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Oskarshamn site investigation

Hydraulic Injection Tests in Borehole KLX17A, 2007

Subarea Laxemar

Cristian Enachescu, Reinder van der Wall, Philipp Wolf
Golder Associates GmbH

July 2007

Svensk Kärnbränslehantering AB
Swedish Nuclear Fuel
and Waste Management Co
Box 5864
SE-102 40 Stockholm Sweden
Tel 08-459 84 00
+46 8 459 84 00
Fax 08-661 57 19
+46 8 661 57 19

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

Abstract

Hydraulic injection tests have been performed in Borehole KLX17A 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 KLX17A performed between 09th of May and 01st of June 2007.

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 69.00–701.08 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 KLX17A 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 KLX17A. Testerna utfördes mellan den 09 maj till den 01 juni 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 återhämtningsfasen gav ytterligare information avseende flödesgeometri, hydrauliska gränser och sprickläckage. Injektionstester utfördes mellan 69,00–701,08 m borrhålslängd. Resultaten av testutvärderingen presenteras som transmissivitet, hydraulisk konduktivitet och grundvattennivå uttryckt i ekvivalent sötvattenpelare (fresh-water head).

Borehole KLX17A – 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 KLX17A between 09th of May and 01st of June 2007 following the methodology described in SKB MD 323.001e and in the activity plan AP PS 400-07-009 (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 KLX17A. The commission was conducted by Golder Associates AB and Golder Associates GmbH.

Borehole KLX17A 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 October 2006 at 701.08 m length with an inner diameter of 197 m to a depth of 65.35 m and further on of 76 mm to the bottom of the borehole. The inclination of the borehole is –61.34°. The upper 11.95 m is cased with large diameter telescopic casing ranging from diameter (outer diameter) 208–323 mm. A cone casing is placed from 62.02 m to 66.76 m ranging from diameter (outer diameter) 84–104 mm.

The work was carried out in accordance with activity plan AP PS 400-07-009. 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 pumping and injection tests in borehole KLX17A.	AP PS 400-07-009	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 620.010	1.0
Allmäna ordning-, skydds- och miljöregler för platsundersökningar Oskarshamn.	SKB SDPO-003	1.0
Miljökontrollprogram Platsundersökningar.	SKB SDP-301	1.0
Hantering av primärdata vid platsundersökningar.	SKB SDP-508	1.0

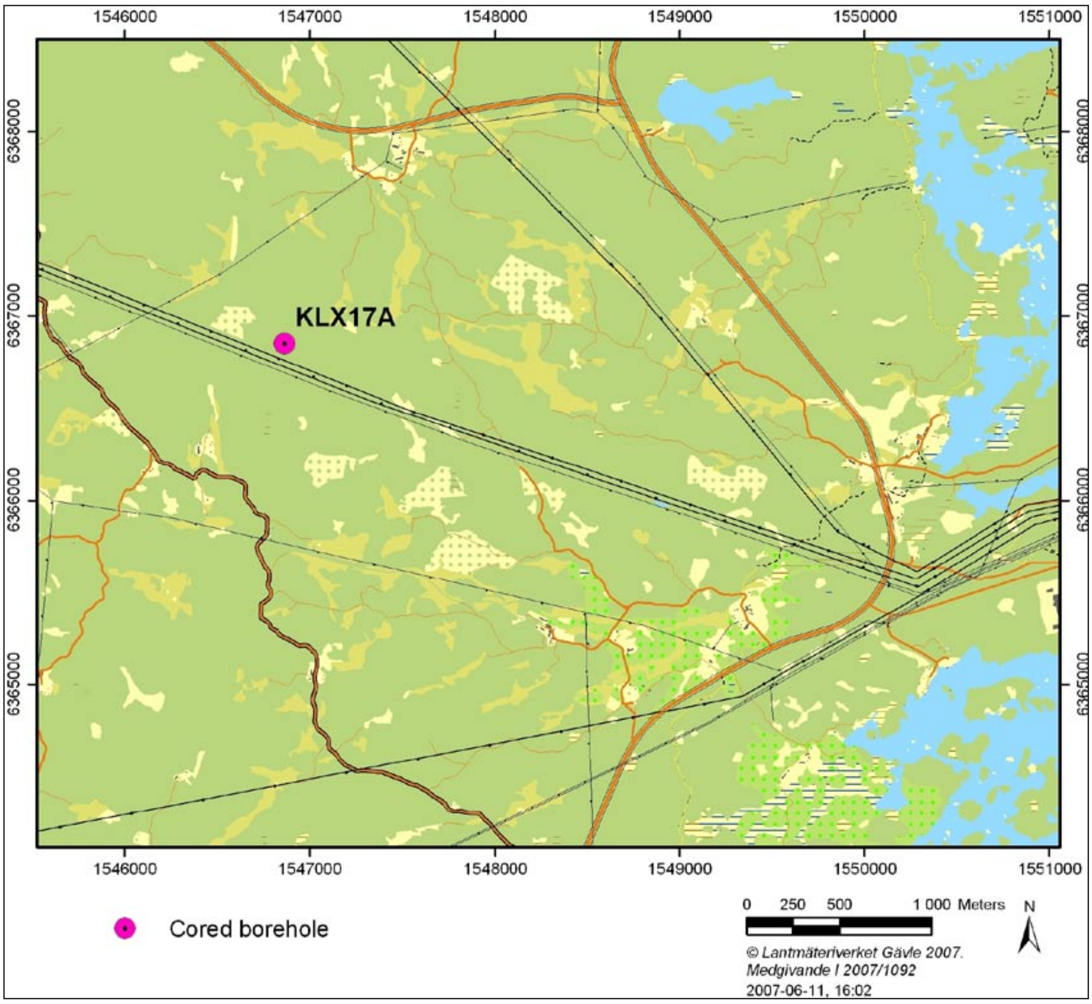

Figure 1-1. *The investigation area Laxemar, Oskarshamn with location of borehole KLX17A.*

2 Objective and scope

The objective of the hydrotests in borehole KLX17A 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. 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 689.00 m to the bottom of the hole. The used single packer tool consists of a 5 m section but the lower packer was not connected to the pressure lines and therefore not inflated.

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 09th of May and 01st of June 2007.

Between 349.00 m to 369.00 m and 489.00 m to 649.00 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 –61.34° 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 294.85 m to 594.23 m below top of casing (ToC).

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 2-1. Performed injection tests at borehole KLX17A.

No. of injection tests*	Interval	Positions	Time/test	Total test time
6	100 m	69.00–669.00 m	125 min	12.5 hrs
34	20 m	69.00–694.00 m	90 min	51.0 hrs
37	5 m	339.00–694.00 m	90 min	55.5 hrs
Single Packer**	12.08 m	689.00–701.08 m	90 min	1.5 hrs
			Total:	120.5 hrs

* Excluding repeated tests; ** conducted with a 5 m tool (bottom packer not inflated).

Table 2-2. Information about KLX17A (from SICADA 2007-01-17).

Title	Value				
Old idcode name (s):	KLX17A				
Comment:	No comment exists				
Borehole length (m):	701.08				
Reference level:	TOC				
Drilling period (s):	From date	To date	Secup (m)	Seclow (m)	Drilling type
	2006-08-07	2006-08-15	0.15	65.42	Percussion drilling
	2006-09-13	2006-10-23	65.42	701.08	Core drilling
Starting point coordinate:	Length (m)	Northing (m)	Easting (m)	Elevation (m.a.s.l.)	Coord system
(centerpoint of TOC)	0.00	6366848.75	1546862.09	27.63	RT90-RHB70
	3.00	6366850.16	1546862.37	25.00	RT90-RHB70
Angles:	Length (m)	Bearing	Inclination (– = down)		
	0.000	11.21	–61.34	RT90-RHB70	
Borehole diameter:	Secup (m)	Seclow (m)	Hole diam (m)		
	0.15	2.60	0.339		
	2.60	11.95	0.248		
	11.95	65.35	0.197		
	65.35	65.42	0.159		
	65.42	66.76	0.086		
	66.76	701.08	0.076		
Core diameter:	Secup (m)	Seclow (m)	Core diam (m)		
	65.42	65.85	0.072		
	65.85	701.08	0.050		
Casing diameter:	Secup (m)	Seclow (m)	Case in (m)	Case out (m)	
	0.00	11.95	0.200	0.208	
	0.15	2.50	0.310	0.323	
	2.50	2.60	0.280	0.323	
Cone dimensions:	Secup (m)	Seclow (m)	Cone in (m)	Cone out (m)	
	62.02	65.02	0.100	0.104	
	65.02	66.76	0.080	0.084	
Grove milling:	Length (m)	Trace detectable			
	75,000	YES			
	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			
	650,000	YES			
	680,000	YES			

2.2 Injection tests

Injection tests were conducted according to the Activity Plan AP PS 400-07-009 and the Method Description for hydraulic injection tests, SKB MD 323.001e (SKB internal documents). Tests were done in 100 m test sections between 69.00–669.00 m below ToC, in 20 m test sections between 69.00–694.00 m below ToC and in 5 m test sections between 339.00–694.00 m below ToC with the exception of the sections between 349.00–369.00 m and 489.00–649.00 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 689.00 m to the bottom of the borehole. The measurements were performed with SKB's custom made equipment for hydraulic testing called PSS2.

Table 2-3. Tests performed.

Bh ID	Test section (m bToC)	Test type[1]	Test no	Test start date, time	Test stop date, time
KLX17A	69.00–169.00	3	1	070509 13:47:00	070509 15:57:00
KLX17A	169.00–269.00	3	1	070509 17:46:00	070509 19:36:00
KLX17A	269.00–369.00	3	1	070510 09:35:00	070510 11:25:00
KLX17A	369.00–469.00	3	1	070510 13:23:00	070510 15:12:00
KLX17A	469.00–569.00	3	1	070510 16:42:00	070510 22:58:00
KLX17A	569.00–669.00	3	1	070511 10:16:00	070511 11:59:00
KLX17A	569.00–669.00	3	2	070511 14:16:00	070511 16:24:00
KLX17A	69.00–89.00	3	1	070513 11:15:00	070513 12:47:00
KLX17A	87.00–107.00	3	1	070513 14:08:00	070513 15:31:00
KLX17A	107.00–127.00	3	1	070513 16:09:00	070513 17:35:00
KLX17A	127.00–147.00	3	1	070513 18:16:00	070513 21:44:00
KLX17A	147.00–167.00	3	1	070514 08:51:00	070514 10:16:00
KLX17A	149.00–169.00	3	1	070514 10:40:00	070514 12:06:00
KLX17A	169.00–189.00	3	1	070514 13:27:00	070514 14:56:00
KLX17A	189.00–209.00	3	1	070514 15:33:00	070514 16:57:00
KLX17A	209.00–229.00	3	1	070514 17:32:00	070514 19:44:00
KLX17A	229.00–249.00	3	1	070515 08:47:00	070515 10:21:00
KLX17A	249.00–269.00	3	1	070515 10:58:00	070515 13:29:00
KLX17A	269.00–289.00	3	1	070515 14:02:00	070515 16:21:00
KLX17A	289.00–309.00	3	1	070515 16:55:00	070515 20:24:00
KLX17A	309.00–329.00	3	1	070516 08:46:00	070516 10:12:00
KLX17A	329.00–349.00	3	1	070516 10:45:00	070516 12:34:00
KLX17A	349.00–369.00	3	1	070516 13:20:00	070516 14:09:00
KLX17A	369.00–389.00	3	1	070516 14:43:00	070516 16:06:00
KLX17A	389.00–409.00	3	1	070516 16:39:00	070516 18:49:00
KLX17A	409.00–429.00	3	1	070517 08:43:00	070517 10:09:00
KLX17A	428.00–448.00	3	1	070517 10:43:00	070517 12:11:00
KLX17A	448.00–468.00	3	1	070517 13:34:00	070517 15:21:00
KLX17A	449.00–469.00	3	1	070517 15:47:00	070517 17:32:00
KLX17A	469.00–489.00	4B	1	070517 18:06:00	070517 21:46:00
KLX17A	469.00–489.00	3	2	070520 17:54:00	070520 20:53:00
KLX17A	489.00–509.00	4B	1	070518 08:47:00	070518 10:32:00
KLX17A	509.00–529.00	3	1	070518 11:04:00	070518 12:01:00
KLX17A	529.00–549.00	4B	1	070518 12:36:00	070518 14:22:00
KLX17A	549.00–569.00	3	1	070518 15:13:00	070518 16:08:00

Bh ID	Test section (m bToC)	Test type[1]	Test no	Test start date, time	Test stop date, time
KLX17A	569.00–589.00	3	1	070518 16:44:00	070518 17:35:00
KLX17A	569.00–589.00	4B	2	070518 18:44:00	070518 21:18:00
KLX17A	589.00–609.00	3	1	070519 08:59:00	070519 09:57:00
KLX17A	609.00–629.00	3	1	070519 10:33:00	070519 11:30:00
KLX17A	629.00–649.00	3	1	070519 12:19:00	070519 14:12:00
KLX17A	649.00–669.00	3	1	070519 15:31:00	070519 18:47:00
KLX17A	669.00–689.00	3	1	070520 08:53:00	070520 10:21:00
KLX17A	674.00–694.00	3	1	070520 11:04:00	070520 12:51:00
KLX17A	339.00–344.00	3	1	070522 13:43:00	070522 15:25:00
KLX17A	344.00–349.00	3	1	070522 15:54:00	070522 16:44:00
KLX17A	369.00–374.00	3	1	070523 09:07:00	070523 10:33:00
KLX17A	374.00–379.00	3	1	070523 10:58:00	070523 11:47:00
KLX17A	379.00–384.00	4B	1	070523 13:07:00	070523 15:21:00
KLX17A	384.00–389.00	3	1	070523 15:49:00	070523 17:24:00
KLX17A	387.00–392.00	3	1	070523 17:48:00	070523 23:02:00
KLX17A	392.00–397.00	3	1	070524 10:35:00	070524 11:24:00
KLX17A	397.00–402.00	3	1	070524 13:08:00	070524 14:37:00
KLX17A	402.00–407.00	3	1	070524 15:07:00	070524 15:56:00
KLX17A	404.00–409.00	3	1	070524 16:22:00	070524 17:11:00
KLX17A	409.00–414.00	3	1	070524 17:35:00	070524 19:01:00
KLX17A	414.00–419.00	3	1	070525 08:18:00	070525 10:11:00
KLX17A	419.00–424.00	3	1	070525 10:36:00	070525 12:07:00
KLX17A	420.00–425.00	3	1	070525 12:56:00	070525 14:20:00
KLX17A	425.00–430.00	3	1	070525 14:50:00	070525 16:17:00
KLX17A	430.00–435.00	3	1	070525 16:44:00	070525 18:08:00
KLX17A	435.00–440.00	4B	1	070526 08:17:00	070526 09:21:00
KLX17A	435.00–440.00	4B	2	070530 16:22:00	070531 03:12:00
KLX17A	440.00–45.00	3	1	070526 09:56:00	070526 10:47:00
KLX17A	444.00–449.00	3	1	070526 11:16:00	070526 12:24:00
KLX17A	449.00–454.00	4B	1	070526 13:34:00	070526 15:46:00
KLX17A	454.00–459.00	3	1	070526 16:14:00	070526 17:07:00
KLX17A	459.00–464.00	4B	1	070527 08:14:00	070527 10:26:00
KLX17A	464.00–469.00	3	1	070527 10:58:00	070527 12:40:00
KLX17A	469.00–474.00	3	1	070527 14:03:00	070527 16:41:00
KLX17A	474.00–479.00	3	1	070527 17:09:00	070527 17:57:00
KLX17A	479.00–484.00	3	1	070528 08:04:00	070528 08:53:00
KLX17A	484.00–489.00	3	1	070528 09:21:00	070528 10:11:00
KLX17A	649.00–654.00	3	1	070528 13:43:00	070528 14:32:00
KLX17A	654.00–659.00	3	1	070528 15:01:00	070528 15:50:00
KLX17A	659.00–664.00	3	1	070528 16:16:00	070528 17:05:00
KLX17A	664.00–669.00	3	1	070528 17:28:00	070528 20:41:00
KLX17A	669.00–674.00	3	1	070529 08:10:00	070529 09:01:00
KLX17A	674.00–679.00	3	1	070529 09:34:00	070529 11:48:00
KLX17A	679.00–684.00	3	1	070529 13:00:00	070529 14:30:00
KLX17A	684.00–689.00	3	1	070529 15:01:00	070529 17:29:00
KLX17A	689.00–694.00	3	1	070529 17:58:00	070529 19:22:00
KLX17A	689.00–701.08	3	1	070601 16:46:00	070601 19:13:00

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

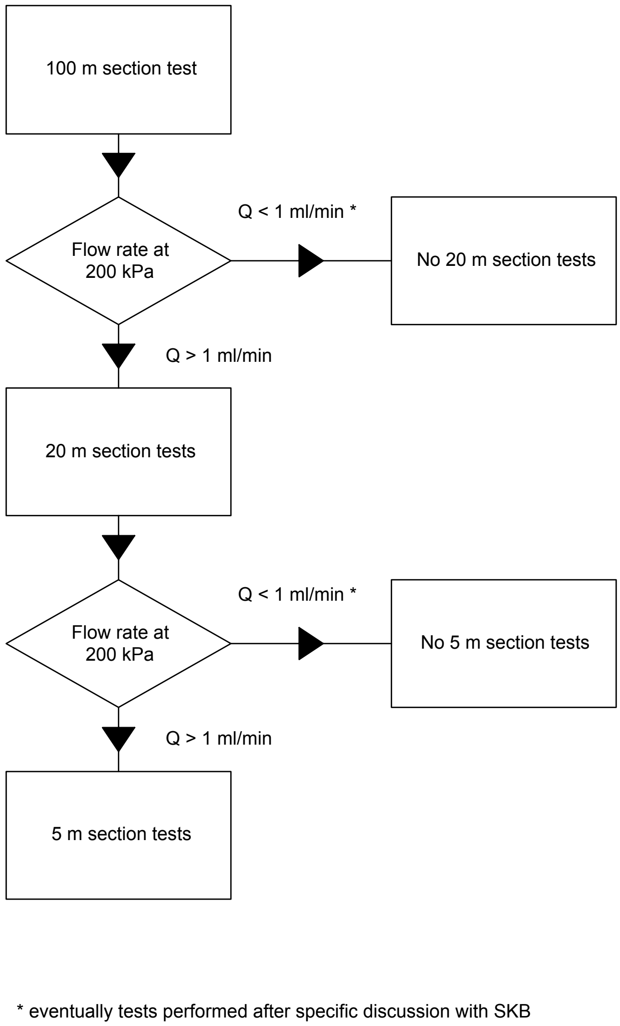

Figure 2-1. *Flow chart for test sections.*

No other additional measurements except the actual hydraulic tests and related measurements of packer position and water level in annulus of borehole KLX17A were conducted.

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.

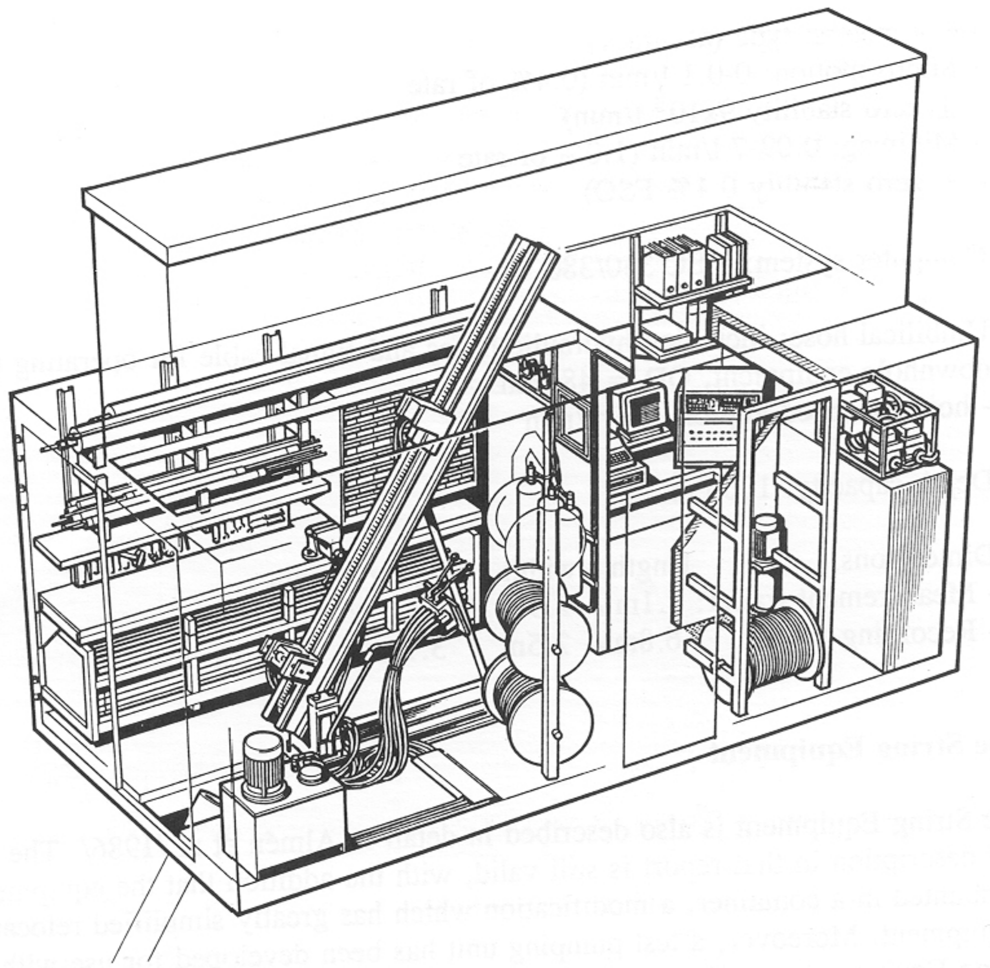

Figure 3-1. A view of the layout and equipment of PSS2.

Photo 1. *Hydraulic rig.*

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

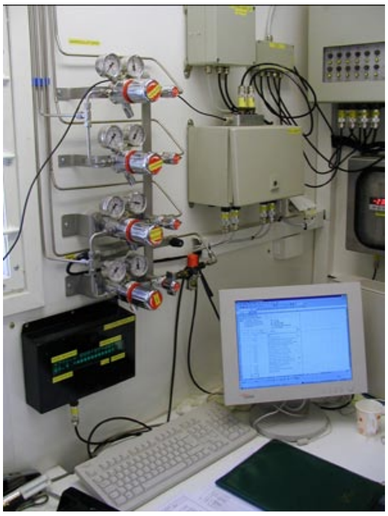

Photo 3. *Computer room, displays and gas regulators.*

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

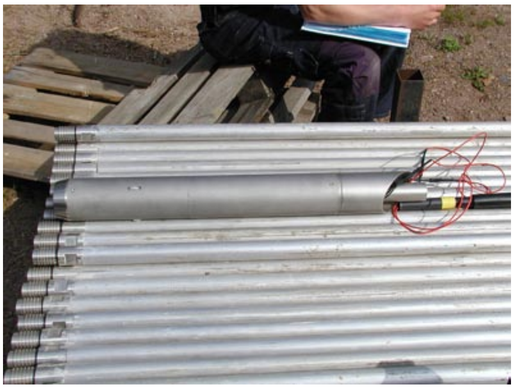

Photo 5. *Positioner, bottom end of down-in-hole string.*

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

The tool scheme is presented in Figure 3-2.

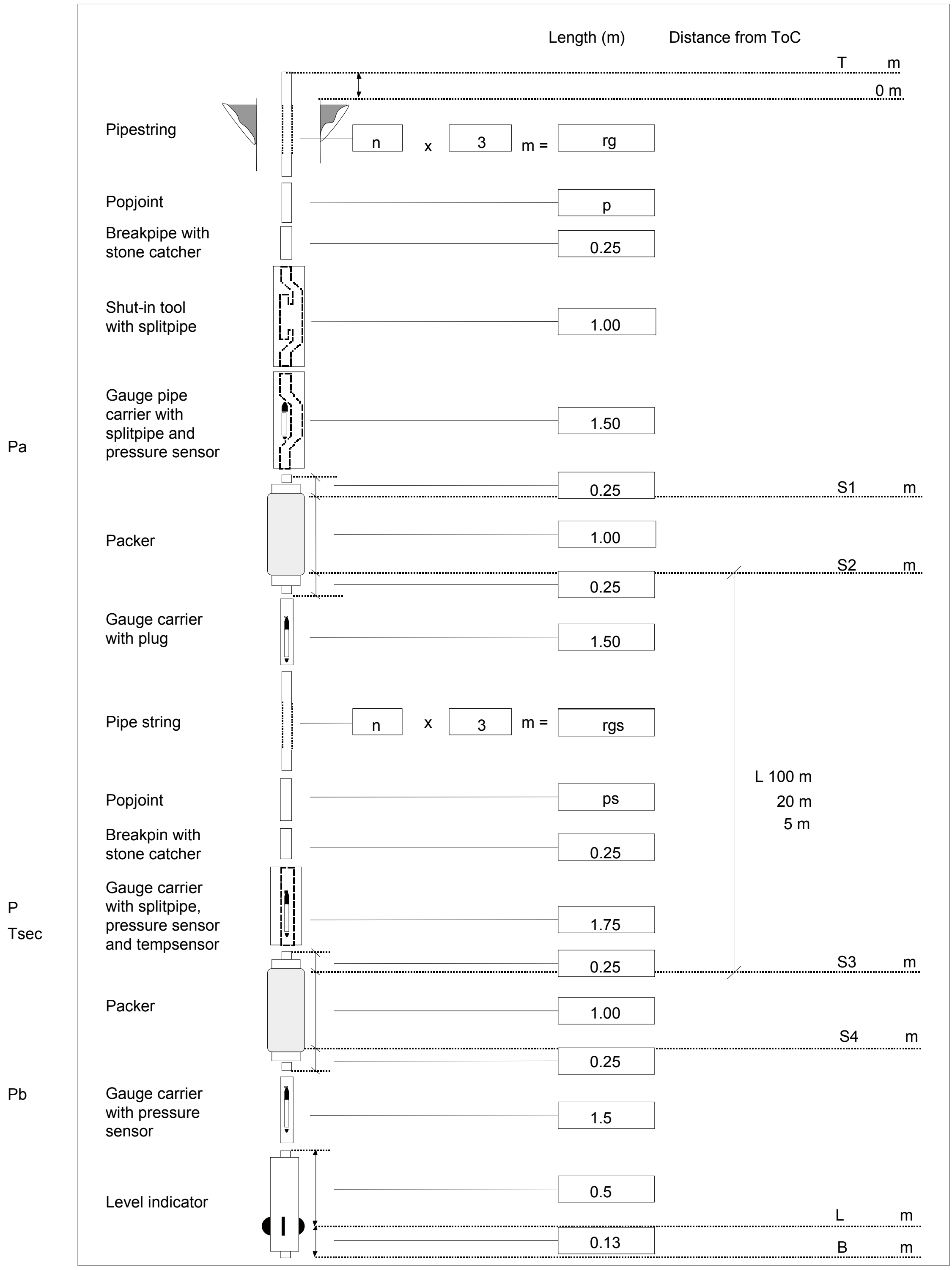

Figure 3-2. *Schematic drawing of the down-hole equipment in the PSS2 system.*

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)
KLX17A	69.00–169.00	p_a p T p_b L	67.00 168.13 167.96 171.00 172.25	Test section	Signal cable Pump string Packer line	9.1 33 6	0.359
KLX17A	69.00–89.00	p_a p T p_b L	67.00 88.13 87.96 91.00 92.25	Test section	Signal cable Pump string Packer line	9.1 33 6	0.072
KLX17A	339.00–344.00	p_a p T p_b L	337.00 343.13 342.96 346.00 347.25	Test section	Signal cable Pump string Packer line	9.1 33 6	0.018
KLX17A	689.00–701.08	p_a p T p_b L	687.00 673.13 672.96 696.00 697.25	Test section	Signal cable Pump string Packer line	9.1 33 6	0.043

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 3-3.

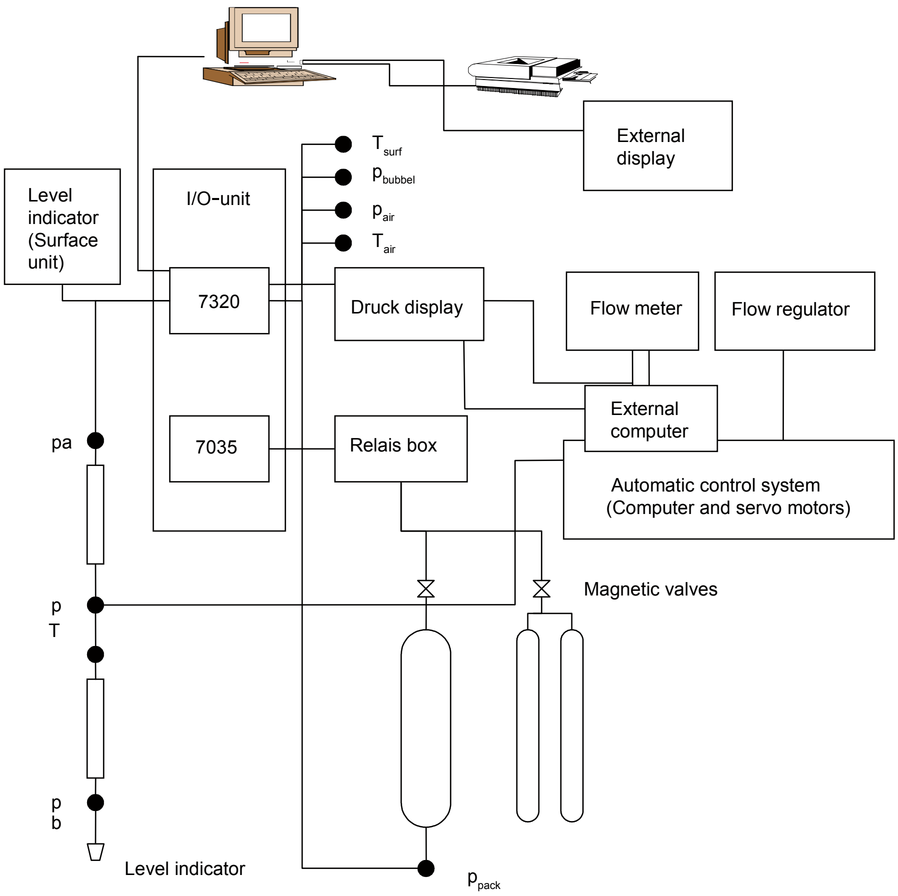

***Figure 3-3.** Schematic drawing of the data acquisition system and the flow regulation control system in PSS2.*

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 of Multikabel and hoses for packer and test valve. Clean the tubings with hot steam.
- Filling injection tank with water out of the borehole HLX14.
- 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.

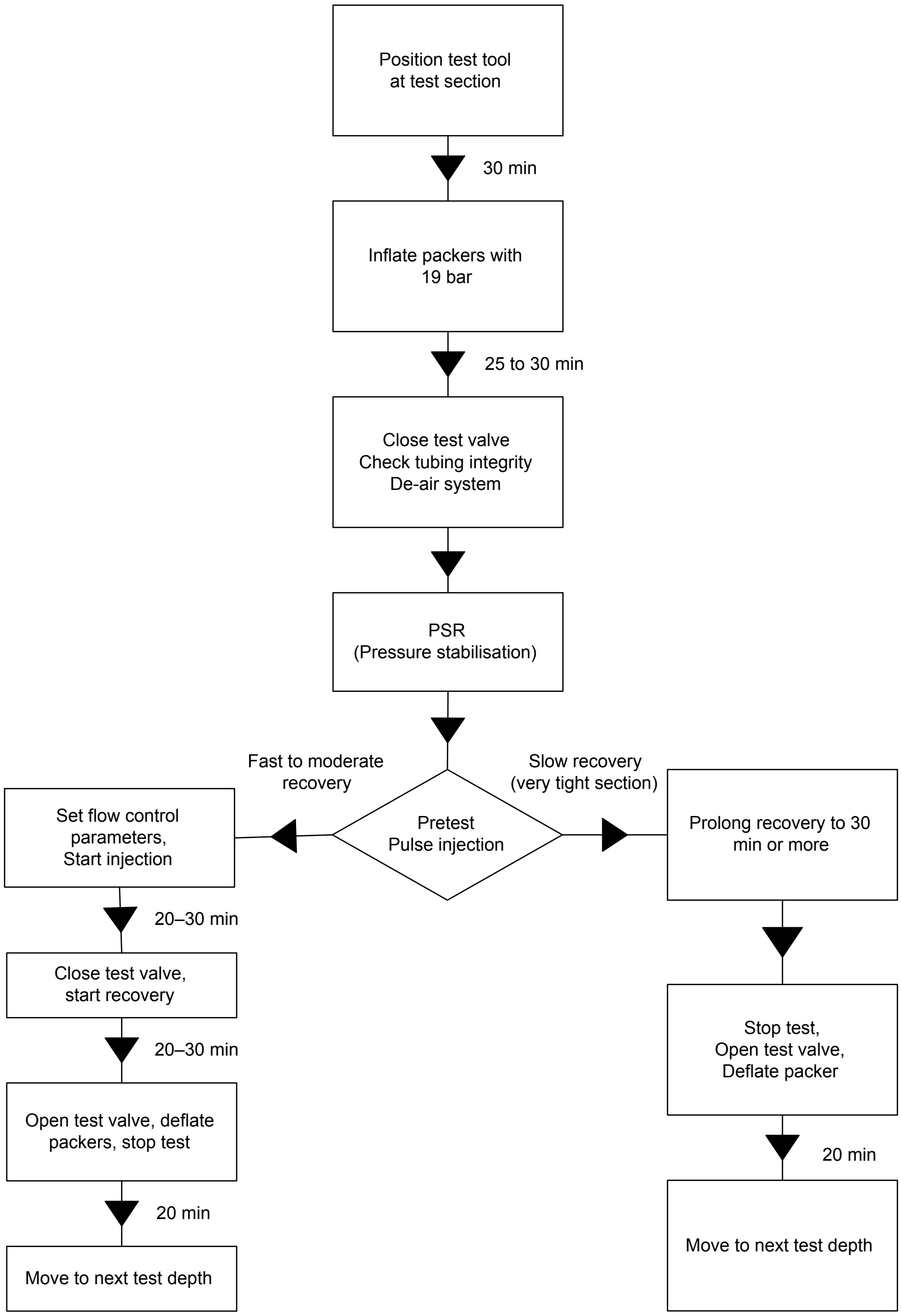

Figure 4-1. *Flow chart for test performance.*

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 method /Jacob and Lohman 1952/ 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, 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 below shows an example of a typical pressure versus time evolution for such a tight section.

  - 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.

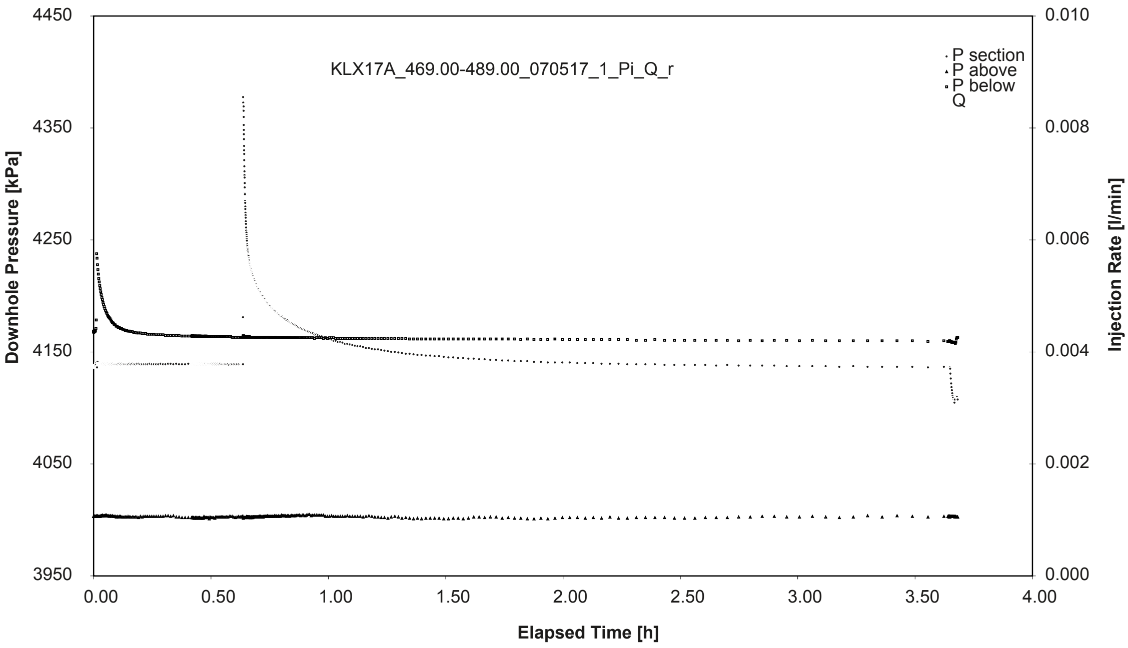

Figure 4-2. *Typical pressure versus time plot of a Pulse injection test.*

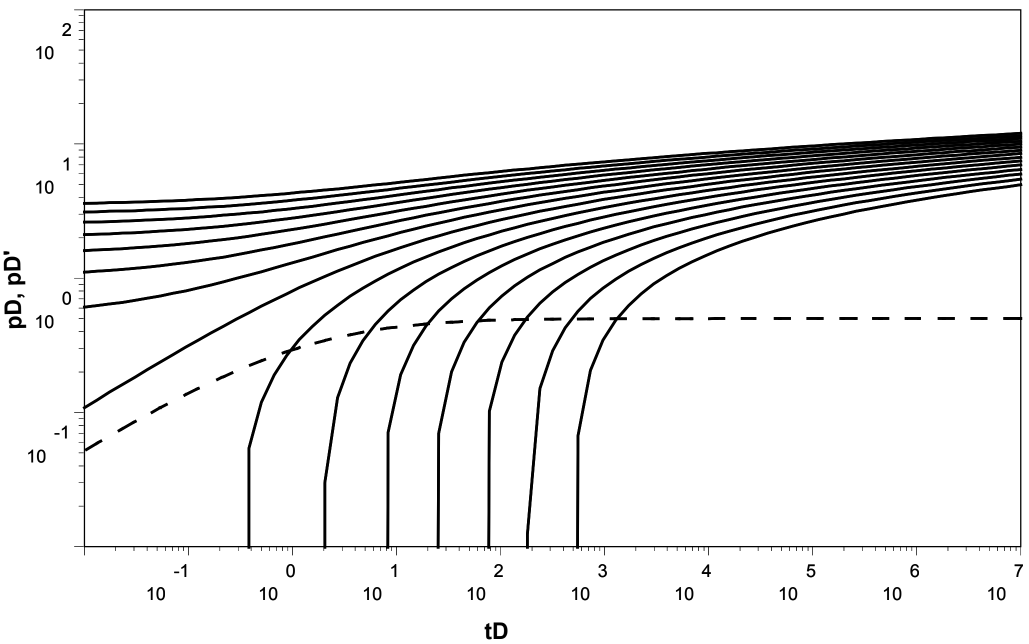

Figure 4-3. *Deconvolution type curve set for pulse test analysis.*

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.

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/.

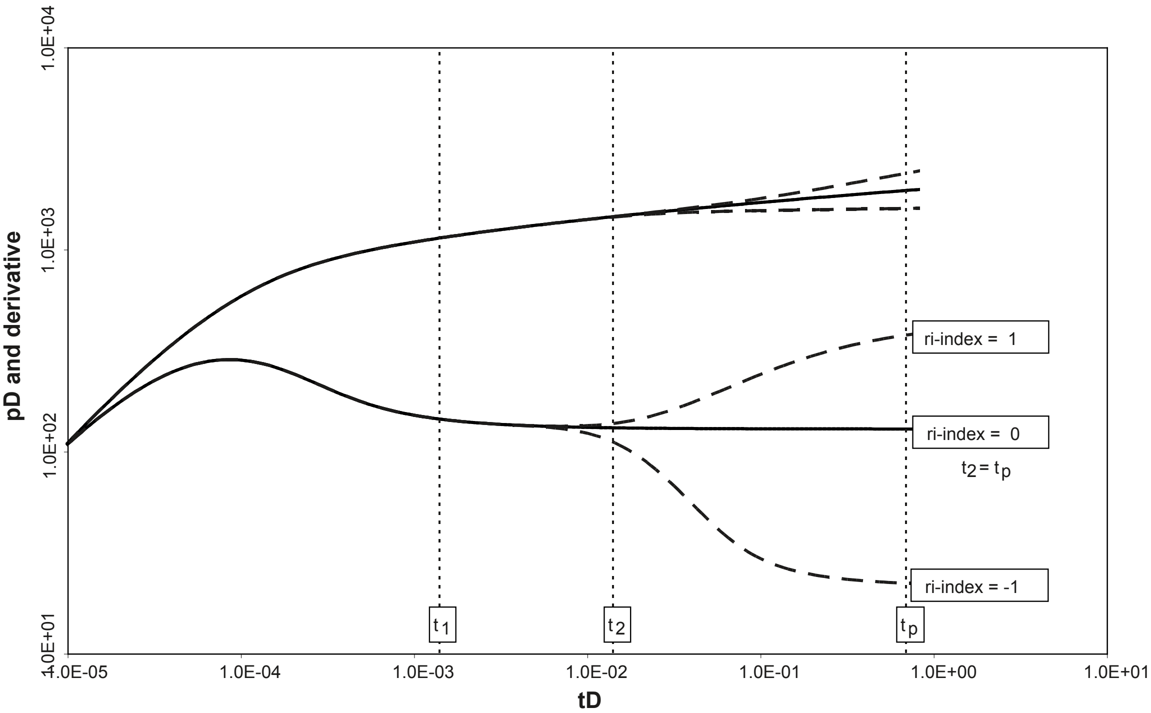

Figure 4-4. *Schematic plot of the assignments for the ri-indices.*

Calculation of the radius of influence

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

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

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:

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

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

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

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

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 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.

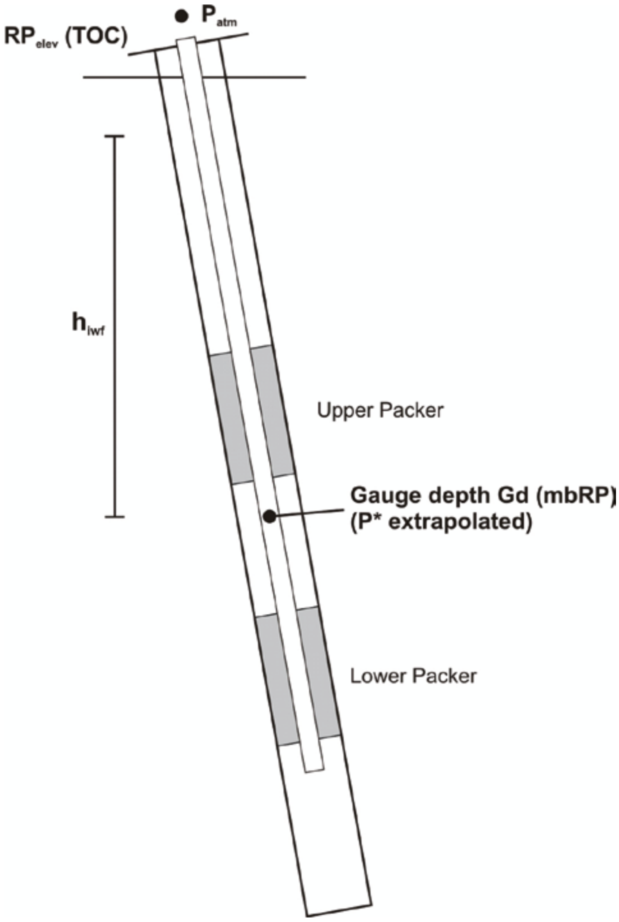

Figure 4-5. *Schematic methodologies for calculation of the freshwater head.*

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 5 m section tests at depths below of ca 390 m borehole length. As this value is of minor importance for the evaluation of the performed injection tests, it was agreed by SKB to proceed with the testing program. For the subsequent following single packer test, the Pa and Pb pressure transducers were exchanged in their positions to allow measurement of the Pa pressure during the single packer test performance.

5 Results

In the following, results of all tests are presented and analysed. Chapter 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 Table 6-1 and 6-2 of the Summary chapter. In addition, the results are presented in appendices 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 400-07-009; SKB controlling document).

5.1 100 m single-hole injection tests

In the following, the 100 m section tests conducted in borehole KLX17A are presented and analysed.

5.1.1 Section 69.00–169.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 199 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 24.4 L/min at start of the CHi phase to 11.0 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The CHir phase shows a good quality 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 derivative with a horizontal stabilisation at early times, followed by a downward trend and a further stabilisation at middle times, indicating radial flow. A further downward trend at late times cannot be explained by the chosen flow model. The CHi phase was analysed using an infinite acting composite model. For the analysis of the CHir phase a composite model with radial flow, wellbore storage and skin was chosen. The analysis is presented in Appendix 2-1.

Selected representative parameters

The recommended transmissivity of $1.4 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHi phase (outer zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-6}$ m^2/s to $4.0 \cdot 10^{-5}$ m^2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,424.8 kPa.

Both phases show a relatively good consistency. In case a further full test analysis is planned, the late time downward trend of the derivative at the CHi phase can probably explained by using a different flow dimension for the outer zone.

5.1.2 Section 169.00–269.00 m, test no. 1, injection

Comments to test

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

The CHi phase was conducted with a pressure difference of 214 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 6.0 L/min at start of the CHi phase to 3.3 L/min at the end, indicating a relatively high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a horizontal stabilisation at early times, followed by a downward trend and further horizontal stabilisation at late times, indicating an increase of transmissivity at some distance from the borehole. The CHi phase was analysed using a radial composite flow model. The CHir phase shows a unit downward trend at middles times indicating a positive skin, followed by a slight horizontal stabilisation at late times. For the analysis of the CHir phase a composite radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-2.

Selected representative parameters

The recommended transmissivity of $4.0 \cdot 10^{-6}$ m^2/s was derived from the analysis of the CHi phase (outer zone), which shows a very good horizontal derivative stabilisation. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-6}$ m^2/s to $8.0 \cdot 10^{-6}$ m^2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,278.8 kPa.

The analysis of the CHi and CHir phases show some inconsistency by the skin factor (negative for the CHi and positive for the CHir phase). However, no further analysis is recommended.

5.1.3 Section 269.00–369.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 224 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 1.93 L/min at start of the CHi phase to 0.60 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 horizontal stabilisation at middle and late times, indicating radial flow geometry. The CHi phase was analysed using a radial homogenous flow model. The CHir phase shows a gentle downward trend at middles times indicating a negative skin, followed by a slight horizontal stabilisation at late times. For the analysis of the CHir phase a homogenous radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-3.

Selected representative parameters

The recommended transmissivity of $2.7 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-7}$ m^2/s to $5.0 \cdot 10^{-7}$ m^2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,119.6 kPa.

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

5.1.4 Section 369.00–469.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 210 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 27.4 L/min at start of the CHi phase to 23.4 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The CHir phase shows a fast recovery which leads to a noisy derivative but is still amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a horizontal stabilisation at early times, followed by an upward trend and a further horizontal stabilisation at late times. This is indicating a decrease of transmissivity at some distance to the borehole. The CHi phase was analysed using a radial composite flow model. The CHir phase shows a unit downward trend at middles times indicating a positive skin, followed by a horizontal stabilisation at late times. For the analysis of the CHir phase a homogenous radial flow model with wellbore storage and skin was chosen. This homogenous model is consistent with the composite model of the CHi phase. The analysis is presented in Appendix 2-4.

Selected representative parameters

The recommended transmissivity of $6.8 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-5}$ m^2/s to $1.0 \cdot 10^{-4}$ m^2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,970.6 kPa.

The analysis of the CHi and CHir phases show some inconsistency in respect to the flow model used for analysis (two shell composite for the CHi phase and homogenous for the CHir phase). However, no further analysis is recommended.

5.1.5 Section 469.00–69.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 215 kPa with a slightly increase of pressure during the injection. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 0.010 L/min at start of the CHi phase to 0.0023 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows an upward trend at middle times and a horizontal stabilisation at late times. This is indicating a decrease of transmissivity at some distance to the borehole. The CHi phase was analysed using a composite model with radial flow. The CHir phase shows an upward trend at middle times, followed by a hump and downward trend at late times. Despite of an extended 4 hours recovery, the CHir derivative is showing only wellbore storage and skin effects but was not long enough to allow for a horizontal stabilisation at late times. For the analysis of the CHir phase a composite radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-5.

Selected representative parameters

The recommended transmissivity of $6.2 \cdot 10^{-10}$ m^2/s was derived from the analysis of the CHi phase (outer zone). The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-10}$ m^2/s to $4.0 \cdot 10^{-9}$ m^2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using type curve extrapolation in the Horner plot to a value of 4,789.1 kPa.

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

5.1.6 Section 569.00–669.00 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 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. As there was a malfunction of the regulation unit observed at the first injection test at this section, the regulation unit was restarted and a second test was performed at the same section. Only the CHi and CHir phases of the second test were analysed quantitatively.

The CHi phase was conducted with a pressure difference of 212 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 0.011 L/min at start of the CHi phase to 0.0088 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy horizontal stabilisation at middle and late times. The CHi phase was analysed using a homogenous model with radial flow. The CHir phase shows a unit downward slope at late times, which is indicating a positive skin. The CHir derivative is showing only wellbore storage and skin effects but was not long enough to allow for a horizontal stabilisation at late times. For the analysis of the CHir phase a homogenous radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-6.

Selected representative parameters

The recommended transmissivity of $6.7 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHi phase which shows a horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-10}$ m^2/s to $1.0 \cdot 10^{-8}$ m^2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using type curve extrapolation in the Horner plot to a value of 5,617.6 kPa.

The analysis of the CHi and CHir phases shows good consistency if considering the limited quality of the CHi derivative. No further analysis is recommended.

5.2 20 m single-hole injection tests

In the following, the 20 m section tests conducted in borehole KLX17A are presented and analysed.

5.2.1 Section 69.00–89.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 200 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 0.49 L/min at start of the CHi phase to 0.18 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 flat derivative at middle and late times, indicating a 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 and 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 $1.2 \cdot 10^{-7}$ 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 $8.0 \cdot 10^{-8}$ m^2/s to $3.0 \cdot 10^{-7}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 734.3 kPa.

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

5.2.2 Section 87.00–107.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 200 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 1.17 L/min at start of the CHi phase to 0.63 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but flat derivative at middle and late times, indicating a radial flow. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a unit downward slope at early times which is indicating a positive skin. A horizontal stabilisation at middle to late times was observed. 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 $6.6 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHi phase, which shows a noisy but clear horizontal stabilisation with less skin. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-7}$ m^2/s to $3.0 \cdot 10^{-6}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 895.3 kPa.

The analyses of the CHi and CHir phases show good consistency with the exception of the very high skin factor (18.1) of the CHir phase. No further analysis is recommended.

5.2.3 Section 107.00–127.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 201 kPa. A slightly increase of the pressure in the section above by 3 kPa was observed during the CHi phase, indicating some hydraulic connection between the section and the section above through the formation. The injection rate decreased from 19.8 L/min at start of the CHi phase to 12.1 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi–log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but flat derivative at middle times followed by a downward trend at late times, indicating an increase of transmissivity at some distance to the borehole. A composite radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a unit downward slope at middle and late times which is indicating a positive skin. The derivative tends at late times to a horizontal stabilisation. A composite radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-9.

Selected representative parameters

The recommended transmissivity of $2.0 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHi phase (inner zone), which shows a noisy but clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-6}$ m^2/s to $4.0 \cdot 10^{-5}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 1,065.6 kPa.

The analyses of the CHi and CHir phases show good consistency with the exception of the skin factor of the CHi (positive) and the CHir (negative) phase. No further analysis is recommended.

5.2.4 Section 127.00–147.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually with a pressure difference of 230 kPa. No hydraulic connection to adjacent sections was observed during the CHi phase. The injection rate decreased from 0.015 L/min at start of the CHi phase to 0.0057 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 and a further horizontal stabilisation at late times, indicating a decrease of transmissivity at some distance to 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 a upward slope at middle and a horizontal stabilisation at late times which is consistent with the CHi analysis. A composite radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-10.

Selected representative parameters

The recommended transmissivity of $1.5 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows a good data quality and clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-9}$ m^2/s to $6.0 \cdot 10^{-9}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 1,235.4 kPa.

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

5.2.5 Section 147.00–167.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 201 kPa. No hydraulic connection to adjacent sections was observed during the CHi phase. The injection rate decreased from 0.075 L/min at start of the CHi phase to 0.043 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 noisy but flat derivative at middle and late times. A homogenous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at middle to late times which tends to some horizontal stabilisation at late times. A first kind of horizontal stabilisation is already covered by the downward trend of the skin effect and not clearly visible. However, a composite radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-11.

Selected representative parameters

The recommended transmissivity of $4.5 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHi phase, which shows a noisy but clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-8}$ m^2/s to $1.0 \cdot 10^{-7}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,407.3 kPa.

The analyses of the CHi and CHir phases show some inconsistency for the flow model used for analysis (homogenous for the CHi phase and two shell composite for the CHir phase). However, no further analysis is recommended.

5.2.6 Section 149.00–169.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 200 kPa. No hydraulic connection to adjacent sections was observed during the CHi phase. The injection rate decreased from 0.071 L/min at start of the CHi phase to 0.039 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 noisy but flat derivative at middle and late times. A homogenous radial flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at middle to late times which tends to some horizontal stabilisation at late times. A first kind of horizontal stabilisation is already covered by the downward trend of the skin effect and not clearly visible. However, a composite radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-12.

Selected representative parameters

The recommended transmissivity of $4.5 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHi phase, which shows a noisy but clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-8}$ m^2/s to $1.0 \cdot 10^{-7}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,424.8 kPa.

The analyses of the CHi and CHir phases show some inconsistency for the flow model used for analysis (homogenous for the CHi phase and two shell composite for the CHir phase). However, no further analysis is recommended.

5.2.7 Section 169.00–189.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 241 kPa. No hydraulic connection to adjacent sections was observed during the CHi phase. The injection rate decreased from 1.16 L/min at start of the CHi phase to 0.43 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 flat derivative at early times followed by an upward trend 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 flat derivative at middle times followed by a slight upward trend and further flat derivative at late times. A composite 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 $4.6 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHir phase (inner zone), which shows the most clear horizontal derivative stabilisation. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-7}$ m^2/s to $8.0 \cdot 10^{-7}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 1,584.2 kPa.

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

5.2.8 Section 189.00–209.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 200 kPa. No hydraulic connection to adjacent sections was observed during the CHi phase. The injection rate decreased from 4.53 L/min at start of the CHi phase to 2.76 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The CHi data are a bit noisy due to regulation effects; the CHir phase shows a very fast recovery resulting in a bit noisy derivative curve. 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 both phases show a noisy but flat derivative at middle and late times. A homogenous radial flow model was chosen for the analysis of both phases. The analysis of the CHir phase includes wellbore storage and skin effects. The analysis is presented in Appendix 2-14.

Selected representative parameters

The recommended transmissivity of $7.3 \cdot 10^{-6}$ m²/s was derived from the analysis of the CHi phase, which shows the most clear horizontal derivative stabilisation by less skin effect. The confidence range for the interval transmissivity is estimated to be $4.0 \cdot 10^{-6}$ m²/s to $2.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,771.4 kPa.

The analyses of the CHi and CHir phases show good consistency and despite of the noisy derivatives still a sufficient quality. No further analysis is recommended.

5.2.9 Section 209.00–229.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 201 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 0.029 L/min at start of the CHi phase to 0.016 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 a downward trend and further horizontal stabilisation 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 downward trend at late times. A change of transmissivity is already covered by wellbore storage and skin effects at early and middle times. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-15.

Selected representative parameters

The recommended transmissivity of $1.6 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHi phase (outer zone), which shows the better horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-9}$ m²/s to $4.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). 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 1,938.5 kPa.

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

5.2.10 Section 229.00–249.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 with a pressure difference of 200 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 0.060 L/min at start of the CHi phase to 0.013 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 and further horizontal stabilisation at late times, indicating a decrease 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 slightly upward derivative at early times, followed by a clear upward trend and a tendency for a further horizontal stabilisation at late times. A change of transmissivity is partly covered by wellbore storage and skin effects at early and middle times. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-16.

Selected representative parameters

The recommended transmissivity of $3.6 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHi phase (outer zone), which shows the better horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-9}$ m^2/s to $2.0 \cdot 10^{-8}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,105.7 kPa.

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

5.2.11 Section 249.00–269.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually with a pressure difference of 237 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 0.014 L/min at start of the CHi phase to 0.0038 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the data and derivative of the CHi phase are very noisy. However, both phases show no problems and are still adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a very noisy but flat derivative at middle and late times. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows only a wellbore storage affected part of the recovery. For a full analysis, a total recovery time of at minimum 10 hours would have been necessary. However, a homogenous model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-17.

Selected representative parameters

The recommended transmissivity of $3.0 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHi phase, which shows a very noisy but already clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-9}$ m^2/s to $6.0 \cdot 10^{-9}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,284.7 kPa.

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

5.2.12 Section 269.00–289.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually with a pressure difference of 207 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 0.004 L/min at start of the CHi phase to 0.0011 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the data and derivative of the CHi phase are very noisy. However, both phases show no problems and are still adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a very noisy but flat derivative at early times followed by an upward trend and further horizontal stabilisation at middle and late times. This is indicating a decrease 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 only a wellbore storage affected part of the recovery. For a full analysis, a total recovery time of at minimum 10 hours would have been necessary. Nevertheless, the shape of derivative indicates some upward trend in addition to the unit slope of the wellbore storage effect. Therefore, a two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-18.

Selected representative parameters

The recommended transmissivity of $8.7 \cdot 10^{-10}$ m^2/s was derived from the analysis of the CHi phase (inner zone), which shows a very noisy but relative clear horizontal stabilisation. 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.

The flow dimension displayed during the test is 2 (radial flow). 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 2,450.0 kPa.

Despite of the relative high uncertainty depending of the data quality of the CHi phase and the relative short CHir phase, the analyses of the CHi and CHir phases show good consistency. No further analysis is recommended.

5.2.13 Section 289.00–309.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually with a pressure difference of 222 kPa. No hydraulic connection to the adjacent sections was observed during the CHi phase. The injection rate decreased from 0.035 L/min at start of the CHi phase to 0.009 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Due to the low flow rate, the data and derivative of the CHi phase are noisy. However, both phases show no problems and are still adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but nearly flat derivative at early times followed by an upward trend and further horizontal stabilisation at late times. This is indicating a decrease 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. According to the extended recovery phase, the derivative of the CHir phase shows flat derivative at middle times followed by an upward trend and further horizontal stabilisation at late times. With the given assumption of a radial flow, it was not possible to match the derivative fairly good with the calculated type curve. Nevertheless, a two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-19.

Selected representative parameters

The recommended transmissivity of $2.8 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHi phase (outer zone), which shows a noisy but relative clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-9}$ m^2/s to $4.0 \cdot 10^{-8}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,621.4 kPa.

Despite of the relative high uncertainty depending of the data quality of the CHi phase and the poor match of late time derivative data at the CHir phase, the analyses of the CHi and CHir phases show good consistency. In case further analysis is planned, a total test simulation eventually with consideration of non-radial flow geometry should help to better analyse the recovery data.

5.2.14 Section 309.00–329.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 209 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 1.67 L/min at start of the CHi phase to 0.58 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 an upward trend at middle times bending to a kind of horizontal stabilisation at late times, indicating a decrease 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 nearly flat derivative at early times followed by an upward trend and further horizontal stabilization at late times. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-20.

Selected representative parameters

The recommended transmissivity of $3.2 \cdot 10^{-7}$ m^2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-7}$ m^2/s to $3.0 \cdot 10^{-6}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,786.2 kPa.

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

5.2.15 Section 329.00–349.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 201 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 0.017 L/min at start of the CHi phase to 0.0082 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the flow rate close to the measurement limit of the flowmeter, the flow data are affected by background noise. Nevertheless, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a very noisy but nevertheless flat derivative at middle and late times. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a trend to horizontal stabilisation at late times. A homogenous model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-21.

Selected representative parameters

The recommended transmissivity of $7.6 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHi phase, which shows the better horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be $4.0 \cdot 10^{-9}$ m^2/s to $3.0 \cdot 10^{-8}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,955.4 kPa.

The analyses of the CHi and CHir phases show good consistency despite of a high skin factor used for analysis of the CHir phase. No further analysis is recommended.

5.2.16 Section 349.00–369.00 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 117 kPa in 20 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0\ 10^{-11}$ m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

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

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.

5.2.17 Section 369.00–389.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 200 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 0.049 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Due to the low flow rate, the flow data are affected by background noise. Nevertheless, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a very noisy but nevertheless flat derivative at middle and late times. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at late times. A homogenous model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-23.

Selected representative parameters

The recommended transmissivity of $9.5 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHir phase, which shows the better horizontal stabilisation of the derivative and less background noise. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-8}$ m^2/s to $2.0 \cdot 10^{-7}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,290.3 kPa.

The analyses of the CHi and CHir phases show good consistency despite of the relative high uncertainty due to background noise at the CHi data. No further analysis is recommended.

5.2.18 Section 389.00–409.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 0.015 L/min at start of the CHi phase to 0.0068 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the flow data are affected by background noise. Due to the expected low transmissivity, the CHir phase was extended to one hour to allow a full recovery. Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a very noisy but nevertheless flat derivative at middle and late times. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a trend to a horizontal stabilisation at late times. A homogenous model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-24.

Selected representative parameters

The recommended transmissivity of $5.4 \cdot 10^{-9}$ m²/s was derived from the analysis of the CHi phase, which shows a still noisy but better horizontal derivative stabilisation. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-9}$ m²/s to $2.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,459.6 kPa.

The analyses of the CHi and CHir phases show good consistency despite of the relative high uncertainty due to background noise at the CHi data and the late time data of the CHir phase. No further analysis is recommended.

5.2.19 Section 409.00–429.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 200 kPa. A hydraulic connection to the bottom zone was observed during the CHi phase which is explained by some crossflow through the formation. The injection rate decreased from 22.7 L/min at start of the CHi phase to 19.3 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, indicating a 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 stabilization at middle and late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-25.

Selected representative parameters

The recommended transmissivity of $7.5 \cdot 10^{-5}$ m²/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality at horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-5}$ m²/s to $1.0 \cdot 10^{-4}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,627.6 kPa.

The analyses of the CHi and CHir phases show consistency. The very large skin factor of the CHi and CHir phases may be explained by turbulent flow due to high flow rates. No further analysis is recommended.

5.2.20 Section 428.00–448.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 200 kPa. A slight hydraulic connection to the section above was observed during the CHi phase which is explained by some crossflow through the formation. This is consistent with a consistent observation during the previous test at the section 409.00–429.00 m where a crossflow to the section below was observed. The injection rate decreased from 15.1 L/min at start of the CHi phase to 11.35 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The start of the injection is strongly influenced by effects of the automatic regulation system, the start of the CHir phase shows a very fast recovery. Nevertheless, 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 noisy but flat derivative at middle and late times, indicating a radial flow. Due to some uncertainties at early time data caused by effects of the automatic regulation system, the early time data could not be matched with a type curve. However, 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 horizontal stabilization at middle and late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-26.

Selected representative parameters

The recommended transmissivity of $5.9 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality at horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-6}$ m^2/s to $8.0 \cdot 10^{-5}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,791.9 kPa.

The analyses of the CHi and CHir phases show some inconsistency regarding the chosen flow models. This may be attributed to the noisy early time data of the CHi phase due to regulation effects. The resulting transmissivities of the CHi phase (outer zone) and the CHir phase are consistent. The very large skin factor of the CHir phase may be explained by non-Darcy flow due to high flow rates. In case of a further analysis, a full test simulation should help to explain the described effects.

5.2.21 Section 448.00–468.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 236 kPa. A slight hydraulic connection to the section below was observed during the CHi phase which is explained by some crossflow through the formation. The injection rate decreased from 0.015 L/min at start of the CHi phase to 0.0042 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the flow data of the CHi phase are relative noisy. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but flat derivative at middle and late times, indicating a radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The CHir phase lasted not long enough to allow for a horizontal stabilisation of the derivative. However, a tendency for any horizontal stabilisation (still covered by skin effects) could be derived from the shape of the derivative. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-27.

Selected representative parameters

The recommended transmissivity of $1.5 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHi phase, which shows a clear horizontal stabilisation of the late time data. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-10}$ m^2/s to $3.0 \cdot 10^{-9}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,944.3 kPa.

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

5.2.22 Section 449.00–469.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 226 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 0.015 L/min at start of the CHi phase to 0.0040 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the flow data of the CHi phase are relative noisy. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but flat derivative at middle and late times, indicating a radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The CHir phase lasted not long enough to allow for a horizontal stabilisation of the derivative at late times. However, a tendency for a horizontal stabilisation (still covered by skin effects) could be derived from the shape of the late time data of the derivative. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-28.

Selected representative parameters

The recommended transmissivity of $1.6 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHi phase, which shows a noisy but clear horizontal stabilisation of the late time data. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-10}$ m^2/s to $3.0 \cdot 10^{-9}$ m^2/s.

The flow dimension displayed during the test is 2 (radial flow). 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 3,955.4 kPa.

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

5.2.23 Section 469.00–489.00 m, test no. 1 and 2, pulse injection and 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 very low formation transmissivity; therefore the recovery of the pulse injection was extended to three hours to allow for a nearly full pressure recovery. By analysing this pulse injection, some difficulties were observed and it was decided to perform instead of the pulse a constant head recovery test at the same section when pulling out the tool. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. The recovery was extended for two hours. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted manually using a pressure difference of 243 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 0.015 L/min at start of the CHi phase to 0.0031 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the flow data of the CHi phase are relative noisy. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a clear upward trend at middle times and a noisy but flat derivative at late times, indicating a decrease 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. At the CHir phase, an upward trend at middle times is already mainly covered by wellbore storage effects but still visible. The CHir phase lasted not long enough to allow for a complete horizontal stabilisation of the derivative at late times. However, a tendency for a horizontal stabilisation (still covered by skin effects) could be derived from the shape of the late time data of the derivative. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-29.

Selected representative parameters

The recommended transmissivity of $7.9\cdot10^{-10}$ m^2/s was derived from the analysis of the CHi phase (outer zone), which shows a noisy but horizontal stabilisation of the late time data. The confidence range for the interval transmissivity is estimated to be $4.0\cdot10^{-10}$ m^2/s to $6.0\cdot10^{-9}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 4,126.4 kPa.

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

5.2.24 Section 489.00–509.00 m, test no. 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a very low formation transmissivity; therefore the recovery of the pulse injection was extended to one hour. However, after one hour just 20% of the initial pulse pressure was recovered. As the flow rate during the pulse injection was already decreasing below of 0.001 L/min, it was decided to skip the pulse injection (T probably smaller than 1.0 10^{-11} m^2/s). A following injection confirmed a flow rate below of 0.001 L/min and was skipped after 5 min. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-30.

Selected representative parameters

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.2.25 Section 509.00–529.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a very low formation transmissivity. As the flow rate during the pulse injection was already decreasing below of 0.001 L/min, it was decided to skip the pulse injection (T probably smaller than 1.0 10^{-11} m^2/s). A following injection confirmed a flow rate below of 0.001 L/min and was skipped after 5 min. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-31.

Selected representative parameters

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.2.26 Section 529.00–549.00 m, test no. 1, pulse injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a very low formation transmissivity; therefore the recovery of the pulse injection was extended to one hour. However, after one hour no further pressure recovery could be observed. As the flow rate during the pulse injection was already decreasing below of 0.001 L/min, it was decided to skip the pulse injection (T probably smaller than 1.0 10^{-11} m^2/s). According to the low flow rate during the pulse injection, no further constant head injection was performed. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-32.

Selected representative parameters

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.2.27 Section 549.00–569.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a very low formation transmissivity. As the flow rate during the pulse injection was already decreasing below of 0.001 L/min, it was decided to skip the pulse injection after 10 min (T probably smaller than 1.0 10^{-11} m^2/s). A following constant head injection confirmed a flow rate below of 0.001 L/min and was skipped after 5 min. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-33.

Selected representative parameters

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.2.28 Section 569.00–589.00 m, test no. 1 and 2, pulse injection

Comments to test

The first test at this section was skipped after a leakage in the pipe string was observed during the pipe check. The leaking pipes were replaced and a second test in the same section was started. 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 very low formation transmissivity; therefore the recovery of the pulse injection was extended to two hours. It was observed that the pressure did not recover but already started to rise again during the extended pulse recovery, therefore the pulse test was skipped after two hours. The flow rate during the pulse injection was already decreasing below of 0.001 L/min (T probably smaller than 1.0 10^{-11} m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

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

Selected representative parameters

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.2.29 Section 589.00–609.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a very low formation transmissivity. As the flow rate during the pulse injection was already decreasing below of 0.001 L/min, it was decided to skip the pulse injection after 10 min (T probably smaller than $1.0\ 10^{-11}$ m^2/s). A following constant head injection confirmed a flow rate below of 0.001 L/min and was skipped after 5 min. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-35.

Selected representative parameters

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.2.30 Section 609.00–629.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a very low formation transmissivity. As the flow rate during the pulse injection was already decreasing below of 0.001 L/min, it was decided to skip the pulse injection after 10 min (T probably smaller than $1.0\ 10^{-11}$ m^2/s). A following constant head injection confirmed a flow rate below of 0.001 L/min and was skipped after 5 min. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-36.

Selected representative parameters

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.2.31 Section 629.00–649.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The pressure response and the recovery of the pulse test indicated a very low formation transmissivity. As the flow rate during the pulse injection was already decreasing below of 0.001 L/min, it was decided to skip the pulse injection after 10 min (T probably smaller than $1.0\ 10^{-11}$ m^2/s). A following constant head injection confirmed a flow rate below of 0.001 L/min. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-37.

Selected representative parameters

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m^2/s.

No further analysis is recommended.

5.2.32 Section 649.00–669.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 262 kPa. A hydraulic connection to the bottom zone was observed which is indicating some crossflow through the formation. The injection rate decreased from 0.034 L/min at start of the CHi phase to 0.0090 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate, the flow data of the CHi phase are relative noisy. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but flat derivative at middle and late times, indicating a radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The CHir phase shows a horizontal stabilisation of the derivative data at late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-38.

Selected representative parameters

The recommended transmissivity of $1.0 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHir phase, which shows the best quality of late time derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-9}$ m²/s to $2.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,619.1 kPa.

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

5.2.33 Section 669.00–689.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 200 kPa. A hydraulic connection to the bottom zone was observed which is indicating some crossflow through the formation. The injection rate decreased from 0.029 L/min at start of the CHi phase to 0.018 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate, the flow data of the CHi phase are relative noisy. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but flat derivative at middle and late times, indicating a radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The CHir phase shows a horizontal stabilisation of the derivative data at middle and late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-39.

Selected representative parameters

The recommended transmissivity of $1.7 \cdot 10^{-8}$ m²/s was derived from the analysis of the CHir phase, which shows the best quality of the derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-9}$ m²/s to $3.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,787.1 kPa.

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

5.2.34 Section 674.00–694.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 201 kPa. A hydraulic connection to the bottom zone was observed which is indicating some crossflow through the formation. The injection rate decreased from 0.11 L/min at start of the CHi phase to 0.025 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate, the flow data of the CHi phase are relative noisy. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but flat derivative at middle and late times, indicating a radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The CHir phase shows a horizontal stabilisation of the derivative data at middle and late times. A homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-40.

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 the best quality of the derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-8}$ m^2/s to $5.0 \cdot 10^{-8}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,833.7 kPa.

The analyses of the CHi and CHir phases show good 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 KLX17A are presented and analysed.

5.3.1 Section 339.00–344.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 253 kPa. No hydraulic connections to the adjacent sections were observed during the CHi phase. The injection rate decreased from 0.0028 L/min at start of the CHi phase to 0.0015 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the flow data of the CHi phase are relative noisy. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a very noisy but flat derivative at middle and late times, indicating a radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The CHir phase was not long enough to allow a horizontal stabilisation of late time derivative data. The shape of the derivative displays only wellbore storage and skin effects. Despite of these restrictions, a homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-41.

Selected representative parameters

The recommended transmissivity of $7.7 \cdot 10^{-10}$ m^2/s was derived from the analysis of the CHi phase, which shows a very noisy but already clear derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $4.0 \cdot 10^{-10}$ m^2/s to $3.0 \cdot 10^{-9}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,908.0 kPa.

The analyses of the CHi and CHir phases show some inconsistency and uncertainty. Due to the very noisy CHi data, the recommended transmissivity includes a high range of uncertainty. According to the too short CHir phase, no horizontal stabilisation of late time derivative values is displayed. No further analysis is recommended.

5.3.2 Section 344.00–349.00 m, test no. 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 40 kPa in 20 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0\ 10^{-11}$ m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

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

5.3.3 Section 369.00–374.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 201 kPa. No hydraulic connections to the adjacent sections were observed during the CHi phase. The injection rate decreased from 0.066 L/min at start of the CHi phase to 0.044 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate and additional effects of the automatic flow regulation, the flow data of the CHi phase are relative noisy. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a very noisy but flat derivative at middle and late times, indicating a radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The CHir phase shows a trend to a flat derivative at middle times, followed by a unit downward trend and a final horizontal stabilisation at late times. This is indicating an increase of transmissivity at some distance to the borehole. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-43.

Selected representative parameters

The recommended transmissivity of $5.4 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHi phase, which shows a very noisy but already clear derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-8}$ m^2/s to $4.0 \cdot 10^{-7}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,164.3 kPa.

The analyses of the CHi and CHir phases show some inconsistency and uncertainty. Due to the very noisy CHi data, the recommended transmissivity includes a high range of uncertainty. The flow models used for the CHi (homogenous) and CHir phase (two shell composite) differ, but it cannot be excluded that a potentially appropriate two shell composite model is covered by the noisy data of the CHi phase. No further analysis is recommended.

5.3.4 Section 374.00–379.00 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 approximately 170 kPa in 20 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1.0 10^{-11} m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

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

5.3.5 Section 379.00–384.00 m, test no. 1, pulse injection

Comments to test

The test was conducted as pulse injection (PI) with a pressure difference of 239 kPa. No hydraulic connection between the test section and the adjacent zones was observed. The decision to conduct a pulse injection instead of a constant head injection with subsequent pressure recovery was made because the injection rate dropped below of the lower measurement limit of the small flowmeter (< 1 ml/min) within the 10 sec of pulse injection. The recovery of the pulse was extended to one hour to allow for more than 95% recovery. The pulse injection was analysed using a wellbore storage coefficient calculated from the volume of water needed to elevate the pressure in the test section by 239 kPa (0.004 L). The PI phase 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 convolved PI pressure shows a horizontal stabilization at middle times, followed by an upward trend and a final flat derivative at late times. This is indicating a decrease of transmissivity at some distance to the borehole. The PI phase was analyzed using a two shell composite model with radial flow. The analysis is presented in Appendix 2-45.

Selected representative parameters

The recommended transmissivity of $2.9 \cdot 10^{-10}$ m^2/s was derived from the analysis of the PI phase (outer zone) where the data are not too noisy and the derivative shows a clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-10}$ m^2/s to $1.0 \cdot 10^{-9}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth could not be extrapolated from the analysis.

No further analysis is recommended.

5.3.6 Section 384.00–389.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 196 kPa. No hydraulic connections to the adjacent sections were observed during the CHi phase. The injection rate decreased from 0.0082 L/min at start of the CHi phase to 0.0035 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the flow data of the CHi phase are relative noisy. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a very noisy but flat derivative at middle and late times, indicating a radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The CHir phase shows a trend to a flat derivative at late times, a full horizontal stabilisation was not yet displayed. A homogenous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-46.

Selected representative parameters

The recommended transmissivity of $3.4 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHir phase, which shows a much better data quality and a nearly horizontal stabilisation at late times. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-9}$ m^2/s to $6.0 \cdot 10^{-9}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,288.7 kPa.

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

5.3.7 Section 387.00–392.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 201 kPa. No hydraulic connection to the adjacent zones was observed but the pressure transducer in the section above (Pa) started to show irregular pressure values due to a malfunction. The injection rate decreased from 0.0077 L/min at start of the CHi phase to 0.0034 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the flow data are affected by background noise. Due to the expected low transmissivity, the CHir phase was extended to four hours to allow a full recovery. Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a very noisy but nevertheless flat derivative at middle and late times. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a flat derivative at late times, already influenced by effects of the resolution of the pressure transducer. A homogenous model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-47.

Selected representative parameters

The recommended transmissivity of $3.2 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality and an already horizontal derivative stabilisation. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-9}$ m^2/s to $6.0 \cdot 10^{-9}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,315.8 kPa.

The analyses of the CHi and CHir phases show good consistency despite of the relative high uncertainty due to background noise at the CHi data and the late time data effects of the CHir phase. No further analysis is recommended.

5.3.8 Section 392.00–397.00 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 approximately 93 kPa in 20 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0\ 10^{-11}$ m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

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

5.3.9 Section 397.00–402.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 207 kPa. No hydraulic connection to the adjacent zones was observed but the pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 0.0085 L/min at start of the CHi phase to 0.0056 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate close to the measurement limit of the flowmeter, the flow data are affected by background noise. Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but nevertheless clear downward trend at middle times followed by a flat derivative at late times. This is 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 flat derivative at late times. A previous downward trend is already covered by the wellbore storage and skin effects of the early and middle time data and therefore not clearly visible. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-49.

Selected representative parameters

The recommended transmissivity of $5.6 \cdot 10^{-9}$ m²/s was derived from the analysis of the CHi phase (outer zone), which shows a noisy but still clear horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-9}$ m²/s to

$4.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,412.9 kPa.

The analyses of the CHi and CHir phases show good consistency despite of the uncertainty due to background noise at the CHi data. No further analysis is recommended.

5.3.10 Section 402.00–407.00 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 approximately 57 kPa in 20 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0\ 10^{-11}$ m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-50.

Selected representative parameters

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

No further analysis is recommended.

5.3.11 Section 404.00–409.00 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 approximately 120 kPa in 20 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0\ 10^{-11}$ m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-51.

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 409.00–414.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 198 kPa. No hydraulic connection to the adjacent zones was observed but the pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 0.097 L/min at start of the CHi phase to 0.033 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The flow rate during the CHi phase is a bit noisy due to effects of the automatic regulation system and the recovery started relative fast. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat but very noisy derivative at middle and late times, indicating radial flow. A homogeneous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at late times. However, to match the type curve an additional downward trend which is already covered by wellbore storage and skin effects was implemented in the analysis. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis where the inner zone transmissivity of the CHir phase is consistent with the CHi phase transmissivity. The analysis is presented in Appendix 2-52.

Selected representative parameters

The recommended transmissivity of $4.8 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHi phase, which shows a good horizontal stabilisation of the derivative and the more simple flow model. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-8}$ m^2/s to $3.0 \cdot 10^{-7}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,506.6 kPa.

The analyses of the CHi and CHir phases show some inconsistency, in this case especially in the different flow models used for analysis and the late time transmissivity of the CHir phase. In case a further analysis is performed, a full test simulation may help to explain the observed inconsistencies.

5.3.13 Section 414.00–419.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 200 kPa. No hydraulic connection to the adjacent zones was observed but the pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 0.056 L/min at start of the CHi phase to 0.030 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The flow rate during the CHi phase is a bit noisy due to effects of the automatic regulation system and the recovery started relative fast. However, both phases are still adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat but very noisy derivative at middle and late times, indicating radial flow. A homogeneous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at late times. However, to match the type curve an additional downward trend which is already covered by wellbore storage and skin effects was implemented in the analysis. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis where the inner zone transmissivity of the CHir phase is consistent with the CHi phase transmissivity. The analysis is presented in Appendix 2-53.

Selected representative parameters

The recommended transmissivity of $3.5 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHi phase, which shows a horizontal stabilisation of the derivative and the more simple flow model. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-8}$ m^2/s to $2.0 \cdot 10^{-7}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,544.9 kPa.

The analyses of the CHi and CHir phases show some inconsistency, in this case especially in the different flow models used for analysis and the late time transmissivity of the CHir phase. In case a further analysis is performed, a full test simulation may help to explain the observed inconsistencies.

5.3.14 Section 419.00–424.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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.

A first injection start was skipped due to a very instable flow regulation. A second injection start was successful after readjusting the regulation input parameters (P and I values). The CHi phase was conducted using a pressure difference of 201 kPa. A hydraulic connection to the bottom zone was observed, indicating some crossflow through the formation. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 17.42 L/min at start of the CHi phase to 11.76 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The recovery started relative fast. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat but noisy derivative at middle and late times, indicating radial flow. A homogeneous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at late times. A homogenous model with radial flow, wellbore storage and skin was chosen for the analysis. Both analyses include a relative high positive skin factor. The analysis is presented in Appendix 2-54.

Selected representative parameters

The recommended transmissivity of $3.2 \cdot 10^{-5}$ m²/s was derived from the analysis of the CHir phase, which shows a good horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-5}$ m²/s to $6.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,591.5 kPa.

The analyses of the CHi and CHir phases show good consistency. The relative high skin factor may be related to non-Darcy flow. No further analysis is recommended.

5.3.15 Section 420.00–425.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 202 kPa. A hydraulic connection to the bottom zone was observed, indicating some crossflow through the formation. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 21.51 L/min at start of the CHi phase to 11.65 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The recovery started relative fast. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat but noisy derivative at middle and late times, indicating radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at middle to late times. A homogenous model with radial flow, wellbore storage and skin was chosen for the analysis. Both analyses include a relative high positive skin factor. The analysis is presented in Appendix 2-55.

Selected representative parameters

The recommended transmissivity of $3.5 \cdot 10^{-5}$ m²/s was derived from the analysis of the CHir phase, which shows a good and less noisy horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be $4.0 \cdot 10^{-6}$ m²/s to $6.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,602.3 kPa.

The analyses of the CHi and CHir phases show good consistency. The relative high skin value may be related to non-Darcy flow. No further analysis is recommended.

5.3.16 Section 425.00–430.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 200 kPa. A hydraulic connection to the bottom zone was observed, indicating some crossflow through the formation. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 13.51 L/min at start of the CHi phase to 7.21 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The recovery started relative fast. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat but noisy derivative at middle and late times, indicating radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at middle to late times. A homogenous model with radial flow, wellbore storage and skin was chosen for the analysis. Both analyses include a relative high positive skin factor. The analysis is presented in Appendix 2-56.

Selected representative parameters

The recommended transmissivity of $1.9 \cdot 10^{-5}$ m^2/s was derived from the analysis of the CHir phase, which shows a good and less noisy horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-5}$ m^2/s to $4.0 \cdot 10^{-5}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,645.1 kPa.

The analyses of the CHi and CHir phases show good consistency. The relative high skin value may be related to non-Darcy flow. No further analysis is recommended.

5.3.17 Section 430.00–435.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 7.06 L/min at start of the CHi phase to 5.84 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The recovery started relative fast. However, both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat but noisy derivative at middle and late times, indicating radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at middle to late times. A homogenous model with radial flow, wellbore storage and skin was chosen for the analysis. Both analyses include a relative high positive skin factor. The analysis is presented in Appendix 2-57.

Selected representative parameters

The recommended transmissivity of $1.7 \cdot 10^{-5}$ m²/s was derived from the analysis of the CHir phase, which shows a good and less noisy horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be $4.0 \cdot 10^{-6}$ m²/s to $4.0 \cdot 10^{-5}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,686.0 kPa.

The analyses of the CHi and CHir phases show good consistency. The relative high skin value may be related to non-Darcy flow. No further analysis is recommended.

5.3.18 Section 435.00–440.00 m, test no. 1 and 2, pulse injection

Comments to test

The first test at this section was skipped after a malfunction of the automatic injection test procedure stopped the pulse recovery and deflated the packers. A second test in the same section was performed by stopping at that section during the pulling out procedure to allow for a stabilisation of pressures and to minimise effects of borehole history. The test design consisted of a pulse injection test conducted with the goal of deriving the formation transmissivity. The pressure response and the recovery of the pulse test indicated a very low formation transmissivity; therefore the recovery of the pulse injection was extended to ten hours overnight. It was observed that the pressure did not recover but already started to rise again during the extended pulse recovery, therefore the pulse test was skipped. The flow rate during the pulse injection was already decreasing below of 0.001 L/min (T probably smaller than $1.0\ 10^{-11}$ m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-58.

Selected representative parameters

Based on the test response (no pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to $1.0 \cdot 10^{-11}$ m²/s.

No further analysis is recommended.

5.3.19 Section 440.00–445.00 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 approximately 70 kPa in 20 min and kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0\ 10^{-11}$ m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-59.

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 444.00–449.00 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 approximately 245 kPa then started to drop down slowly but did not stabilise in 20 min and kept decreasing. This phenomenon is caused by prolonged packer expansion in a very tight section and some additional reaction of the formation (eventually opening of small fissures and T probably smaller than 1.0 10^{-11} m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-60.

Selected representative parameters

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

No further analysis is recommended.

5.3.21 Section 449.00–454.00 m, test no. 1, pulse injection

Comments to test

The test was conducted as pulse injection (PI) with a pressure difference of 199 kPa. No hydraulic connection between the test section and the adjacent zones was observed. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The decision to conduct a pulse injection instead of a constant head injection with subsequent pressure recovery was made because the injection rate dropped below of the lower measurement limit of the small flowmeter (< 1 ml/min) within the 10 sec of pulse injection. The recovery of the pulse was extended to 1.5 hours to allow for 95% recovery. The pulse injection was analysed using a wellbore storage coefficient calculated from the volume of water needed to elevate the pressure in the test section by 199 kPa (0.002 L). The PI phase 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 convolved PI pressure shows a horizontal stabilization at early times, followed by an upward trend and a final flat derivative at late times. This is indicating a decrease of transmissivity at some distance to the borehole. The PI phase was analysed using a two shell composite model with radial flow. The analysis is presented in Appendix 2-61.

Selected representative parameters

The recommended transmissivity of $4.6 \cdot 10^{-11}$ m²/s was derived from the analysis of the PI phase (outer zone) where the data are of good quality and the derivative shows a clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-11}$ m²/s to $2.0 \cdot 10^{-10}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth could not be extrapolated from the analysis.

No further analysis is recommended.

5.3.22 Section 454.00–459.00 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 approximately 40 kPa in 20 min and kept rising without pressure stabilisation. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0\ 10^{-11}$ m²/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-62.

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.

5.3.23 Section 459.00–464.00 m, test no. 1, pulse injection

Comments to test

The test was conducted as pulse injection (PI) with a pressure difference of 195 kPa. No hydraulic connection between the test section and the adjacent zones was observed. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The decision to conduct a pulse injection instead of a constant head injection with subsequent pressure recovery was made because the injection rate dropped below of the lower measurement limit of the small flowmeter (< 1 ml/min) within the 10 sec of pulse injection. The recovery of the pulse was extended to 1.5 hours to allow for more than 95% recovery. The pulse injection was analysed using a wellbore storage coefficient calculated from the volume of water needed to elevate the pressure in the test section by 199 kPa (0.004 L). The PI phase 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 convolved PI pressure shows a horizontal stabilization at middle and late times. This is indicating a radial flow (flow dimension of two). The PI phase was analysed using a homogenous model with radial flow. The analysis is presented in Appendix 2-63.

Selected representative parameters

The recommended transmissivity of $1.1 \cdot 10^{-10}$ m²/s was derived from the analysis of the PI phase. The confidence range for the interval transmissivity is estimated to be $6.0 \cdot 10^{-11}$ m²/s to $2.0 \cdot 10^{-10}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth could not be extrapolated from the analysis.

No further analysis is recommended.

5.3.24 Section 464.00–469.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 200 kPa. No hydraulic connection to the adjacent zones was observed. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 0.0073 L/min at start of the CHi phase to 0.0034 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). According to the low flow rate close to the measurement limit of the flow meter, the CHi phase shows some background noise. However, both phases are of good quality 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 CHi phase shows a flat but noisy derivative at middle and late times, indicating radial flow. A homogenous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at middle and late times. Due to the still too short recovery period, no stabilisation of the derivative was derived. To match the derivative with the type curve, an additional downward trend at late times was implemented in the type curve which is already covered by the effect of the skin factor.
A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-64.

Selected representative parameters

The recommended transmissivity of $1.5 \cdot 10^{-9}$ m²/s was derived from the analysis of the CHir phase (inner zone) which shows the best match with the type curve. The confidence range for the interval transmissivity is estimated to be $8.0 \cdot 10^{-10}$ m²/s to $8.0 \cdot 10^{-9}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,968.1 kPa.

The analyses of the CHi and CHir phases show some inconsistency according to the flow model chosen for analysis. Probably the major background noise of the CHi phase is covering a two shell composite model. No further analysis is recommended.

5.3.25 Section 469.00–474.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 197 kPa. No hydraulic connection to the adjacent zones was observed. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 0.0098 L/min at start of the CHi phase to 0.0025 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). According to the low flow rate close to the measurement limit of the flow meter, the CHi phase shows some background noise. However, both phases are of good quality 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 CHi phase shows an upward trend at middle times and a flat but very noisy derivative at late times, indicating a decrease 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 flat derivative at early times, an upward trend at middle times and a further horizontal stabilisation at late times. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-65.

Selected representative parameters

The recommended transmissivity of $5.9 \cdot 10^{-10}$ m^2/s was derived from the analysis of the CHir phase (outer zone) which shows the best match with the type curve and horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $4.0 \cdot 10^{-10}$ m^2/s to $8.0 \cdot 10^{-9}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 4,006.6 kPa.

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

5.3.26 Section 474.00–479.00 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 approximately 30 kPa in 20 min and kept rising without pressure stabilisation. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1.0\ 10^{-11}$ m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-66.

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.

5.3.27 Section 479.00–484.00 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 approximately 29 kPa in 20 min and kept rising without pressure stabilisation. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1.0 10^{-11} m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-67.

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.

5.3.28 Section 484.00–489.00 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 approximately 23 kPa in 20 min and kept rising without pressure stabilisation. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1.0 10^{-11} m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-68.

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.

5.3.29 Section 649.00–654.00 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 approximately 27 kPa in 20 min and kept rising without pressure stabilisation. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1.0 10^{-11} m^2/s). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-69.

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.

5.3.30 Section 654.00–659.00 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 approximately 700 kPa in 20 min and kept rising without pressure stabilisation. 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.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-70.

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 659.00–664.00 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 approximately 28 kPa in 20 min and kept rising without pressure stabilisation. 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.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-71.

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.

5.3.32 Section 664.00–669.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 207 kPa. Some hydraulic connection to the bottom zone was observed during the CHi phase, indicating a crossflow through the formation. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 0.028 L/min at start of the CHi phase to 0.0087 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). According to the low flow rate, the CHi phase shows some background noise. However, both phases are still of good quality 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 CHi phase shows a flat derivative at early times followed by a downward trend at middle times and a flat but very noisy 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 downward trend at middle times and a horizontal stabilisation at late times. The early and middle times are already covered by effects of the wellbore storage and skin factor. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-72.

Selected representative parameters

The recommended transmissivity of $6.1 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHir phase (outer zone) which shows the best match with the type curve and horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $1.0 \cdot 10^{-10}$ m^2/s to $1.0 \cdot 10^{-8}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,624.0 kPa.

The analyses of the CHi and CHir phases show good consistency despite of a relative wide confidence range which is caused by the background noise of the CHi phase and the multiplier between the transmissivities of the inner and outer zones. No further analysis is recommended.

5.3.33 Section 669.00–674.00 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 approximately 58 kPa in 20 min and kept rising without pressure stabilisation. 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.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data are presented in Appendix 2-73.

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.

5.3.34 Section 674.00–679.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 193 kPa. No hydraulic connection to the adjacent zones was observed during the test phases. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. The injection rate decreased from 0.0070 L/min at start of the CHi phase to 0.0043 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). According to the low flow rate, the CHi phase shows some background noise. However, both phases are still of good quality 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 CHi phase shows a flat derivative from early to late times, indicating a radial flow. A homogeneous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at late times. The early and middle times are already covered by effects of the wellbore storage and skin factor. A homogeneous model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-74.

Selected representative parameters

The recommended transmissivity of $7.9 \cdot 10^{-9}$ m^2/s was derived from the analysis of the CHir phase which shows the best match with the type curve and a good horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $2.0 \cdot 10^{-9}$ m^2/s to $2.0 \cdot 10^{-8}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,706.3 kPa.

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

5.3.35 Section 679.00–684.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 191 kPa. No hydraulic connection but a short pressure peak was observed in the bottom zone at start of the CHi phase. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. During the packer compliance period (PSR-phase) the interval pressure dropped by 25 kPa and then stabilised. The injection rate decreased from 0.0086 L/min at start of the CHi phase to 0.0052 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). According to the low flow rate, the CHi phase shows some background noise. However, both phases are still of good quality 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 CHi phase shows a flat derivative from early to late times, indicating a radial flow. A homogeneous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilisation at late times. The early and middle times are already covered by effects of the wellbore storage and skin factor. A homogeneous model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-75.

Selected representative parameters

The recommended transmissivity of $1.7 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHir phase which shows the best match with the type curve and a good horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-9}$ m^2/s to $3.0 \cdot 10^{-8}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,732.3 kPa.

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

5.3.36 Section 684.00–689.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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. According to the very noisy data of the CHi phase, this test phase was not analysed. Only the CHir phase was analysed quantitatively.

The CHi phase was conducted manually using a pressure difference of 198 kPa. No hydraulic connection but a short pressure peak was observed in the bottom zone at start of the CHi phase. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. During the packer compliance period (PSR-phase) the interval pressure dropped by 5 kPa and then stabilised. The injection rate decreased from 0.0042 L/min at start of the CHi phase to 0.0020 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). According to the low flow rate close to the measurement limit of the flowmeter, the CHi phase shows major background noise. Only the CHir phase is of good quality 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. The derivative of the CHir phase shows a downward trend at late times. The whole test phase is already covered by effects of the wellbore storage and skin factor. A horizontal stabilisation was not observed at late times. A homogeneous model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-76.

Selected representative parameters

The recommended transmissivity of $9.9 \cdot 10^{-9}$ m²/s was derived from the analysis of the CHir phase which shows a good match with the type curve. The confidence range for the interval transmissivity is estimated to be $5.0 \cdot 10^{-9}$ m²/s to $2.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,787.2 kPa.

The analysis of the CHir phase shows a good quality despite of the missing horizontal stabilisation at late times. No further analysis is recommended.

5.3.37 Section 689.00–694.00 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 manually using a pressure difference of 193 kPa. A hydraulic connection was observed in the bottom zone during the CHi phase, indicating some crossflow through the formation. The pressure transducer in the section above (Pa) did not display any values due to a malfunction. During the packer compliance period (PSR-phase) the interval pressure dropped by 8 kPa and then stabilised. The injection rate decreased from 0.012 L/min at start of the CHi phase to 0.0071 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). According to the low flow rate close to the measurement limit of the flowmeter, the CHi phase shows some background noise. However, the CHi and CHir phases are of good quality 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 CHi phase shows a flat derivative from early to late times, indicating a radial flow. A homogeneous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at late times but already a tendency for horizontal stabilisation. The whole CHir phase is already covered by effects of the wellbore storage and skin factor. An additional downward trend at middle times, indicating an increase of transmissivity at some distance to the borehole, is already covered by effects of the skin factor. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-77.

Selected representative parameters

The recommended transmissivity of $5.9 \cdot 10^{-9}$ m²/s was derived from the analysis of the CHi phase which shows a noisy derivative but still a clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $3.0 \cdot 10^{-9}$ m²/s to $3.0 \cdot 10^{-8}$ m²/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,825.4 kPa.

The analysis of the CHi and CHir phases show a good consistency despite of the different flow models used for analysis. No further analysis is recommended.

5.4 Single packer injection test

In the following, the single packer test conducted in borehole KLX17A is presented and analysed.

5.4.1 Section 689.00–701.08 m, test no. 1, injection

Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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.

A first try to conduct a CHi phase was skipped due to a malfunction of the automatic regulation system which did not react to regulate the flow after start of the injection. The second start of the CHi phase was conducted after rebooting the system automatically using a pressure difference of 202 kPa. No hydraulic connection was observed in the section above during the CHi phase. The injection rate decreased from 0.042 L/min at start of the CHi phase to 0.015 L/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). According to the low flow rate, the CHi phase shows some background noise. However, the CHi and CHir phases are of good quality 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 CHi phase shows a noisy but flat derivative at middle to late times, indicating a radial flow. A homogeneous model with radial flow was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at middle times followed by a flat derivative at late times. An additional downward trend at middle times, indicating an increase of transmissivity at some distance to the borehole, is already covered by effects of the skin factor. A two shell composite model with radial flow, wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-78.

Selected representative parameters

The recommended transmissivity of $1.5 \cdot 10^{-8}$ m^2/s was derived from the analysis of the CHir phase (outer zone) which shows the best data quality and clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be $6.0 \cdot 10^{-9}$ m^2/s to $3.0 \cdot 10^{-8}$ m^2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,827.2 kPa.

