4964	4964	4964	5040	5040	5040	
KLX 27A	2008-02-04 10:40:00	2008-02-04 11:18:00	562,30	567,30		568,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-04 12:28:00	2008-02-04 14:07:00	567,30	572,30		573,30	650,56	5051	5051	5051	5127	5128	5128	
KLX 27A	2008-02-04 14:39:00	2008-02-04 16:15:00	572,30	577,30		578,30	650,56	5095	5095	5095	5172	5172	5172	
KLX 27A	2008-02-05 10:35:00	2008-02-05 12:03:00	587,30	592,30		593,30	650,56	5226	5226	5226	5302	5302	5302	
KLX 27A	2008-02-05 13:05:00	2008-02-05 14:27:00	592,30	597,30		598,30	650,56	5270	5269	5269	5346	5346	5346	
KLX 27A	2008-02-05 14:58:00	2008-02-05 16:19:00	597,30	602,30		603,30	650,56	5314	5314	5315	5390	5390	5390	
KLX 27A	2008-02-05 16:55:00	2008-02-05 17:35:00	602,30	607,30		608,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-05 18:08:00	2008-02-05 18:47:00	607,30	612,30		613,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-06 08:28:00	2008-02-06 09:06:00	612,30	617,30		618,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-06 09:36:00	2008-02-06 10:16:00	617,30	622,30		623,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-02-06 10:47:00	2008-02-06 12:10:00	622,30	627,30		628,30	650,56	5534	5534	5533	5608	5628	5608	
KLX 27A	2008-02-06 13:09:00	2008-02-06 14:32:00	627,30	632,30		633,30	650,56	5577	5578	5578	5649	5659	5650	
KLX 27A	2008-02-06 15:07:00	2008-02-06 16:31:00	632,30	637,30		638,30	650,56	5621	5621	5621	5693	5698	5693	
KLX 27A	2008-02-06 17:02:00	2008-02-06 18:25:00	637,30	642,30		643,30	650,56	5665	5665	5665	5737	5852	5738	
KLX 27A	2008-02-07 08:33:00	2008-02-07 09:54:00	640,20	645,20		646,20	650,56	5690	5692	5691	5771	5803	5770	
KLX 27A	2008-02-09 13:18:00	2008-02-09 15:17:00	645,20	650,56		651,56	650,56	#NV	#NV	#NV	#NV	#NV	#NV	

APPENDIX 5-2

SICADA data tables (Pulse injection tests)

(Simplified version v1.8)

SICADA/Data Import Template

SKB & Ergodata AB 2006

File Identity	
Created By	
Created	

File Time Zone

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Activity Type	HY665 PLU Pulse Test

Project	PLU KLX 27A

Activity Information						**Additional Activity Data**						
						C30	C40	I160	P20	P200	P220	R240
Idcode	**Start Date**	**Stop Date**	**Secup (m)**	**Seclow (m)**	**Section No**	**Company evaluating data**	**Company performing field work**	**Instrument**	**Field crew manager**	**Field crew**	**Person evaluating data**	**Length calibration type**
KLX 27A	2008-01-23 16:42:00	2008-02-04 19:23:00	257,30	582,30		Golder Associates	Golder Associates	PSS 2	Philipp Wolf	Philipp Wolf, Linda Höckert, Erik Löfgren	Stephan Rohs, Philipp Wolf, Reinder van der Wall	

Table	plu_slug_test_ed Slug- & pulse test, calculated and evaluated results		
Column	**Datatype**	**Unit**	**Column Description**
site	CHAR		Investigation site name
idcode	CHAR		Object or borehole identification code
secup	FLOAT	m	
seclow	FLOAT	m	Lower section limit (m)
start_date	DATE		Date (yymmdd hh:mm:ss)
stop_date	DATE		Date (yymmdd hh:mm:ss)
activity_type	CHAR		Activity type code
sign	CHAR		Activity QA signature
error_flag	CHAR		*: Data for the activity is erroneous and should not be used
test_type	CHAR		Type of test, one of 7, see table description
formation_type	CHAR		1: Rock, 2: Soil (superficial deposits)
start_flow_period	DATE		Date and time of flow phase start (YYYYMMDD hhmmss)
dur_flow_phase_tp	FLOAT	s	Time for the flowing phase of the test (tp)
dur_rec_phase_tf	FLOAT	s	Time for the recovery phase of the test (tF)
initial_head_h0	FLOAT	m	Initial formation hydraulic head, see table description
initial_displacem_dh0	FLOAT	m	Initial displacement of hydraulic head,see table description
displacem_dh0_p	FLOAT	m	Initial displacement of slugtest,see table description
displacem_dh0_f	FLOAT	m	Initial displacement of bailtest,see table description
head_at_flow_end_hp	FLOAT	m	Hydraulic head at end of flow phase,see table description
final_head_hf	FLOAT	m	Hydraulic head at the end of the recovery,see table descr.
initial_press_pi	FLOAT	kPa	Initial formation pressure
initial_press_diff_dp0	FLOAT	kPa	Initial pressure change from pi at time dt=0,pulse test
press_change_dp0_p	FLOAT	kPa	Initial pressure change;pulse test-measured
press_at_flow_end_pp	FLOAT	kPa	Final pressure at the end of the flowing period
final_press_pf	FLOAT	kPa	Final pressure at the end of the recovery period
formation_width_b	FLOAT	m	b:Interpreted formation thickness repr. for evaluated T,see
transmissivity_ts	FLOAT	m**2/s	Ts: Transmissivity based on slugtest, see table description
value_type_ts	CHAR		0:true value,-1:Ts<lower meas.limit,1:Ts>upper meas.limit
bc_ts	CHAR		Best choice code.1 means Ts is best choice of transm.,else 0
transmissivity_tp	FLOAT	m**2/s	TP: Transmissivity based on pulse test, see table descript.
value_type_tp	CHAR		0:true value,-1:Tp<lower meas.limit,1:Tp>upper meas.limit
bc_tp	CHAR		Best choice code.1 means Tp is best choice of transm.,else 0
l_meas_limit_t	FLOAT	m**2	Estimated lower measurement limit for Ts orTp,see descript.
u_meas_limit_t	FLOAT	m**2	Estimated upper measurement limit for Ts & Tp, see descript.
storativity_s	FLOAT		S= Storativity, see table description
assumed_s	FLOAT		S*=assumed storativity, see table description
skin	FLOAT		Skin factor
assumed_skin	FLOAT		Asumed skin factor
c	FLOAT	m**3/pa	Well bore storage coefficient
fluid_temp_tew	FLOAT	oC	Fluid temperature in the test section, see table description
fluid_elcond_ecw	FLOAT	mS/m	Fluid electric conductivity in test section,see table descri
fluid_salinity_tdsw	FLOAT	mg/l	Total salinity of the test section fluid (EC), see descr.
fluid_salinity_tdswm	FLOAT	mg/l	Total salinity of the test section fluid (samples),see descr
dt1	FLOAT	s	Estimated start time of evaluation, see table description
dt2	FLOAT	s	Estimated stop time of evaluation, see table description
reference	CHAR		SKB report No for reports describing data and evaluation
comments	CHAR		Short comment to evaluated parameters

			(m)	(m)					(s)	(s)	(m)	(m)	(m)	(m)	(m)	(m)	(kPa)	(kPa)
idcode	start_date	stop_date	secup	seclow	section_no	test_type	formation_type	start_flow_period	dur_flow_phase_tp	dur_rec_phase_tf	initial_head_h0	initial_displacem_dh0	displacem_dh0_p	displacem_dh0_f	ow_end_hp	final_head_hf	initial_press_pi	initial_press_diff_dp0
KLX 27A	2008-01-23 16:42:00	2008-01-23 19:21:00	257,30	277,30		4B	1	2008-01-23 17:19:11	10	7200							2517	224
KLX 27A	2008-01-25 08:42:00	2008-01-25 10:27:00	297,30	317,30		4B	1	2008-01-25 09:25:55	10	3600							2883	208
KLX 27A	2008-01-25 11:05:00	2008-01-25 12:42:00	317,30	337,30		4B	1	#NV	#NV	#NV							#NV	#NV
KLX 27A	2008-01-25 17:35:00	2008-01-25 21:16:00	377,30	397,30		4B	1	2008-01-25 18:14:24	10	10800							3591	208
KLX 27A	2008-02-04 16:44:00	2008-02-04 19:23:00	577,30	582,30		4B	1	2008-02-04 17:21:40	10	7200							5202	213
KLX 27A	2008-02-05 08:24:00	2008-02-05 10:05:00	582,30	587,30		4B	1	2008-02-05 09:03:23	10	3600							5251	203