The analysis of the CHi and CHir phases show a good consistency despite of the different flow models used for analysis. 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 KLX17A (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
69.00	169.00	20070509 13:47	20070509 15:57	1.83E–04	1.67E–04	1800	1800	1423	1431	1630	1429	9.1	**CHi/CHir**
169.00	269.00	20070509 17:46	20070509 19:36	5.47E–05	5.76E–05	1800	1800	2278	2282	2496	2283	10.4	**CHi/CHir**
269.00	369.00	20070510 09:35	20070510 11:25	9.97E–06	1.14E–05	1800	1800	3124	3125	3349	3144	11.7	**CHi/CHir**
369.00	469.00	20070510 13:23	20070510 15:12	3.89E–04	4.04E–04	1800	1800	3977	3965	4175	3974	13.3	**CHi/CHir**
469.00	569.00	20070510 16:42	20070510 22:58	3.83E–08	5.33E–08	1800	14400	4808	4838	5053	4811	14.6	**CHi/CHir**
569.00	669.00	20070511 14:16	20070511 16:24	1.47E–07	1.52E–07	1800	1800	5623	5628	5840	5636	15.6	**CHi/CHir**
69.00	89.00	20070513 11:15	20070513 12:47	3.00E–06	3.33E–06	1200	1200	736	744	944	750	8.0	**CHi/CHir**
87.00	107.00	20070513 14:08	20070513 15:31	1.05E–05	1.15E–05	1200	1200	892	896	1096	896	8.3	**CHi/CHir**
107.00	127.00	20070513 16:09	20070513 17:35	2.02E–04	2.09E–04	1200	1200	1064	1068	1269	1070	8.5	**CHi/CHir**
127.00	147.00	20070513 18:16	20070513 21:44	9.50E–08	1.17E–07	1200	7200	1237	1245	1475	1244	8.7	**CHi/CHir**
147.00	167.00	20070514 08:51	20070514 10:16	7.17E–07	7.52E–07	1200	1200	1406	1409	1610	1411	9.0	**CHi/CHir**
149.00	169.00	20070514 10:40	20070514 12:06	6.50E–07	6.77E–07	1200	1200	1424	1428	1628	1428	9.0	**CHi/CHir**
169.00	189.00	20070514 13:27	20070514 14:56	7.15E–06	8.47E–06	1200	1200	1596	1601	1842	1632	9.3	**CHi/CHir**
189.00	209.00	20070514 15:33	20070514 16:57	4.60E–05	4.70E–05	1200	1200	1767	1771	1971	1771	9.6	**CHi/CHir**
209.00	229.00	20070514 17:32	20070514 19:44	2.67E–07	2.95E–07	1200	3600	1938	1944	2145	1942	9.9	**CHi/CHir**
229.00	249.00	20070515 08:47	20070515 10:21	2.17E–07	3.17E–07	1200	1200	2105	2113	2313	2152	10.1	**CHi/CHir**
249.00	269.00	20070515 10:58	20070515 13:29	6.33E–08	9.87E–08	1200	1200	2275	2285	2522	2370	10.4	**CHi/CHir**
269.00	289.00	20070515 14:02	20070515 16:21	1.83E–08	2.67E–08	1200	1200	2447	2469	2676	2482	10.7	**CHi/CHir**
289.00	309.00	20070515 16:55	20070515 20:24	1.50E–07	2.00E–07	1200	7200	2618	2627	2849	2628	11.0	**CHi/CHir**
309.00	329.00	20070516 08:46	20070516 10:12	9.67E–06	1.07E–05	1200	1200	2784	2784	2993	2807	11.2	**CHi/CHir**
329.00	349.00	20070516 10:45	20070516 12:34	1.37E–07	1.45E–07	1200	2400	2953	2956	3157	2956	11.5	**CHi/CHir**
349.00	369.00	20070516 13:20	20070516 14:09	#NV	#NV	#NV	#NV	3123	#NV	#NV	#NV	11.8	–
369.00	389.00	20070516 14:43	20070516 16:06	8.17E–07	8.32E–07	1200	1200	3293	3291	3491	3291	12.1	**CHi/CHir**
389.00	409.00	20070516 16:39	20070516 18:49	1.13E–07	1.17E–07	1200	3600	3463	3461	3661	3460	12.3	**CHi/CHir**
409.00	429.00	20070517 08:43	20070517 10:09	3.21E–04	3.30E–04	1200	1200	3627	3624	3824	3629	12.2	**CHi/CHir**
428.00	448.00	20070517 10:43	20070517 12:11	1.89E–04	1.92E–04	1200	1200	3791	3790	3990	3793	13.0	**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
448.00	468.00	20070517 13:34	20070517 15:21	7.00E–08	8.67E–08	1200	1200	3963	3962	4198	3986	13.3	**CHi/CHir**
449.00	469.00	20070517 15:47	20070517 17:32	6.67E–08	8.17E–07	1200	1200	3969	3976	4202	4000	13.3	**CHi/CHir**
469.00	489.00	20070517 18:06	20070517 21:46	#NV	#NV	10	7200	4136	4138	4372	4136	13.6	Pi
469.00	489.00	20070520 17:54	20070520 20:53	5.17E–08	7.50E–08	1200	7200	4140	4140	4383	4148	13.6	**CHi/CHir**
489.00	509.00	20070518 08:47	20070518 10:32	#NV	#NV	10	3600	4302	4309	4553	4497	13.9	Pi
509.00	529.00	20070518 11:04	20070518 12:01	#NV	#NV	#NV	#NV	4470	#NV	#NV	#NV	14.1	–
529.00	549.00	20070518 12:36	20070518 14:22	#NV	#NV	#NV	#NV	4637	#NV	#NV	#NV	14.4	Pi
549.00	569.00	20070518 15:13	20070518 16:08	#NV	#NV	#NV	#NV	4803	#NV	#NV	#NV	14.6	–
569.00	589.00	20070518 18:44	20070518 18:44	#NV	#NV	#NV	#NV	5019	#NV	#NV	#NV	14.9	Pi
589.00	609.00	20070519 08:59	20070519 09:57	#NV	#NV	#NV	#NV	5154	#NV	#NV	#NV	15.2	–
609.00	629.00	20070519 10:33	20070519 11:30	#NV	#NV	#NV	#NV	5320	#NV	#NV	#NV	15.4	–
629.00	649.00	20070519 12:19	20070519 14:12	#NV	#NV	#NV	#NV	5460	#NV	#NV	#NV	15.6	–
649.00	669.00	20070519 15:31	20070519 18:47	1.50E–07	1.78E–07	1200	7200	5630	5624	5886	5622	15.9	**CHi/CHir**
669.00	689.00	20070520 08:53	20070520 10:21	3.00E–07	3.30E–07	1200	1200	5789	5787	5987	5800	16.1	**CHi/CHir**
674.00	694.00	20070520 11:04	20070520 12:51	4.17E–07	4.70E–07	1200	2400	5831	5833	6034	5842	16.2	**CHi/CHir**
339.00	344.00	20070522 13:43	20070522 15:25	2.50E–08	2.53E–08	1200	1200	2916	2923	3176	2925	11.4	**CHi/CHir**
344.00	349.00	20070522 15:54	20070522 16:44	#NV	#NV	#NV	#NV	2958	#NV	#NV	#NV	11.5	–
369.00	374.00	20070523 09:07	20070523 10:33	7.27E–07	7.37E–07	1200	1200	3167	3163	3364	3164	11.9	**CHi/CHir**
374.00	379.00	20070523 10:58	20070523 11:47	#NV	#NV	#NV	#NV	3210	#NV	#NV	#NV	12.0	–
379.00	384.00	20070523 13:07	20070523 15:21	#NV	3.98E–07	10	3706	3254	3283	3522	3264	12.0	**Pi**
384.00	389.00	20070523 15:49	20070523 17:24	5.83E–08	6.45E–08	1200	1200	3297	3300	3496	3301	12.1	**CHi/CHir**
387.00	392.00	20070523 17:48	20070523 23:02	5.67E–08	6.05E–08	1200	14400	3324	3323	3524	3317	12.2	**CHi/CHir**
392.00	397.00	20070524 10:35	20070524 11:24	#NV	#NV	#NV	#NV	3363	#NV	#NV	#NV	12.2	–
397.00	402.00	20070524 13:08	20070524 14:37	9.27E–08	9.27E–08	1200	1200	3408	3415	3622	3413	12.3	**CHi/CHir**
402.00	407.00	20070524 15:07	20070524 15:56	#NV	#NV	#NV	#NV	3452	#NV	#NV	#NV	12.4	–
404.00	409.00	20070524 16:22	20070524 17:11	#NV	#NV	#NV	#NV	3469	#NV	#NV	#NV	12.4	–
409.00	414.00	20070524 17:35	20070524 19:01	5.50E–07	5.67E–07	1200	1200	3512	3507	3705	3506	12.5	**CHi/CHir**
414.00	419.00	20070525 08:18	20070525 10:11	5.00E–07	4.95E–07	1200	1200	3549	3544	3744	3544	12.5	**CHi/CHir**
419.00	424.00	20070525 10:36	20070525 12:07	1.96E–04	2.00E–04	1200	1200	3591	3590	3791	3592	12.3	**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
420.00	425.00	20070525 12:56	20070525 14:20	1.94E–04	2.00E–04	1200	1200	3604	3600	3802	3604	12.3	**CHi/CHir**
425.00	430.00	20070525 14:50	20070525 16:17	1.20E–04	1.22E–04	1200	1200	3649	3644	3844	3644	12.4	**CHi/CHir**
430.00	435.00	20070525 16:44	20070525 18:08	9.73E–05	9.88E–05	1200	1200	3689	3686	3886	3687	12.8	**CHi/CHir**
435.00	440.00	20070526 08:17	20070526 09:21	#NV	1.62E–07	10	1200	3726	#NV	#NV	#NV	12.9	Pi
435.00	440.00	20070530 16:22	20070531 03:12	#NV	2.05E–07	10	36000	3728	3761	3951	3985	12.9	Pi
440.00	445.00	20070526 09:56	20070526 10:47	#NV	#NV	#NV	#NV	3770	#NV	#NV	#NV	13.0	–
444.00	449.00	20070526 11:16	20070526 12:24	#NV	#NV	#NV	#NV	3804	#NV	#NV	#NV	13.1	–
449.00	454.00	20070526 13:34	20070526 15:46	#NV	2.33E–07	10	5400	3849	3853	4043	3862	13.1	**Pi**
454.00	459.00	20070526 16:14	20070526 17:07	#NV	#NV	#NV	#NV	3890	#NV	#NV	#NV	13.2	–
459.00	464.00	20070527 08:14	20070527 10:26	#NV	3.50E–07	10	5400	3929	3932	4115	3940	13.2	**Pi**
464.00	469.00	20070527 10:58	20070527 12:40	5.67E–08	6.63E–08	1200	3600	3972	3969	4169	3970	13.4	**CHi/CHir**
469.00	474.00	20070527 14:03	20070527 16:41	4.08E–08	5.25E–08	1200	3600	4016	4019	4216	4034	13.4	**CHi/CHir**
474.00	479.00	20070527 17:09	20070527 17:57	#NV	#NV	#NV	#NV	4055	#NV	#NV	#NV	13.5	–
479.00	484.00	20070528 08:04	20070528 08:53	#NV	#NV	#NV	#NV	4093	#NV	#NV	#NV	13.6	–
484.00	489.00	20070528 09:21	20070528 10:11	#NV	#NV	#NV	#NV	4137	#NV	#NV	#NV	13.6	–
649.00	654.00	20070528 13:43	20070528 14:32	#NV	#NV	#NV	#NV	5503	#NV	#NV	#NV	15.7	–
654.00	659.00	20070528 15:01	20070528 15:50	#NV	#NV	#NV	#NV	5544	#NV	#NV	#NV	15.8	–
659.00	664.00	20070528 16:16	20070528 17:05	#NV	#NV	#NV	#NV	5587	#NV	#NV	#NV	15.8	–
664.00	669.00	20070528 17:28	20070528 20:41	1.45E–07	1.73E–07	1200	7200	5631	5627	5834	5625	15.9	**CHi/CHir**
669.00	674.00	20070529 08:10	20070529 09:01	#NV	#NV	#NV	#NV	5670	#NV	#NV	#NV	16.0	–
674.00	679.00	20070529 09:34	20070529 11:48	7.17E–08	7.58E–08	1200	3600	5711	5709	5902	5709	16.0	**CHi/CHir**
679.00	684.00	20070529 13:00	20070529 14:30	8.67E–08	9.65E–08	1200	1200	5751	5730	5921	5736	16.1	**CHi/CHir**
684.00	689.00	20070529 15:01	20070529 17:29	3.28E–08	3.70E–08	1200	3600	5792	5791	5989	5786	16.1	**CHi/CHir**
689.00	694.00	20070529 17:58	20070529 19:22	1.18E–07	1.33E–07	1200	1200	5833	5828	6021	5829	16.2	CHi/**CHir**
689.00	701.08	20070601 16:46	20070601 19:13	2.53E–07	2.88E–07	1200	3600	5831	5829	6031	5831	16.2	**CHi/CHir**

Nomenclature	
Q_p	Flow in test section immediately before stop of flow [m³/s]
Q_m	Arithmetical mean flow during perturbation phase [m³/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 KLX17A (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} masl
69.00	169.00	9.0E–06	2.2E–05	22	WBS22	3.5E–06	1.4E–05	1.9E–06	1.2E–05	1.4E–05	2.0E–06	4.0E–05	1.1E–09	–4.5	2.78	10.92	1425.8	15.85
169.00	269.00	2.5E–06	3.3E–06	22	WBS22	2.8E–06	4.0E–06	3.1E–06	5.2E–06	4.0E–06	1.0E–06	8.0E–06	4.0E–09	–0.4	1.38	21.54	2278.8	15.95
269.00	369.00	4.4E–07	5.7E–07	2	WBS2	3.0E+07	#NV	2.7E–07	#NV	2.7E–07	1.0E–07	5.0E–07	1.8E–09	–3.2	2.36	26.22	3119.6	15.61
369.00	469.00	1.8E–05	2.4E–05	22	WBS2	6.3E–05	3.5E–05	6.8E–05	#NV	6.8E–05	2.0E–05	1.0E–04	4.8E–09	12.9	0.50	11.16	3970.6	16.98
469.00	569.00	1.8E–09	2.3E–09	22	WBS22	2.2E–09	6.2E–10	9.4E–10	3.8E–10	6.2E–10	2.0E–10	4.0E–09	2.1E–10	–0.9	7.86	23.10	4789.1	16.13
569.00	669.00	6.8E–09	8.8E–09	2	WBS2	6.7E–09	#NV	7.5E–10	#NV	6.7E–09	5.0E–10	1.0E–08	2.6E–11	1.7	0.68	21.54	5617.6	17.31
69.00	89.00	1.5E–07	1.5E–07	2	WBS2	1.5E–07	#NV	1.2E–07	#NV	1.2E–07	8.0E–08	3.0E–07	1.8E–10	2.0	1.42	12.72	734.3	15.16
87.00	107.00	5.2E–07	5.4E–07	2	WBS2	6.6E–07	#NV	1.9E–06	#NV	6.6E–07	3.0E–07	3.0E–06	1.7E–10	4.4	0.98	19.08	895.3	15.85
107.00	127.00	9.9E–06	1.0E–05	22	WBS22	2.0E–05	4.1E–05	4.4E–06	2.7E–05	2.0E–05	2.0E–06	4.0E–05	1.3E–08	4.4	0.07	3.02	1065.6	15.76
127.00	147.00	4.1E–09	4.2E–09	22	WBS22	3.7E–09	1.5E–09	3.7E–09	1.5E–09	1.5E–09	1.0E–09	6.0E–09	7.0E–11	–1.0	32.52	93.00	1235.4	15.62
147.00	167.00	3.5E–08	3.7E–08	2	WBS22	4.5E–08	#NV	4.4E–08	6.3E–08	4.5E–08	2.0E–08	1.0E–07	6.4E–11	2.6	0.05	17.94	1407.3	15.71
149.00	169.00	3.2E–08	3.3E–08	2	WBS22	4.5E–08	#NV	3.8E–08	5.9E–08	4.5E–08	2.0E–08	1.0E–07	5.9E–11	3.4	0.21	17.10	1424.8	15.75
169.00	189.00	2.9E–07	3.0E–07	22	WBS22	3.0E–07	1.5E–07	4.6E–07	1.5E–07	4.6E–07	1.0E–07	8.0E–07	5.4E–09	–0.9	2.25	6.72	1584.2	14.59
189.00	209.00	2.3E–06	2.4E–06	2	WBS2	7.3E–06	#NV	9.9E–06	#NV	7.3E–06	4.0E–06	2.0E–05	2.1E–10	12.1	0.62	16.92	1771.4	16.28
209.00	229.00	1.3E–08	1.4E–08	22	WBS22	4.7E–09	1.6E–08	6.6E–09	2.6E–08	1.6E–08	2.0E–09	4.0E–08	1.3E–10	–1.7	5.03	15.84	1938.5	15.93
229.00	249.00	1.1E–08	1.1E–08	22	WBS22	8.9E–09	3.6E–09	4.8E–09	3.2E–09	3.6E–09	2.0E–09	2.0E–08	1.1E–11	–1.7	0.12	0.64	2105.7	15.61
249.00	269.00	2.6E–09	2.7E–09	2	WBS2	3.0E–09	#NV	2.7E–09	#NV	3.0E–09	1.0E–09	6.0E–09	3.0E–10	3.0	1.42	12.36	2284.7	16.55
269.00	289.00	8.7E–10	9.1E–10	22	WBS22	8.7E–10	1.7E–10	1.2E–09	1.7E–10	8.7E–10	1.0E–10	2.0E–09	6.2E–11	–0.7	0.18	0.63	2450.0	16.13
289.00	309.00	6.6E–09	6.9E–09	22	WBS22	1.3E–08	2.8E–09	2.6E–08	3.7E–09	2.8E–09	1.0E–09	4.0E–08	8.8E–11	1.0	3.56	18.18	2621.4	16.36
309.00	329.00	4.5E–07	4.8E–07	22	WBS22	1.1E–06	3.4E–07	2.2E–06	3.2E–07	3.2E–07	2.0E–07	3.0E–06	8.1E–10	1.2	1.72	17.88	2786.2	15.94
329.00	349.00	6.7E–09	7.0E–09	2	WBS2	7.6E–09	#NV	2.3E–08	#NV	7.6E–09	4.0E–09	3.0E–08	5.8E–11	2.7	0.15	16.26	2955.4	16.02
349.00	369.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
369.00	389.00	4.0E–08	4.2E–08	2	WBS2	6.8E–08	#NV	9.5E–08	#NV	9.5E–08	3.0E–08	2.0E–07	5.9E–11	9.4	1.54	11.70	3290.3	15.89
389.00	409.00	5.6E–09	5.8E–09	2	WBS2	5.4E–09	#NV	1.3E–08	#NV	1.3E–08	3.0E–09	2.0E–08	6.3E–11	9.4	11.52	25.08	3459.6	16.06
409.00	429.00	1.6E–05	1.7E–05	2	WBS2	4.8E–05	#NV	7.5E–05	#NV	7.5E–05	2.0E–05	1.0E–04	2.3E–09	19.1	0.17	14.76	3627.6	16.10
428.00	448.00	9.3E–06	9.7E–06	22	WBS2	1.5E–05	4.9E–05	5.9E–05	#NV	5.9E–05	8.0E–06	8.0E–05	1.6E–09	30.8	0.20	14.76	3791.9	16.64
448.00	468.00	2.9E–09	3.0E–09	2	WBS2	1.5E–09	#NV	1.4E–09	#NV	1.5E–09	8.0E–10	3.0E–09	8.1E–11	–0.9	1.25	16.14	3944.3	15.15
449.00	469.00	2.9E–09	3.0E–09	2	WBS2	1.6E–09	#NV	1.4E–09	#NV	1.6E–09	8.0E–10	3.0E–09	8.4E–11	–0.6	1.49	15.78	3955.4	15.43

Interval position		Stationary flow parameters		Transient analysis Flow regime		Formation parameters											Static conditions	
up m btoc	low m btoc	Q/s m^2/s	T_M m^2/s	Perturb. Phase	Recovery Phase	T_{f1} m^2/s	T_{f2} m^2/s	T_{s1} m^2/s	T_{s2} m^2/s	T_T m^2/s	T_{TMIN} m^2/s	T_{TMAX} m^2/s	C m^3/Pa	ξ –	dt_1 min	dt_2 min	p* kPa	h_{wif} masl
469.00	489.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV
469.00	489.00	2.1E–09	2.2E–09	22	WBS22	4.3E–09	7.9E–10	2.2E–09	6.0E–10	7.9E–10	4.0E–10	6.0E–09	1.1E–10	–0.2	5.51	17.82	4126.4	15.86
489.00	509.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
509.00	529.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
529.00	549.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
549.00	569.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
569.00	589.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
589.00	609.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
609.00	629.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
629.00	649.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
649.00	669.00	5.6E–09	5.9E–09	2	WBS2	4.7E–09	#NV	1.0E–08	#NV	1.0E–08	2.0E–09	2.0E–08	1.1E–10	4.5	23.28	105.00	5619.1	17.46
669.00	689.00	1.5E–08	1.5E–08	2	WBS2	1.5E–08	#NV	1.7E–08	#NV	1.7E–08	8.0E–09	3.0E–08	5.2E–11	1.4	3.45	18.30	5787.1	17.99
674.00	694.00	2.0E–08	2.1E–08	2	WBS2	2.1E–08	#NV	2.5E–08	#NV	2.5E–08	1.0E–08	5.0E–08	5.1E–11	1.5	2.85	34.86	5833.7	18.60
339.00	344.00	9.7E–10	8.0E–10	2	WBS2	7.7E–10	#NV	1.7E–09	#NV	7.7E–10	4.0E–10	3.0E–09	2.2E–11	1.7	0.49	15.90	2908.0	15.48
344.00	349.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
369.00	374.00	3.6E–08	2.9E–08	2	WBS22	5.4E–08	#NV	7.4E–08	2.5E–07	5.4E–08	3.0E–08	4.0E–07	1.5E–11	4.0	0.30	15.96	3164.3	15.89
374.00	379.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
379.00	384.00	#NV	#NV	#NV	22	#NV	#NV	8.8E–10	2.9E–10	2.9E–10	1.0E–10	1.0E–09	1.5E–11	7.7	16.86	58.98	#NV	#NV
384.00	389.00	2.9E–09	2.4E–09	2	WBS2	2.4E–09	#NV	3.4E–09	#NV	3.4E–09	1.0E–09	6.0E–09	3.4E–11	2.8	9.90	17.70	3288.7	15.73
387.00	392.00	2.8E–09	2.3E–09	2	WBS2	2.3E–09	#NV	3.2E–09	#NV	3.2E–09	1.0E–09	6.0E–09	3.2E–11	2.8	11.76	145.20	3315.8	15.92
392.00	397.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
397.00	402.00	4.4E–09	3.7E–09	22	WBS22	3.9E–09	5.6E–09	5.3E–09	1.5E–08	5.6E–09	3.0E–09	4.0E–08	1.4E–11	2.8	0.71	17.82	3412.9	17.28
402.00	407.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
404.00	409.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
409.00	414.00	2.7E–08	2.3E–08	2	WBS22	4.8E–08	#NV	4.2E–08	1.7E–07	4.8E–08	2.0E–08	3.0E–07	1.3E–11	5.9	0.97	18.72	3506.6	16.57
414.00	419.00	2.5E–08	2.0E–08	2	WBS22	3.5E–08	#NV	3.0E–08	1.0E–07	3.5E–08	2.0E–08	2.0E–07	1.3E–11	4.4	0.71	16.68	3544.9	16.21
419.00	424.00	9.6E–06	7.0E–06	2	WBS2	2.9E–05	#NV	3.2E–05	#NV	3.2E–05	1.0E–05	6.0E–05	1.5E–09	13.6	0.75	14.76	3591.5	16.69
420.00	425.00	9.4E–06	7.8E–06	2	WBS2	3.1E–05	#NV	3.5E–05	#NV	3.5E–05	4.0E–06	6.0E–05	1.9E–09	13.5	0.57	15.48	3602.3	16.94
425.00	430.00	5.9E–06	4.9E–06	2	WBS2	1.7E–05	#NV	1.9E–05	#NV	1.9E–05	1.0E–05	4.0E–05	8.2E–10	13.9	0.41	13.26	3645.1	17.03

Interval position		Stationary flow parameters		Transient analysis Flow regime		Formation parameters											Static conditions	
up m btoc	low m btoc	Q/s m^2/s	T_M m^2/s	Perturb. Phase	Recovery Phase	T_{f1} m^2/s	T_{f2} m^2/s	T_{s1} m^2/s	T_{s2} m^2/s	T_T m^2/s	T_{TMIN} m^2/s	T_{TMAX} m^2/s	C m^3/Pa	ξ –	dt_1 min	dt_2 min	p* kPa	h_{wif} masl
430.00	435.00	4.8E–06	3.9E–06	2	WBS2	1.6E–05	#NV	1.7E–05	#NV	1.7E–05	4.0E–06	4.0E–05	8.1E–10	13.9	1.27	15.90	3686.0	16.93
435.00	440.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
435.00	440.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
440.00	445.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
444.00	449.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
449.00	454.00	#NV	#NV	#NV	22	#NV	#NV	1.1E–10	4.6E–11	4.6E–11	2.0E–11	2.0E–10	1.2E–11	0.6	10.08	83.40	#NV	#NV
454.00	459.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
459.00	464.00	#NV	#NV	#NV	2	#NV	#NV	1.1E–10	#NV	1.1E–10	6.0E–11	2.0E–10	1.9E–11	–0.5	0.16	64.80	#NV	#NV
464.00	469.00	2.8E–09	2.3E–09	2	WBS22	1.5E–09	#NV	1.5E–09	3.9E–09	1.5E–09	8.0E–10	8.0E–09	4.7E–11	–0.8	#NV	#NV	3968.1	16.72
469.00	474.00	2.0E–09	1.7E–09	22	WBS22	3.2E–09	7.2E–10	6.8E–09	5.9E–10	5.9E–10	4.0E–10	8.0E–09	2.1E–11	–0.4	27.54	59.82	4006.6	16.39
474.00	479.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
479.00	484.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
484.00	489.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
649.00	654.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
654.00	659.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
659.00	664.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
664.00	669.00	6.9E–09	5.7E–09	22	WBS22	2.2E–10	1.1E–09	6.1E–10	6.1E–09	6.1E–09	1.0E–10	1.0E–08	1.4E–11	–3.1	14.70	105.00	5624.0	17.96
669.00	674.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E–11	1.0E–13	1.0E–11	#NV	#NV	#NV	#NV	#NV	#NV
674.00	679.00	3.6E–09	3.0E–09	2	WBS2	4.3E–09	#NV	7.9E–09	#NV	7.9E–09	2.0E–09	2.0E–08	2.2E–11	8.0	8.52	52.08	5706.3	18.05
679.00	684.00	4.5E–09	3.7E–09	2	WBS2	5.9E–09	#NV	1.7E–08	#NV	1.7E–08	3.0E–09	3.0E–08	1.9E–11	15.8	6.30	17.40	5732.3	16.55
684.00	689.00	1.6E–09	1.3E–09	#NV	WBS2	#NV	#NV	9.9E–09	#NV	9.9E–09	5.0E–09	2.0E–08	8.8E–11	20.8	#NV	#NV	5787.2	18.00
689.00	694.00	6.0E–09	5.0E–09	2	WBS22	5.9E–09	#NV	8.0E–09	1.6E–08	5.9E–09	3.0E–09	3.0E–08	1.6E–11	1.5	0.33	16.20	5825.4	17.75
689.00	701.08	1.2E–08	1.2E–08	2	WBS22	1.0E–08	#NV	1.2E–08	1.5E–08	1.5E–08	6.0E–09	3.0E–08	4.1E–11	0.4	11.22	54.60	5827.2	17.93

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 KLX17A (see Chapter 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)
69.00	169.00	1.41E–05	655	–1	112.03
169.00	269.00	3.97E–06	1,800	0	135.28
269.00	369.00	2.70E–07	1,800	0	69.09
369.00	469.00	6.76E–05	1800	0	274.81
469.00	569.00	6.23E–10	14400	0	42.83
569.00	669.00	6.67E–09	1800	0	27.39
69.00	89.00	1.16E–07	1200	0	45.67
87.00	107.00	6.60E–07	1200	0	70.53
107.00	127.00	2.03E–05	181	–1	64.51
127.00	147.00	1.50E–09	7200	0	37.72
147.00	167.00	4.49E–08	1200	0	36.02
149.00	169.00	4.45E–08	1200	0	35.94
169.00	189.00	4.60E–07	403	1	37.35
189.00	209.00	7.34E–06	1200	0	128.80
209.00	229.00	1.57E–08	950	–1	24.65
229.00	249.00	3.56E–09	38	1	3.40
249.00	269.00	2.99E–09	1200	0	18.30
269.00	289.00	8.72E–10	38	1	2.39
289.00	309.00	2.83E–09	1200	0	18.05
309.00	329.00	3.16E–07	1200	0	58.67
329.00	349.00	7.58E–09	1200	0	23.09
349.00	369.00	1.00E–11	#NV	#NV	#NV
369.00	389.00	9.54E–08	1200	0	43.49
389.00	409.00	5.41E–09	1200	0	21.22
409.00	429.00	7.46E–05	1200	0	229.98
428.00	448.00	5.94E–05	1200	0	217.25
448.00	468.00	1.47E–09	1200	0	15.32
449.00	469.00	1.63E–09	1200	0	15.72
469.00	489.00	#NV	#NV	#NV	#NV
469.00	489.00	7.87E–10	1200	0	13.11
489.00	509.00	1.00E–11	#NV	#NV	#NV
509.00	529.00	1.00E–11	#NV	#NV	#NV
529.00	549.00	1.00E–11	#NV	#NV	#NV
549.00	569.00	1.00E–11	#NV	#NV	#NV
569.00	589.00	1.00E–11	#NV	#NV	#NV
589.00	609.00	1.00E–11	#NV	#NV	#NV
609.00	629.00	1.00E–11	#NV	#NV	#NV
629.00	649.00	1.00E–11	#NV	#NV	#NV
649.00	669.00	1.00E–08	7200	0	60.61
669.00	689.00	1.69E–08	1200	0	28.21
674.00	694.00	2.54E–08	2400	0	44.18
339.00	344.00	7.74E–10	1200	0	13.05
344.00	349.00	1.00E–11	#NV	#NV	#NV
369.00	374.00	5.44E–08	1200	0	37.79
374.00	379.00	1.00E–11	#NV	#NV	#NV

Borehole secup (m)	Borehole seclow (m)	Recommended transmissivity T_T (m^2/s)	Time t_2 for radius of influence calculation (s)	ri-index (–)	Radius of Influence (m)
379.00	384.00	2.93E–10	3706	0	17.99
384.00	389.00	3.40E–09	1062	–1	17.78
387.00	392.00	3.17E–09	14400	0	64.32
392.00	397.00	1.00E–11	#NV	#NV	#NV
397.00	402.00	5.61E–09	1200	0	21.42
402.00	407.00	1.00E–11	#NV	#NV	#NV
404.00	409.00	1.00E–11	#NV	#NV	#NV
409.00	414.00	4.78E–08	1200	0	36.59
414.00	419.00	3.50E–08	1200	0	33.85
419.00	424.00	3.21E–05	1200	0	186.26
420.00	425.00	3.48E–05	1200	0	190.06
425.00	430.00	1.90E–05	1200	0	163.38
430.00	435.00	1.68E–05	1200	0	158.43
435.00	440.00	1.00E–11	#NV	#NV	#NV
435.00	440.00	1.00E–11	#NV	#NV	#NV
440.00	445.00	1.00E–11	#NV	#NV	#NV
444.00	449.00	1.00E–11	#NV	#NV	#NV
449.00	454.00	4.56E–11	5400	0	13.64
454.00	459.00	1.00E–11	#NV	#NV	#NV
459.00	464.00	1.05E–10	5400	0	16.80
464.00	469.00	1.54E–09	#NV	–1	#NV
469.00	474.00	5.95E–10	3600	0	21.17
474.00	479.00	1.00E–11	#NV	#NV	#NV
479.00	484.00	1.00E–11	#NV	#NV	#NV
484.00	489.00	1.00E–11	#NV	#NV	#NV
649.00	654.00	1.00E–11	#NV	#NV	#NV
654.00	659.00	1.00E–11	#NV	#NV	#NV
659.00	664.00	1.00E–11	#NV	#NV	#NV
664.00	669.00	6.08E–09	7200	0	53.52
669.00	674.00	1.00E–11	#NV	#NV	#NV
674.00	679.00	7.88E–09	3600	0	40.38
679.00	684.00	1.71E–08	1200	0	28.30
684.00	689.00	9.91E–09	#NV	–1	#NV
689.00	694.00	5.92E–09	1200	0	21.71
689.00	701.08	1.50E–08	3600	0	47.43

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

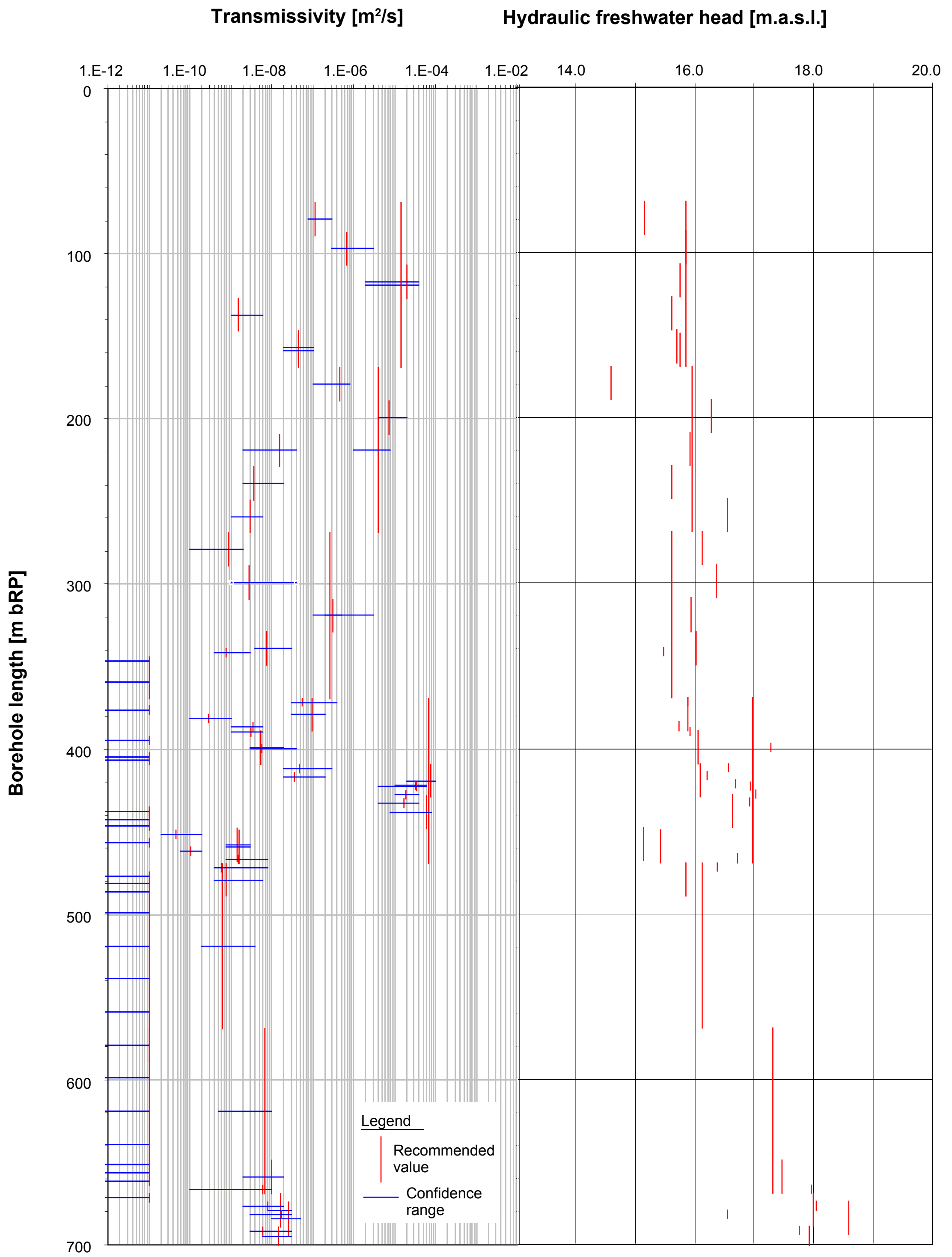

Figure 6-1. *Results summary – profiles of transmissivity and equivalent freshwater head, transmissivities derived from injection tests, freshwater head extrapolated.*

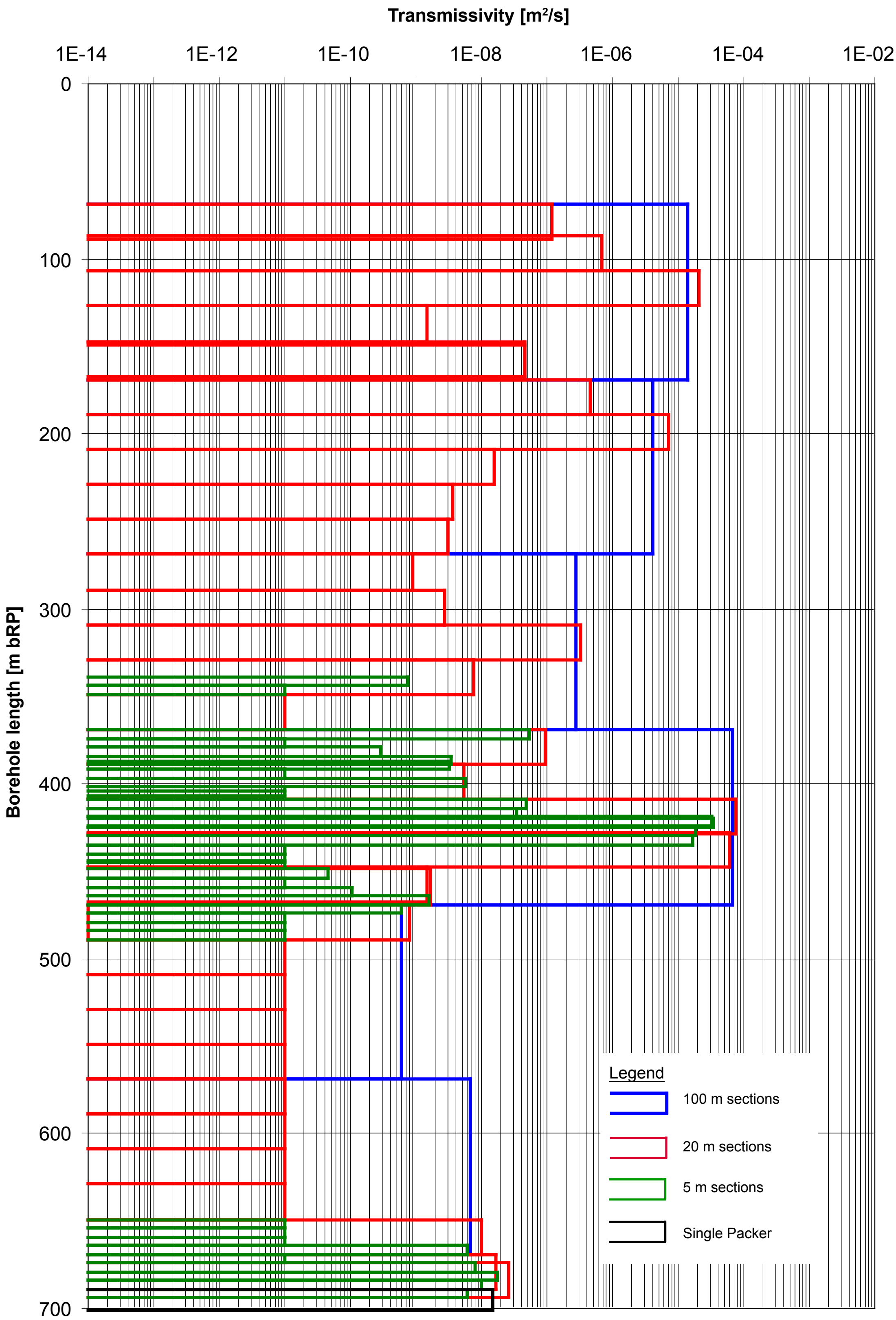

Figure 6-2. Results summary – profile of transmissivity.

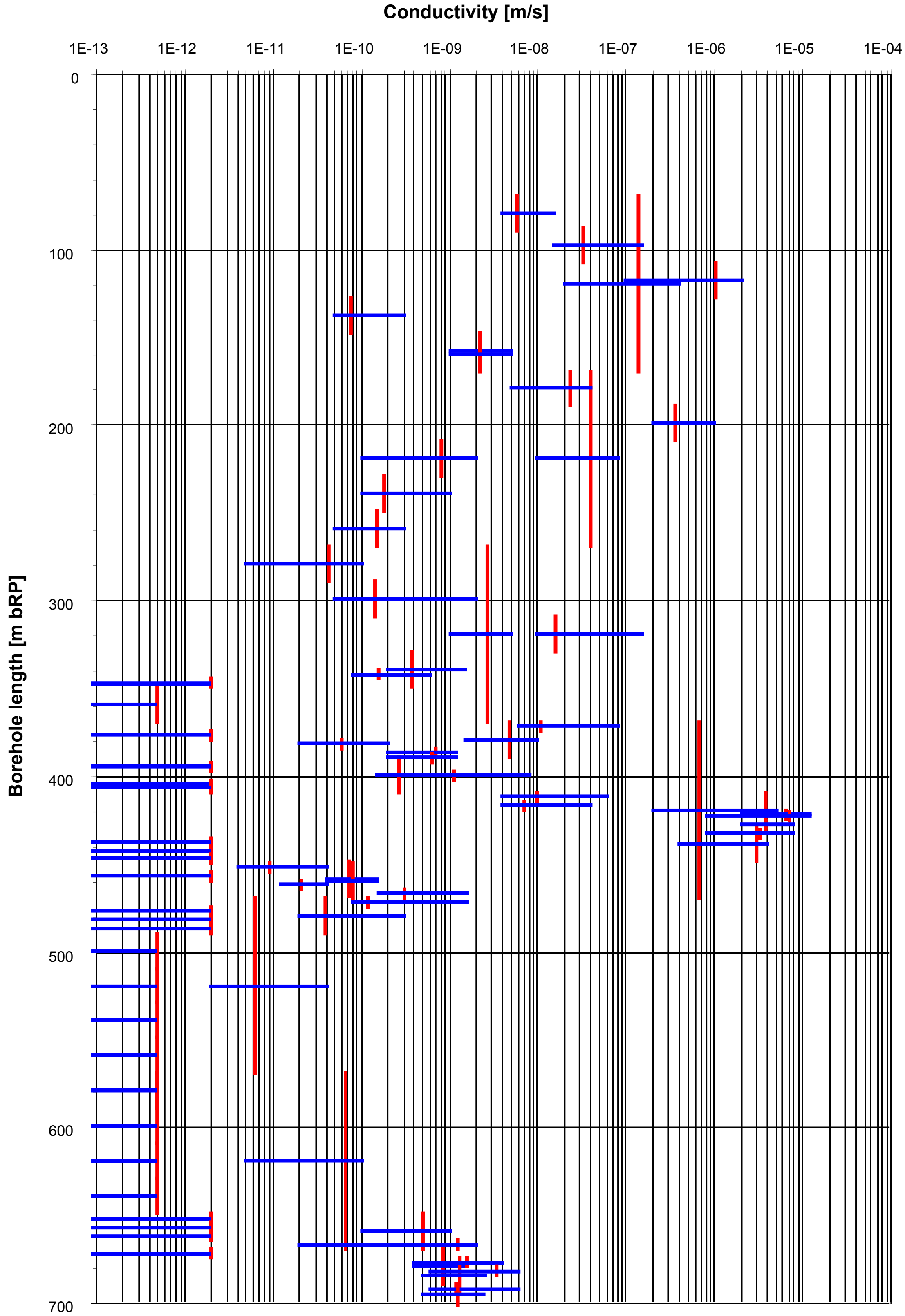

Figure 6-3. *Results summary – profile of hydraulic conductivity.*

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.

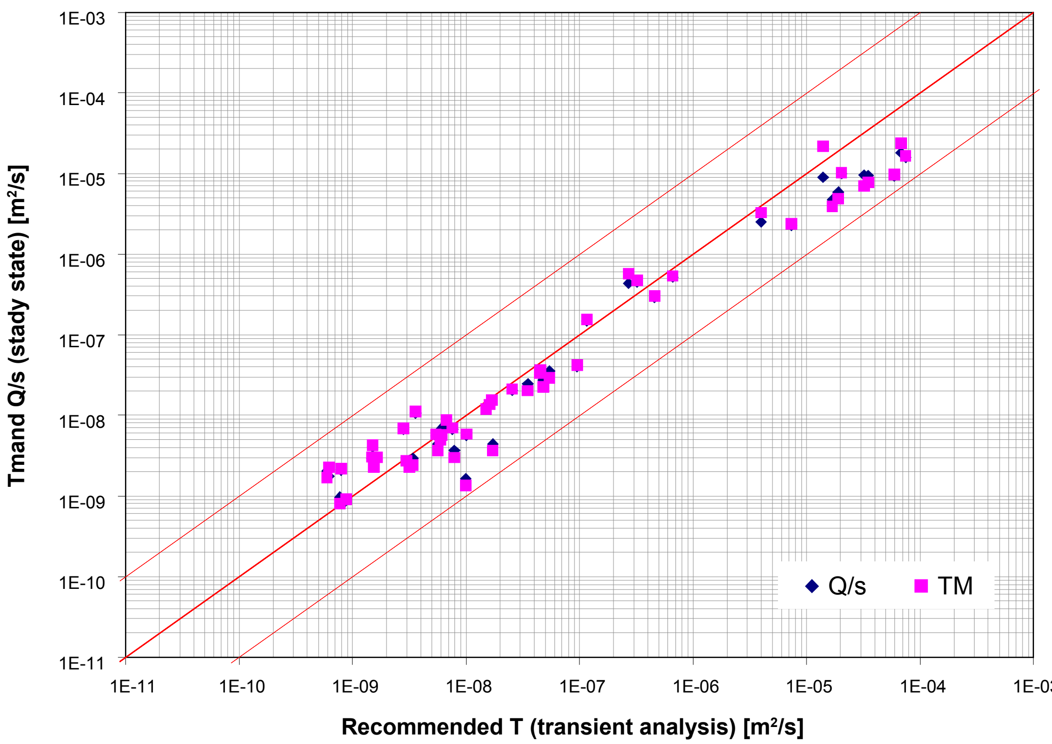

Figure 6-4. Correlation analysis of transmissivities derived by steady state and transient methods.

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:

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

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:	$1 \cdot 10^{-10}$

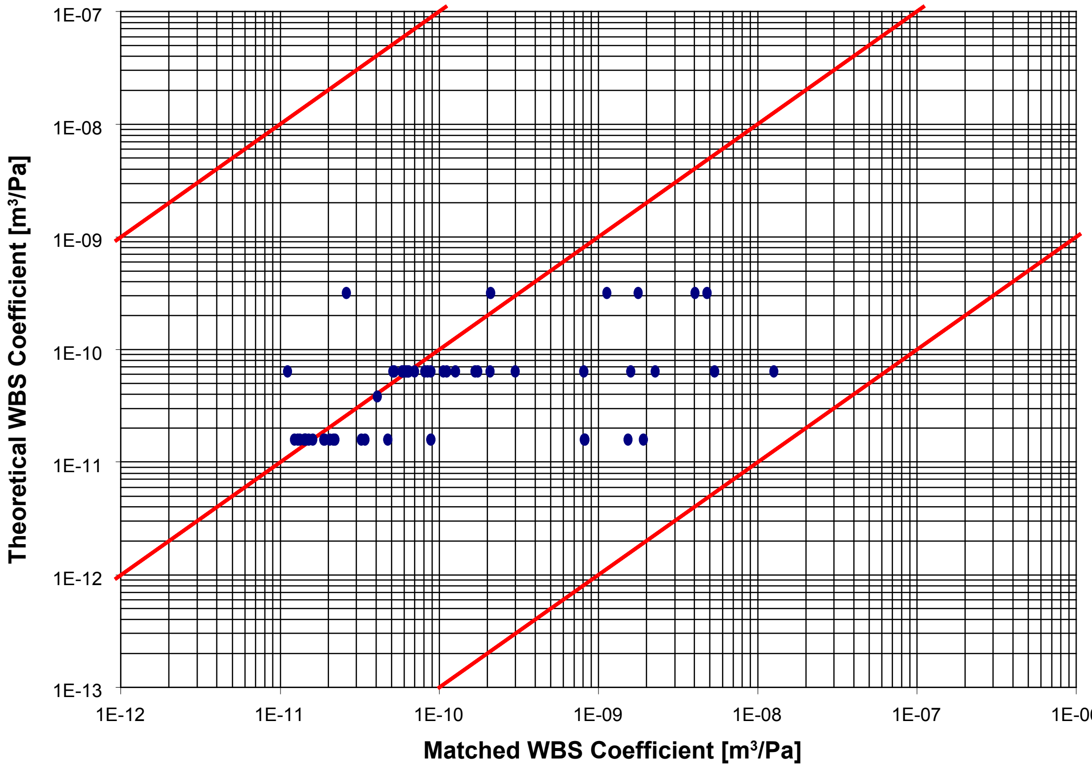

Figure 6-5. *Correlation analysis of theoretical and matched wellbore storage coefficients.*

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.

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 three cases the preliminary pulse was prolonged and the recommended transmissivity range from $4.6\cdot10^{-11}$ m²/s to $2.9\cdot10^{-10}$ m²/s.

The recommended transmissivities derived from the conducted injection tests (CHi and CHir) range between $5.9\cdot10^{-10}$ m²/s and $7.5\cdot10^{-05}$ 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. In these cases, a crossflow or hydraulic connection to adjacent zones cannot be excluded by performing the relevant 20 m respectively 5 m section tests. At some of the relevant 20 m and 5 m sections an increase of Pb was observed during injection which is consistent with the crossflow hypothesis.

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 14.59 m to 18.60 m. The highest freshwater heads were measured between 664 m and 701 m, whereas the lowest freshwater heads were measured between 169 m and 189 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

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX17A				
TEST- AND FILEPROTOCOL					Testorder dated : 2007-04-13				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2007-05-09	13:47	69.00	169.00	__KLX17A_0069.00_200705091347.ht2	KLX17A_69.00-169.00_070509_1_CHir_Q_r.csv	Chir	03.06.2007	09.05.2007	
2007-05-09	17:46	169.00	269.00	__KLX17A_0169.00_200705091746.ht2	KLX17A_169.00-269.00_070509_1_CHir_Q_r.csv	Chir	03.06.2007	09.05.2007	
2007-05-10	09:35	269.00	369.00	__KLX17A_0269.00_200705100935.ht2	KLX17A_269.00-369.00_070510_1_CHir_Q_r.csv	Chir	03.06.2007	10.05.2007	
2007-05-10	13:23	369.00	469.00	__KLX17A_0369.00_200705101323.ht2	KLX17A_369.00-469.00_070510_1_CHir_Q_r.csv	Chir	03.06.2007	10.05.2007	
2007-05-10	16:42	469.00	569.00	__KLX17A_0469.00_200705101642.ht2	KLX17A_469.00-569.00_070511_1_CHir_Q_r.csv	Chir	03.06.2007	11.05.2007	
2007-05-11	10:16	569.00	669.00	__KLX17A_0569.00_200705111016.ht2	KLX17A_569.00-669.00_070511_1_CHir_Q_r.csv	Chir	03.06.2007	11.05.2007	
2007-05-11	14:16	569.00	669.00	__KLX17A_0569.00_200705111416.ht2	KLX17A_569.00-669.00_070511_2_CHir_Q_r.csv	Chir	03.06.2007	11.05.2007	
2007-05-13	11:15	69.00	89.00	__KLX17A_0069.00_200705131115.ht2	KLX17A_69.00-89.00_070513_1_CHir_Q_r.csv	Chir	03.06.2007	13.05.2007	
2007-05-13	14:08	87.00	107.00	__KLX17A_0087.00_200705131408.ht2	KLX17A_87.00-107.00_070513_1_CHir_Q_r.csv	Chir	03.06.2007	13.05.2007	
2007-05-13	16:09	107.00	127.00	__KLX17A_0107.00_200705131609.ht2	KLX17A_107.00-127.00_070513_1_CHir_Q_r.csv	Chir	03.06.2007	13.05.2007	
2007-05-13	18:16	127.00	147.00	__KLX17A_0127.00_200705131816.ht2	KLX17A_127.00-147.00_070513_1_CHir_Q_r.csv	Chir	03.06.2007	14.05.2007	
2007-05-14	08:51	147.00	167.00	__KLX17A_0147.00_200705140851.ht2	KLX17A_147.00-167.00_070514_1_CHir_Q_r.csv	Chir	03.06.2007	14.05.2007	
2007-05-14	10:40	149.00	169.00	__KLX17A_0149.00_200705141040.ht2	KLX17A_149.00-169.00_070514_1_CHir_Q_r.csv	Chir	03.06.2007	14.05.2007	
2007-05-14	13:27	169.00	189.00	__KLX17A_0169.00_200705141327.ht2	KLX17A_169.00-189.00_070514_1_CHir_Q_r.csv	Chir	03.06.2007	14.05.2007	
2007-05-14	15:33	189.00	209.00	__KLX17A_0189.00_200705141533.ht2	KLX17A_189.00-209.00_070514_1_CHir_Q_r.csv	Chir	03.06.2007	14.05.2007	
2007-05-14	17:32	209.00	229.00	__KLX17A_0209.00_200705141732.ht2	KLX17A_209.00-229.00_070514_1_CHir_Q_r.csv	Chir	03.06.2007	15.05.2007	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX17A				
TEST- AND FILEPROTOCOL					Testorder dated : 2007-04-13				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2007-05-15	08:47	229.00	249.00	__KLX17A_0229.00_200705150847.ht2	KLX17A_229.00-249.00_070515_1_CHir_Q_r.csv	Chir	03.06.2007	15.05.2007	
2007-05-15	10:58	249.00	269.00	__KLX17A_0249.00_200705151058.ht2	KLX17A_249.00-269.00_070515_1_CHir_Q_r.csv	Chir	03.06.2007	15.05.2007	
2007-05-15	14:02	269.00	289.00	__KLX17A_0269.00_200705151402.ht2	KLX17A_269.00-289.00_070515_1_CHir_Q_r.csv	Chir	03.06.2007	15.05.2007	
2007-05-15	16:55	289.00	309.00	__KLX17A_0289.00_200705151655.ht2	KLX17A_289.00-309.00_070515_1_CHir_Q_r.csv	Chir	03.06.2007	15.05.2007	
2007-05-16	08:46	309.00	329.00	__KLX17A_0309.00_200705160846.ht2	KLX17A_309.00-329.00_070516_1_CHir_Q_r.XLS	Chir	03.06.2007	16.05.2007	
2007-05-16	10:45	329.00	349.00	__KLX17A_0329.00_200705161045.ht2	KLX17A_329.00-349.00_070516_1_CHir_Q_r.csv	Chir	03.06.2007	16.05.2007	
2007-05-16	13:20	349.00	369.00	__KLX17A_0349.00_200705161320.ht2	KLX17A_349.00-369.00_070516_1_CHir_Q_r.csv	Chir	03.06.2007	16.05.2007	
2007-05-16	14:43	369.00	389.00	__KLX17A_0369.00_200705161443.ht2	KLX17A_369.00-389.00_070516_1_CHir_Q_r.XLS	Chir	03.06.2007	16.05.2007	
2007-05-16	16:39	389.00	409.00	__KLX17A_0389.00_200705161639.ht2	KLX17A_389.00-409.00_070516_1_CHir_Q_r.csv	Chir	03.06.2007	16.05.2007	
2007-05-17	08:43	409.00	429.00	__KLX17A_0409.00_200705170843.ht2	KLX17A_409.00-429.00_070517_1_CHir_Q_r.csv	Chir	03.06.2007	17.05.2007	
2007-05-17	10:43	428.00	448.00	__KLX17A_0428.00_200705171043.ht2	KLX17A_428.00-448.00_070517_1_CHir_Q_r.csv	Chir	03.06.2007	17.05.2007	
2007-05-17	13:34	448.00	468.00	__KLX17A_0448.00_200705171334.ht2	KLX17A_448.00-468.00_070517_1_CHir_Q_r.csv	Chir	03.06.2007	17.05.2007	
2007-05-17	15:47	449.00	469.00	__KLX17A_0449.00_200705171547.ht2	KLX17A_449.00-469.00_070517_1_CHir_Q_r.csv	Chir	03.06.2007	17.05.2007	
2007-05-17	18:06	469.00	489.00	__KLX17A_0469.00_200705171806.ht2	KLX17A_469.00-489.00_070517_1_Pi_Q_r.csv	Pi	03.06.2007	18.05.2007	
2007-05-18	08:47	489.00	509.00	__KLX17A_0489.00_200705180847.ht2	KLX17A_489.00-509.00_070518_1_Pi_Q_r.csv	Pi	03.06.2007	18.05.2007	
2007-05-18	11:04	509.00	529.00	__KLX17A_0509.00_200705181104.ht2	KLX17A_509.00-529.00_070518_1_CHir_Q_r.csv	Chir	03.06.2007	18.05.2007	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX17A				
TEST- AND FILEPROTOCOL					**Testorder dated : 2007-04-13**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2007-05-18	12:36	529.00	549.00	__KLX17A_0529.00_200705181236.ht2	KLX17A_529.00-549.00_070518_1_Pi_Q_r.csv	Pi	03.06.2007	18.05.2007	
2007-05-18	15:13	549.00	569.00	__KLX17A_0549.00_200705181513.ht2	KLX17A_549.00-569.00_070518_1_CHir_Q_r.csv	Chir	03.06.2007	18.05.2007	
2007-05-18	16:44	569.00	589.00	__KLX17A_0569.00_200705181644.ht2	KLX17A_569.00-589.00_070518_1_CHir_Q_r.csv	Chir	03.06.2007	18.05.2007	
2007-05-18	18:44	569.00	589.00	__KLX17A_0569.00_200705181844.ht2	KLX17A_569.00-589.00_070518_2_Pi_Q_r.csv	Pi	03.06.2007	18.05.2007	
2007-05-19	08:59	589.00	609.00	__KLX17A_0589.00_200705190859.ht2	KLX17A_589.00-609.00_070519_1_CHir_Q_r.csv	Chir	03.06.2007	19.05.2007	
2007-05-19	10:33	609.00	629.00	__KLX17A_0609.00_200705191033.ht2	KLX17A_609.00-629.00_070519_1_CHir_Q_r.csv	Chir	03.06.2007	19.05.2007	
2007-05-19	12:19	629.00	649.00	__KLX17A_0629.00_200705191219.ht2	KLX17A_629.00-649.00_070519_1_CHir_Q_r.csv	Chir	03.06.2007	19.05.2007	
2007-05-19	15:31	649.00	669.00	__KLX17A_0649.00_200705191531.ht2	KLX17A_649.00-669.00_070519_1_CHir_Q_r.csv	Chir	03.06.2007	20.05.2007	
2007-05-20	08:53	669.00	689.00	__KLX17A_0669.00_200705200853.ht2	KLX17A_669.00-689.00_070520_1_CHir_Q_r.csv	Chir	03.06.2007	20.05.2007	
2007-05-20	11:04	674.00	694.00	__KLX17A_0674.00_200705201104.ht2	KLX17A_674.00-694.00_070520_1_CHir_Q_r.csv	Chir	03.06.2007	20.05.2007	
2007-05-20	17:54	469.00	489.00	__KLX17A_0469.00_200705201754.ht2	KLX17A_469.00-489.00_070520_2_CHir_Q_r.csv	Chir	03.06.2007	22.05.2007	
2007-05-22	13:43	339.00	344.00	__KLX17A_0339.00_200705221343.ht2	KLX17A_339.00-344.00_070522_1_CHir_Q_r.csv	Chir	03.06.2007	22.05.2007	
2007-05-22	15:54	344.00	349.00	__KLX17A_0344.00_200705221554.ht2	KLX17A_344.00-349.00_070522_1_CHir_Q_r.csv	Chir	03.06.2007	22.05.2007	
2007-05-23	09:07	369.00	374.00	__KLX17A_0369.00_200705230907.ht2	KLX17A_369.00-374.00_070523_1_CHir_Q_r.csv	Chir	03.06.2007	23.05.2007	
2007-05-23	10:58	374.00	379.00	__KLX17A_0374.00_200705231058.ht2	KLX17A_374.00-379.00_070523_1_CHir_Q_r.csv	Chir	03.06.2007	23.05.2007	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX17A				
TEST- AND FILEPROTOCOL					**Testorder dated : 2007-04-13**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2007-05-23	13:07	379.00	384.00	__KLX17A_0379.00_200705231307.ht2	KLX17A_379.00-384.00_070523_1_Pi_Q_r.csv	Pi	03.06.2007	23.05.2007	
2007-05-23	15:49	384.00	389.00	__KLX17A_0384.00_200705231549.ht2	KLX17A_384.00-389.00_070523_1_CHir_Q_r.csv	Chir	03.06.2007	23.05.2007	
2007-05-23	17:48	387.00	392.00	__KLX17A_0387.00_200705231748.ht2	KLX17A_387.00-392.00_070523_1_CHir_Q_r.csv	Chir	03.06.2007	24.05.2007	
2007-05-24	10:35	392.00	397.00	__KLX17A_0392.00_200705241035.ht2	KLX17A_392.00-397.00_070524_1_CHir_Q_r.csv	Chir	03.06.2007	24.05.2007	
2007-05-24	13:08	397.00	402.00	__KLX17A_0397.00_200705241308.ht2	KLX17A_397.00-402.00_070524_1_CHir_Q_r.csv	Chir	03.06.2007	24.05.2007	
2007-05-24	15:07	402.00	407.00	__KLX17A_0402.00_200705241507.ht2	KLX17A_402.00-407.00_070524_1_CHir_Q_r.csv	Chir	03.06.2007	24.05.2007	
2007-05-24	16:22	404.00	409.00	__KLX17A_0404.00_200705241622.ht2	KLX17A_404.00-409.00_070524_1_CHir_Q_r.csv	Chir	03.06.2007	24.05.2007	
2007-05-24	17:35	409.00	414.00	__KLX17A_0409.00_200705241735.ht2	KLX17A_409.00-414.00_070524_1_CHir_Q_r.csv	Chir	03.06.2007	25.05.2007	
2007-05-25	08:18	414.00	419.00	__KLX17A_0414.00_200705250818.ht2	KLX17A_414.00-419.00_070525_1_CHir_Q_r.csv	Chir	03.06.2007	25.05.2007	
2007-05-25	10:36	419.00	424.00	__KLX17A_0419.00_200705251036.ht2	KLX17A_419.00-424.00_070525_1_CHir_Q_r.csv	Chir	03.06.2007	25.05.2007	
2007-05-25	12:56	420.00	425.00	__KLX17A_0420.00_200705251256.ht2	KLX17A_420.00-425.00_070525_1_CHir_Q_r.csv	Chir	03.06.2007	25.05.2007	
2007-05-25	14:50	425.00	430.00	__KLX17A_0425.00_200705251450.ht2	KLX17A_425.00-430.00_070525_1_CHir_Q_r.csv	Chir	03.06.2007	25.05.2007	
2007-05-25	16:44	430.00	435.00	__KLX17A_0430.00_200705251644.ht2	KLX17A_430.00-435.00_070525_1_CHir_Q_r.csv	Chir	03.06.2007	26.05.2007	
2007-05-26	08:17	435.00	440.00	__KLX17A_0435.00_200705260817.ht2	KLX17A_435.00-440.00_070526_1_Pi_Q_r.csv	Pi	03.06.2007	26.05.2007	
2007-05-26	09:56	440.00	445.00	__KLX17A_0440.00_200705260956.ht2	KLX17A_440.00-445.00_070526_1_CHir_Q_r.csv	Chir	03.06.2007	26.05.2007	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX17A				
TEST- AND FILEPROTOCOL					Testorder dated : 2007-04-13				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2007-05-26	11:16	444.00	449.00	__KLX17A_0444.00_200705261116.ht2	KLX17A_444.00-449.00_070526_1_CHir_Q_r.csv	Chir	03.06.2007	26.05.2007	
2007-05-26	13:34	449.00	454.00	__KLX17A_0449.00_200705261334.ht2	KLX17A_449.00-454.00_070526_1_Pi_Q_r.csv	Pi	03.06.2007	26.05.2007	
2007-05-26	16:14	454.00	459.00	__KLX17A_0454.00_200705261614.ht2	KLX17A_454.00-459.00_070526_1_CHir_Q_r.csv	Chir	03.06.2007	27.05.2007	
2007-05-27	08:14	459.00	464.00	__KLX17A_0459.00_200705270814.ht2	KLX17A_459.00-464.00_070527_1_Pi_Q_r.csv	Pi	03.06.2007	27.05.2007	
2007-05-27	10:58	464.00	469.00	__KLX17A_0464.00_200705271058.ht2	KLX17A_464.00-469.00_070527_1_CHir_Q_r.csv	Chir	03.06.2007	27.05.2007	
2007-05-27	14:03	469.00	474.00	__KLX17A_0469.00_200705271403.ht2	KLX17A_469.00-474.00_070527_1_CHir_Q_r.csv	Chir	03.06.2007	27.05.2007	
2007-05-27	17:09	474.00	479.00	__KLX17A_0474.00_200705271709.ht2	KLX17A_474.00-479.00_070527_1_CHir_Q_r.csv	Chir	03.06.2007	28.05.2007	
2007-05-28	08:04	479.00	484.00	__KLX17A_0479.00_200705280804.ht2	KLX17A_479.00-484.00_070528_1_CHir_Q_r.csv	Chir	03.06.2007	28.05.2007	
2007-05-28	09:21	484.00	489.00	__KLX17A_0484.00_200705280921.ht2	KLX17A_484.00-489.00_070528_1_CHir_Q_r.csv	Chir	03.06.2007	28.05.2007	
2007-05-28	13:43	649.00	654.00	__KLX17A_0649.00_200705281343.ht2	KLX17A_649.00-654.00_070528_1_CHir_Q_r.csv	Chir	03.06.2007	28.05.2007	
2007-05-28	15:01	654.00	659.00	__KLX17A_0654.00_200705281501.ht2	KLX17A_654.00-659.00_070528_1_CHir_Q_r.csv	Chir	03.06.2007	28.05.2007	
2007-05-28	16:16	659.00	664.00	__KLX17A_0659.00_200705281616.ht2	KLX17A_659.00-664.00_070528_1_CHir_Q_r.csv	Chir	03.06.2007	28.05.2007	
2007-05-28	17:28	664.00	669.00	__KLX17A_0664.00_200705281728.ht2	KLX17A_664.00-669.00_070528_1_CHir_Q_r.csv	Chir	03.06.2007	29.05.2007	
2007-05-29	08:10	669.00	674.00	__KLX17A_0669.00_200705290810.ht2	KLX17A_669.00-674.00_070529_1_CHir_Q_r.csv	Chir	03.06.2007	29.05.2007	
2007-05-29	09:34	674.00	679.00	__KLX17A_0674.00_200705290934.ht2	KLX17A_674.00-679.00_070529_1_CHir_Q_r.csv	Chir	03.06.2007	29.05.2007	

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX17A				
TEST- AND FILEPROTOCOL					**Testorder dated : 2007-04-13**				
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)	
2007-05-29	13:00	679.00	684.00	__KLX17A_0679.00_200705291300.ht2	KLX17A_679.00-684.00_070529_1_CHir_Q_r.csv	Chir	03.06.2007	29.05.2007	
2007-05-29	15:01	684.00	689.00	__KLX17A_0684.00_200705291501.ht2	KLX17A_684.00-689.00_070529_1_CHir_Q_r.csv	Chir	03.06.2007	29.05.2007	
2007-05-29	17:58	689.00	694.00	__KLX17A_0689.00_200705291758.ht2	KLX17A_689.00-694.00_070529_1_CHir_Q_r.csv	Chir	03.06.2007	30.05.2007	
2007-05-30	16:22	435.00	440.00	__KLX17A_0435.00_200705301622.ht2	KLX17A_435.00-440.00_070530_2_Pi_Q_r.csv	Pi	03.06.2007	01.06.2007	
2007-06-01	16:46	689.00	701.08	__KLX17A_0689.00_200706011646.ht2	KLX17A_689.00-701.08_070601_1_CHir_Q_r.csv	Chir	03.06.2007	02.06.2007	

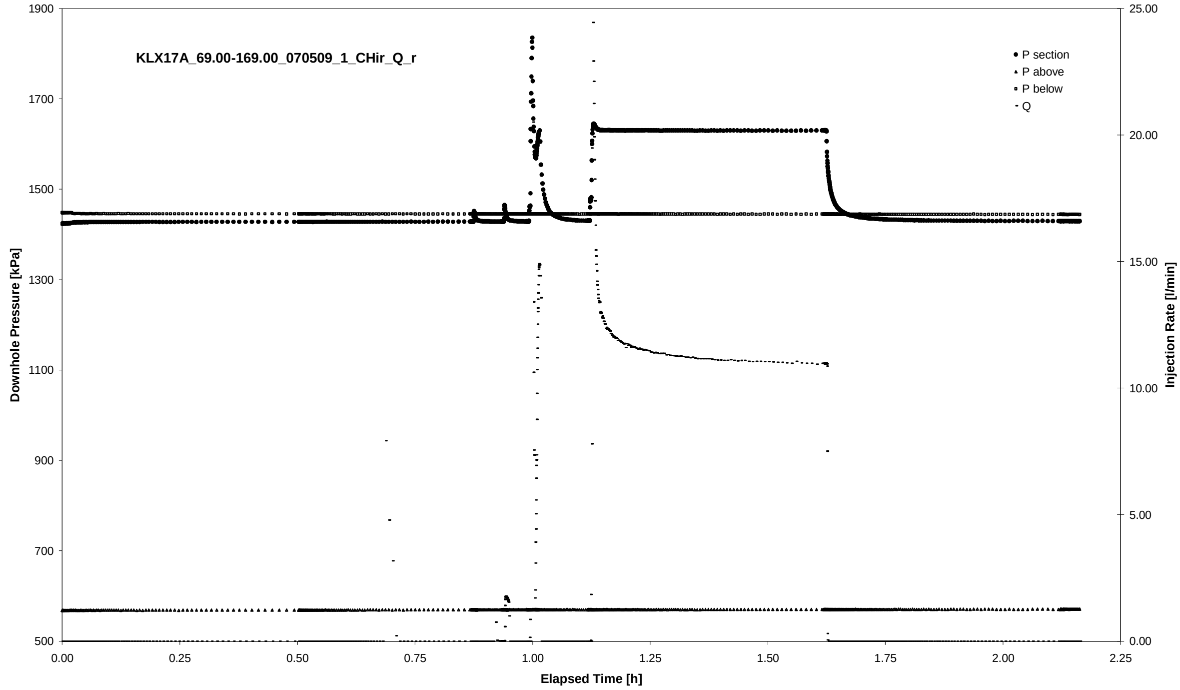
APPENDIX 2

Analysis diagrams

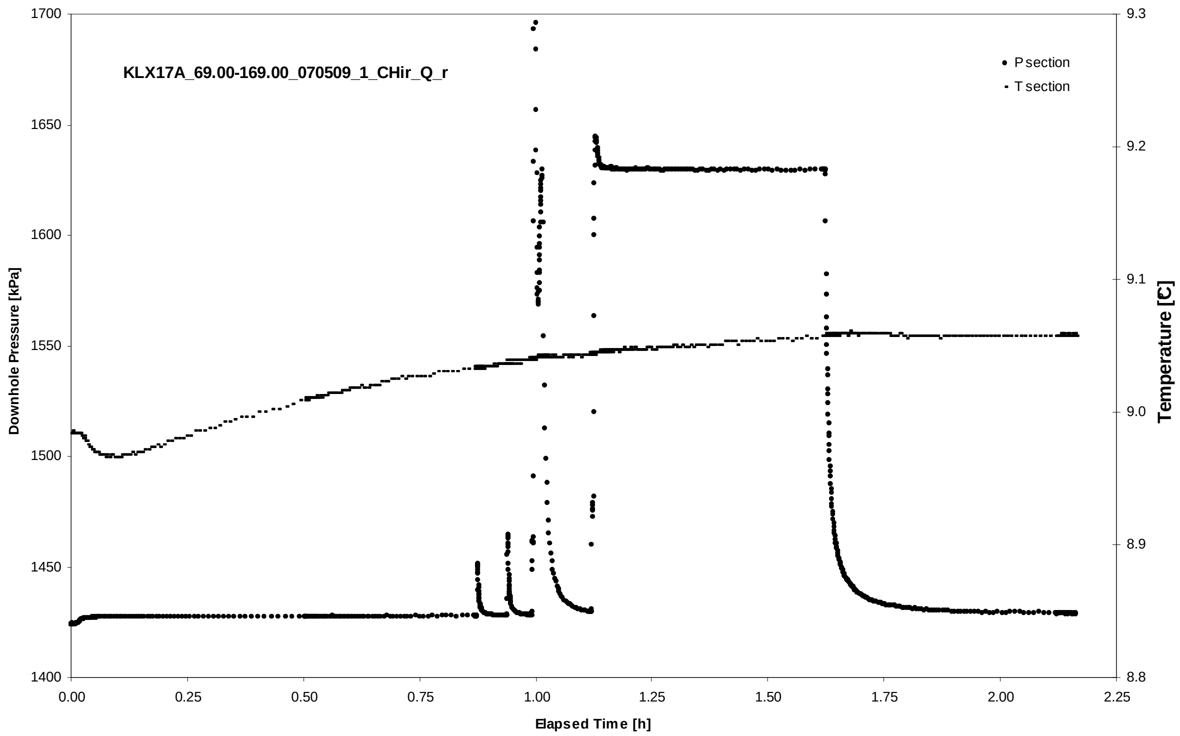
APPENDIX 2-1

Test 69.00 – 169.00 m

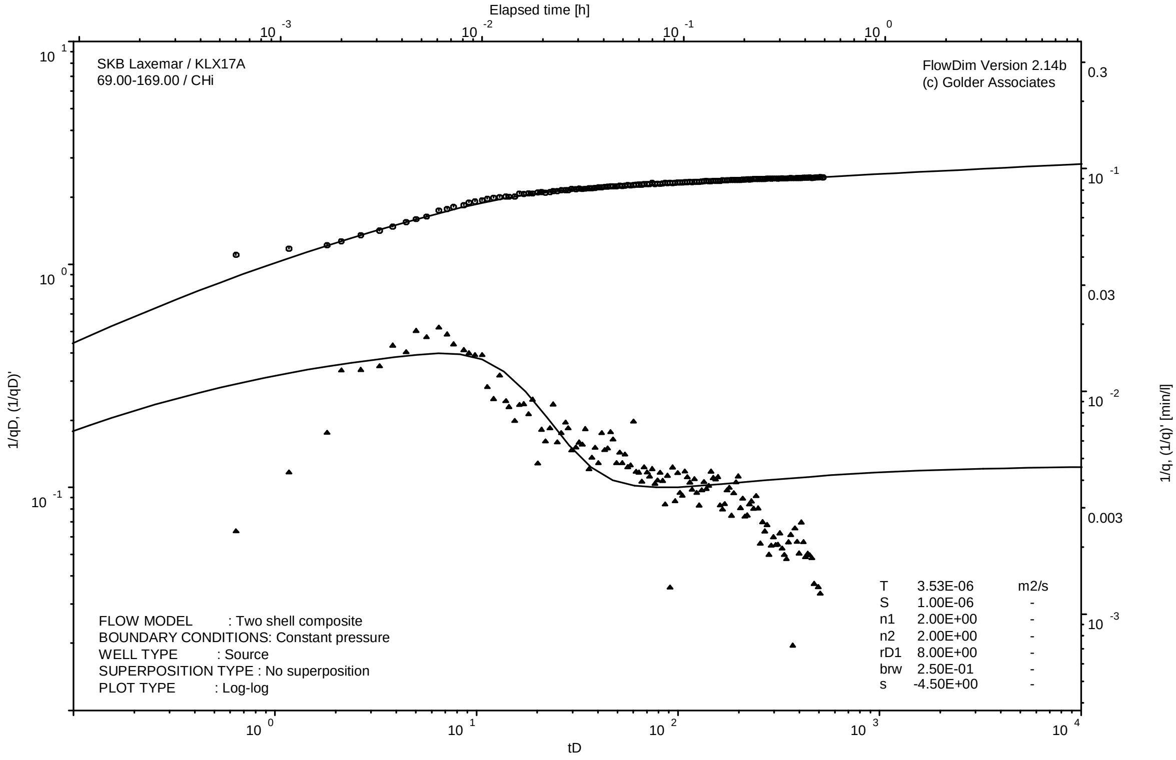
Analysis diagrams



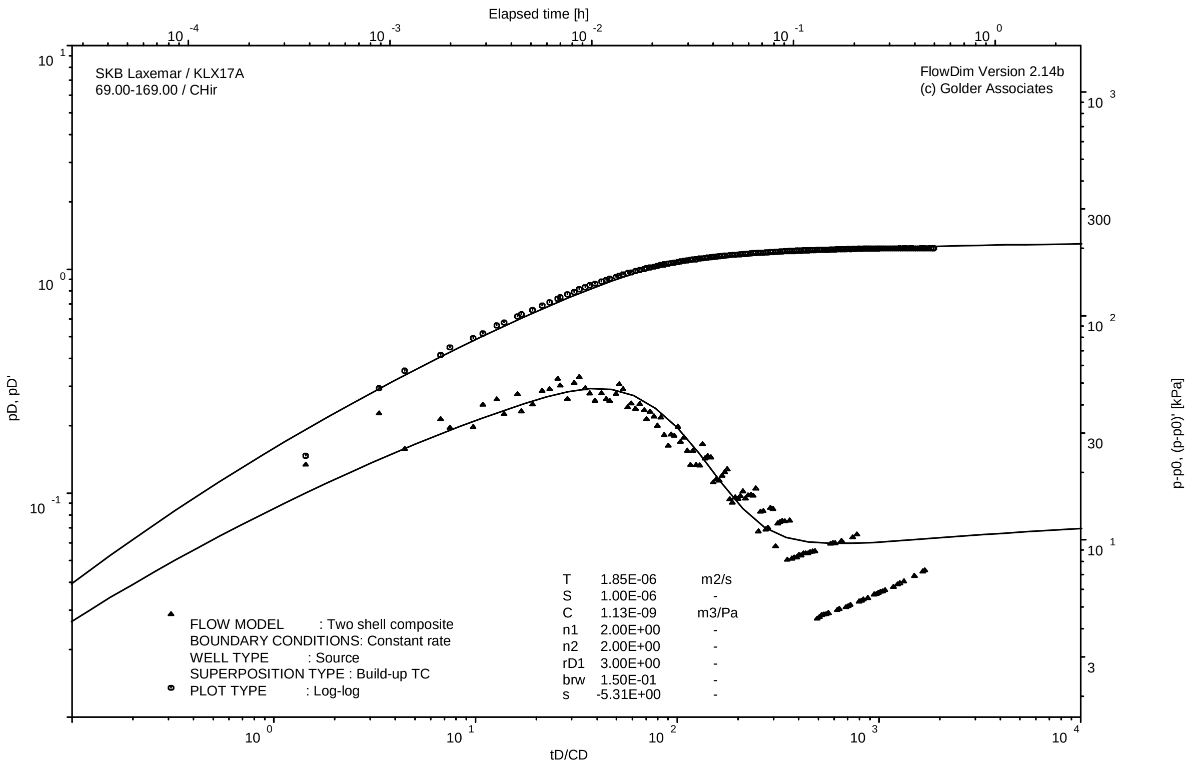
Pressure and flow rate vs. time; cartesian plot



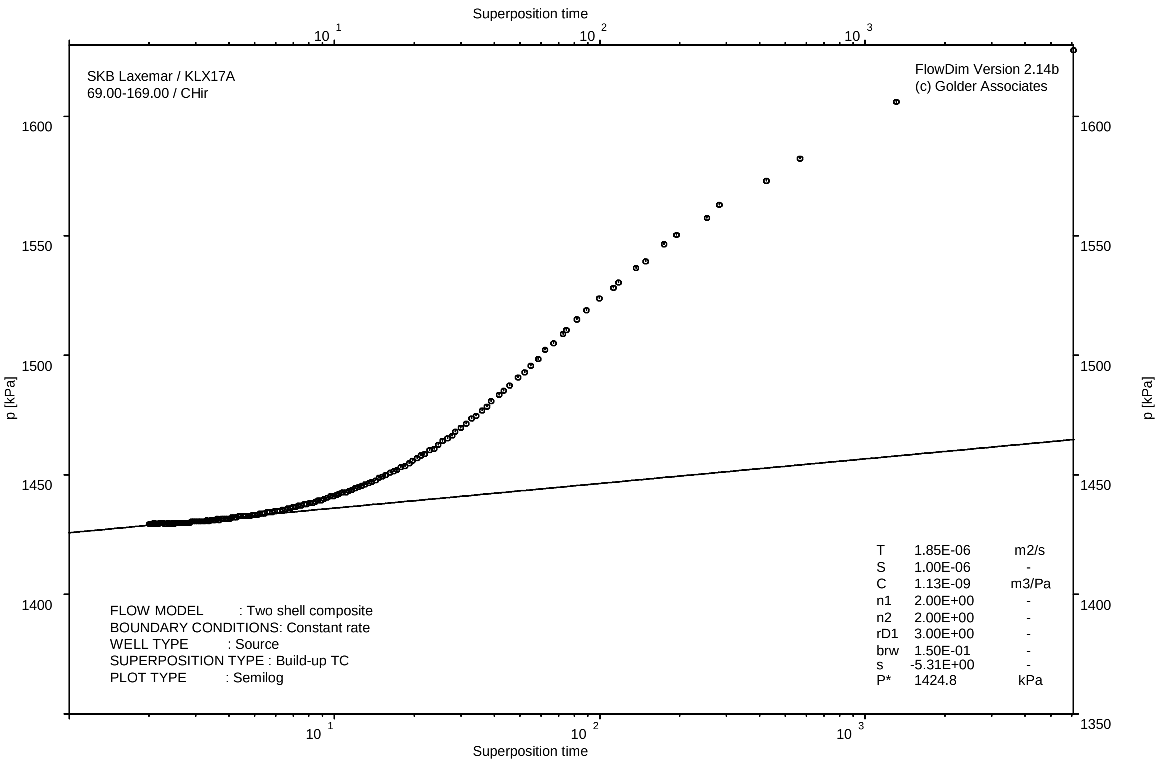
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

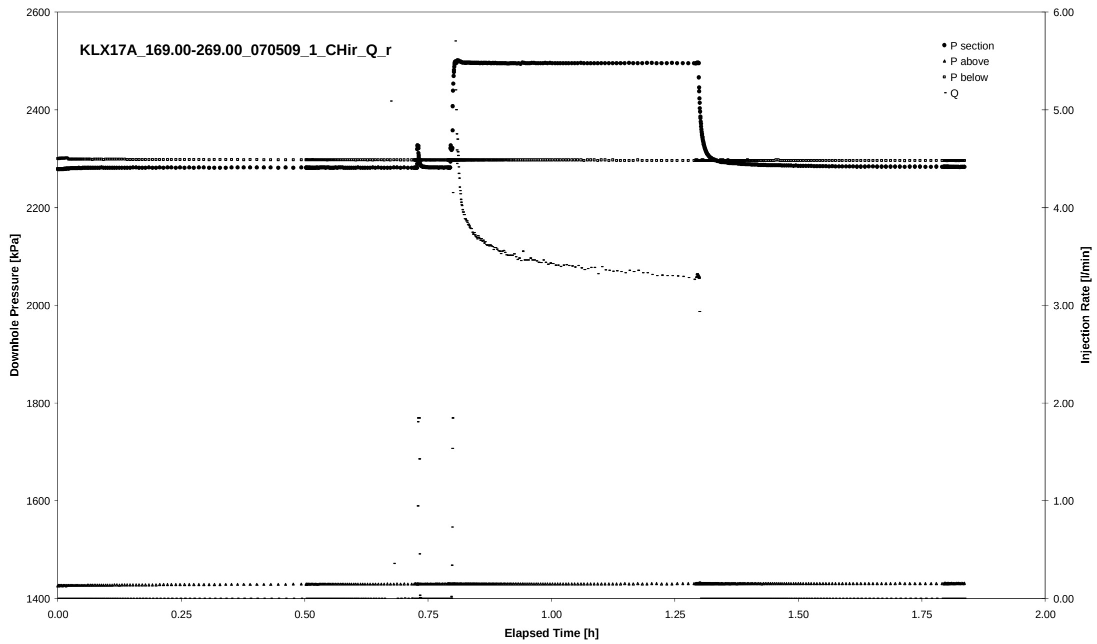


CHIR phase; HORNER match

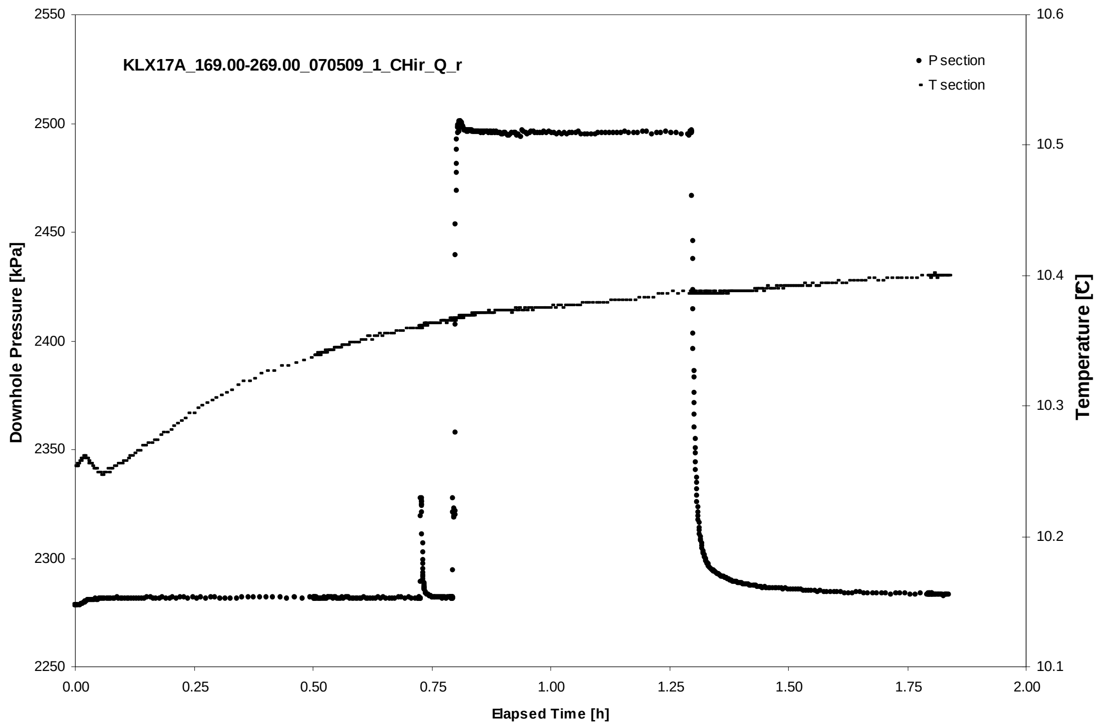
APPENDIX 2-2

Test 169.00 – 269.00 m

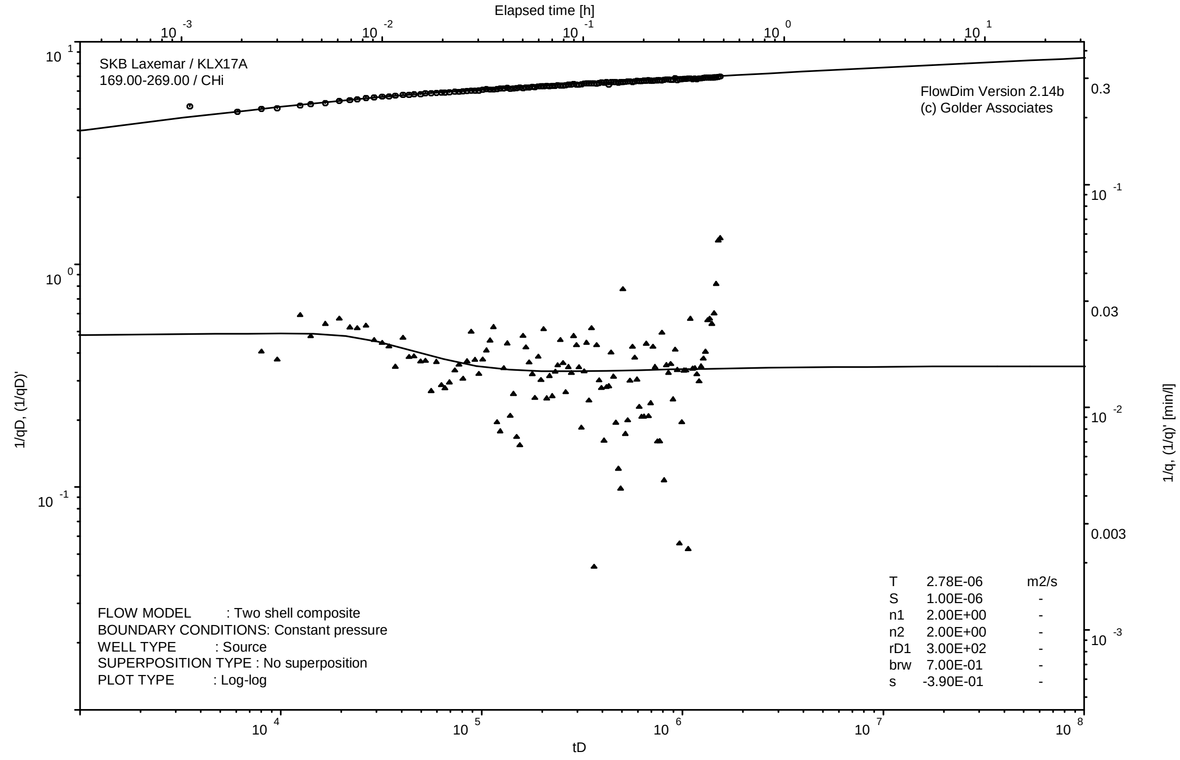
Analysis diagrams



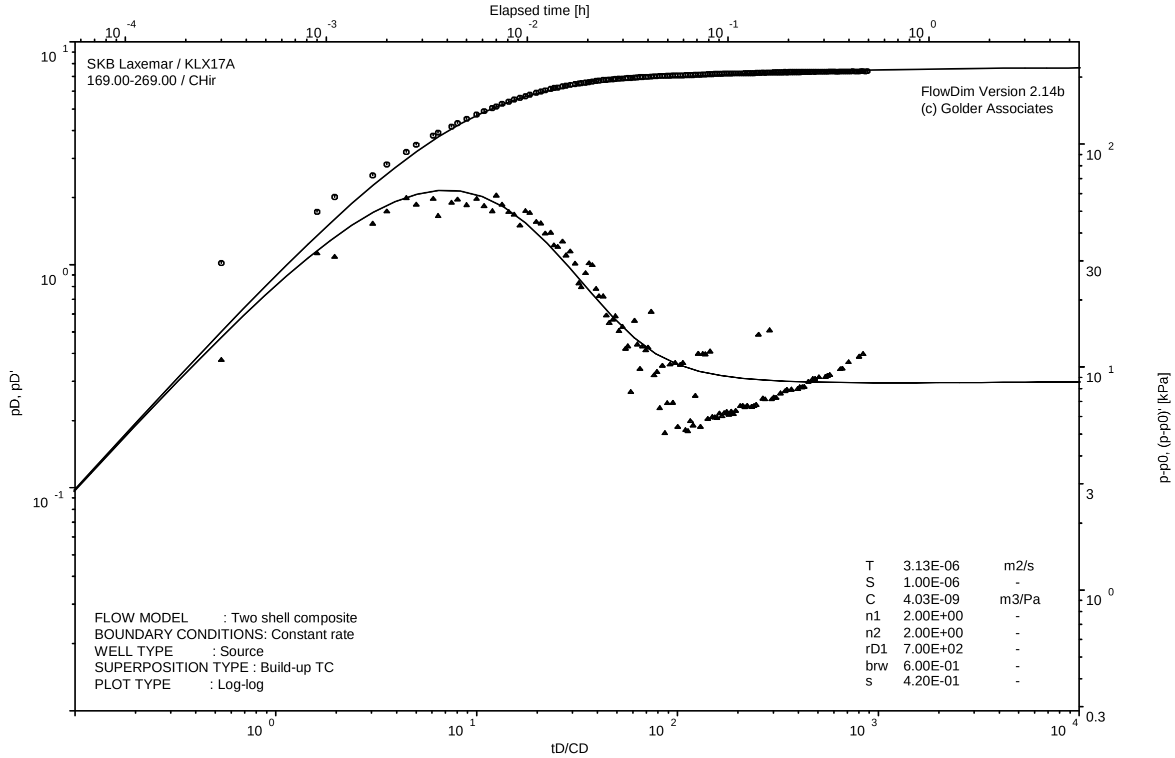
Pressure and flow rate vs. time; cartesian plot



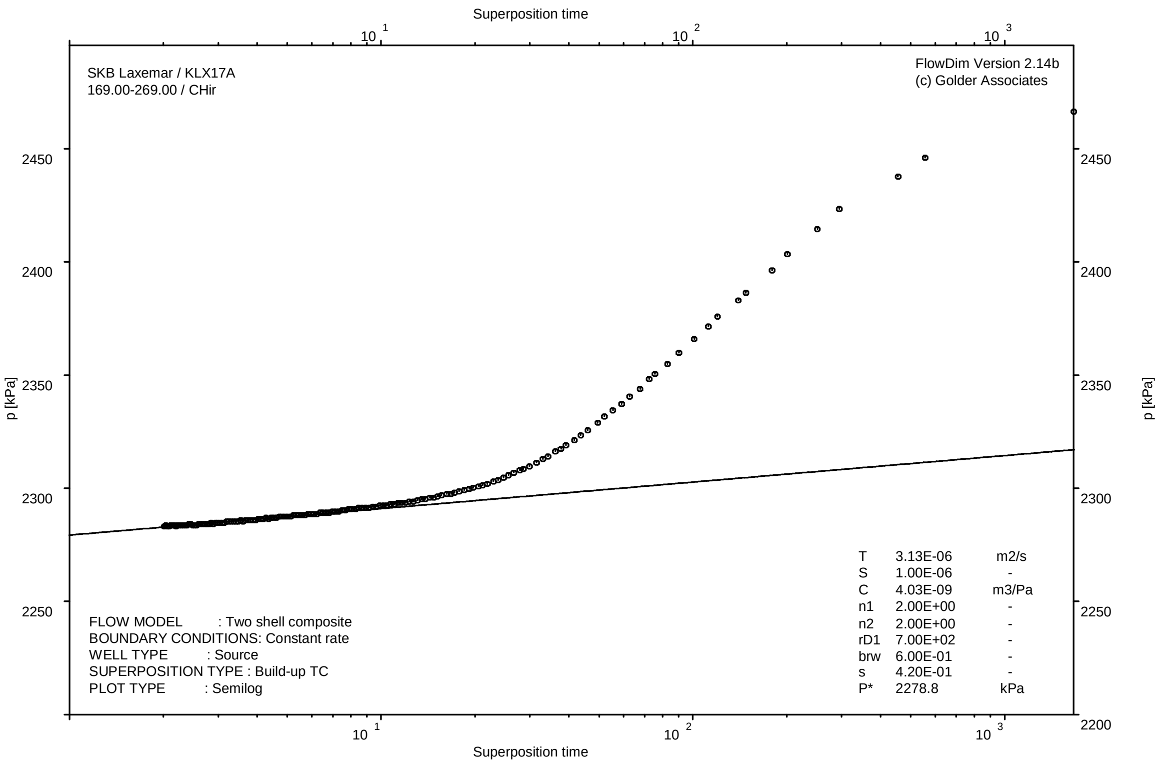
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

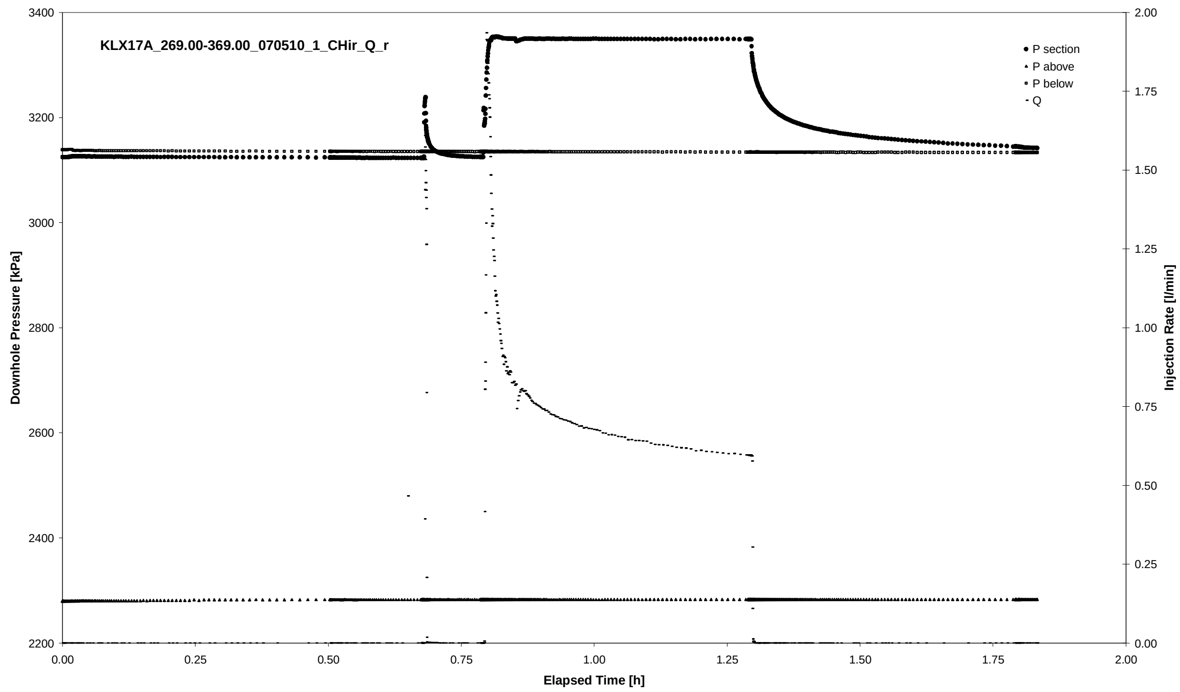


CHIR phase; HORNER match

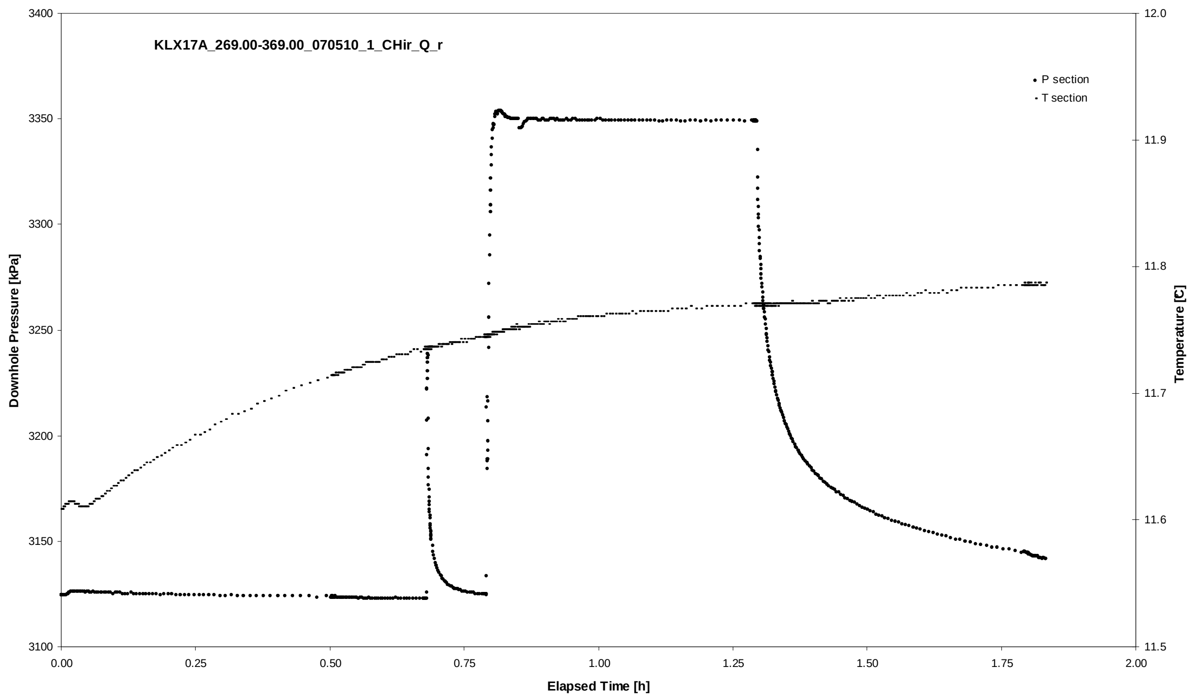
APPENDIX 2-3

Test 269.00 – 369.00 m

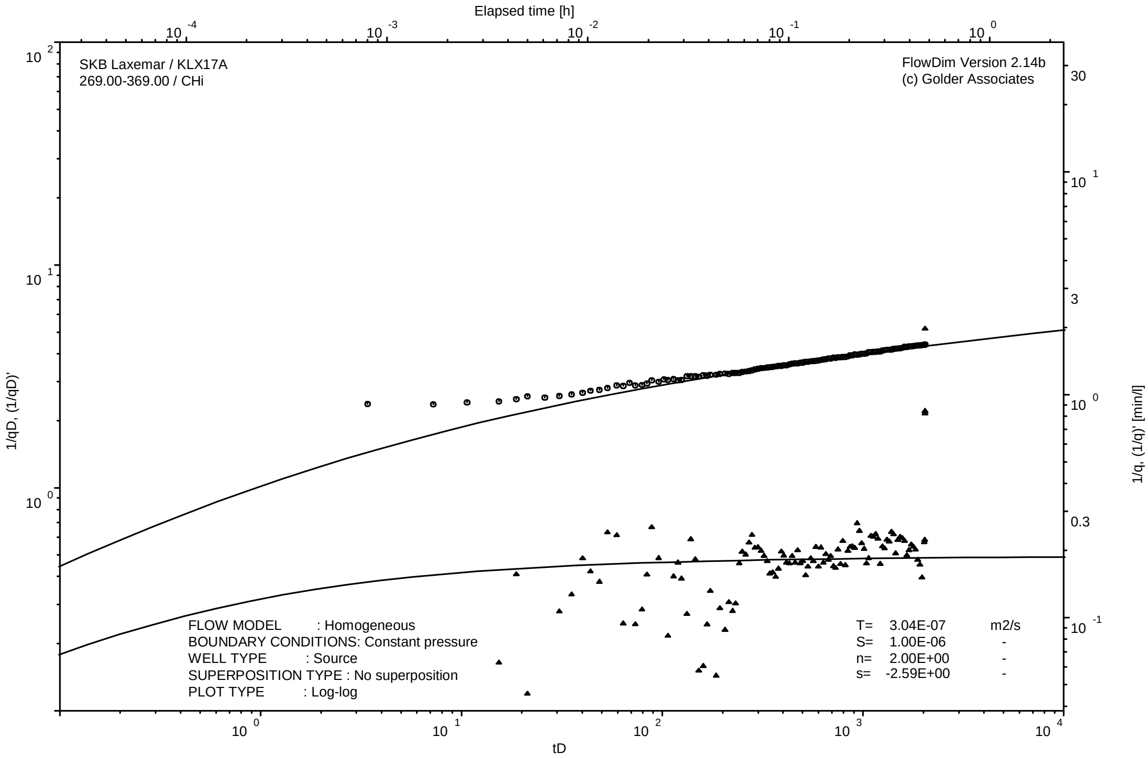
Analysis diagrams



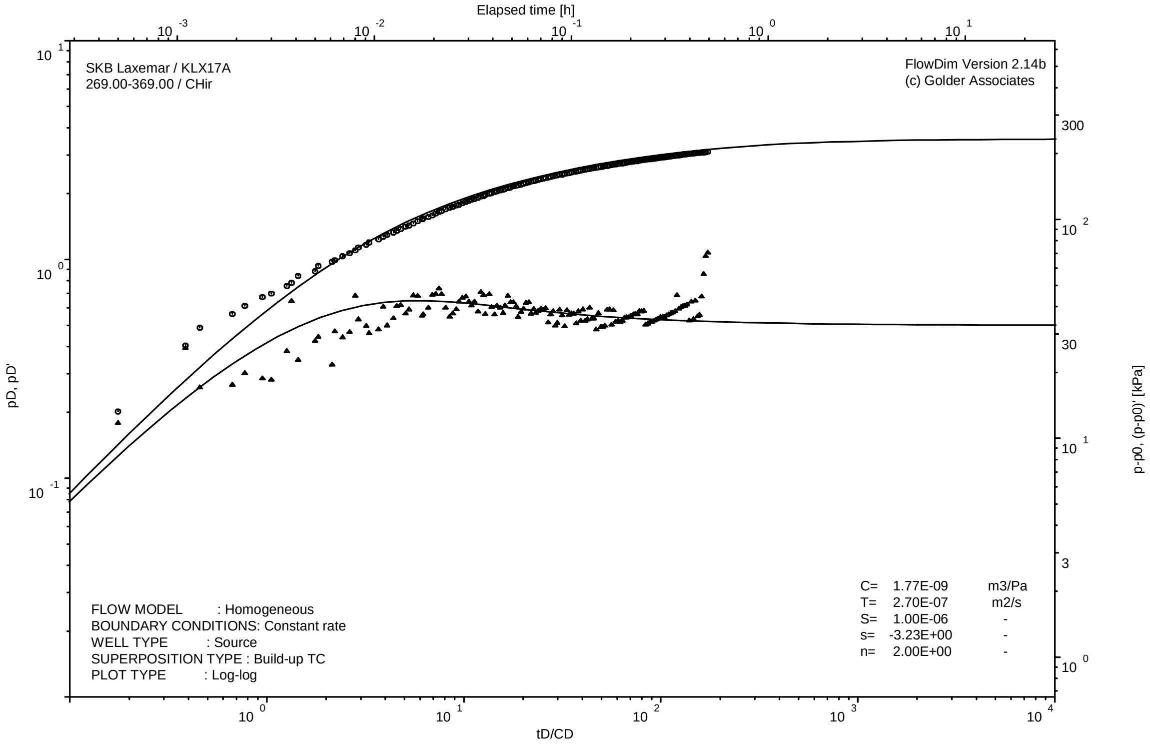
Pressure and flow rate vs. time; cartesian plot



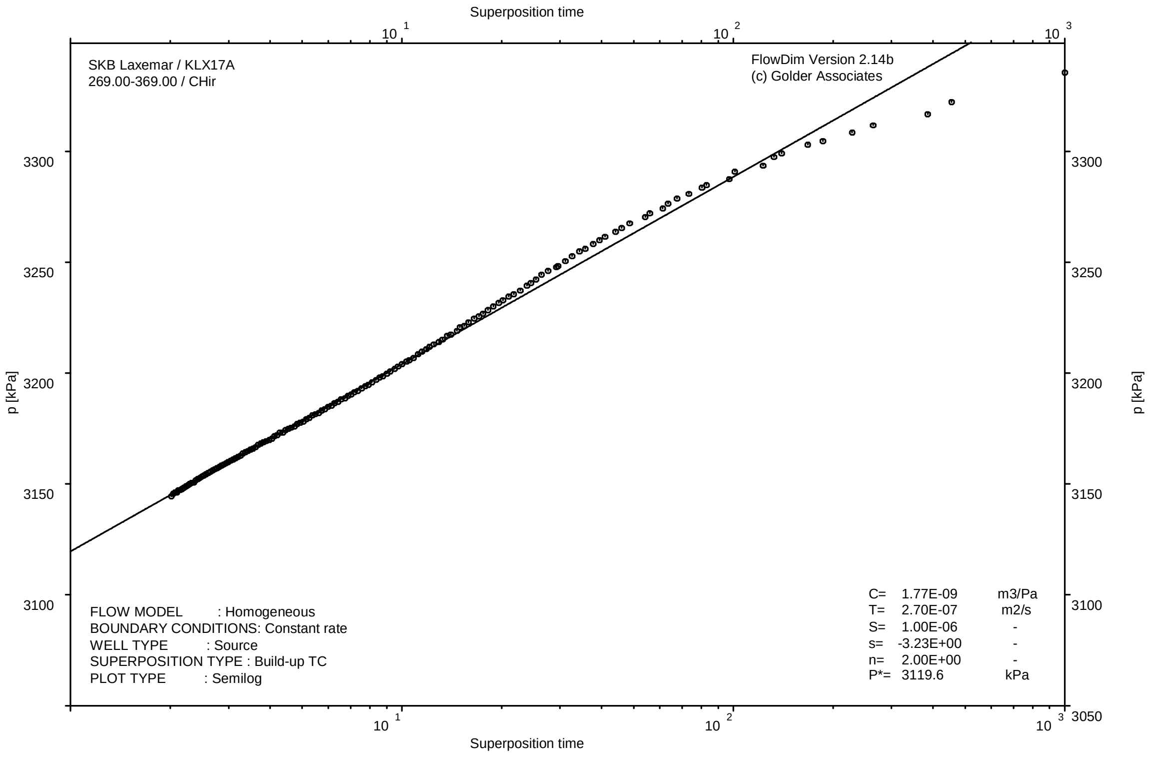
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

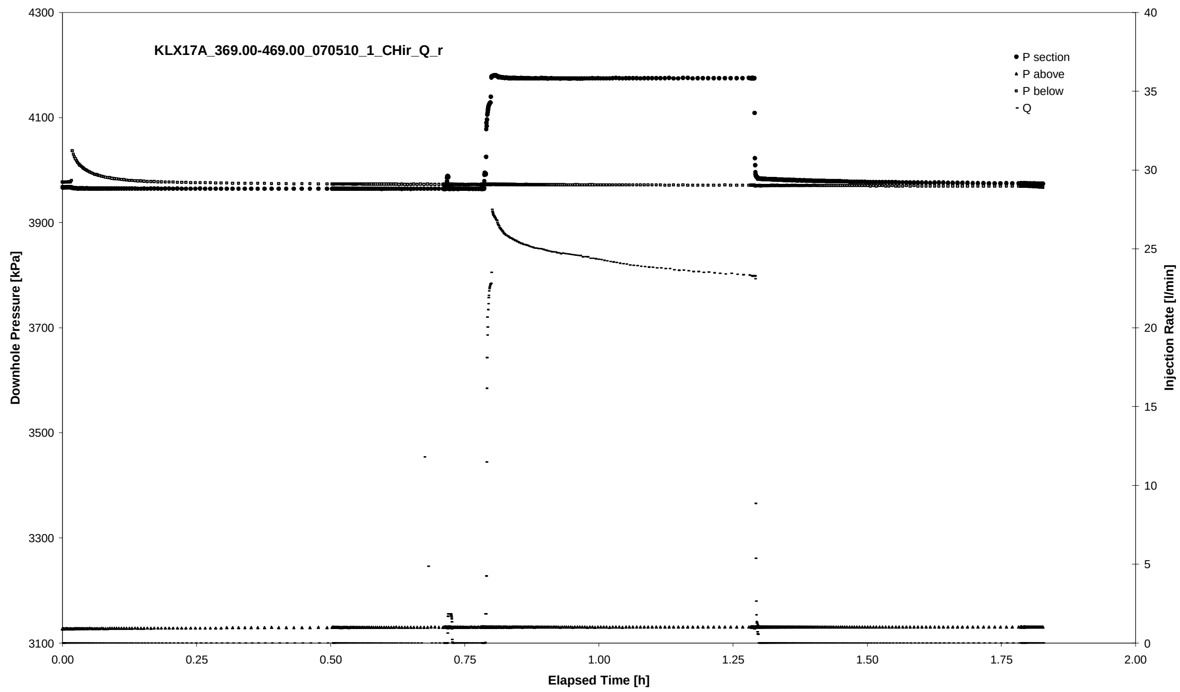


CHIR phase; HORNER match

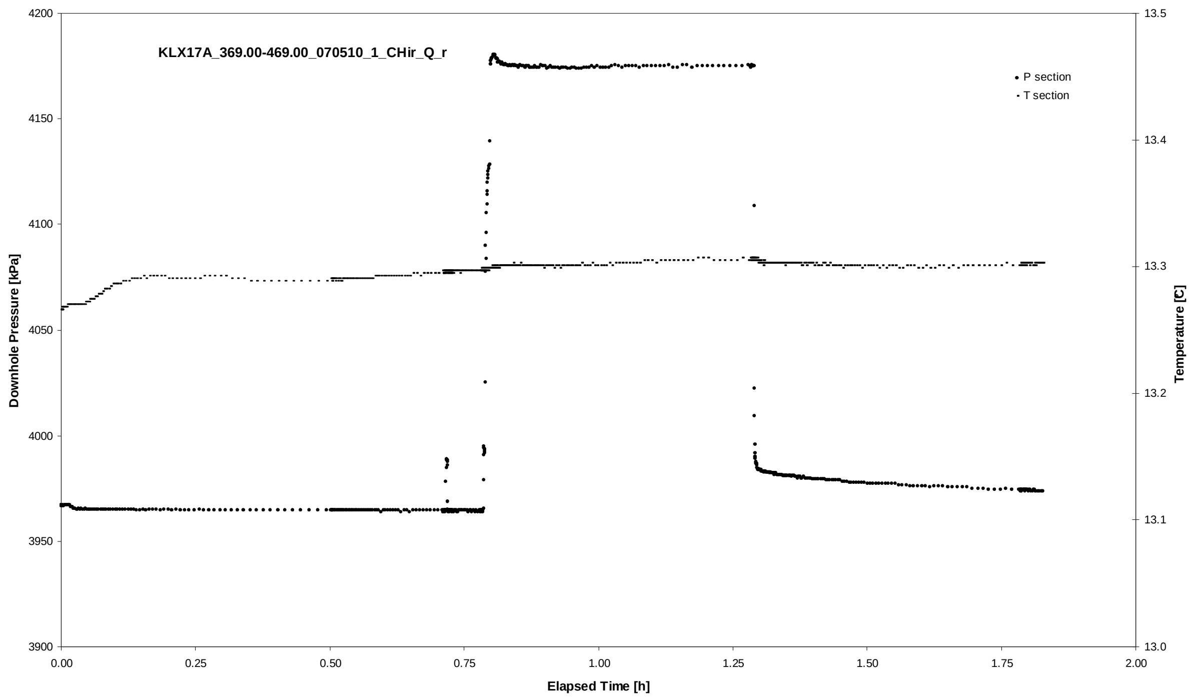
APPENDIX 2-4

Test 369.00 – 469.00 m

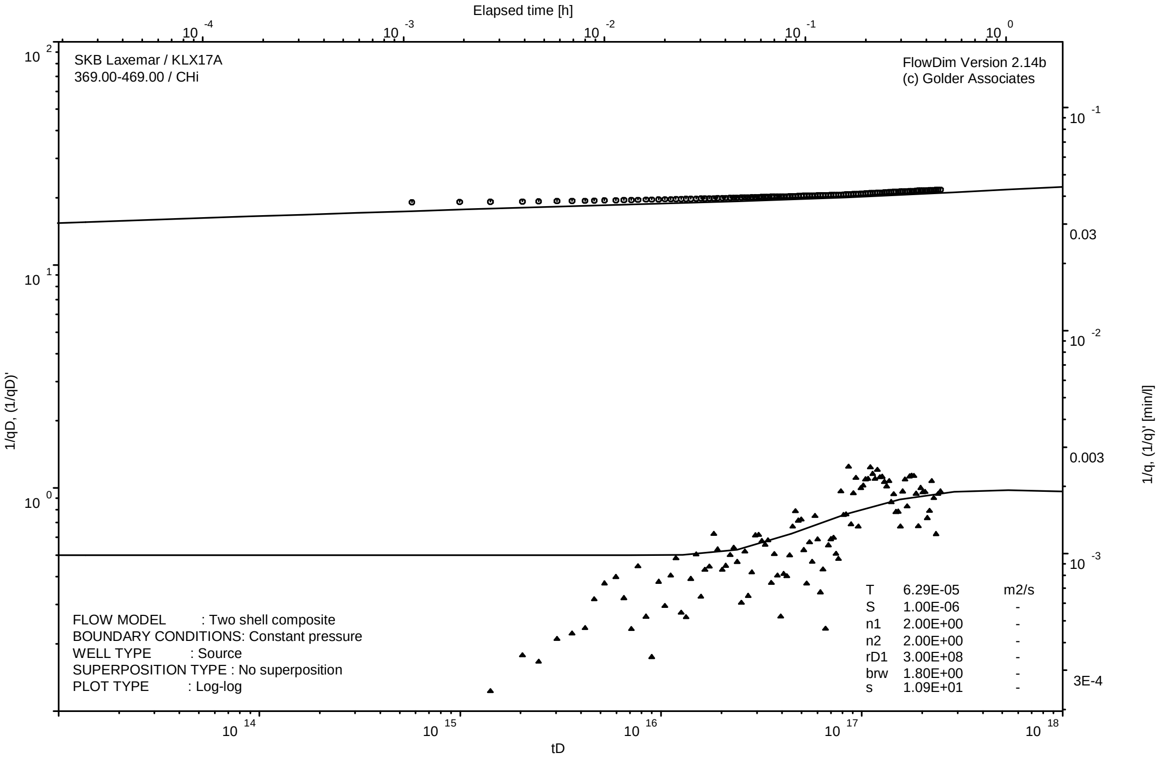
Analysis diagrams



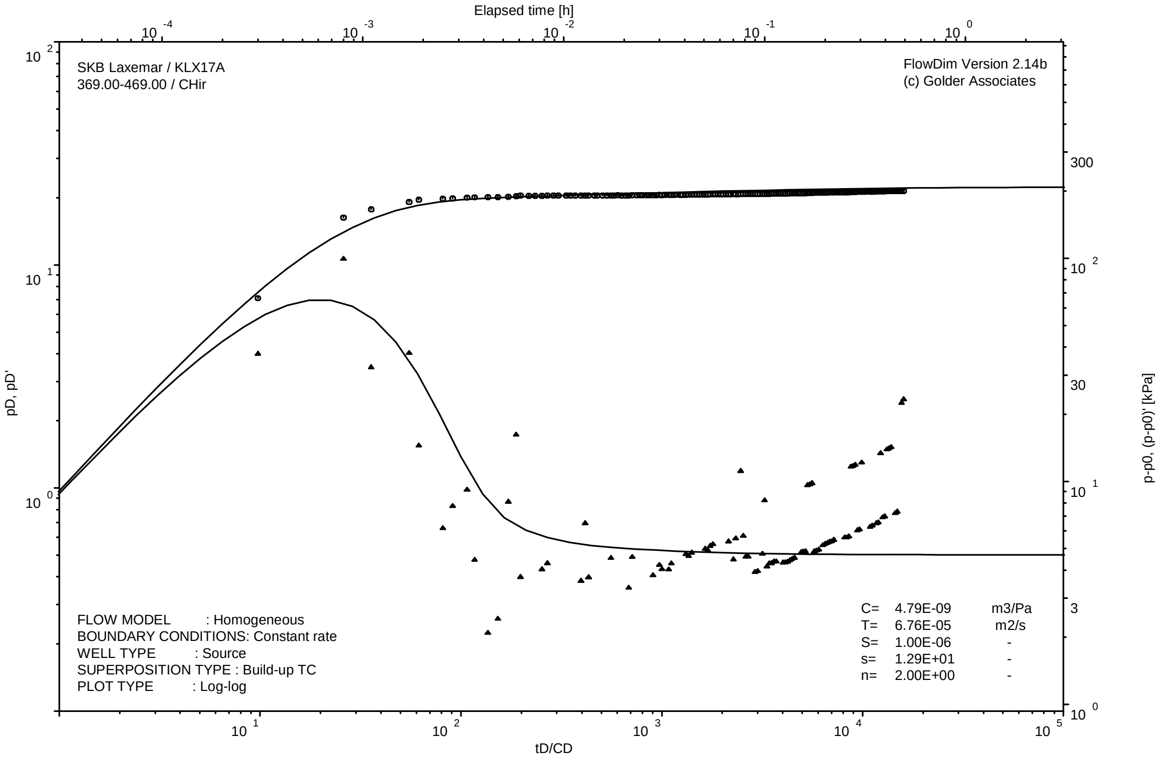
Pressure and flow rate vs. time; cartesian plot



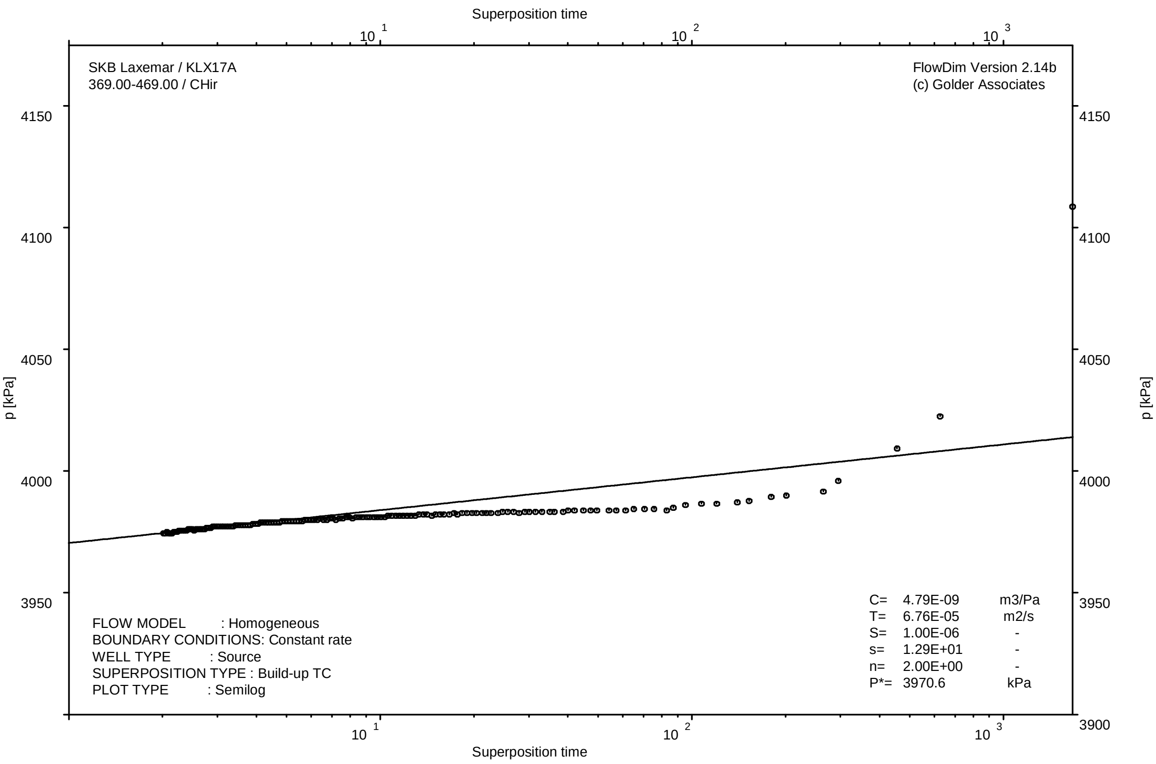
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

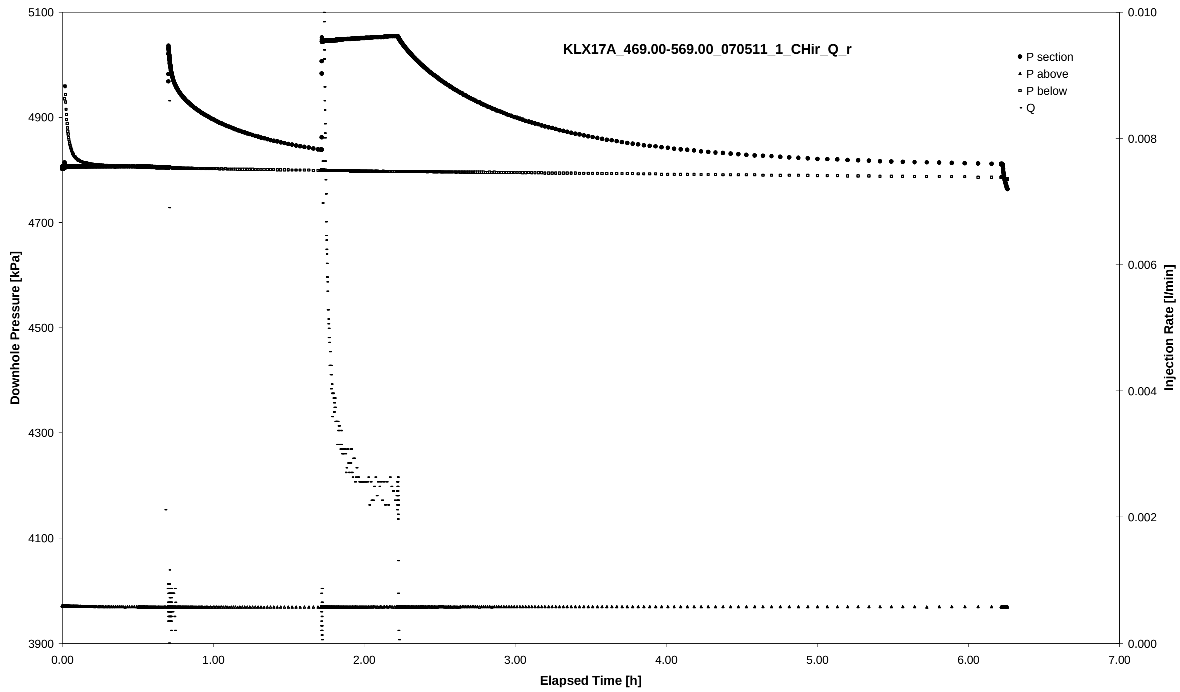


CHIR phase; HORNER match

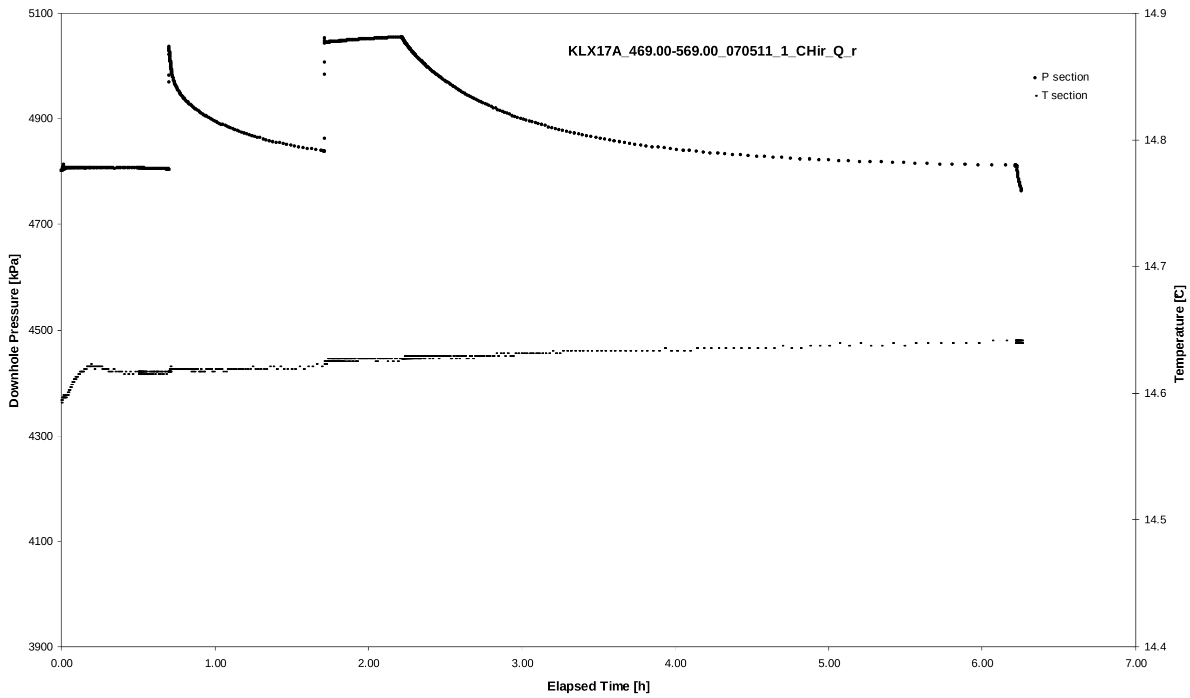
APPENDIX 2-5

Test 469.00 – 569.00 m

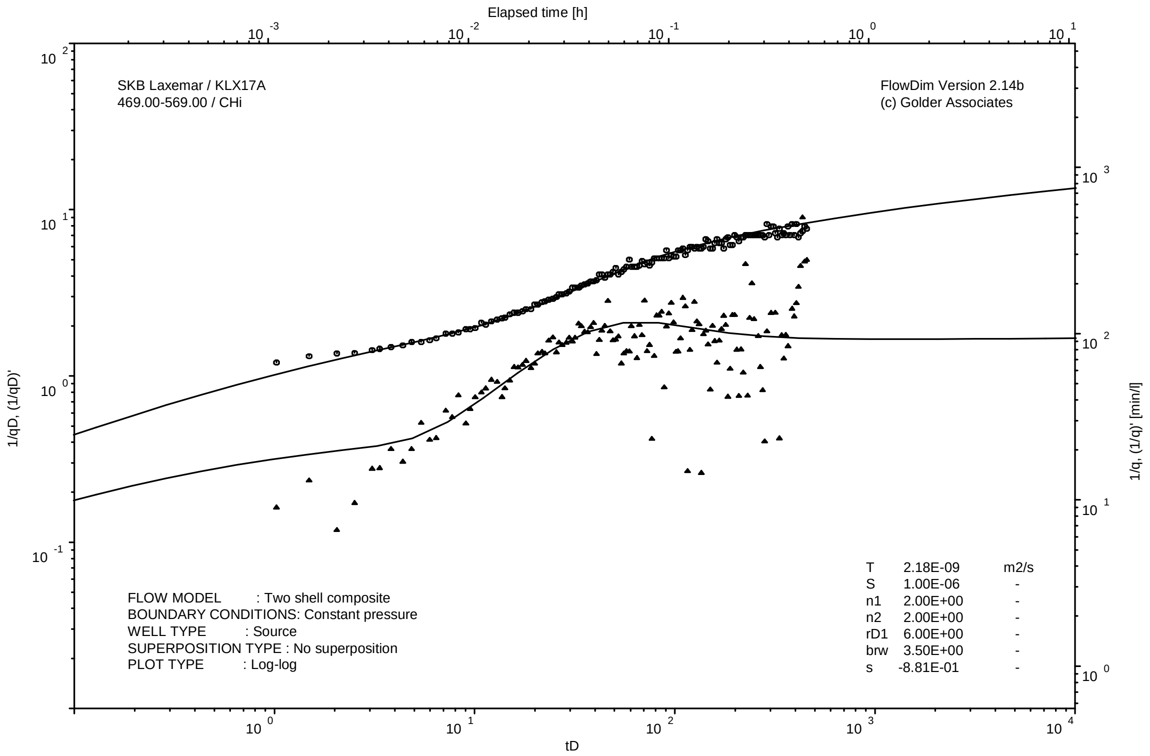
Analysis diagrams



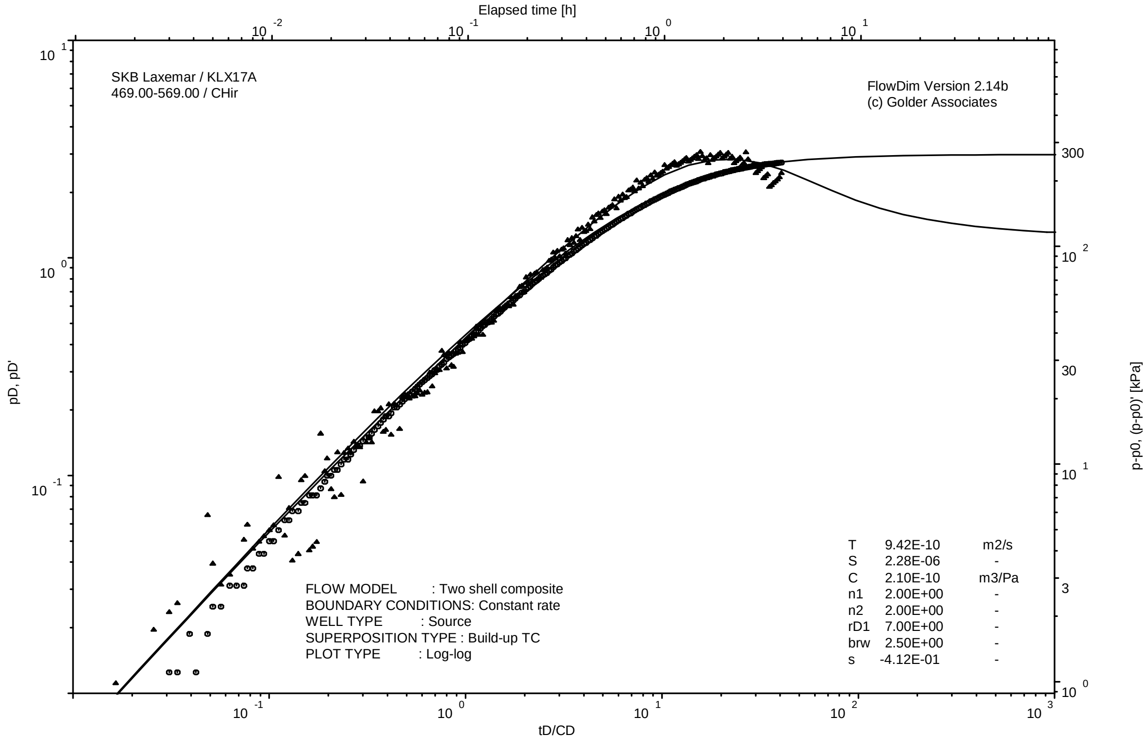
Pressure and flow rate vs. time; cartesian plot



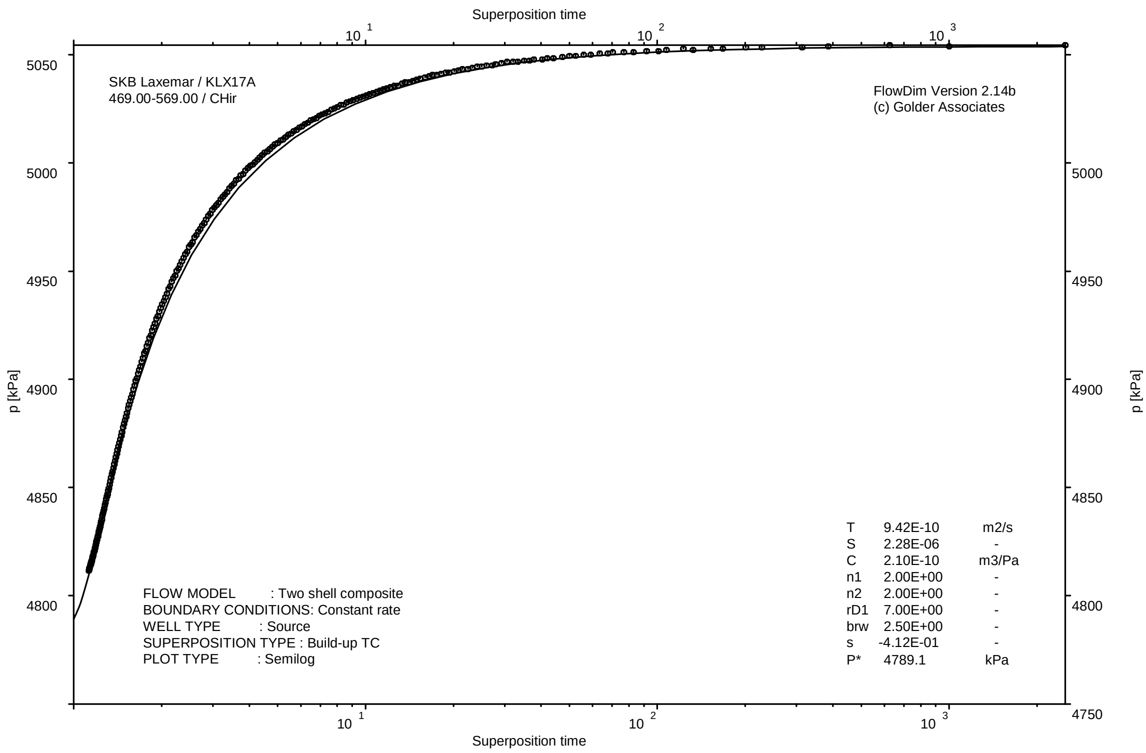
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

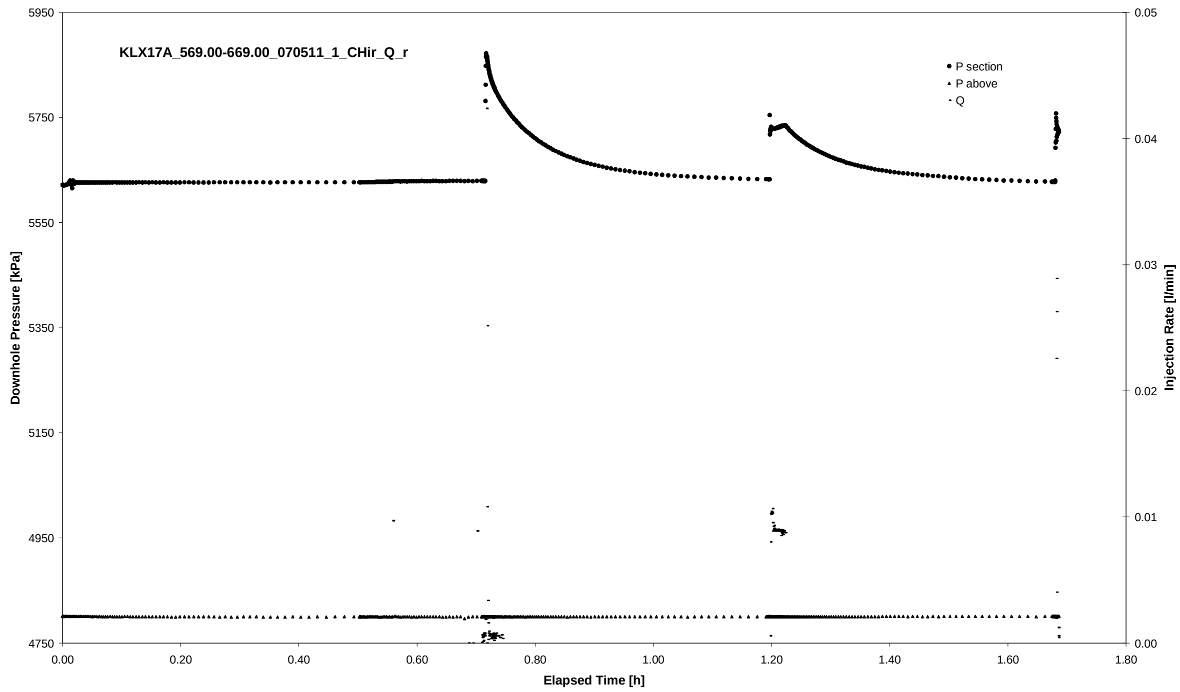


CHIR phase; HORNER match

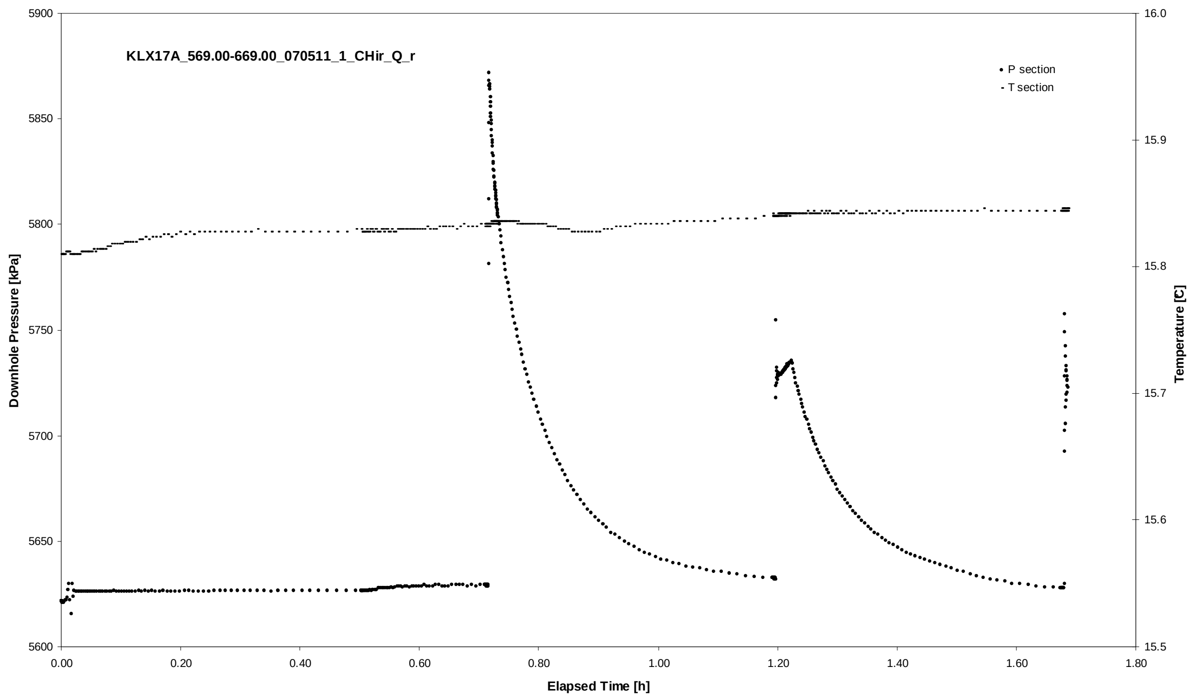
APPENDIX 2-6

Test 569.00 – 669.00 m

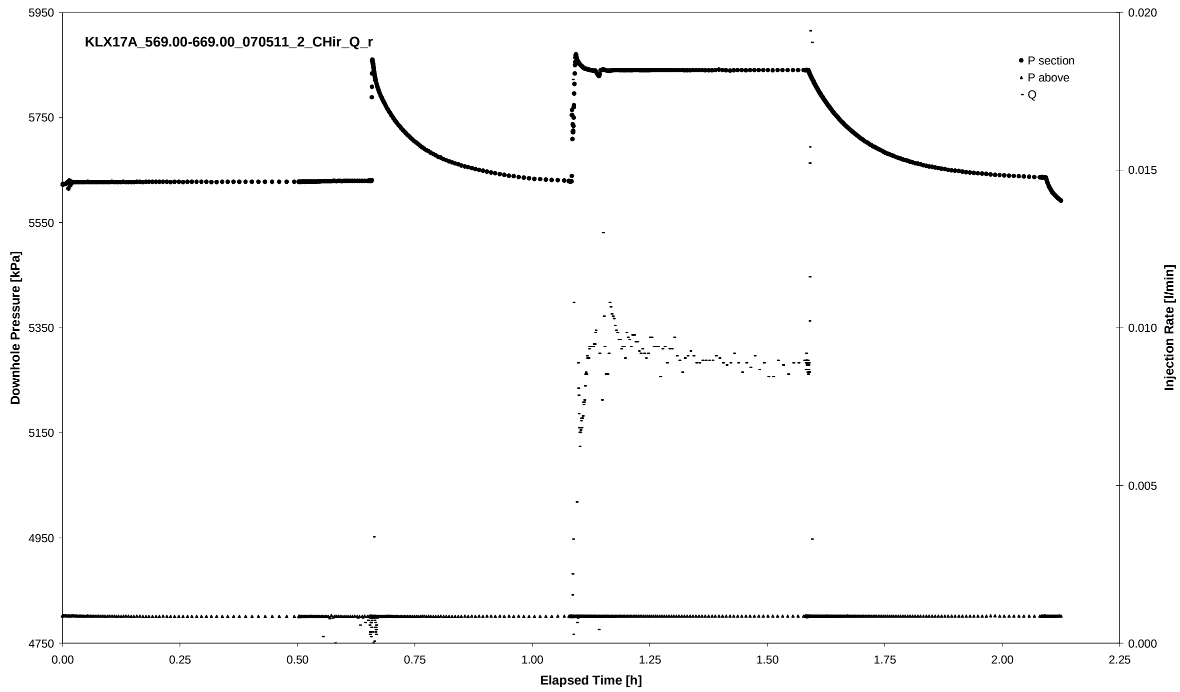
Analysis diagrams



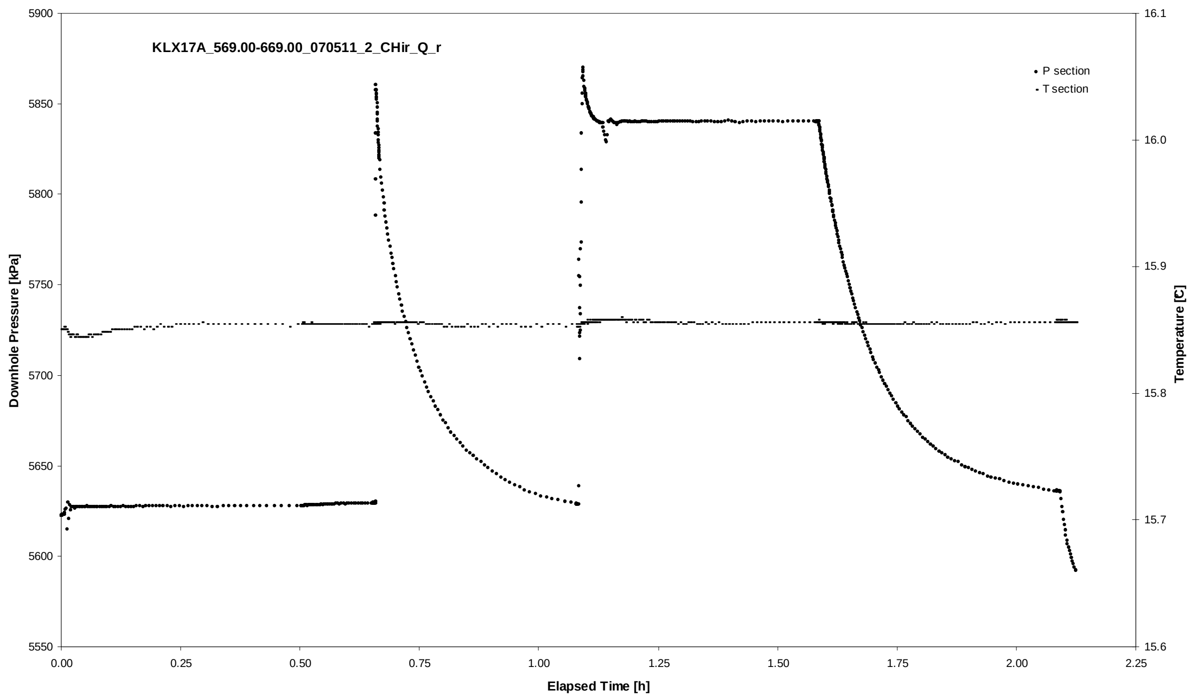
Pressure and flow rate vs. time; cartesian plot (repeated)



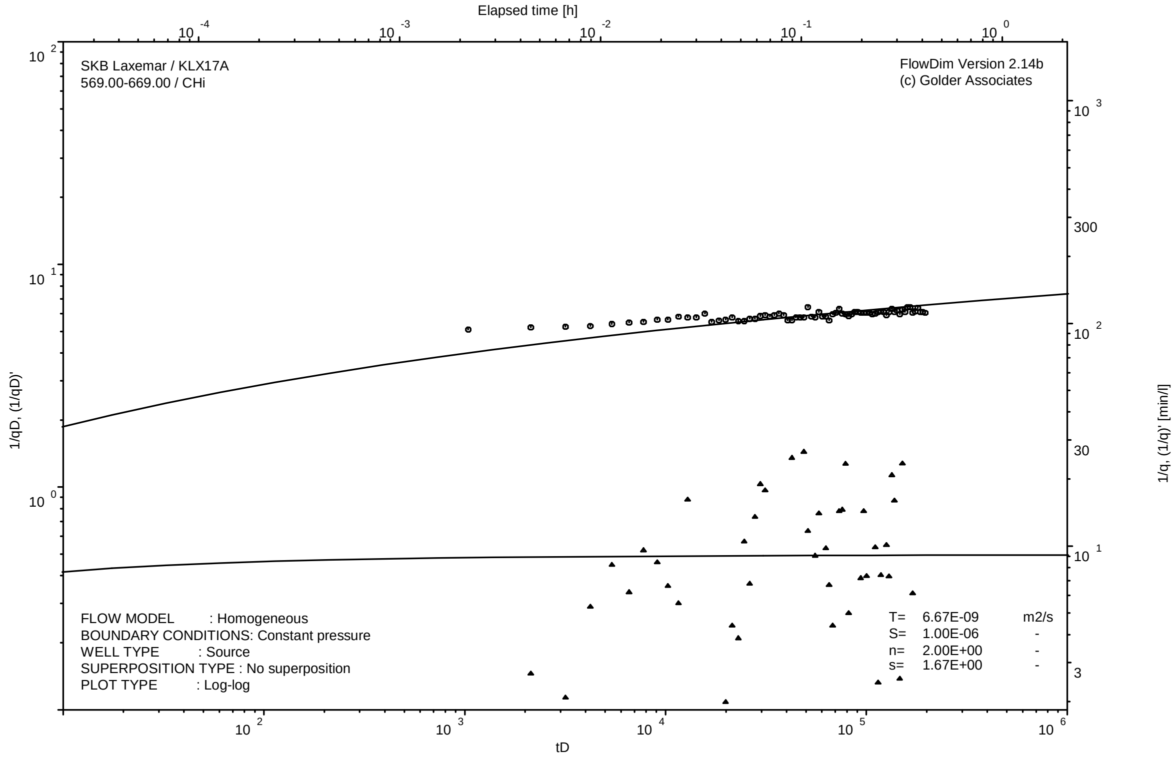
Interval pressure and temperature vs. time; cartesian plot (repeated)



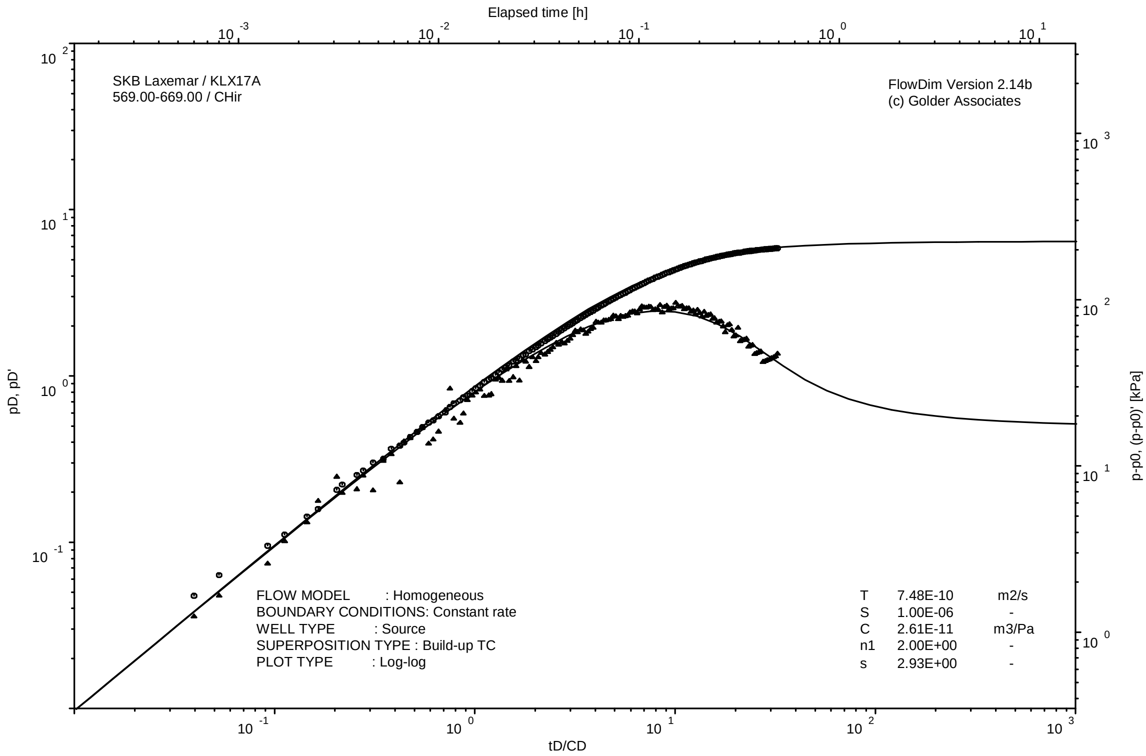
Pressure and flow rate vs. time; cartesian plot



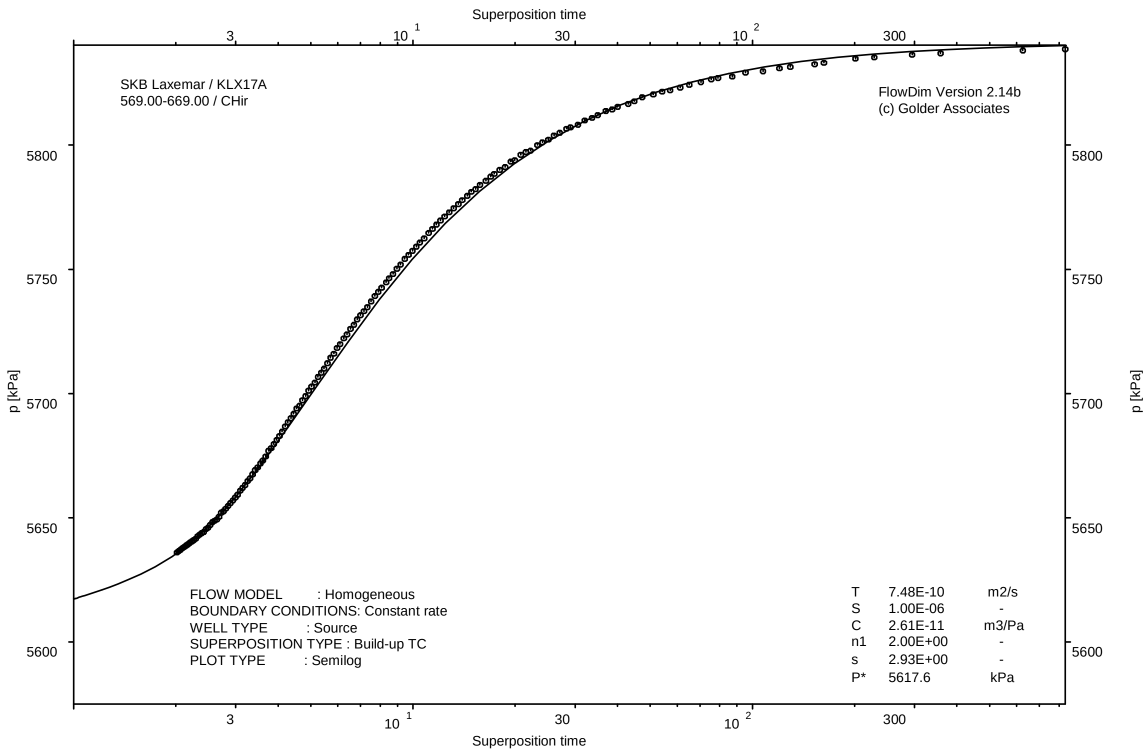
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

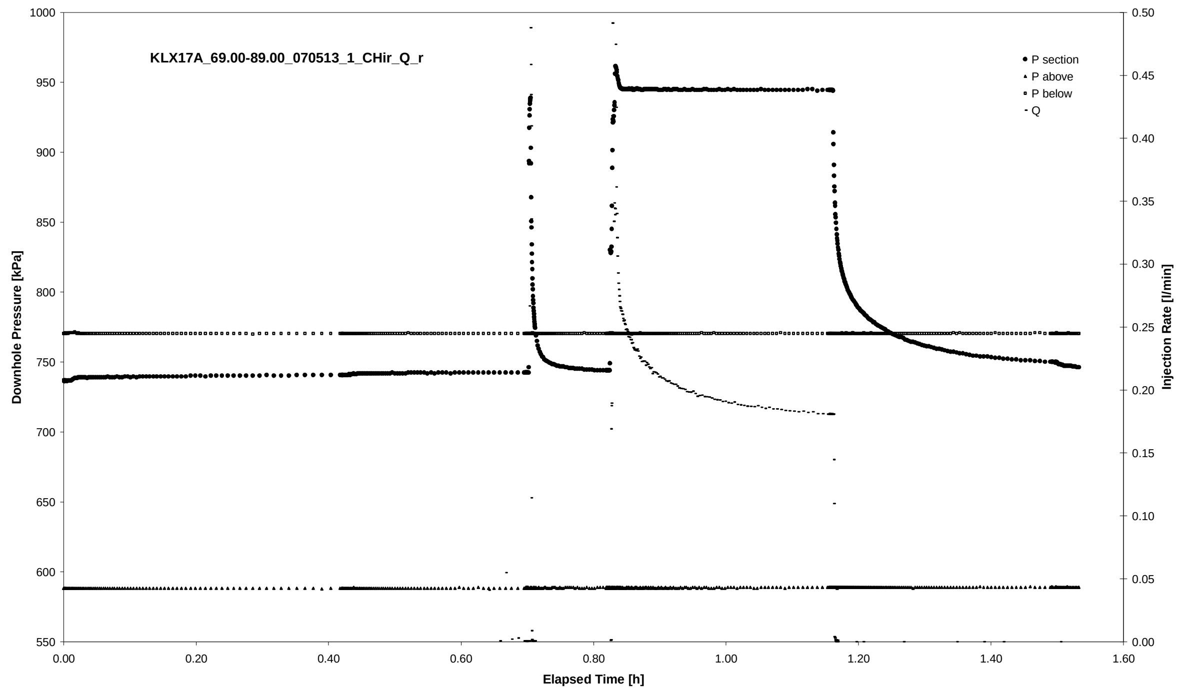


CHIR phase; HORNER match

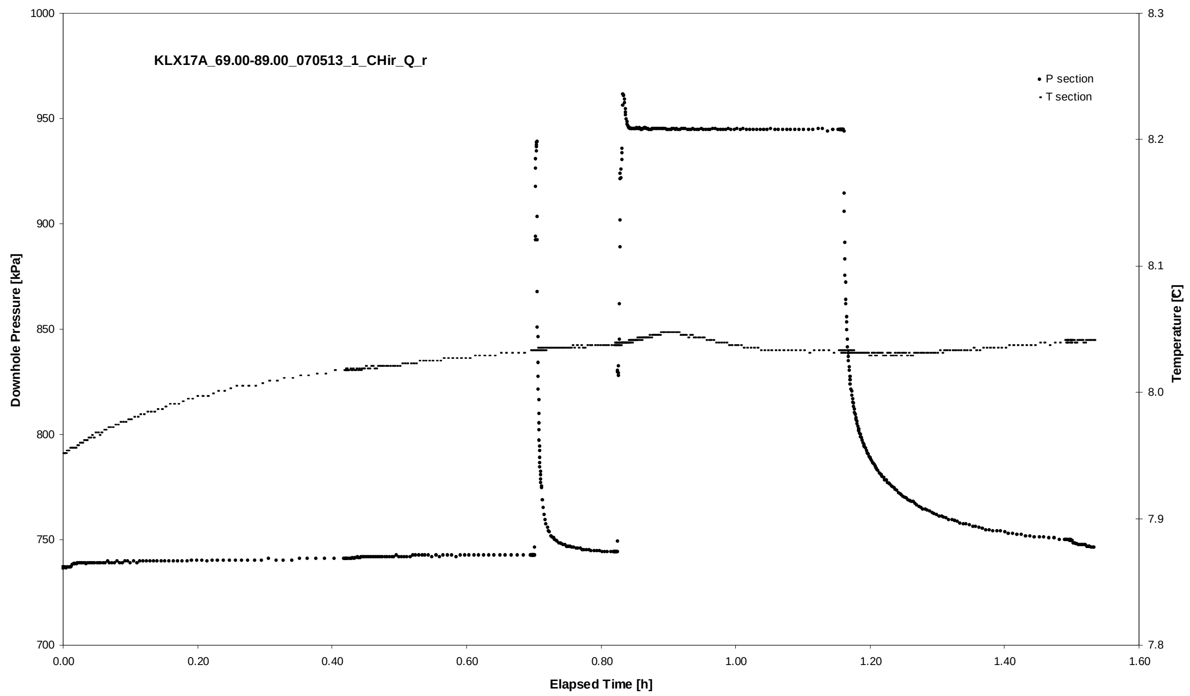
APPENDIX 2-7

Test 69.00 – 89.00 m

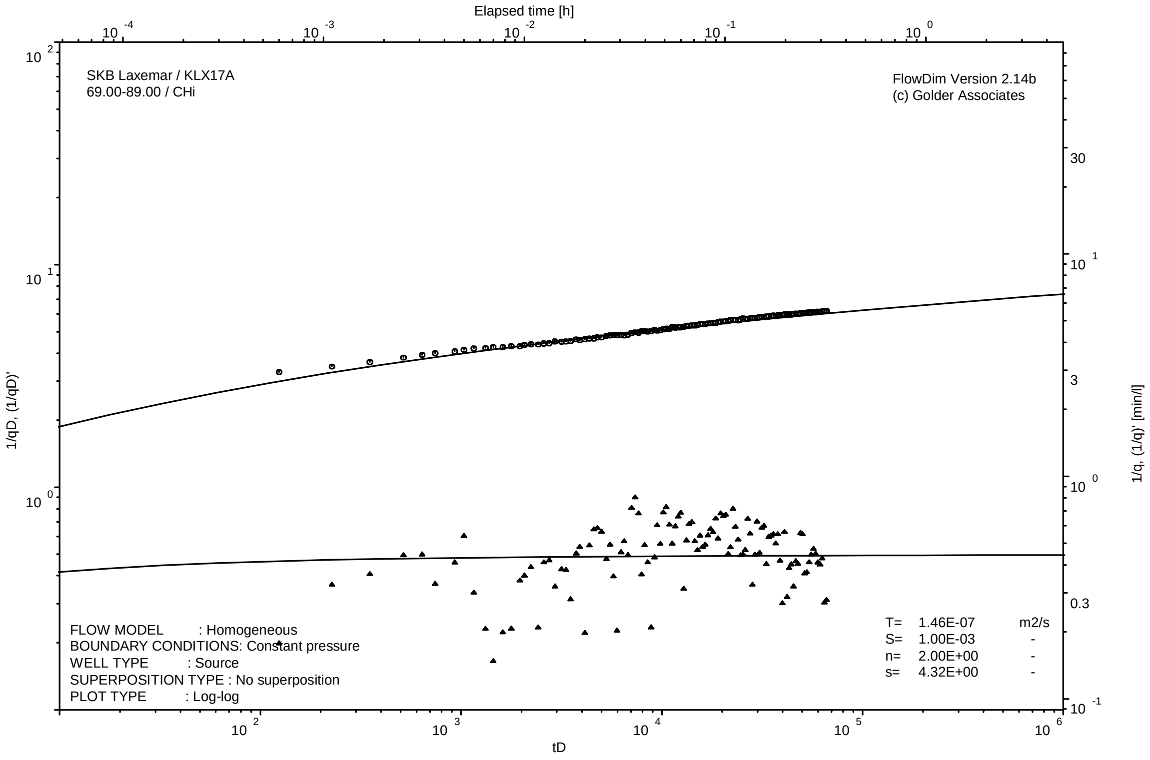
Analysis diagrams



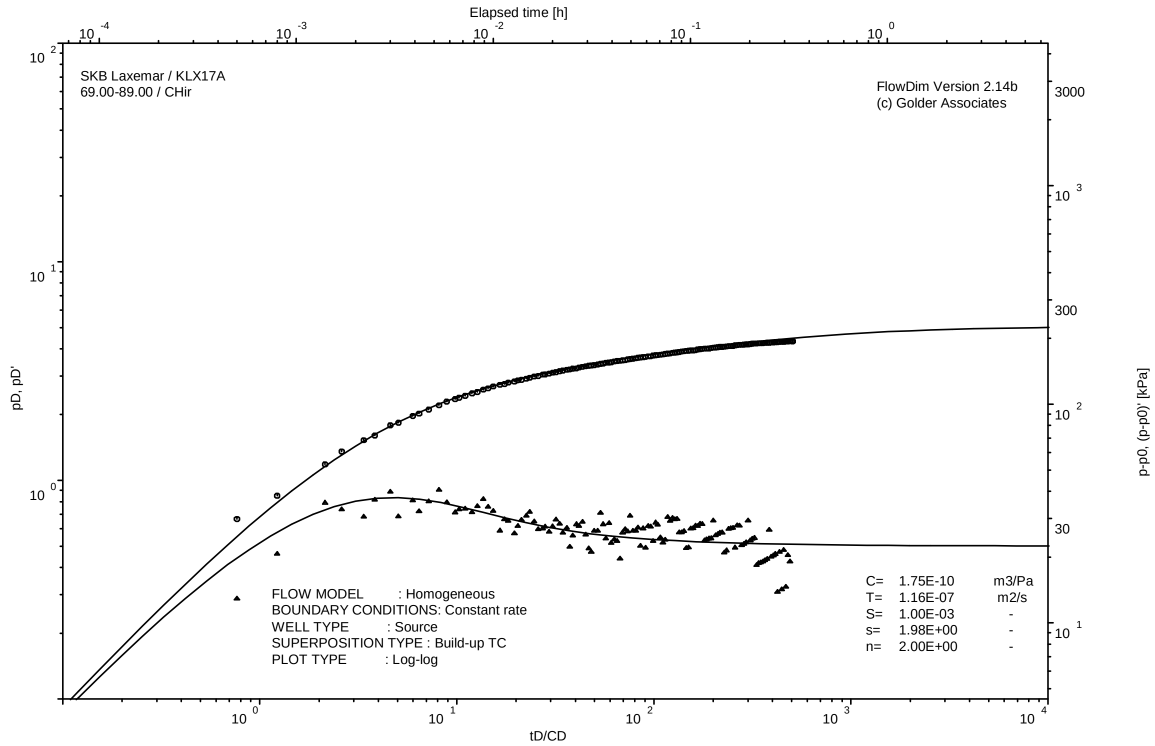
Pressure and flow rate vs. time; cartesian plot



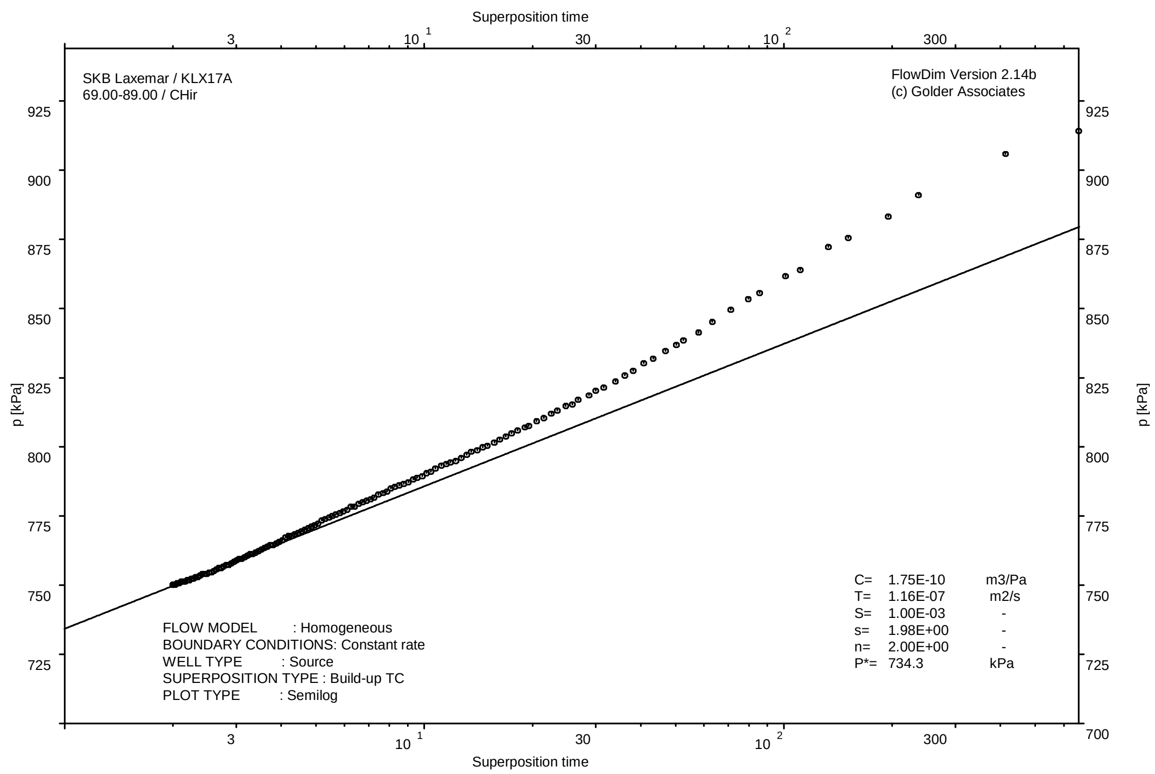
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

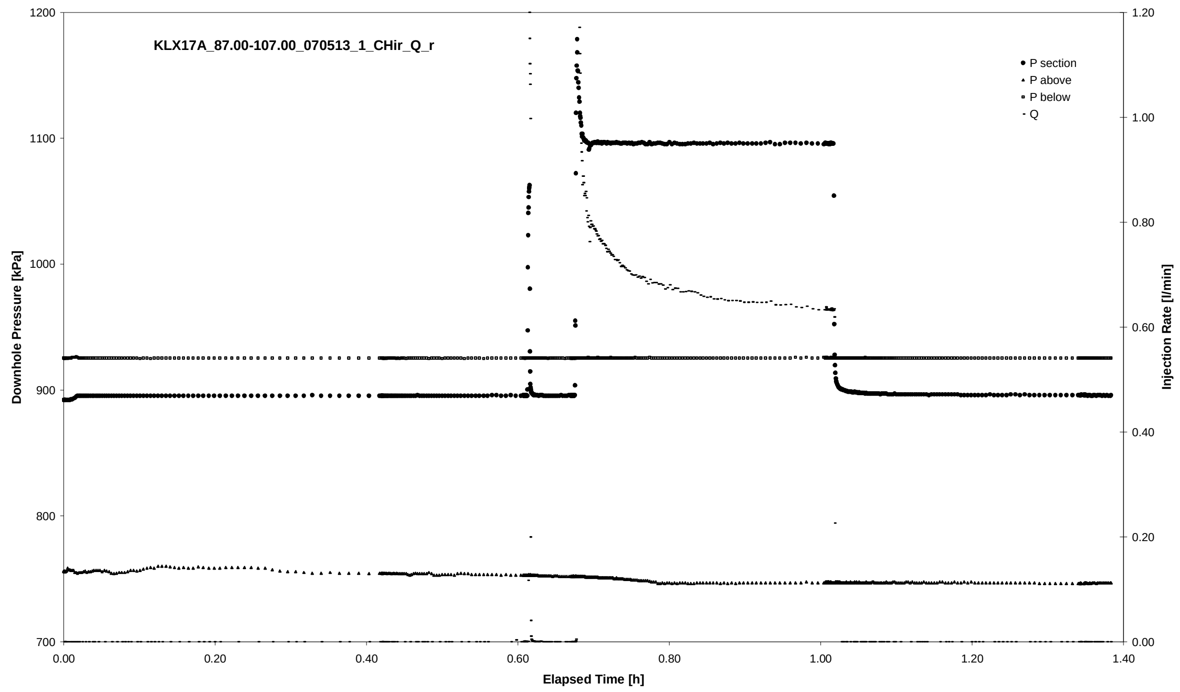


CHIR phase; HORNER match

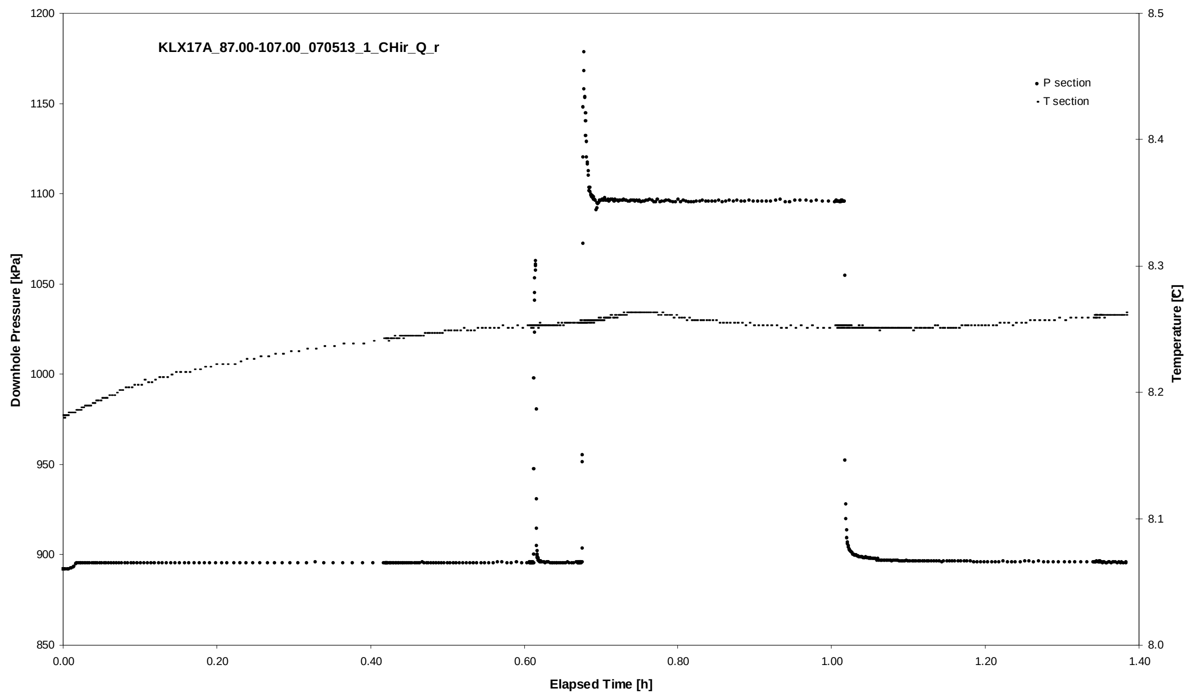
APPENDIX 2-8

Test 87.00 – 107.00 m

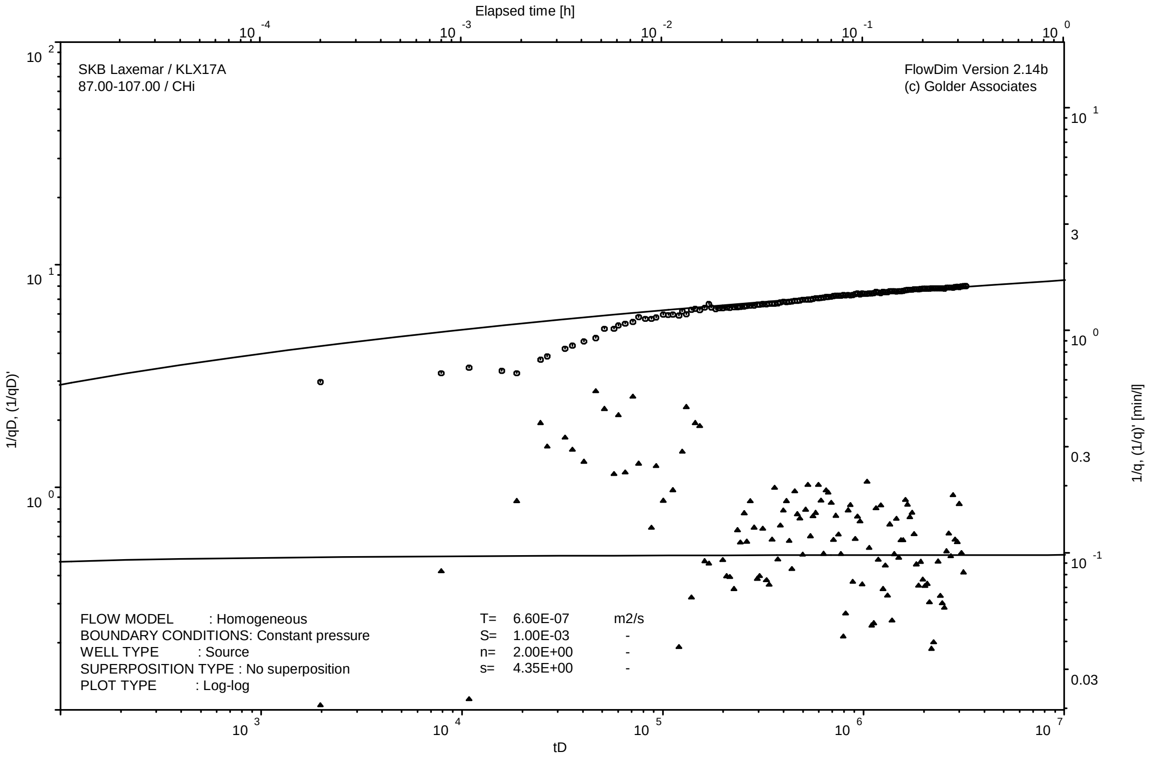
Analysis diagrams



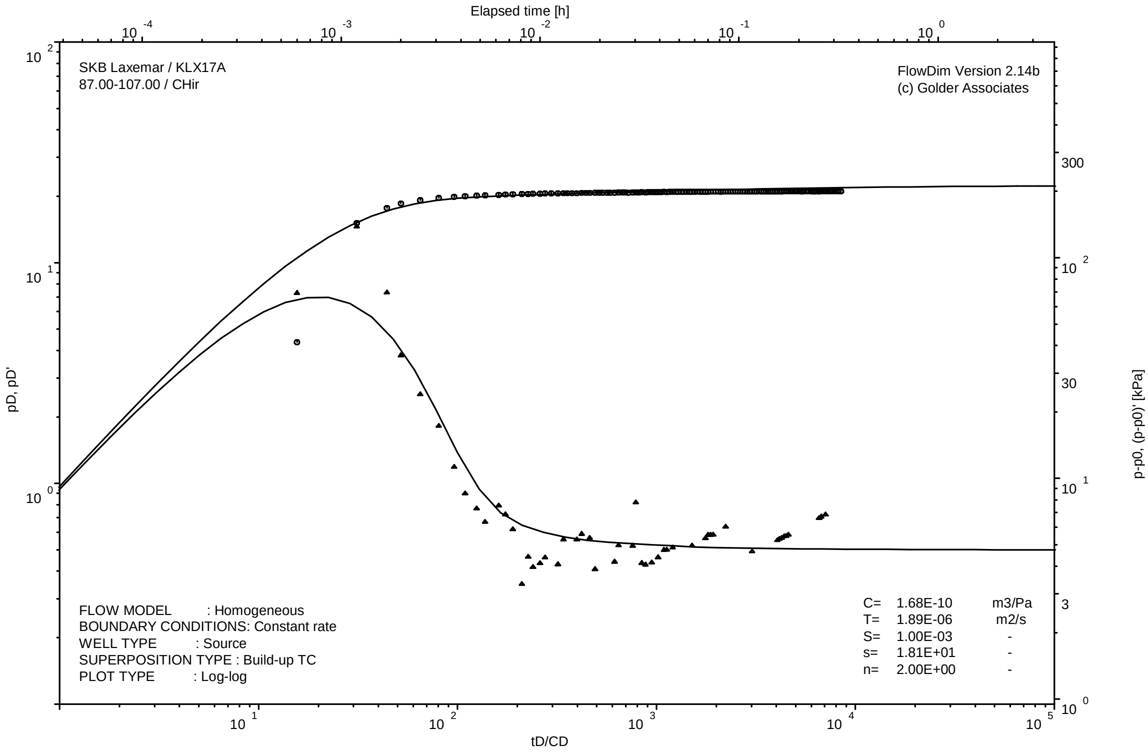
Pressure and flow rate vs. time; cartesian plot



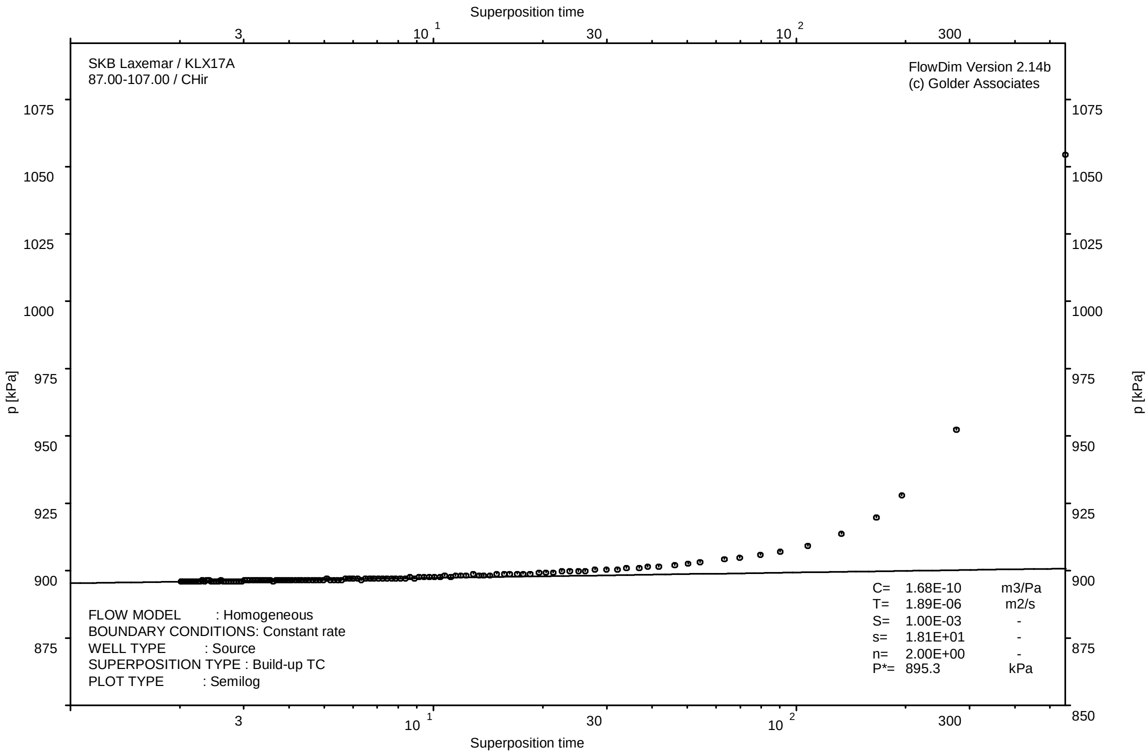
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

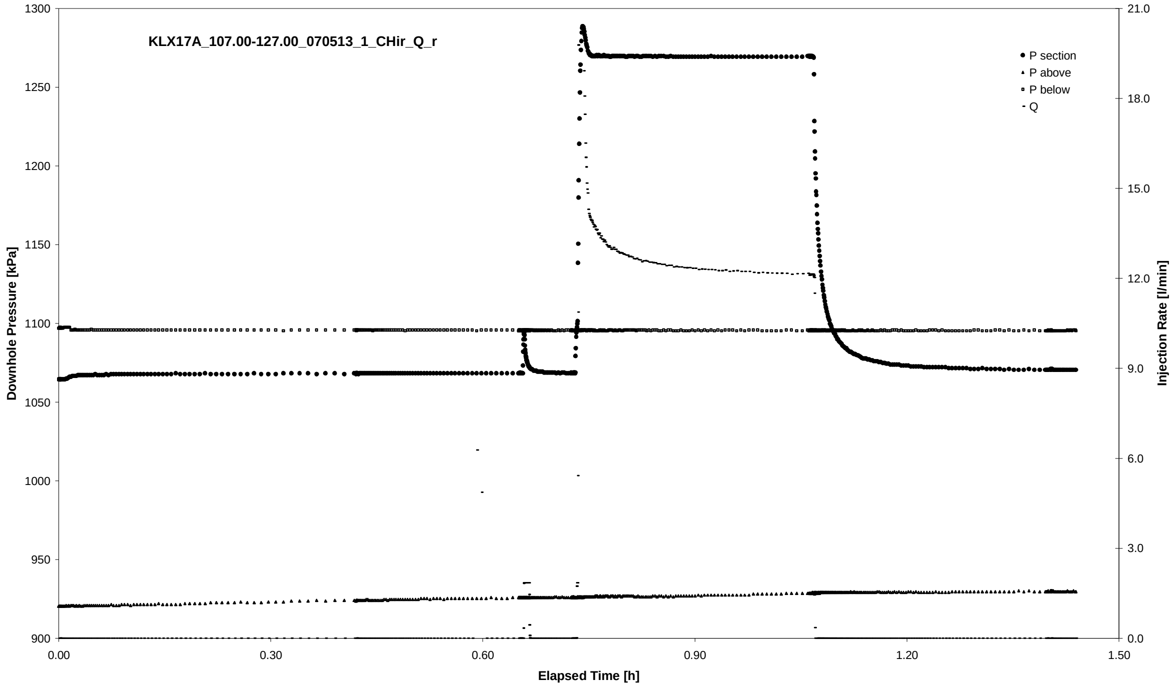


CHIR phase; HORNER match

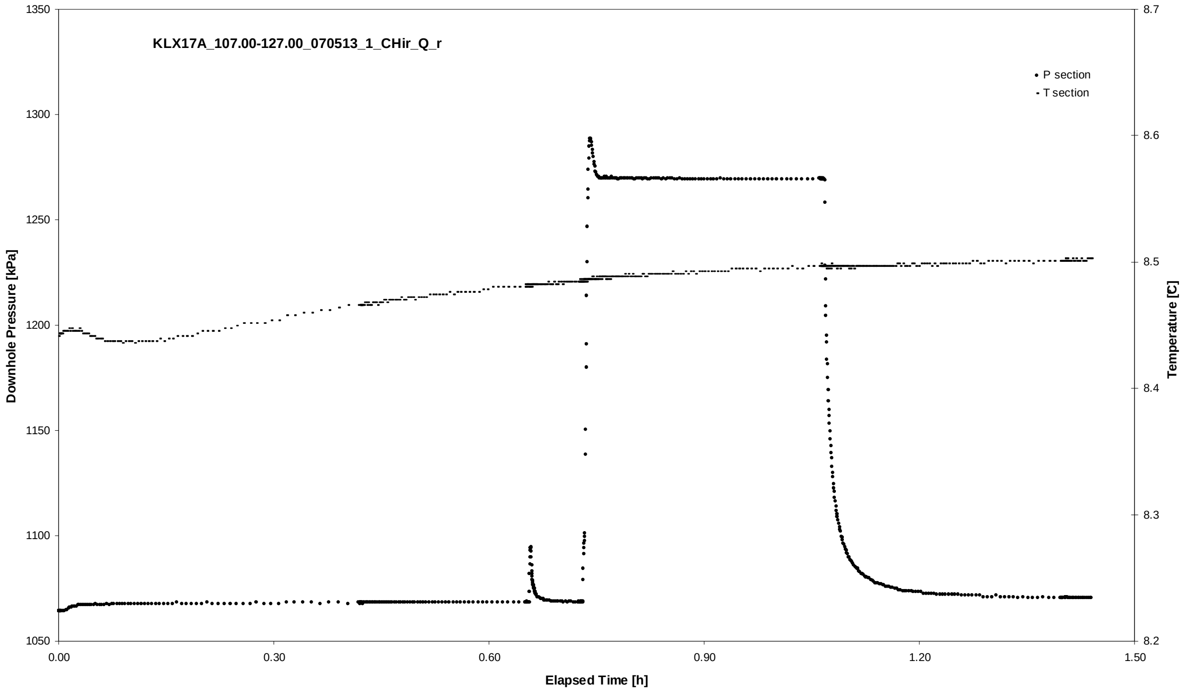
APPENDIX 2-9

Test 107.00 – 127.00 m

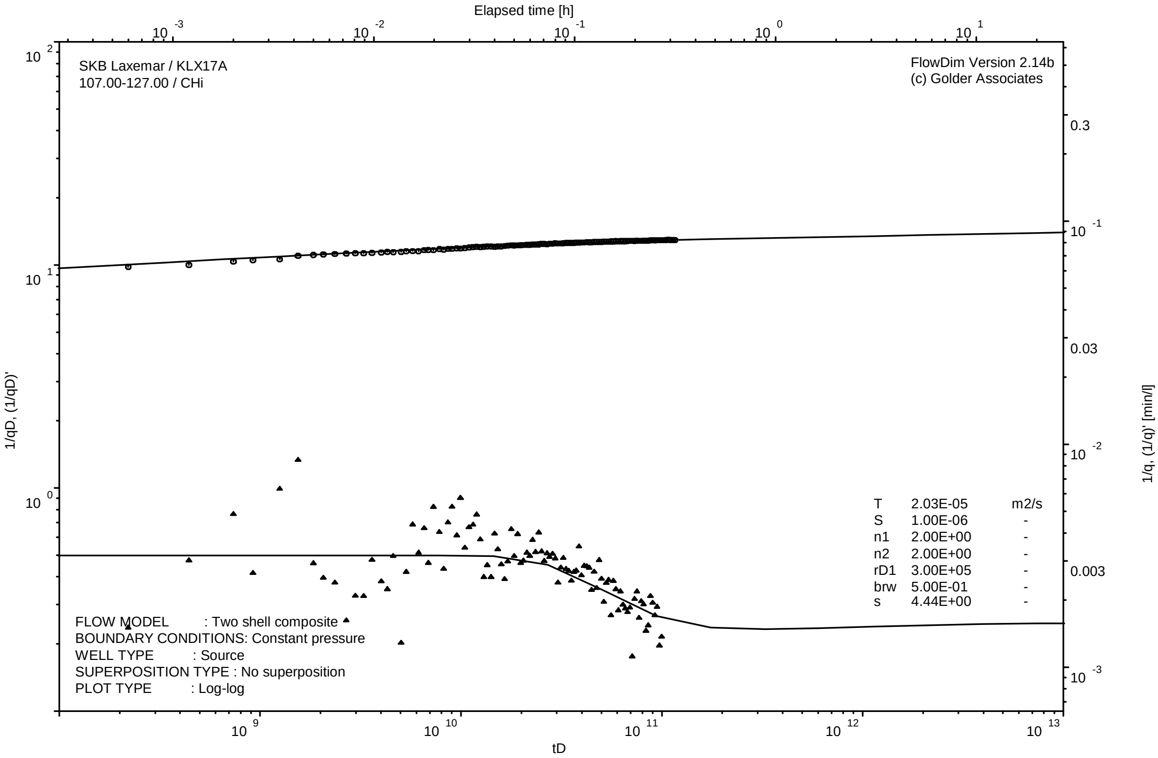
Analysis diagrams



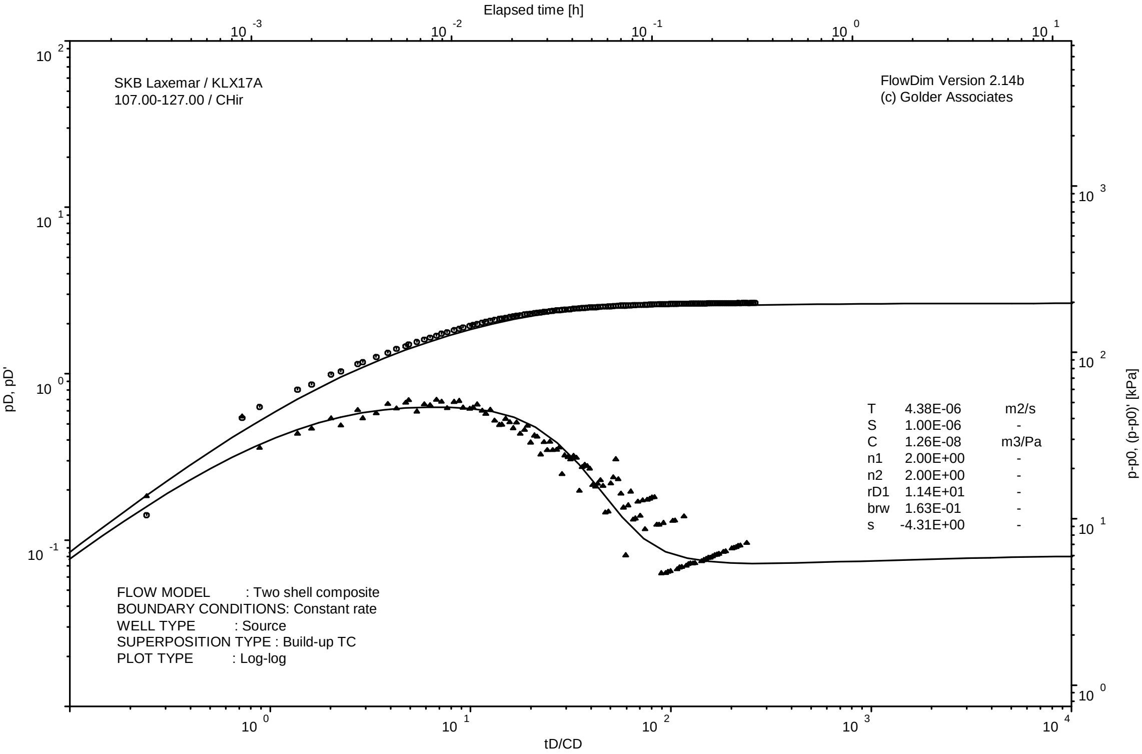
Pressure and flow rate vs. time; cartesian plot



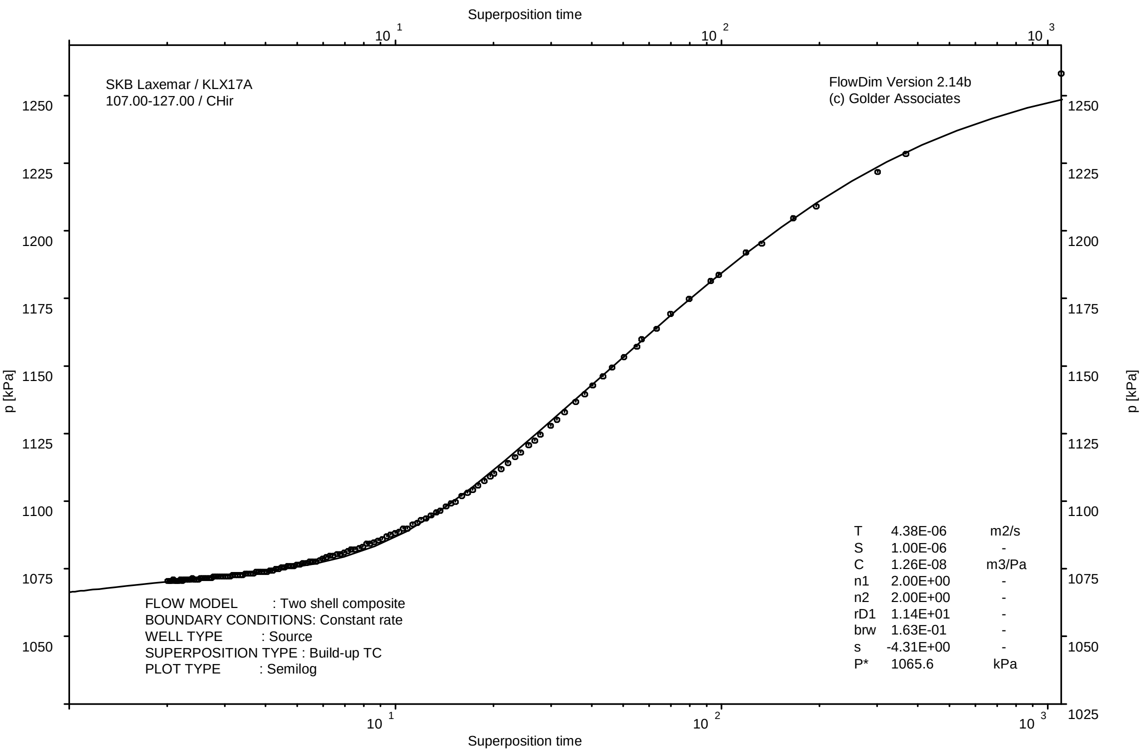
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

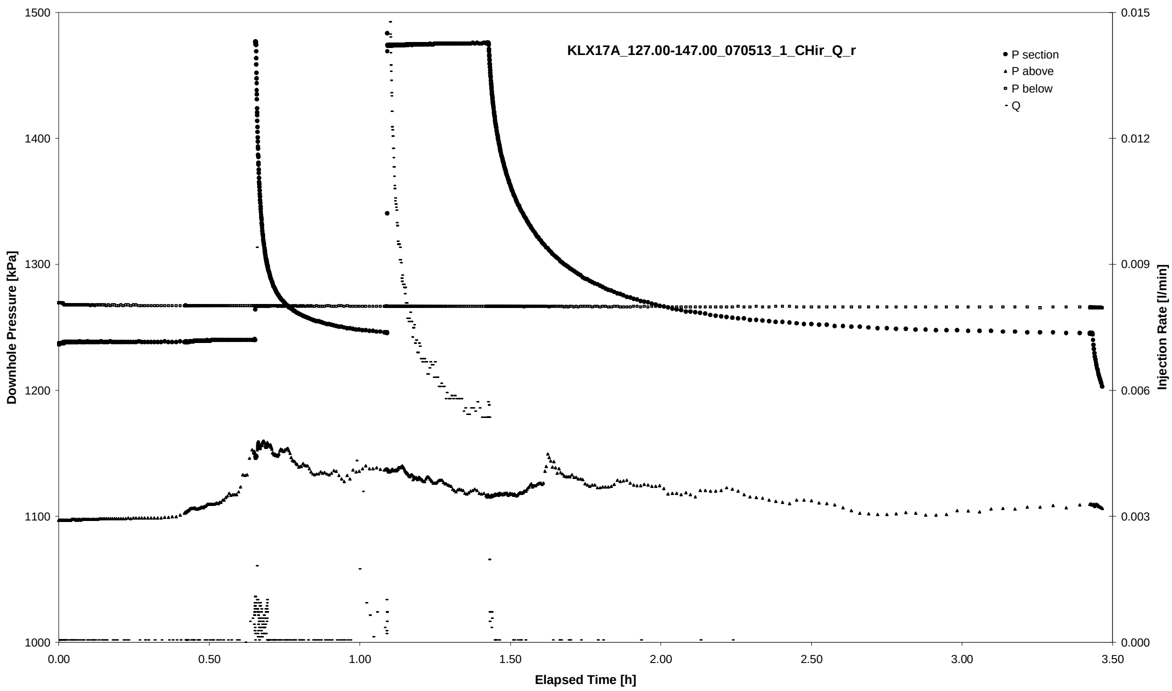


CHIR phase; HORNER match

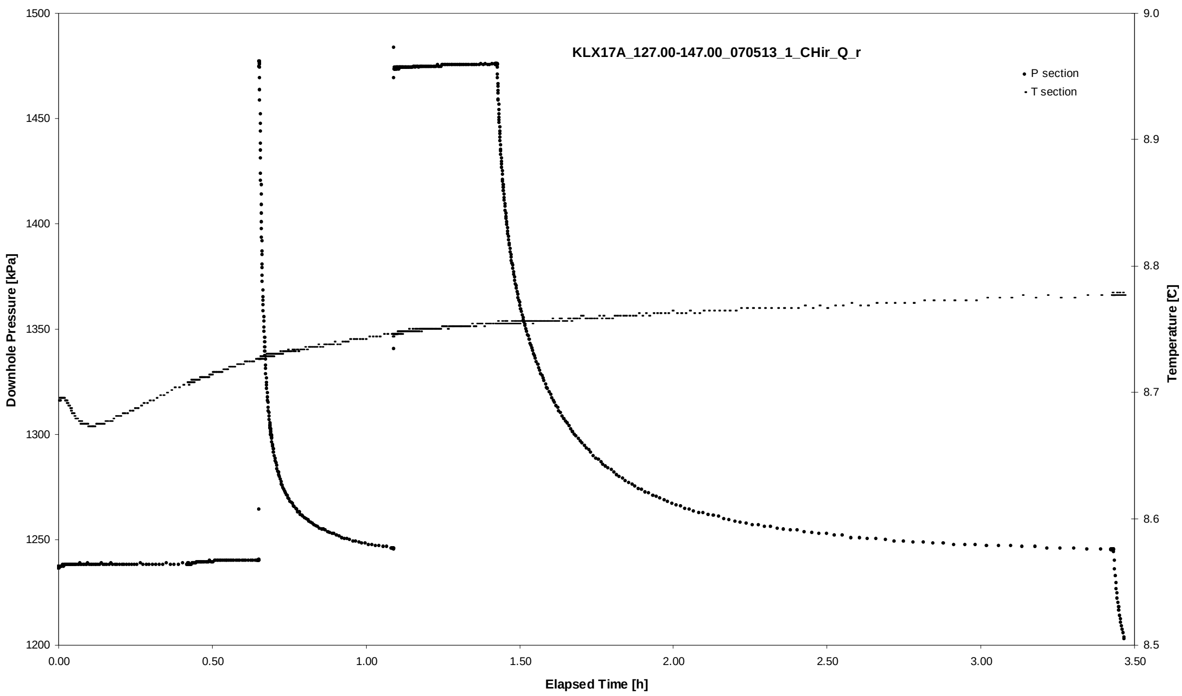
APPENDIX 2-10

Test 127.00 – 147.00 m

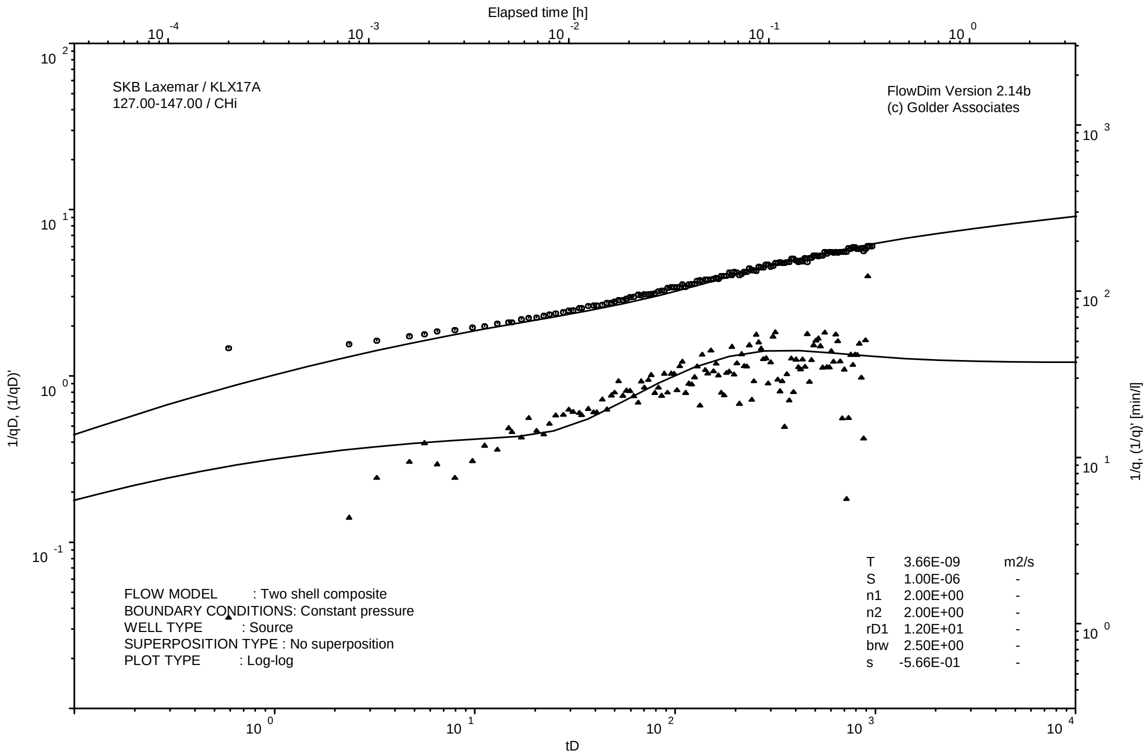
Analysis diagrams



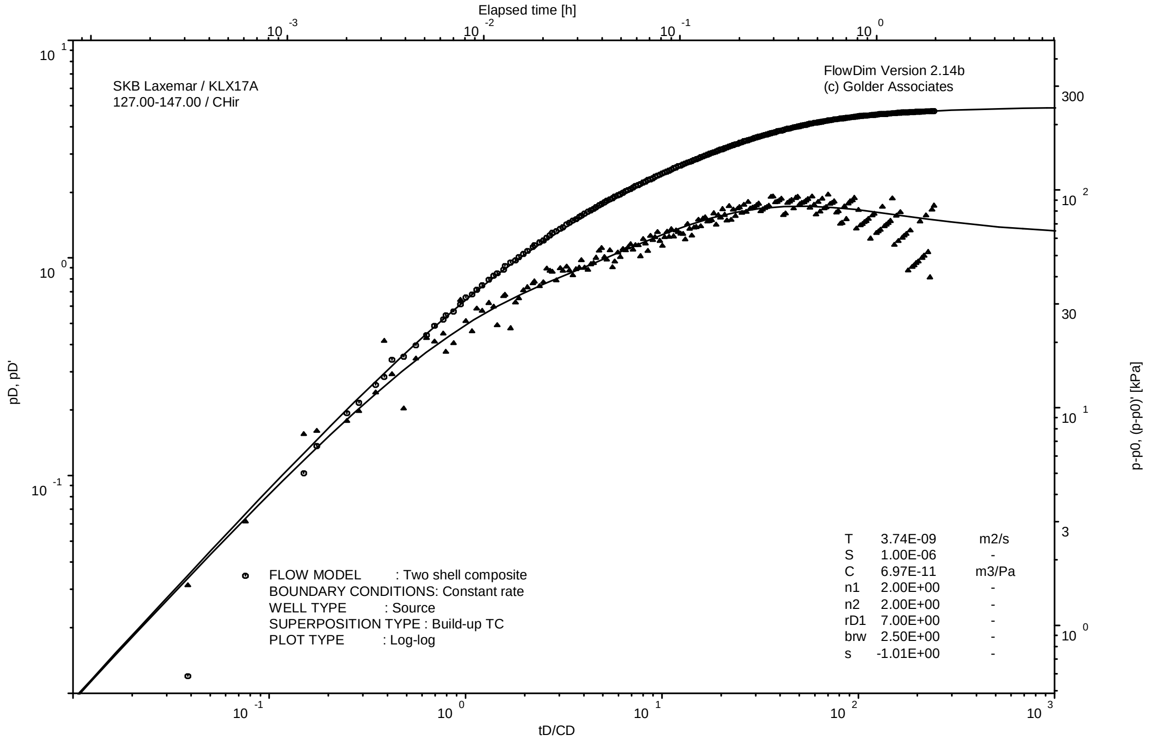
Pressure and flow rate vs. time; cartesian plot



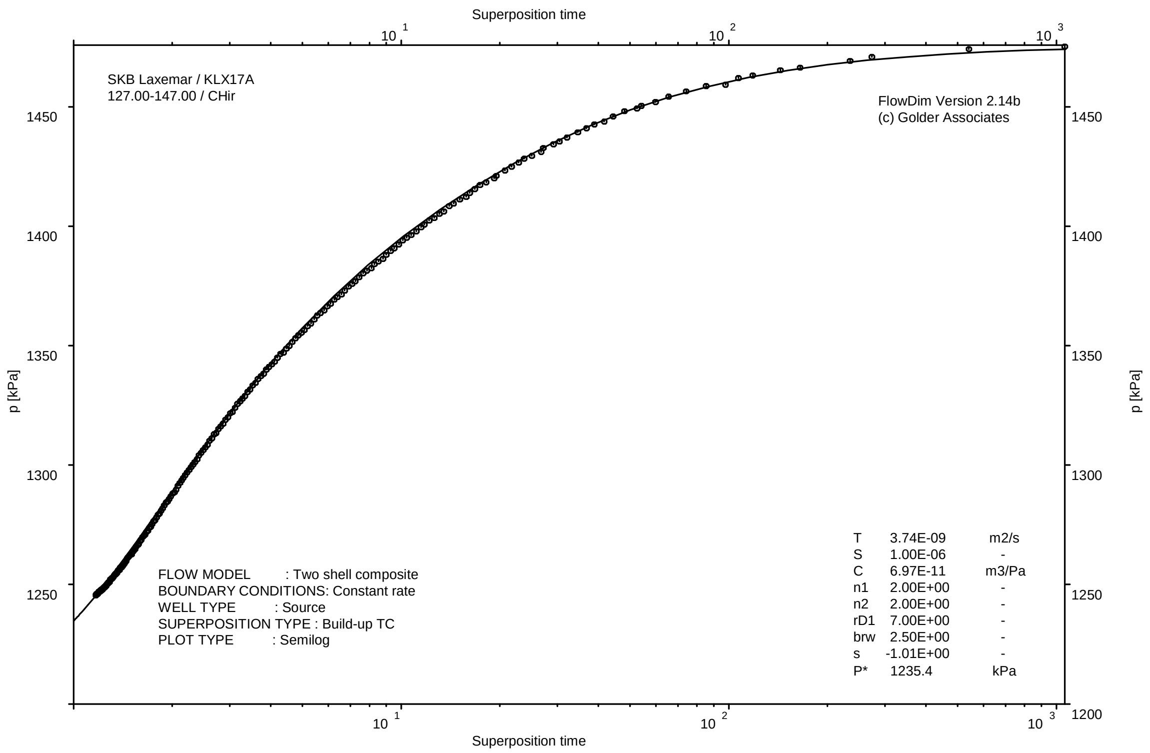
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

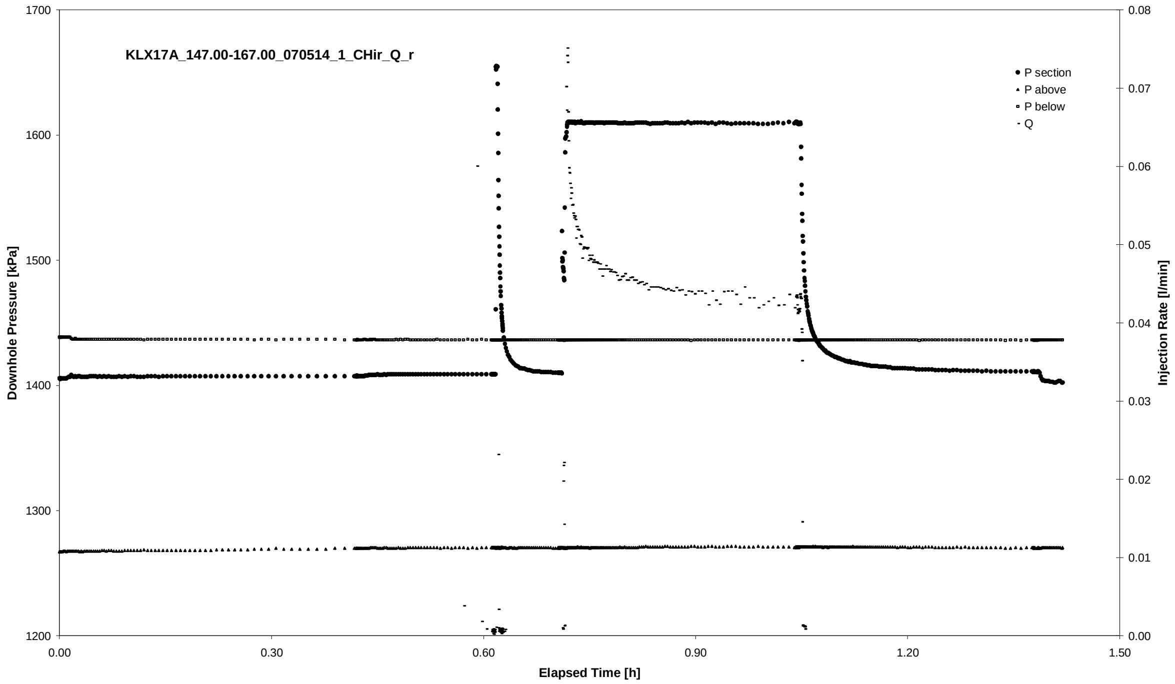


CHIR phase; HORNER match

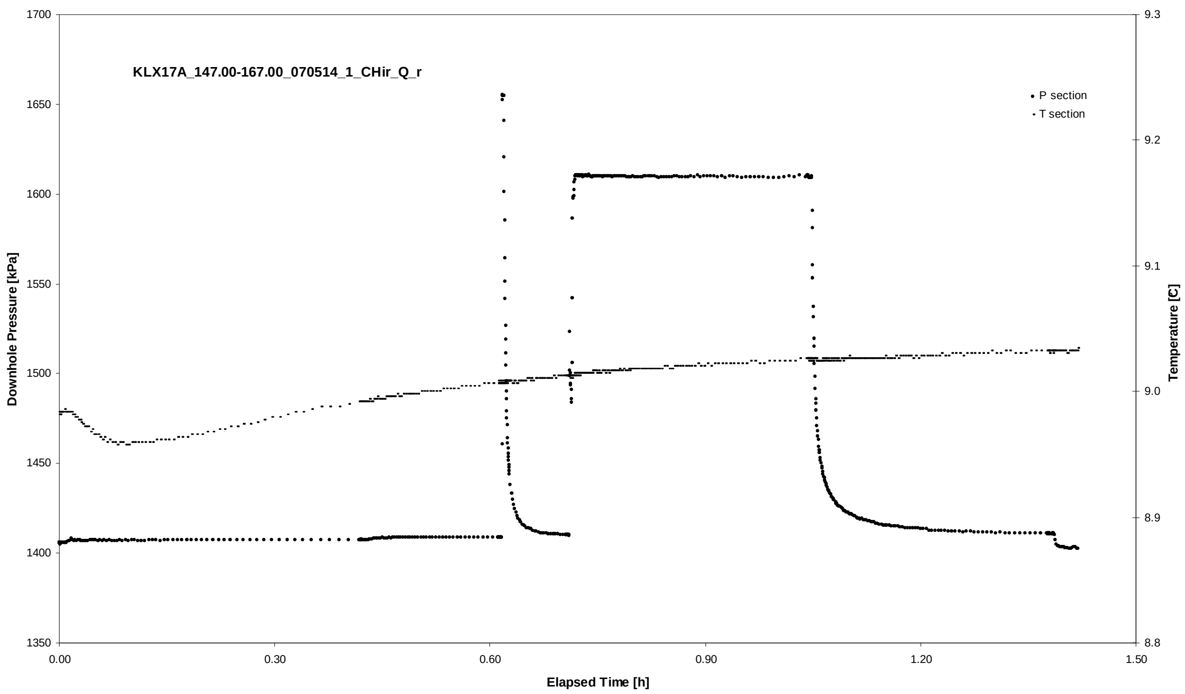
APPENDIX 2-11

Test 147.00 – 167.00 m

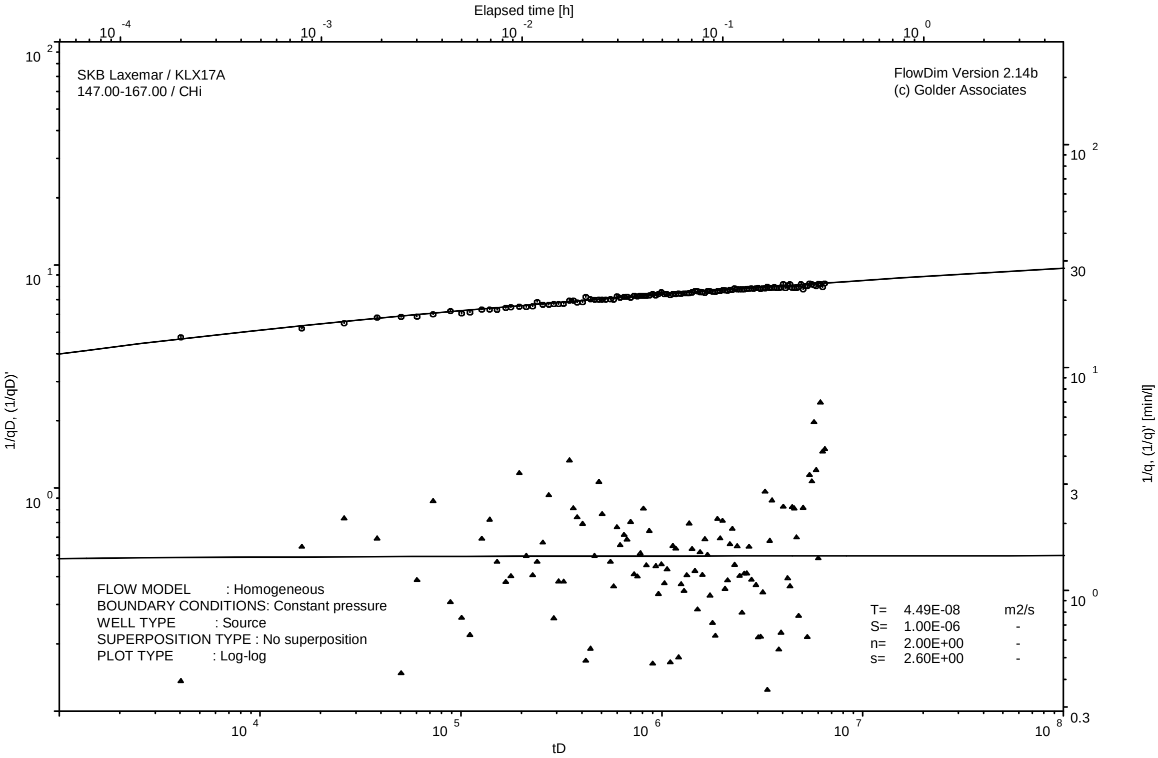
Analysis diagrams



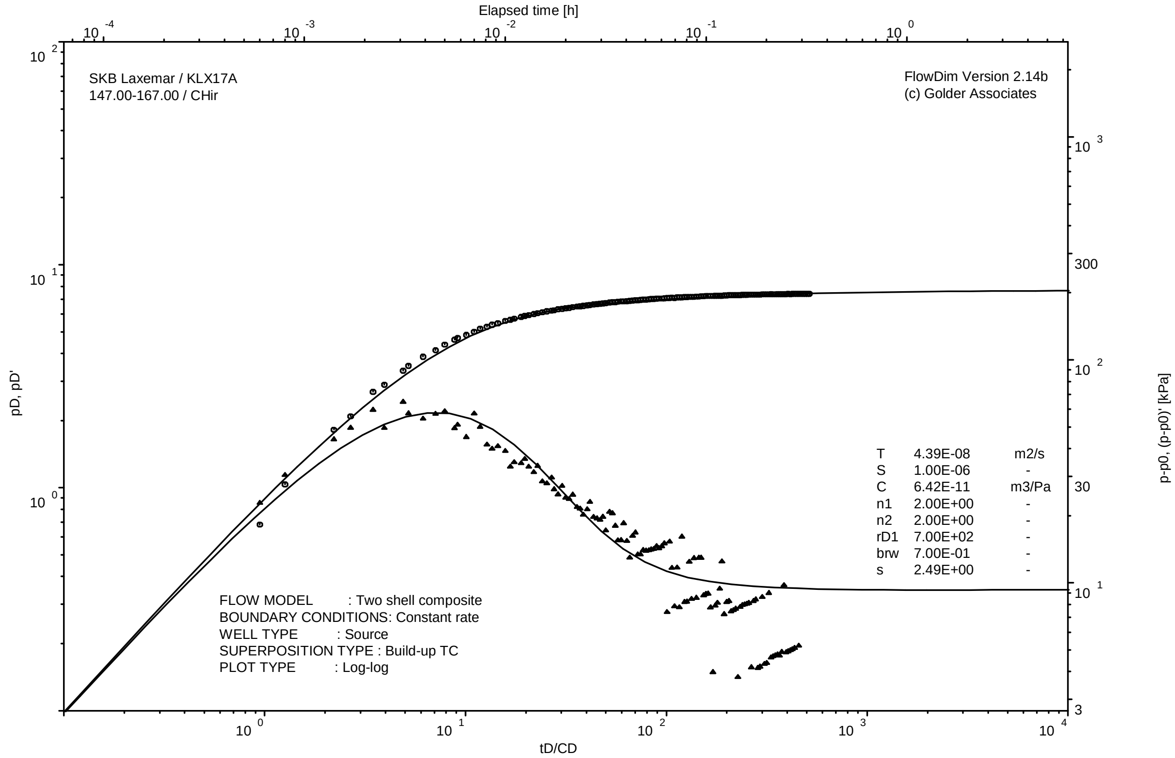
Pressure and flow rate vs. time; cartesian plot