	(m)	(m)	(kPa)	(kPa)	(kPa)	(m)	(m**2/s)			(m**2/s)			(m**2)	(m**2)					(m**3/pa)	(oC)	(mS/m)	(mg/l)	(mg/l)	(s)	(s)		
idcode	secup	seclow	hange_dp0_p	press_at_flow_end_pp	final_press_pf	formation_width_b	transmissivity_ts	value_type_ts	bc_ts	transmissivity_tp	value_type_tp	bc_tp	l_meas_limit_t	u_meas_limit_t	storativity_s	assumed_s	skin	assumed_skin	c	fluid_temp_tew	fluid_elcond_ecw	inity_tdsw	nity_tdswm	dt1	dt2	reference	comments
KLX 27A	257,30	277,30		2741	2532					2,73E-11	0	1	7,00E-12	5,00E-11	1,00E-06	1,00E-06	-2,5		4,92E-11	10,8				#NV	#NV		
KLX 27A	297,30	317,30		3091	2929					6,11E-11	0	1	1,00E-11	1,00E-10	1,00E-06	1,00E-06	-1,2		5,78E-11	11,4				#NV	#NV		
KLX 27A	317,30	337,30		#NV	#NV					1,00E-11	0	1	1,00E-13	1,00E-11	1,00E-06	1,00E-06	#NV		#NV	11,7				#NV	#NV		
KLX 27A	377,30	397,30		3799	3624					6,36E-11	0	1	1,00E-11	1,00E-10	1,00E-06	1,00E-06	1,2		4,99E-11	12,5				100,8	1836,0		
KLX 27A	577,30	582,30		5415	5204					9,37E-11	0	1	5,00E-11	4,00E-10	1,00E-06	1,00E-06	1,7		1,43E-11	15,0				821,4	2679,6		
KLX 27A	582,30	587,30		5454	5269					2,34E-11	0	1	1,00E-11	1,00E-10	1,00E-06	1,00E-06	1,2		7,01E-12	15,1				106,2	1577,9		

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)
sign	CHAR		Activity QA signature
error_flag	CHAR		*: Data for the activity is erroneous and should not be used
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 (m)	seclow (m)	section_no	obs_secup (m)	obs_seclow (m)	pi_above (kPa)	pp_above (kPa)	pf_above (kPa)	pi_below (kPa)	pp_below (kPa)	pf_below (kPa)	comments
KLX 27A	2008-01-23 16:42:00	2008-01-23 19:21:00	257,30	277,30		278,30	650,56	2313	2313	2313	2531	2531	2531	
KLX 27A	2008-01-25 08:42:00	2008-01-25 10:27:00	297,30	317,30		318,30	650,56	2668	2668	2668	2883	2883	2883	
KLX 27A	2008-01-25 11:05:00	2008-01-25 12:42:00	317,30	337,30		338,30	650,56	#NV	#NV	#NV	#NV	#NV	#NV	
KLX 27A	2008-01-25 17:35:00	2008-01-25 21:16:00	377,30	397,30		398,30	650,56	3376	3375	3375	3591	3591	3591	
KLX 27A	2008-02-04 16:44:00	2008-02-04 19:23:00	577,30	582,30		583,30	650,56	5139	5139	5138	5216	5216	5216	
KLX 27A	2008-02-05 08:24:00	2008-02-05 10:05:00	582,30	587,30		588,30	650,56	5183	5183	5182	5258	5258	5258	