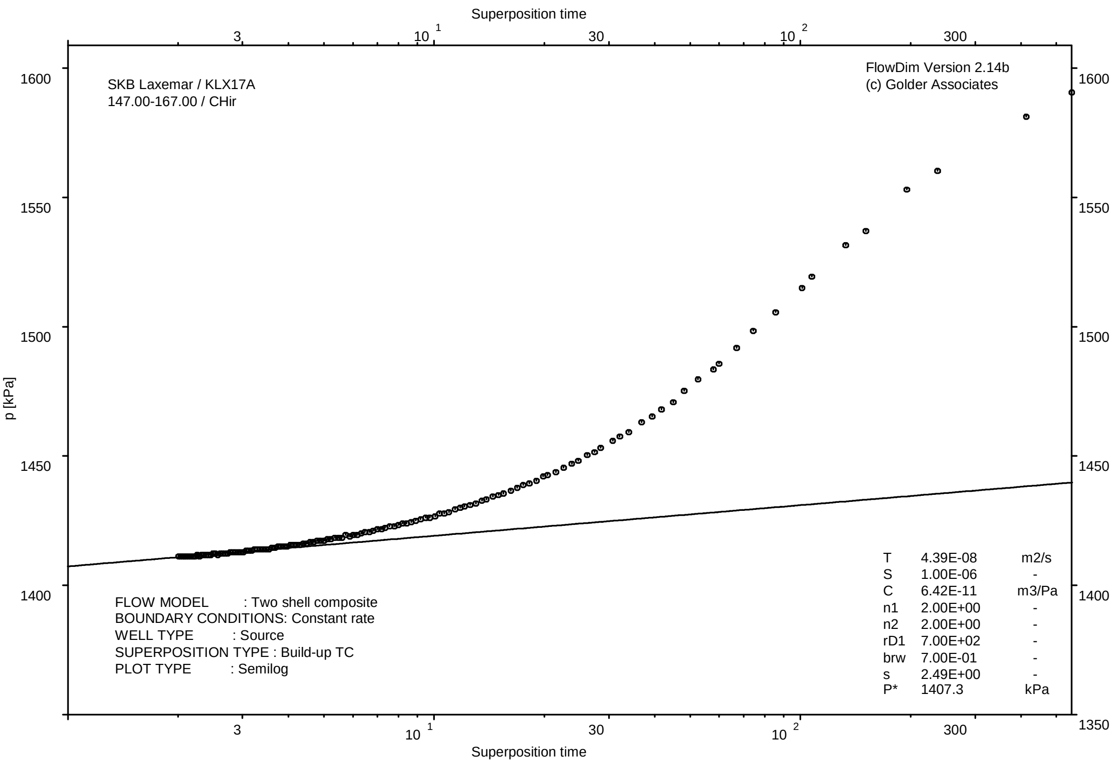
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

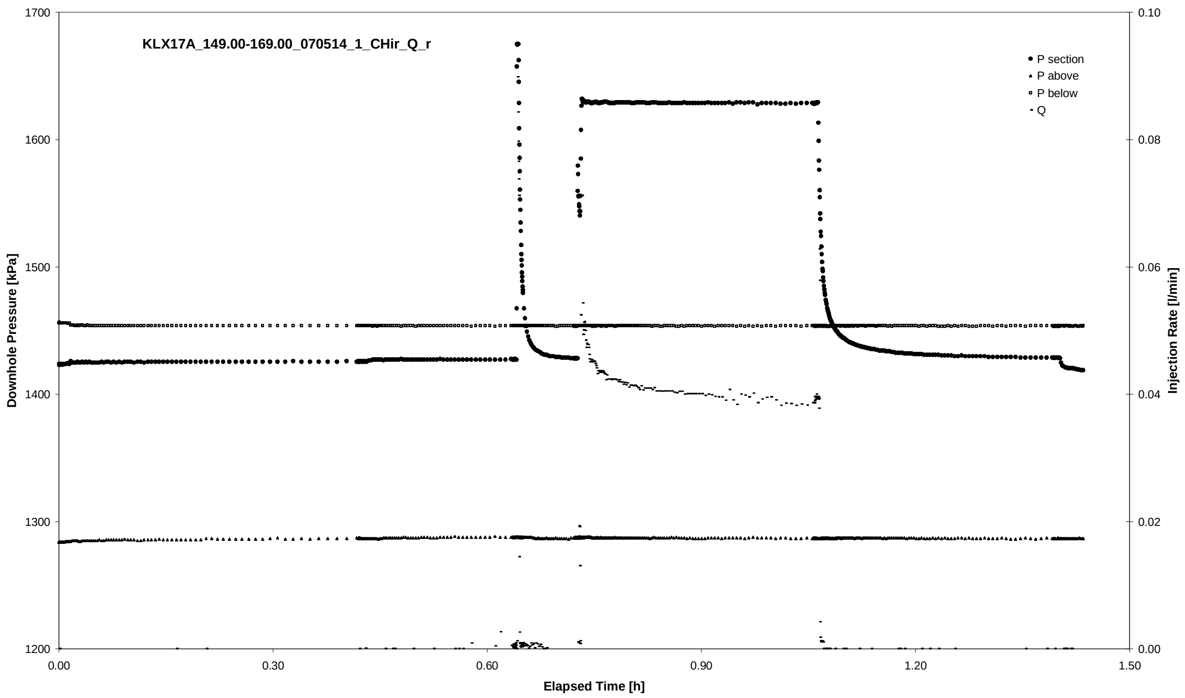


CHIR phase; HORNER match

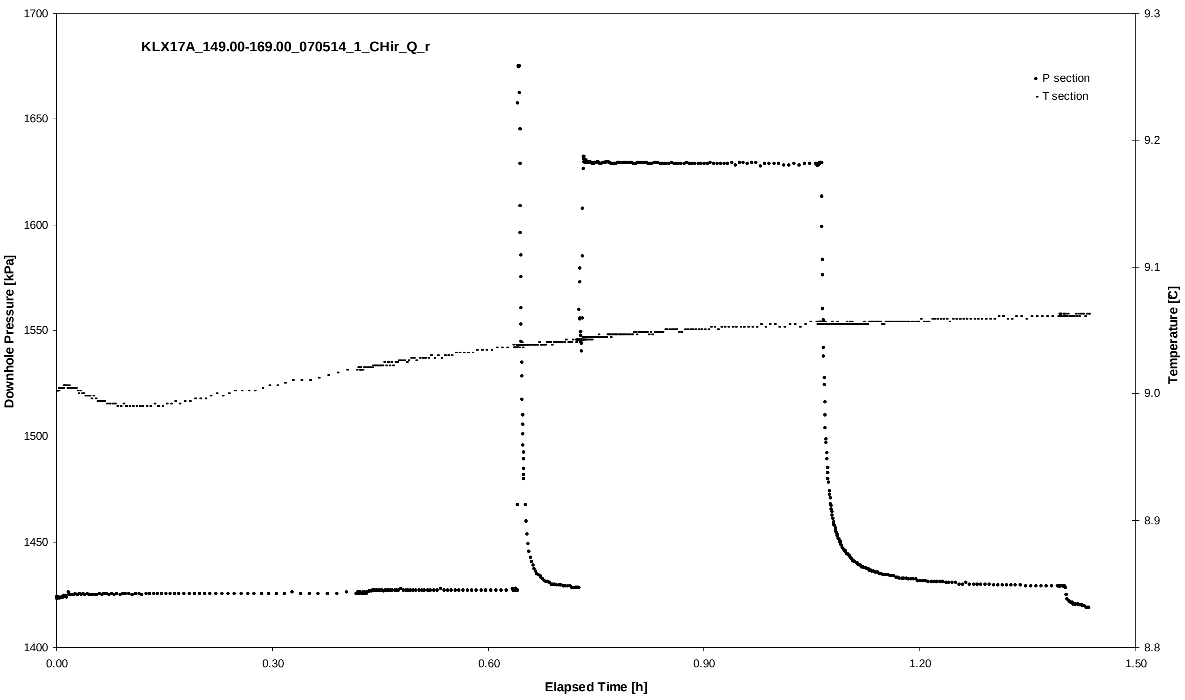
APPENDIX 2-12

Test 149.00 – 169.00 m

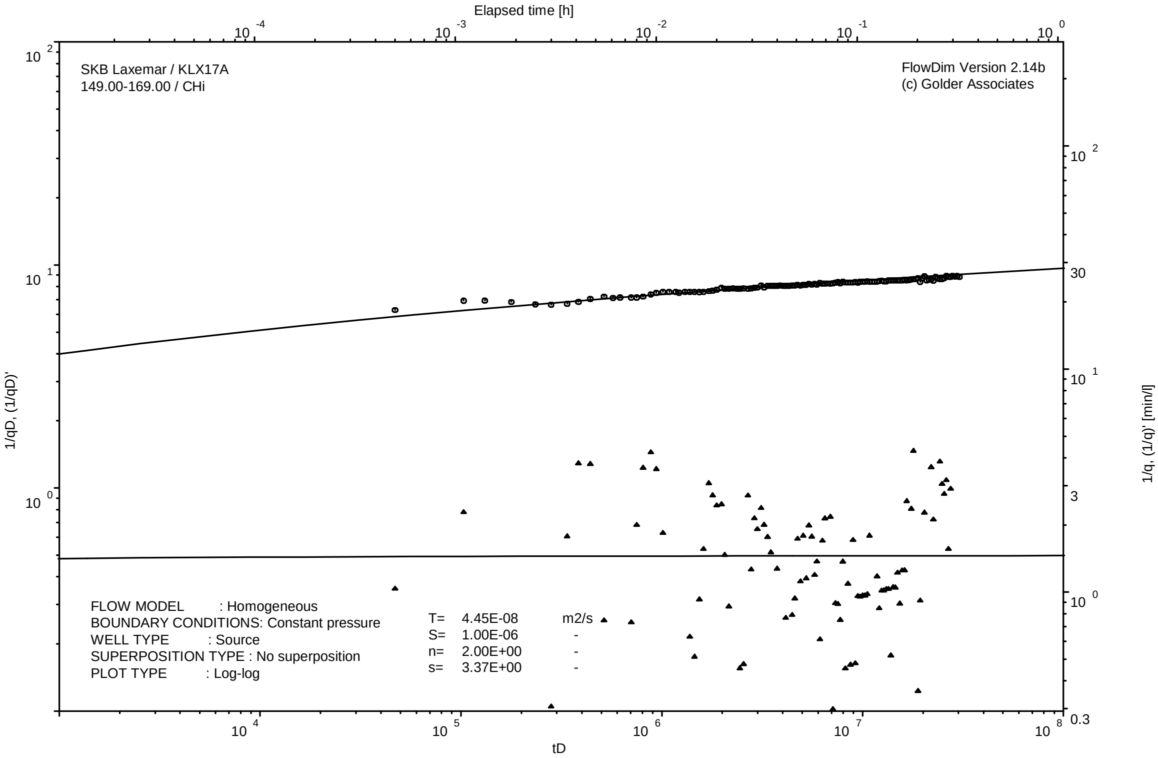
Analysis diagrams



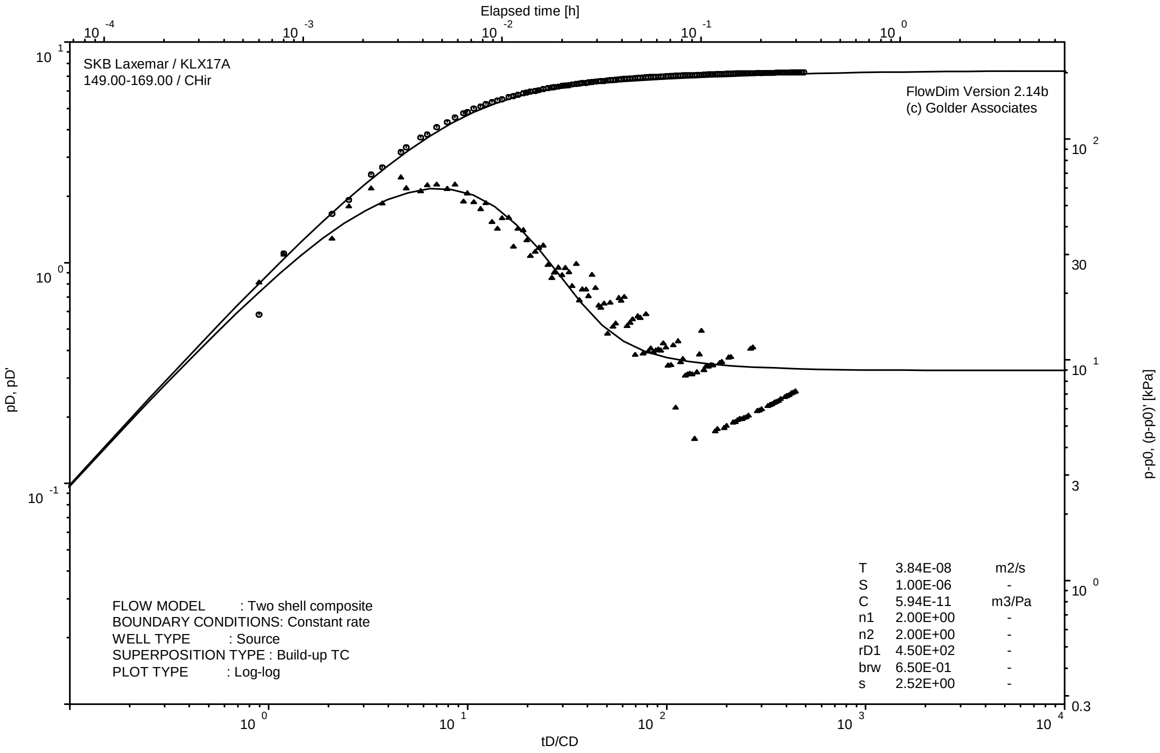
Pressure and flow rate vs. time; cartesian plot



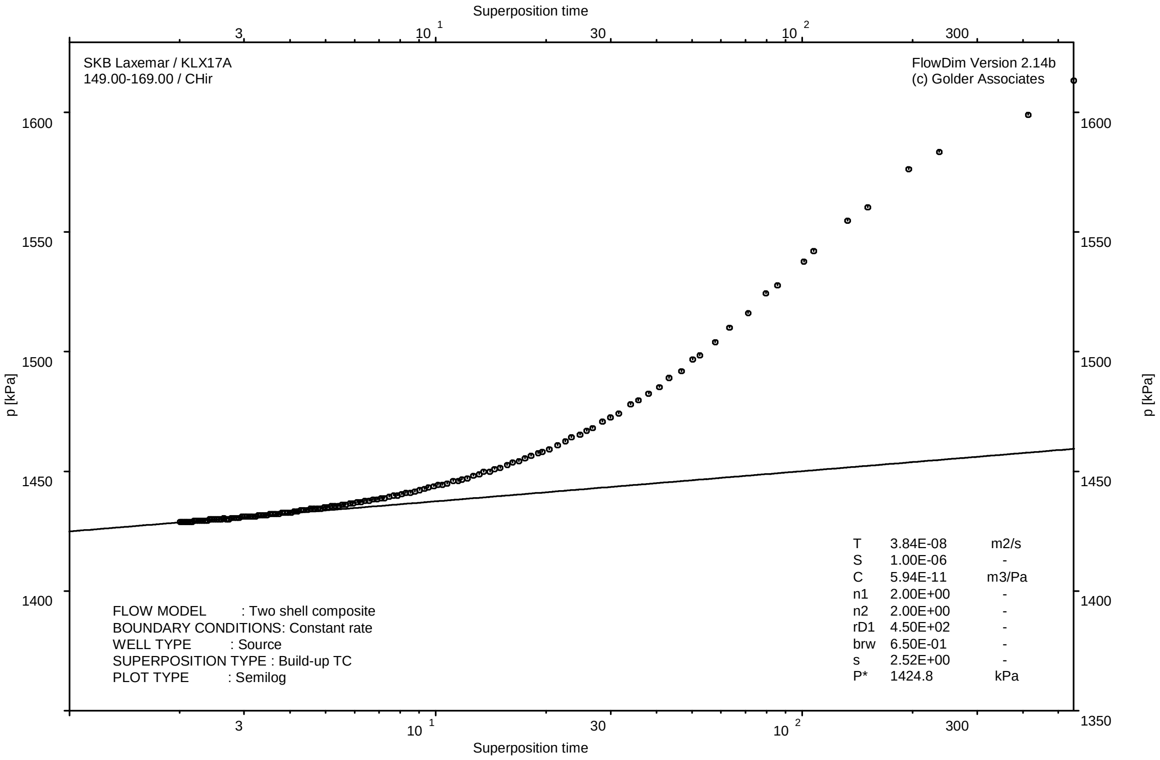
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

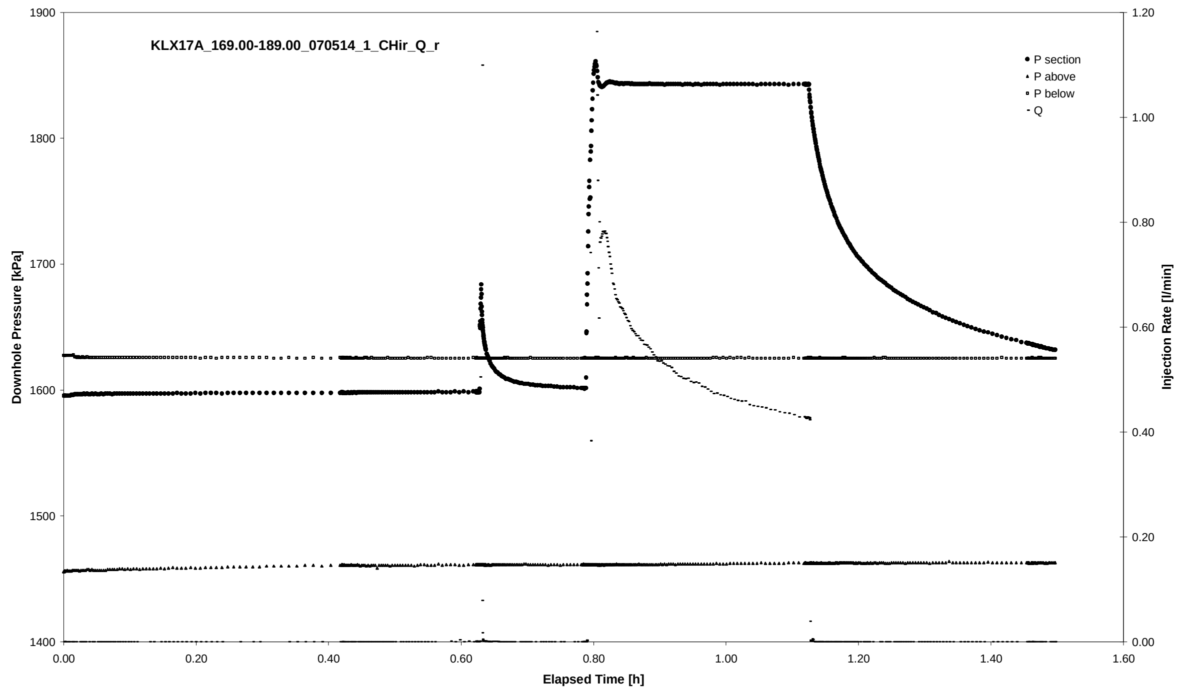


CHIR phase; HORNER match

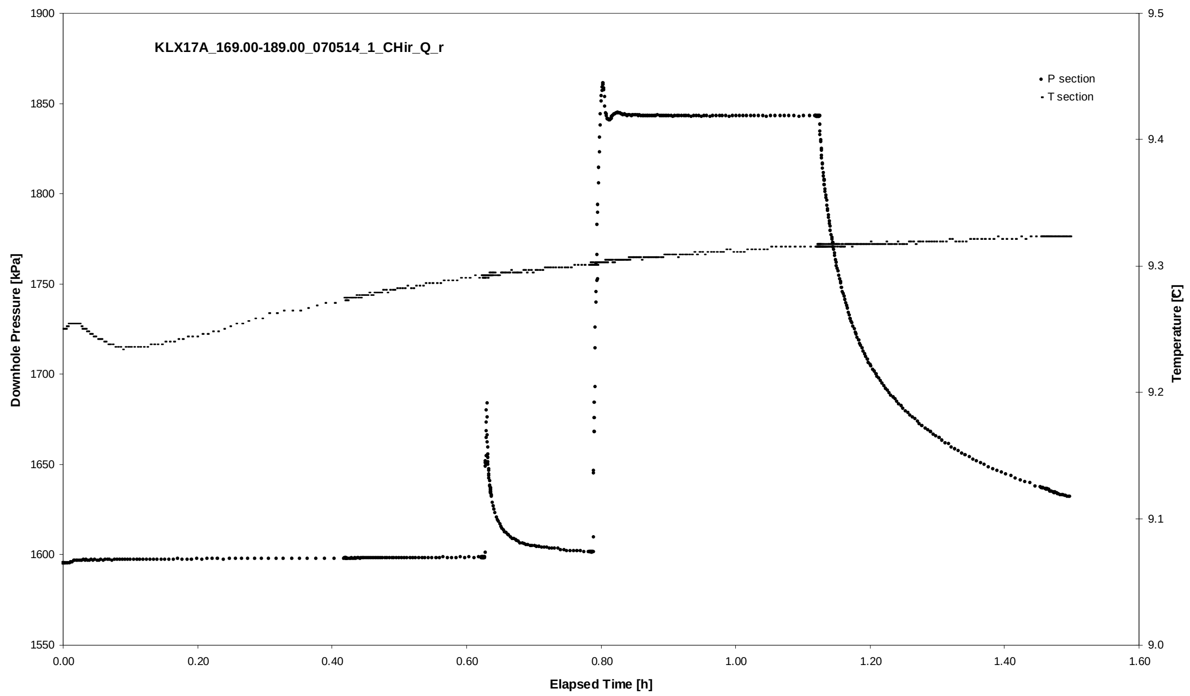
APPENDIX 2-13

Test 169.00 – 189.00 m

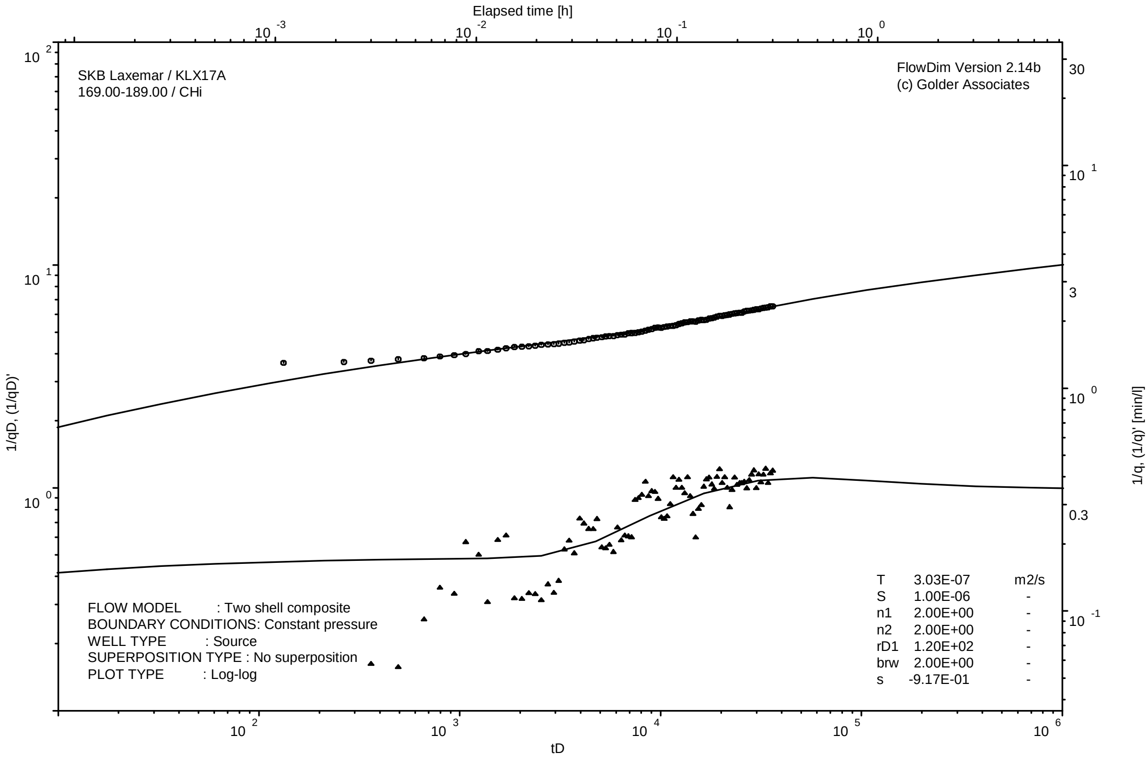
Analysis diagrams



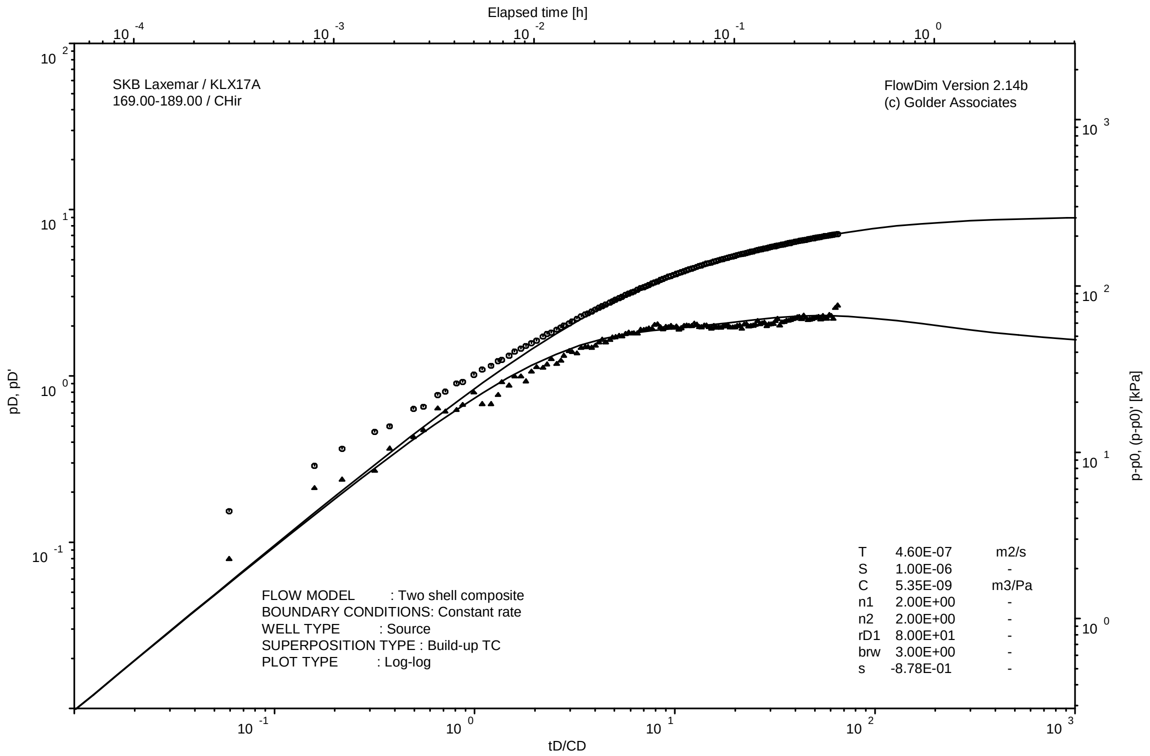
Pressure and flow rate vs. time; cartesian plot



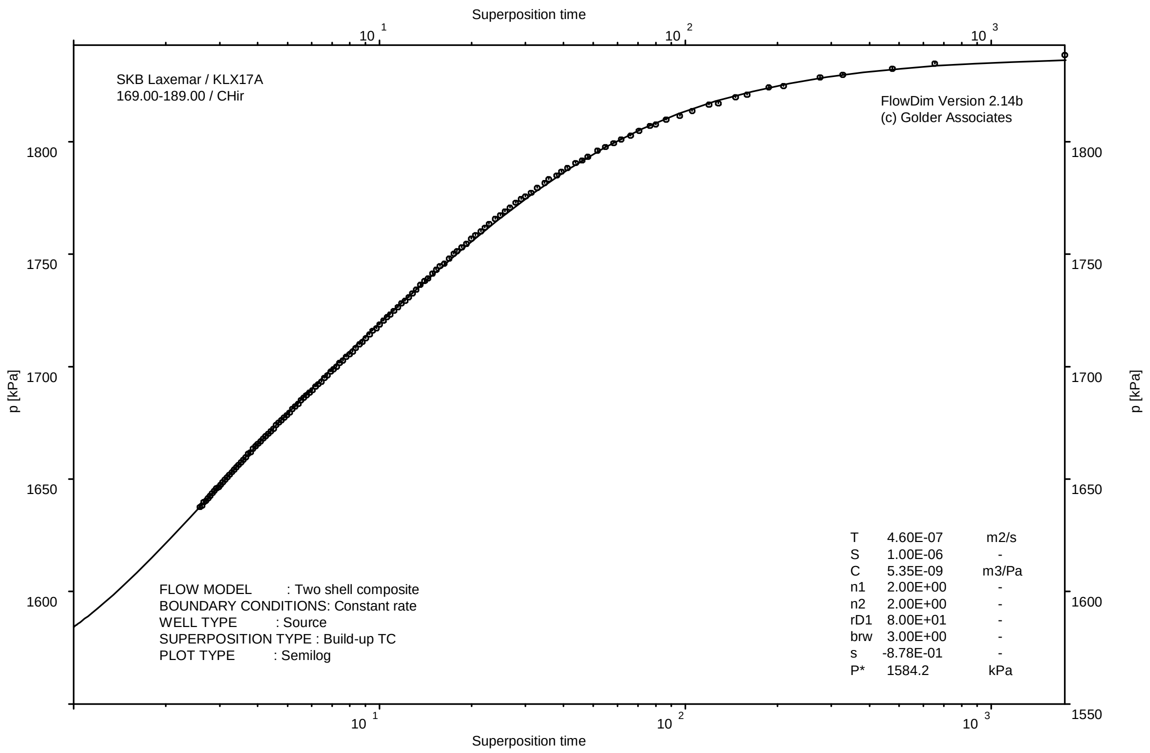
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

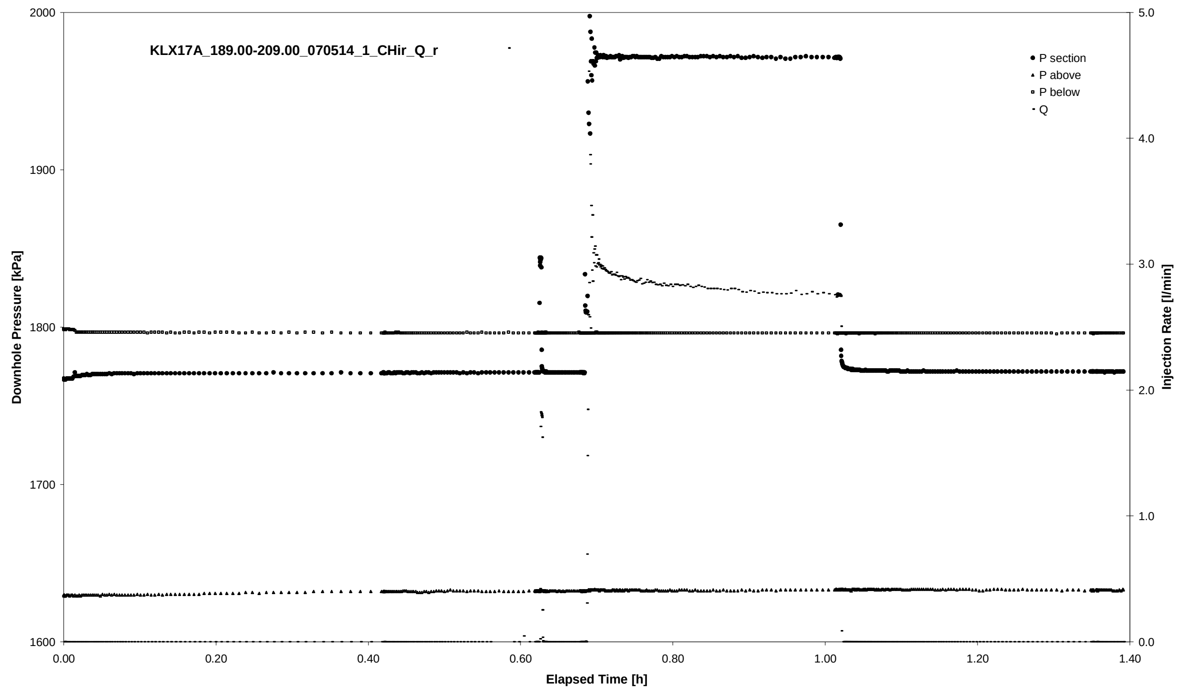


CHIR phase; HORNER match

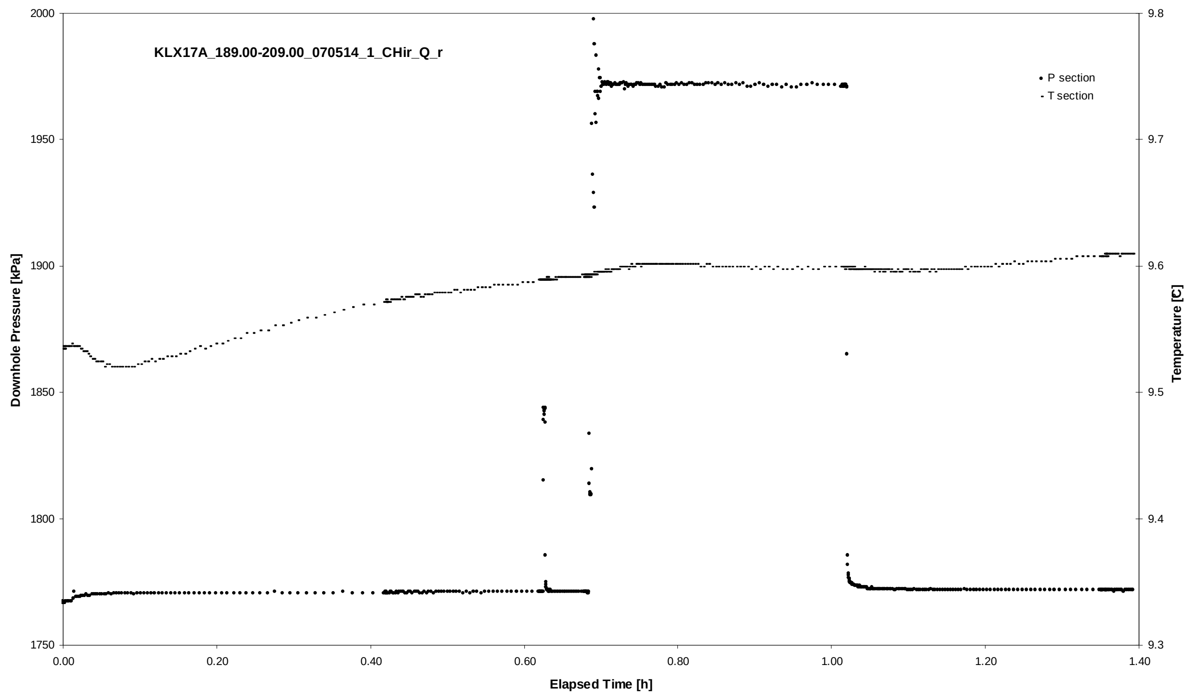
APPENDIX 2-14

Test 189.00 – 209.00 m

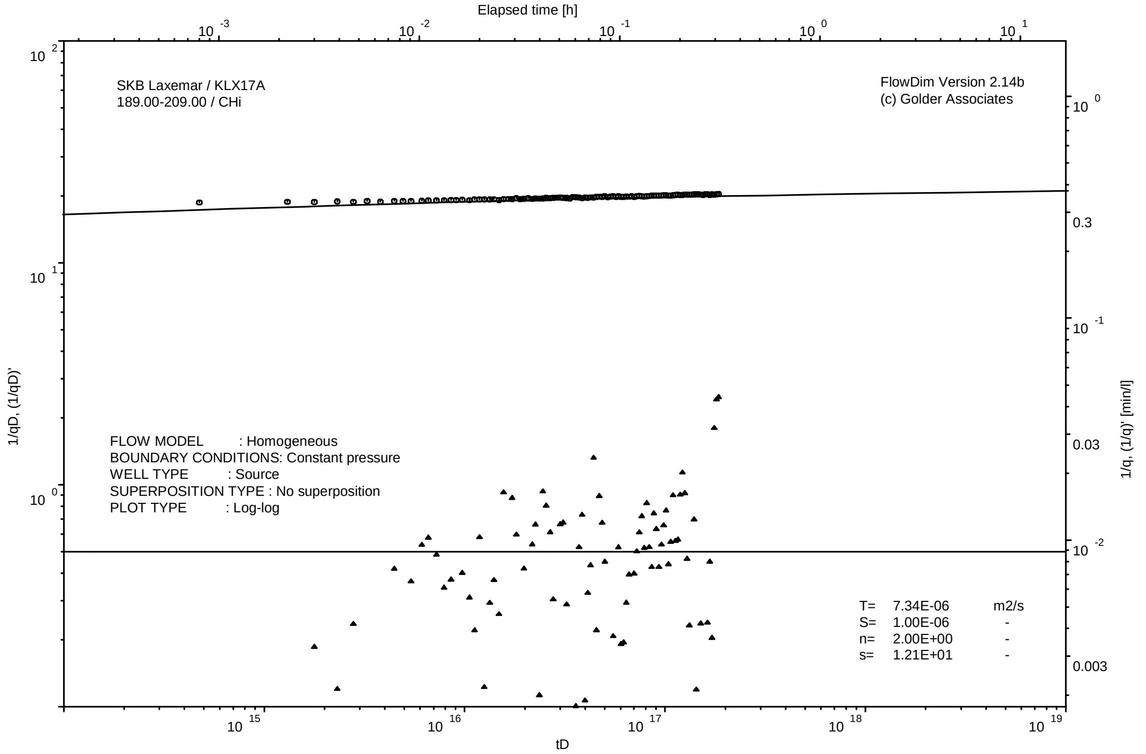
Analysis diagrams



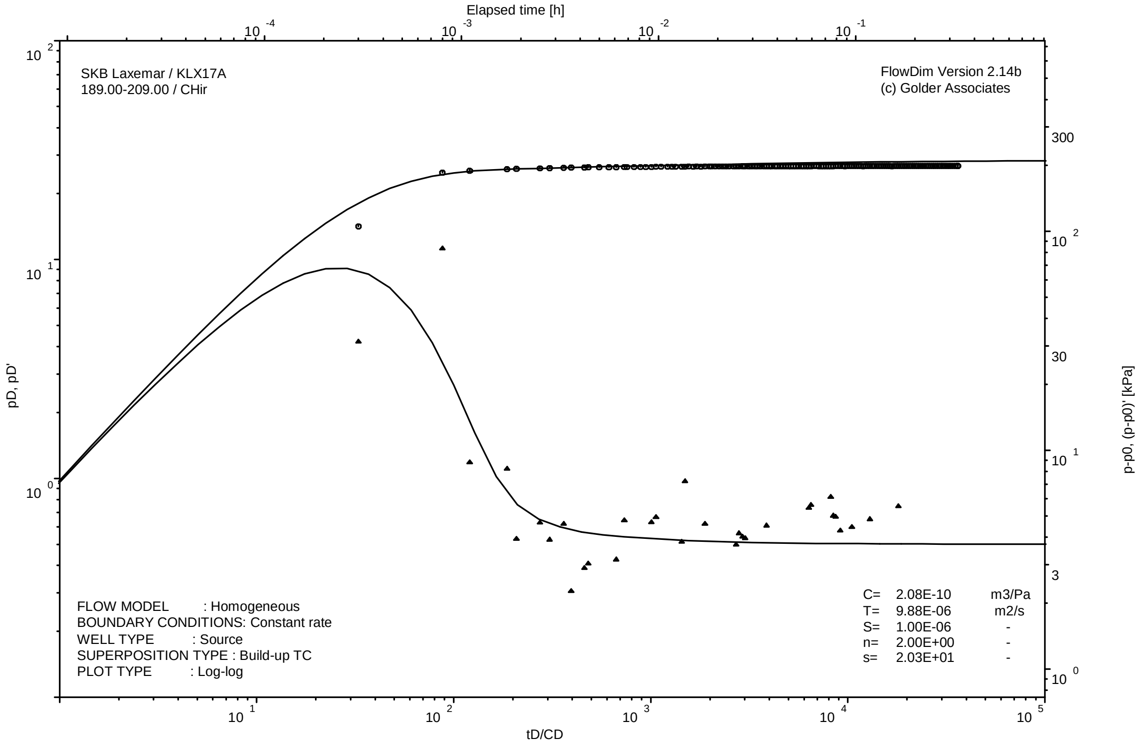
Pressure and flow rate vs. time; cartesian plot



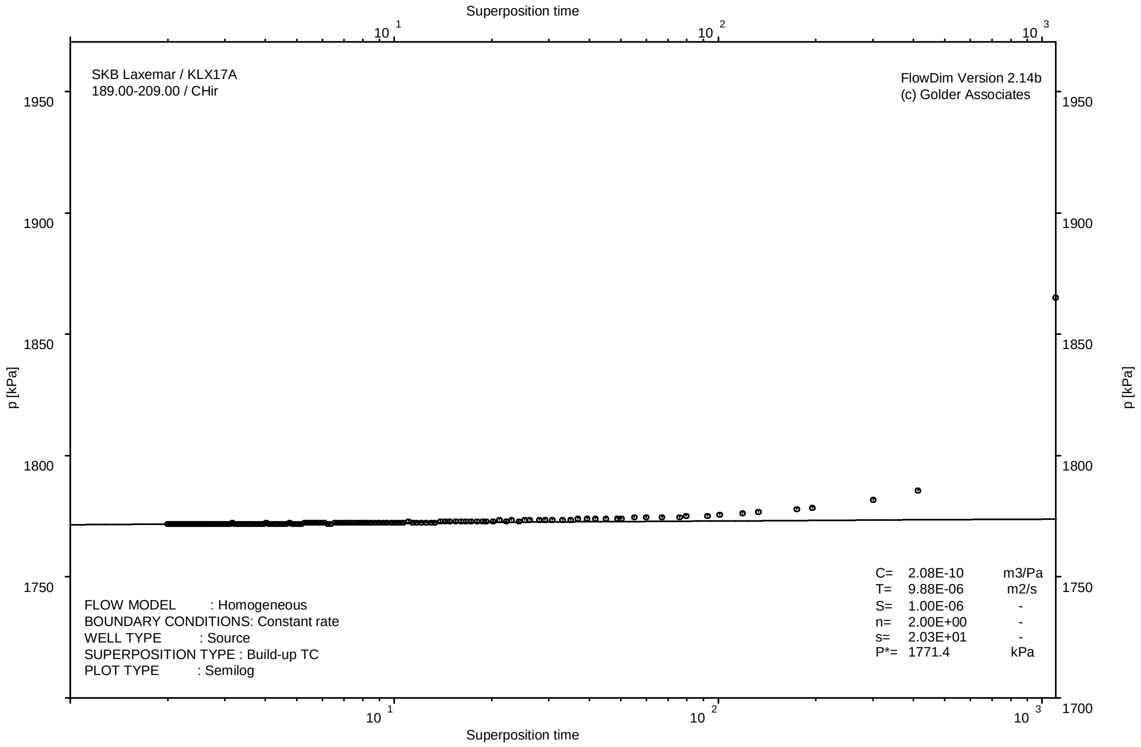
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

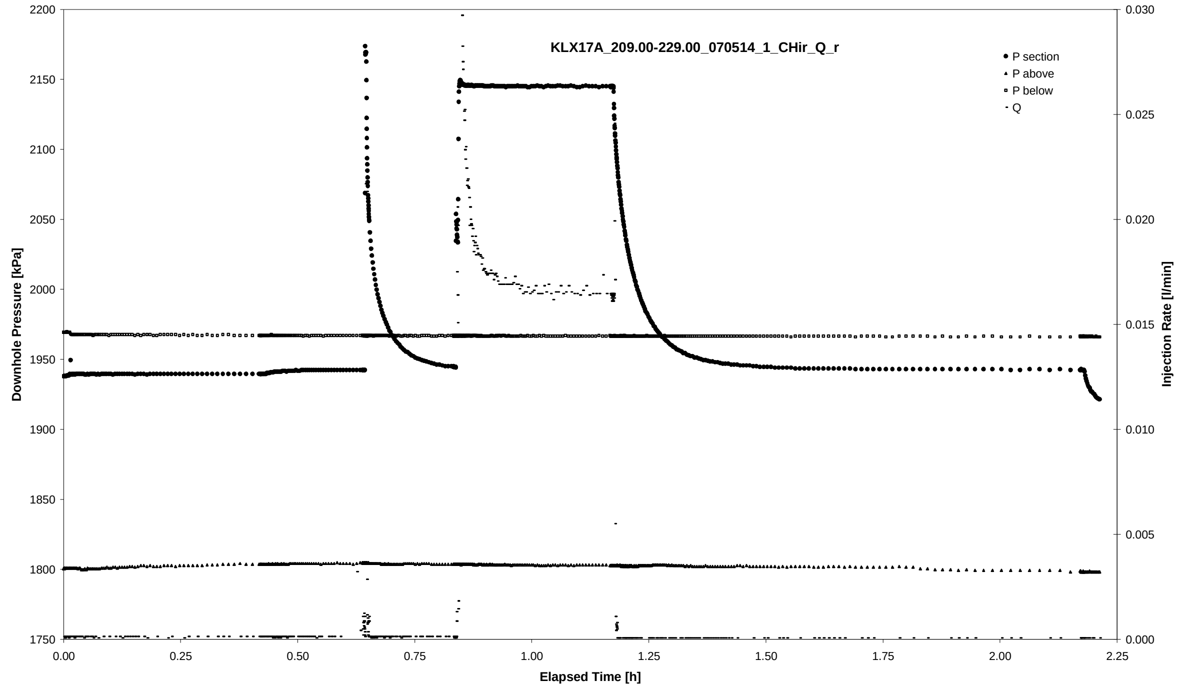


CHIR phase; HORNER match

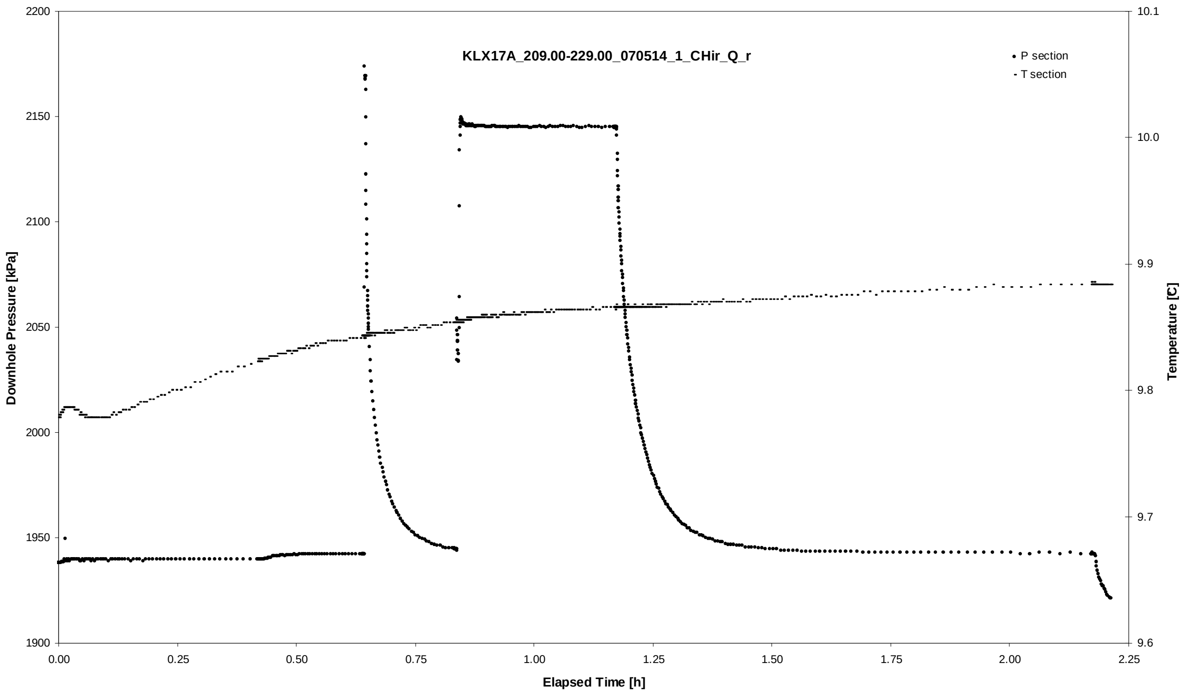
APPENDIX 2-15

Test 209.00 – 229.00 m

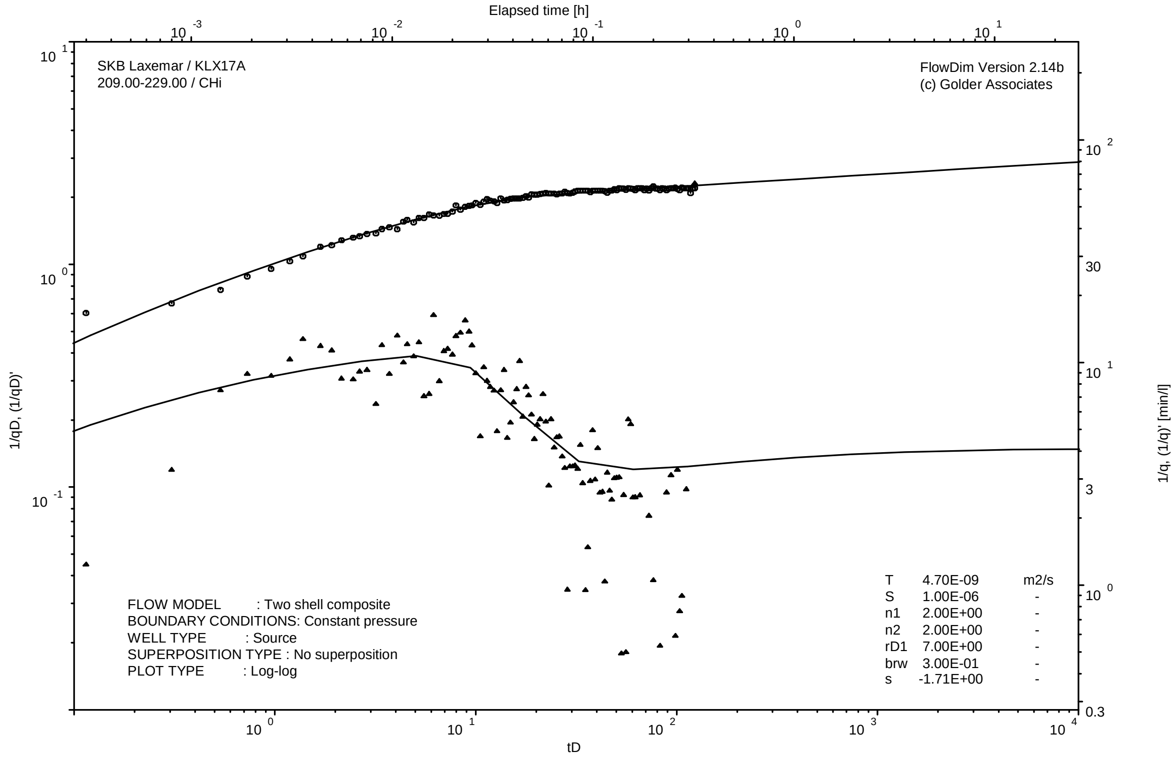
Analysis diagrams



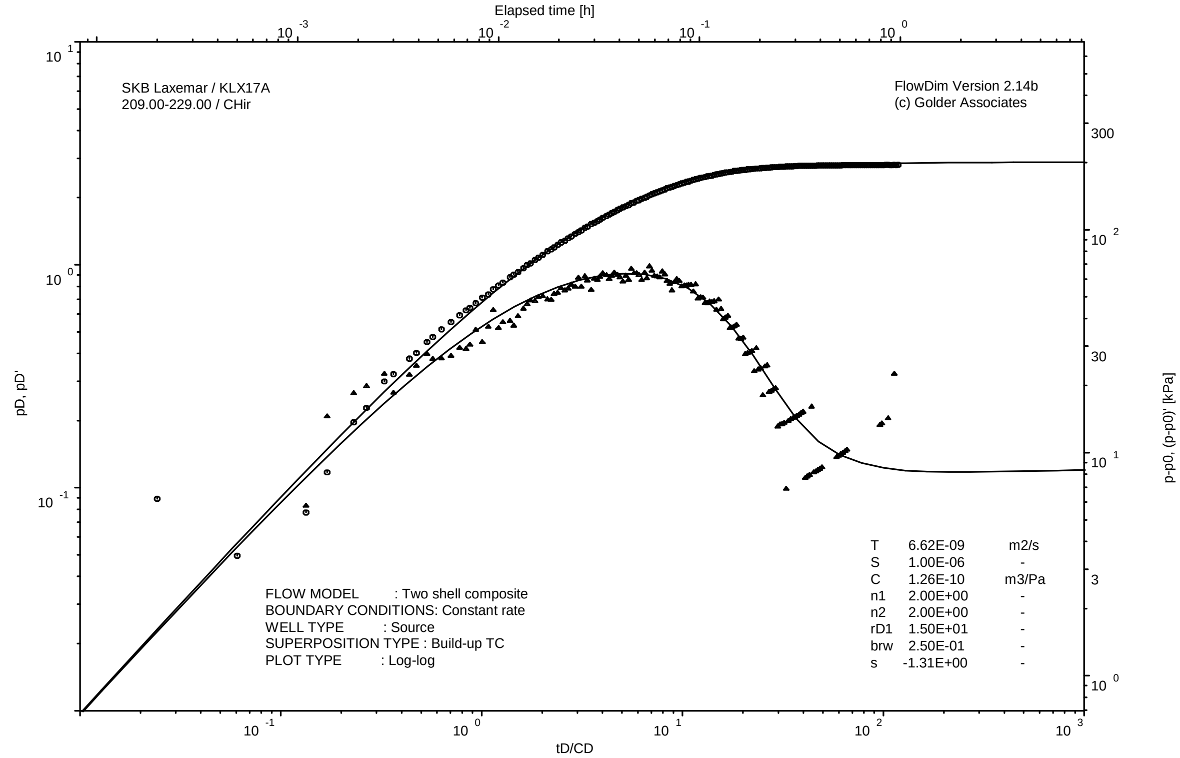
Pressure and flow rate vs. time; cartesian plot



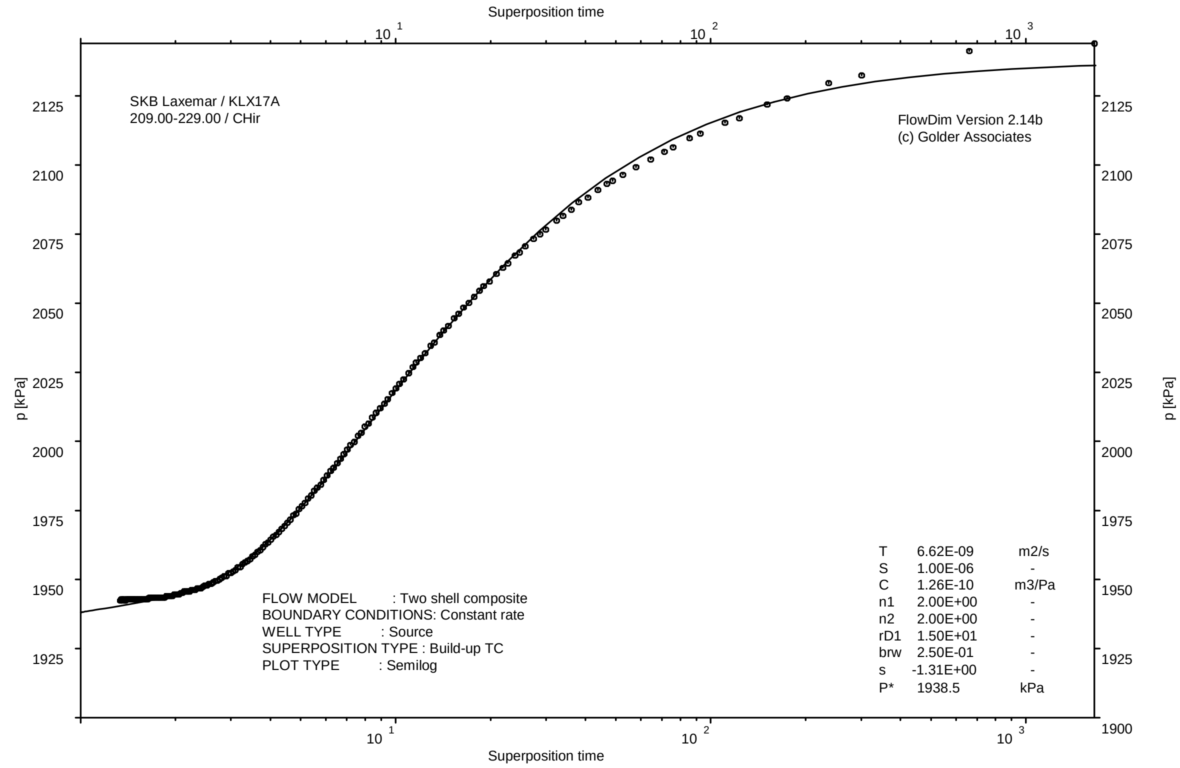
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

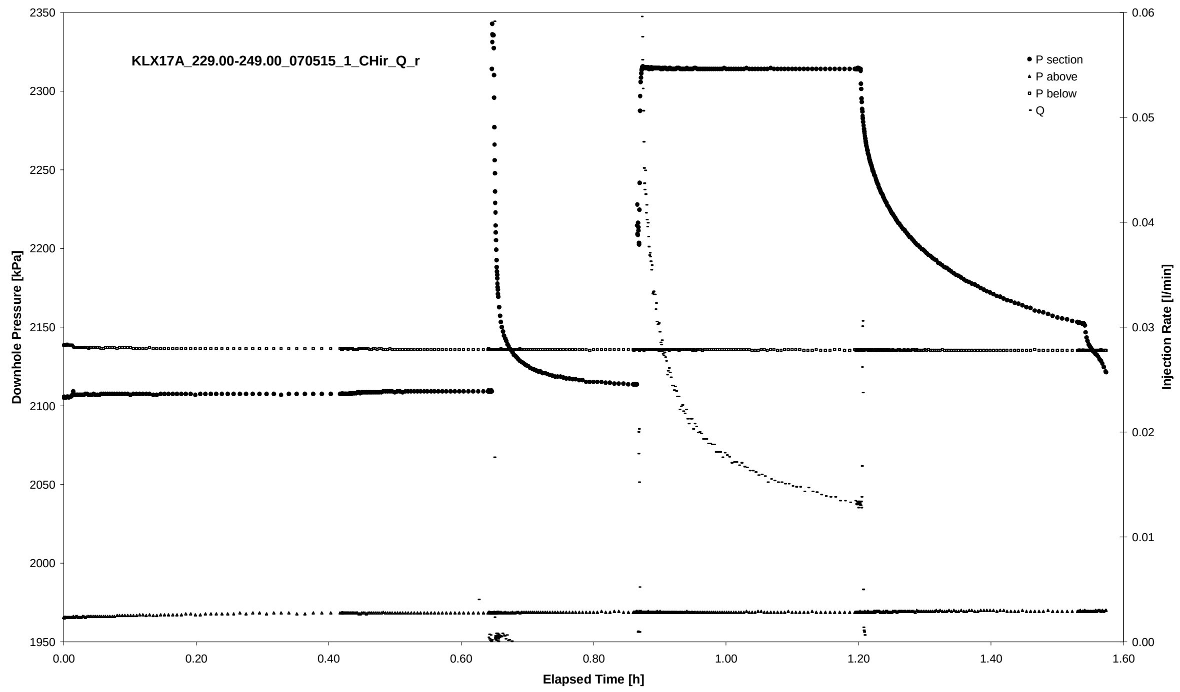


CHIR phase; HORNER match

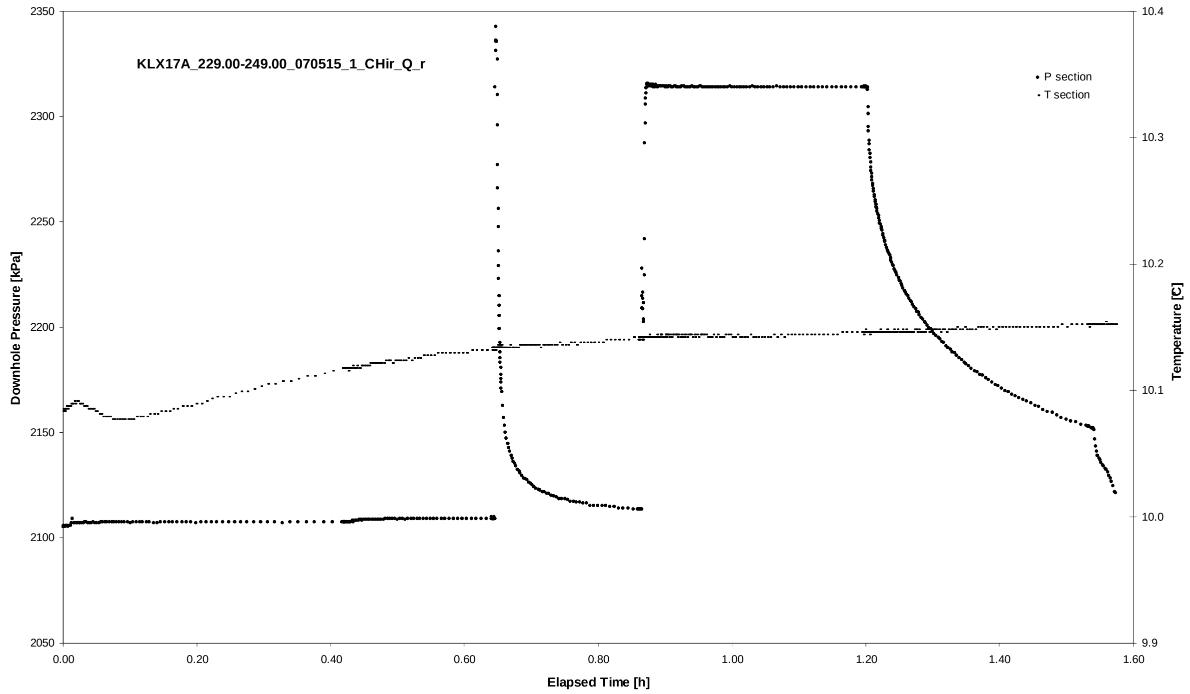
APPENDIX 2-16

Test 229.00 – 249.00 m

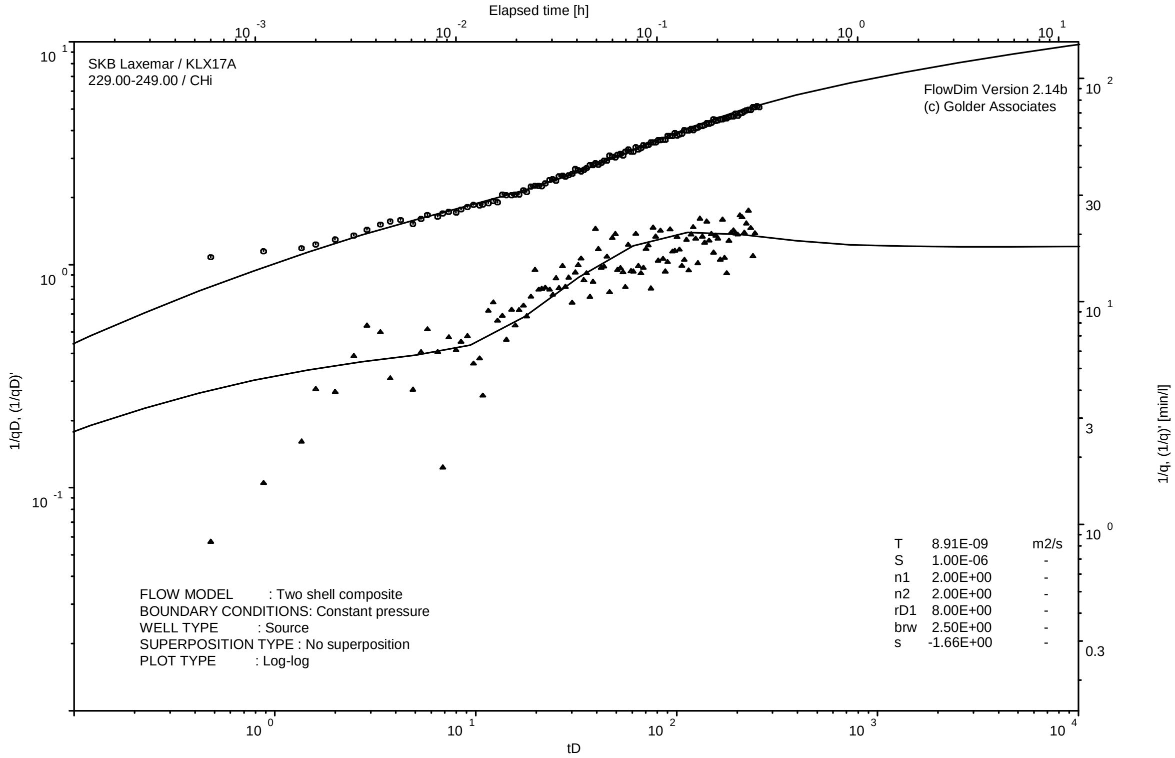
Analysis diagrams



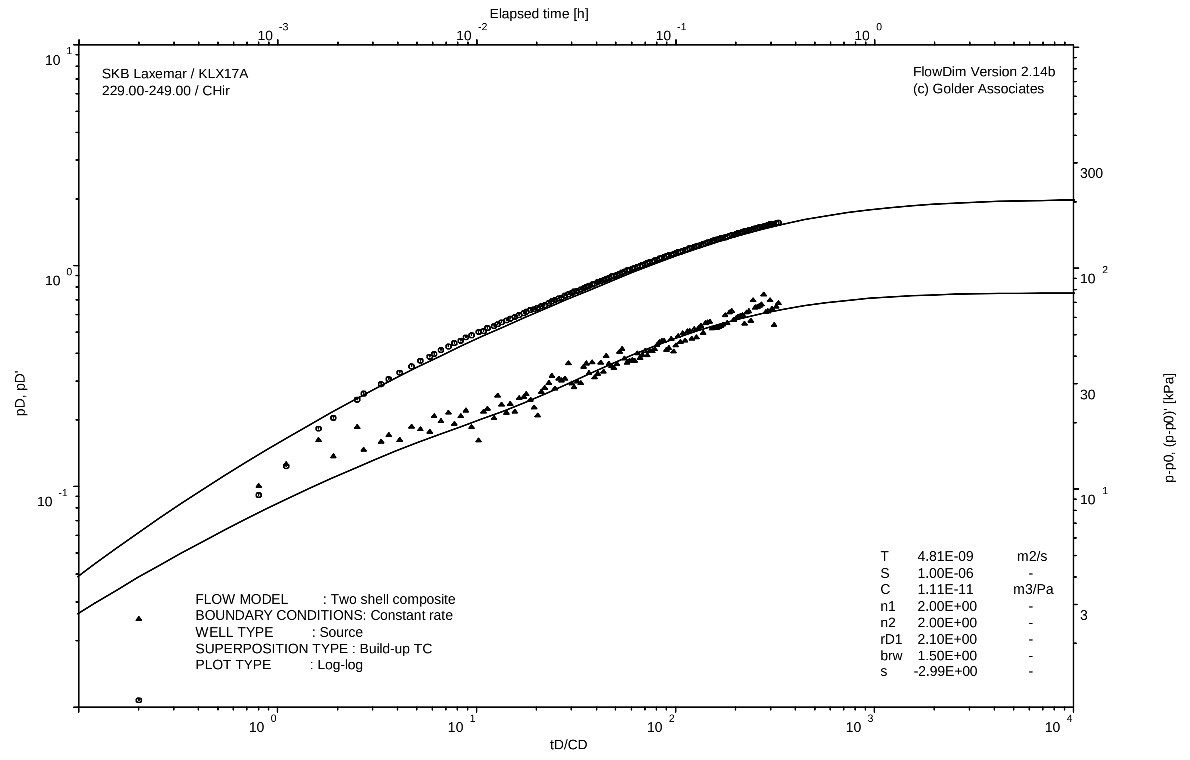
Pressure and flow rate vs. time; cartesian plot



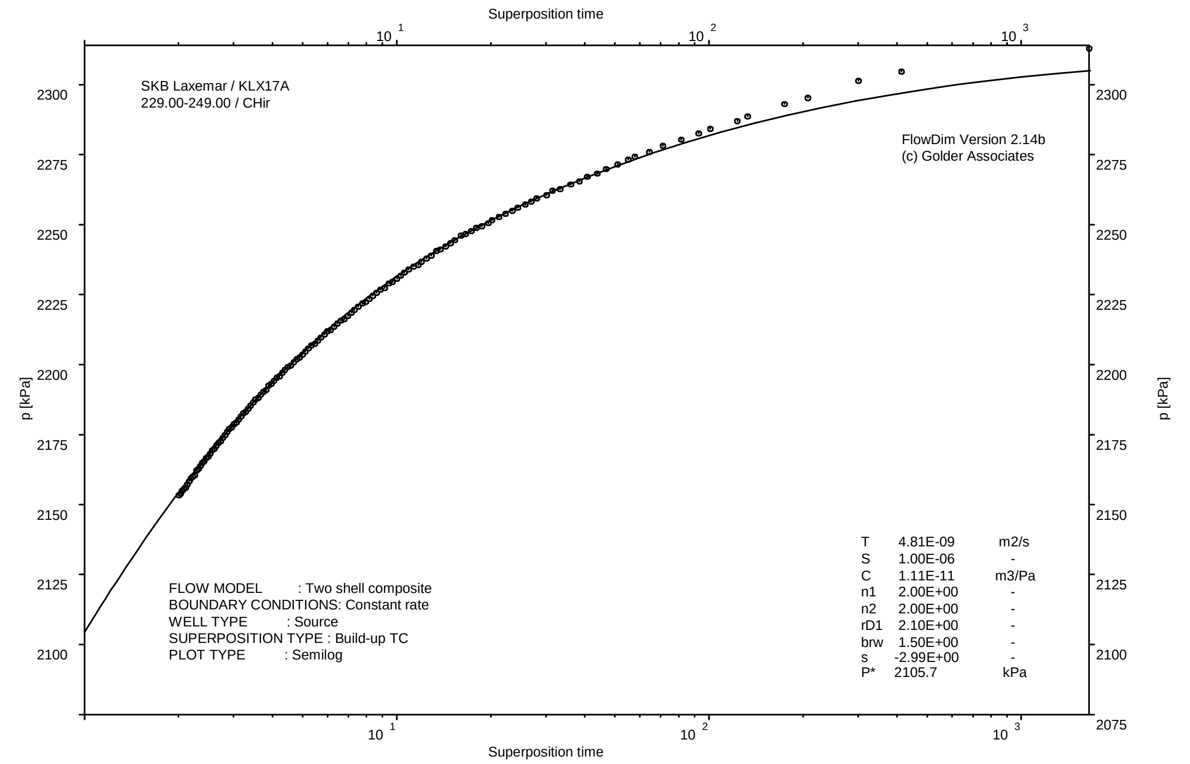
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

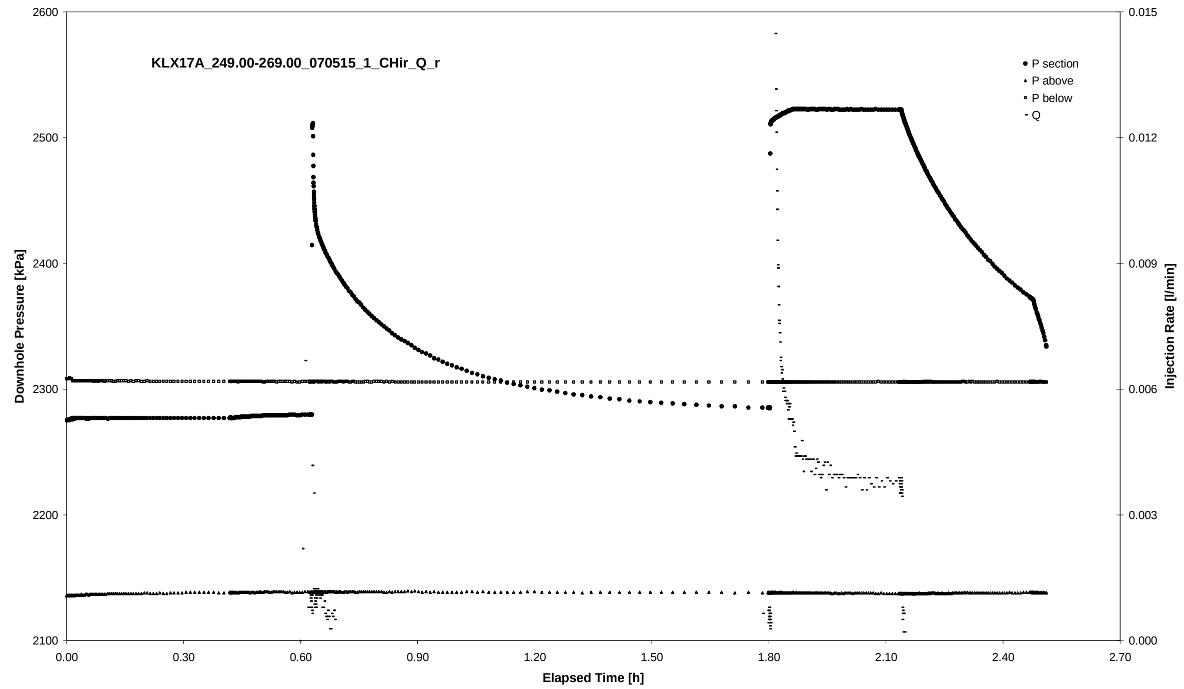


CHIR phase; HORNER match

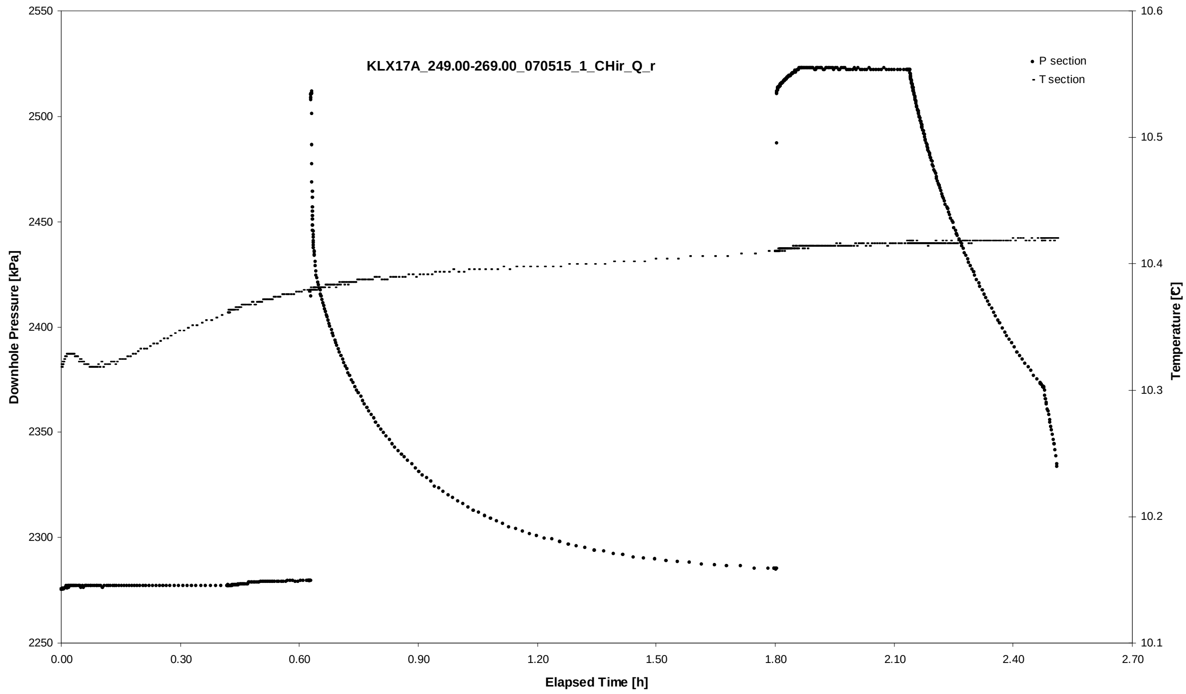
APPENDIX 2-17

Test 249.00 – 269.00 m

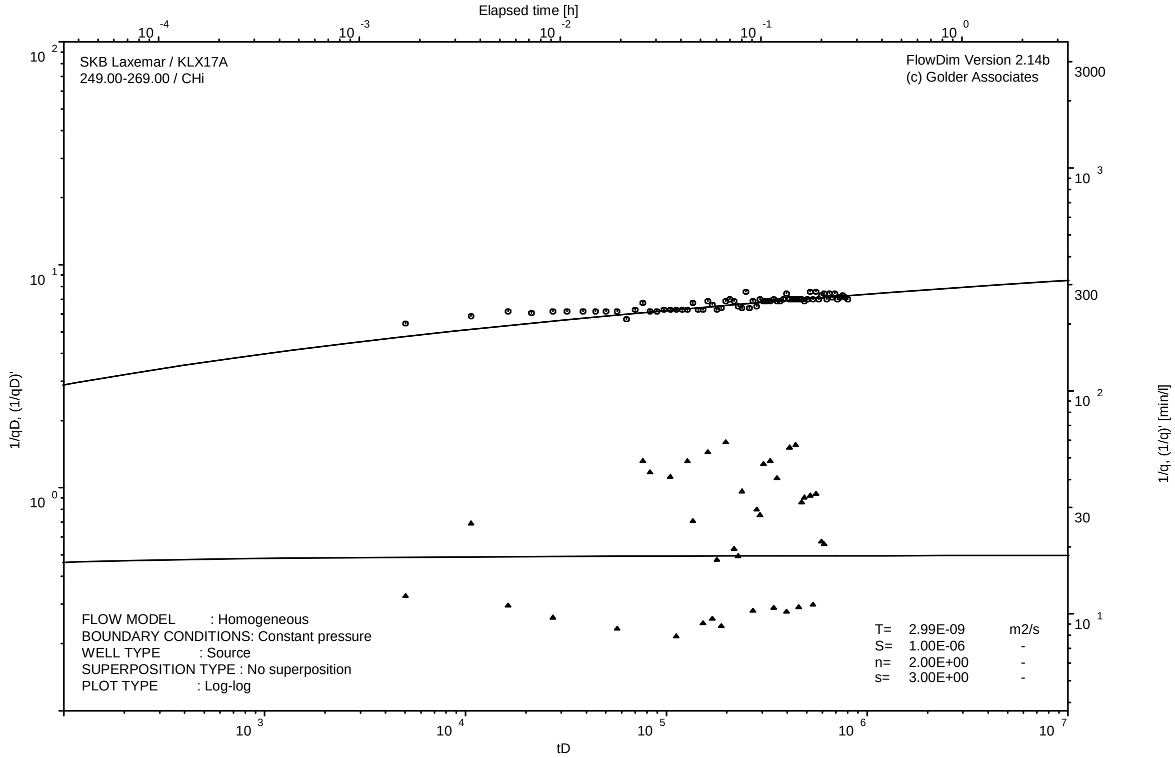
Analysis diagrams



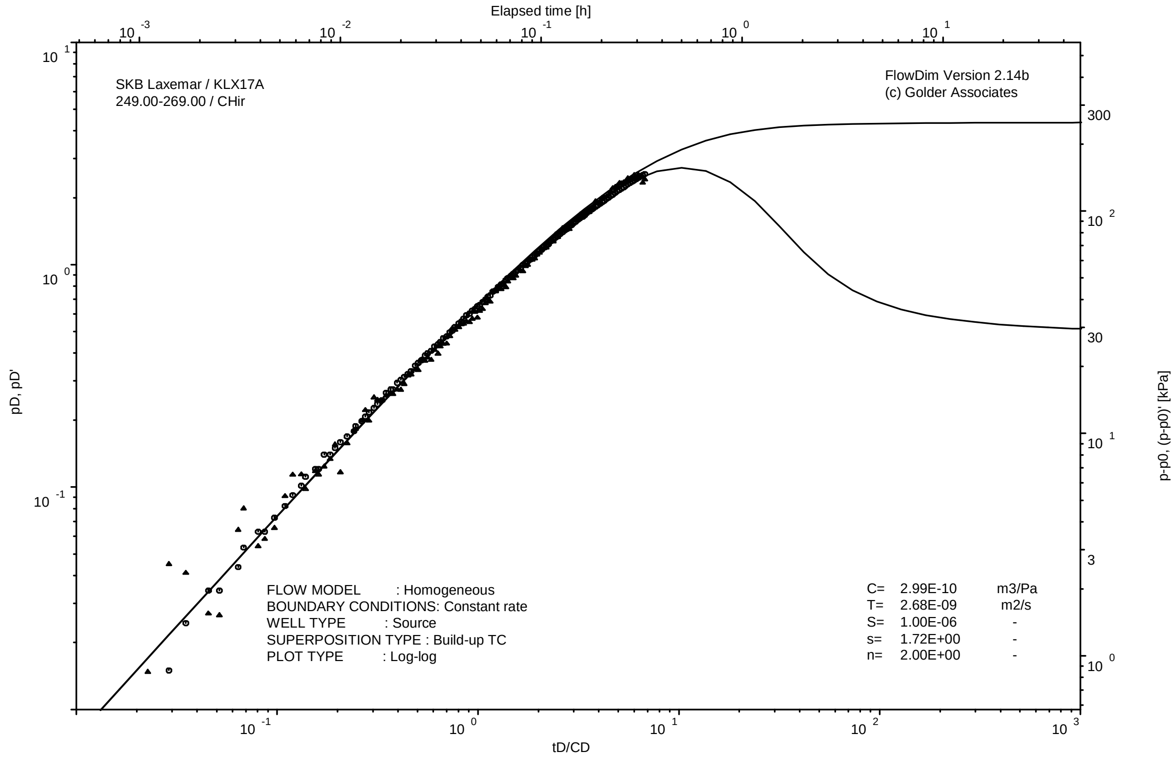
Pressure and flow rate vs. time; cartesian plot



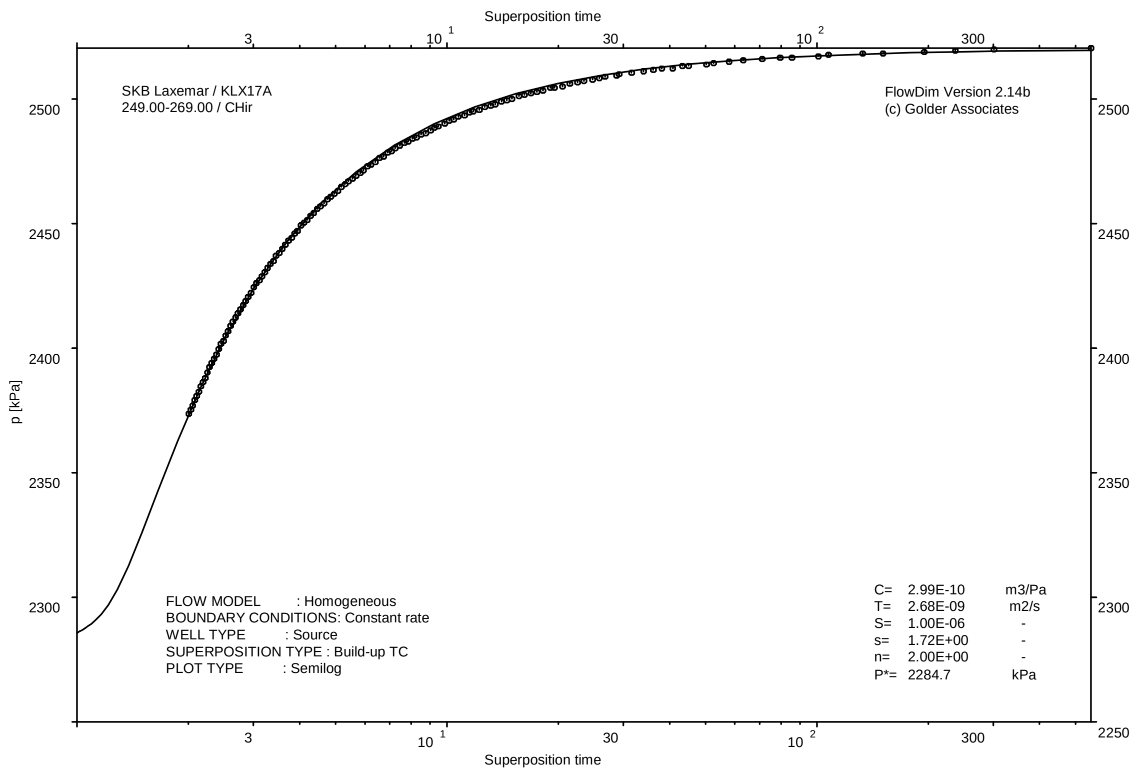
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

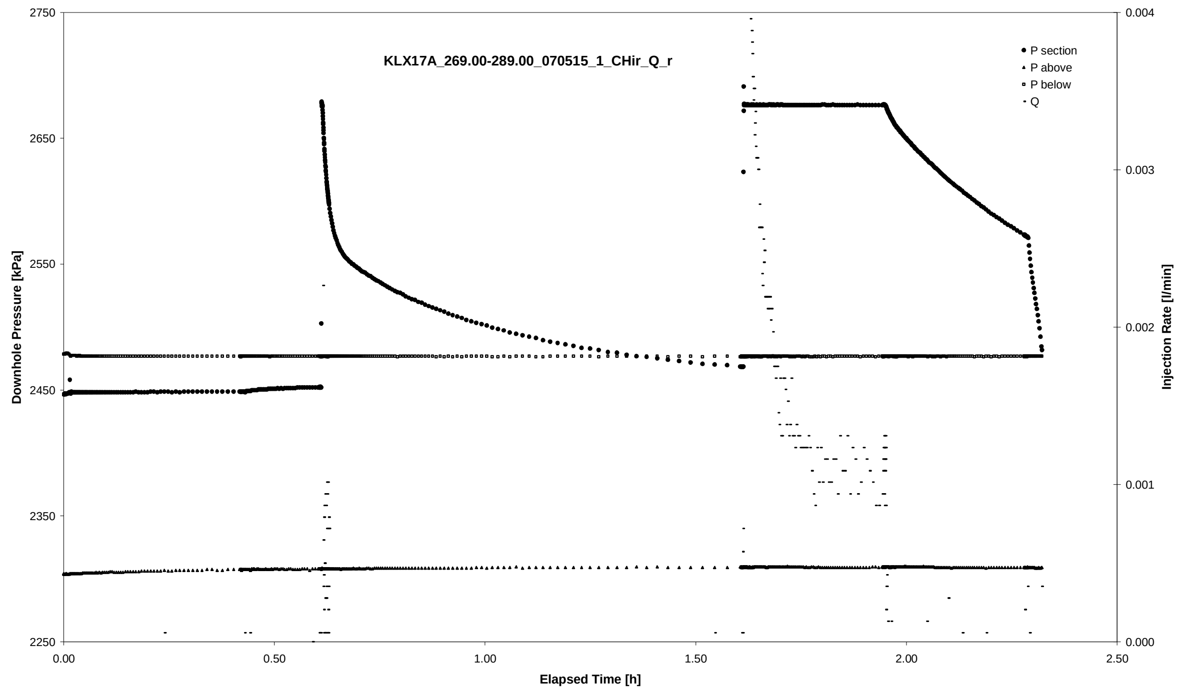


CHIR phase; HORNER match

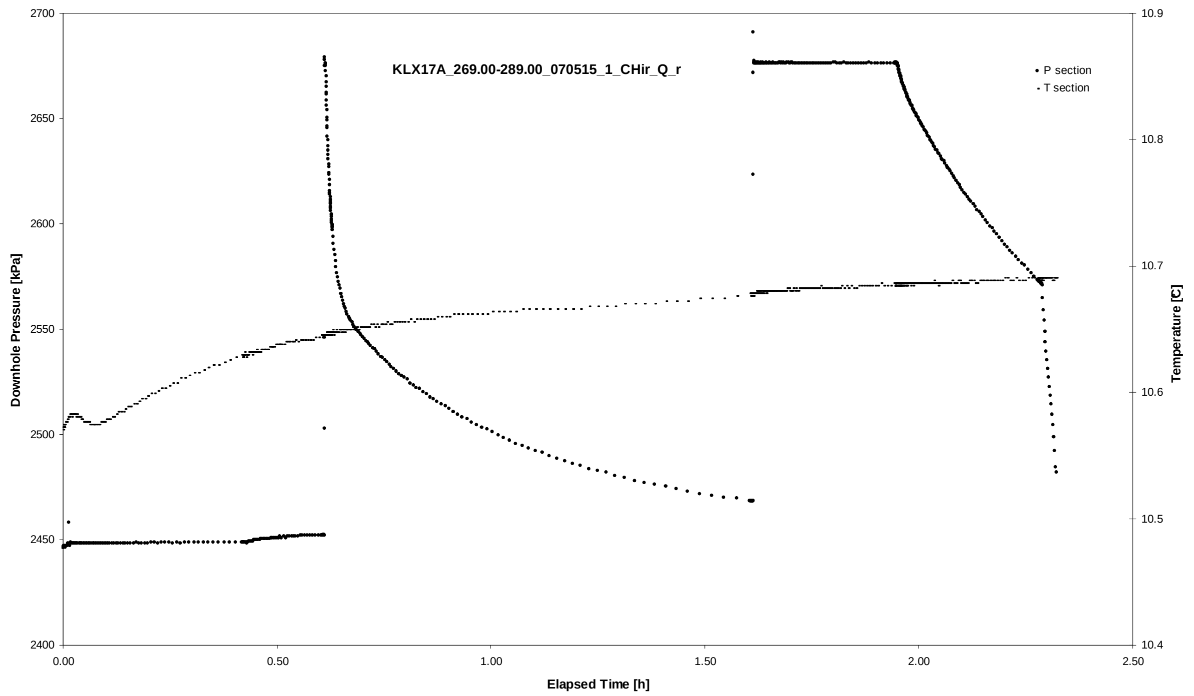
APPENDIX 2-18

Test 269.00 – 289.00 m

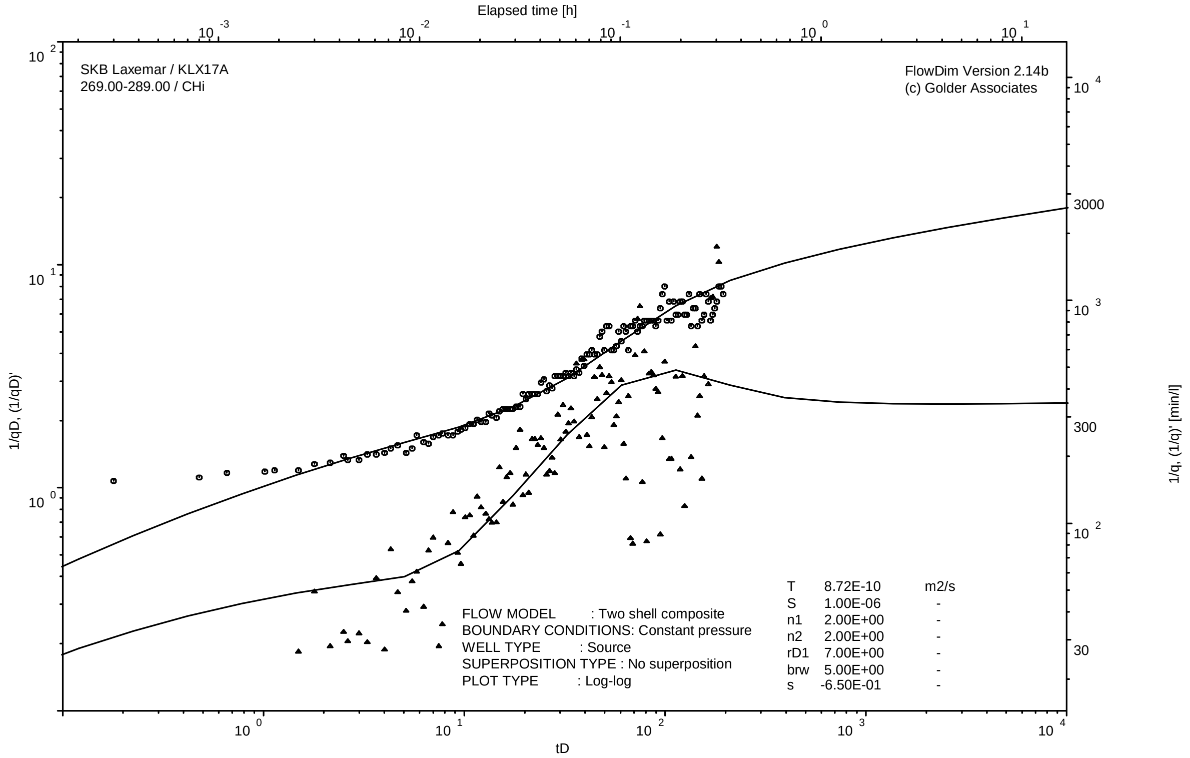
Analysis diagrams



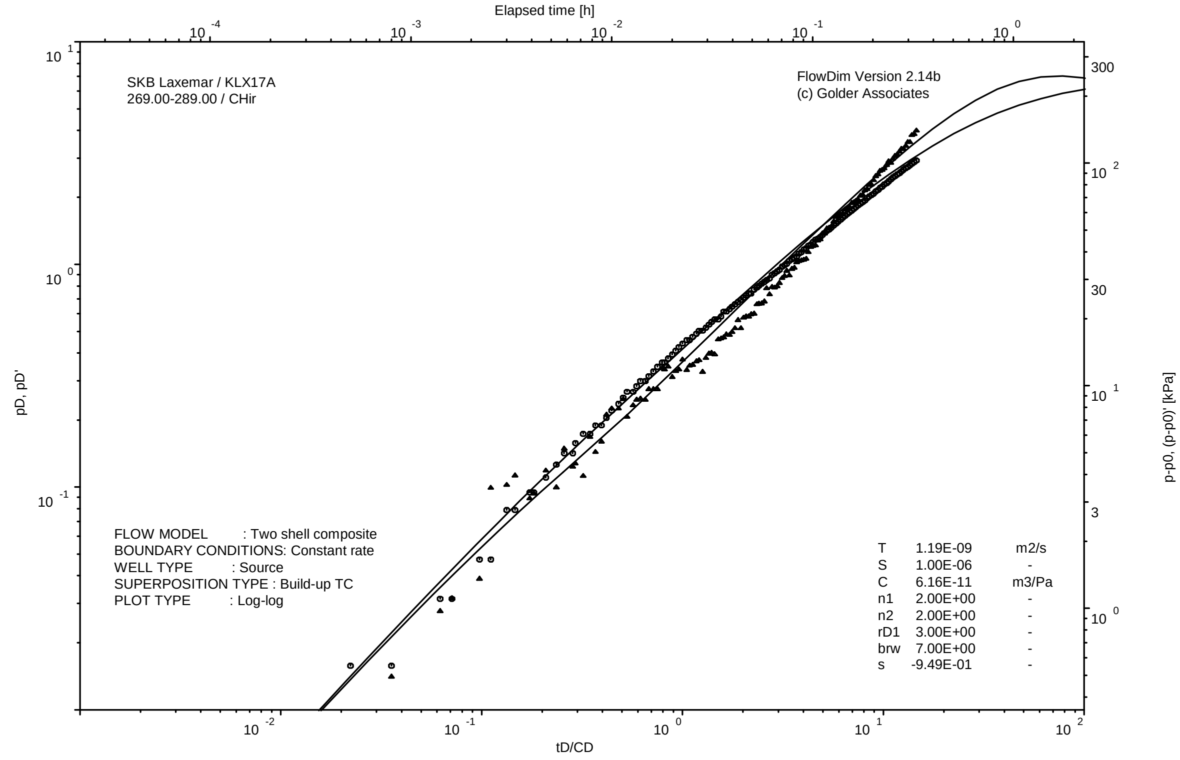
Pressure and flow rate vs. time; cartesian plot



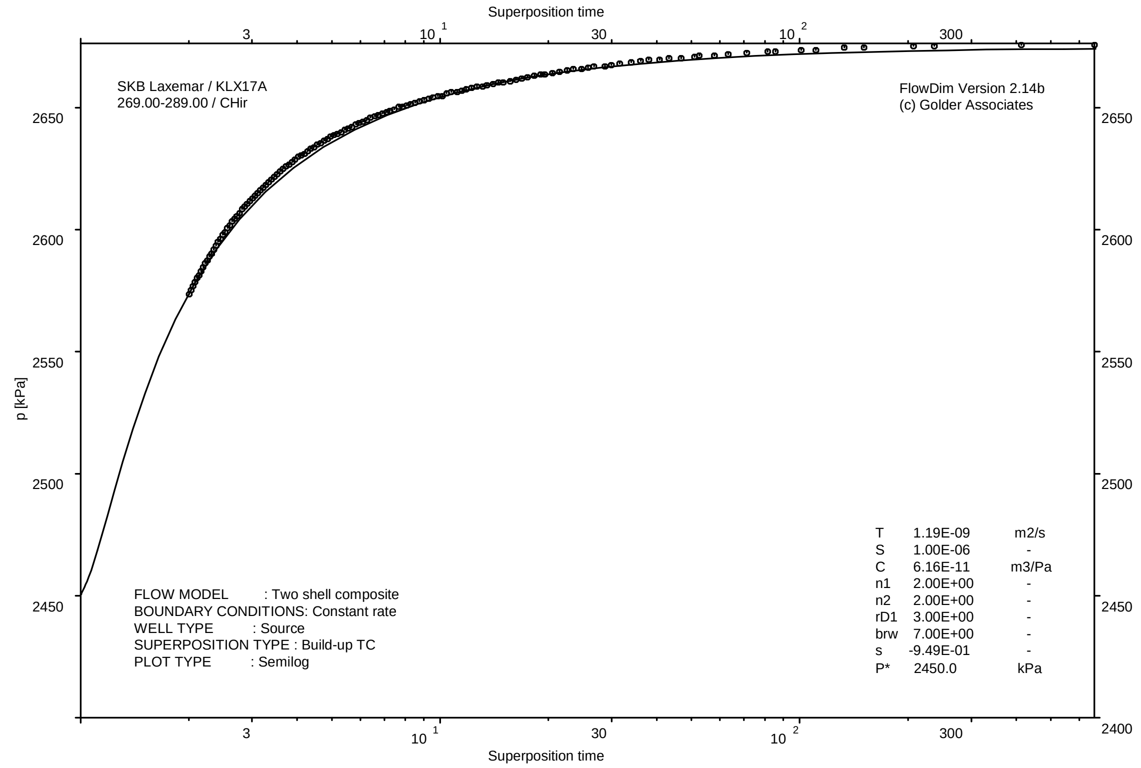
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

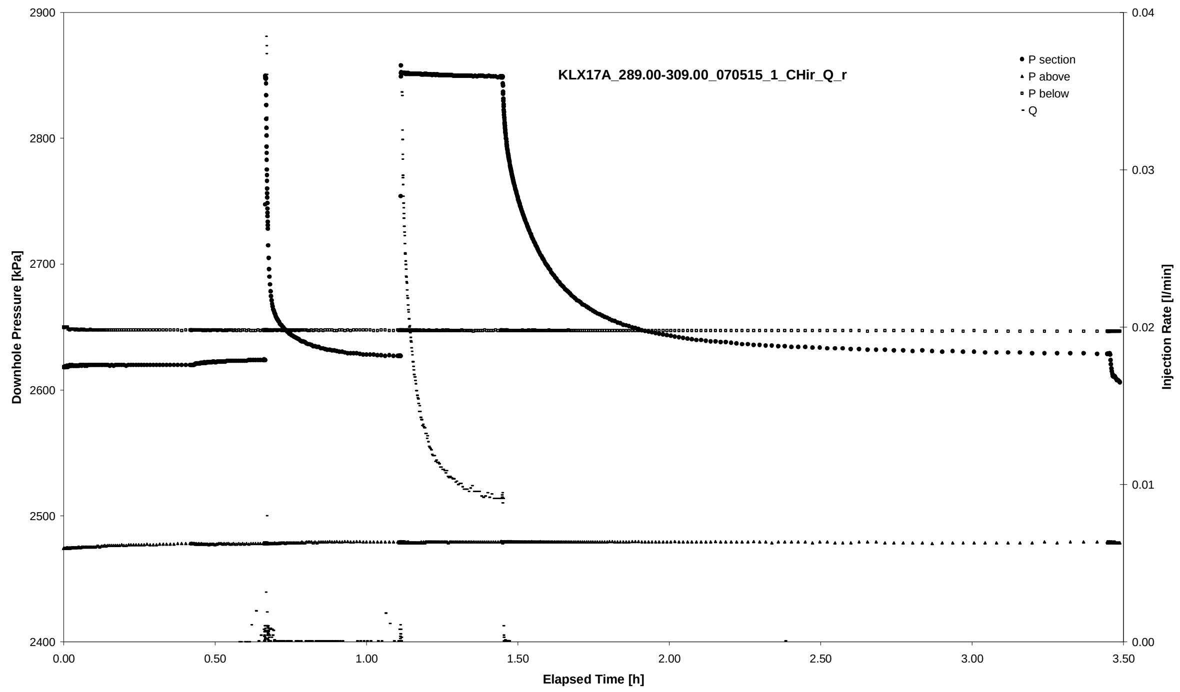


CHIR phase; HORNER match

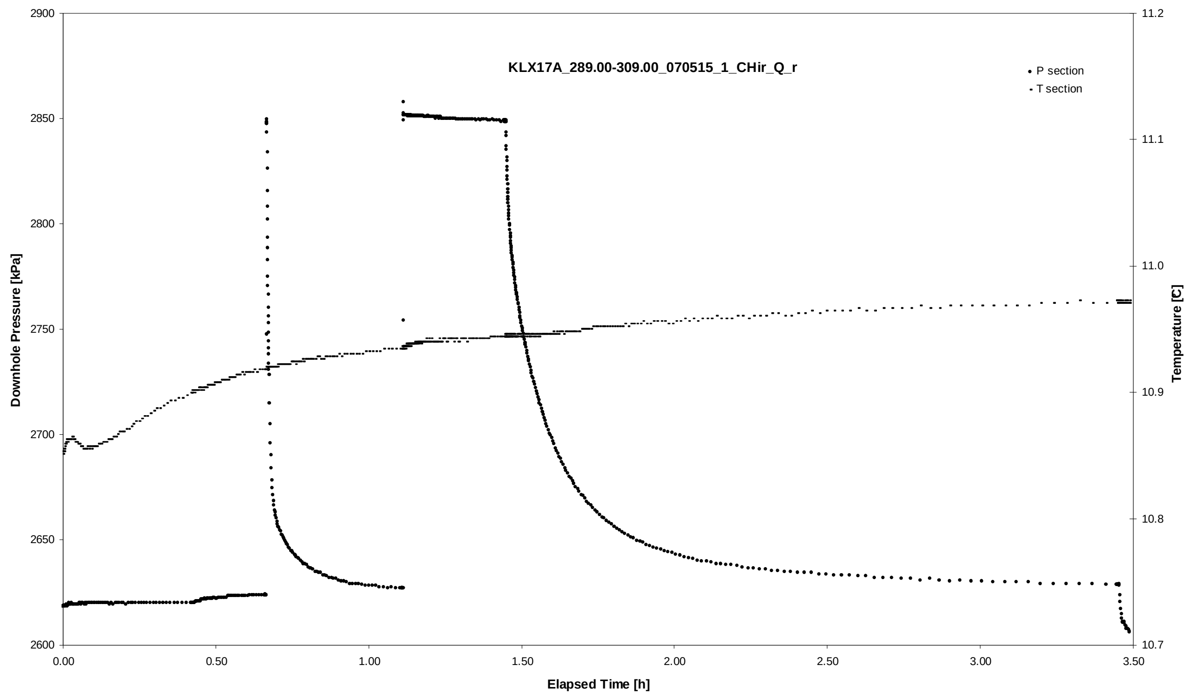
APPENDIX 2-19

Test 289.00 – 309.00 m

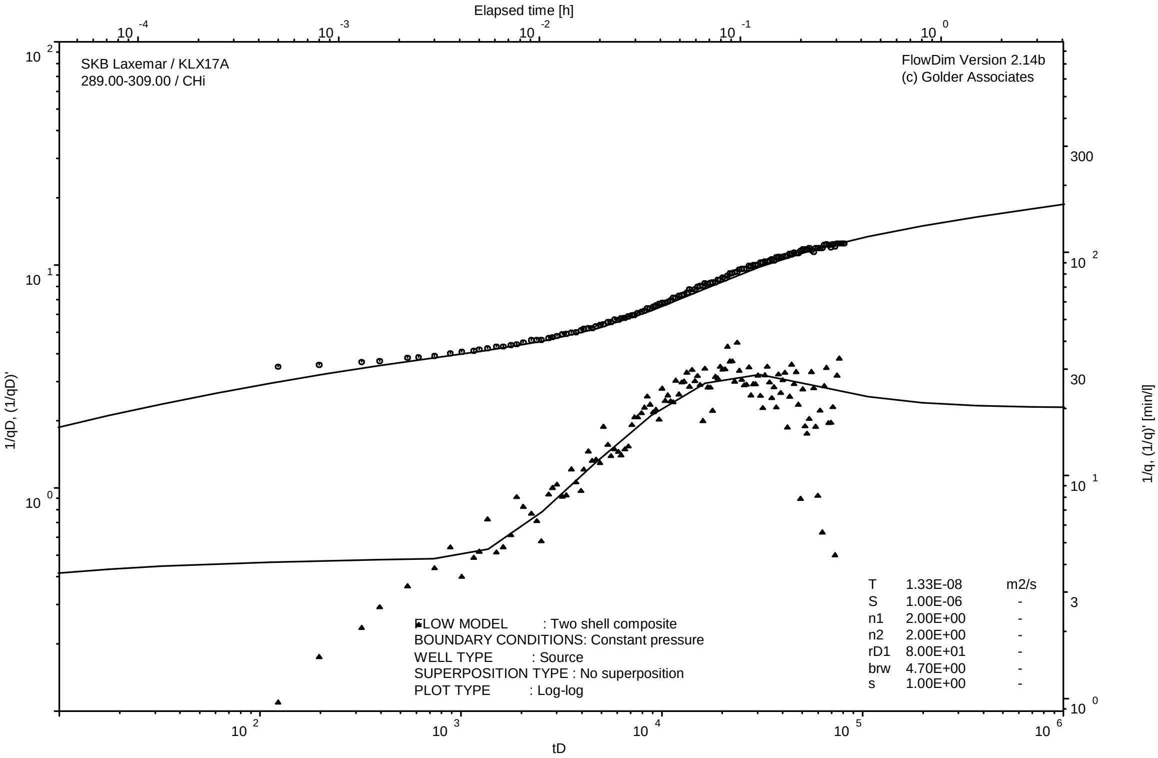
Analysis diagrams



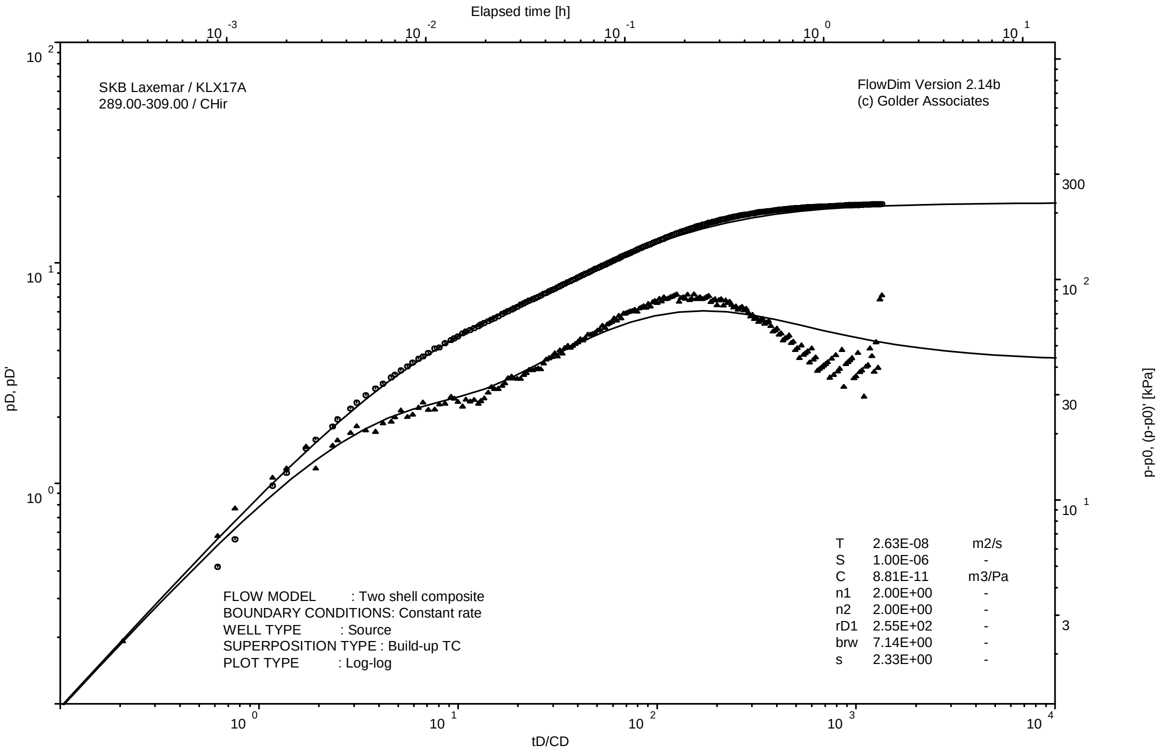
Pressure and flow rate vs. time; cartesian plot



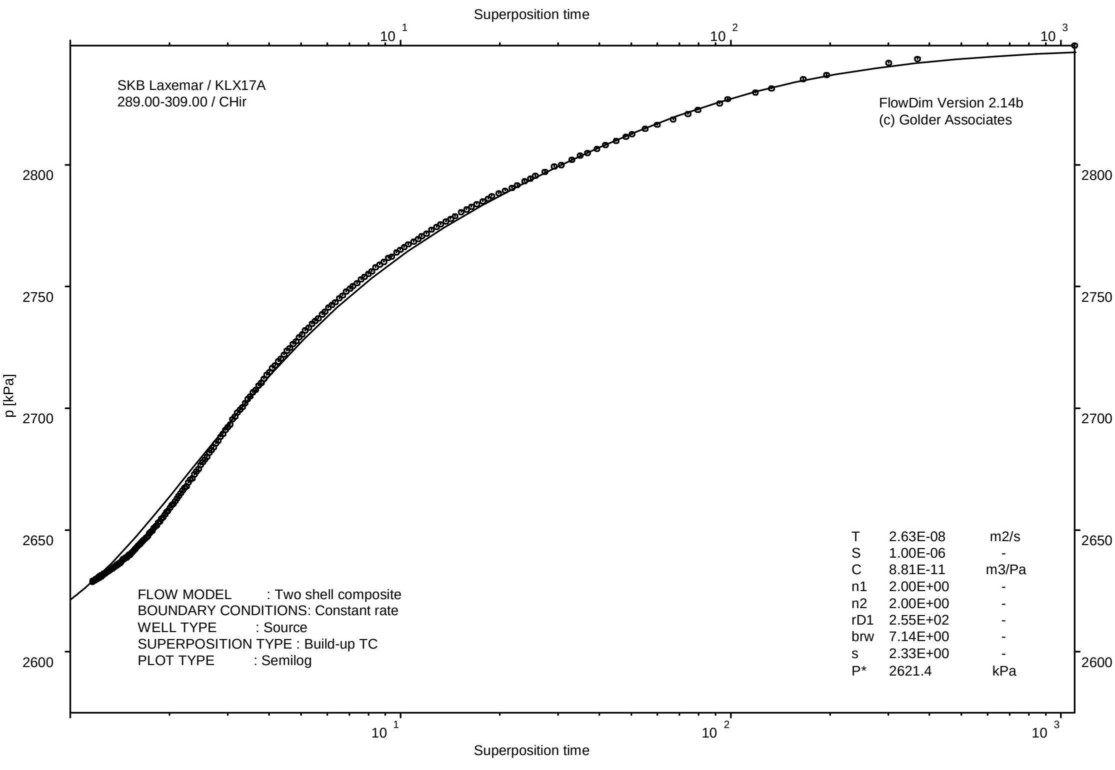
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

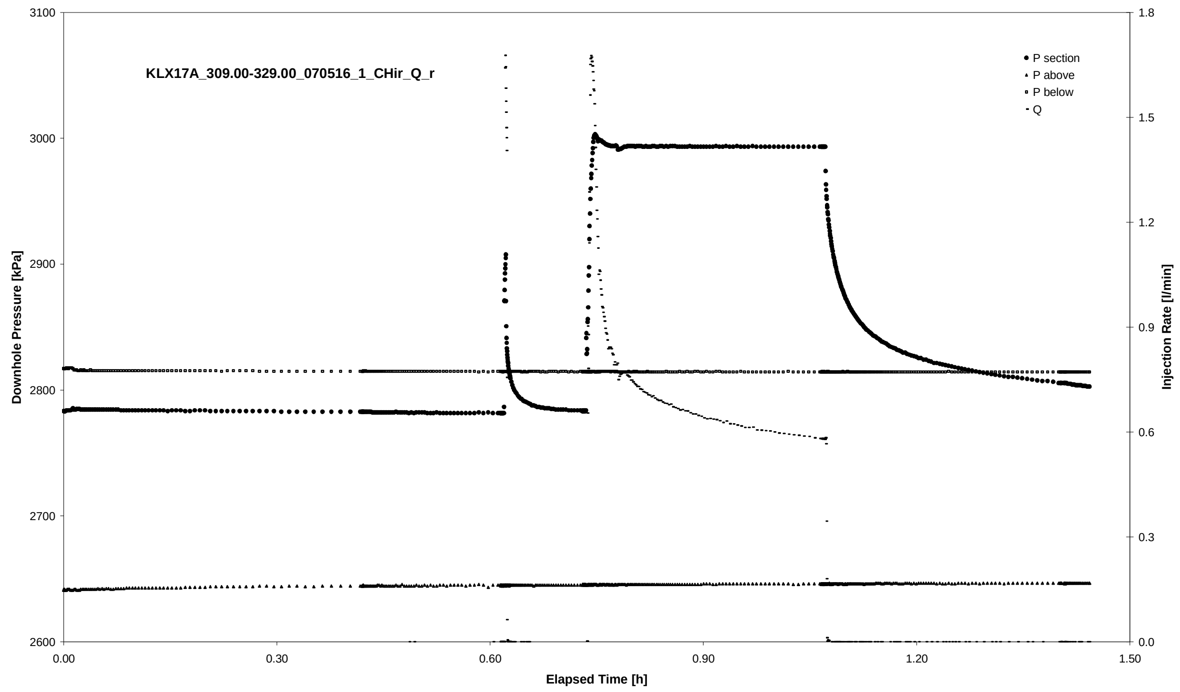


CHIR phase; HORNER match

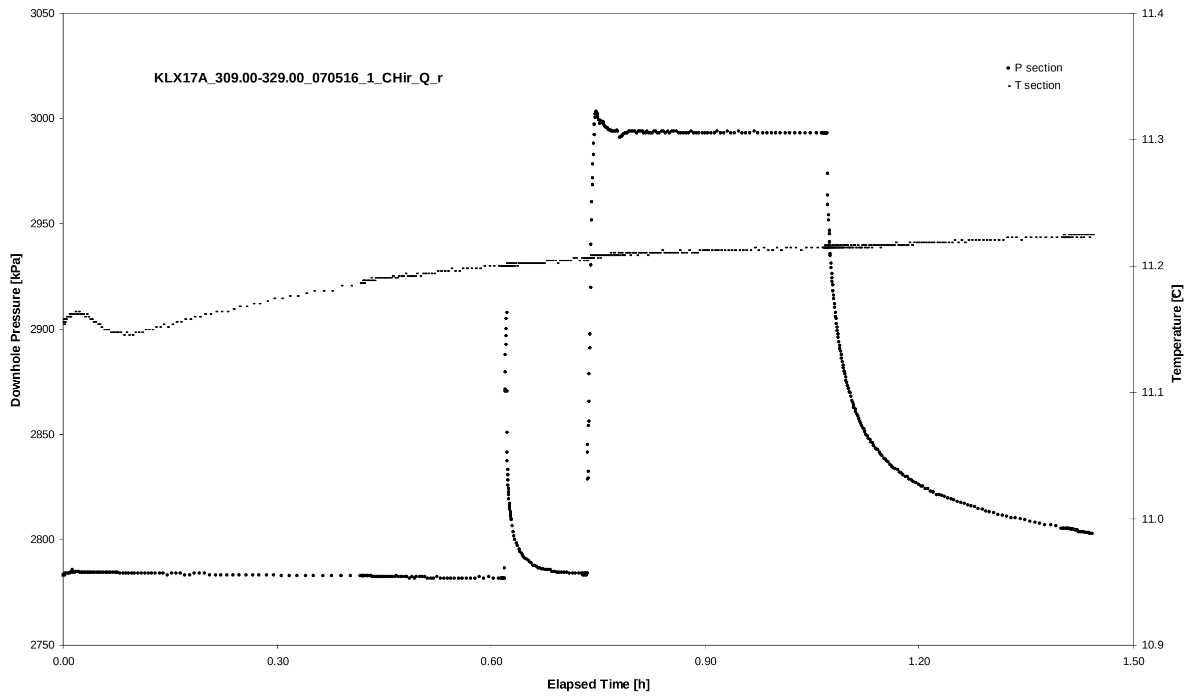
APPENDIX 2-20

Test 309.00 – 329.00 m

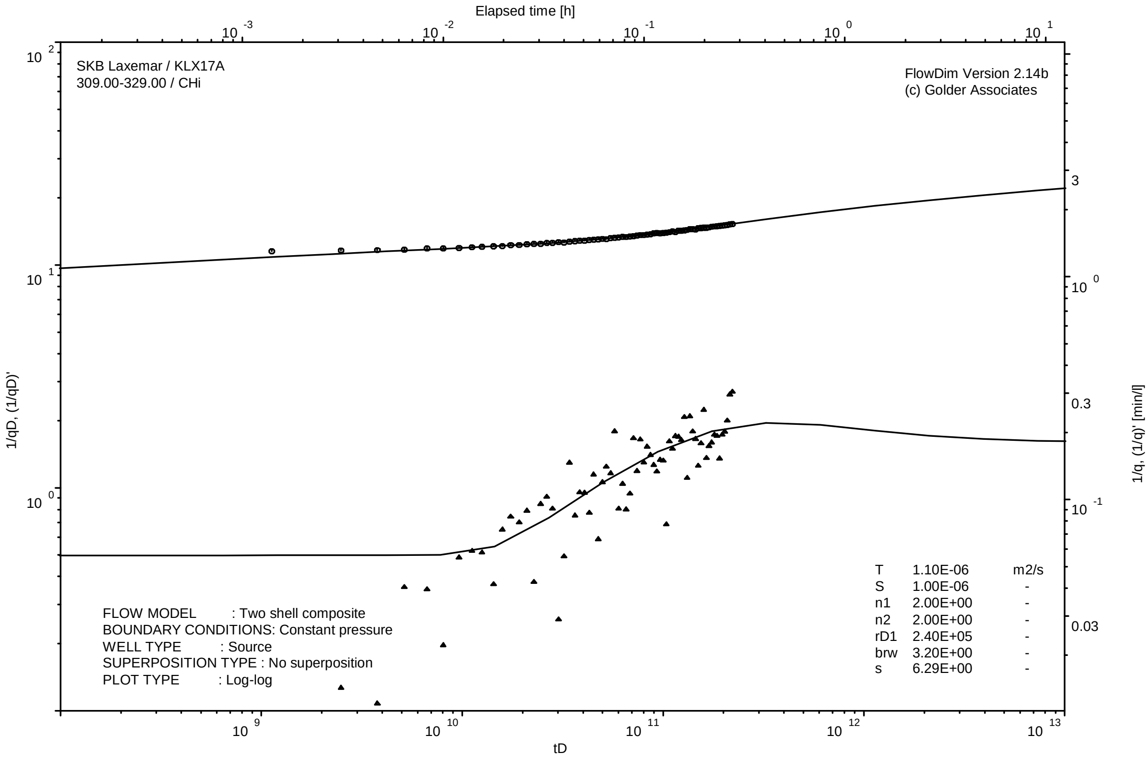
Analysis diagrams



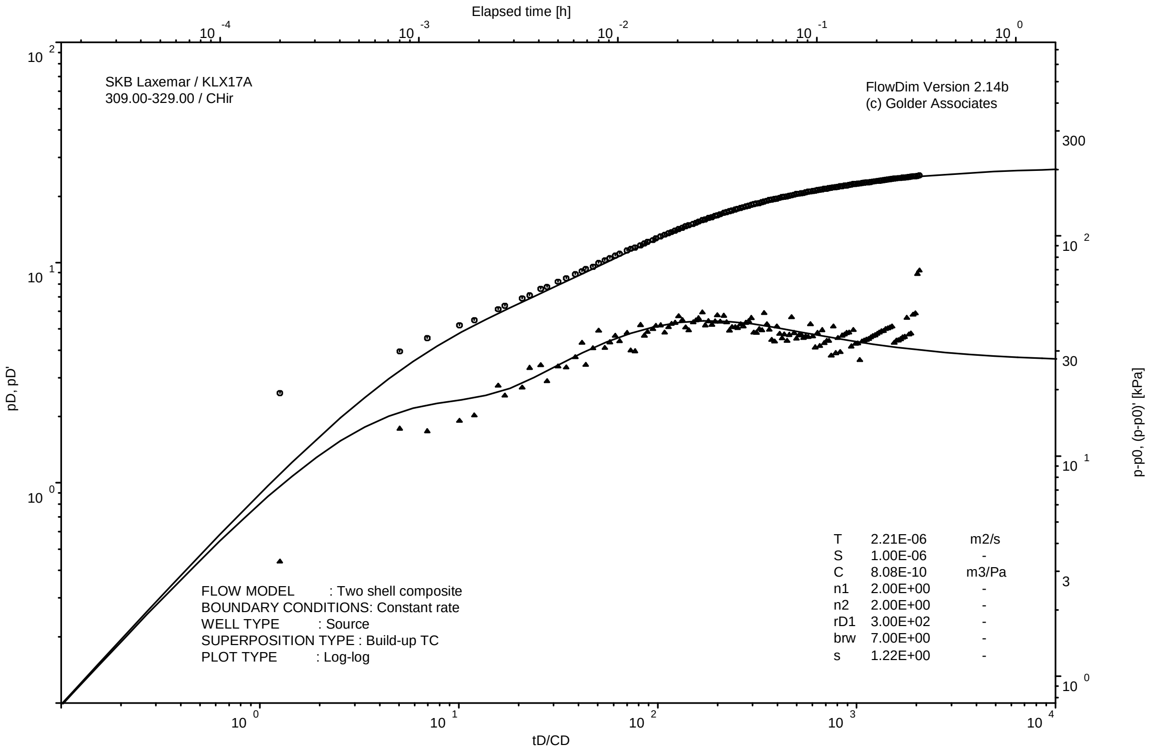
Pressure and flow rate vs. time; cartesian plot



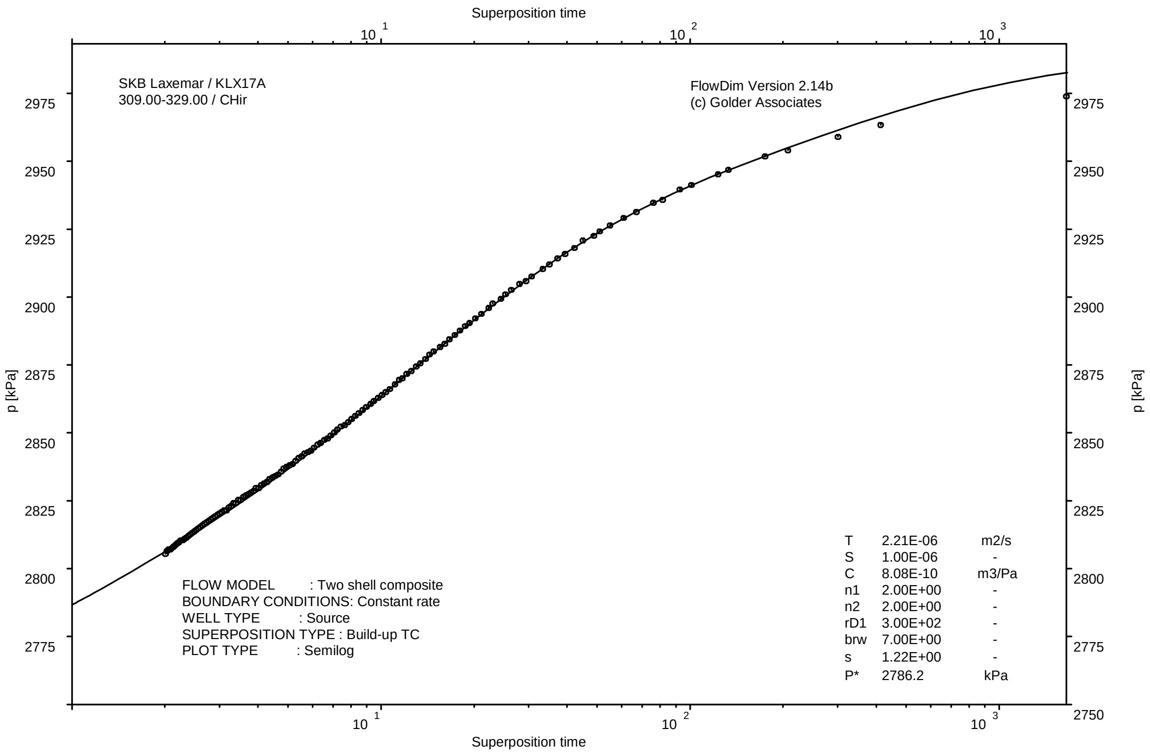
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

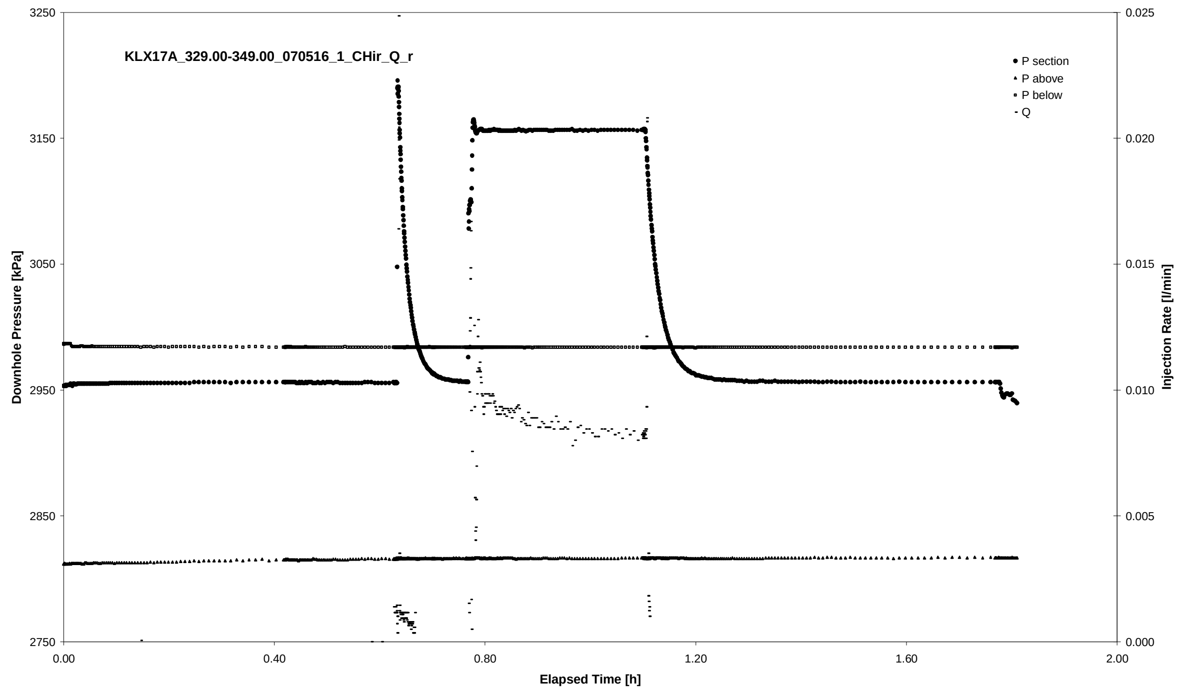


CHIR phase; HORNER match

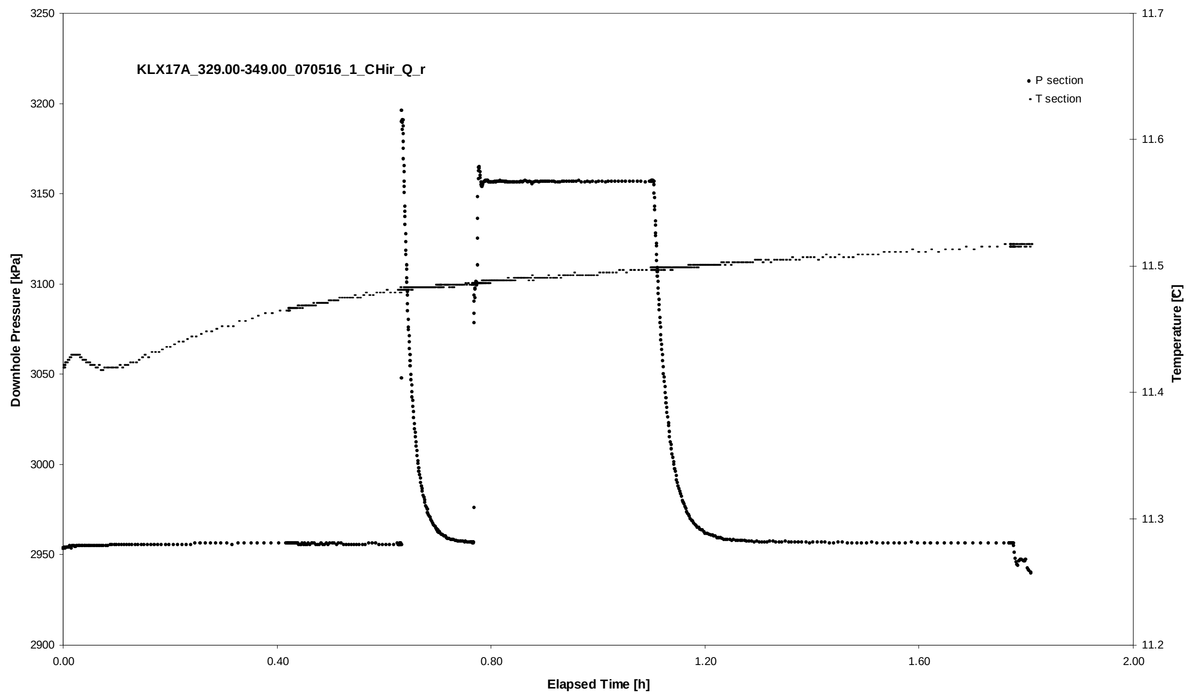
APPENDIX 2-21

Test 329.00 – 349.00 m

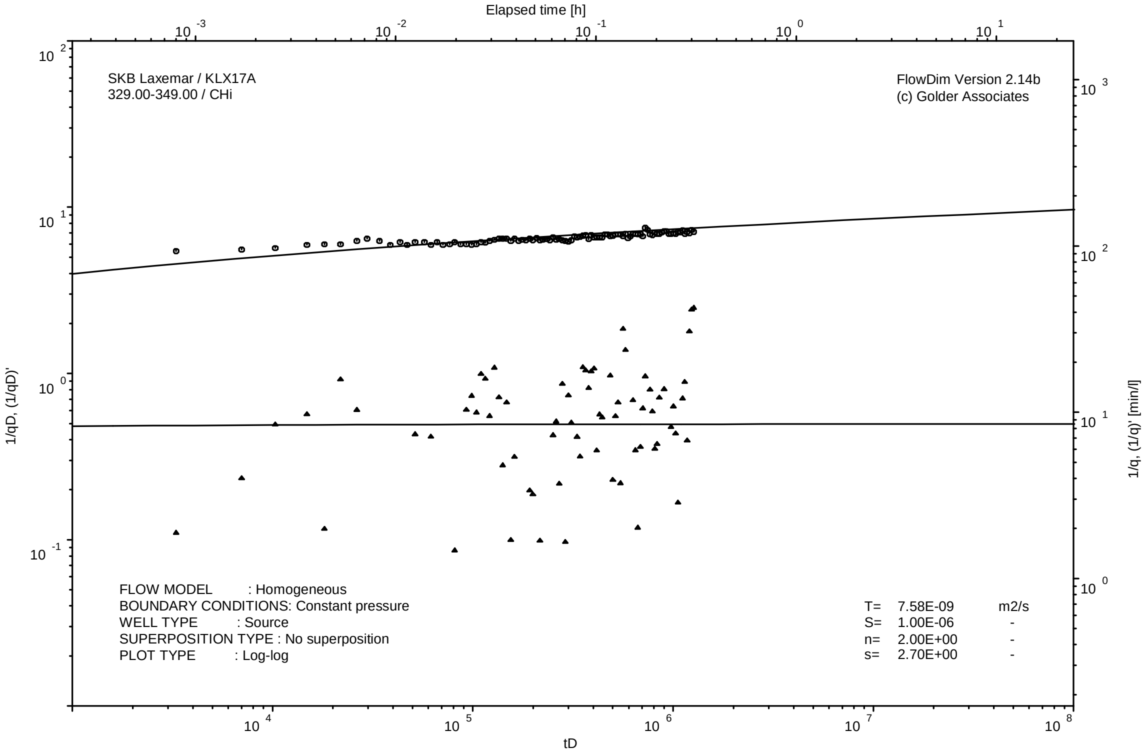
Analysis diagrams



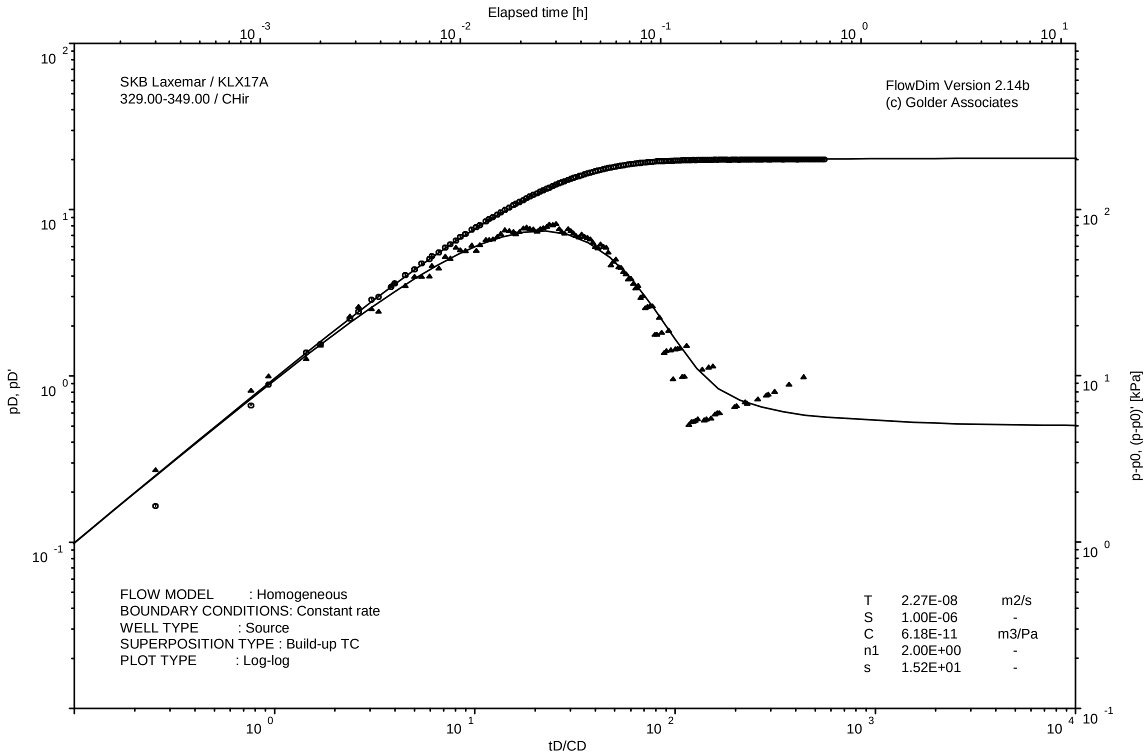
Pressure and flow rate vs. time; cartesian plot



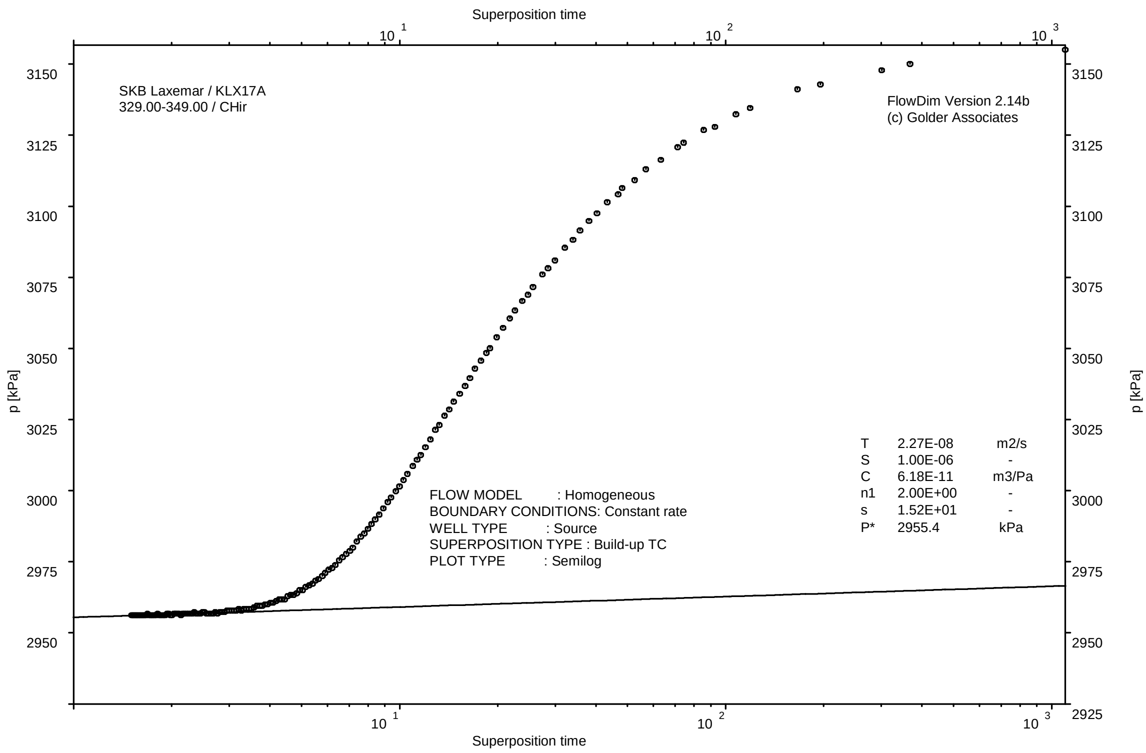
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

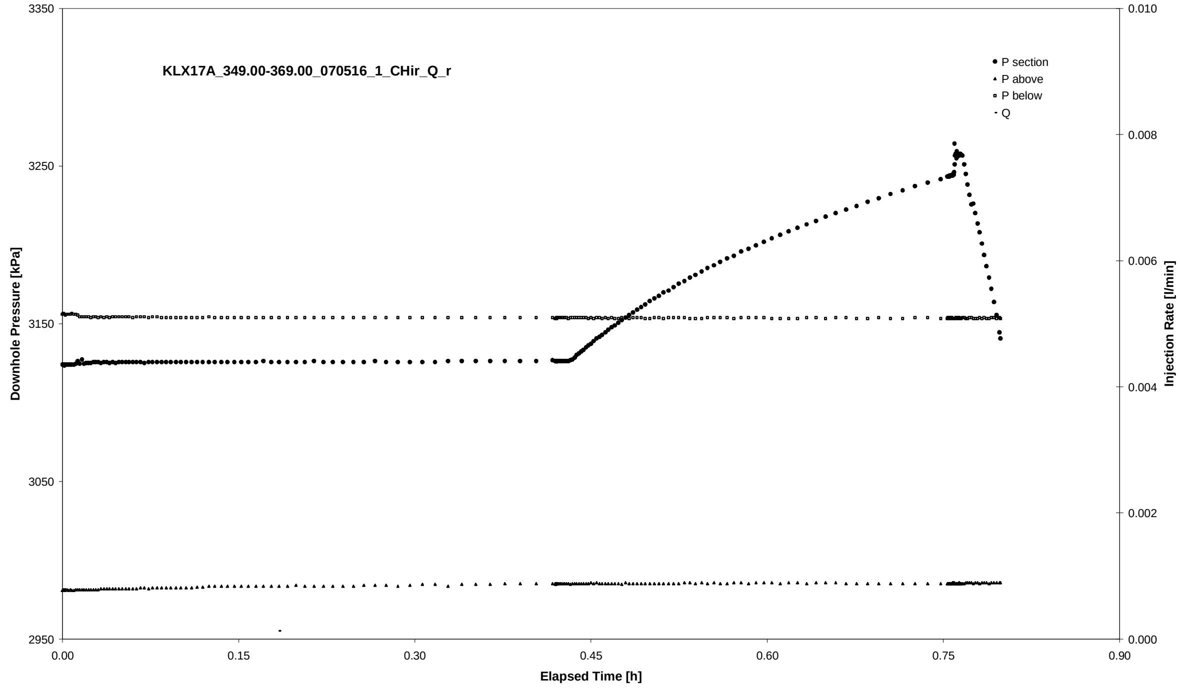


CHIR phase; HORNER match

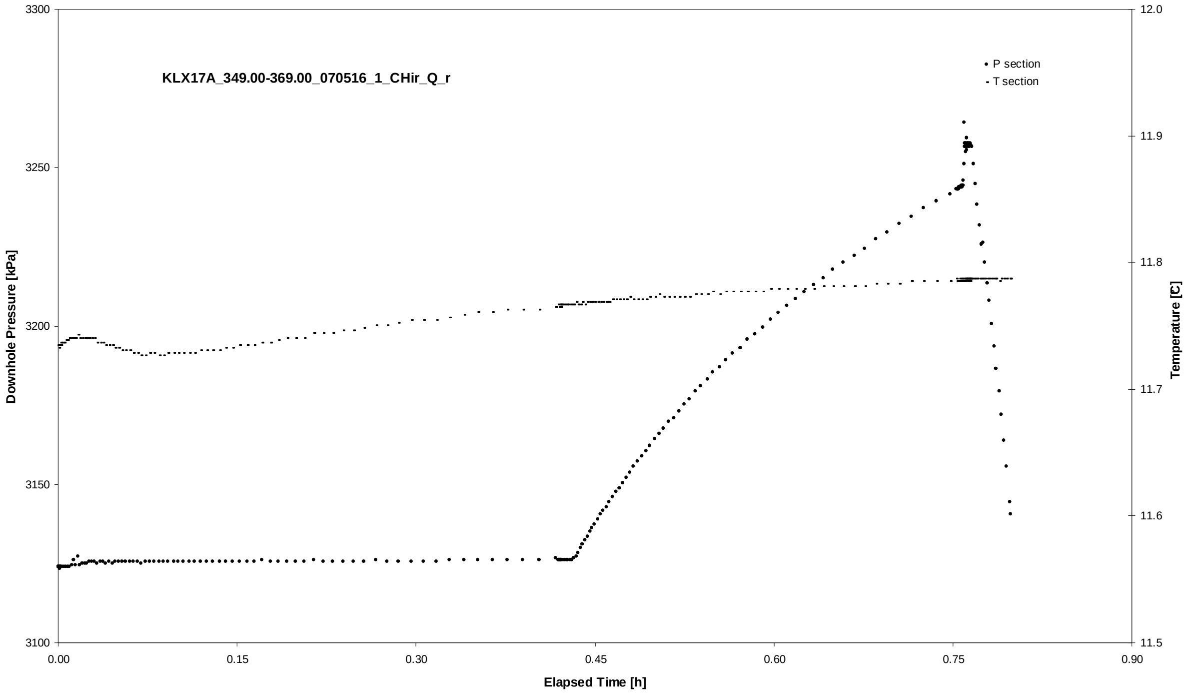
APPENDIX 2-22

Test 349.00 – 369.00 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

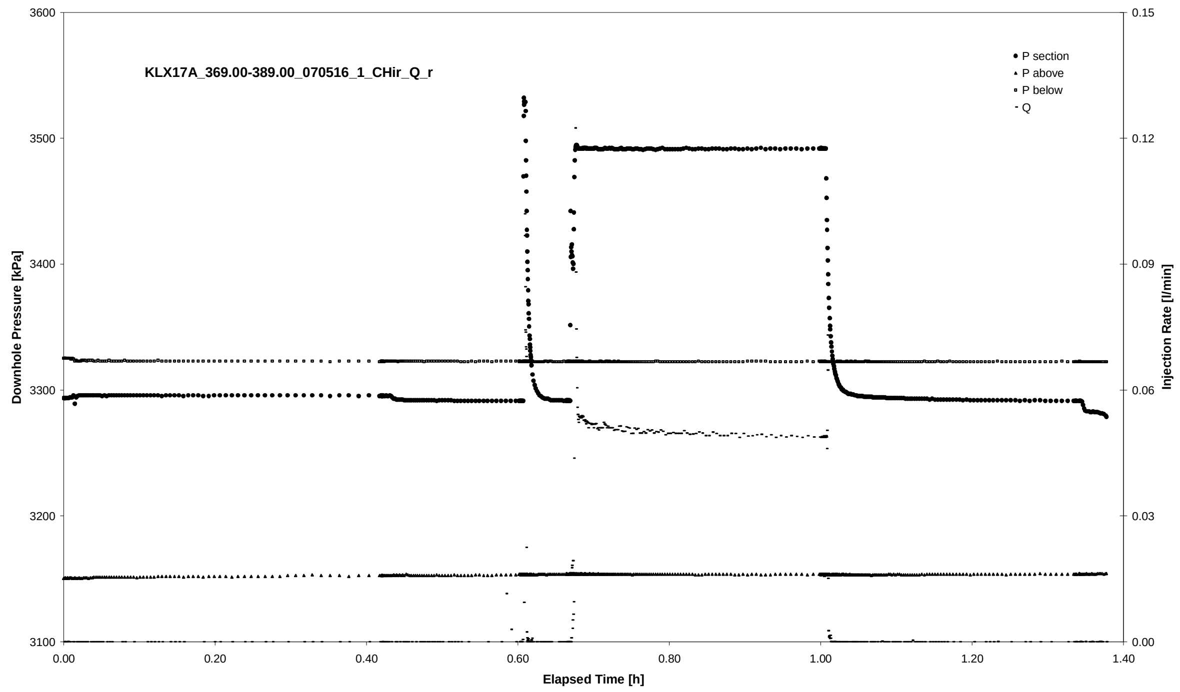
Not analysed

CHIR phase; HORNER match

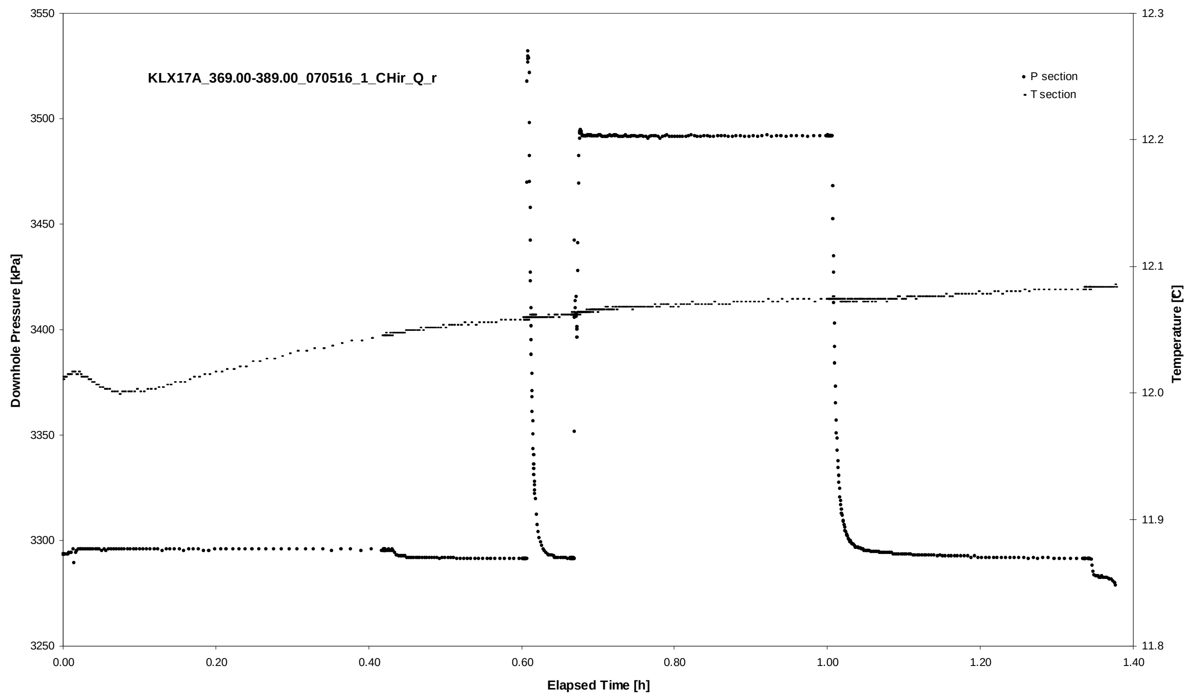
APPENDIX 2-23

Test 369.00 – 389.00 m

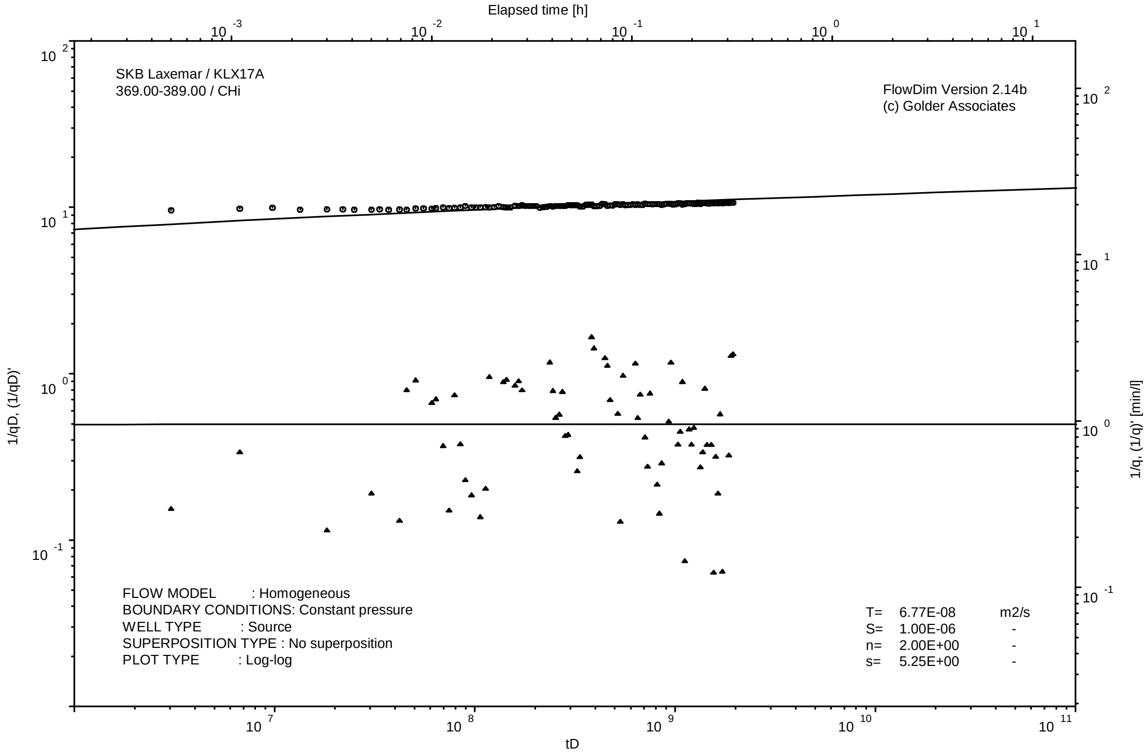
Analysis diagrams



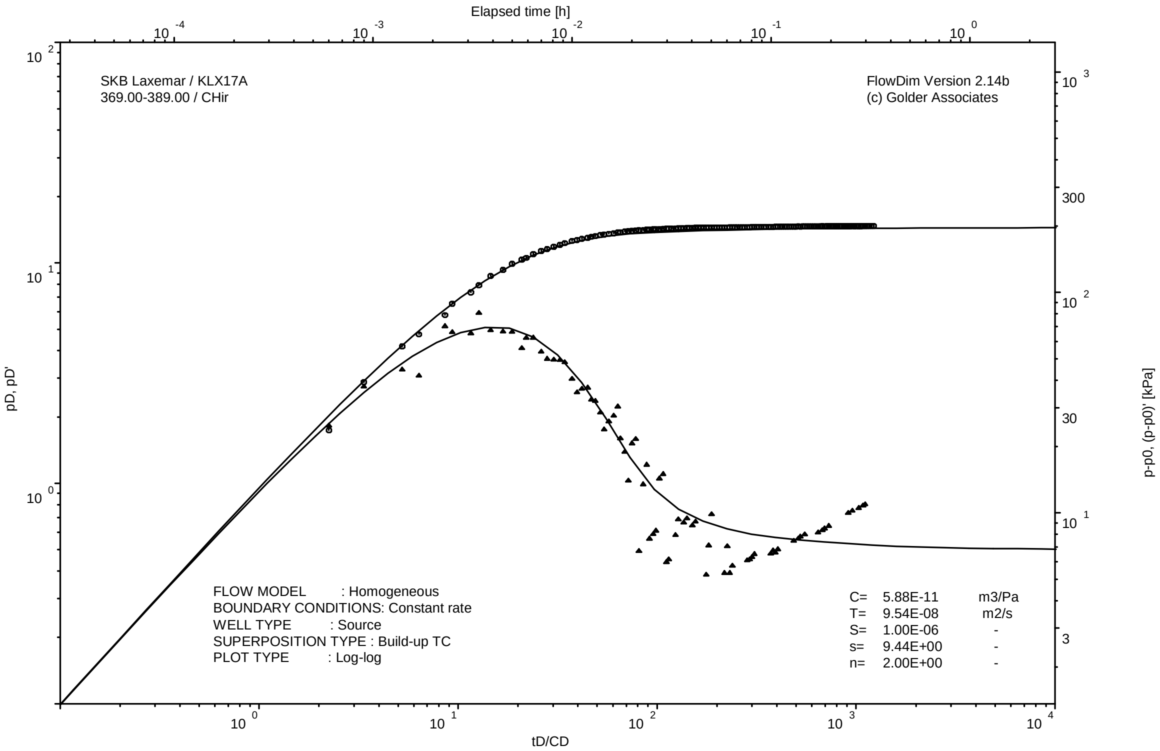
Pressure and flow rate vs. time; cartesian plot



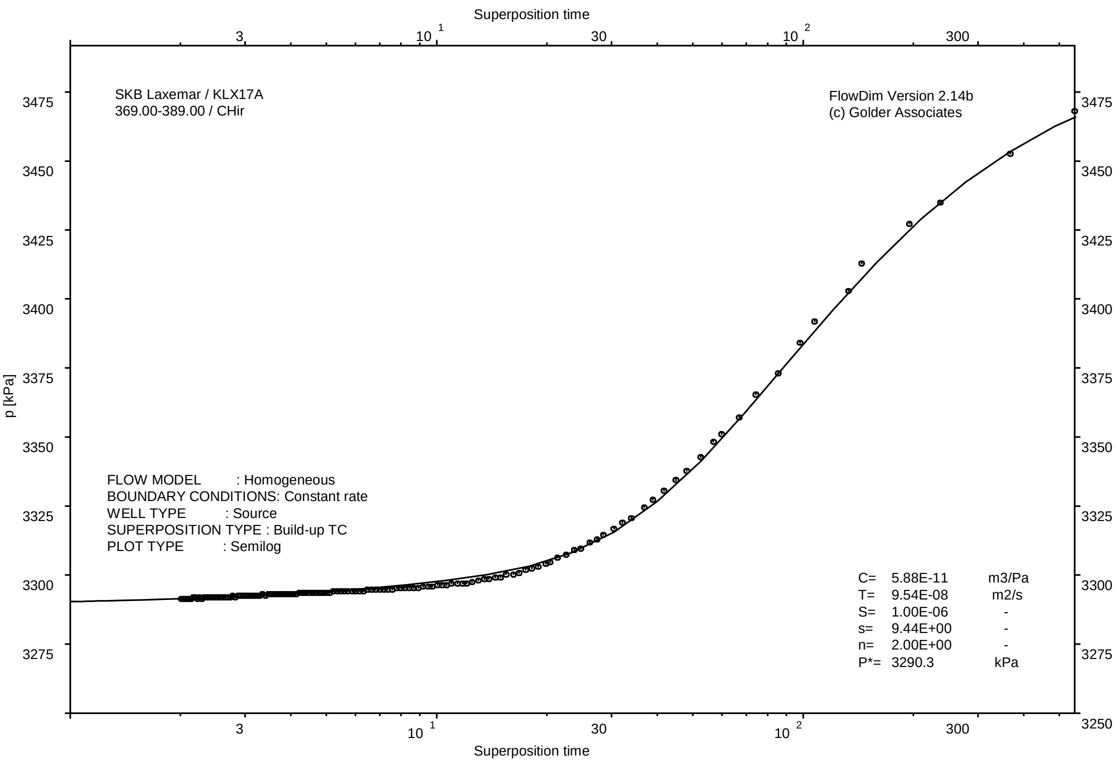
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

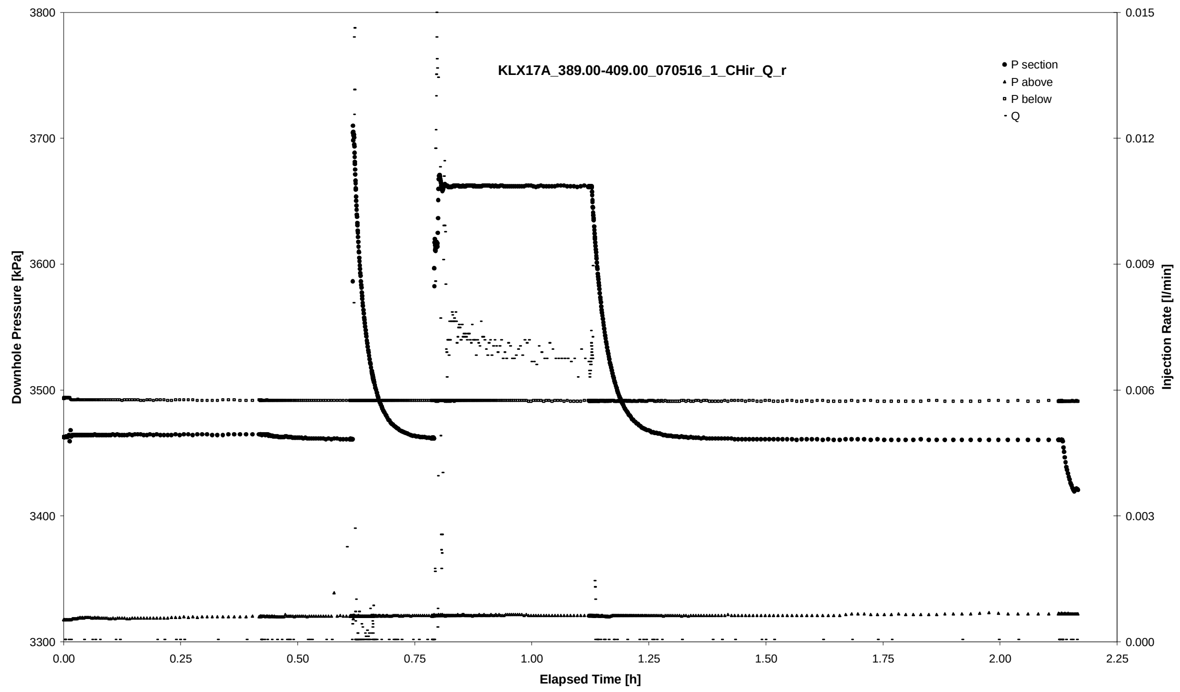


CHIR phase; HORNER match

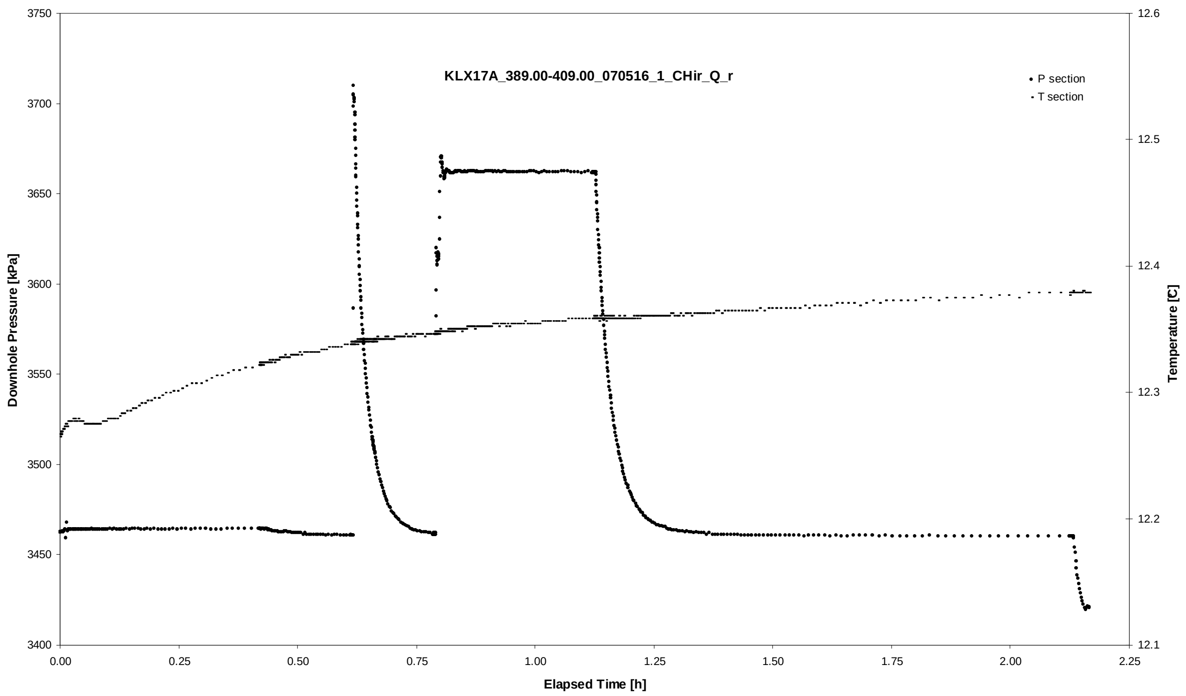
APPENDIX 2-24

Test 389.00 – 409.00 m

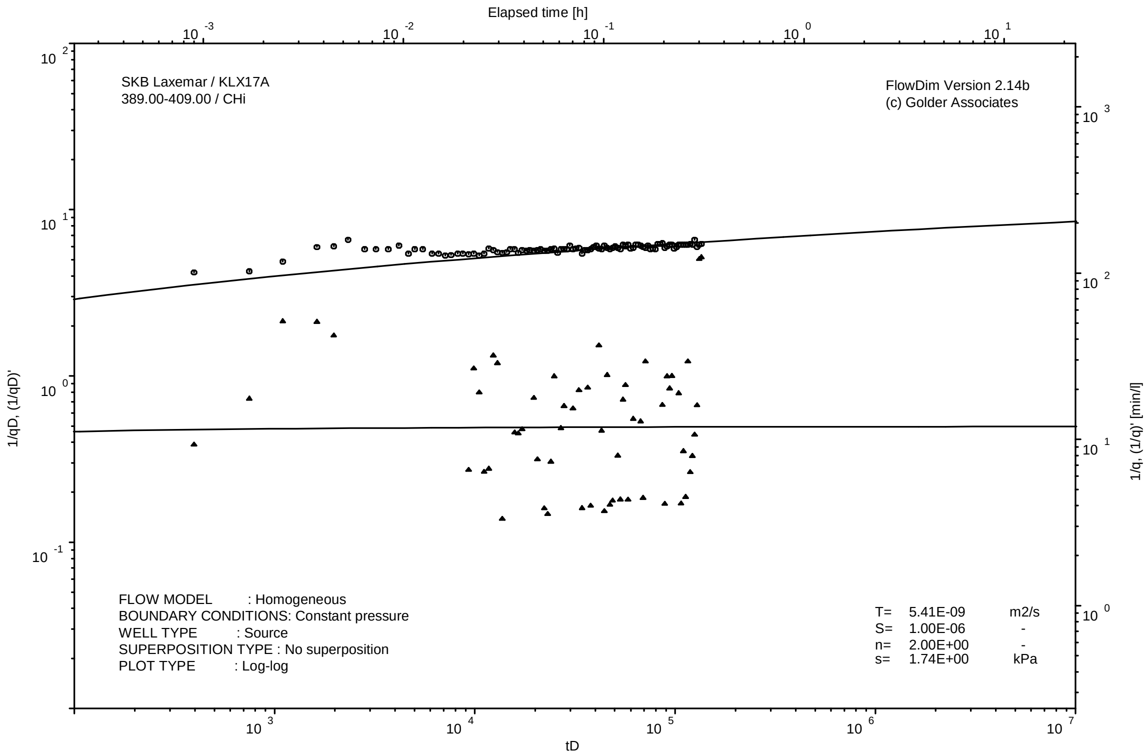
Analysis diagrams



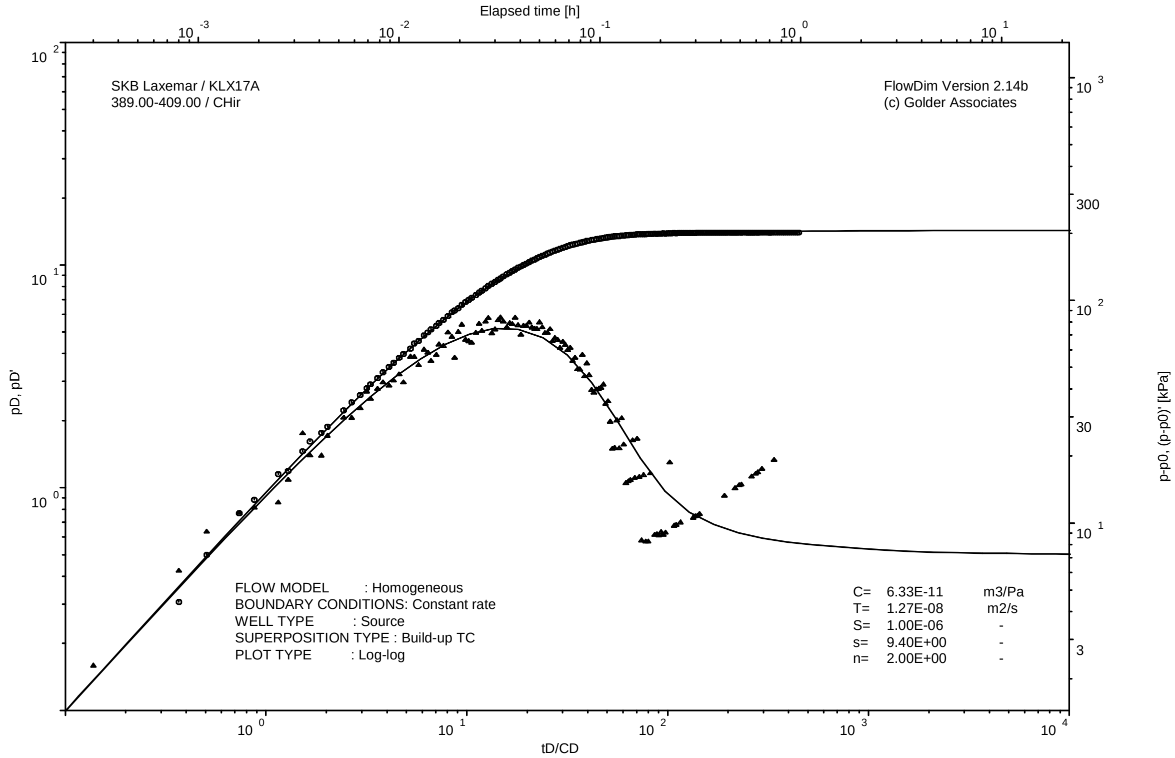
Pressure and flow rate vs. time; cartesian plot



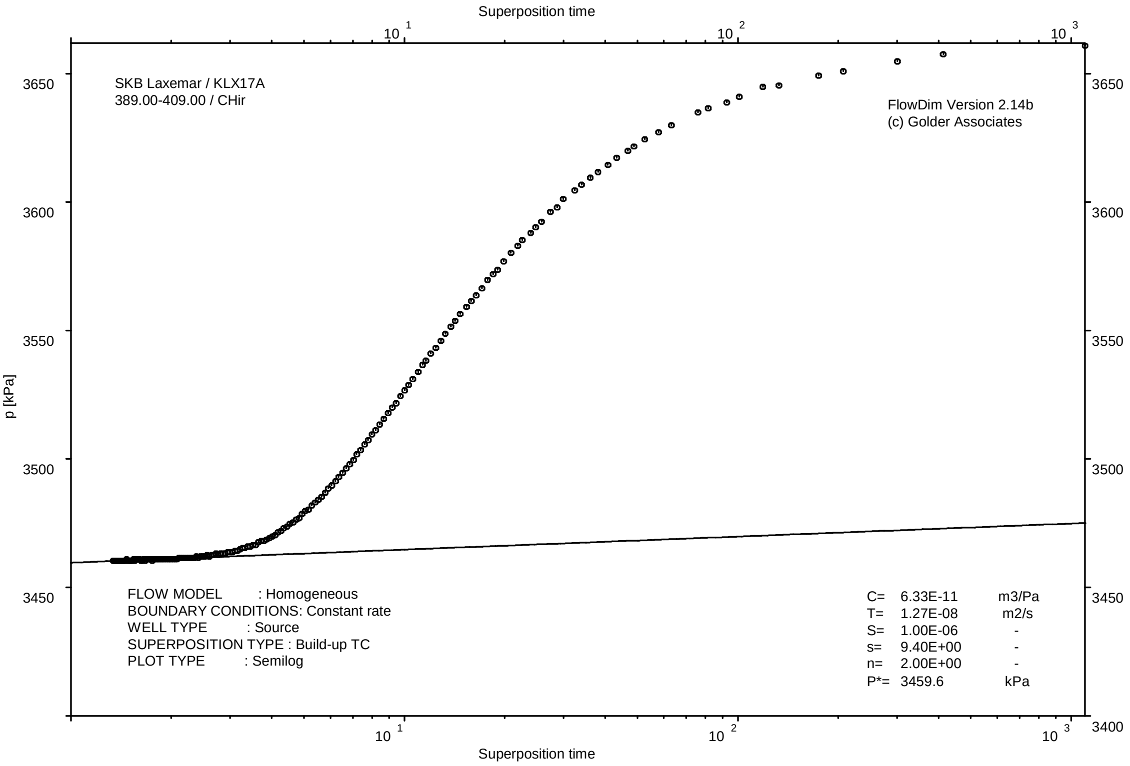
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

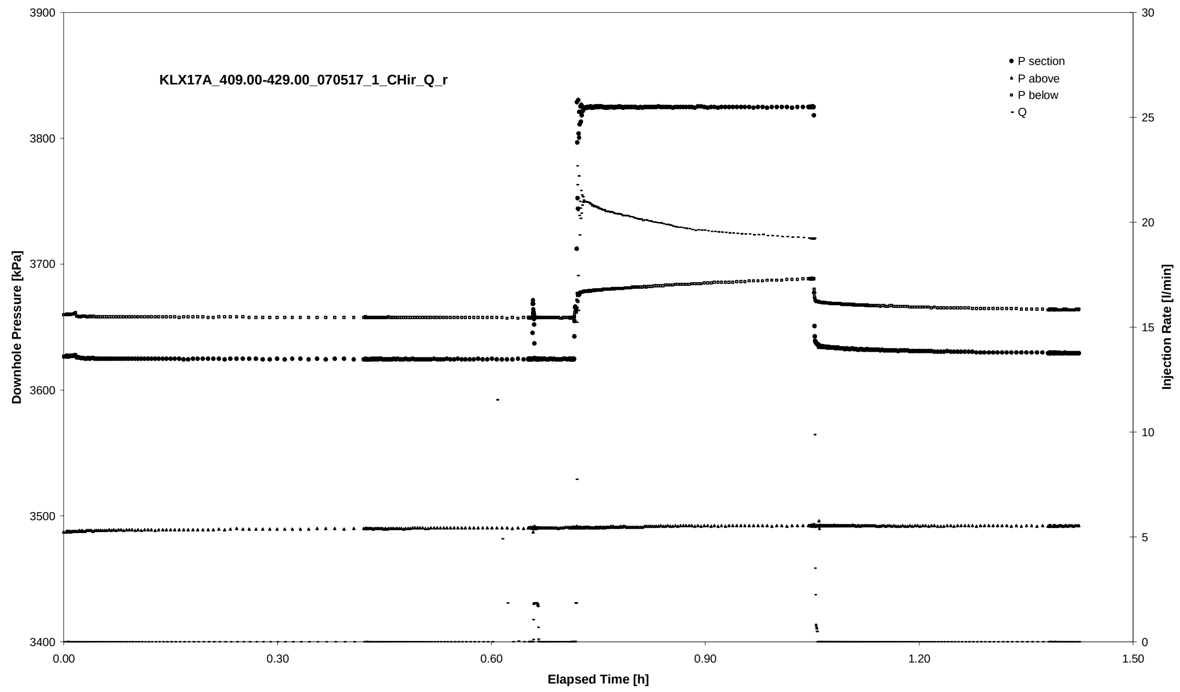


CHIR phase; HORNER match

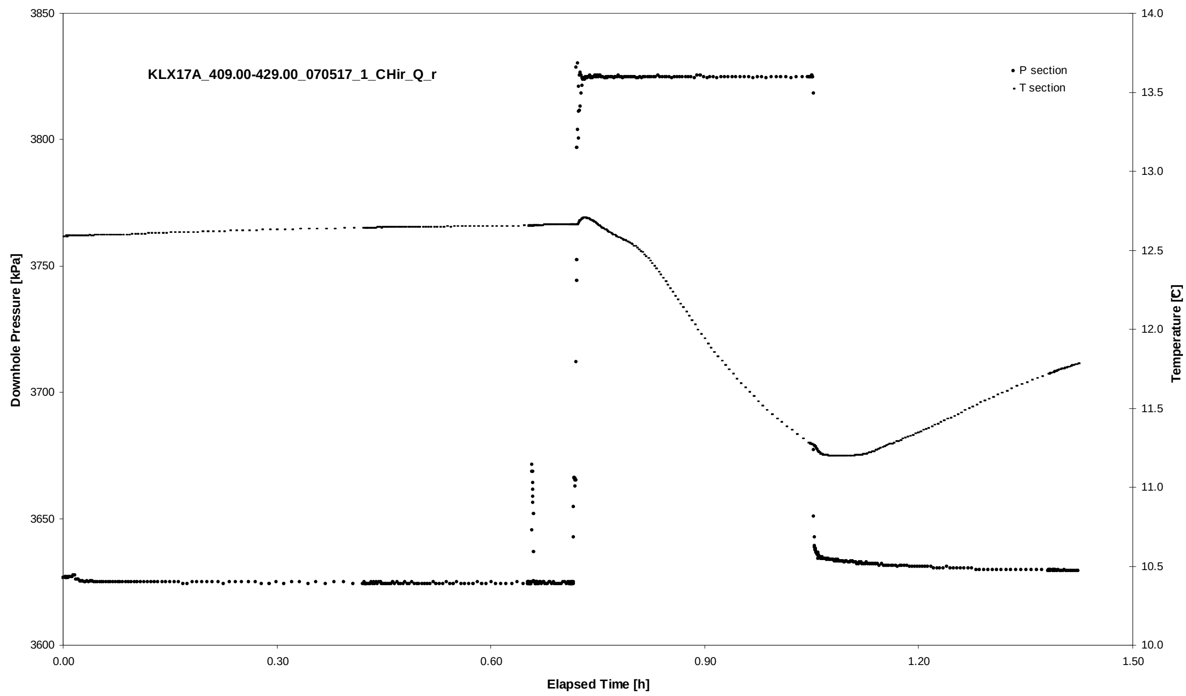
APPENDIX 2-25

Test 409.00 – 429.00 m

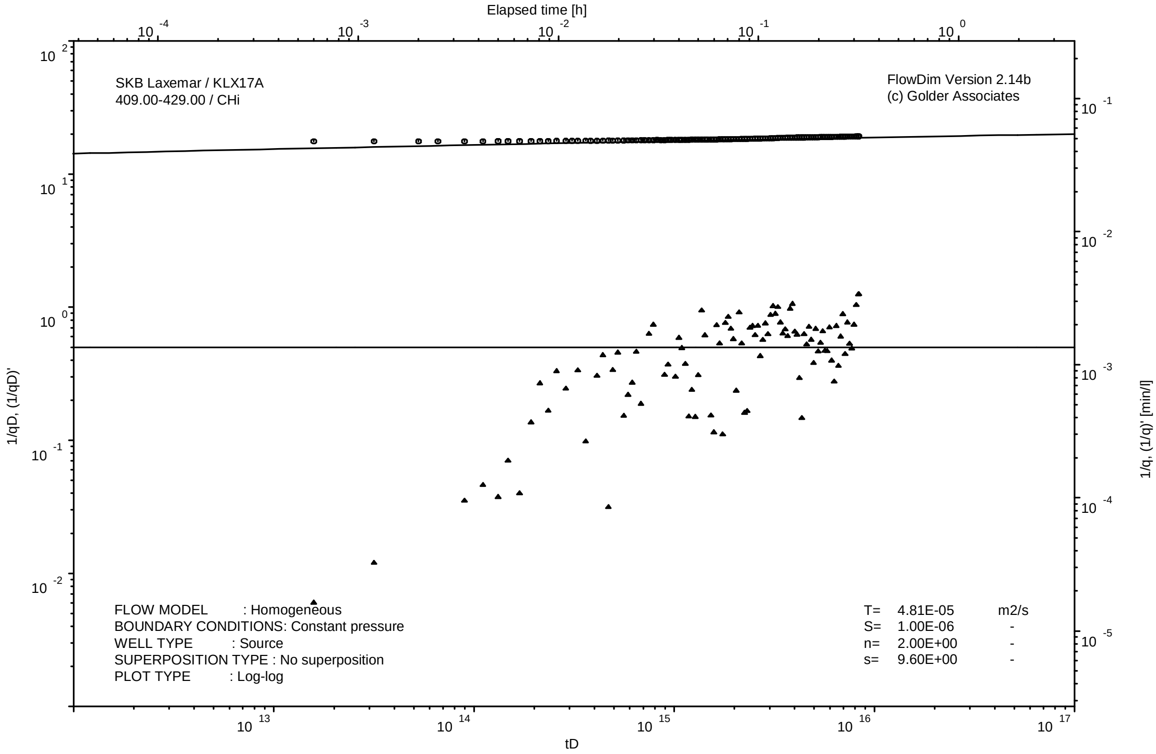
Analysis diagrams



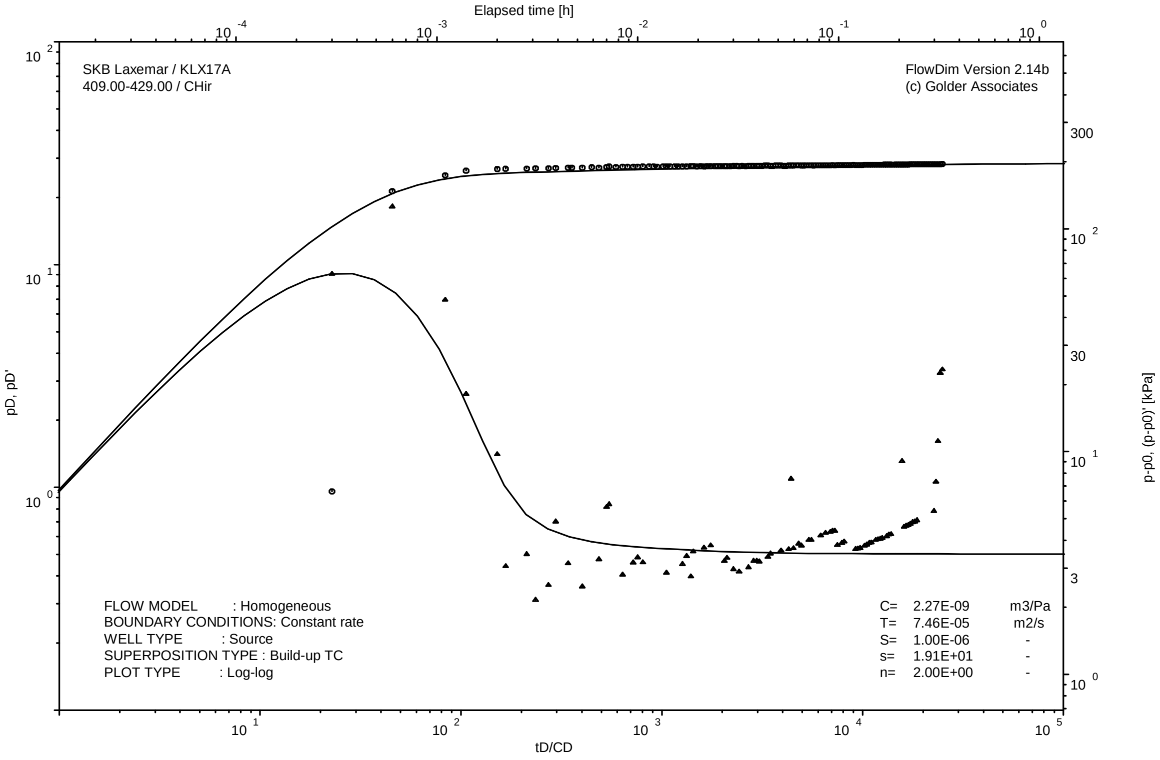
Pressure and flow rate vs. time; cartesian plot



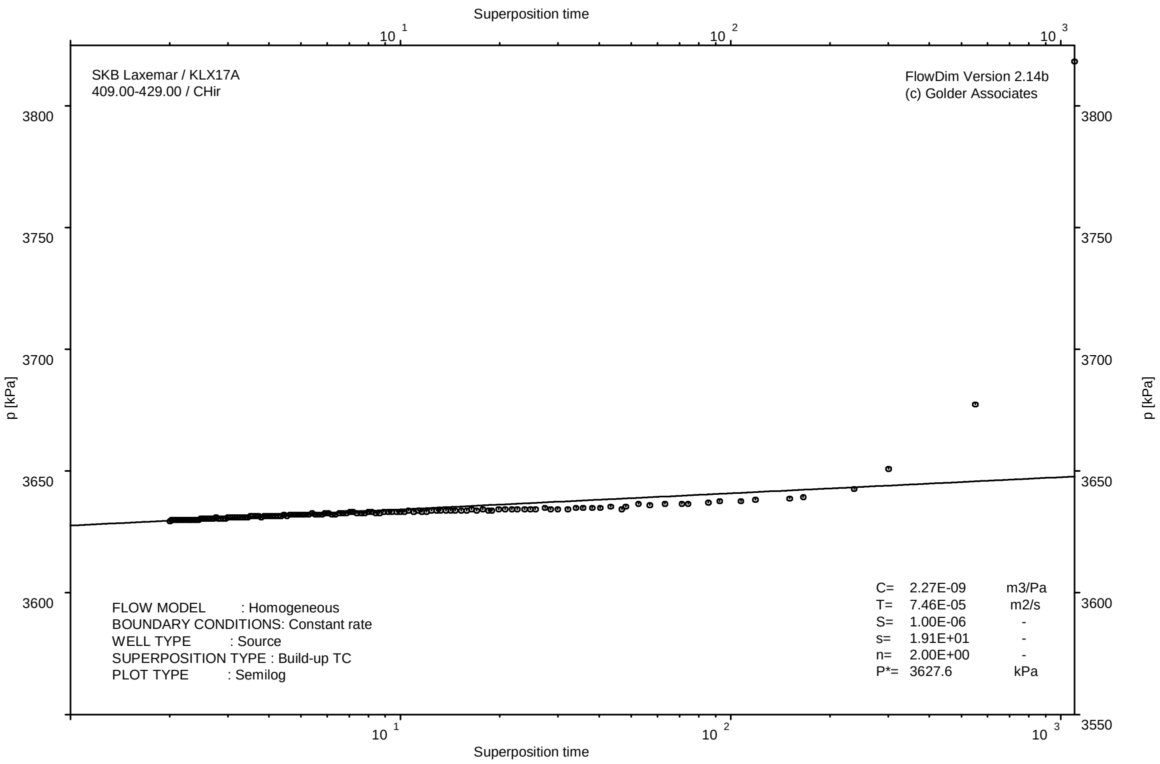
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

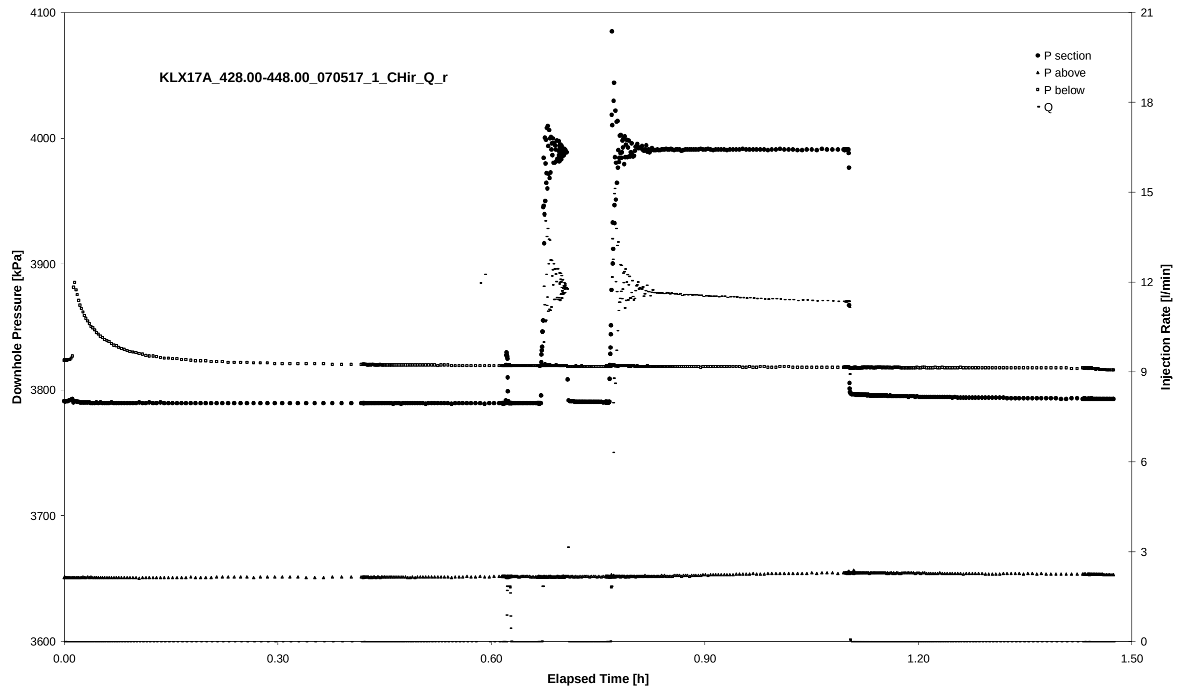


CHIR phase; HORNER match

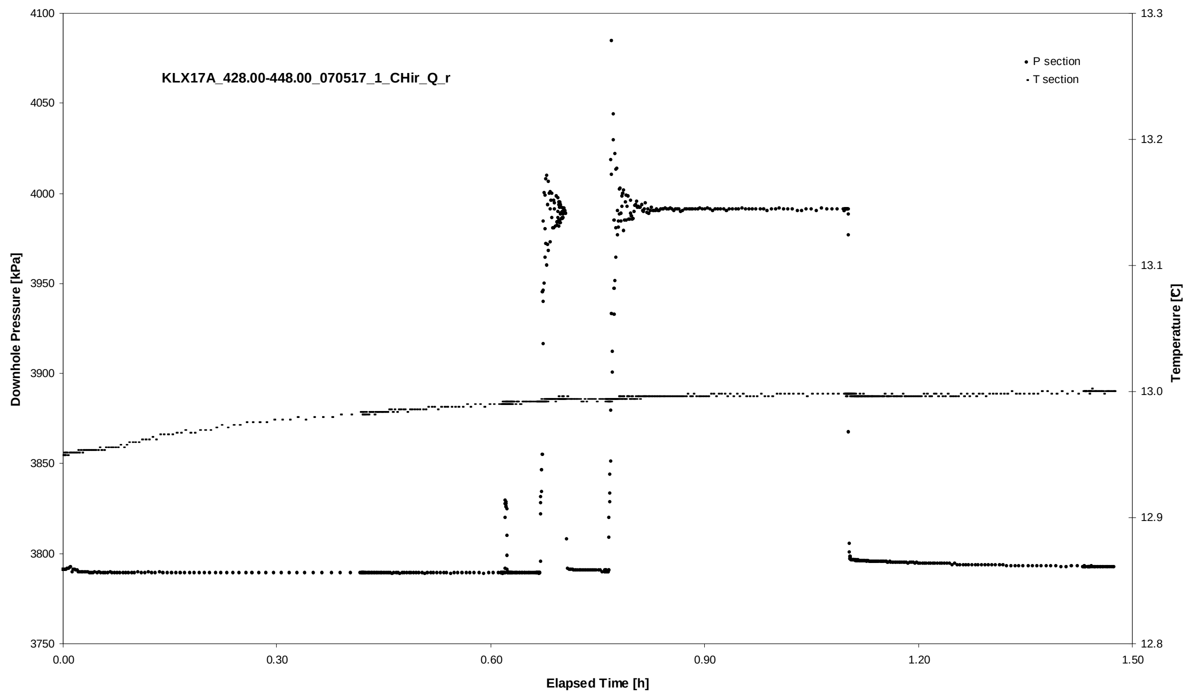
APPENDIX 2-26

Test 428.00 – 448.00 m

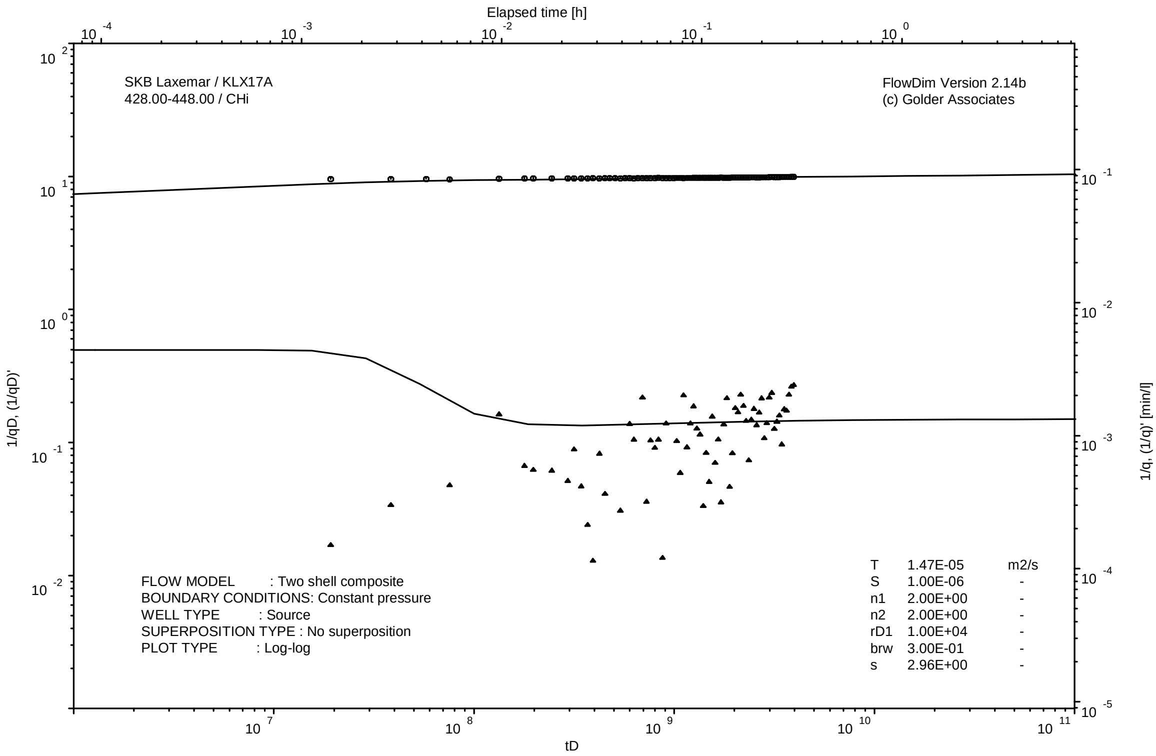
Analysis diagrams



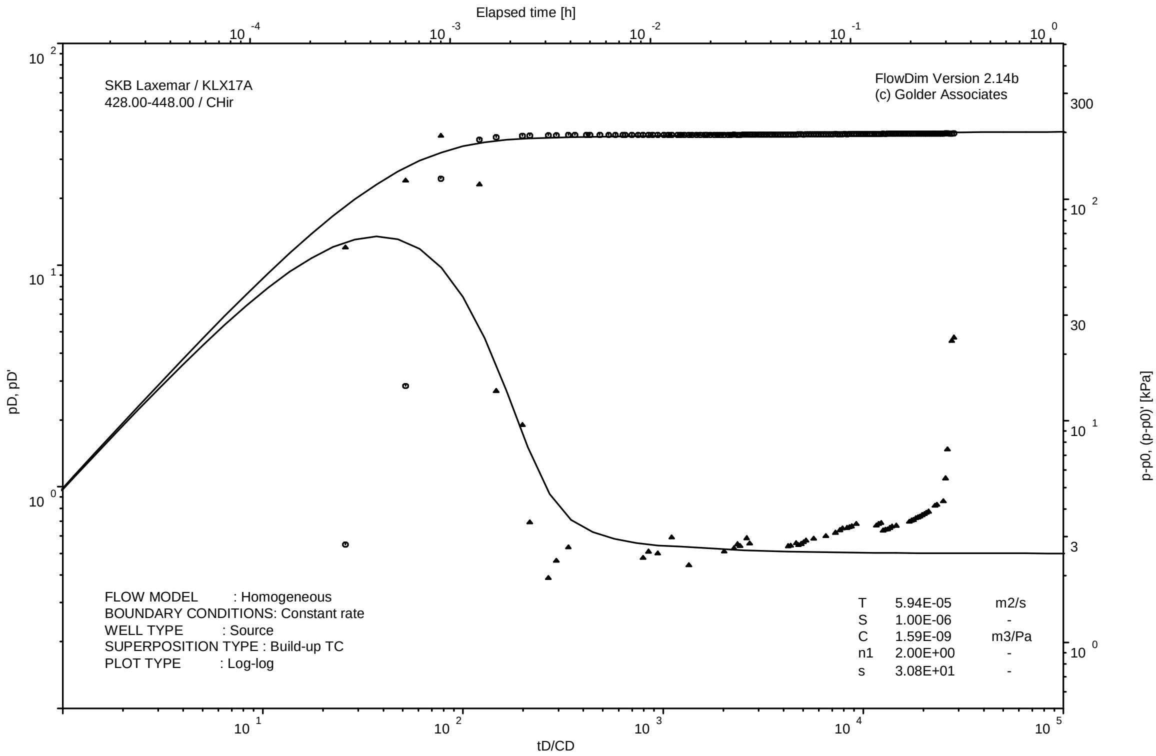
Pressure and flow rate vs. time; cartesian plot



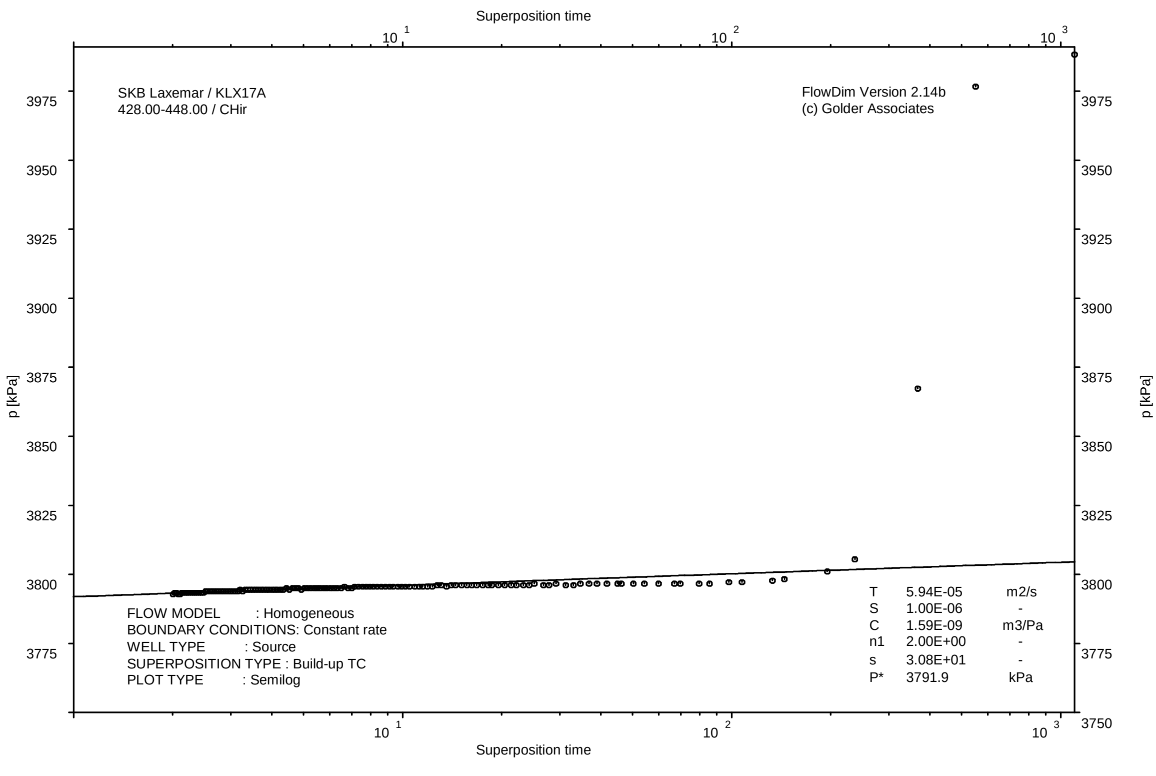
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

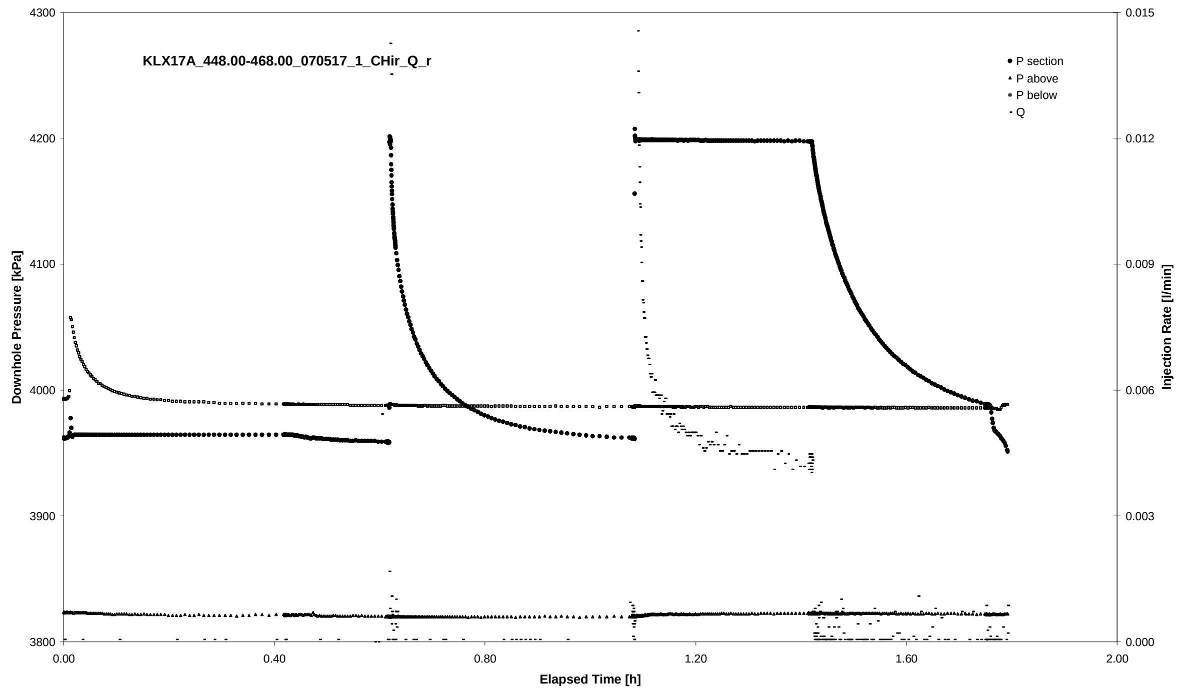


CHIR phase; HORNER match

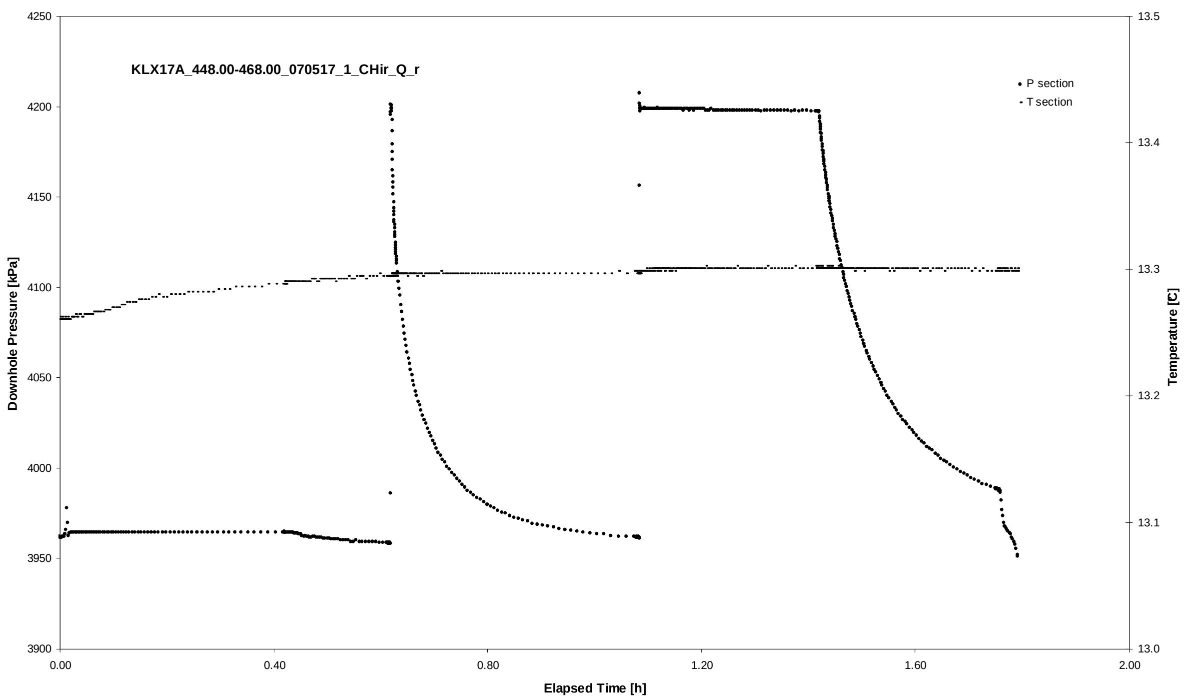
APPENDIX 2-27

Test 448.00 – 468.00 m

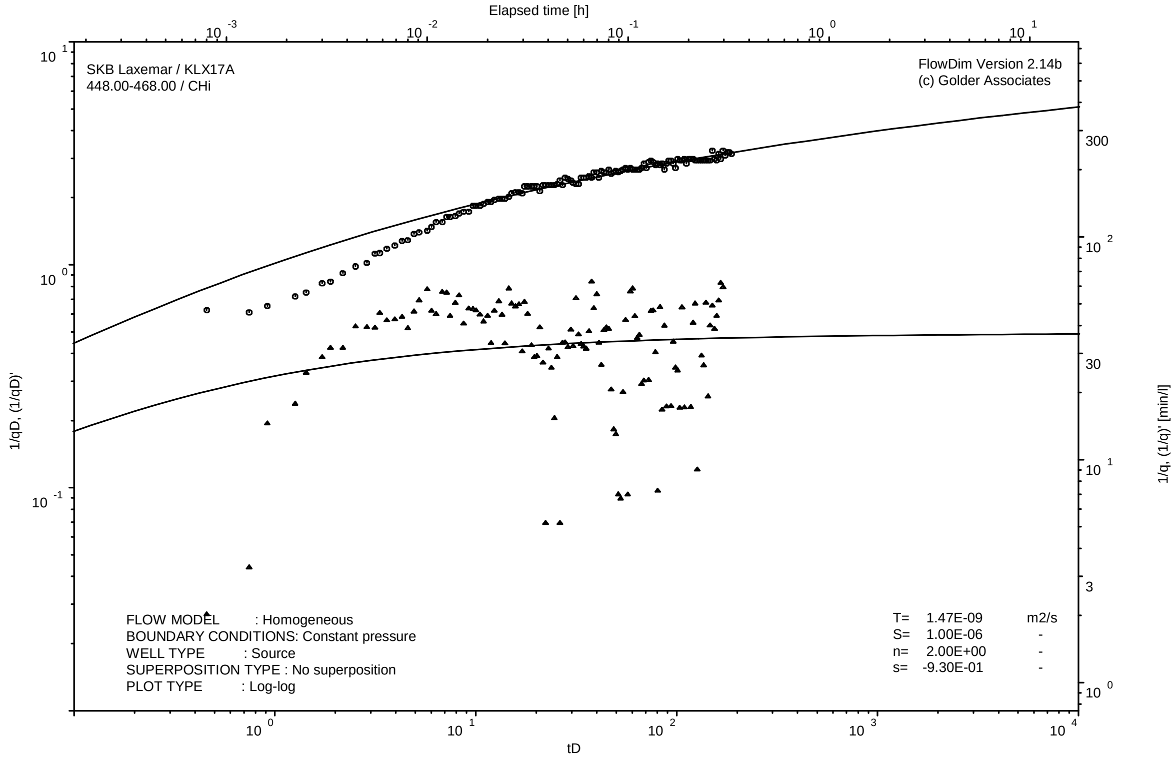
Analysis diagrams



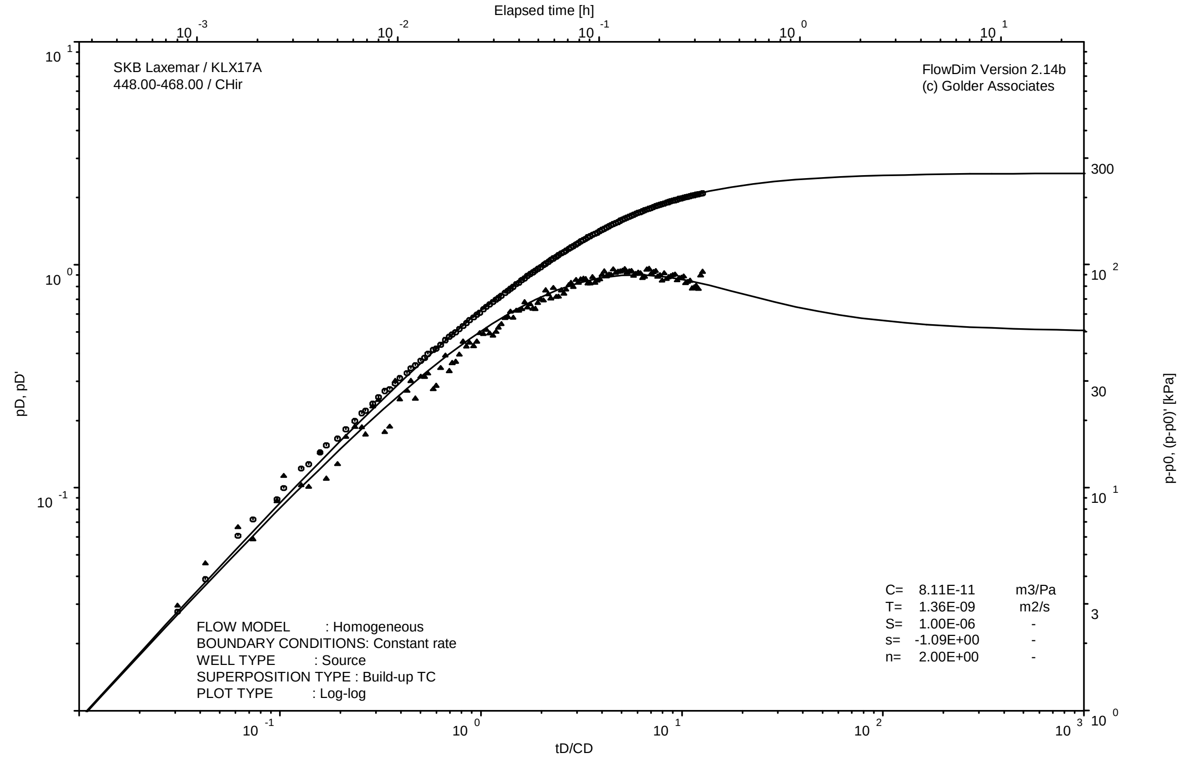
Pressure and flow rate vs. time; cartesian plot



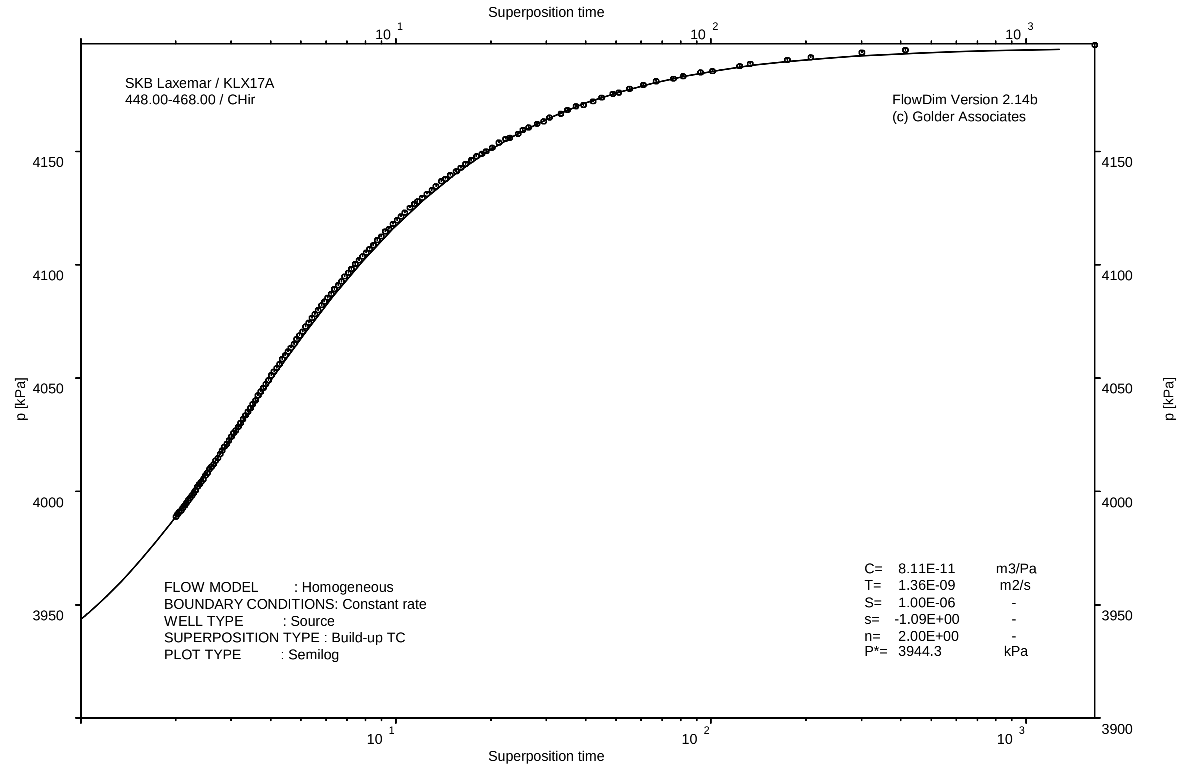
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

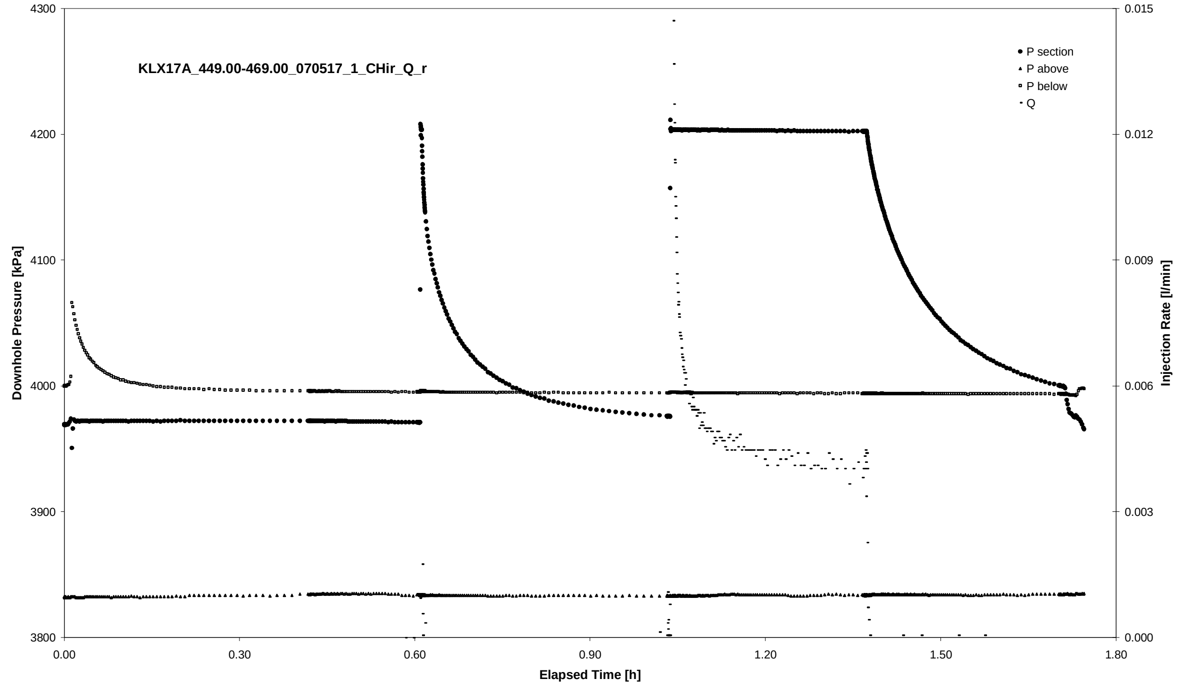


CHIR phase; HORNER match

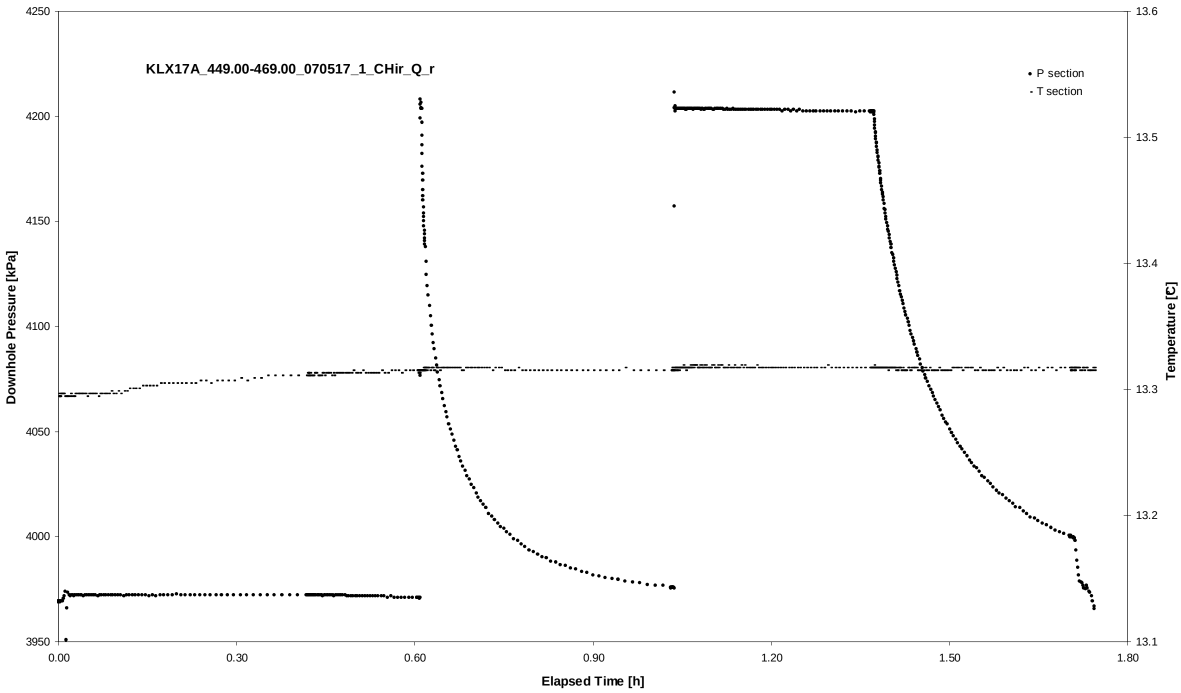
APPENDIX 2-28

Test 449.00 – 469.00 m

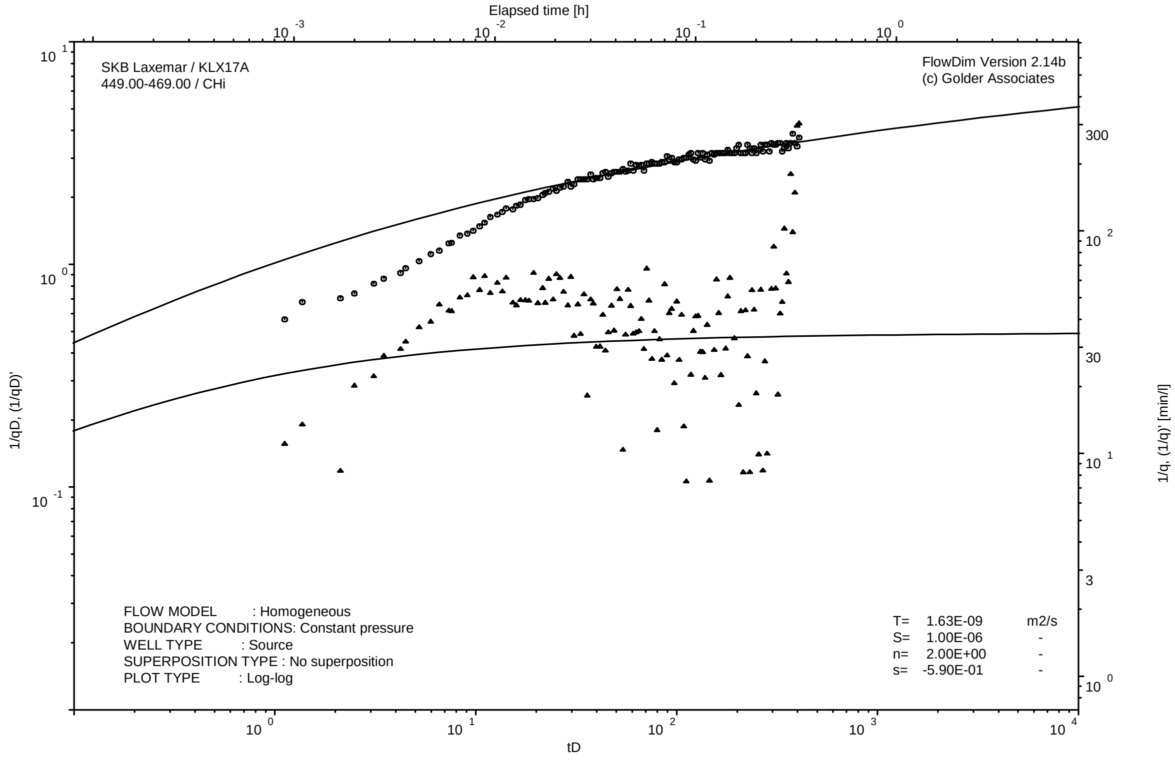
Analysis diagrams



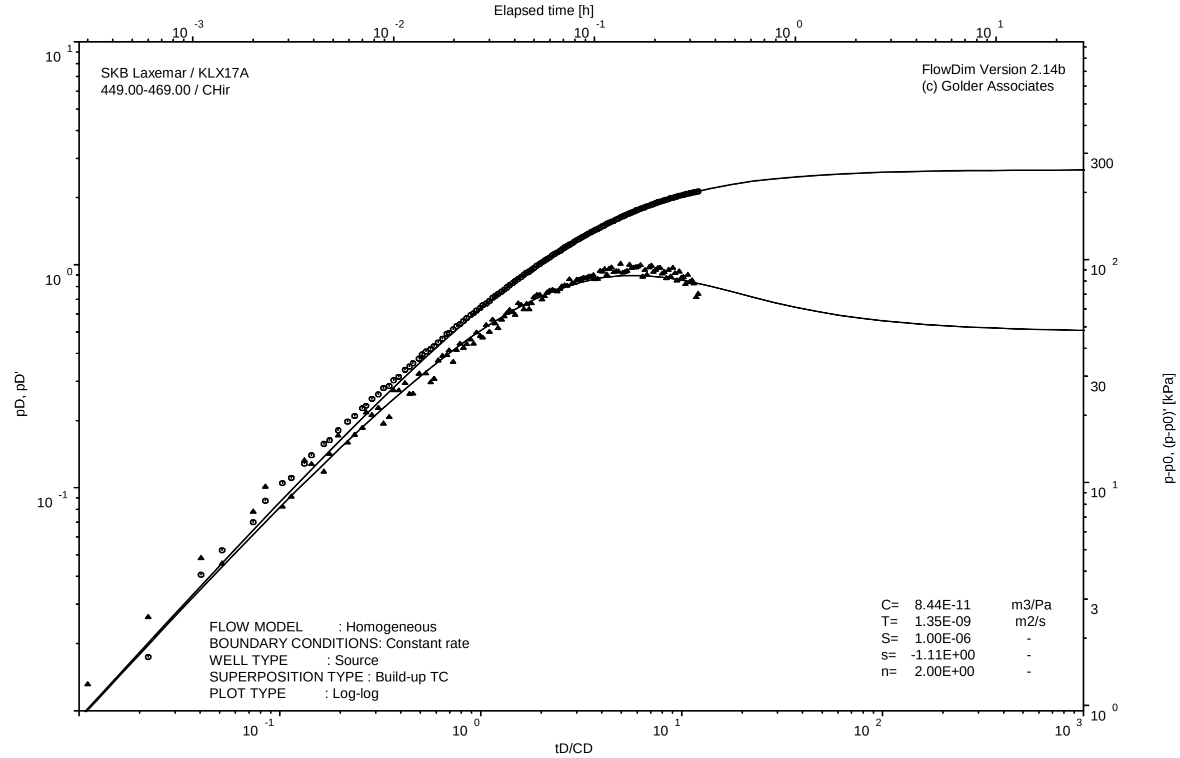
Pressure and flow rate vs. time; cartesian plot



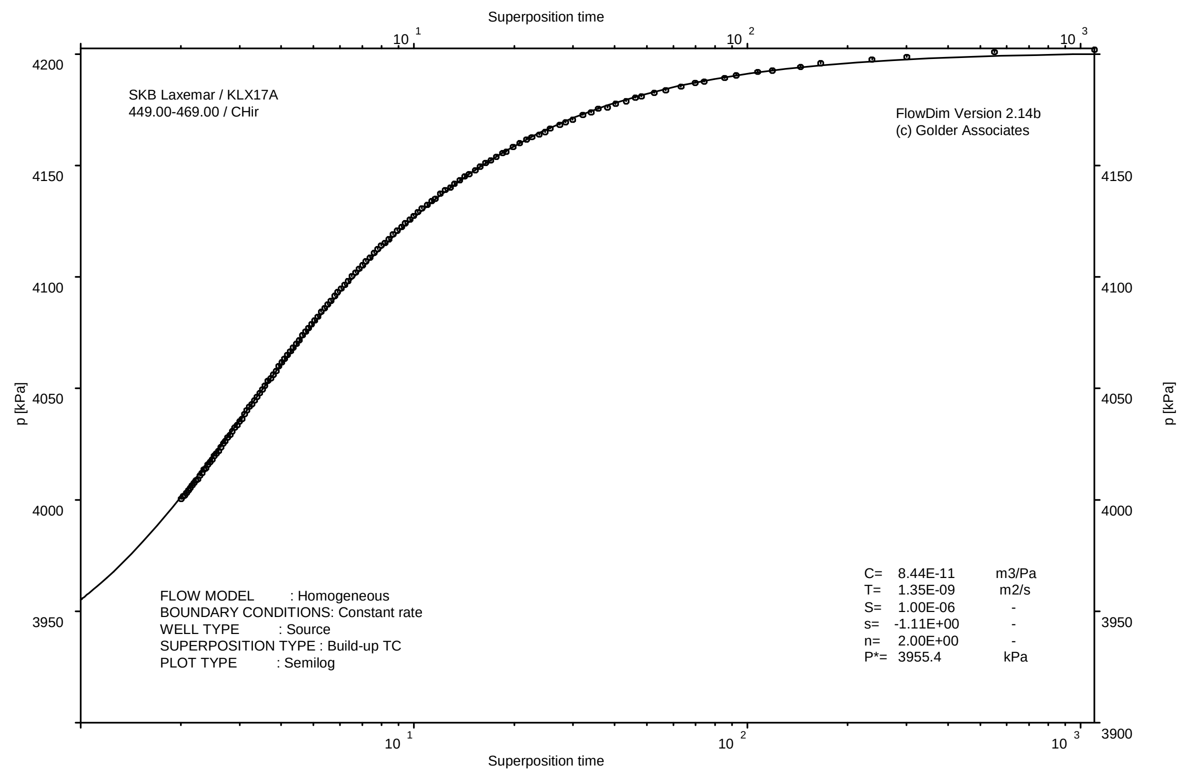
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

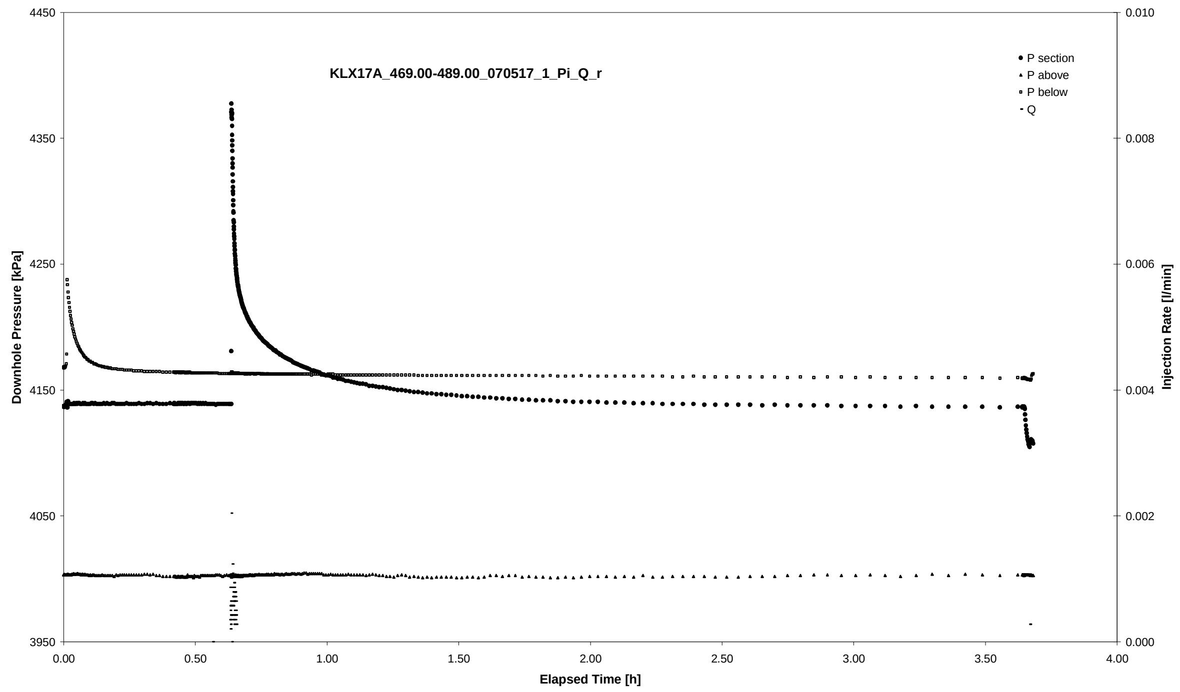


CHIR phase; HORNER match

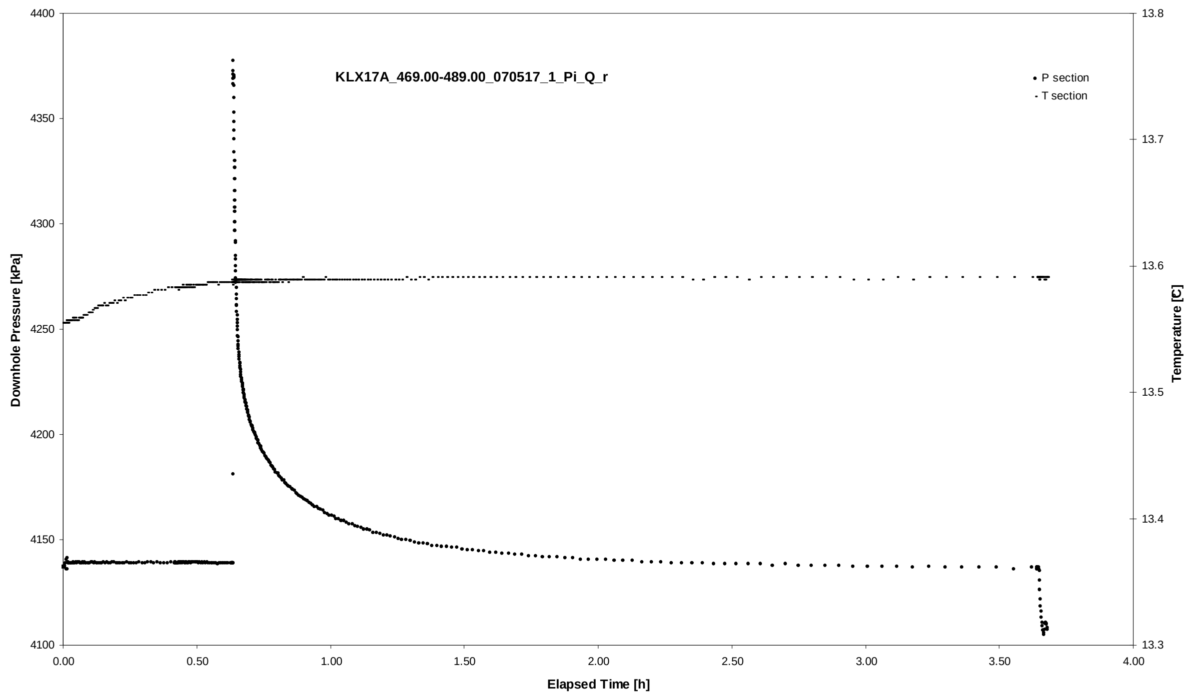
APPENDIX 2-29

Test 469.00 – 489.00 m

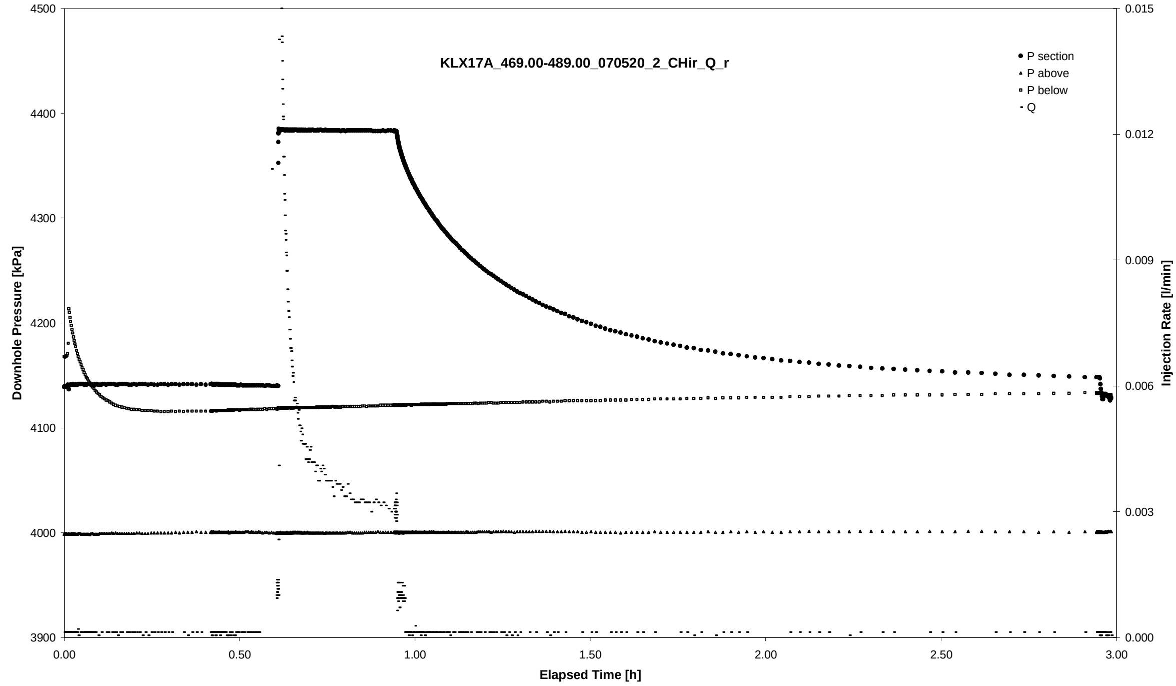
Analysis diagrams



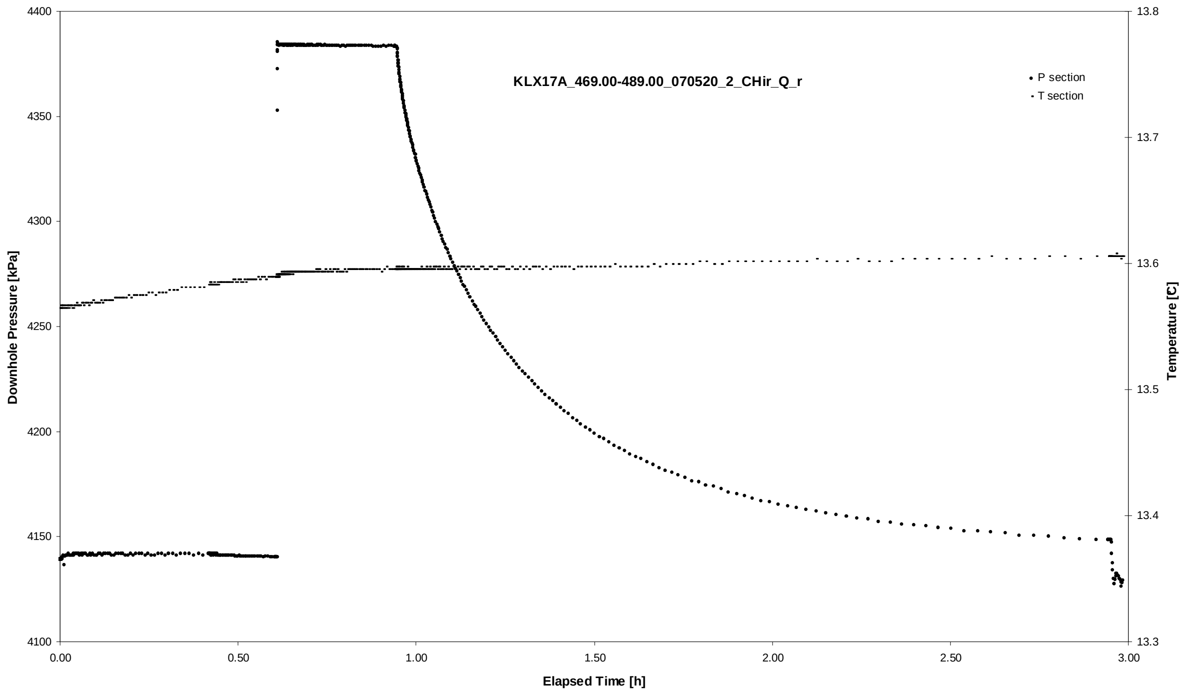
Pressure and flow rate vs. time; cartesian plot (repeated)



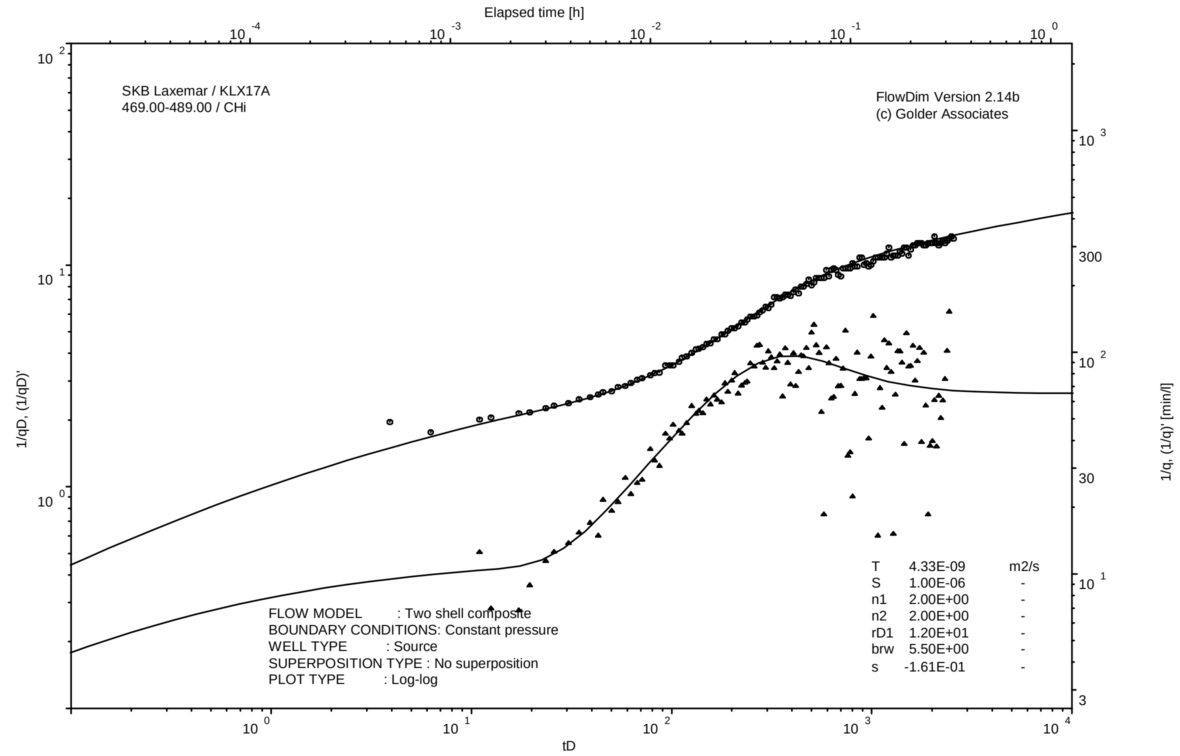
Interval pressure and temperature vs. time; cartesian plot (repeated)



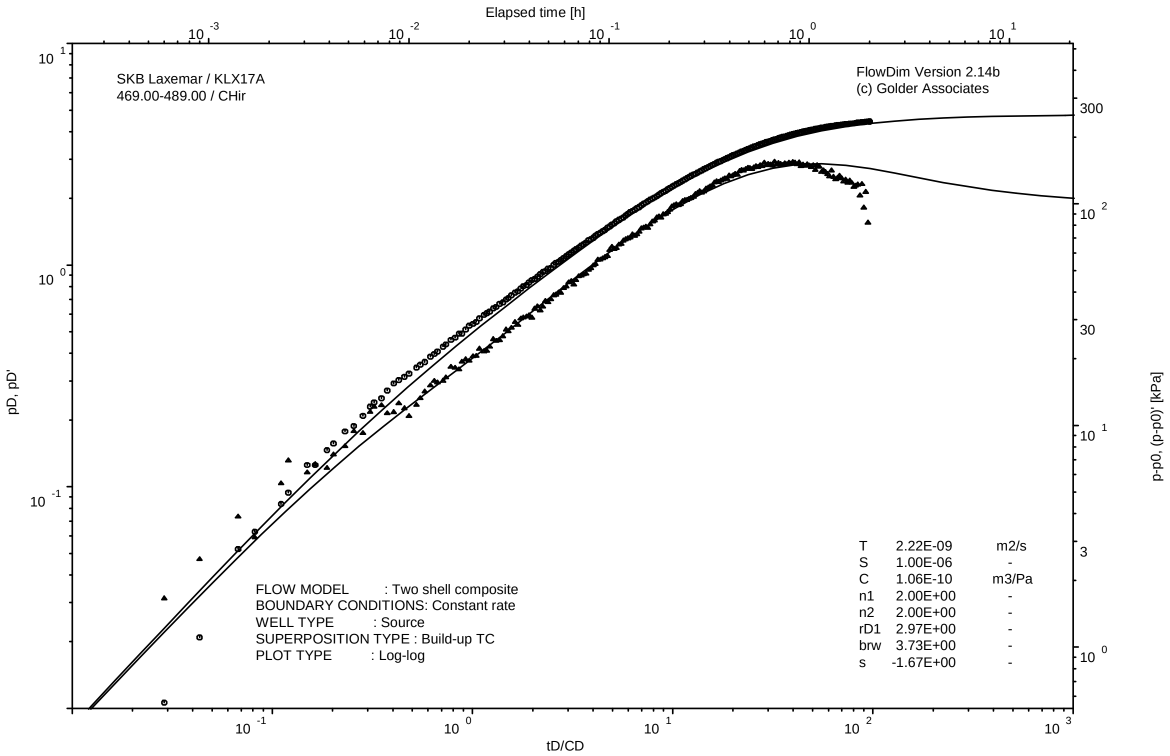
Pressure and flow rate vs. time; cartesian plot



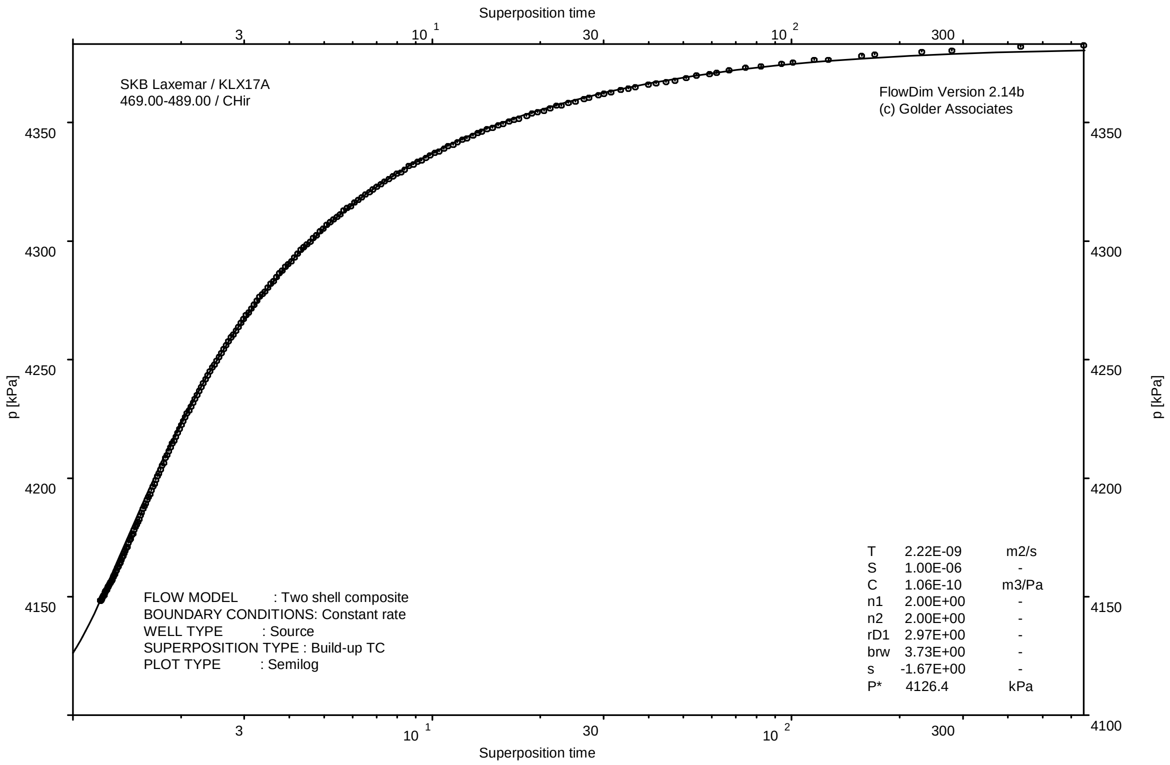
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

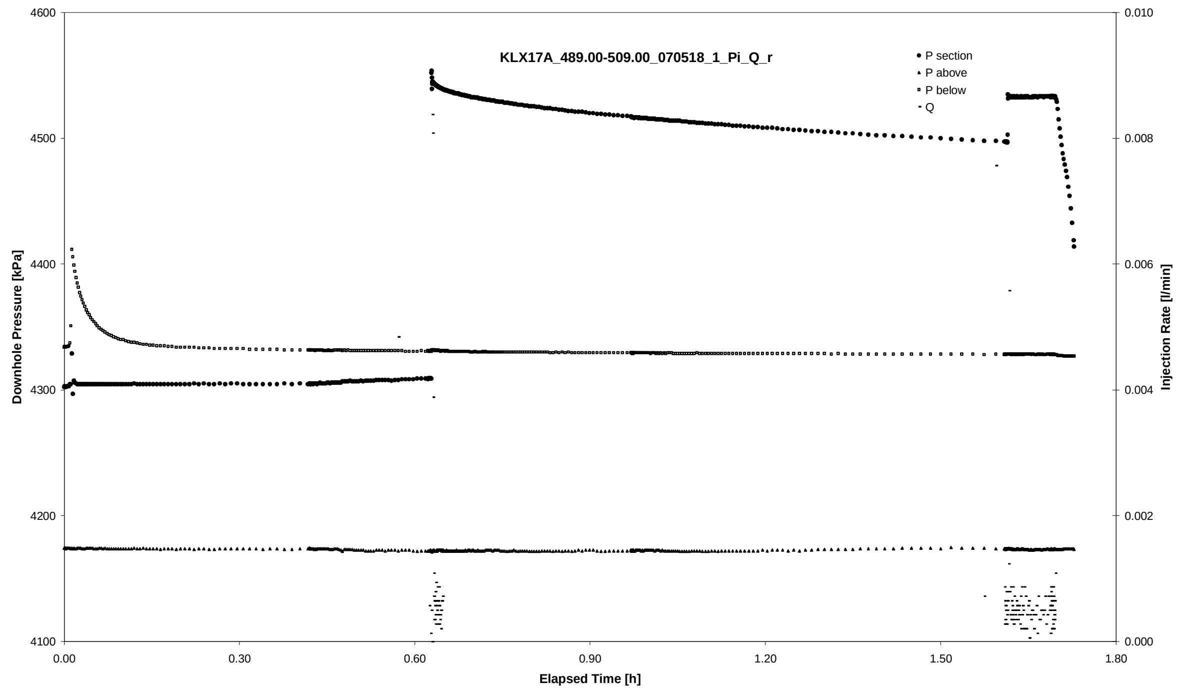


CHIR phase; HORNER match

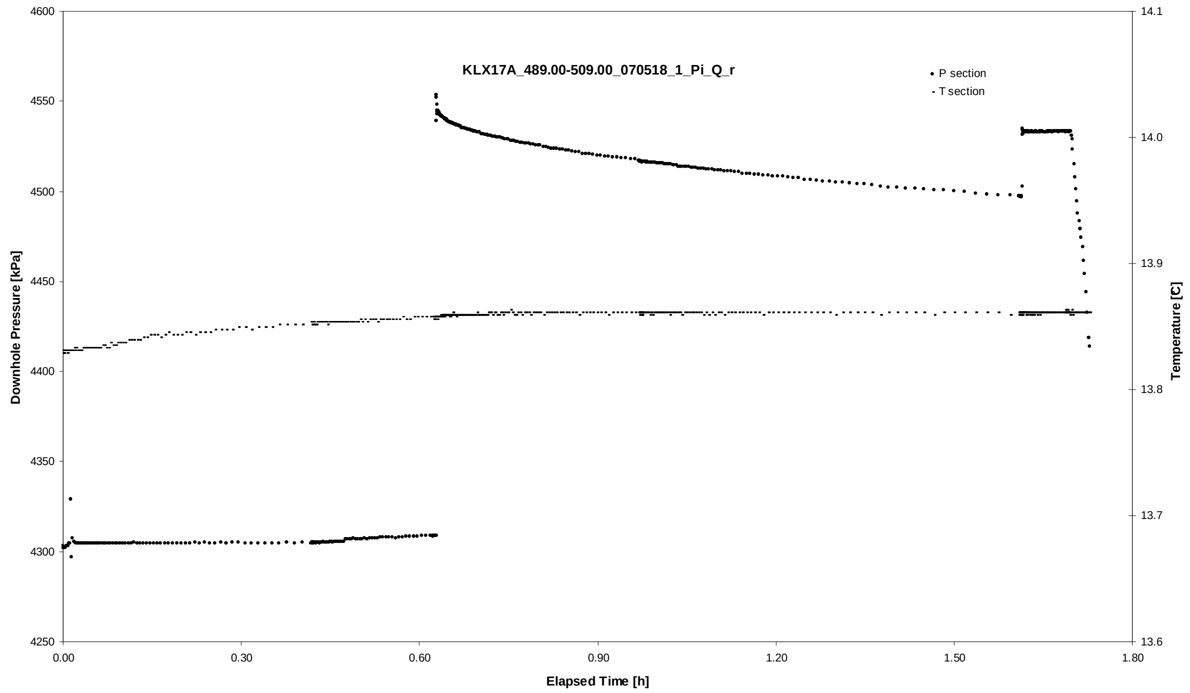
APPENDIX 2-30

Test 489.00 – 509.00 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

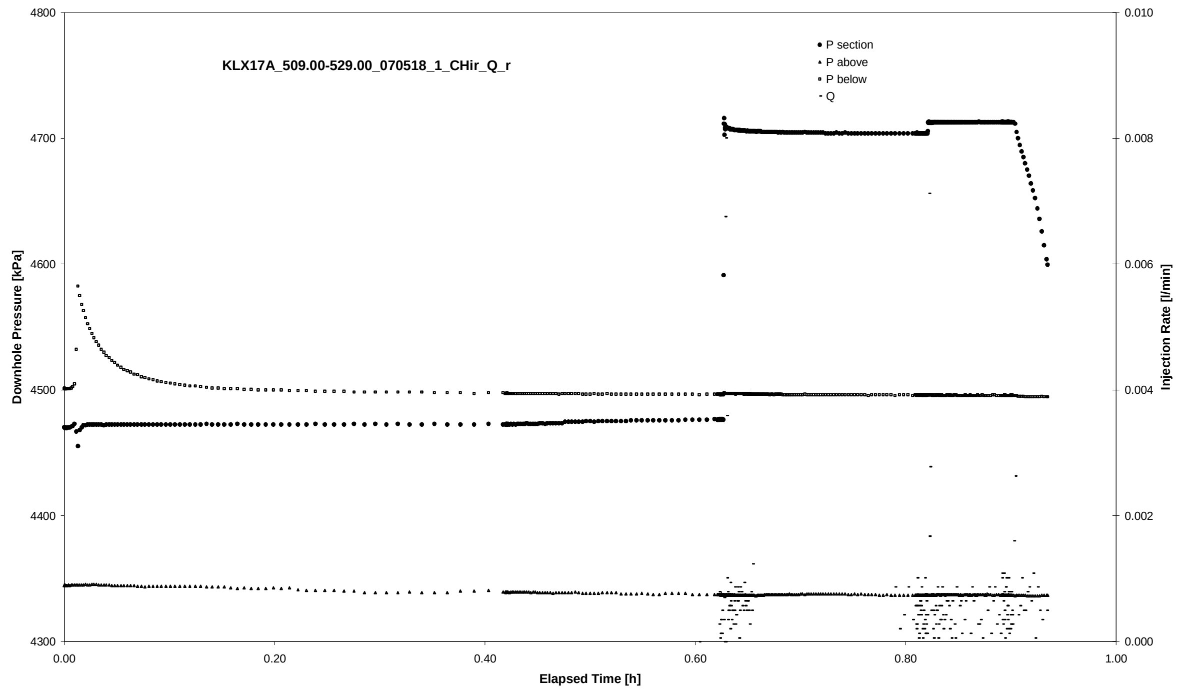
Not analysed

Pulse injection; deconvolution match

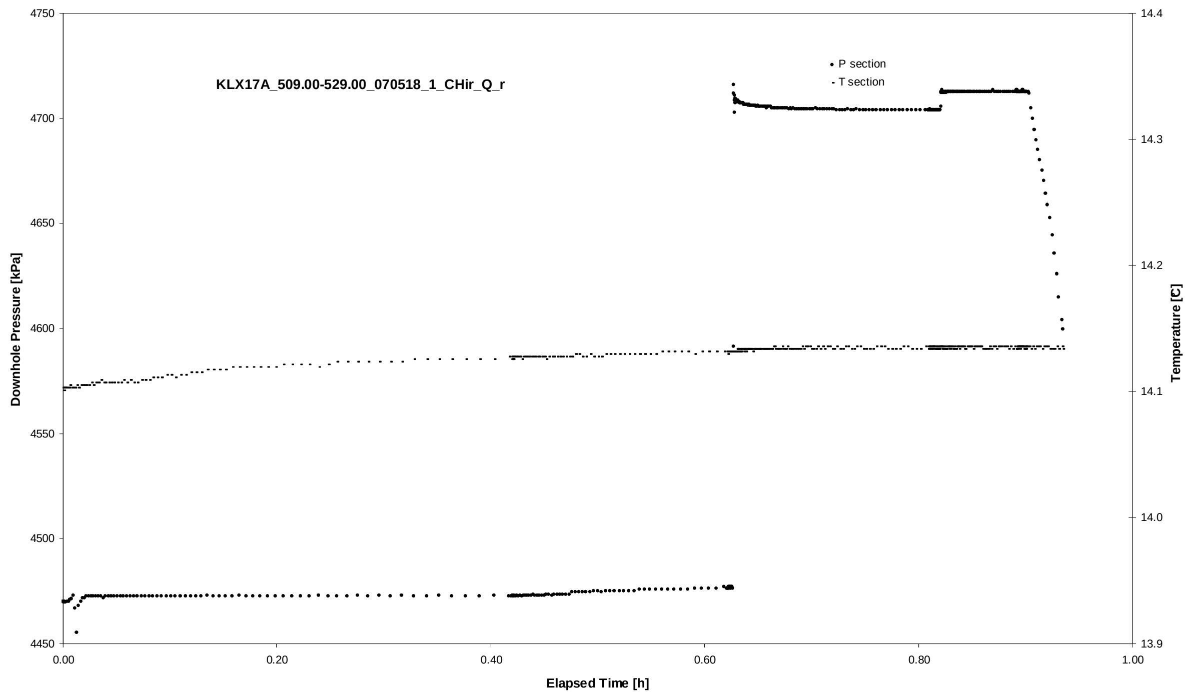
APPENDIX 2-31

Test 509.00 – 529.00 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

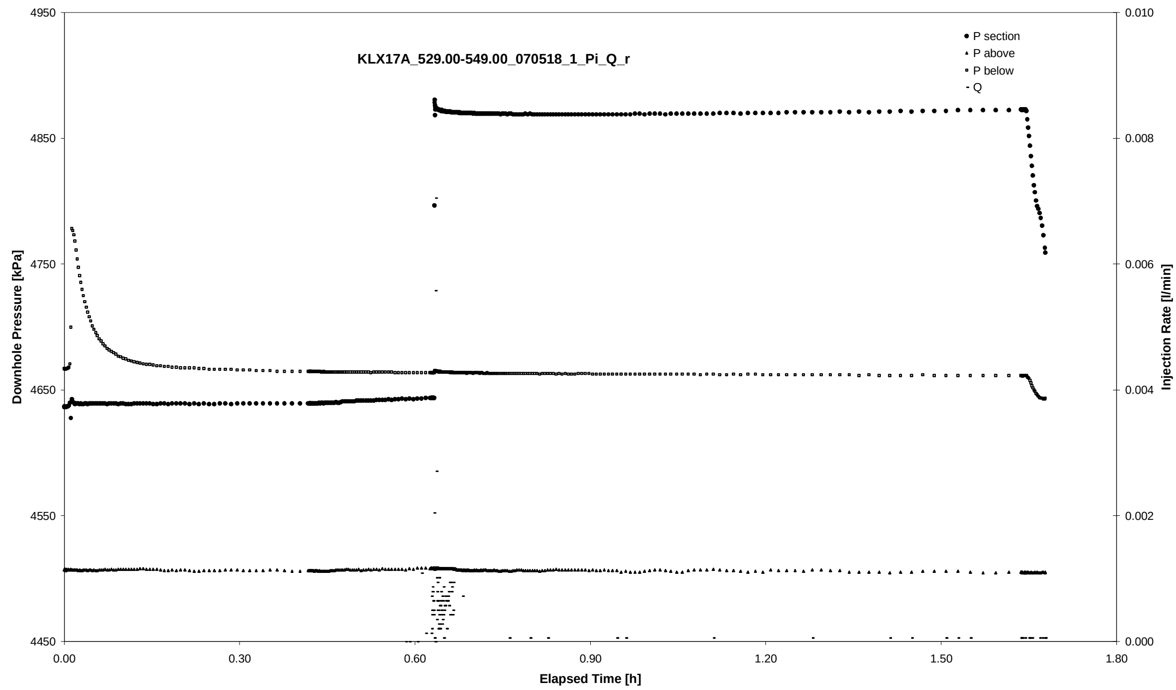
Not analysed

CHIR phase; HORNER match

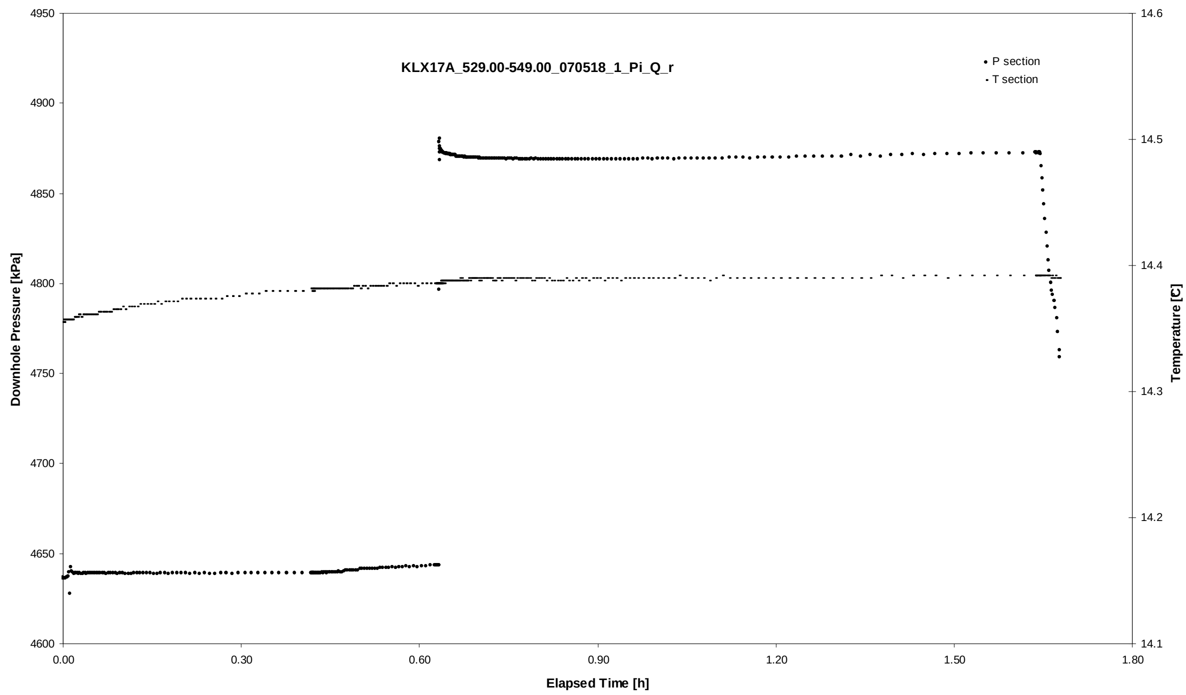
APPENDIX 2-32

Test 529.00 – 549.00 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

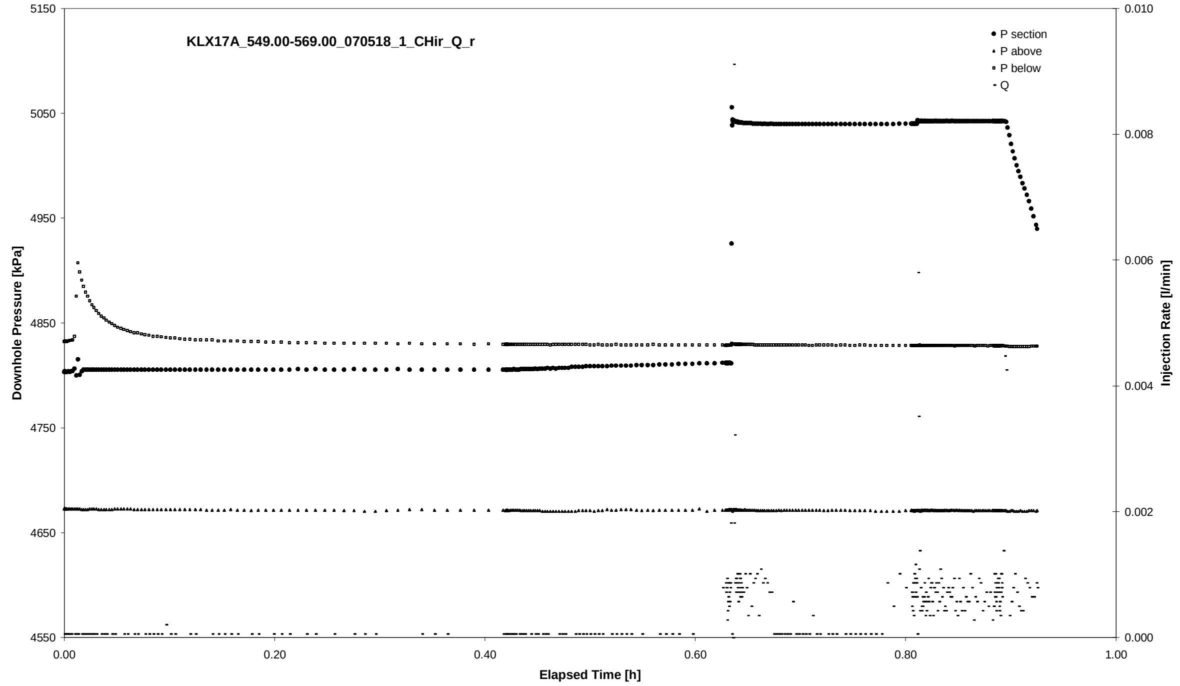
Not analysed

Pulse injection; deconvolution match

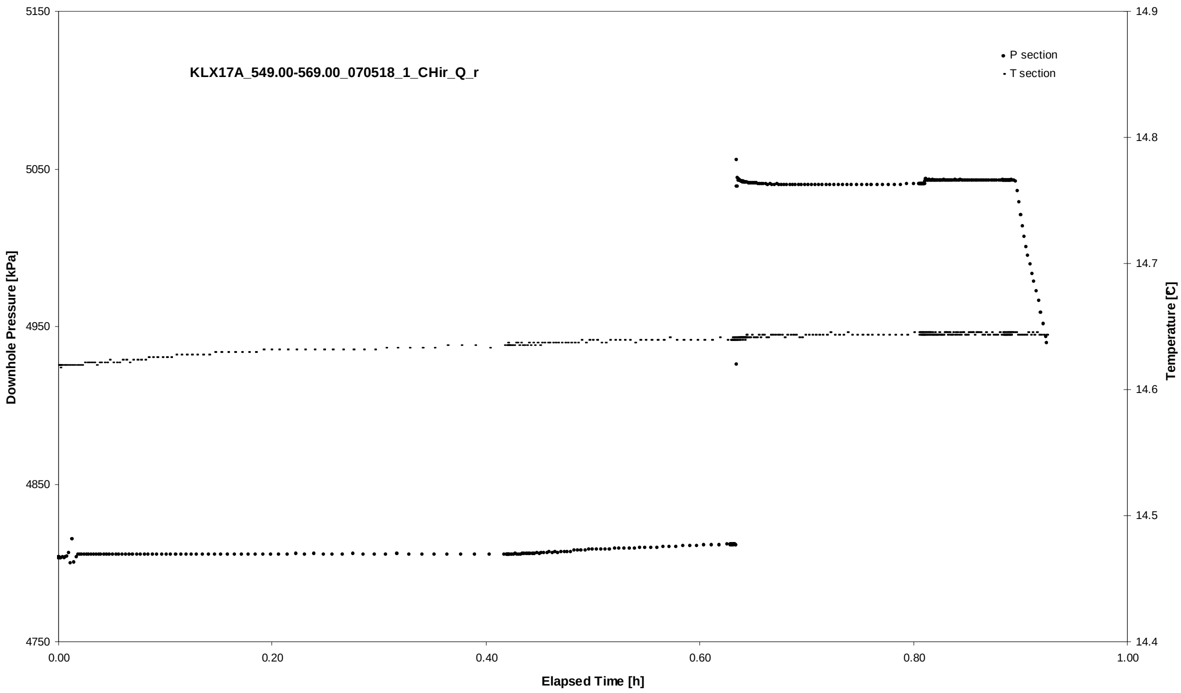
APPENDIX 2-33

Test 549.00 – 569.00 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

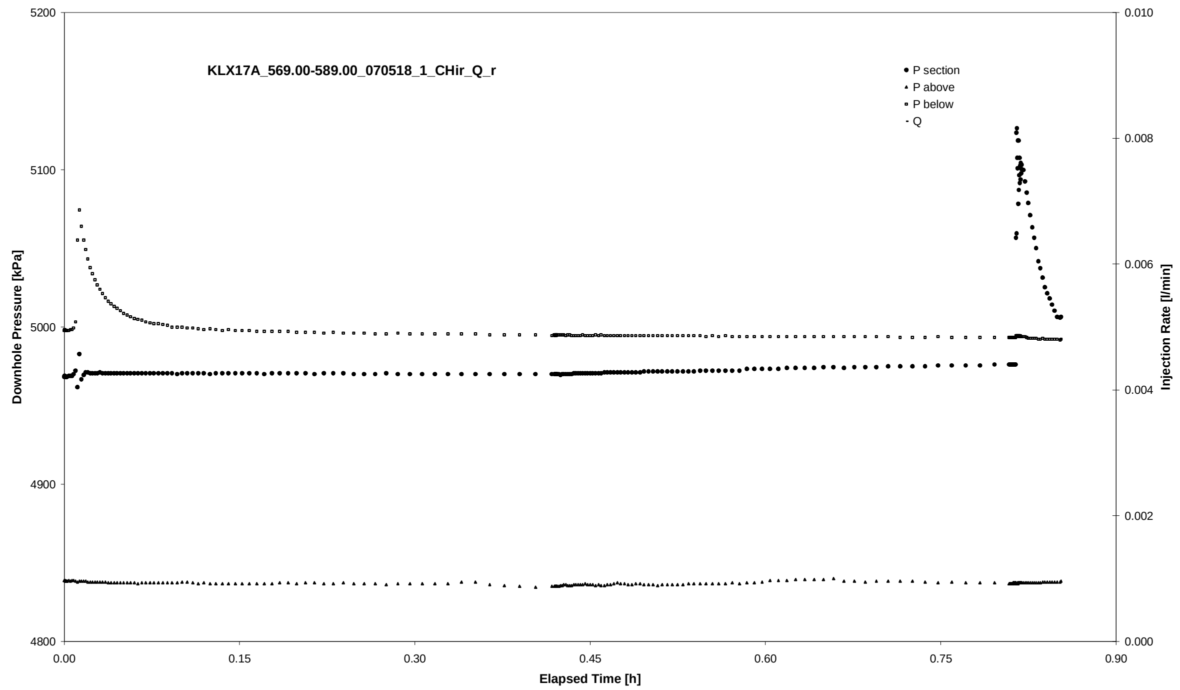
Not analysed

CHIR phase; HORNER match

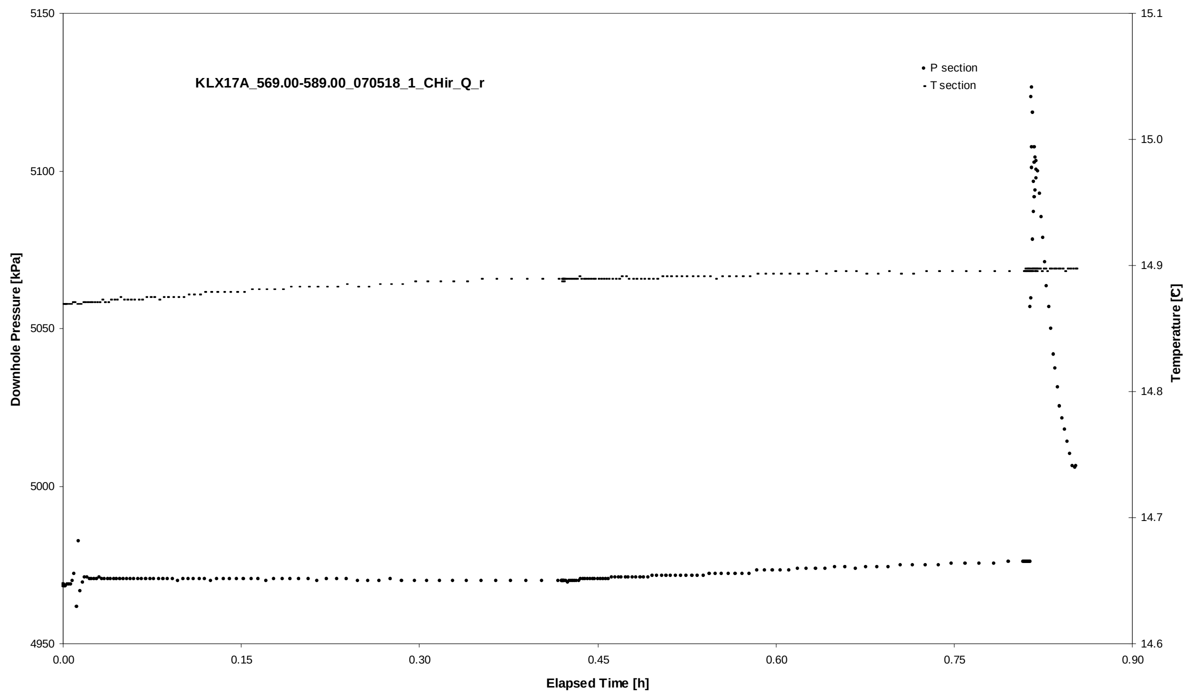
APPENDIX 2-34

Test 569.00 – 589.00 m

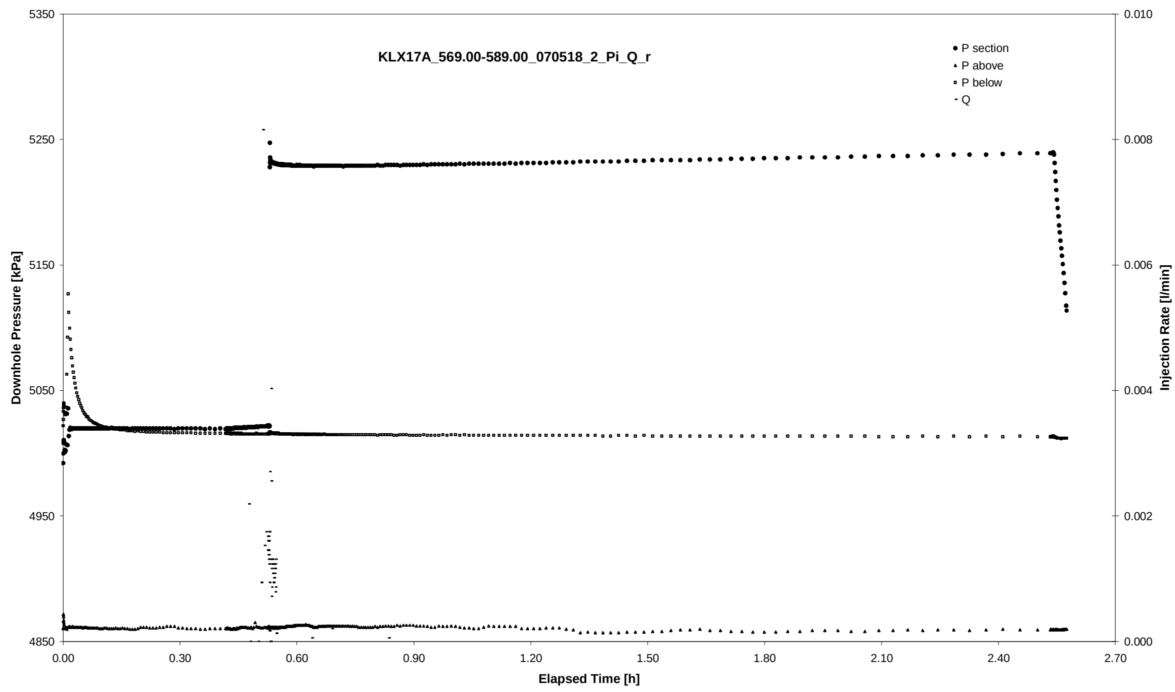
Analysis diagrams



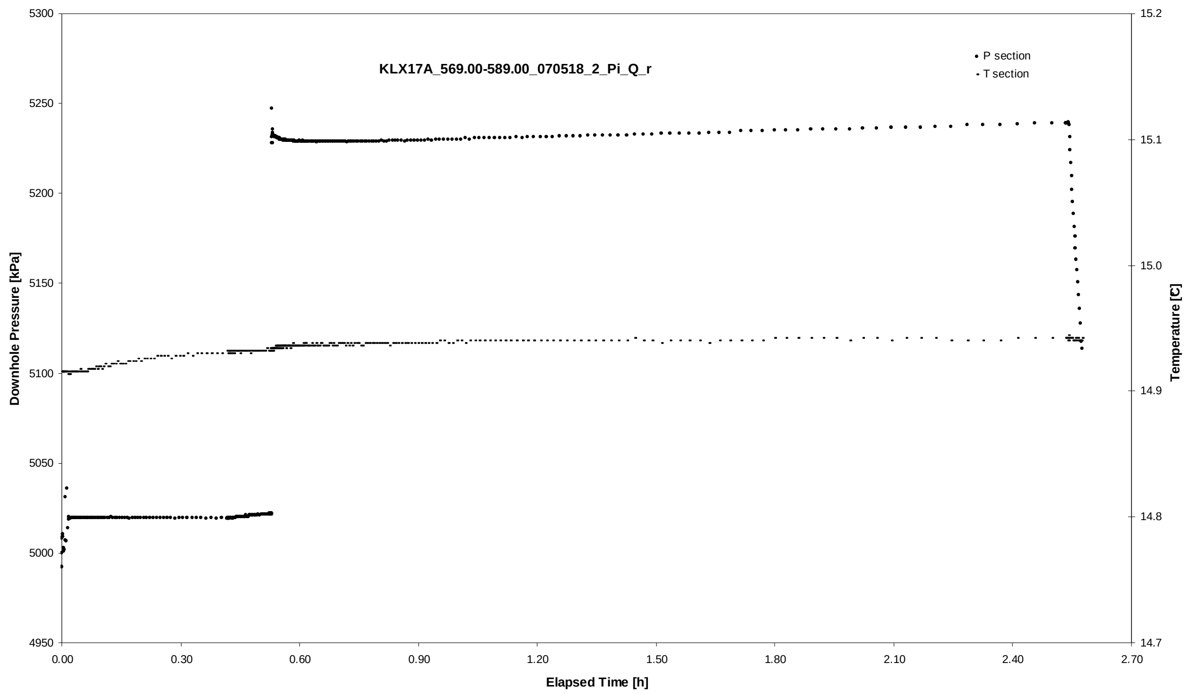
Pressure and flow rate vs. time; cartesian plot (repeated)



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

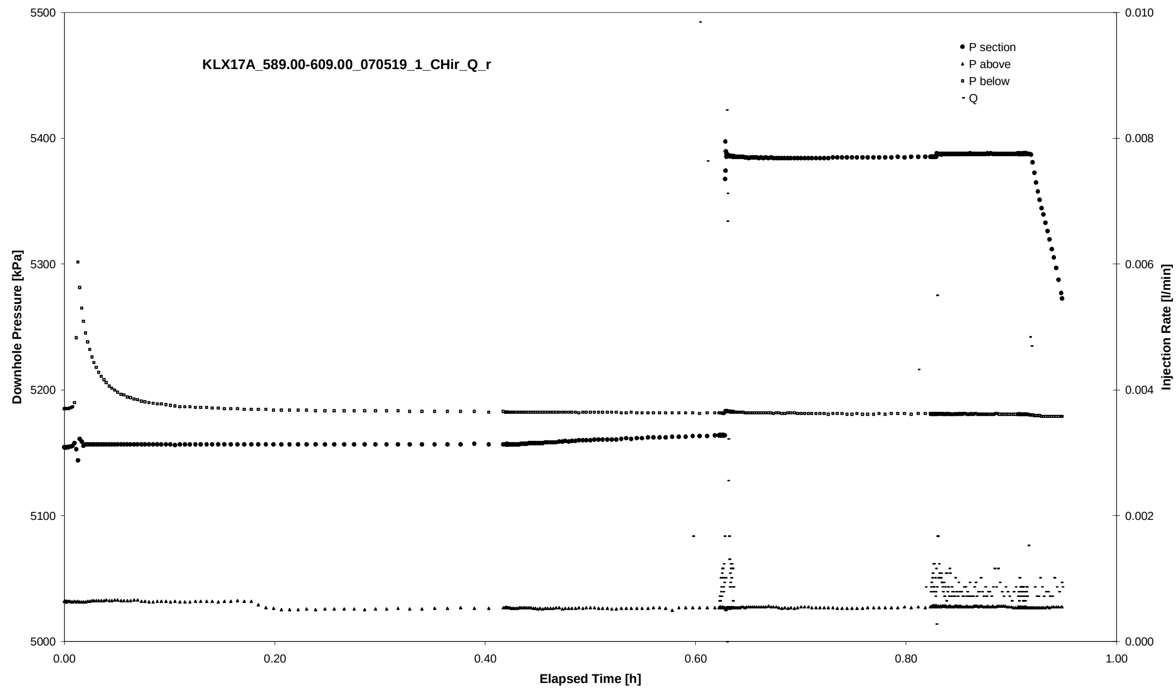
Not analysed

Pulse injection; deconvolution match

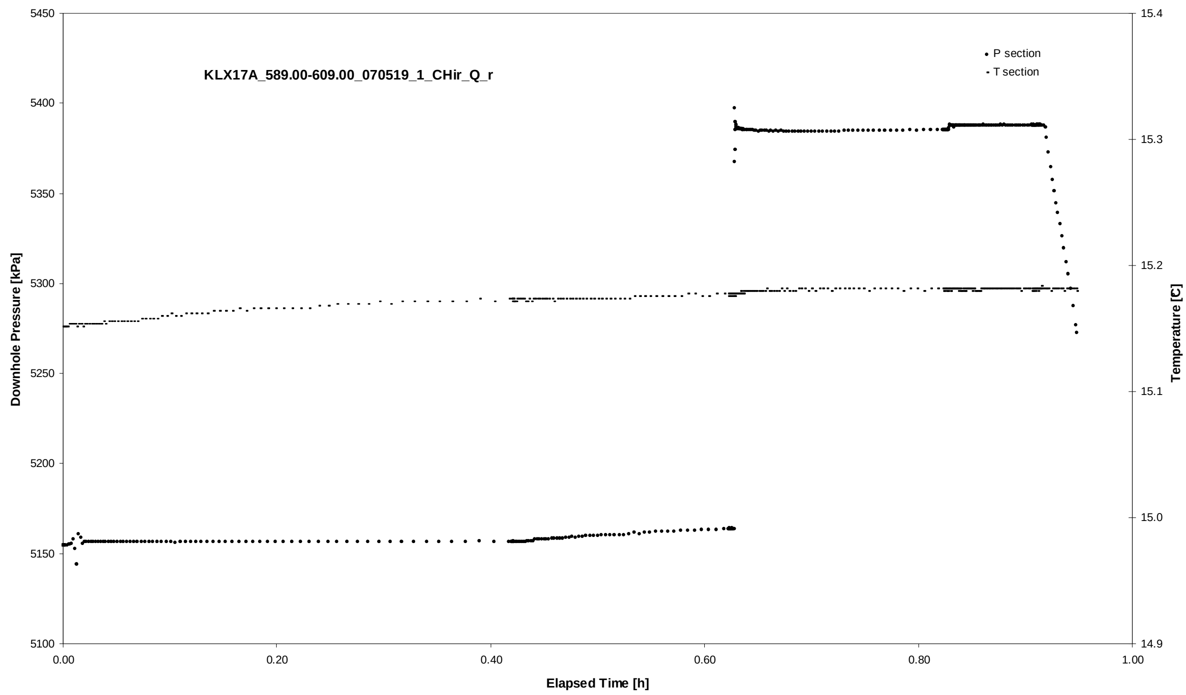
APPENDIX 2-35

Test 589.00 – 609.00 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not analysed

CHI phase; log-log match

Not analysed

CHIR phase; log-log match

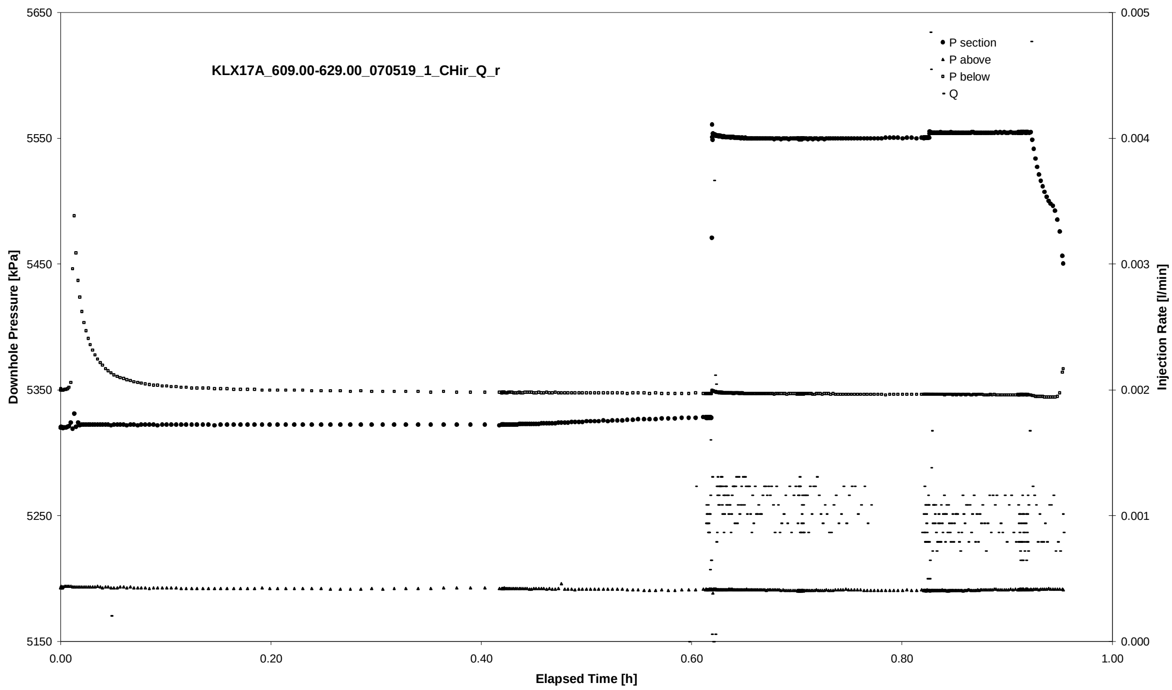
Not analysed

CHIR phase; HORNER match

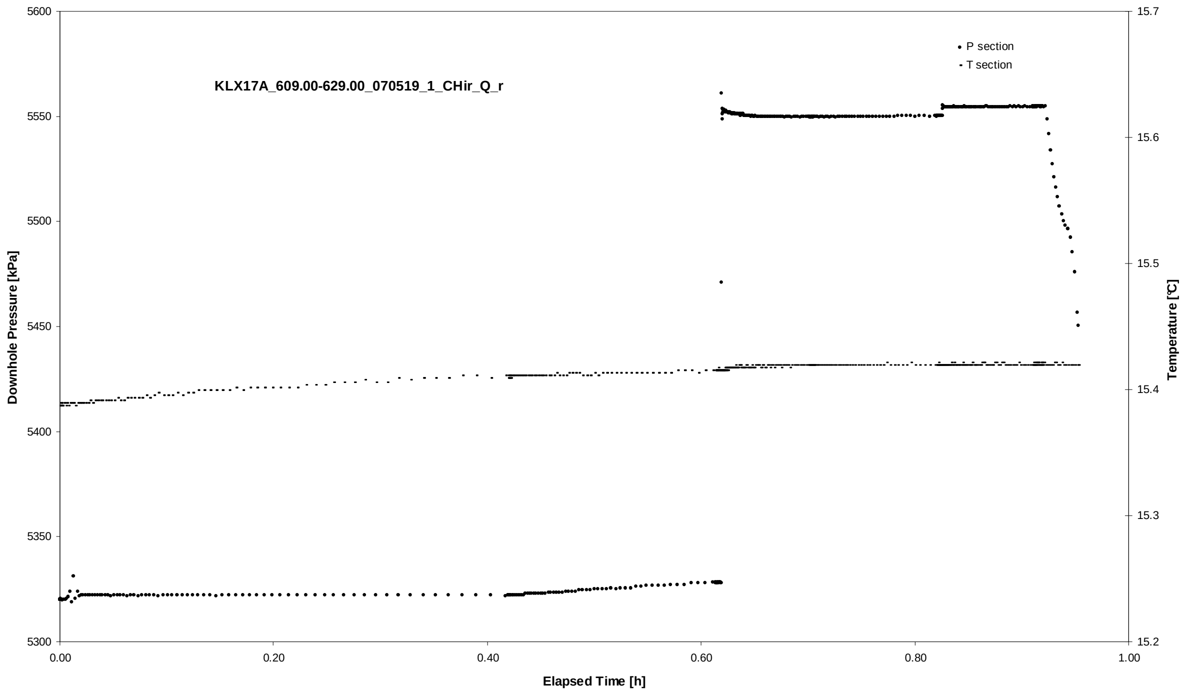
APPENDIX 2-36

Test 609.00 – 629.00 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

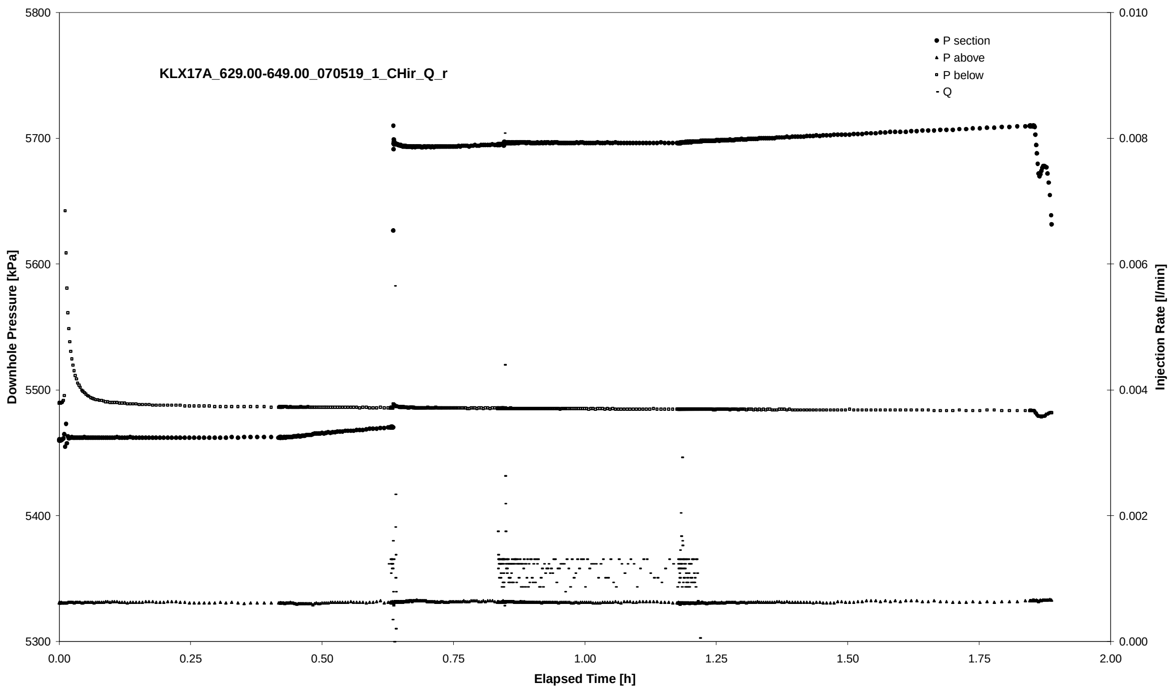
Not analysed

CHIR phase; HORNER match

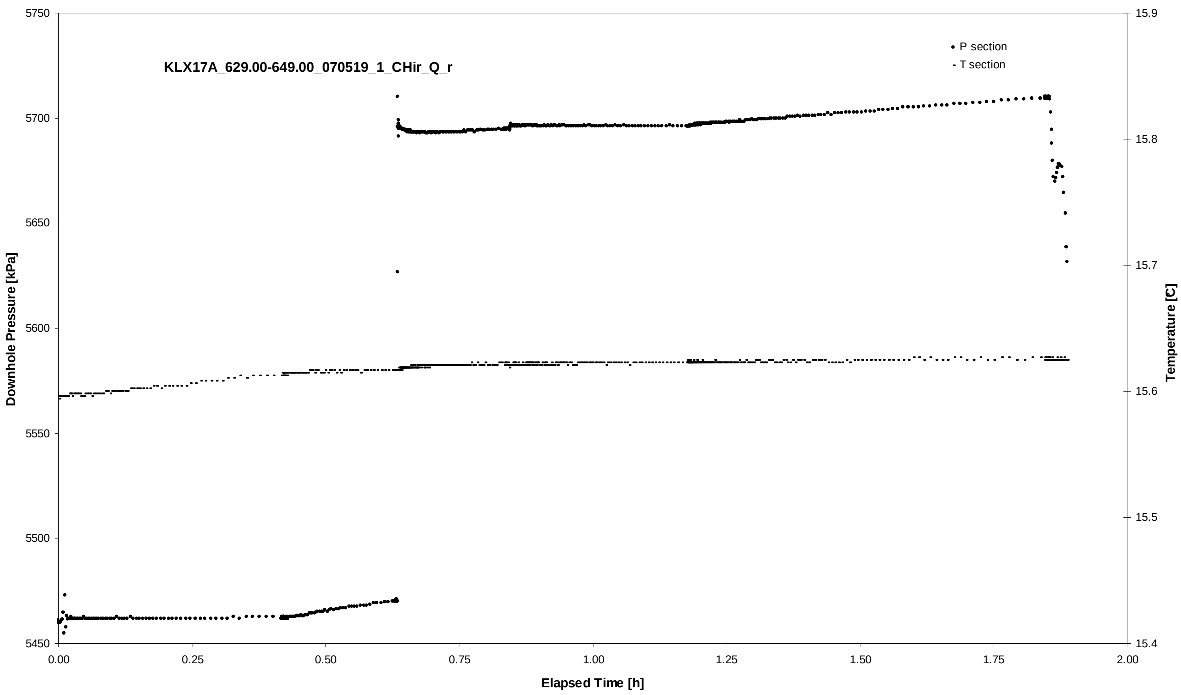
APPENDIX 2-37

Test 629.00 – 649.00 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

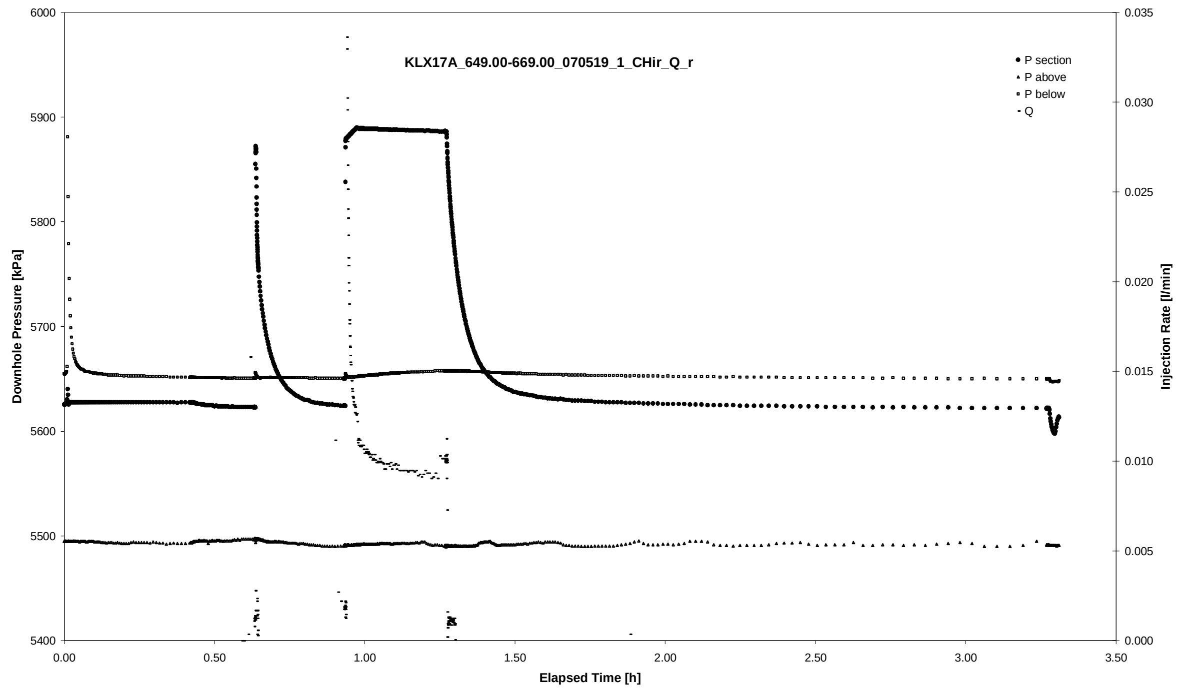
Not analysed

CHIR phase; HORNER match

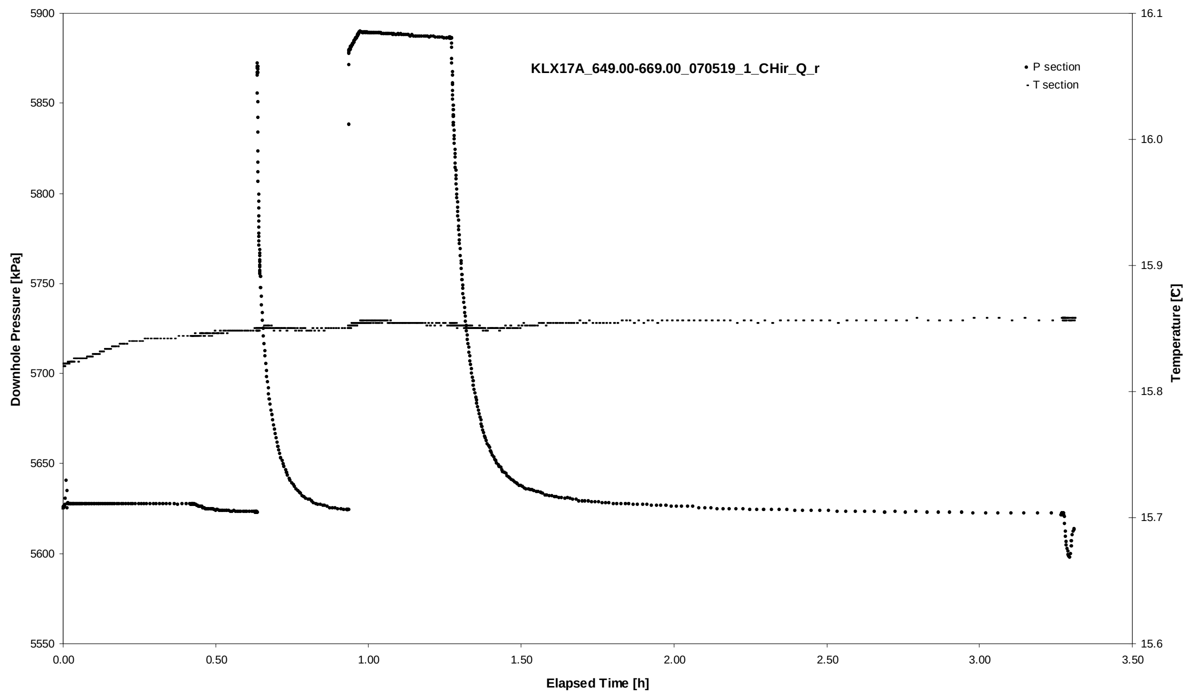
APPENDIX 2-38

Test 649.00 – 669.00 m

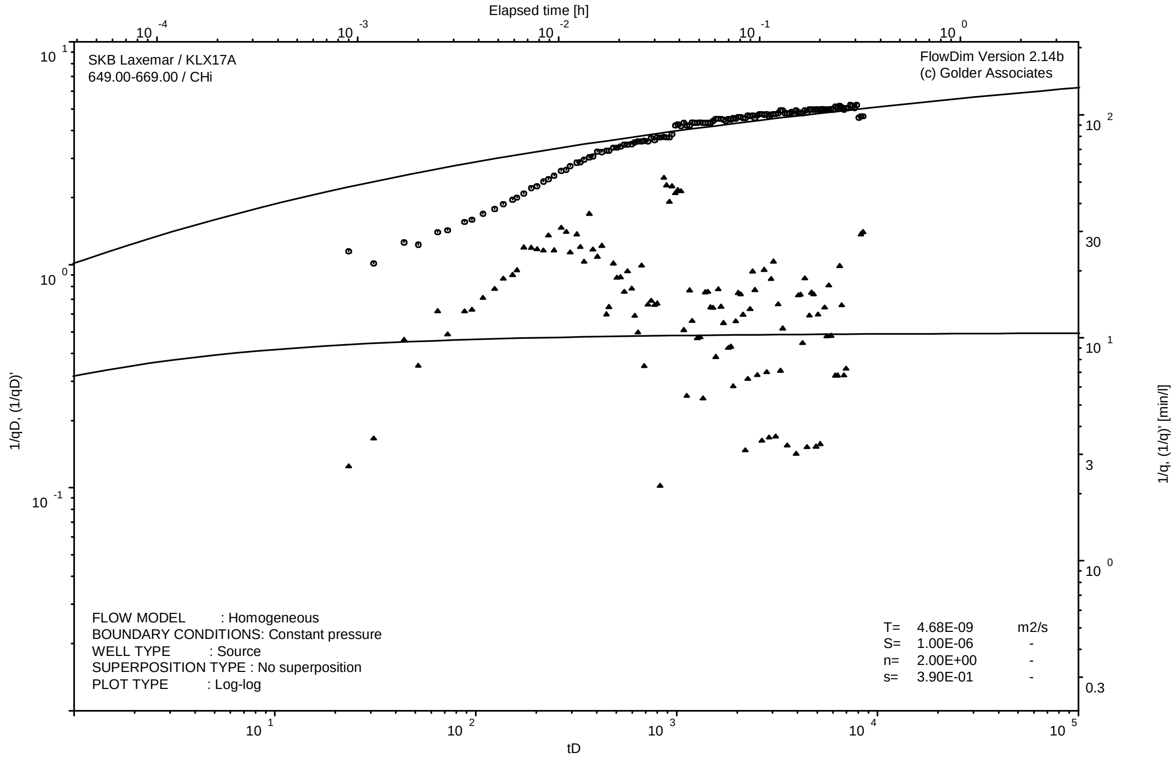
Analysis diagrams



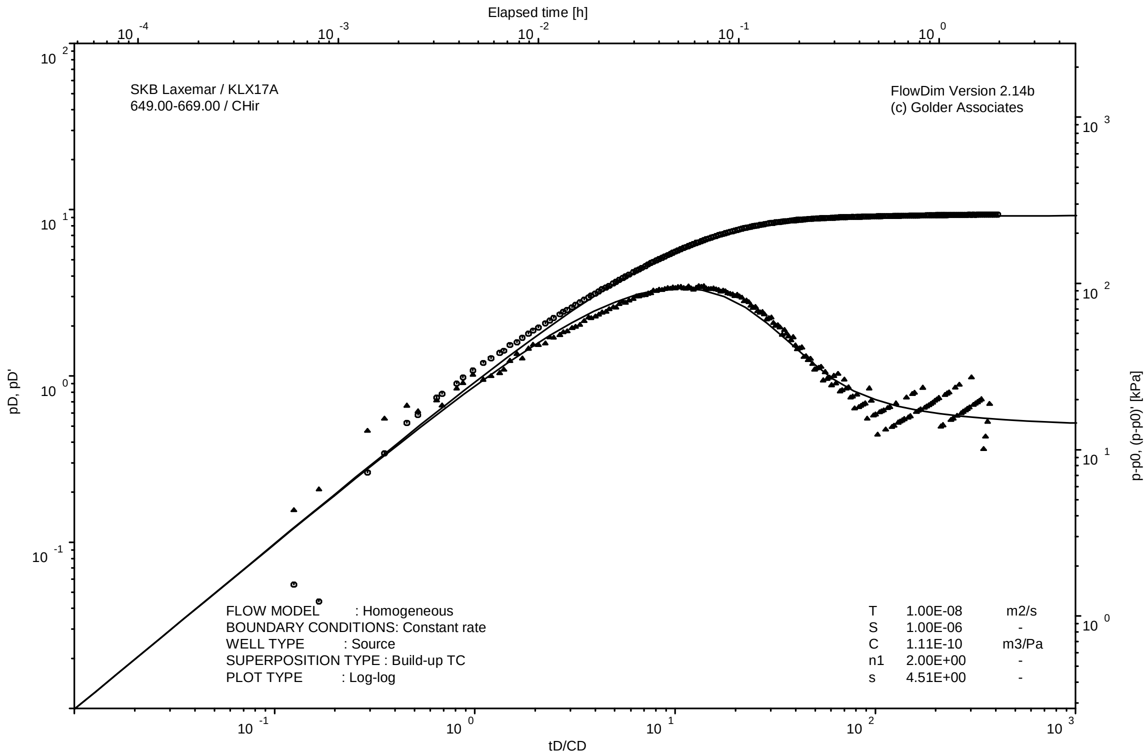
Pressure and flow rate vs. time; cartesian plot



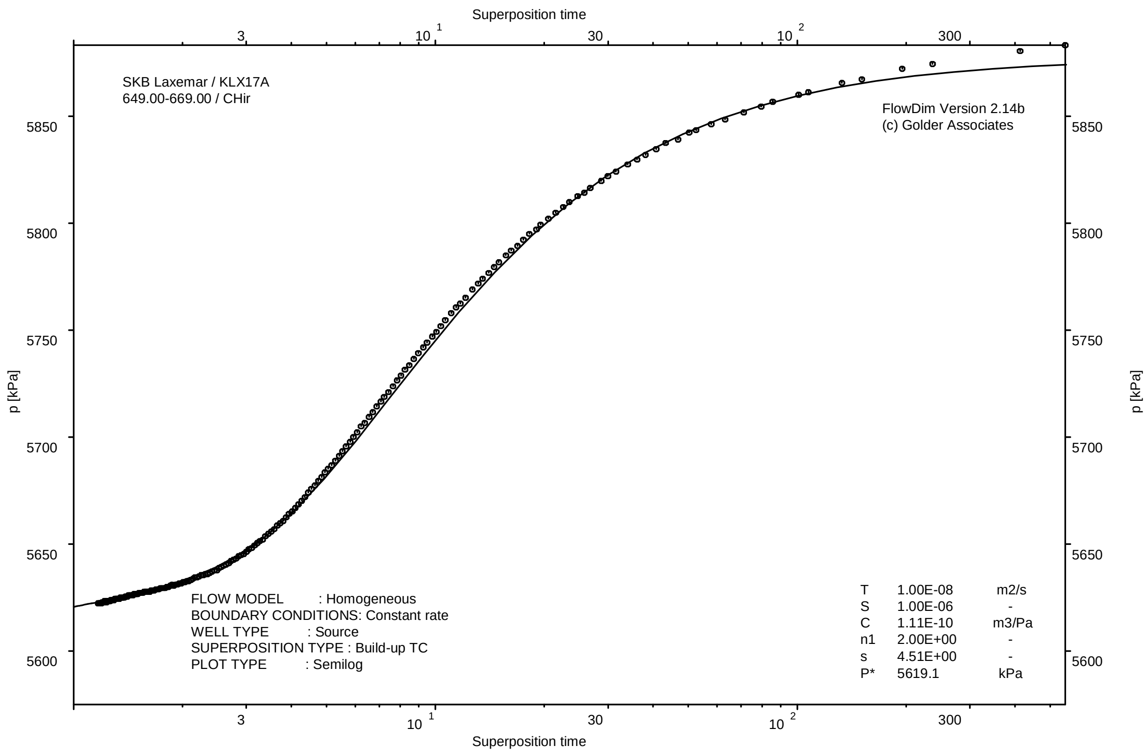
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

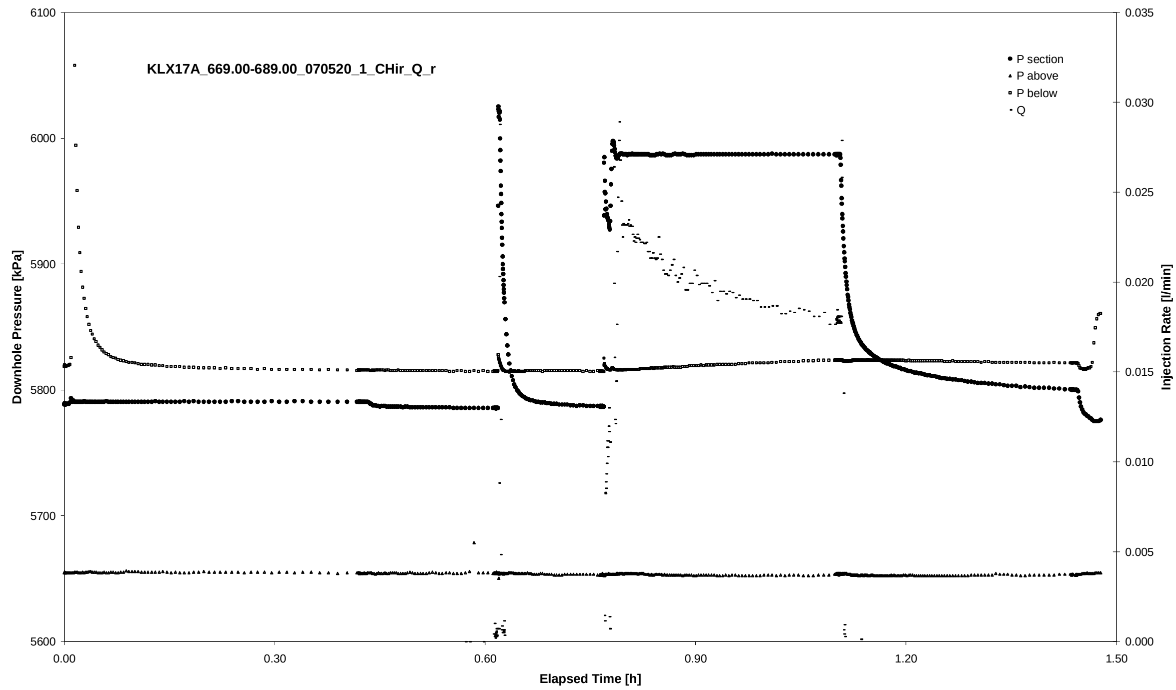


CHIR phase; HORNER match

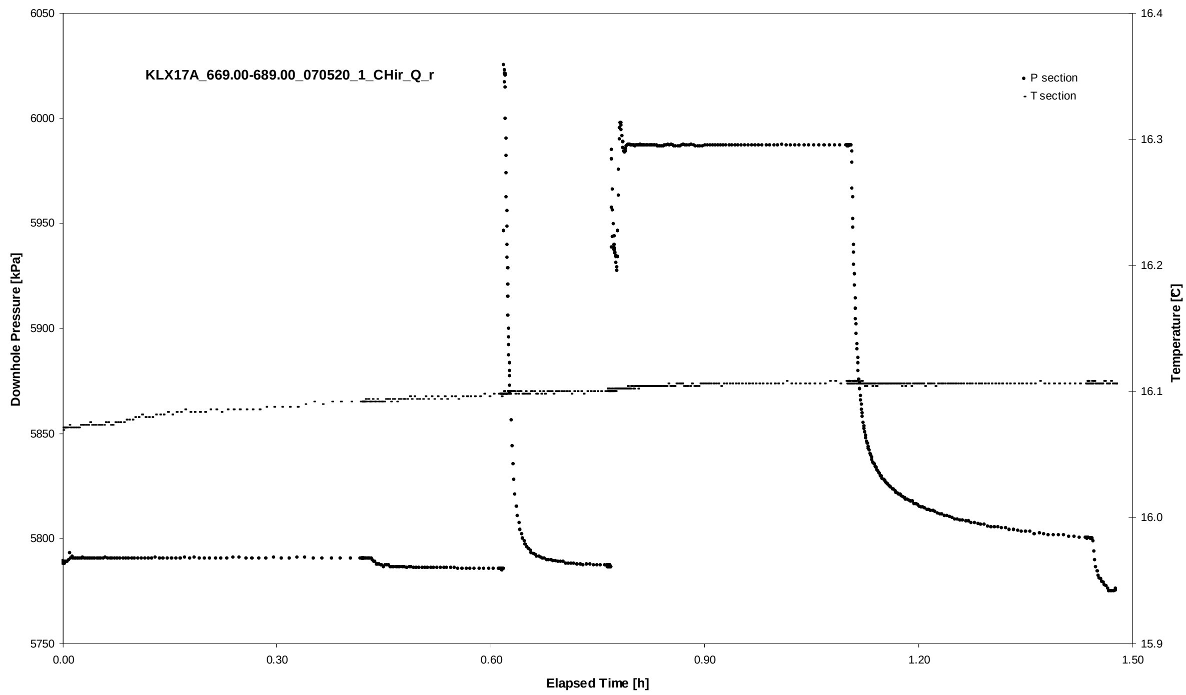
APPENDIX 2-39

Test 669.00 – 689.00 m

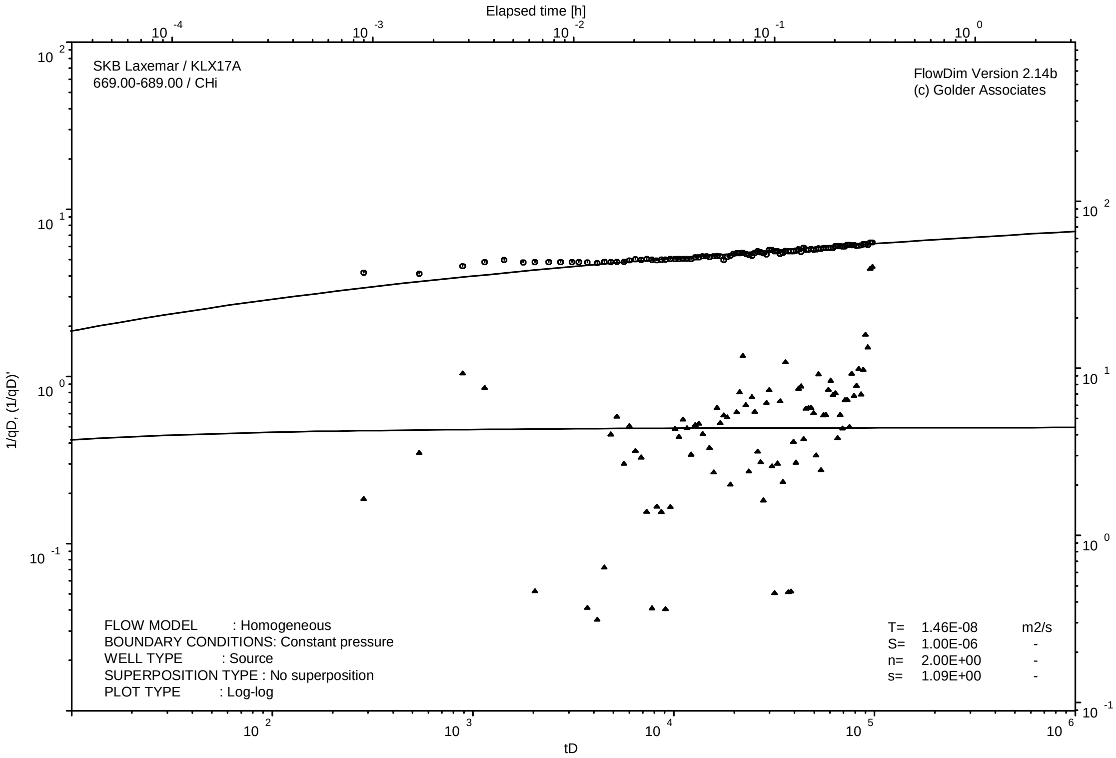
Analysis diagrams



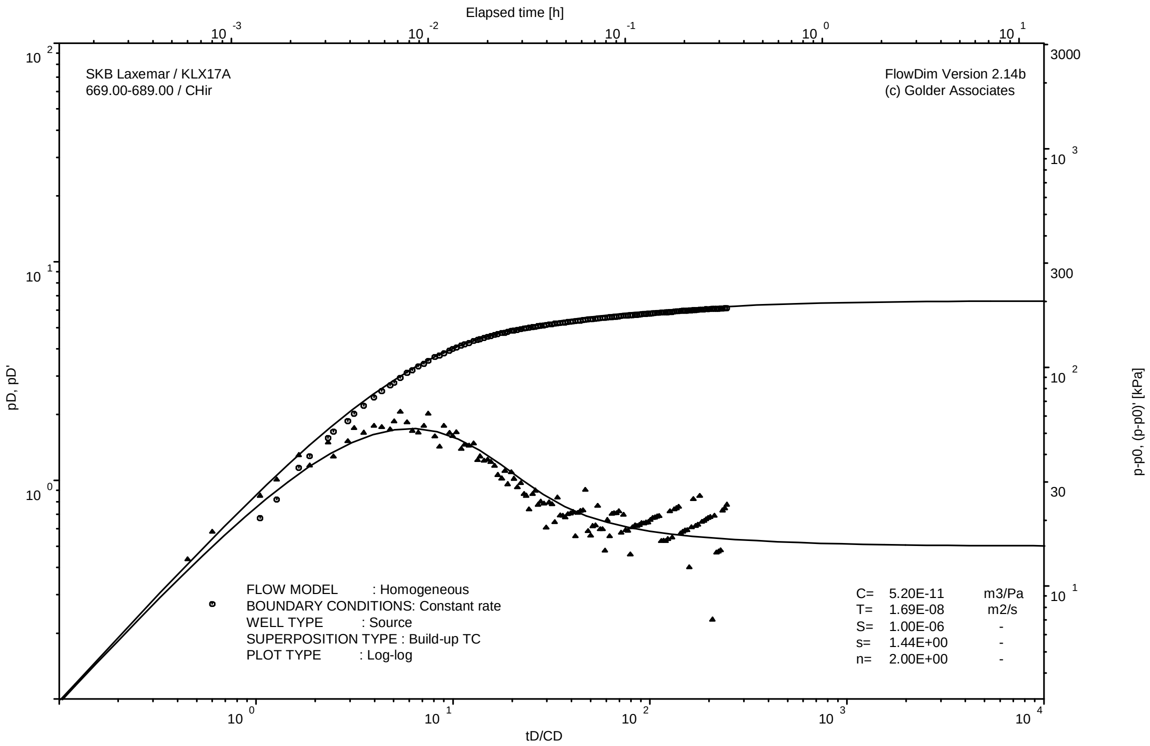
Pressure and flow rate vs. time; cartesian plot



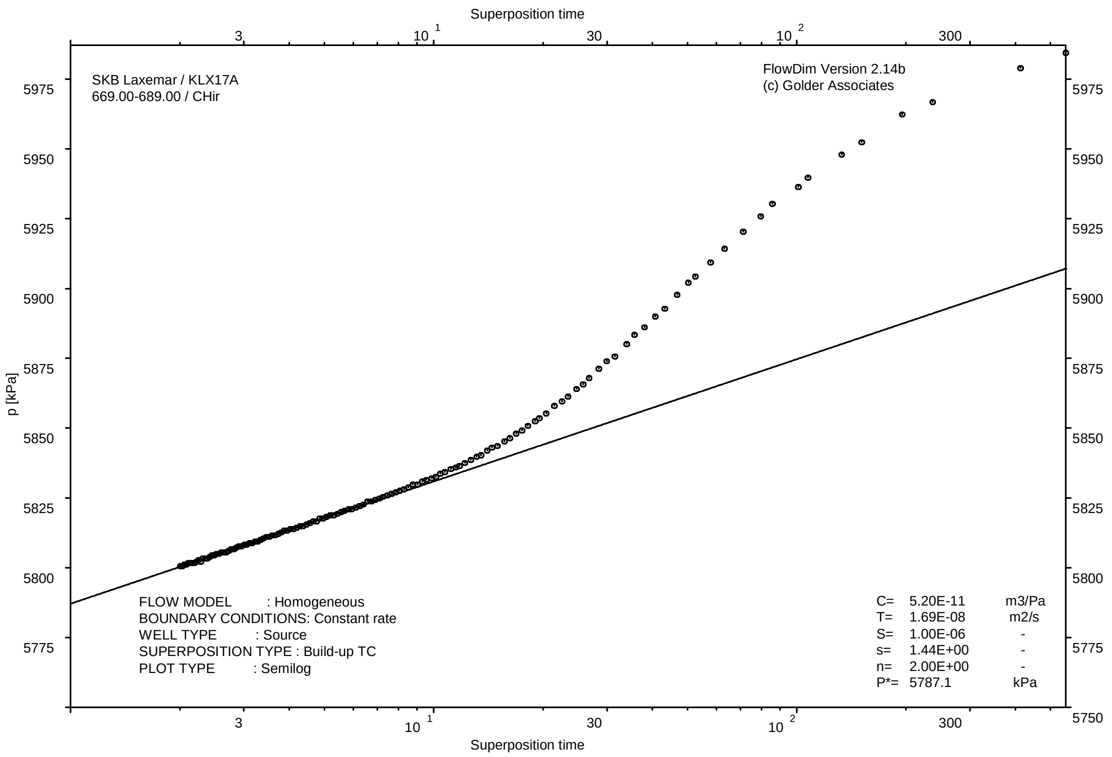
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

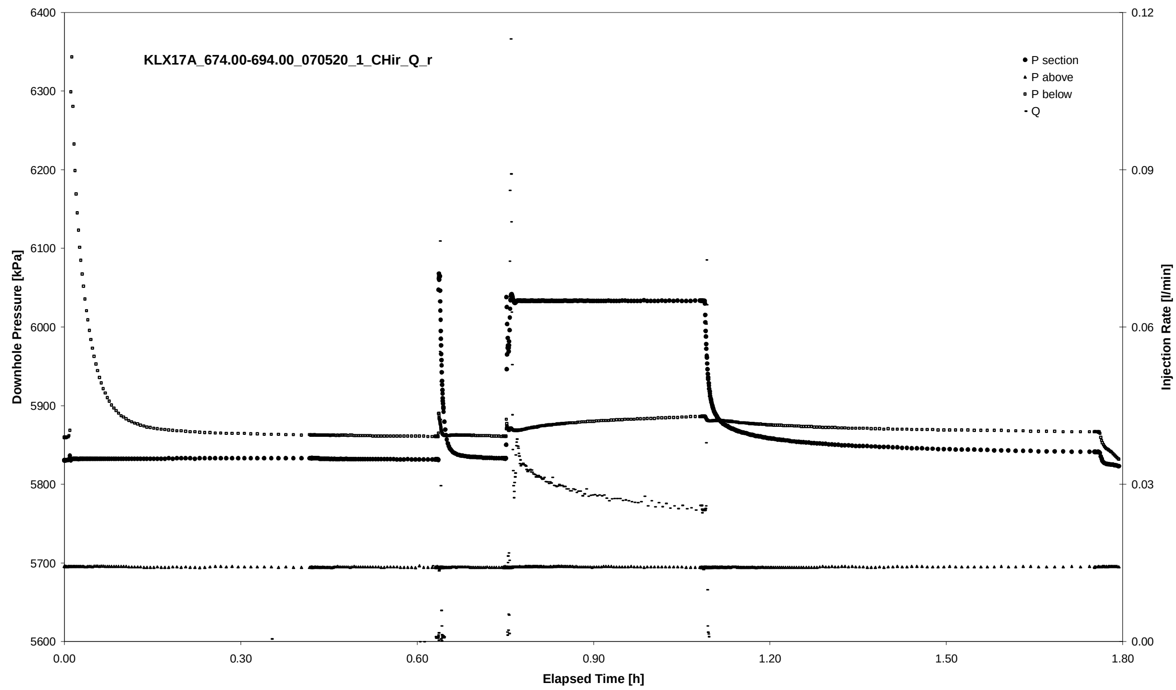


CHIR phase; HORNER match

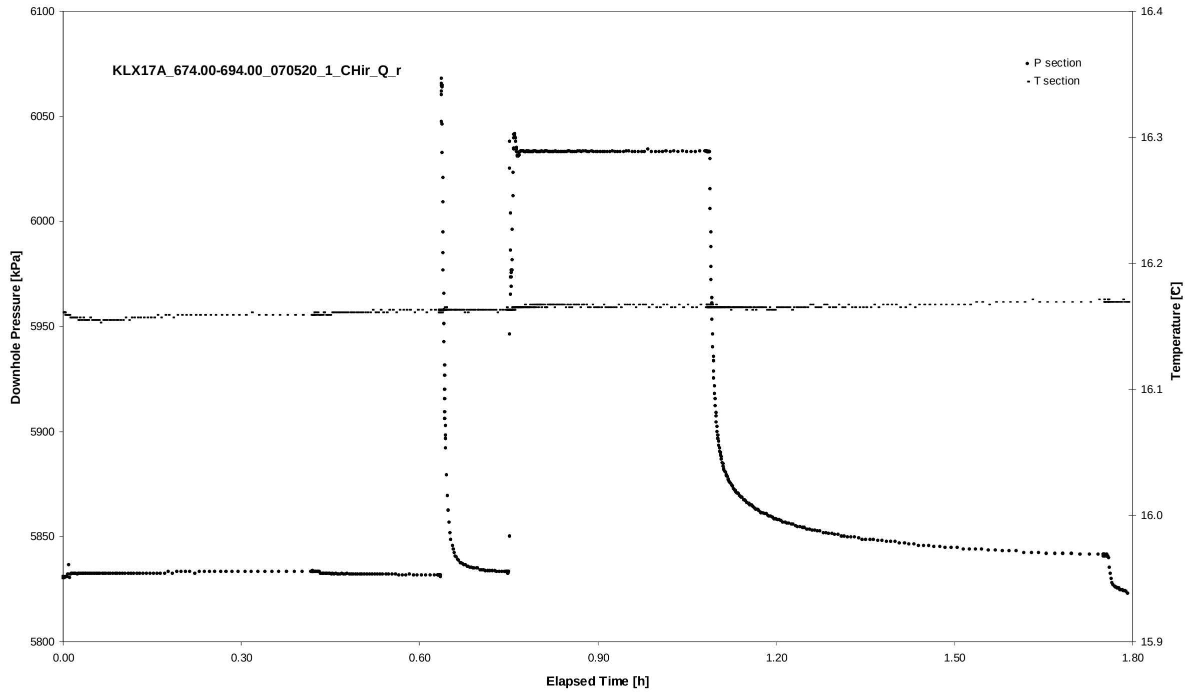
APPENDIX 2-40

Test 674.00 – 694.00 m

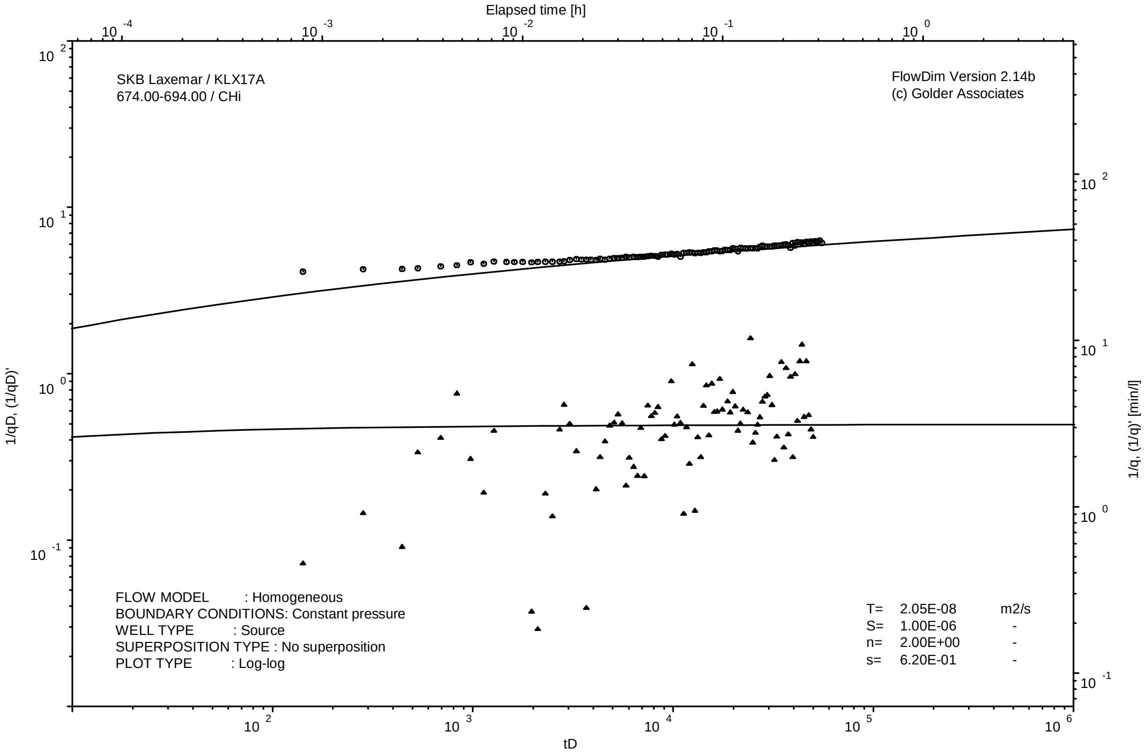
Analysis diagrams



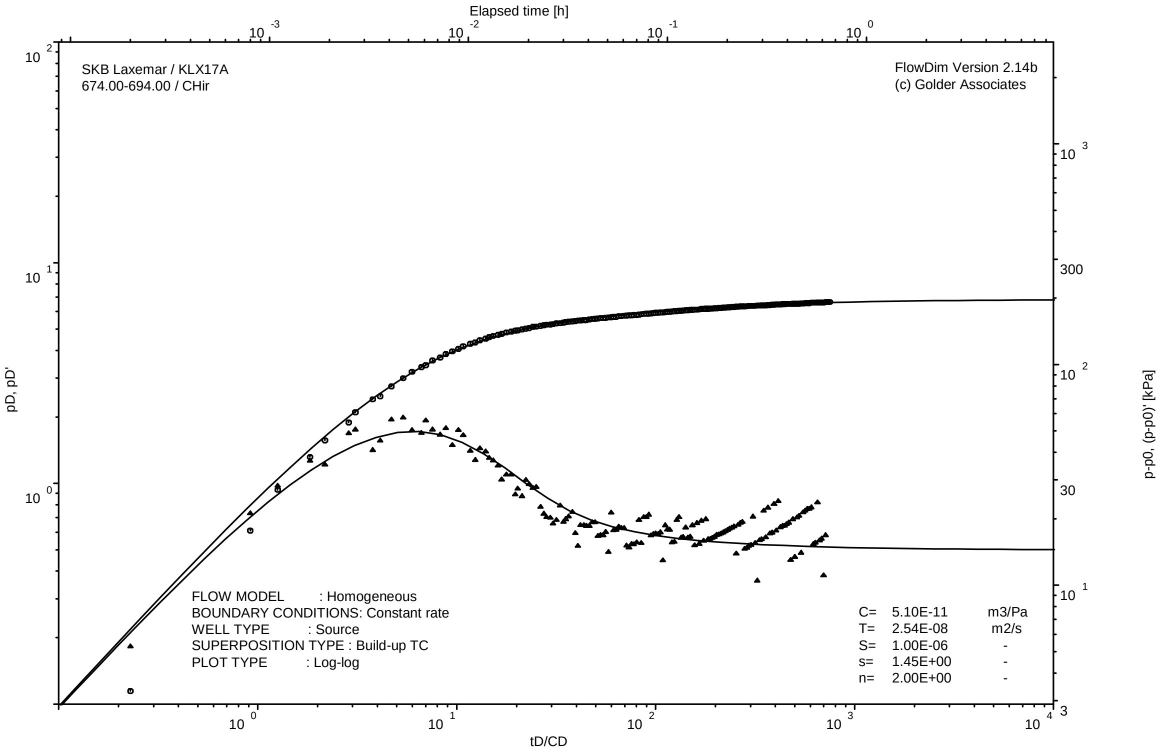
Pressure and flow rate vs. time; cartesian plot



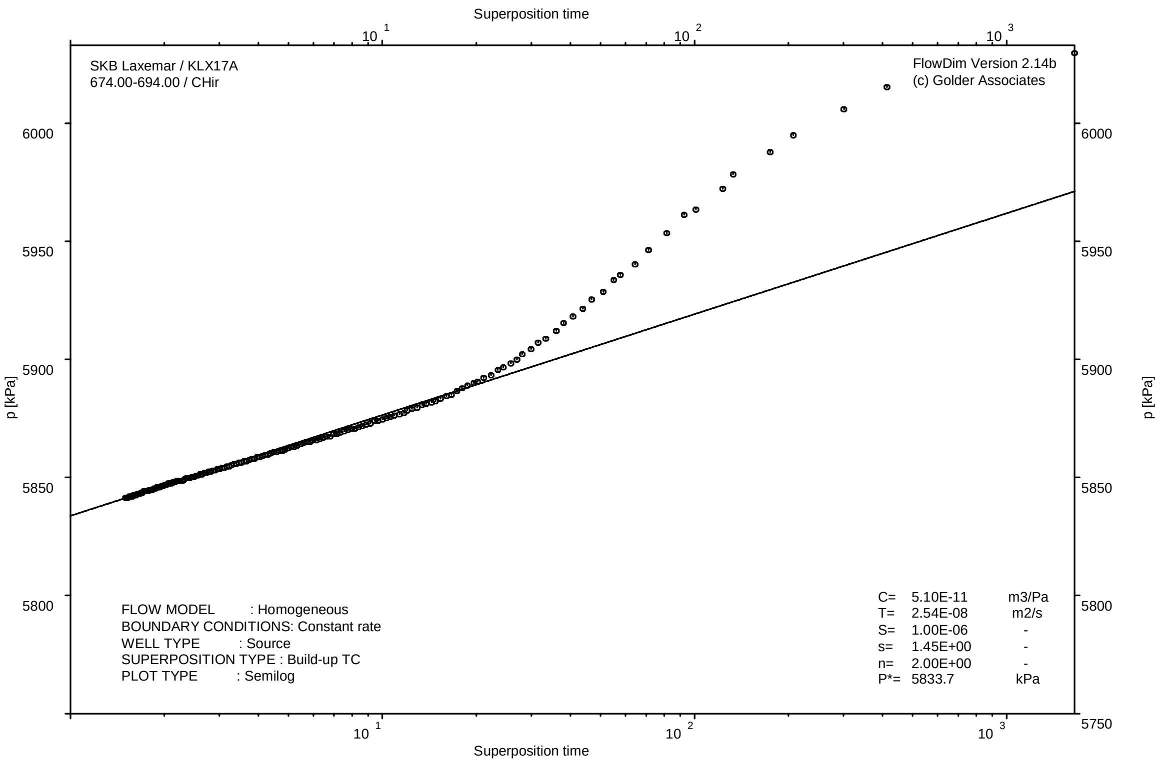
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

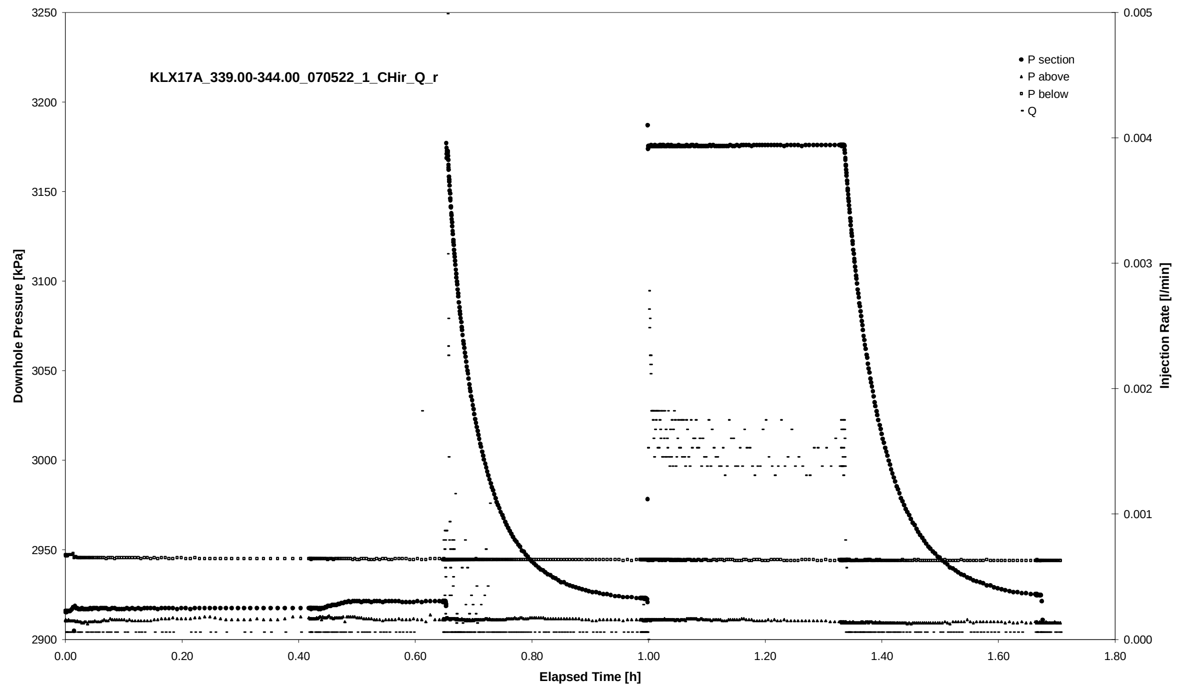


CHIR phase; HORNER match

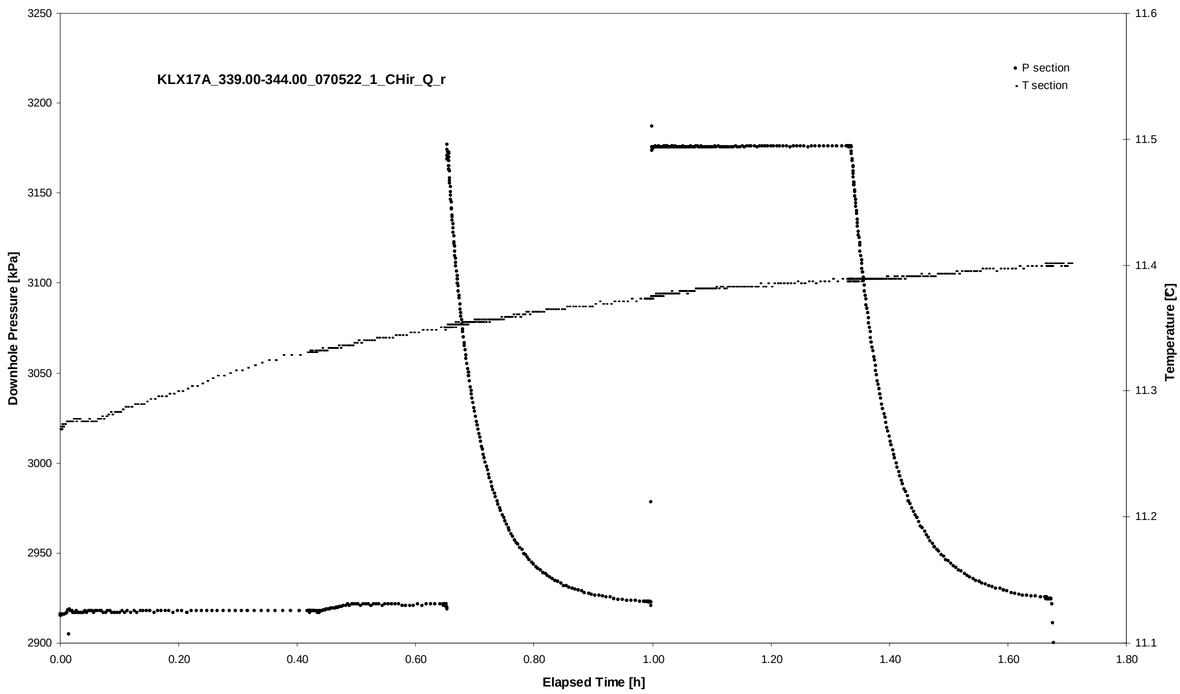
APPENDIX 2-41

Test 339.00 – 344.00 m

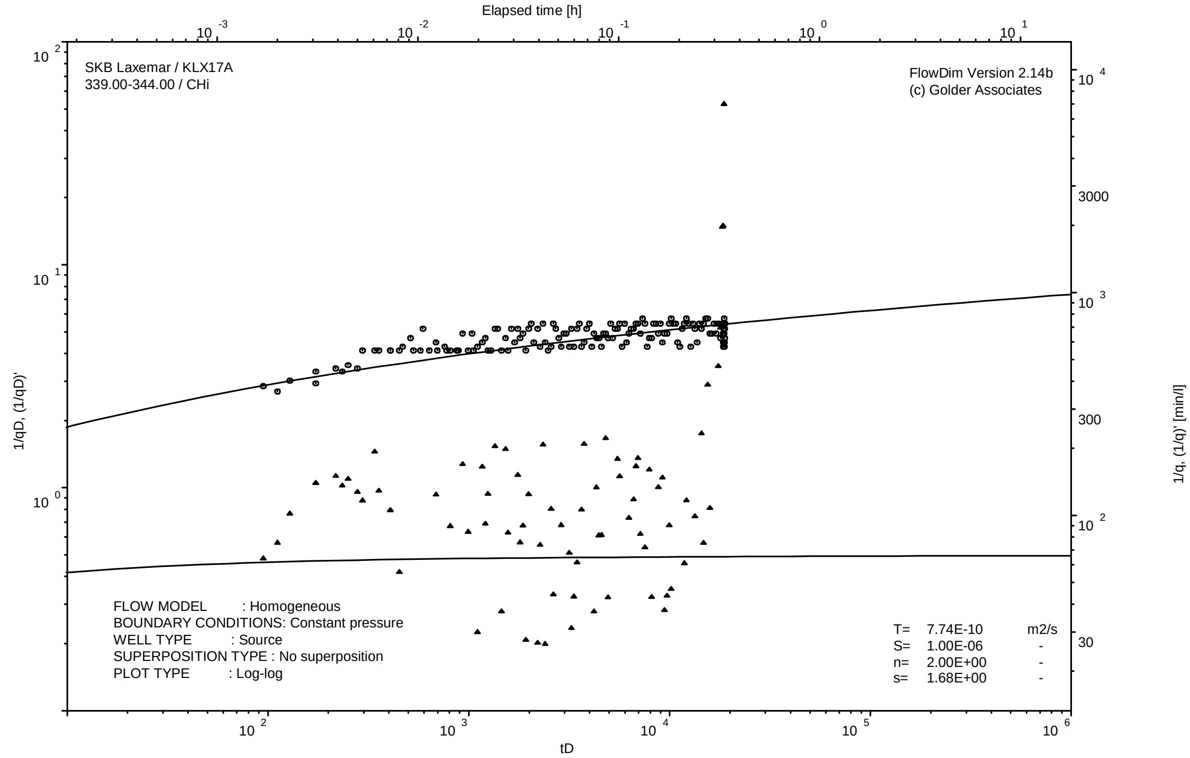
Analysis diagrams



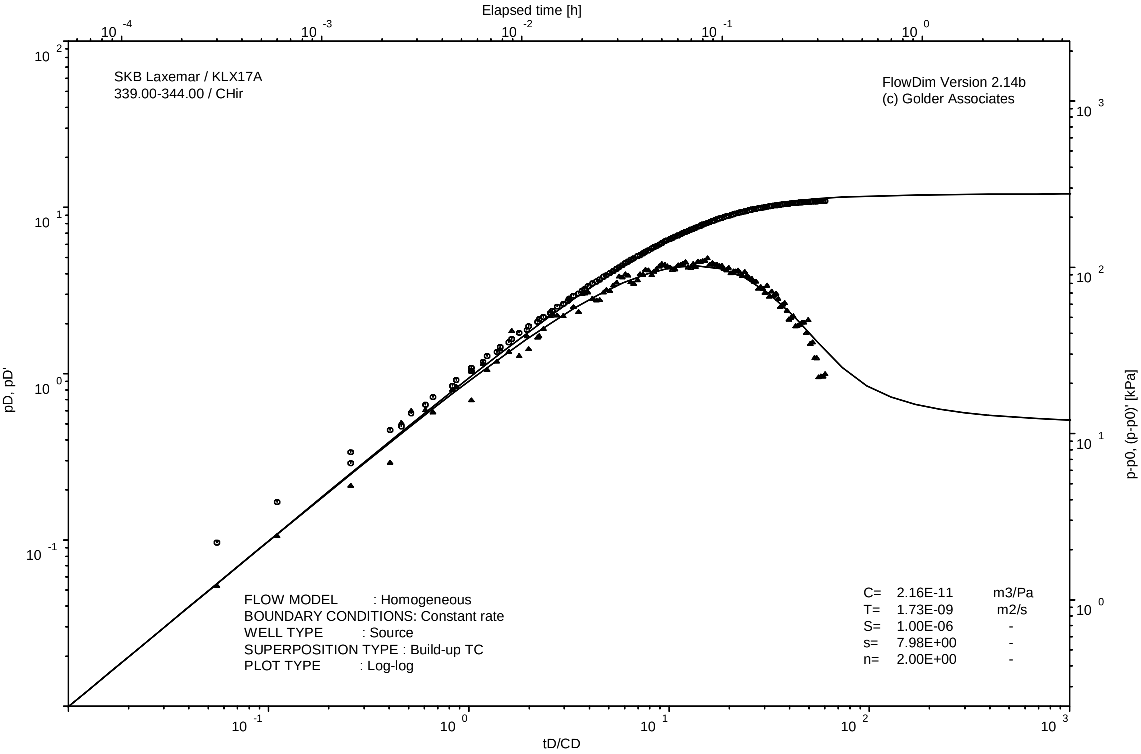
Pressure and flow rate vs. time; cartesian plot



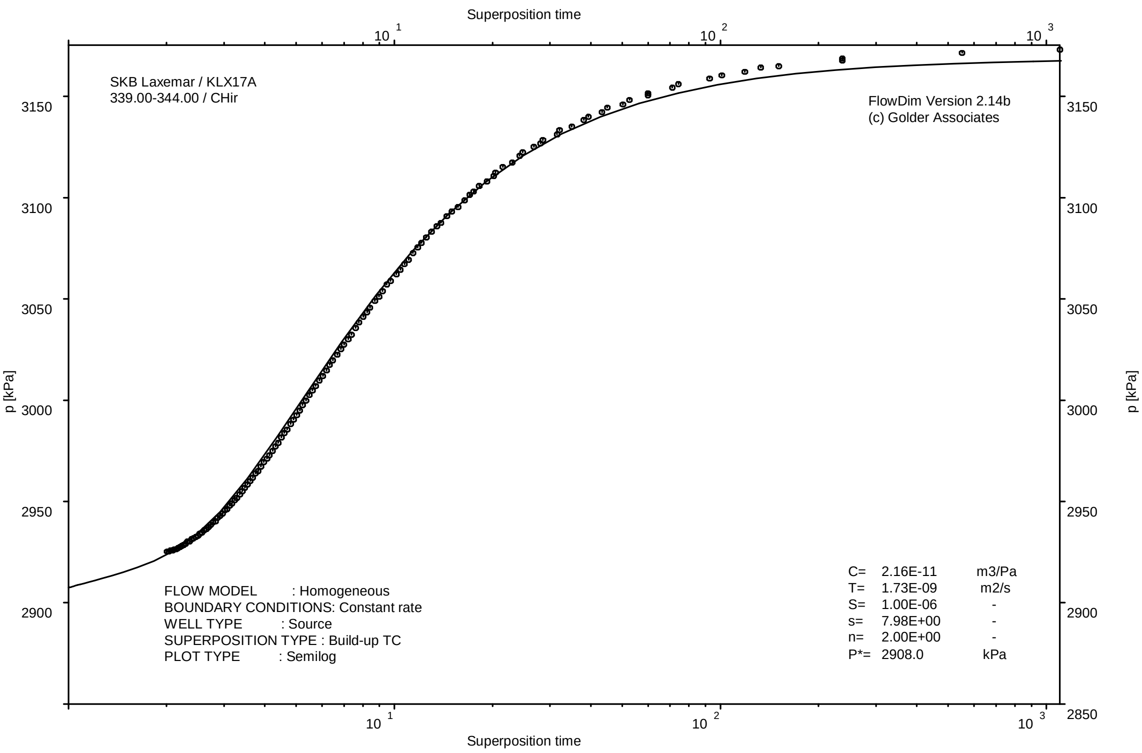
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

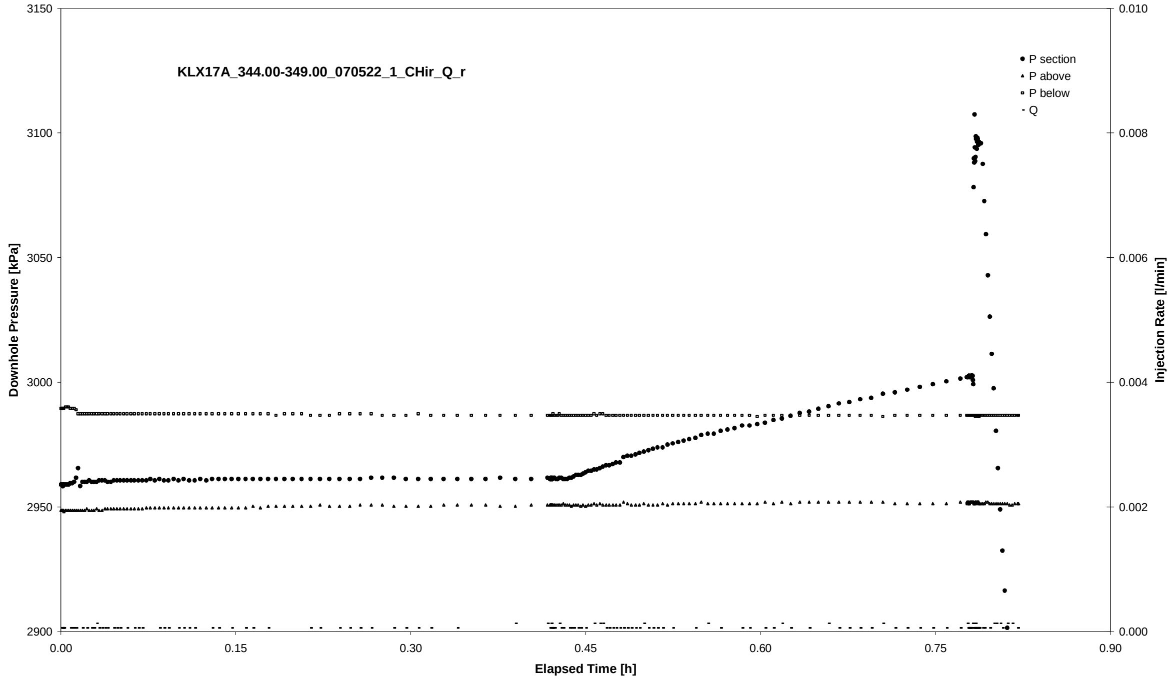


CHIR phase; HORNER match

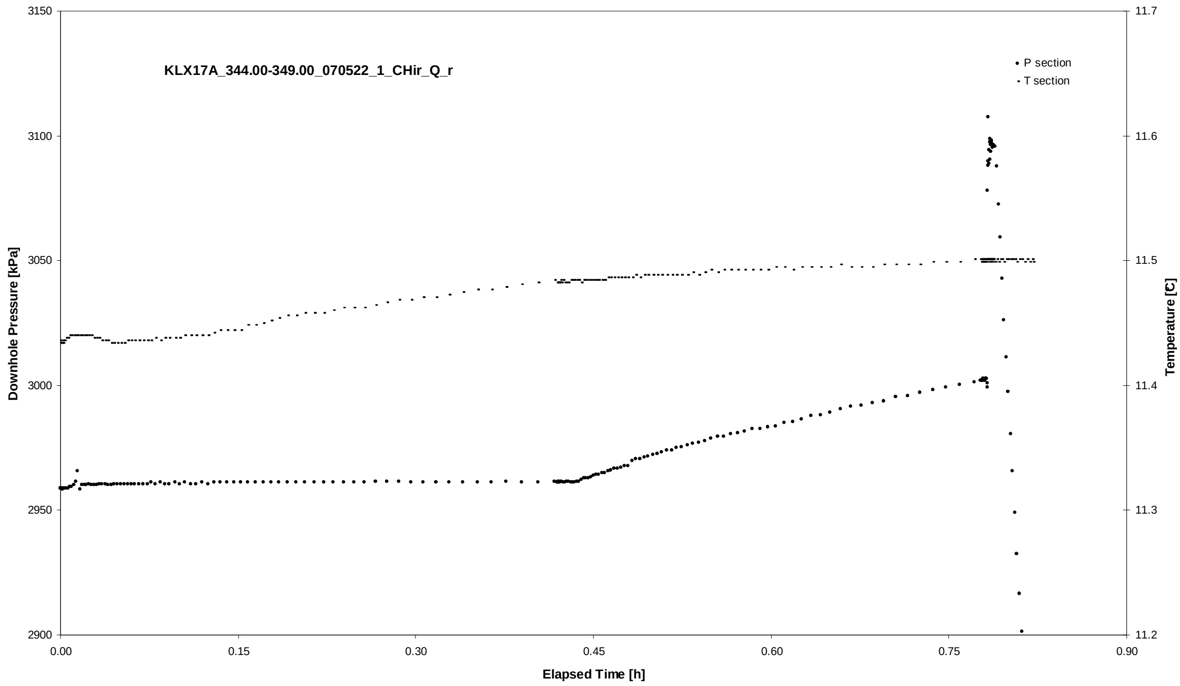
APPENDIX 2-42

Test 344.00 – 349.00 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

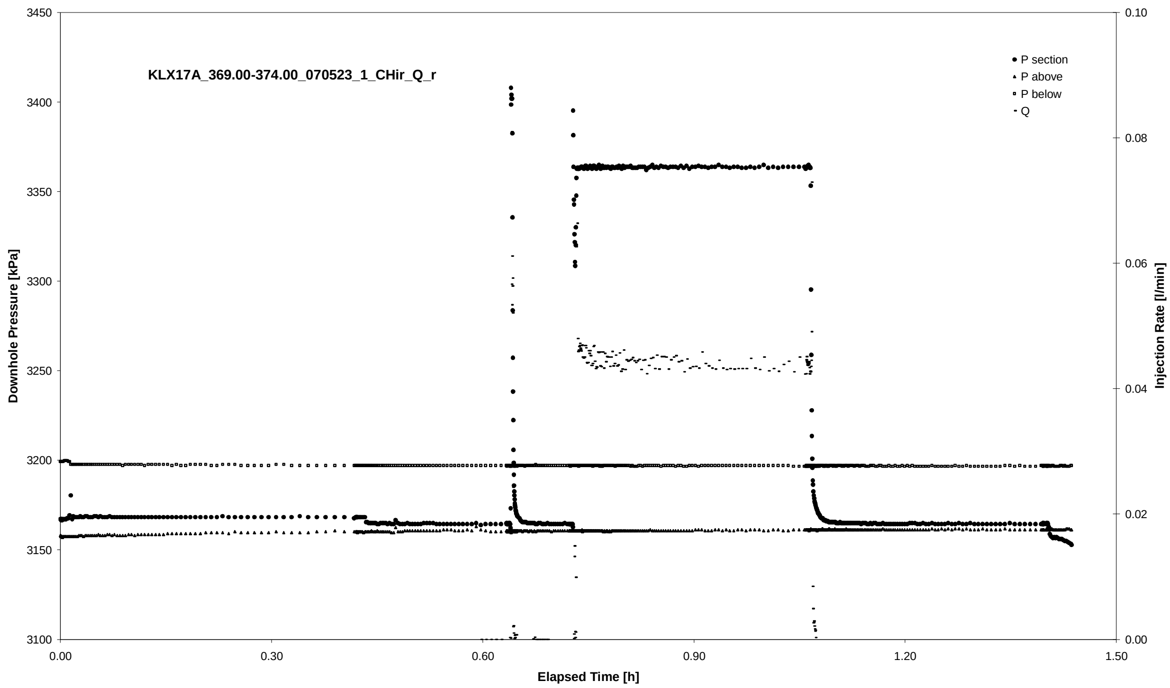
Not analysed

CHIR phase; HORNER match

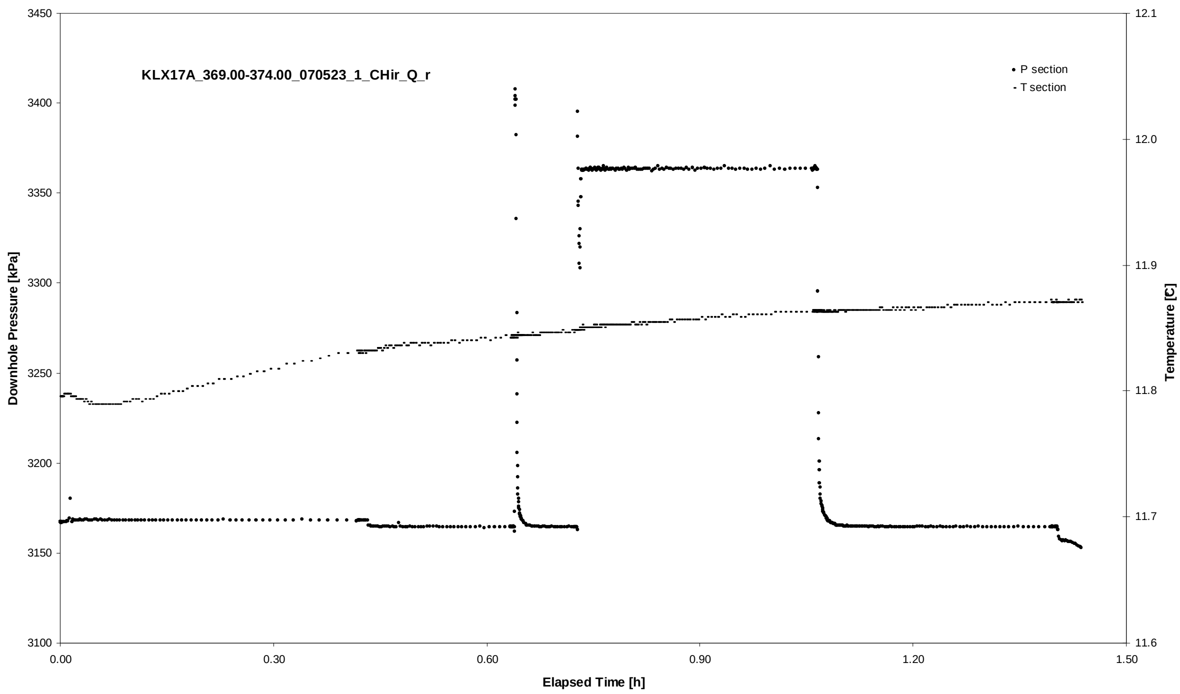
APPENDIX 2-43

Test 369.00 – 374.00 m

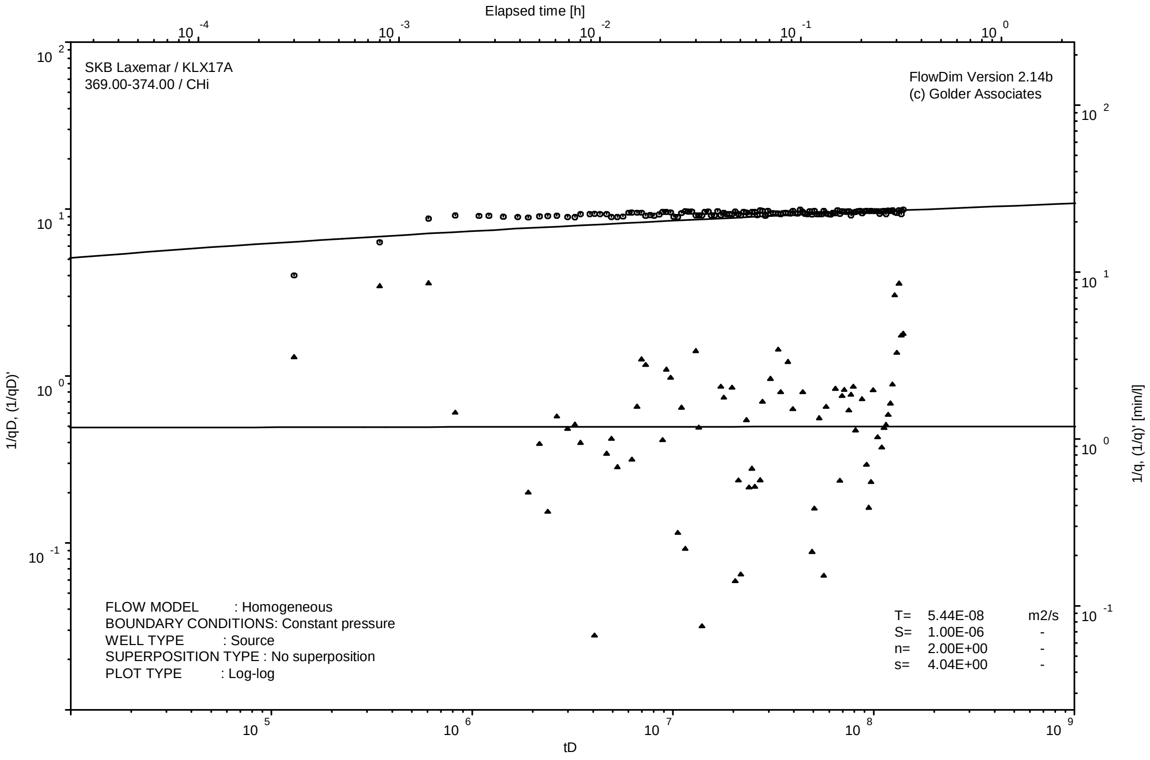
Analysis diagrams



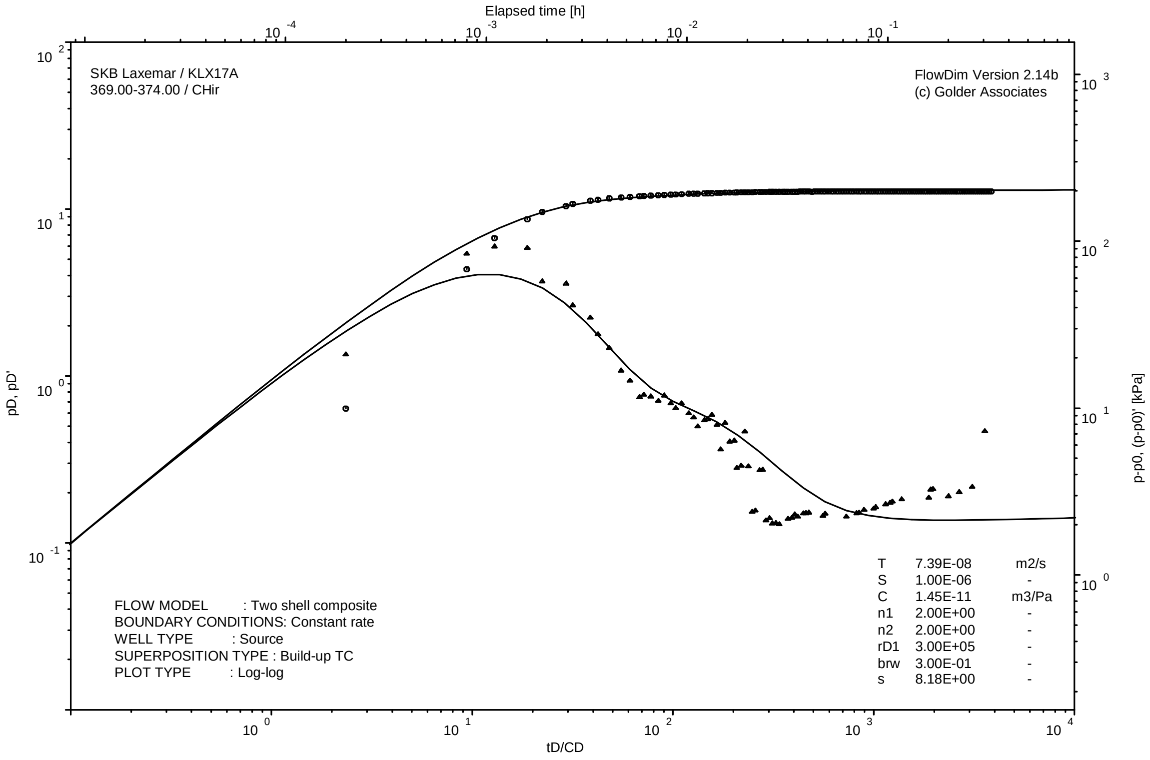
Pressure and flow rate vs. time; cartesian plot



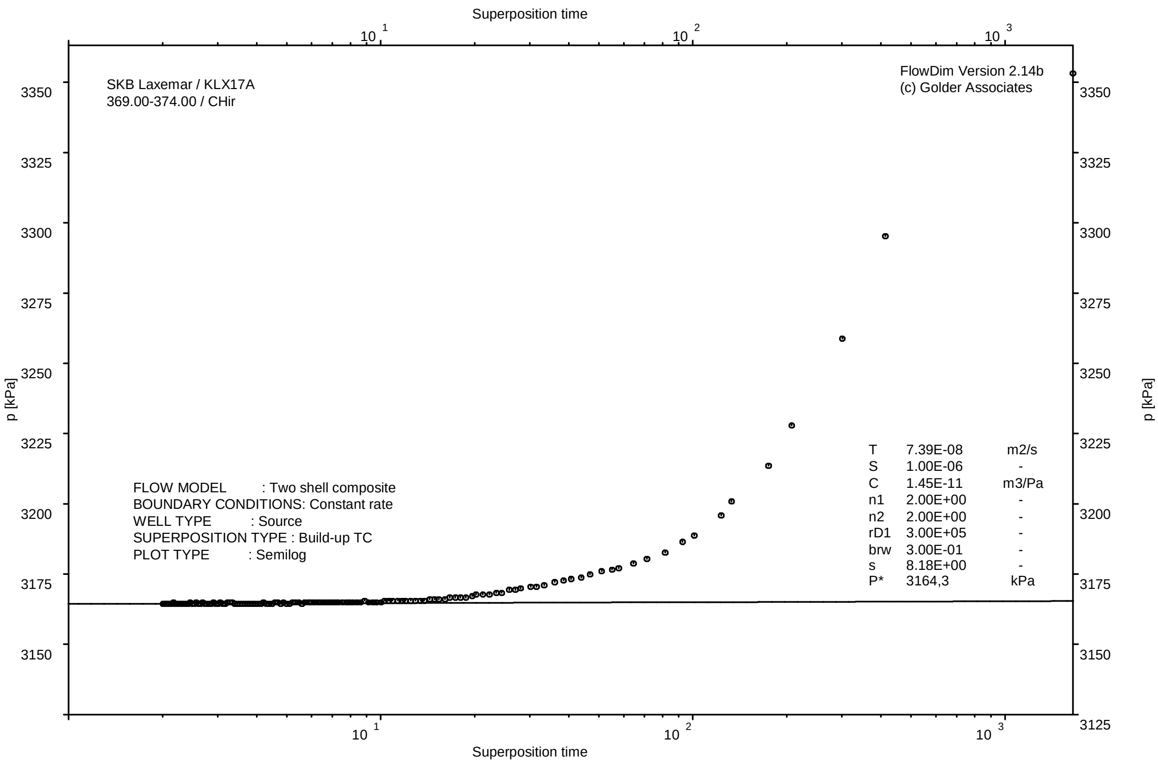
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

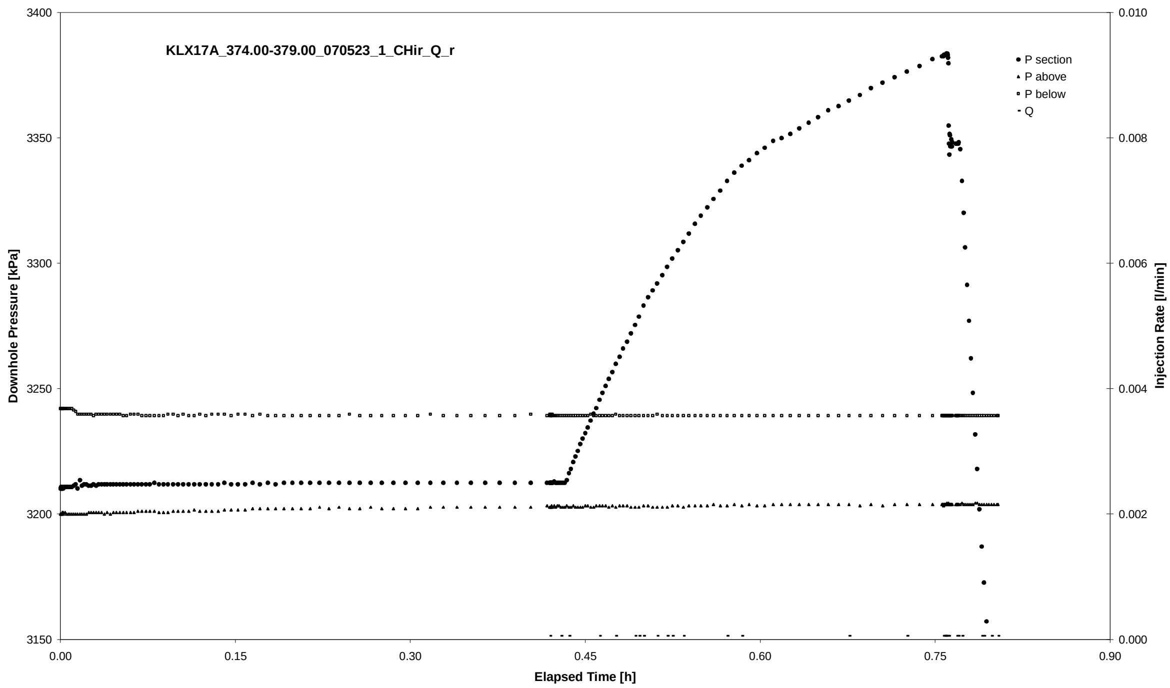


CHIR phase; HORNER match

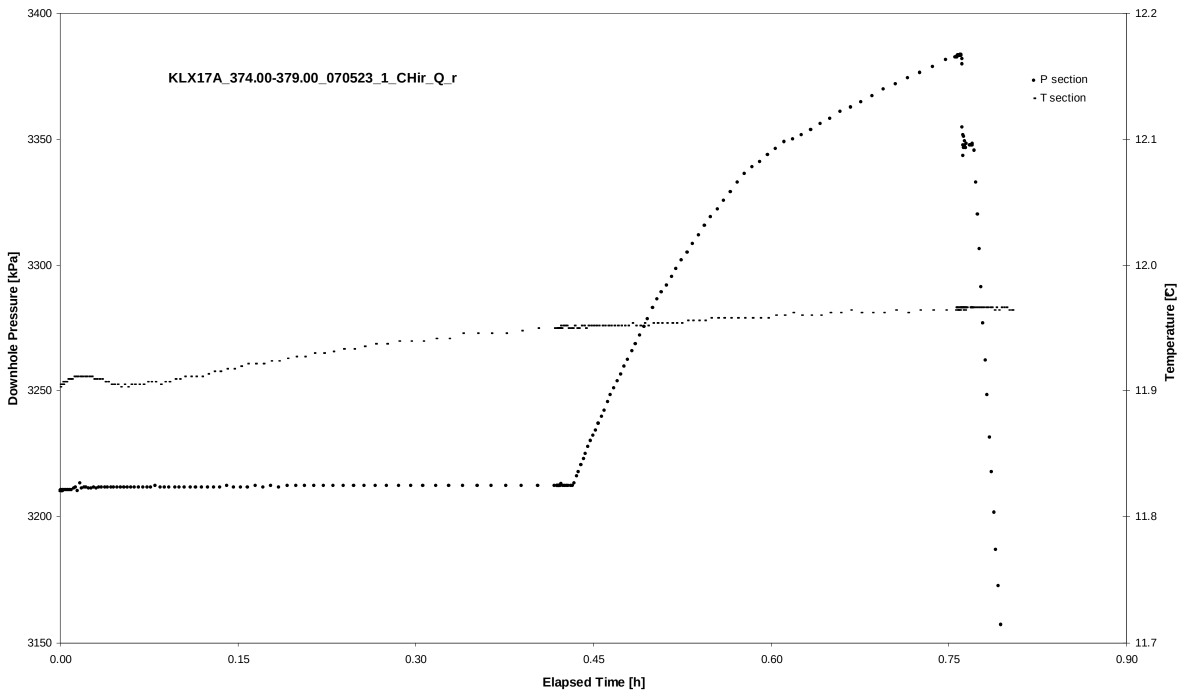
APPENDIX 2-44

Test 374.00 – 379.00 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

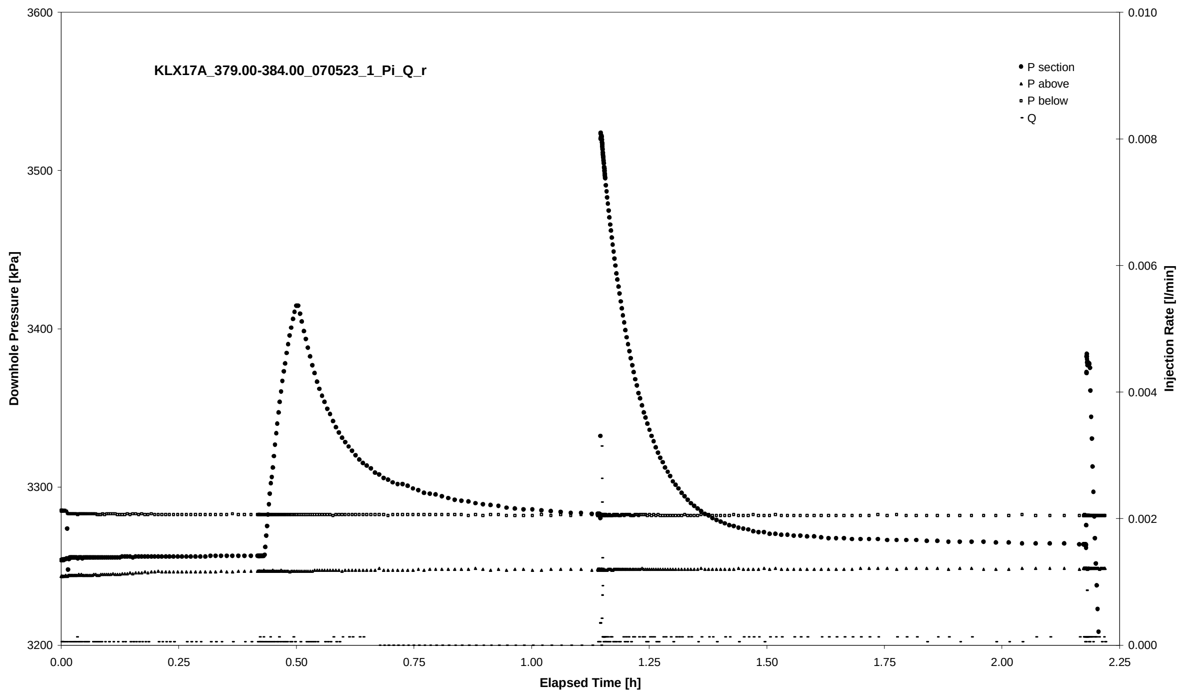
Not analysed

CHIR phase; HORNER match

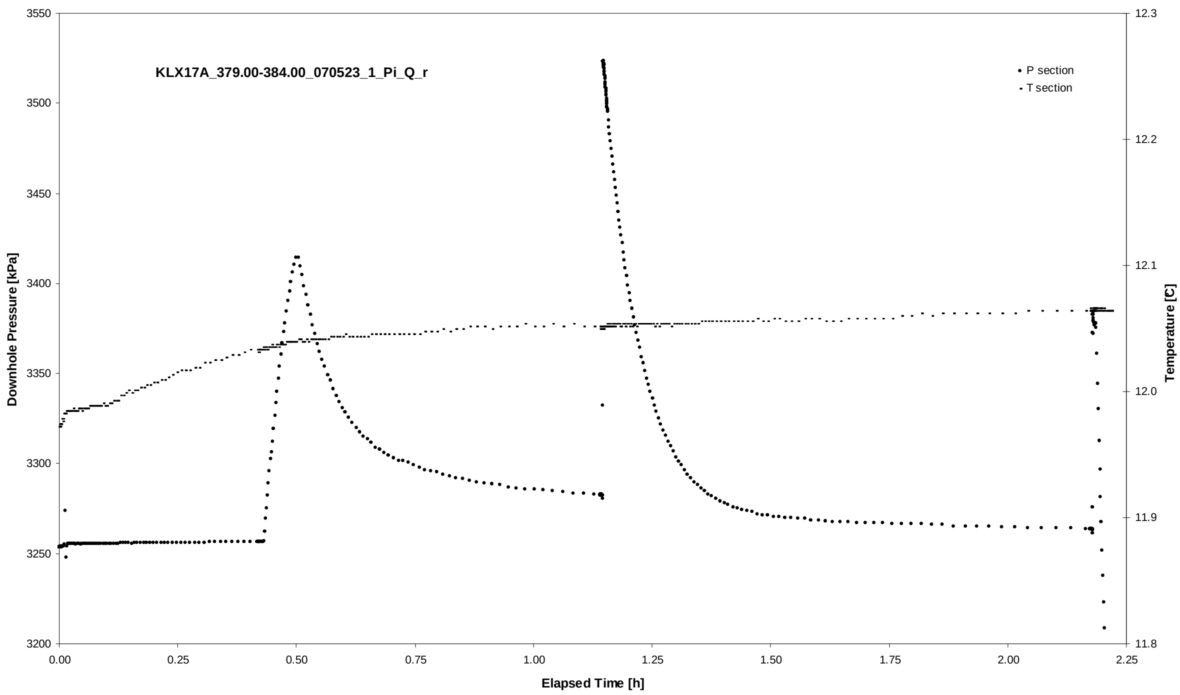
APPENDIX 2-45

Test 379.00 – 384.00 m

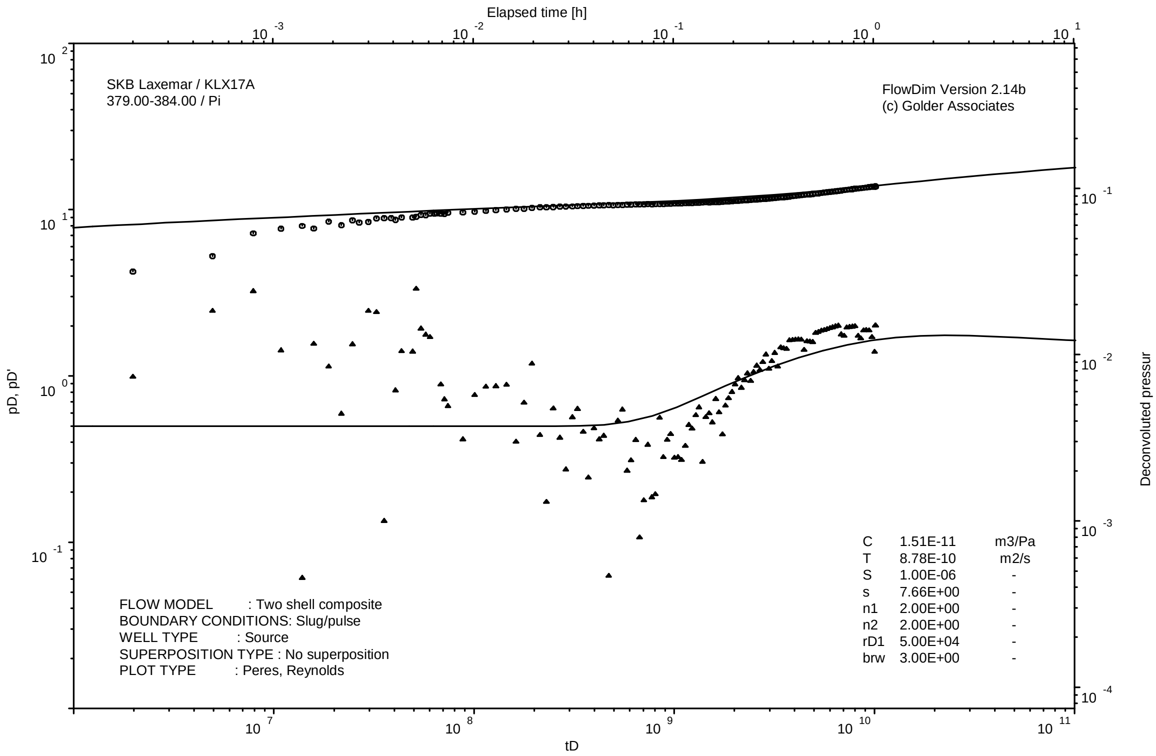
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

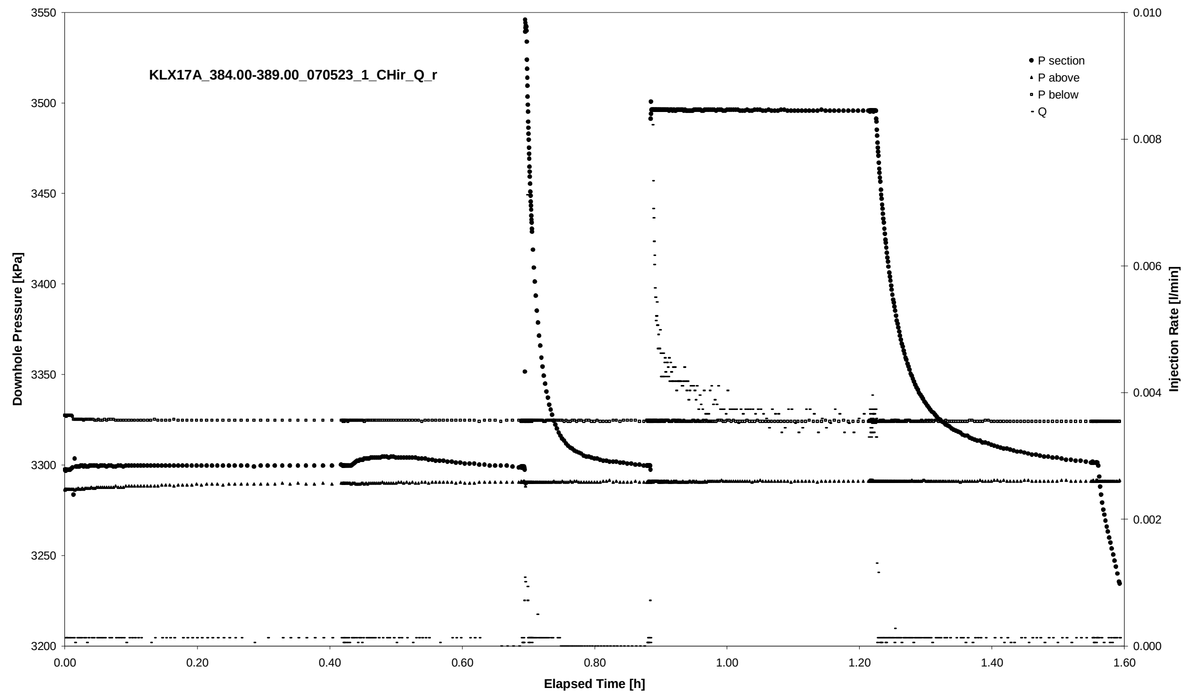


Pulse injection; deconvolution match

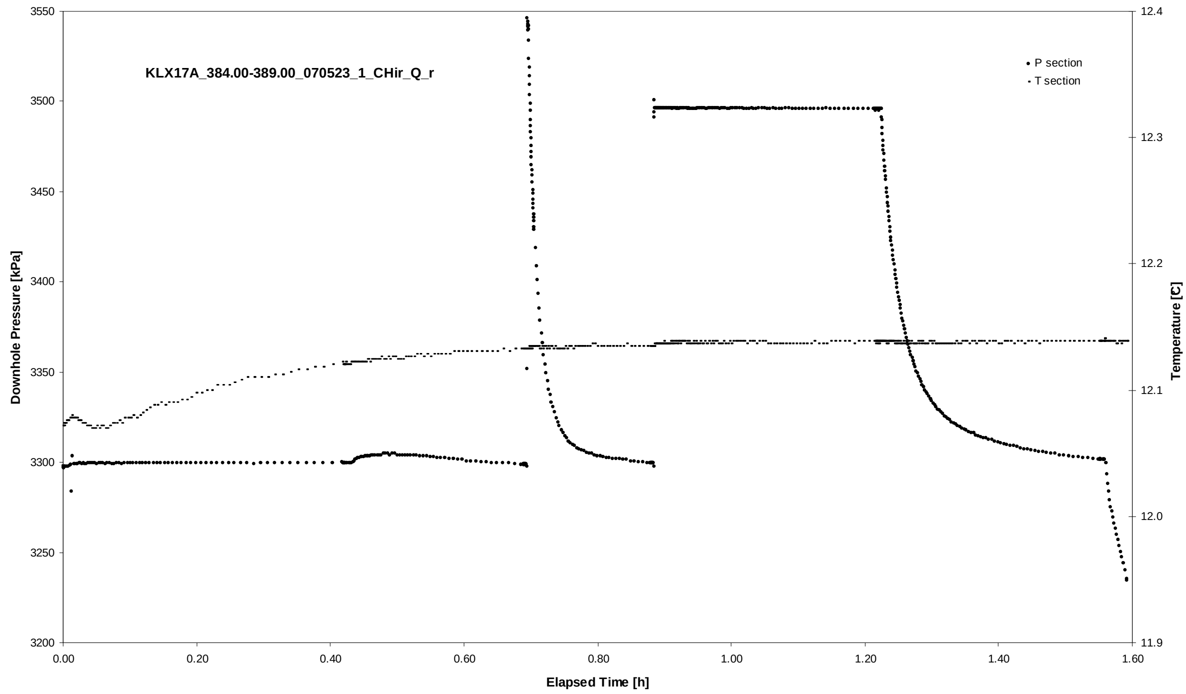
APPENDIX 2-46

Test 384.00 – 389.00 m

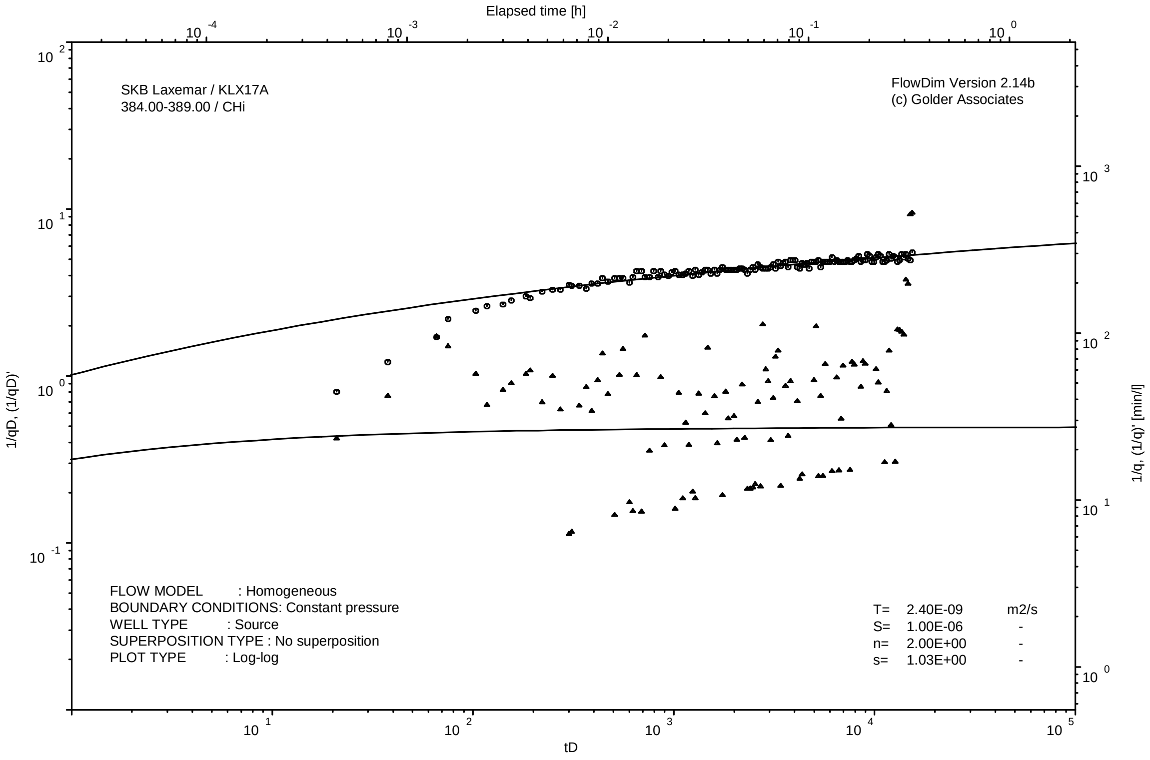
Analysis diagrams



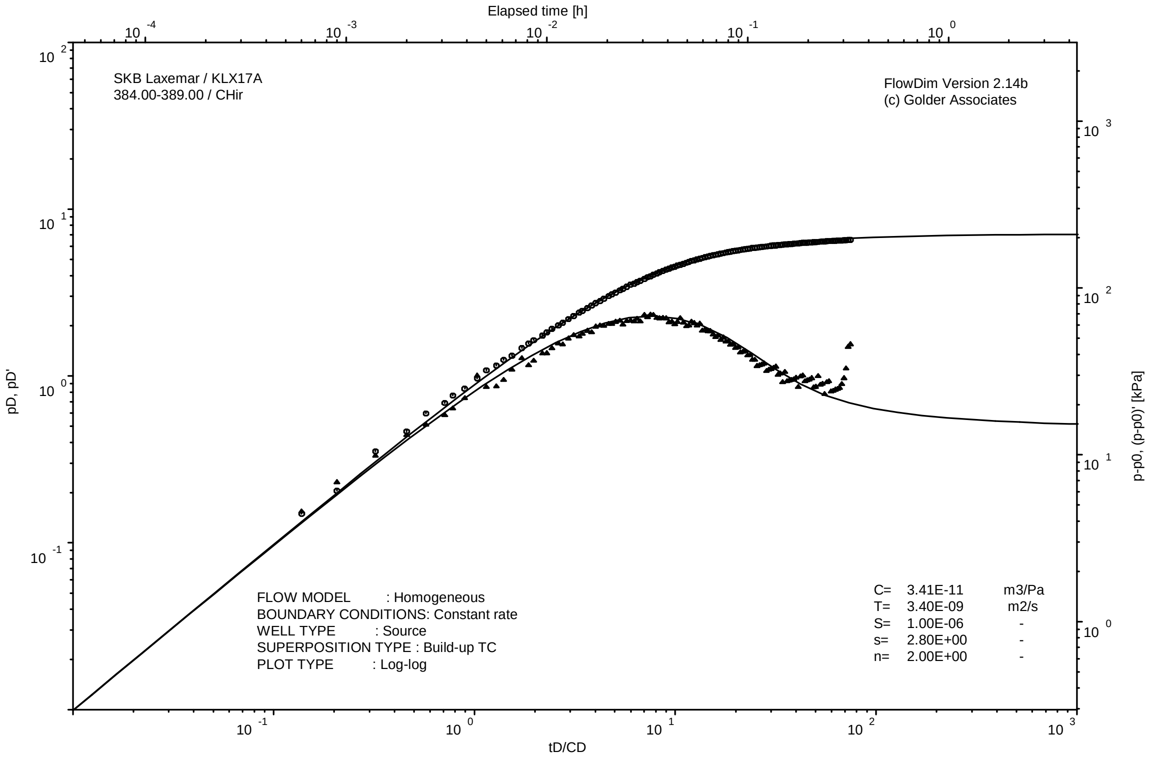
Pressure and flow rate vs. time; cartesian plot



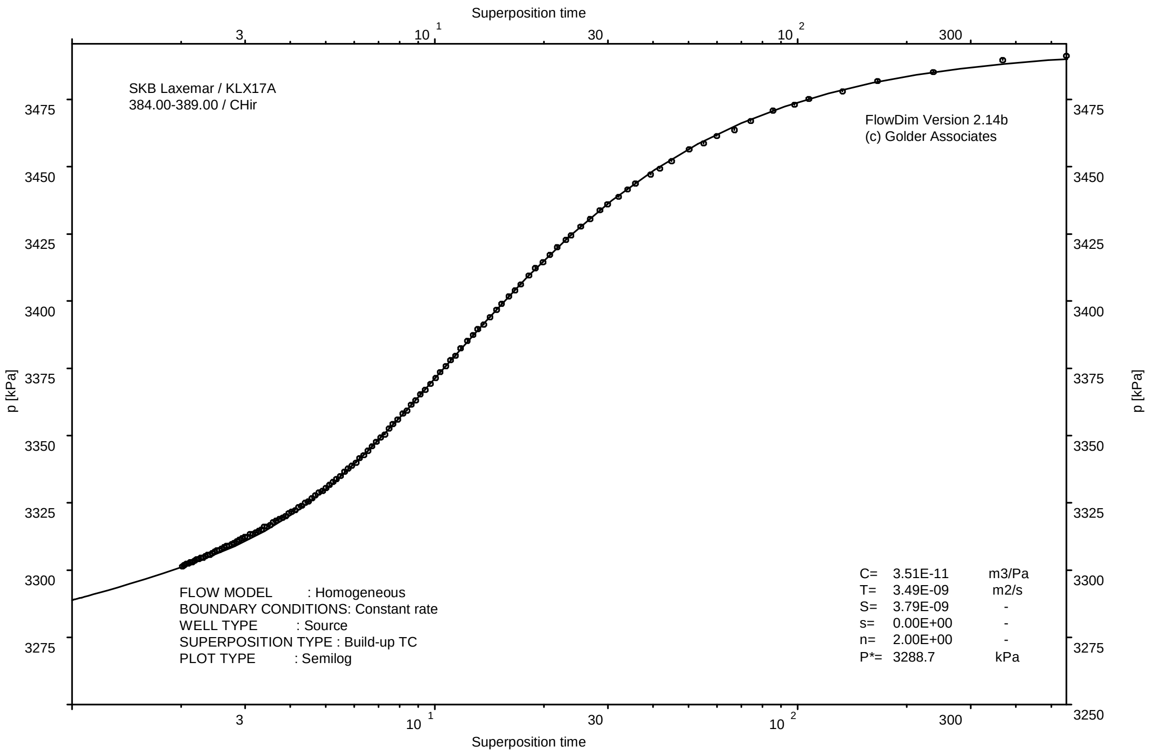
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

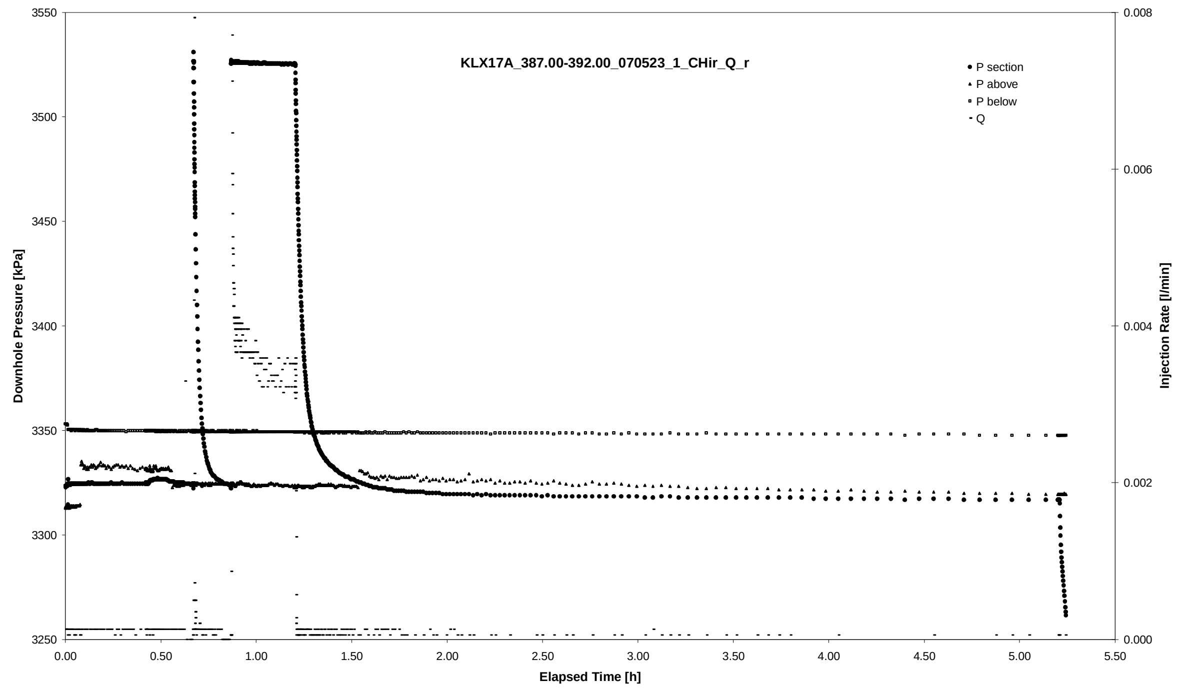


CHIR phase; HORNER match

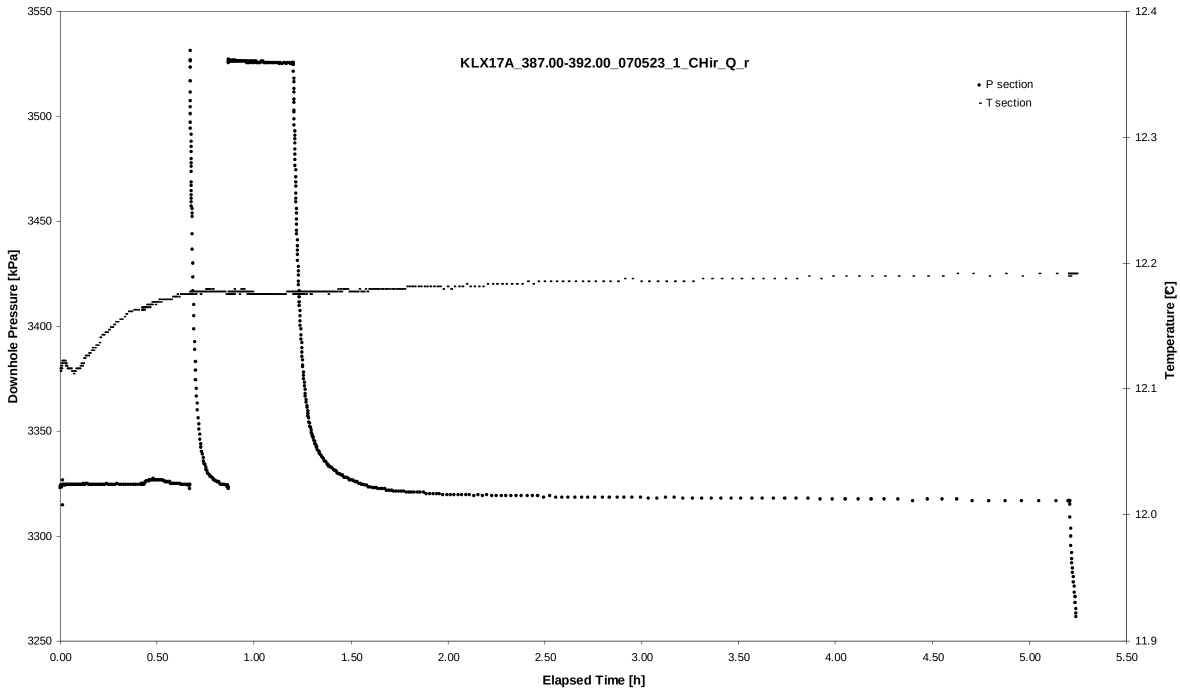
APPENDIX 2-47

Test 387.00 – 392.00 m

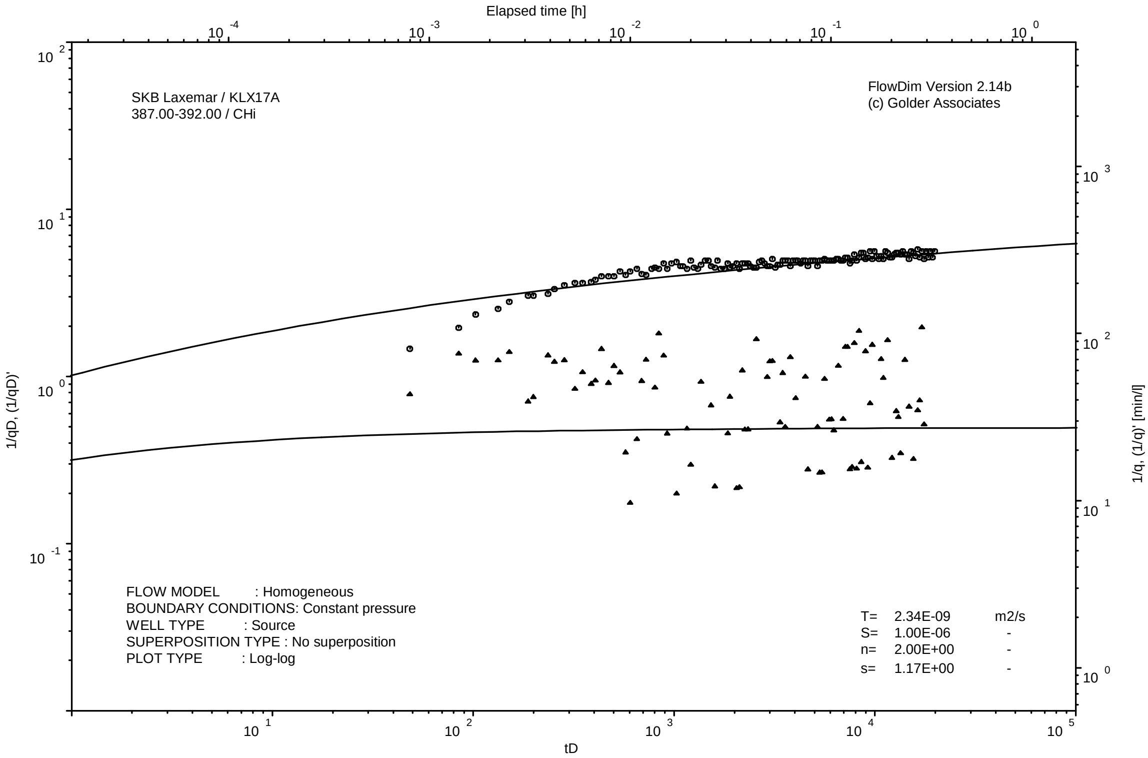
Analysis diagrams



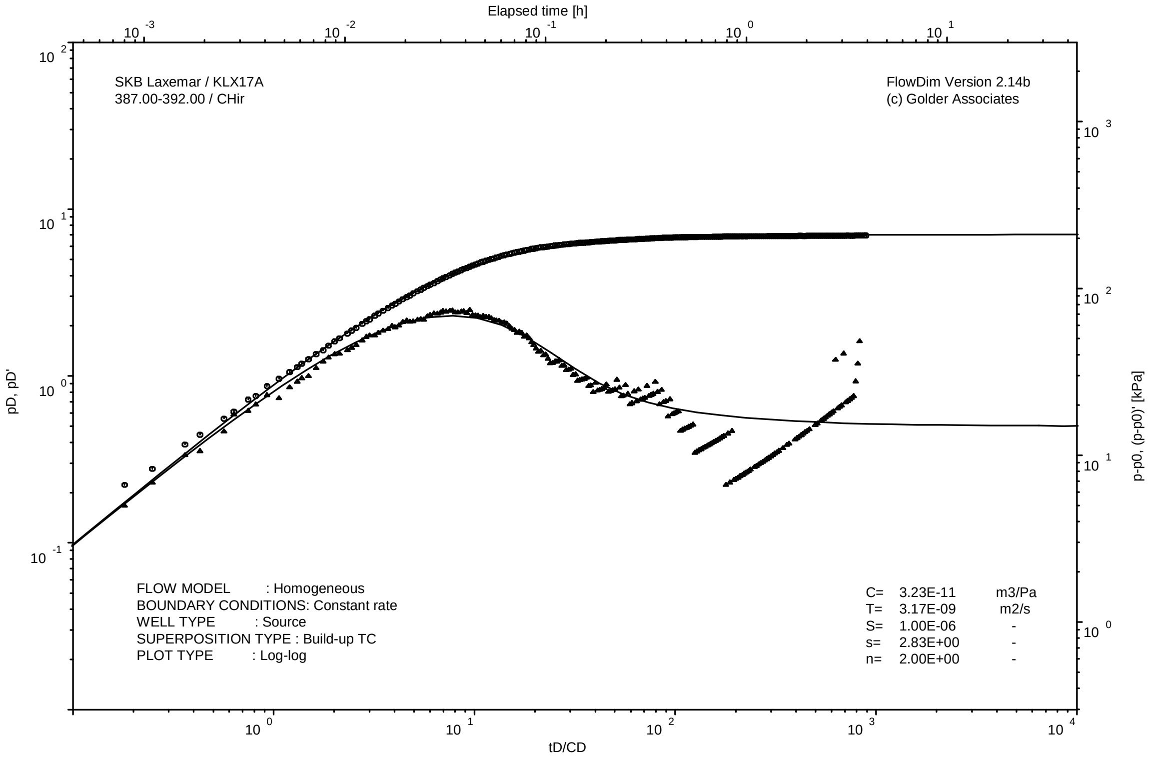
Pressure and flow rate vs. time; cartesian plot



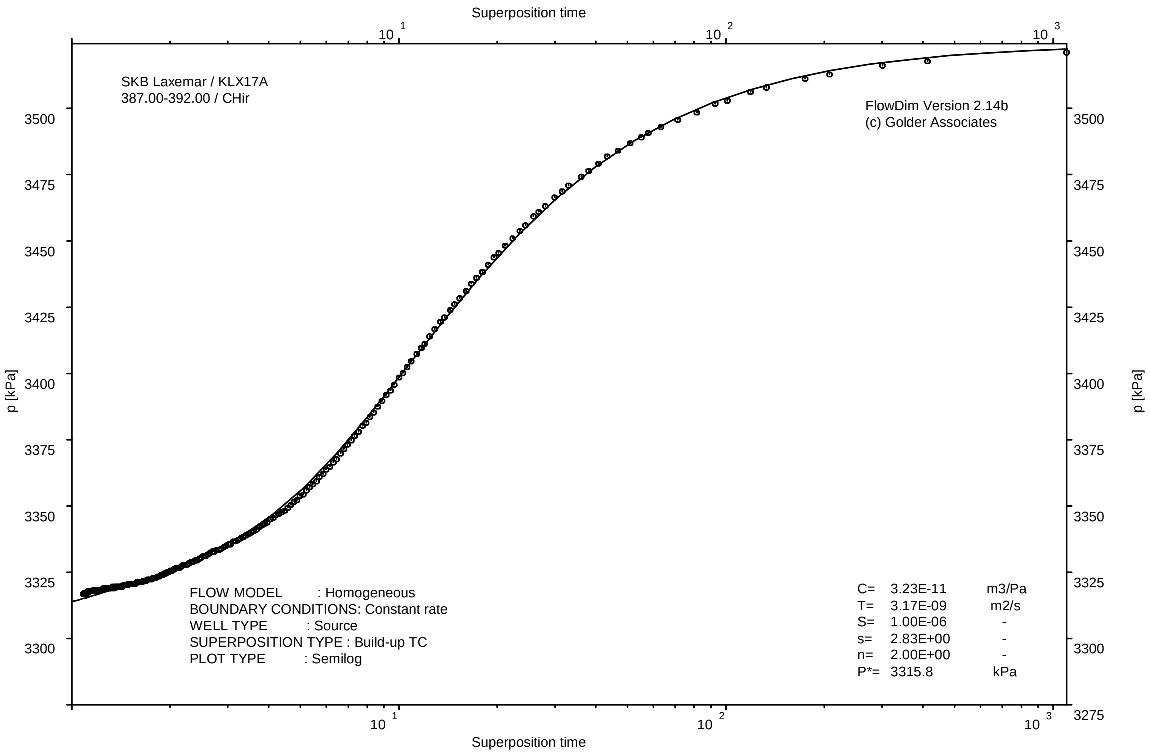
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

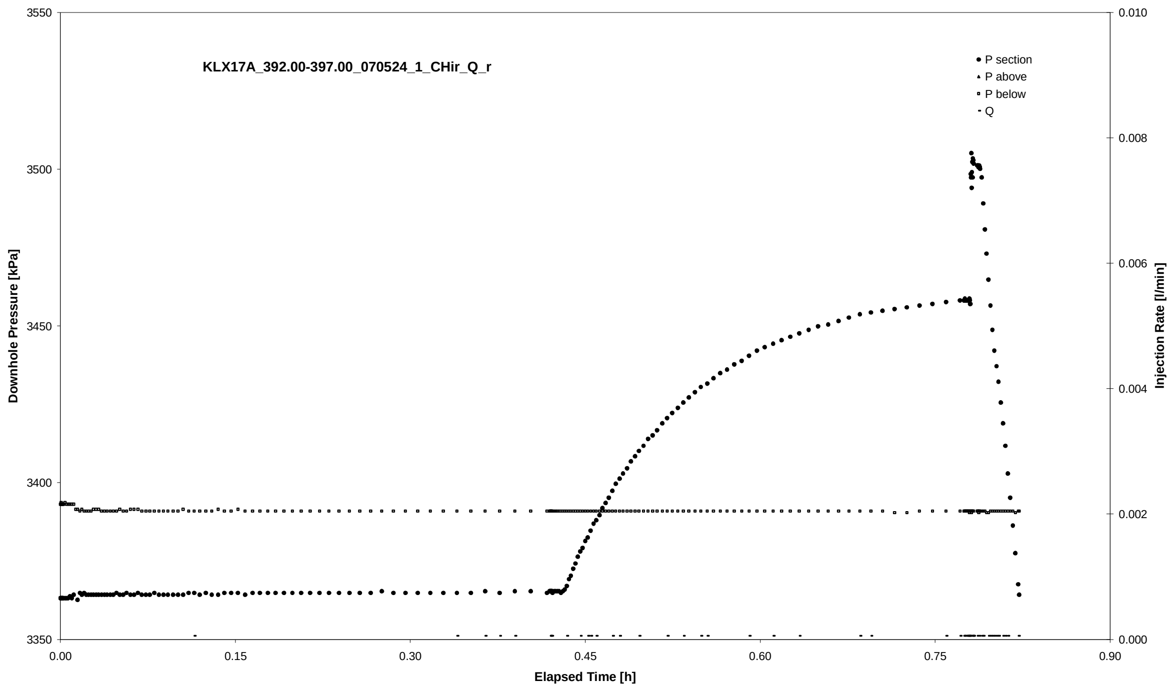


CHIR phase; HORNER match

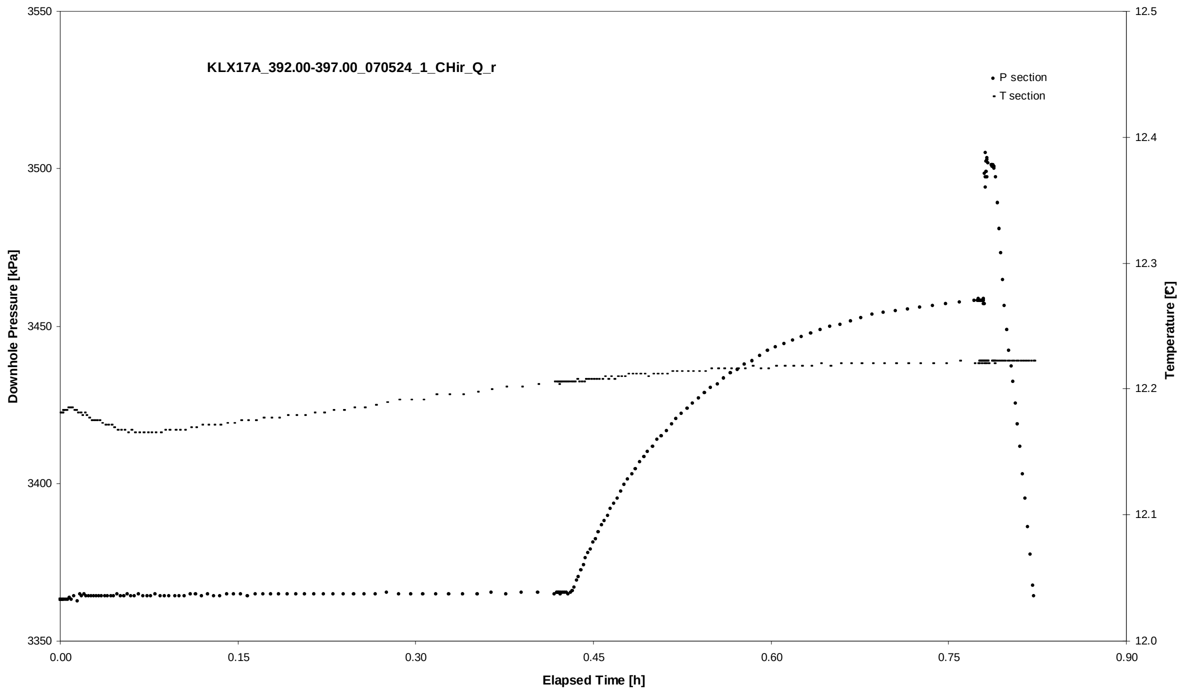
APPENDIX 2-48

Test 392.00 – 397.00 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

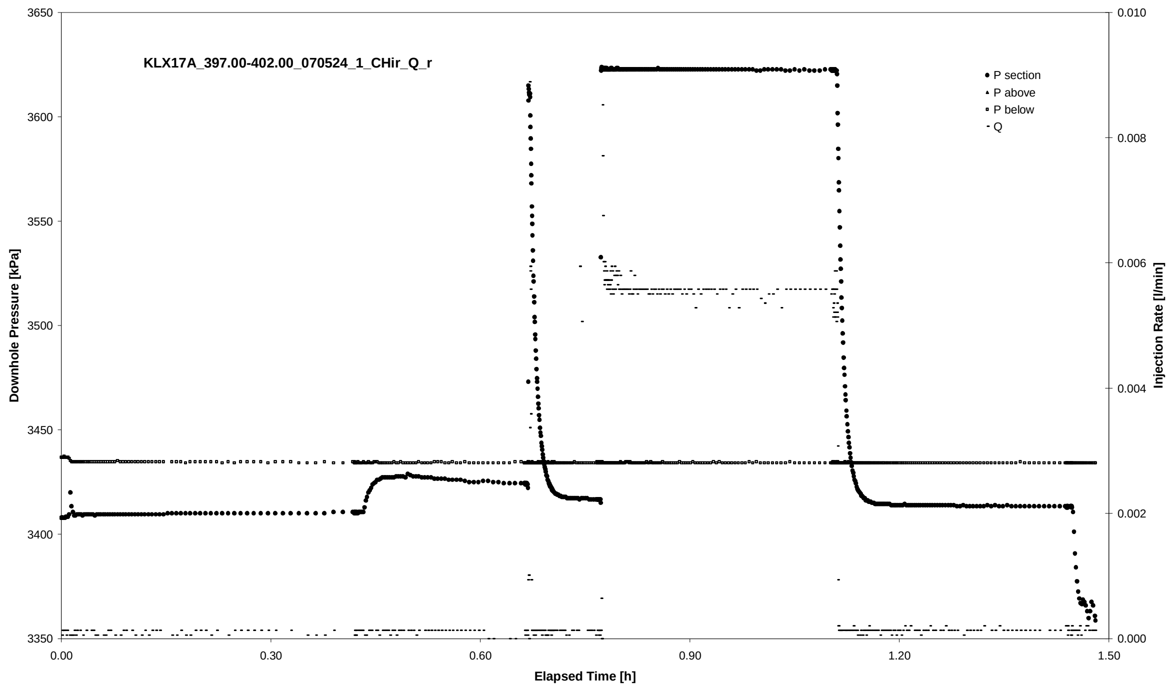
Not analysed

CHIR phase; HORNER match

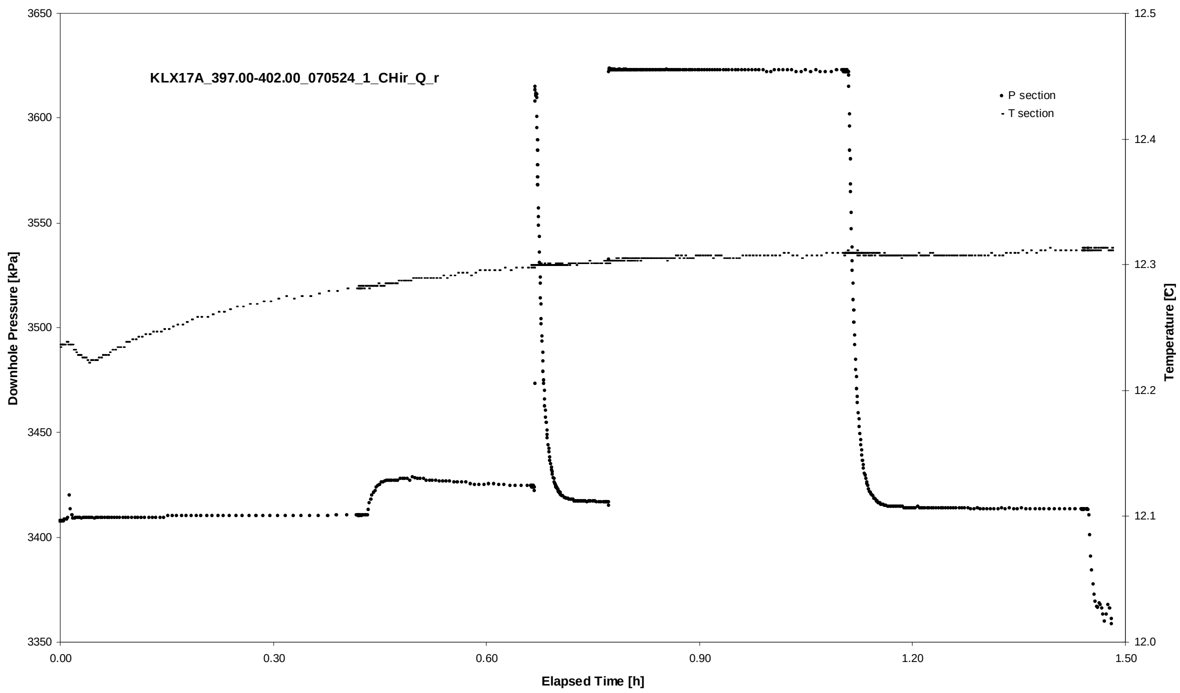
APPENDIX 2-49

Test 397.00 – 402.00 m

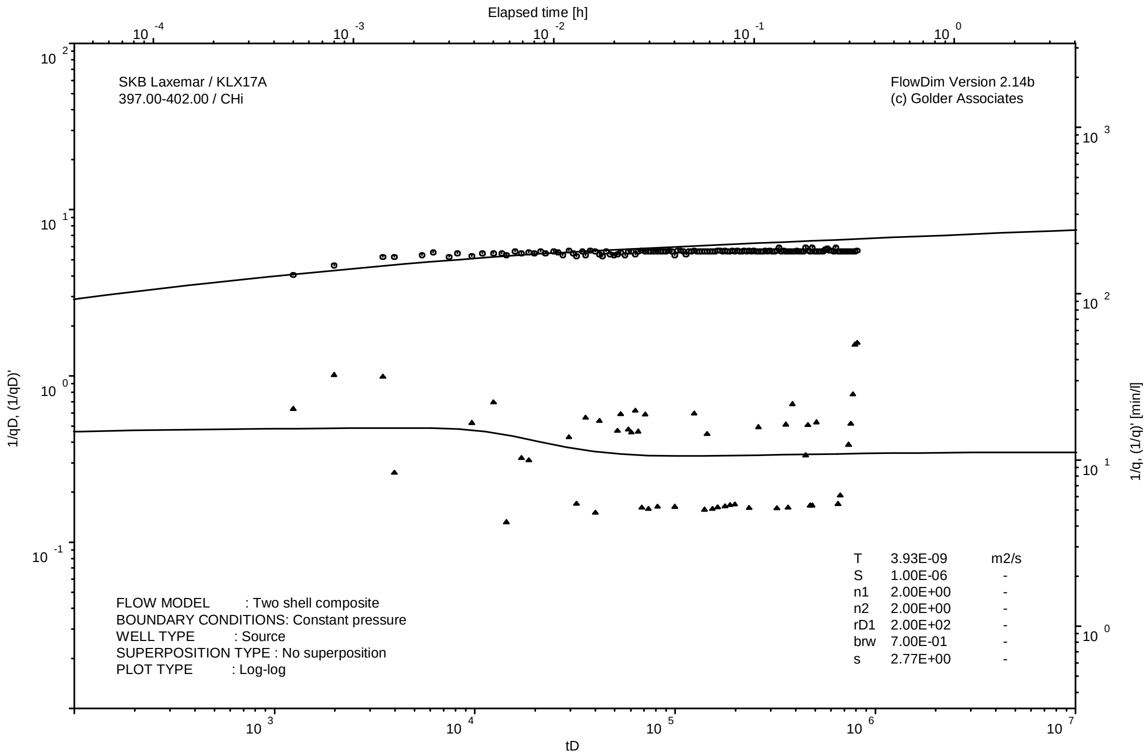
Analysis diagrams



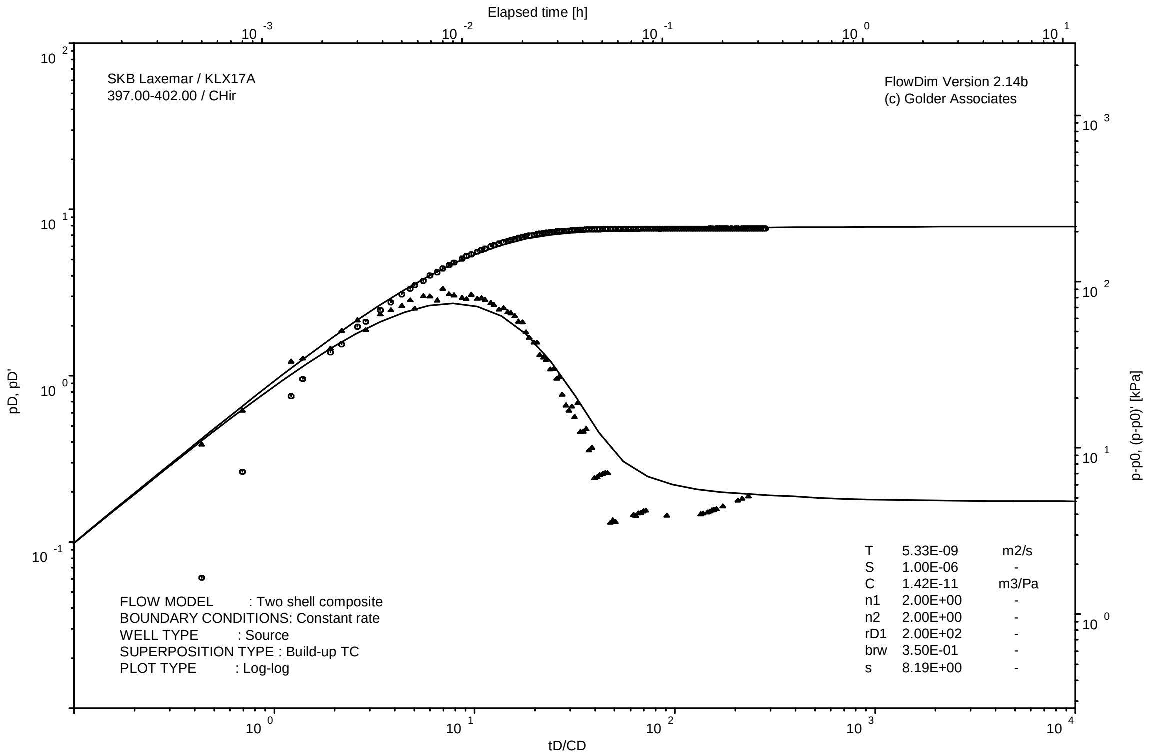
Pressure and flow rate vs. time; cartesian plot



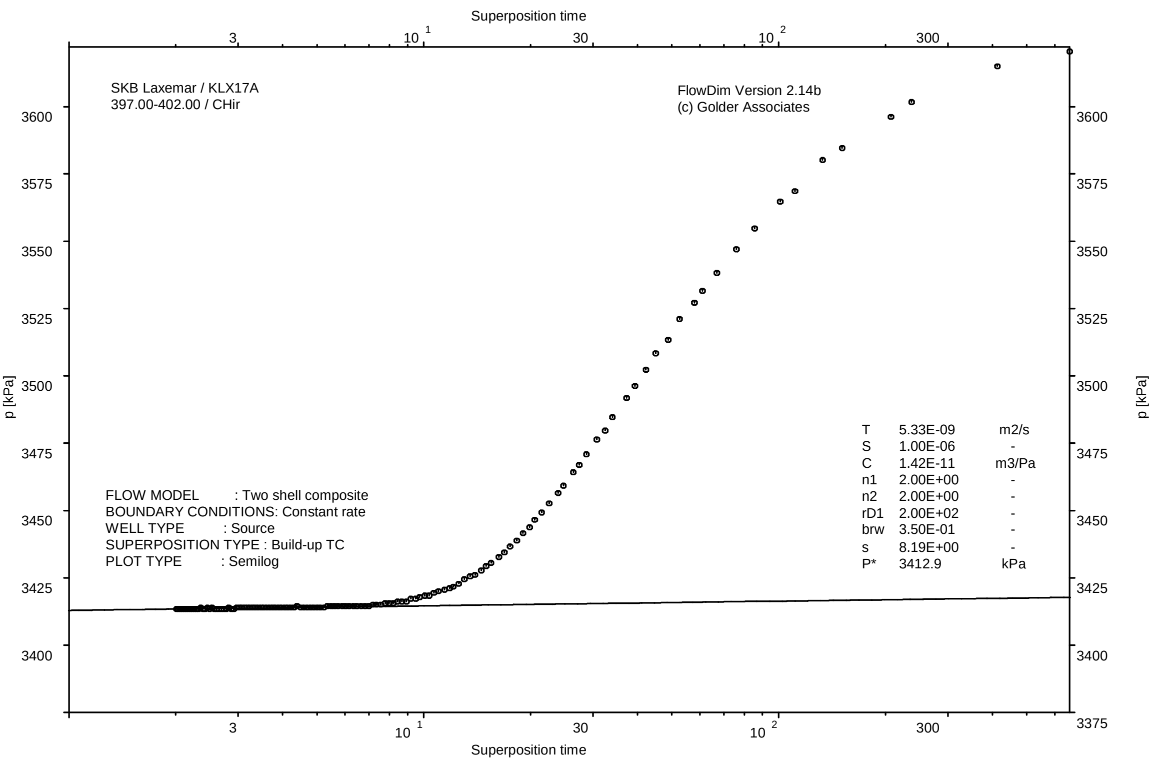
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

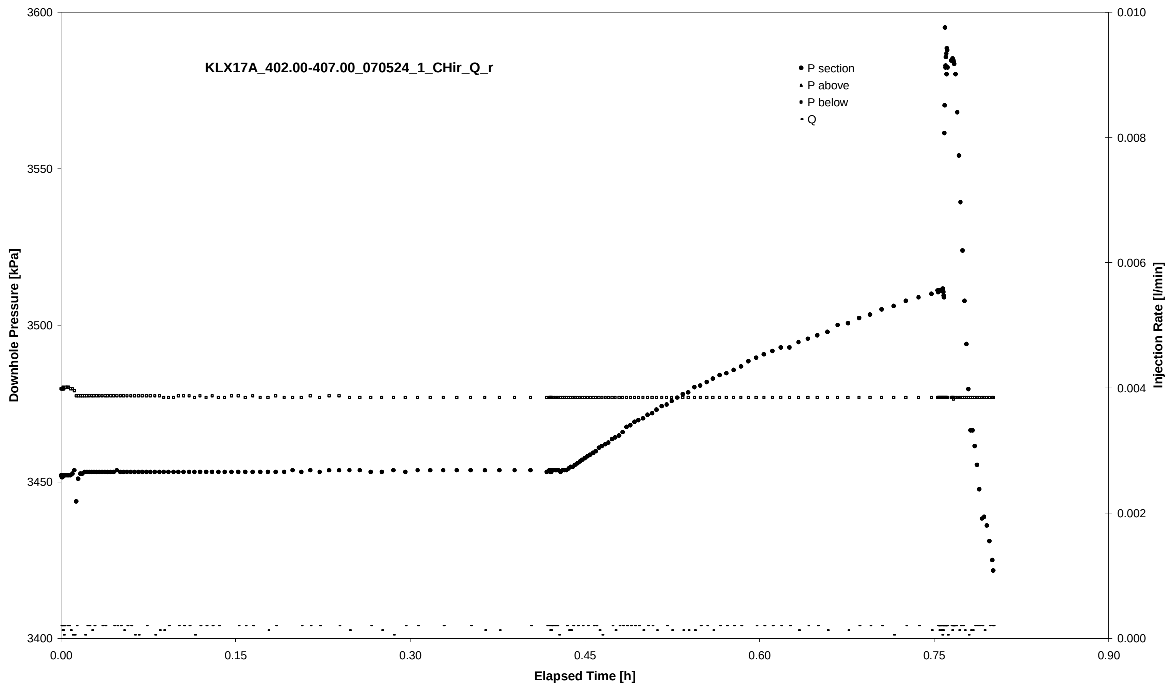


CHIR phase; HORNER match

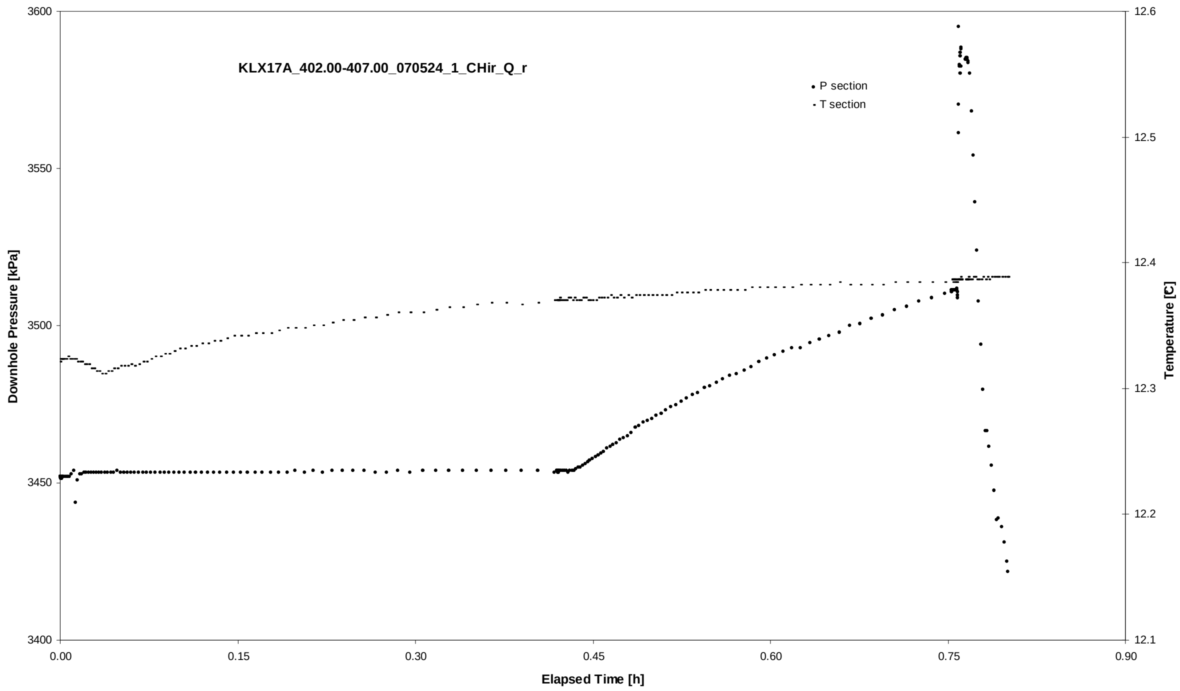
APPENDIX 2-50

Test 402.00 – 407.00 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

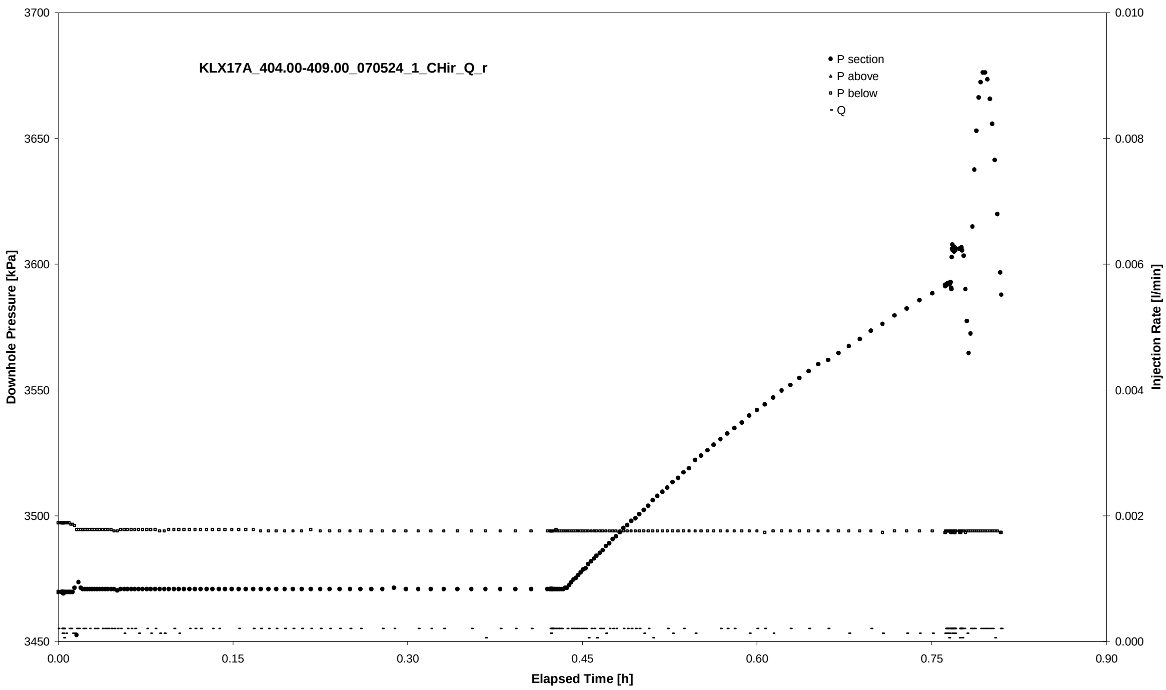
Not analysed

CHIR phase; HORNER match

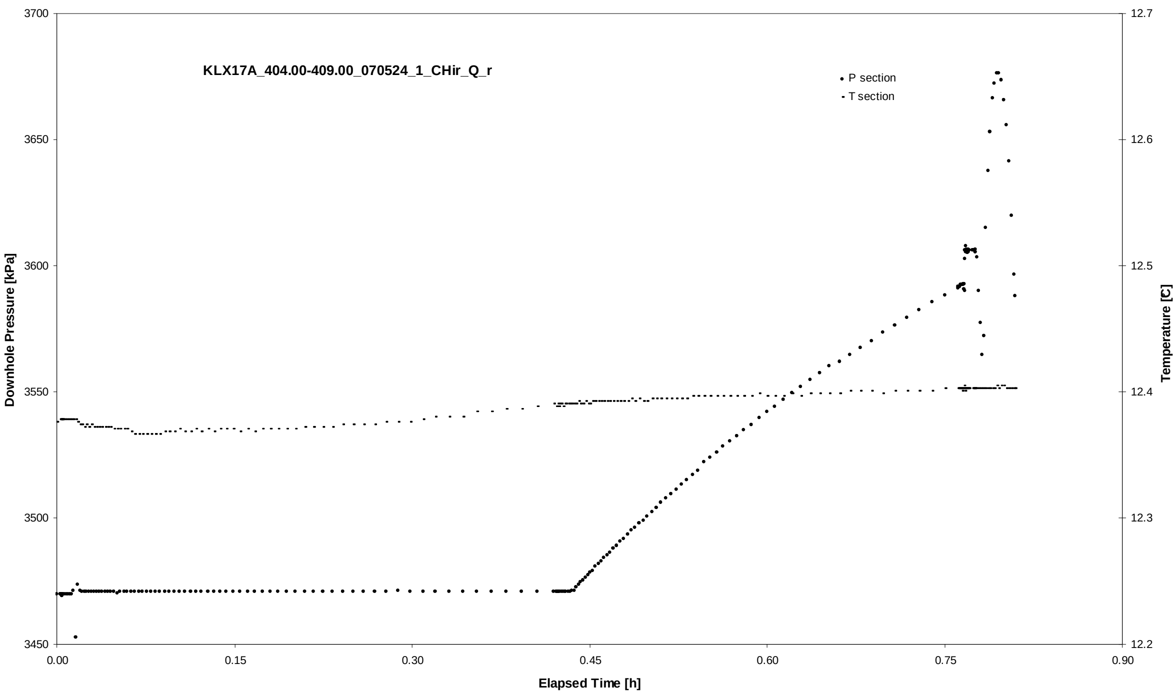
APPENDIX 2-51

Test 404.00 – 409.00 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

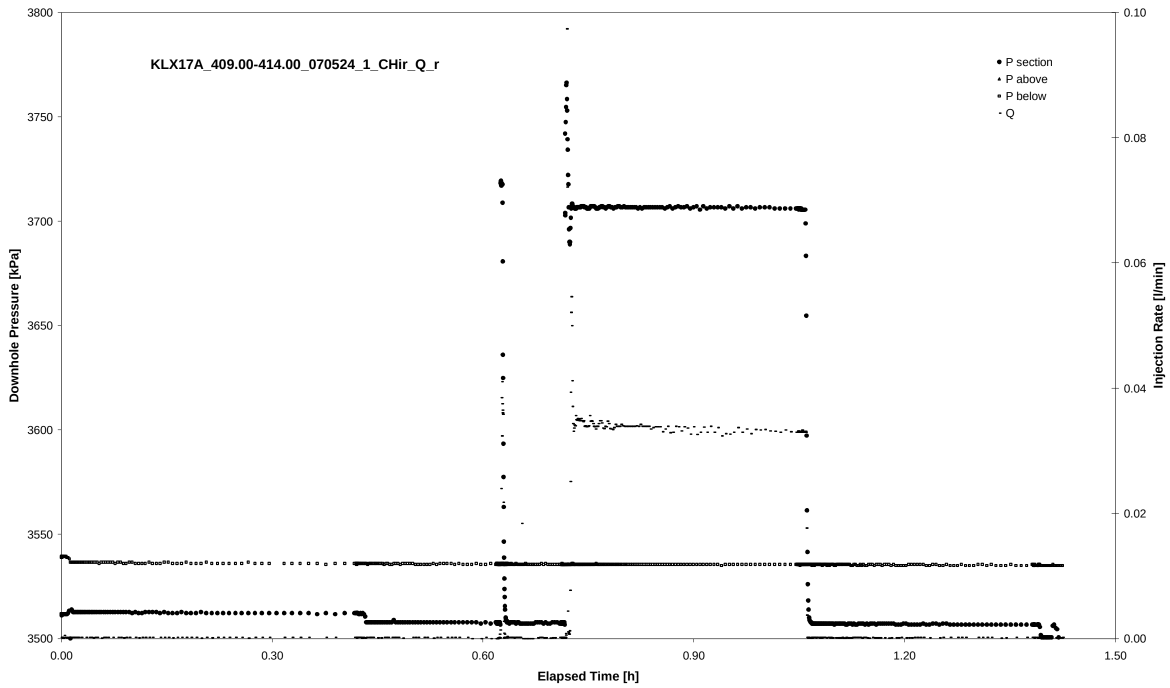
Not analysed

CHIR phase; HORNER match

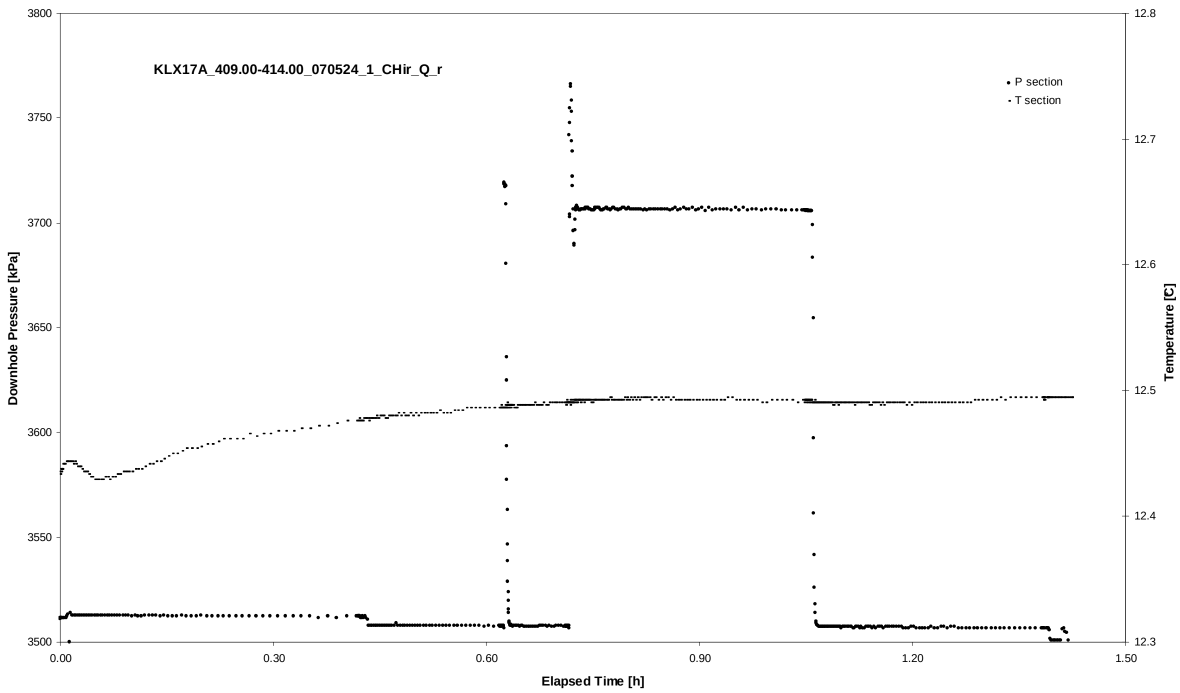
APPENDIX 2-52

Test 409.00 – 414.00 m

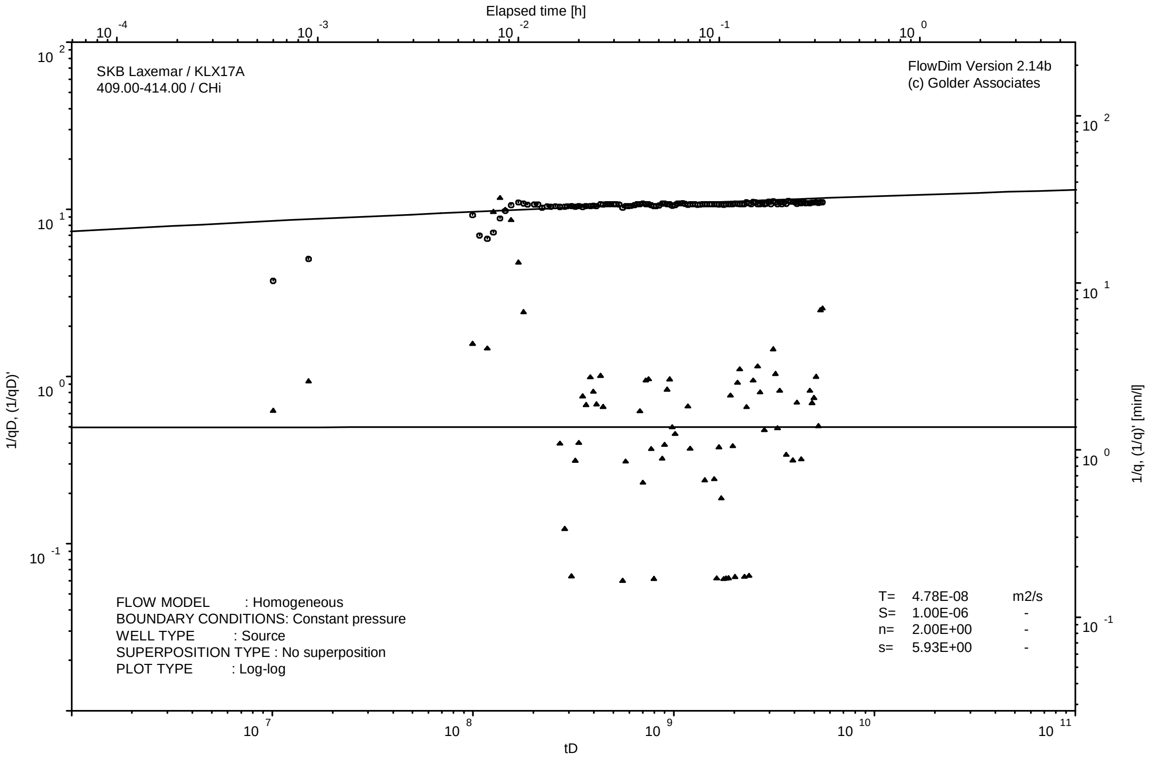
Analysis diagrams



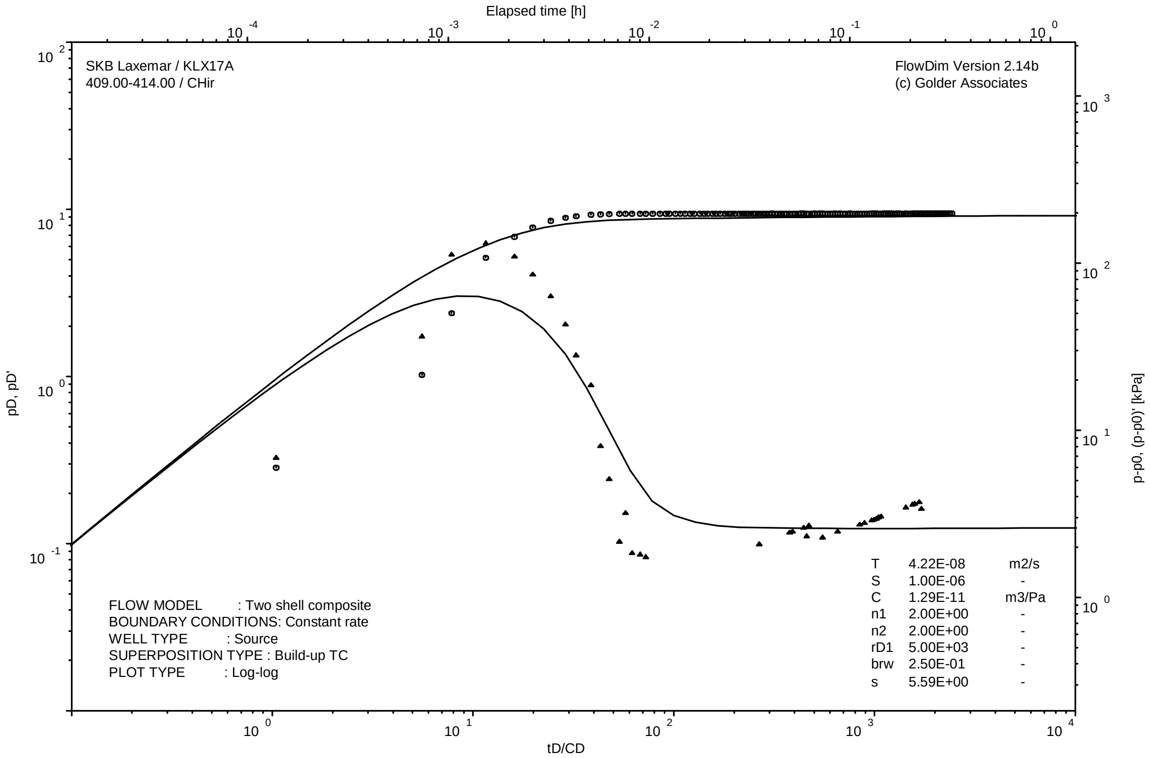
Pressure and flow rate vs. time; cartesian plot



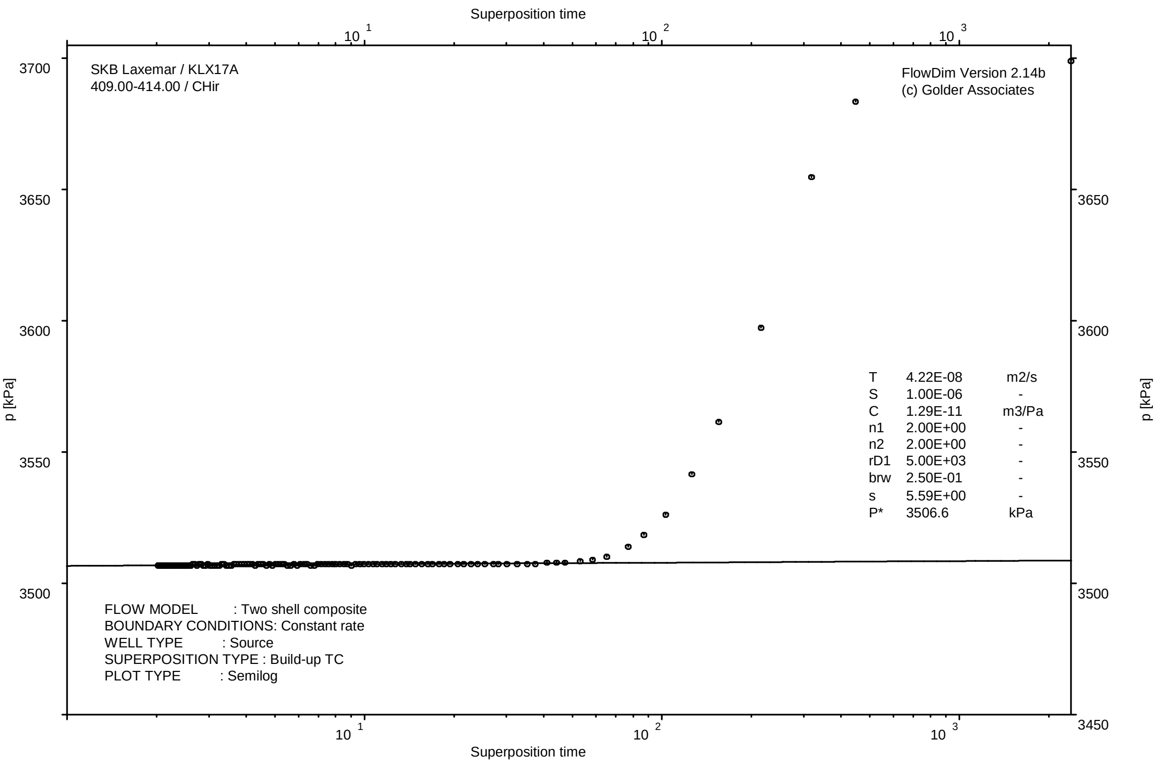
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

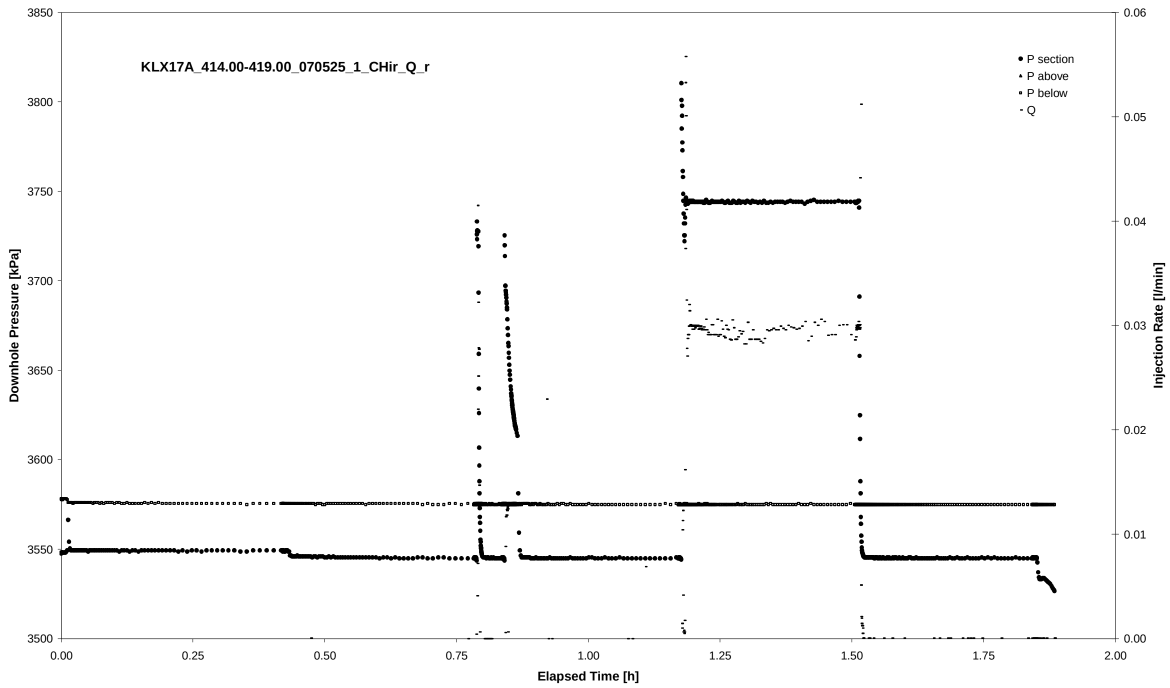


CHIR phase; HORNER match

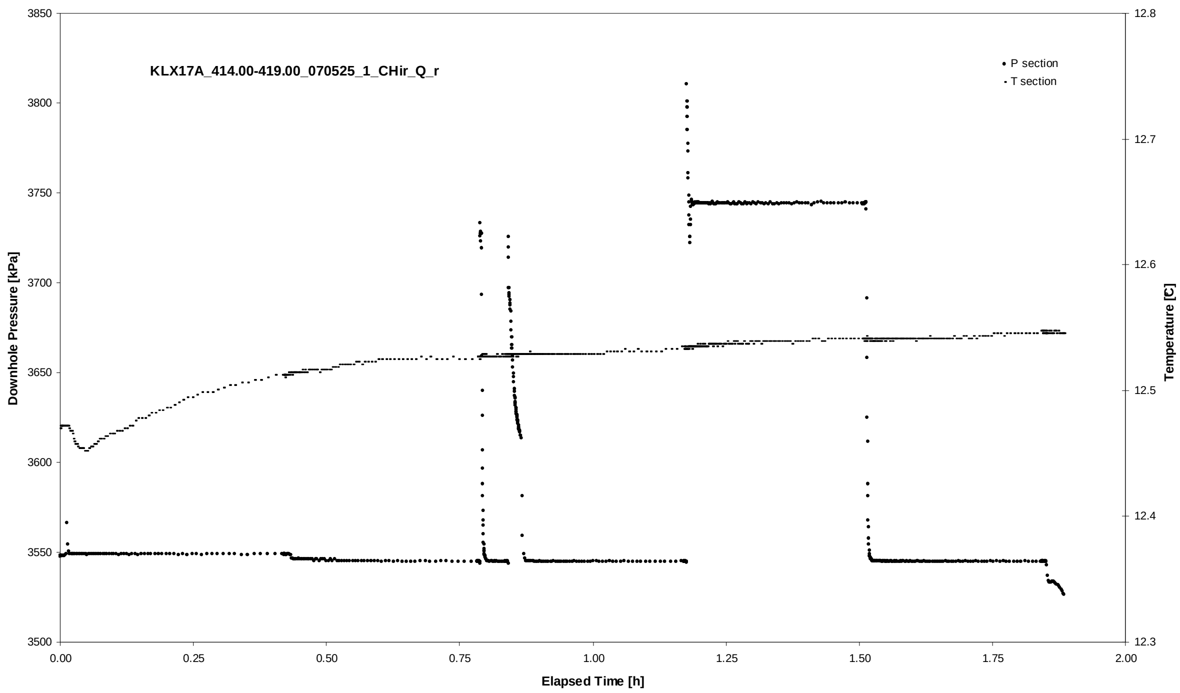
APPENDIX 2-53

Test 414.00 – 419.00 m

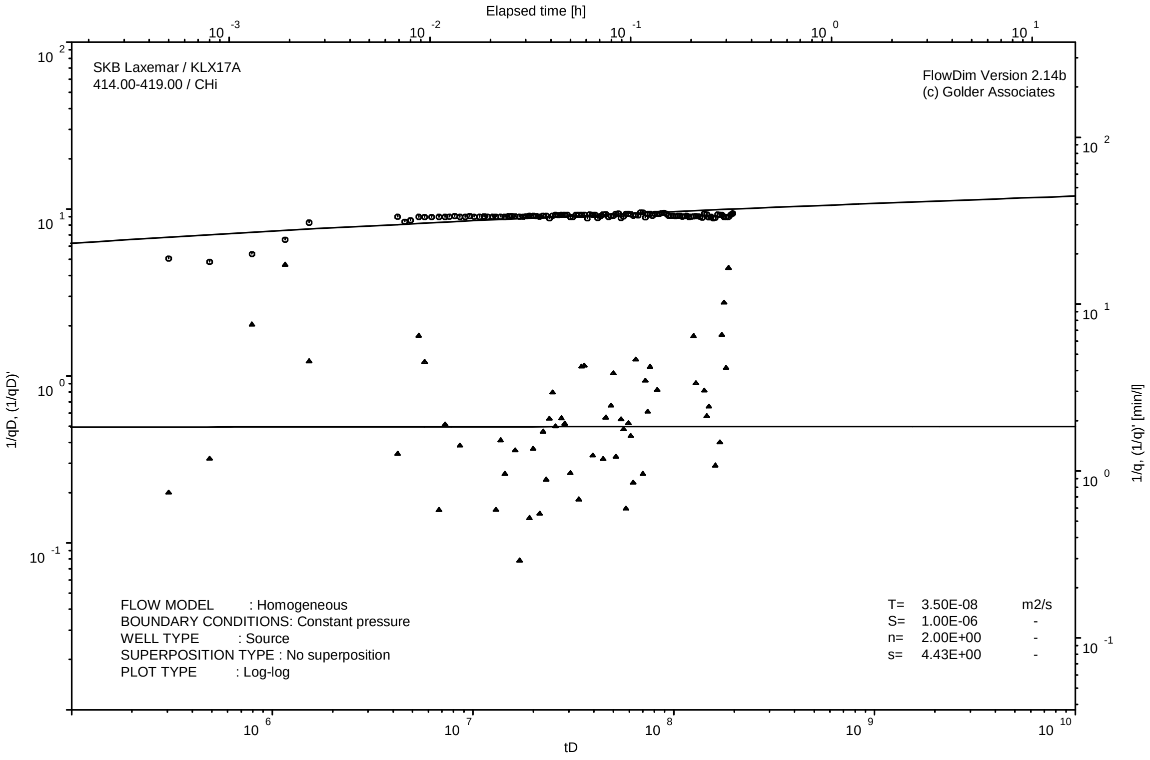
Analysis diagrams



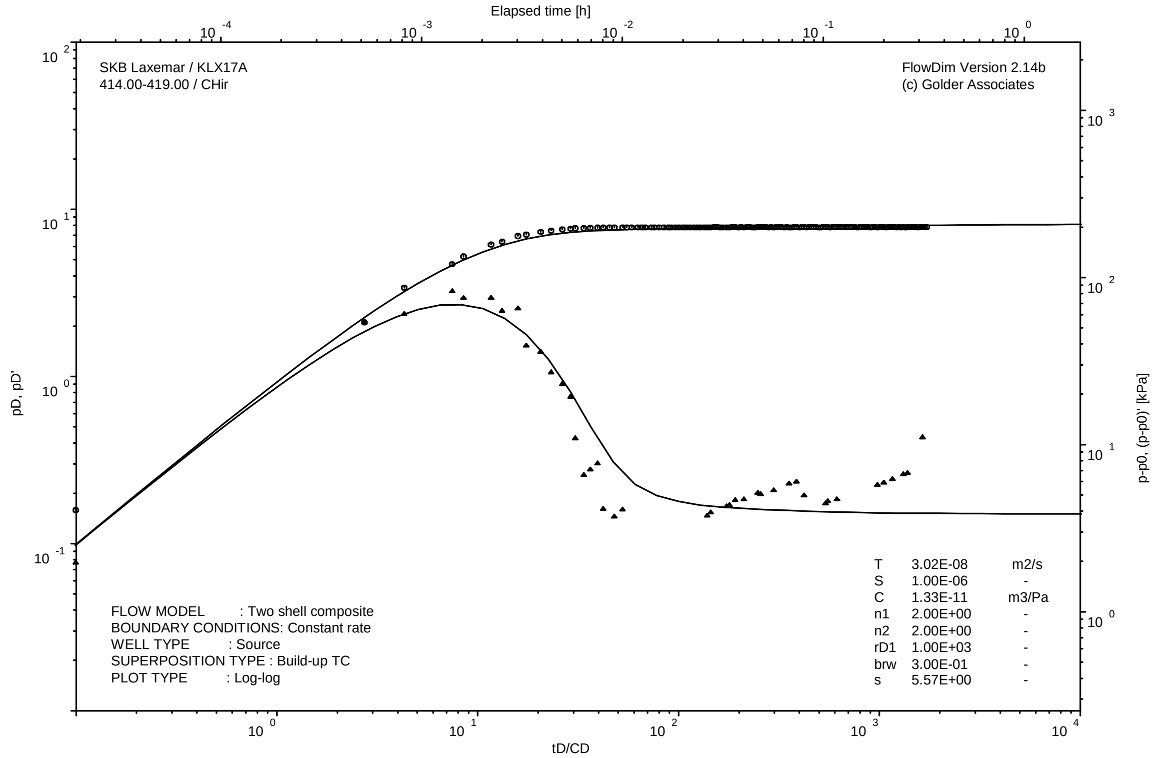
Pressure and flow rate vs. time; cartesian plot



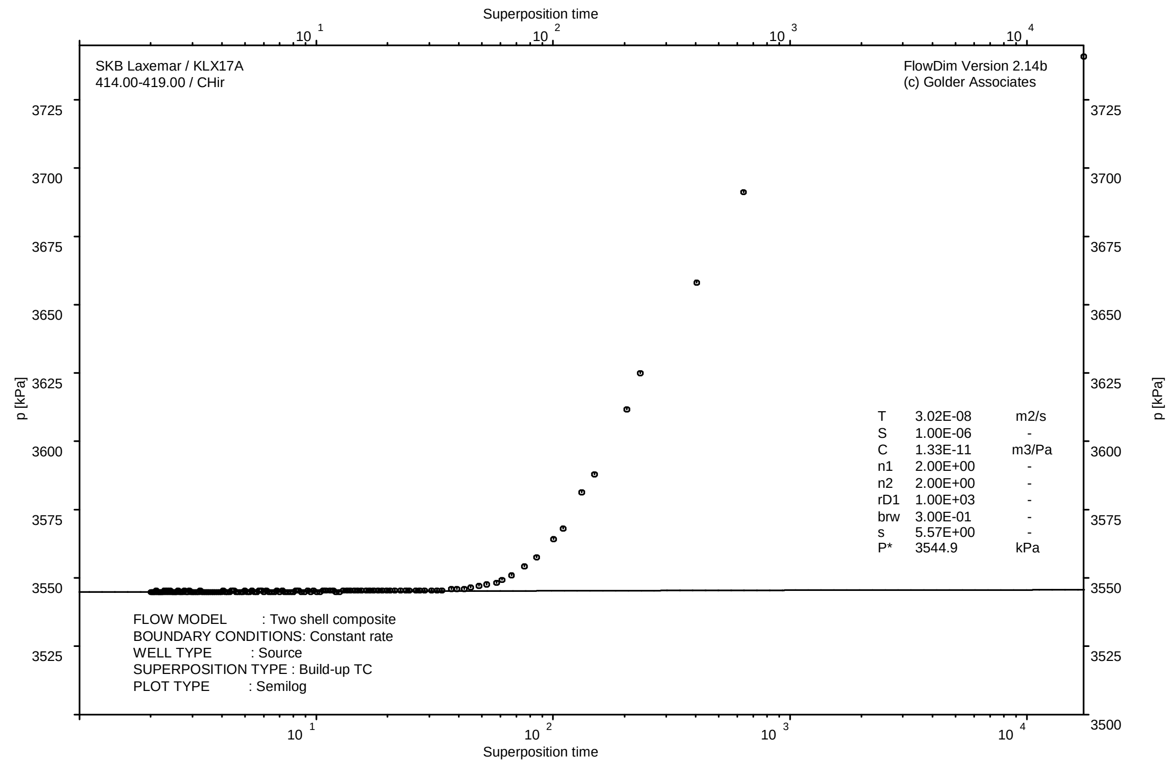
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

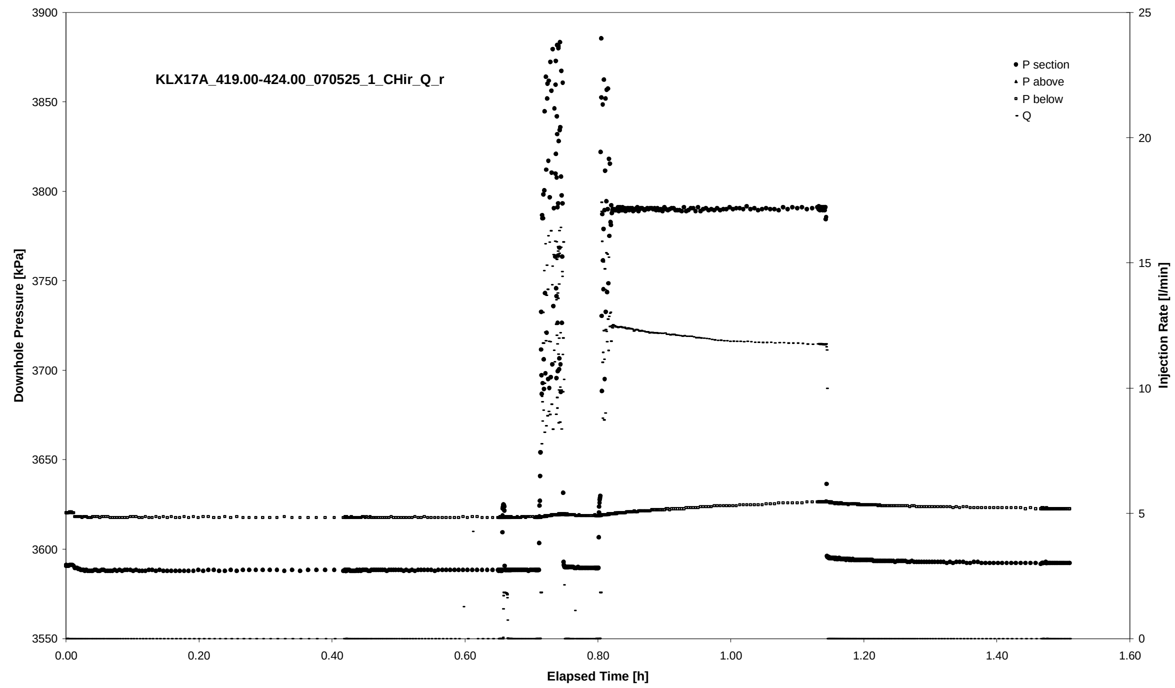


CHIR phase; HORNER match

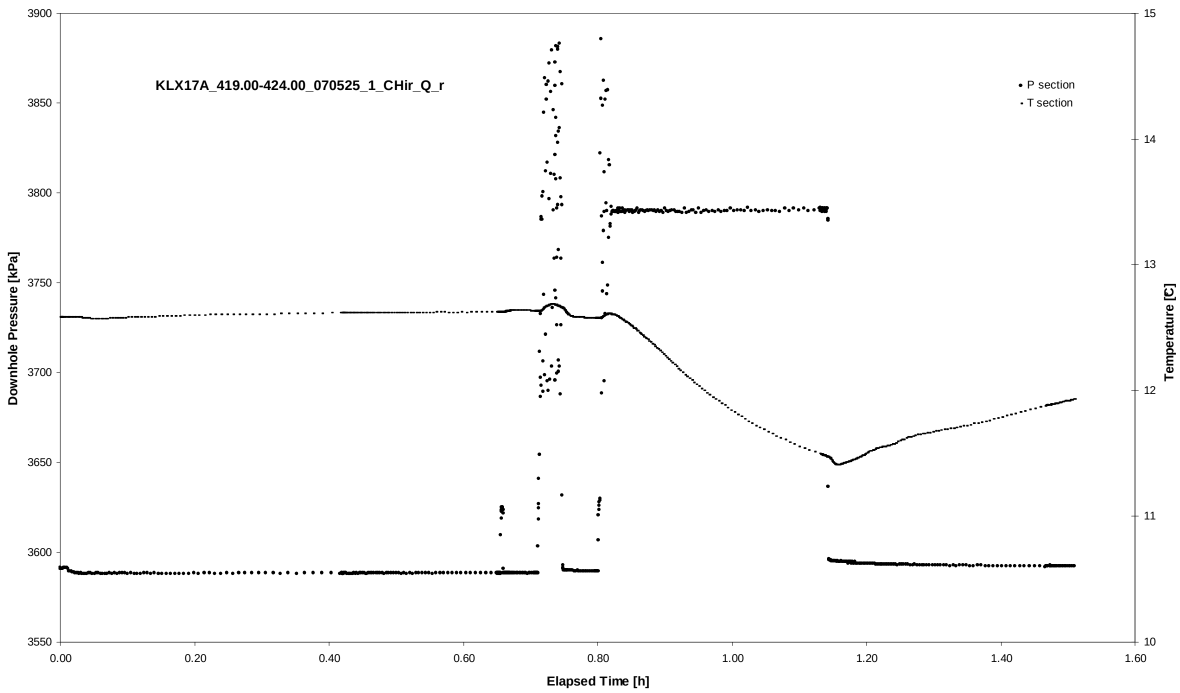
APPENDIX 2-54

Test 419.00 – 424.00 m

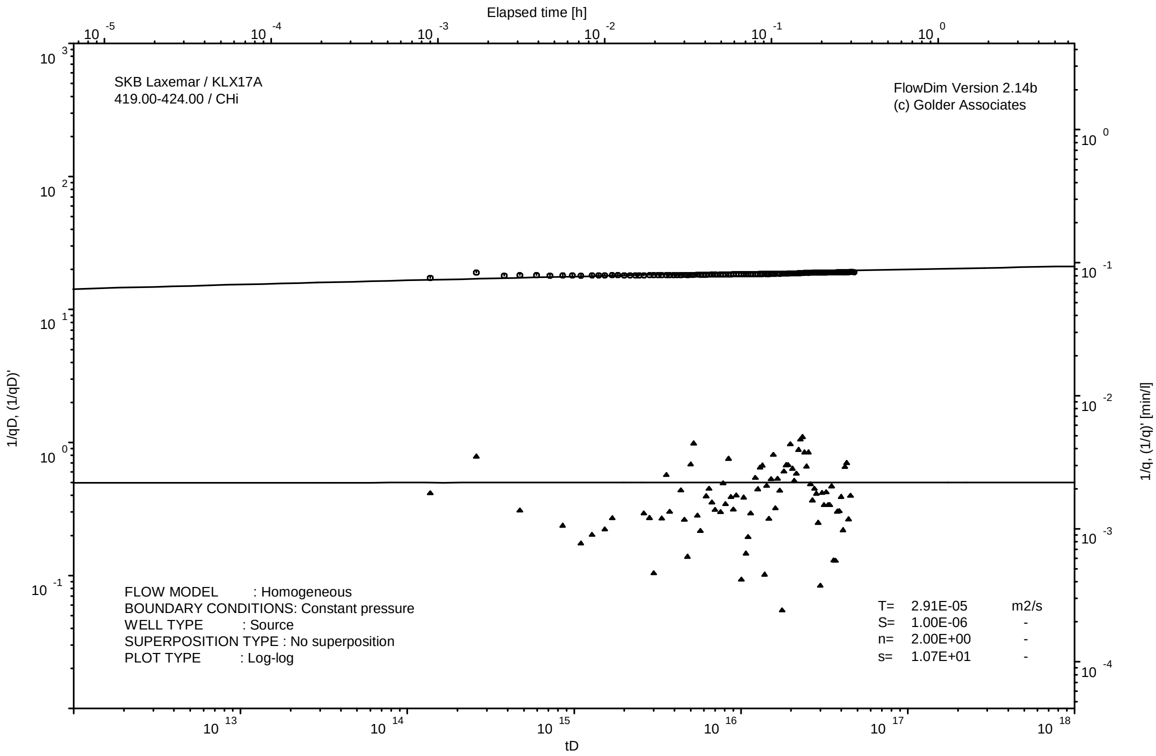
Analysis diagrams



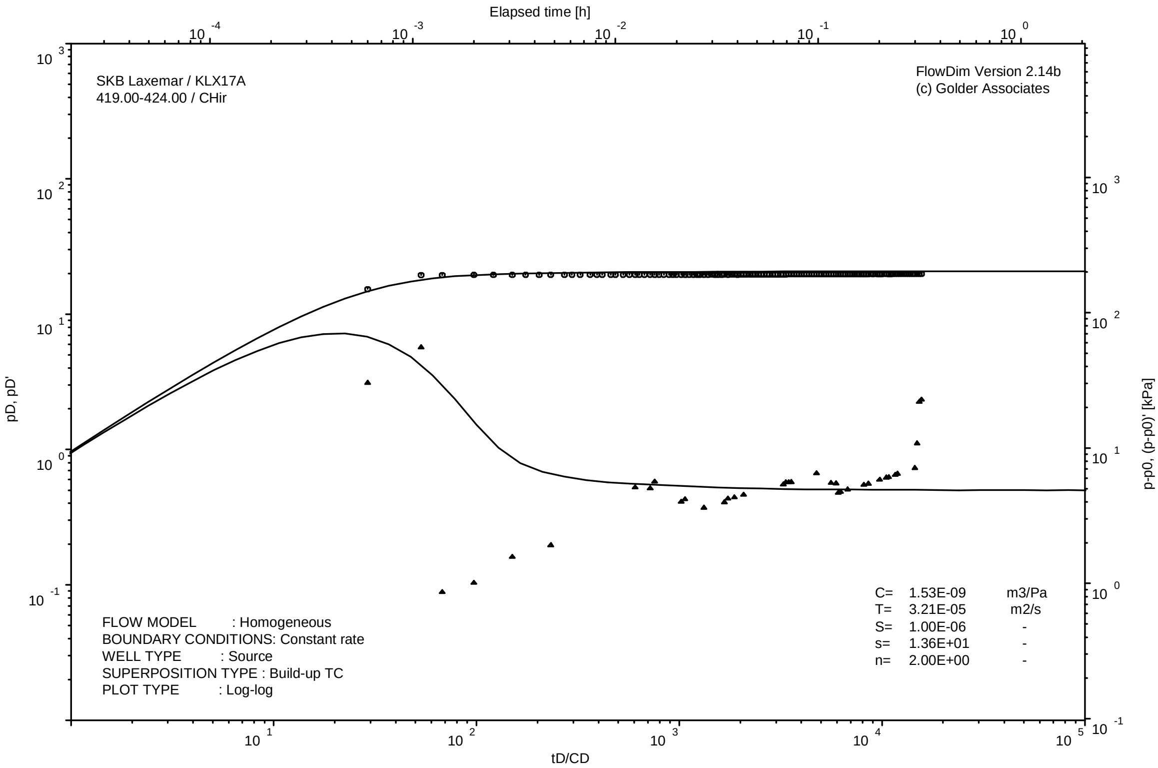
Pressure and flow rate vs. time; cartesian plot



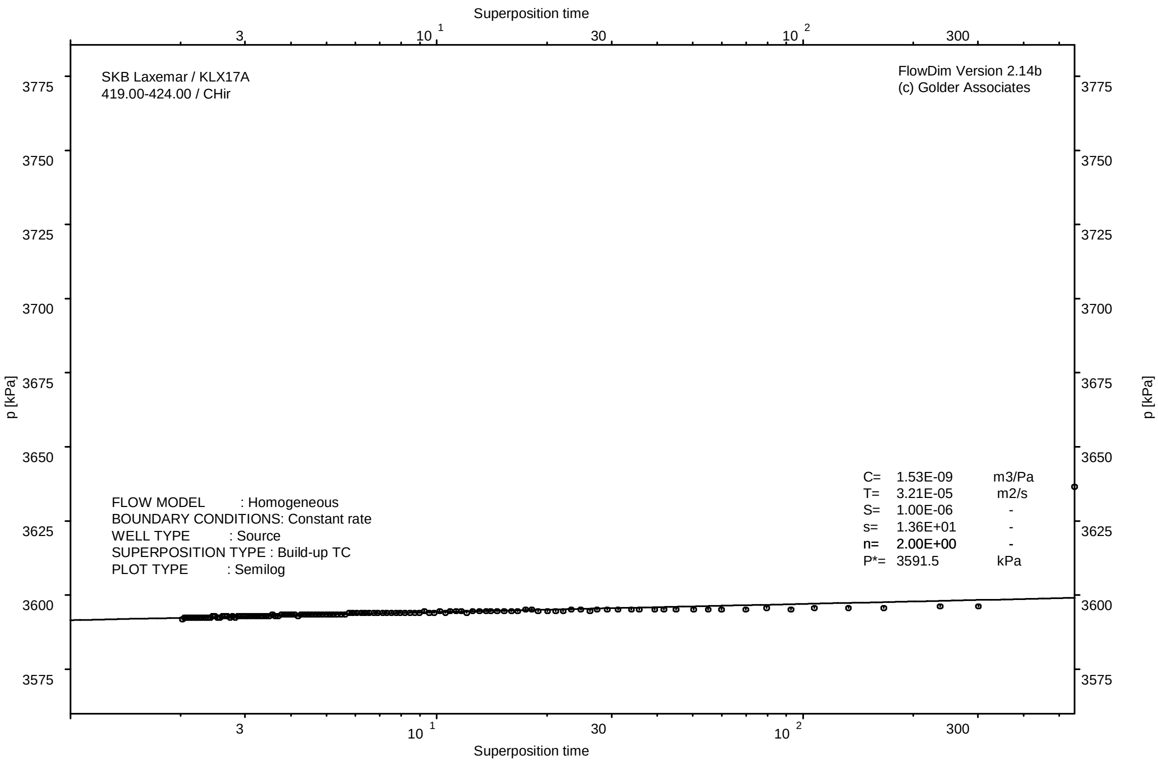
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

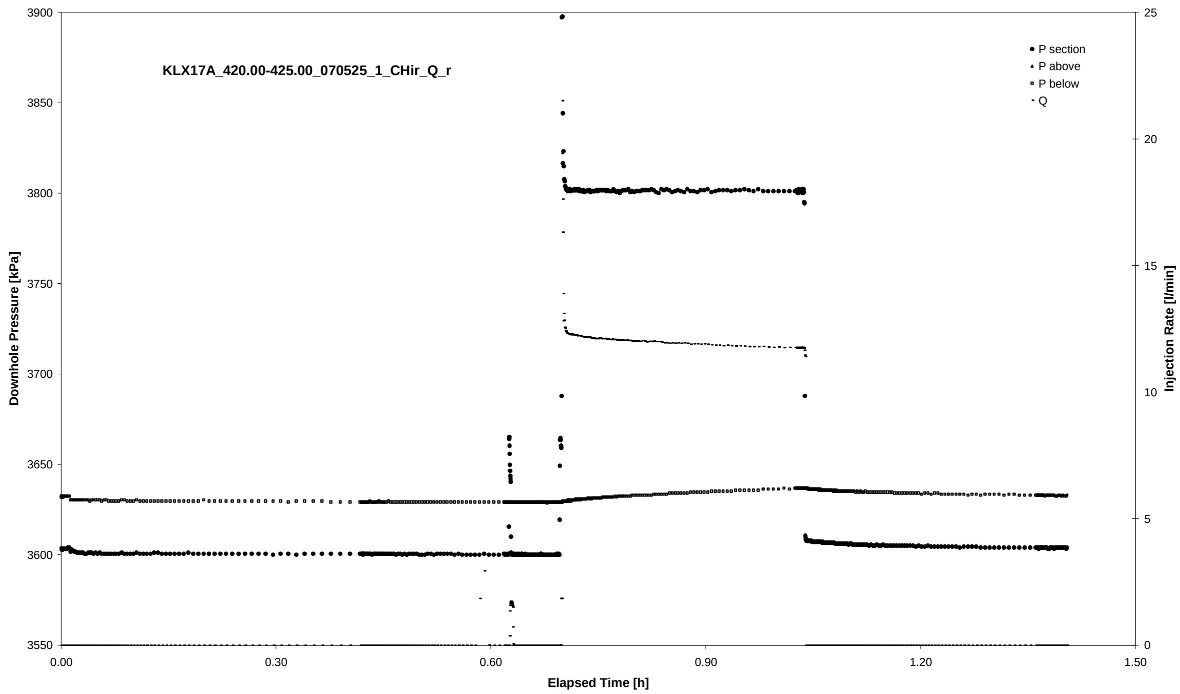


CHIR phase; HORNER match

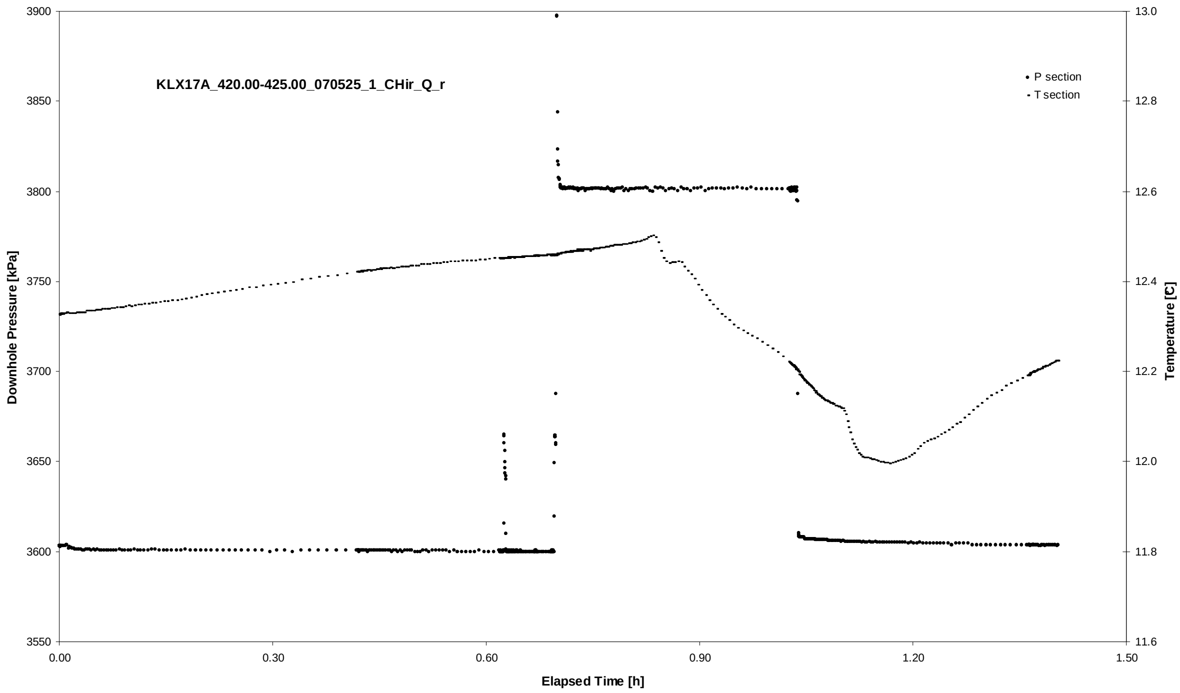
APPENDIX 2-55

Test 420.00 – 425.00 m

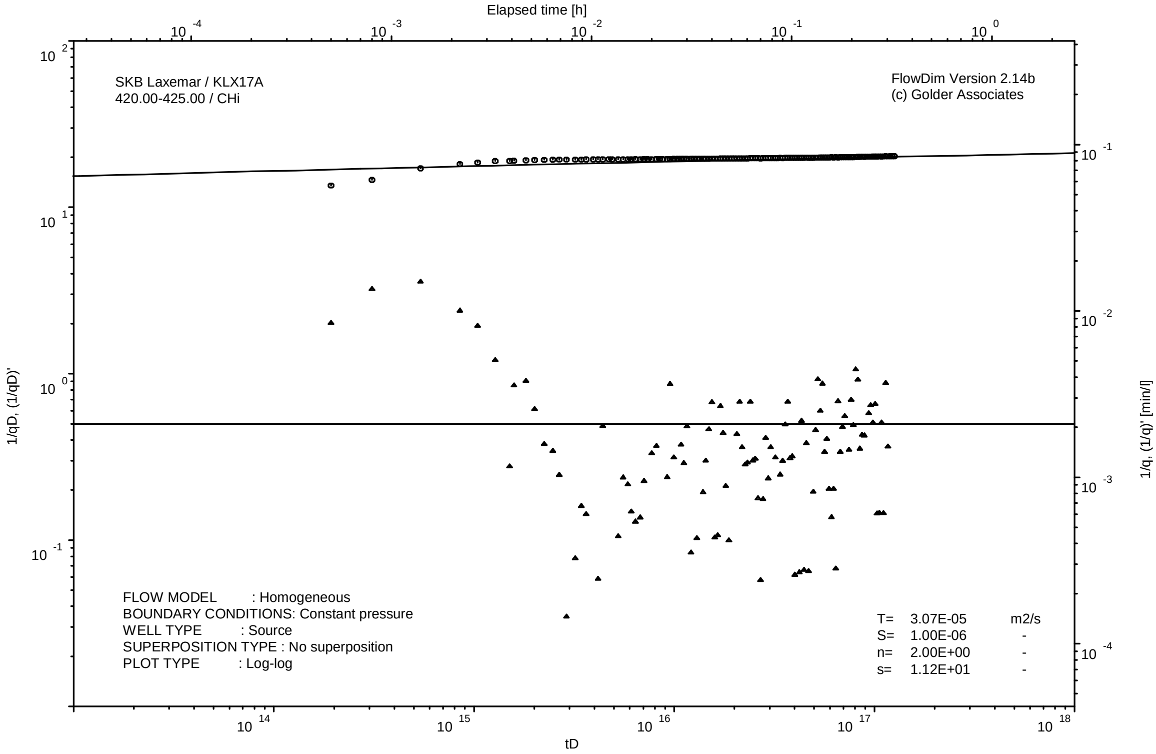
Analysis diagrams



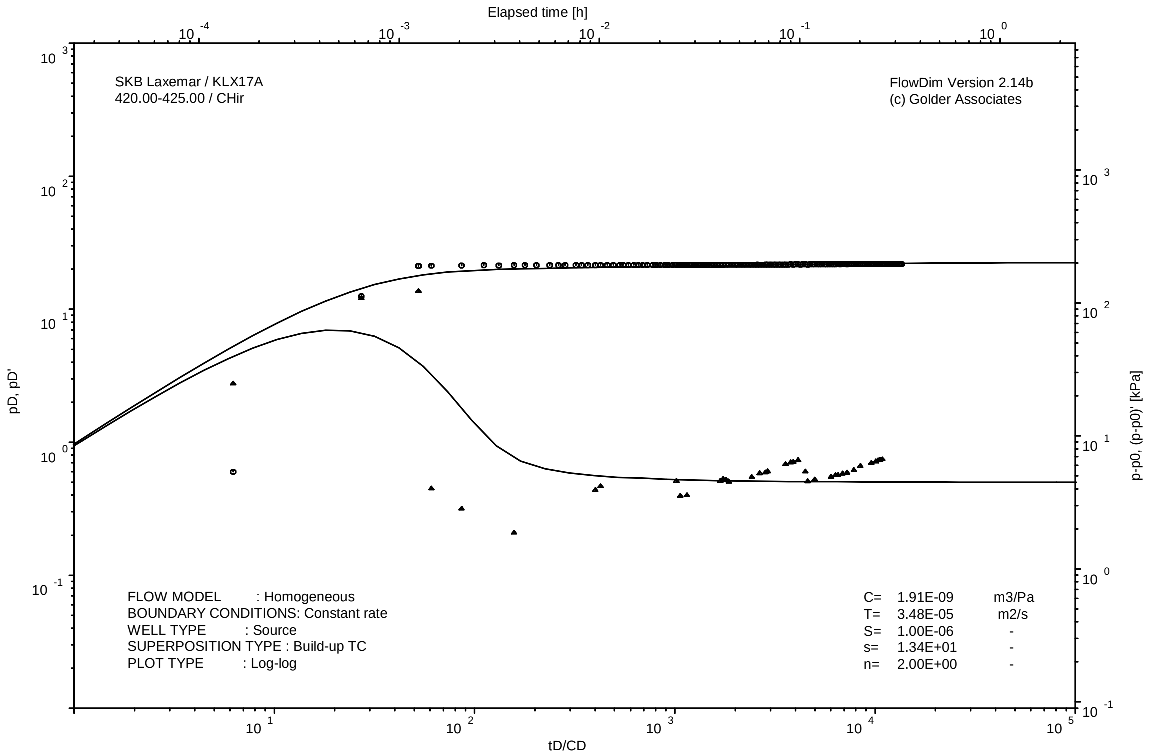
Pressure and flow rate vs. time; cartesian plot



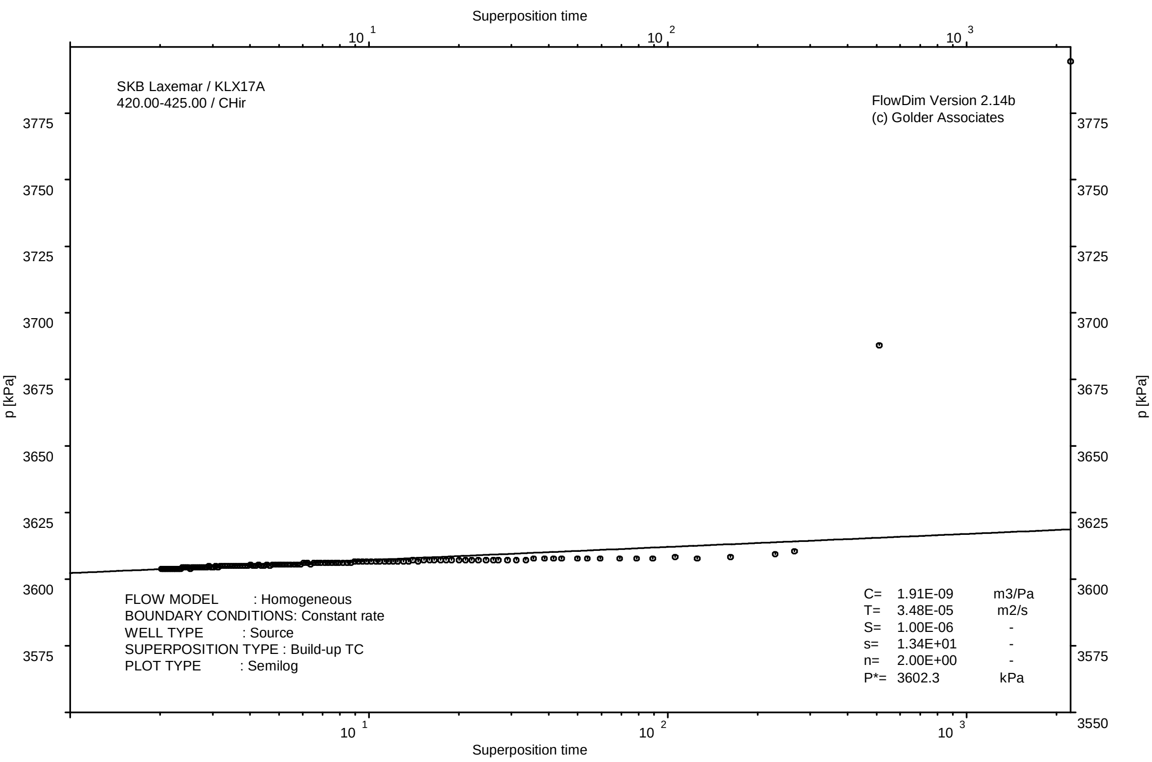
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

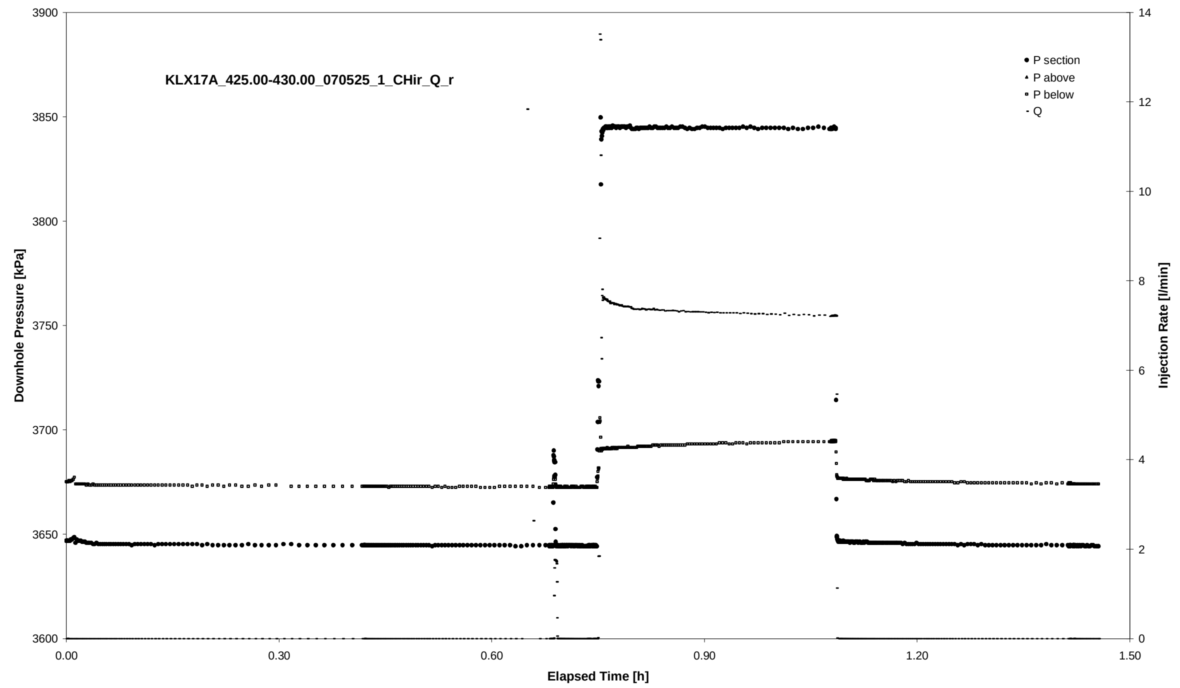


CHIR phase; HORNER match

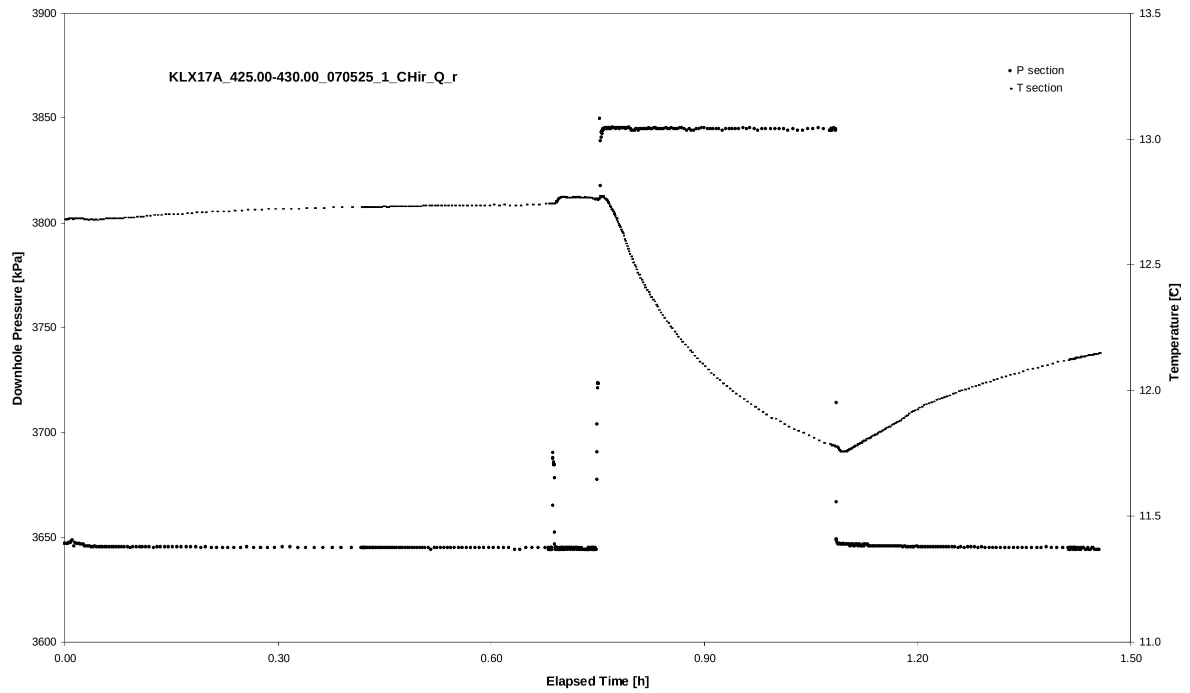
APPENDIX 2-56

Test 425.00 – 430.00 m

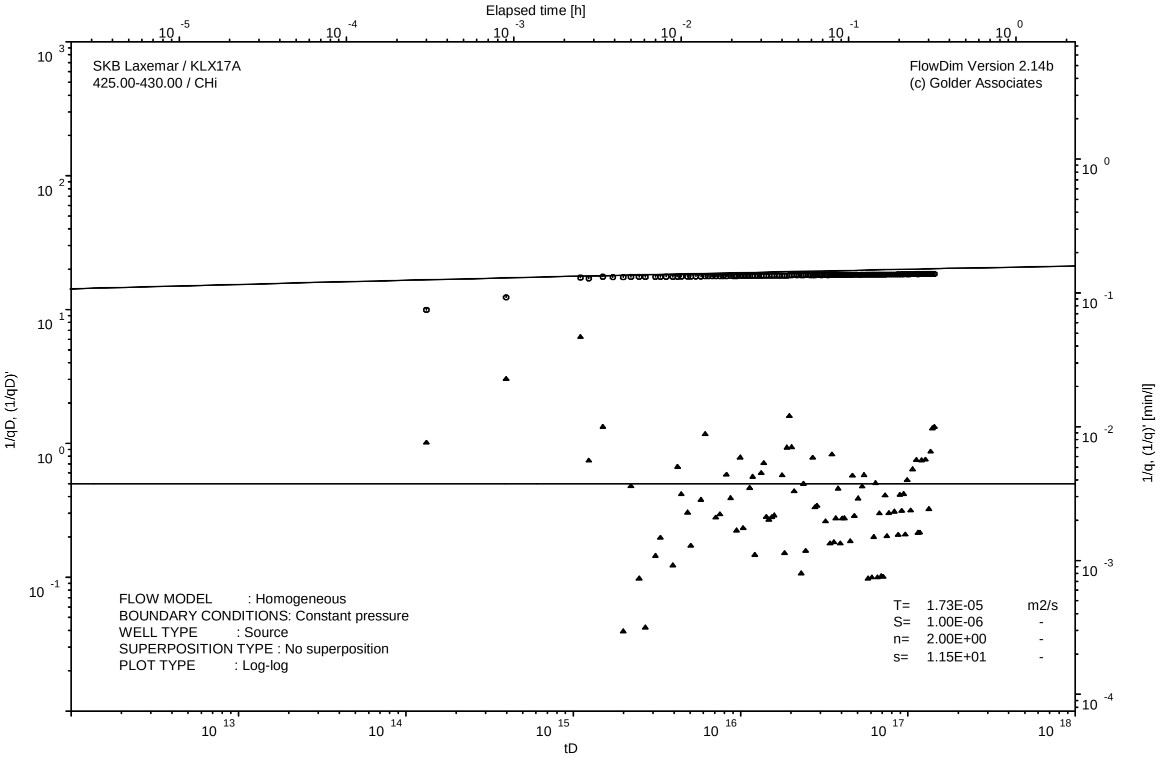
Analysis diagrams



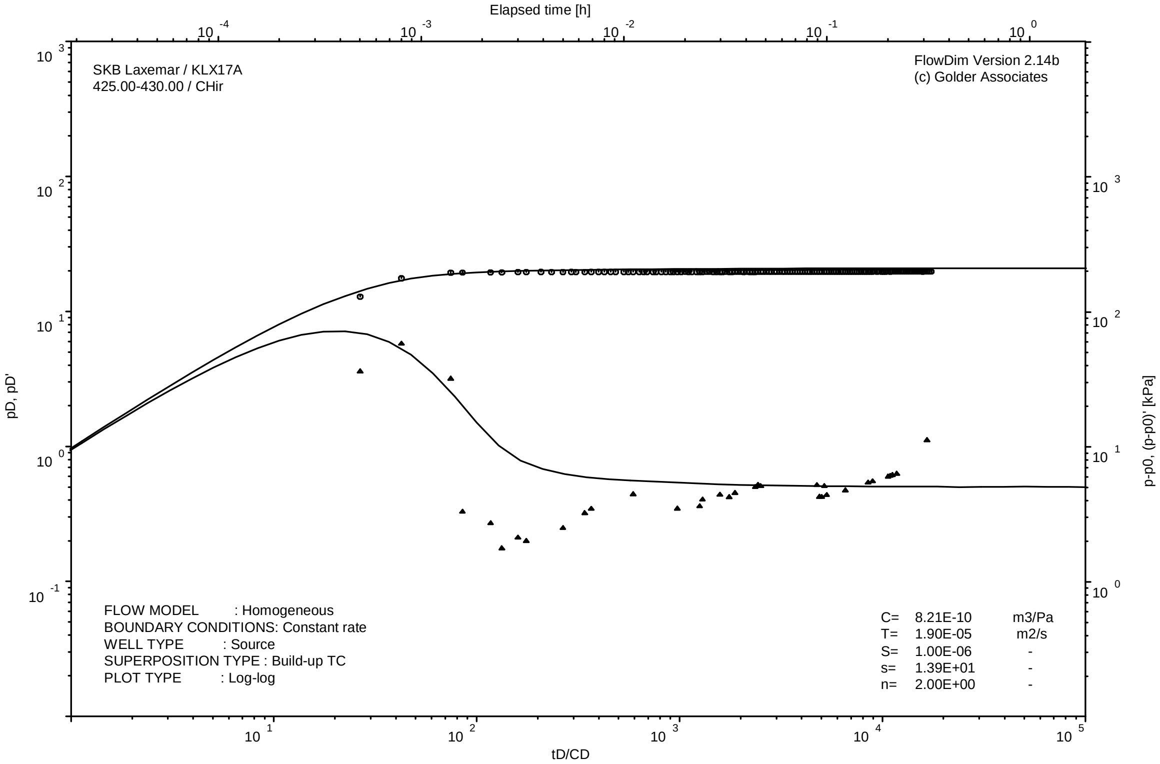
Pressure and flow rate vs. time; cartesian plot



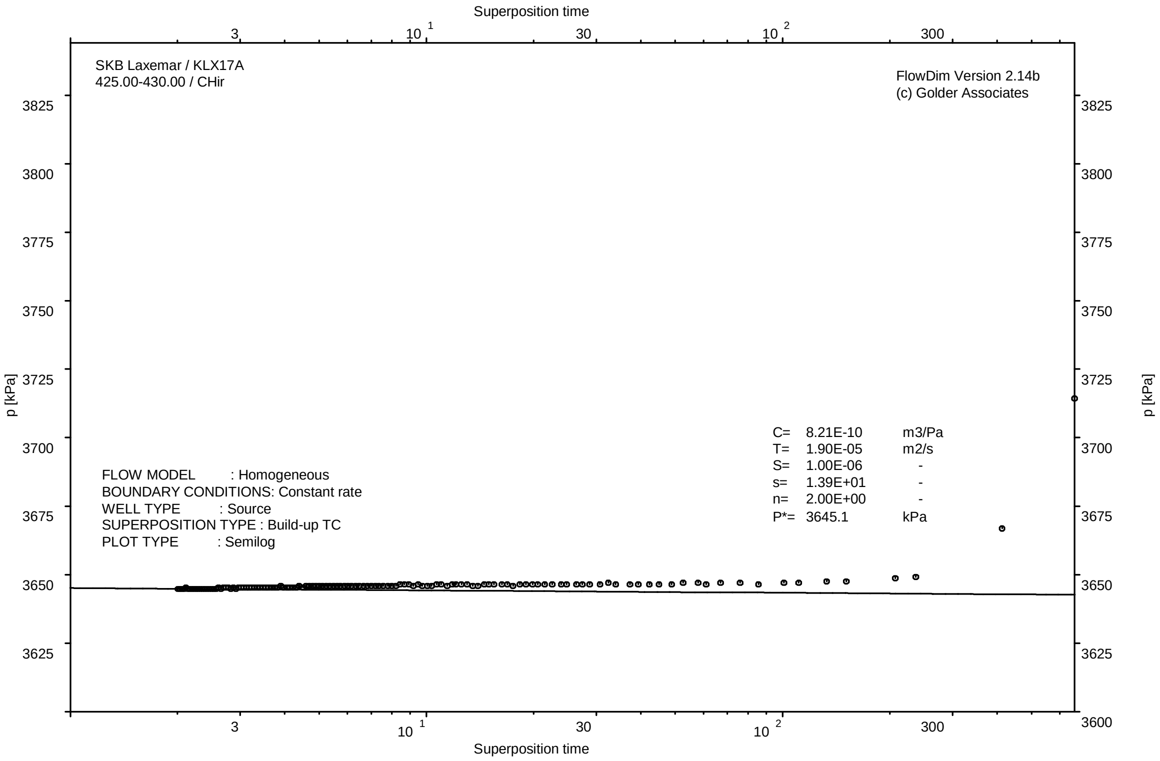
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

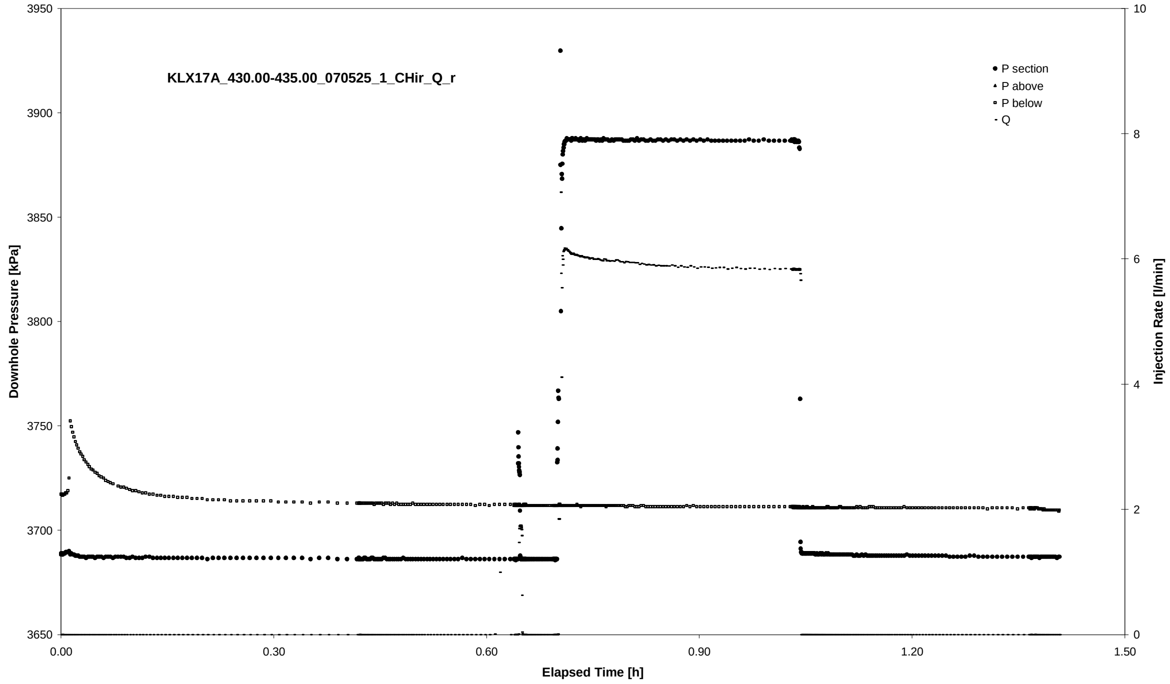


CHIR phase; HORNER match

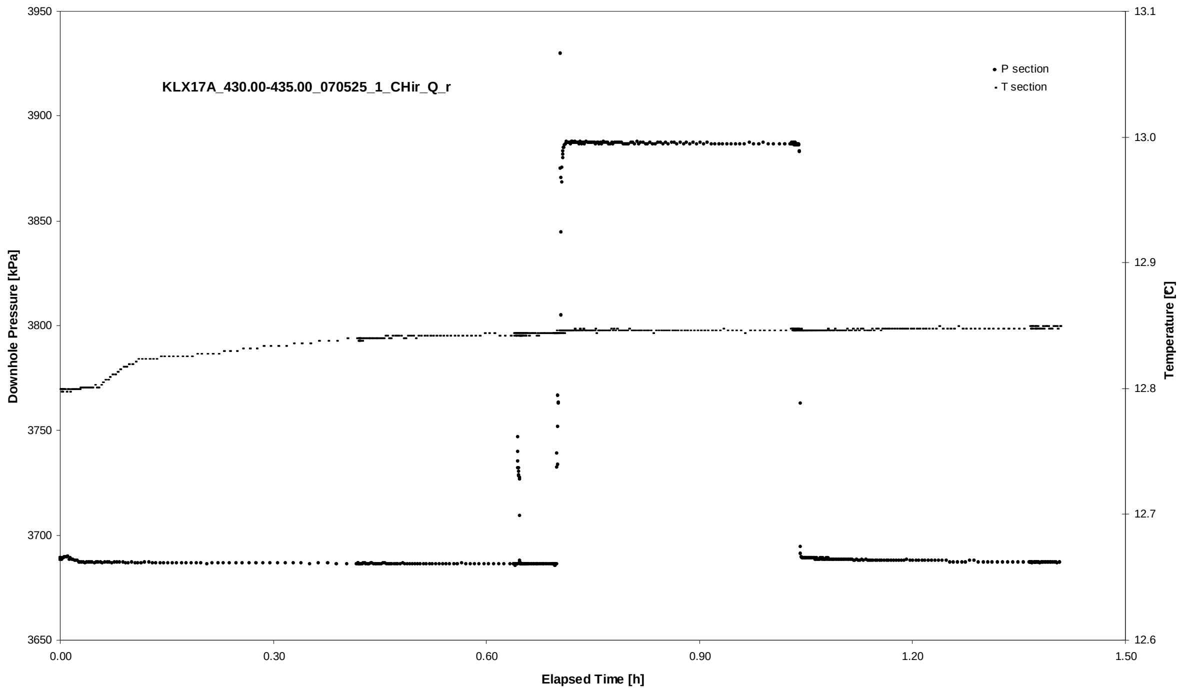
APPENDIX 2-57

Test 430.00 – 435.00 m

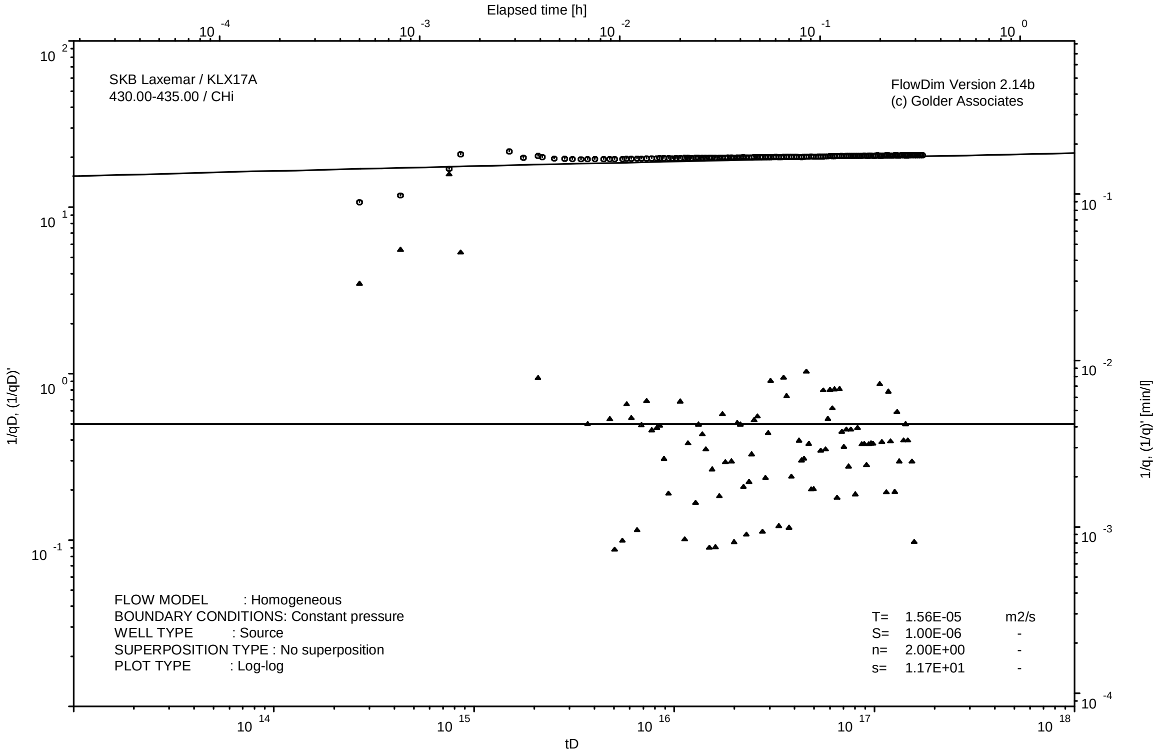
Analysis diagrams



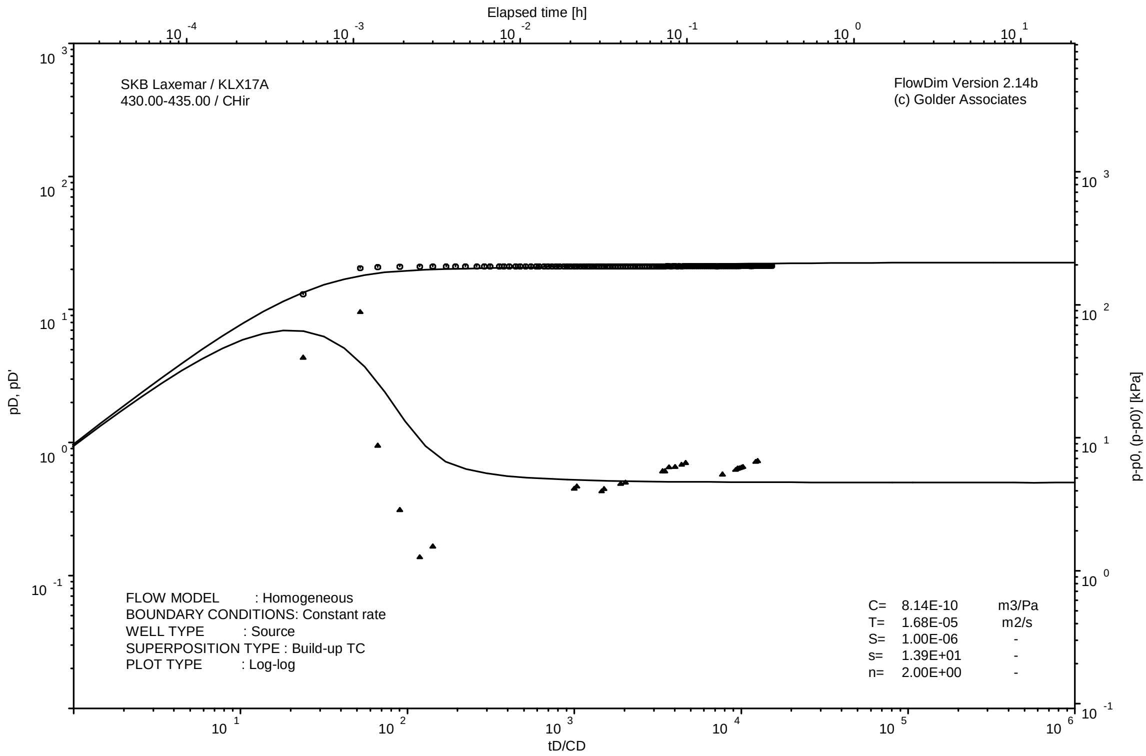
Pressure and flow rate vs. time; cartesian plot



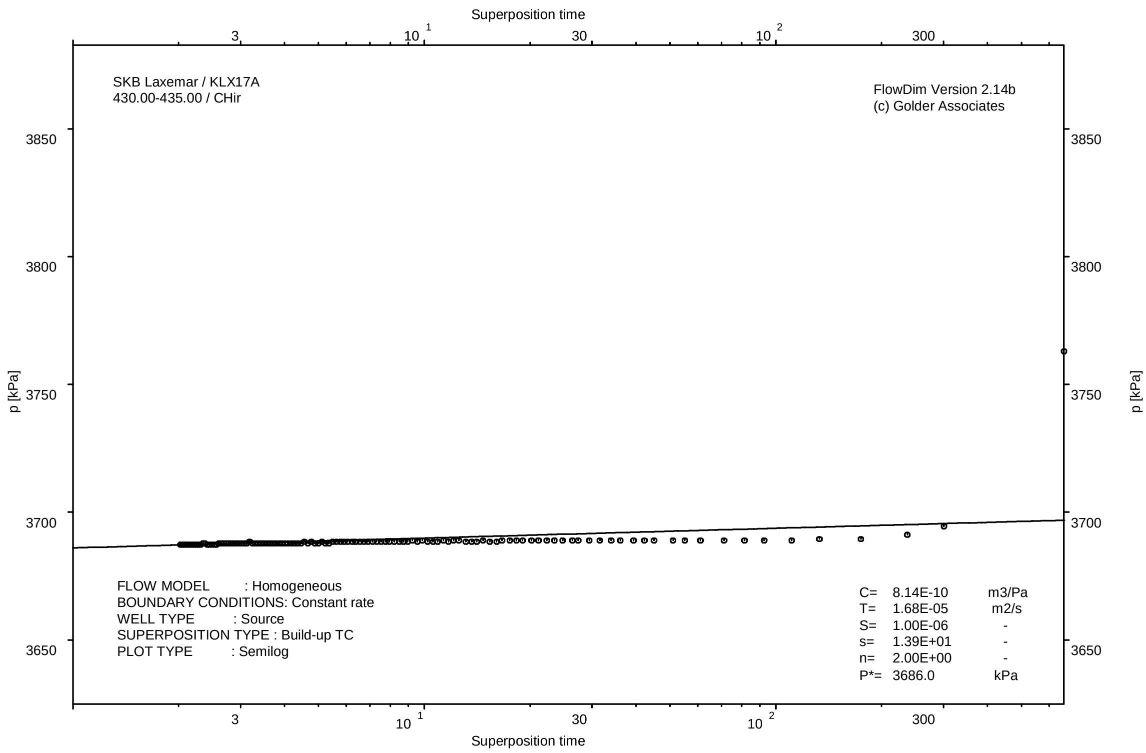
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

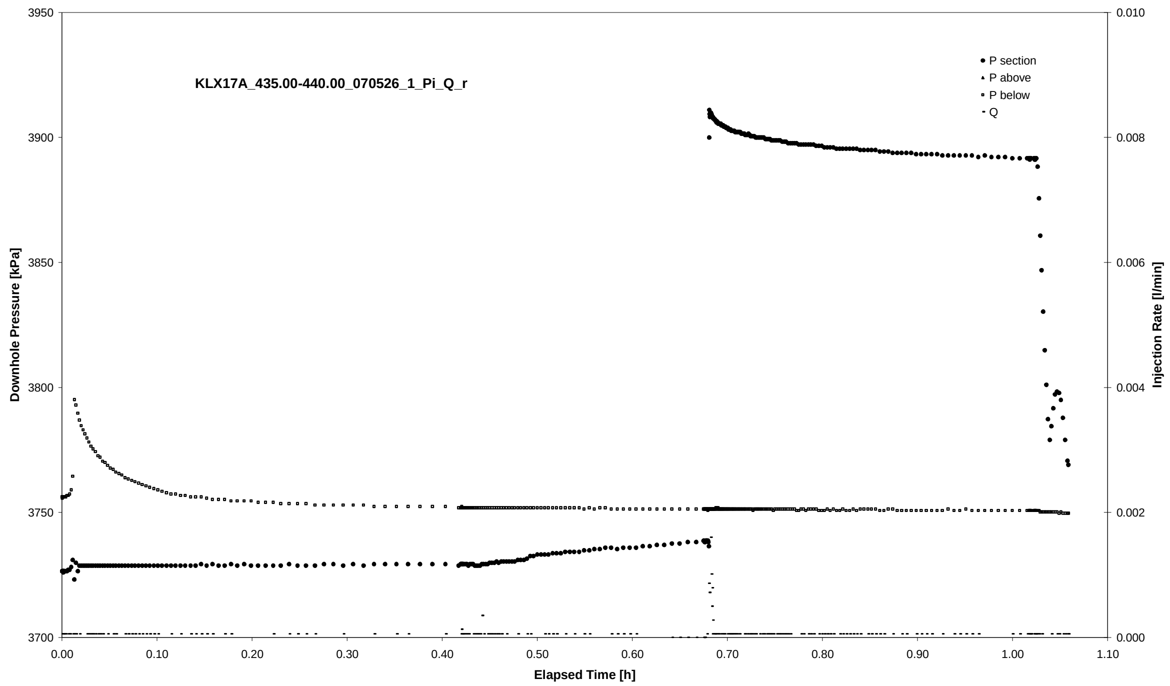


CHIR phase; HORNER match

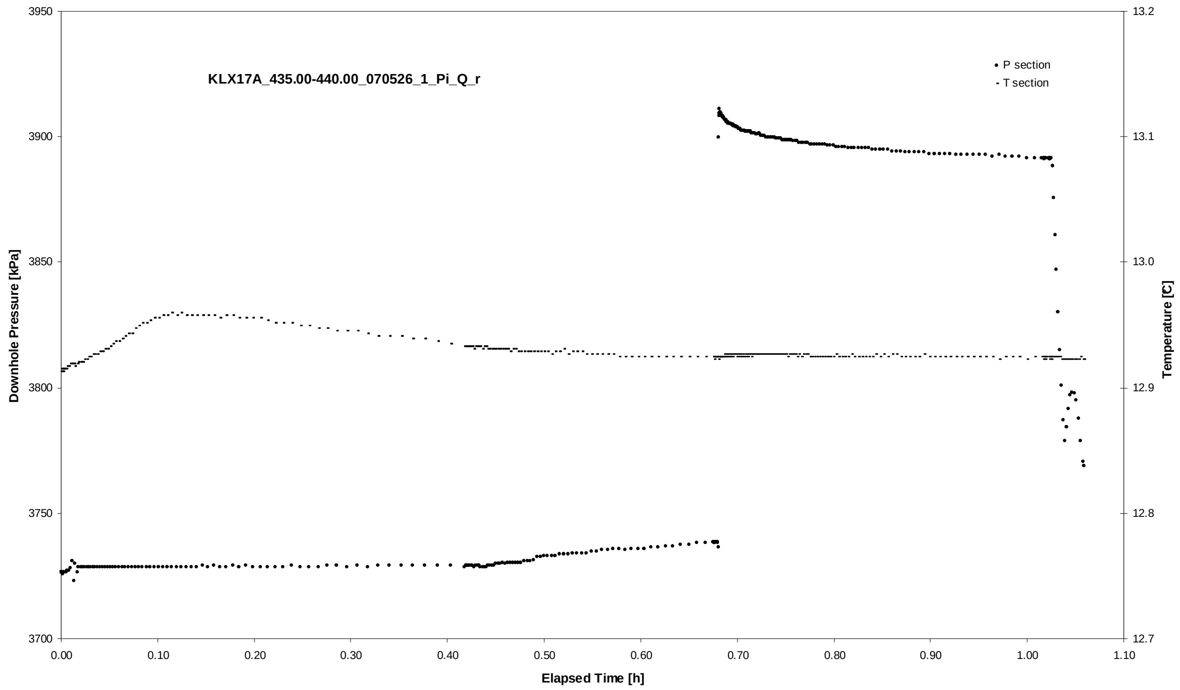
APPENDIX 2-58

Test 435.00 – 440.00 m

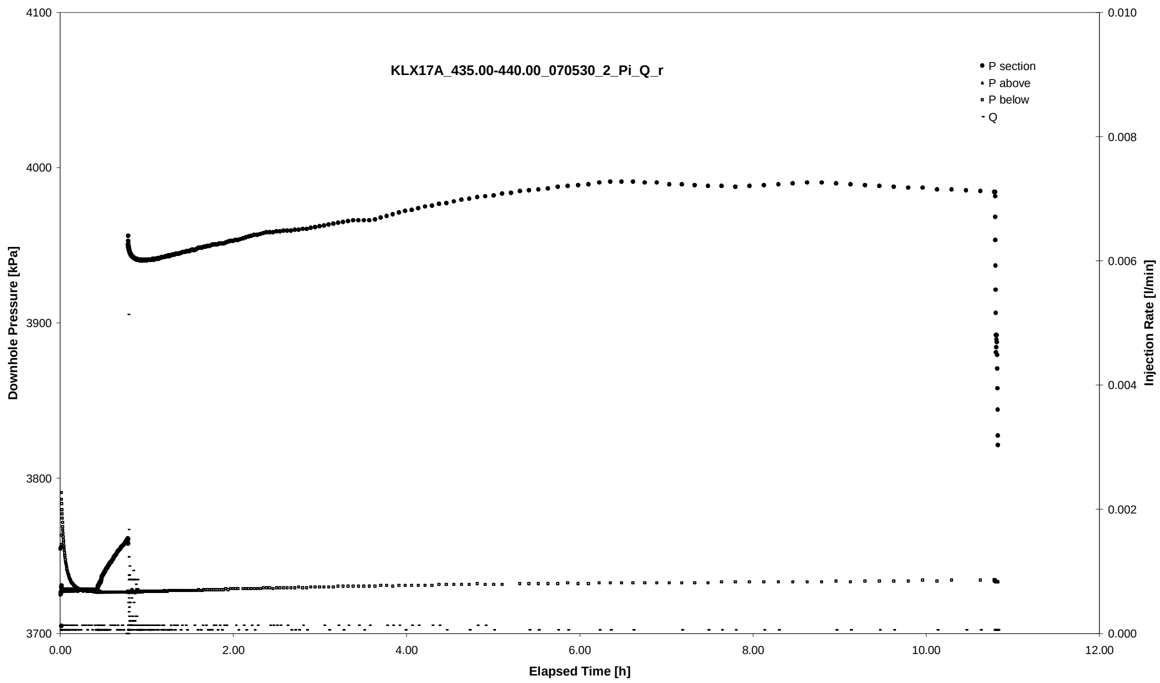
Analysis diagrams



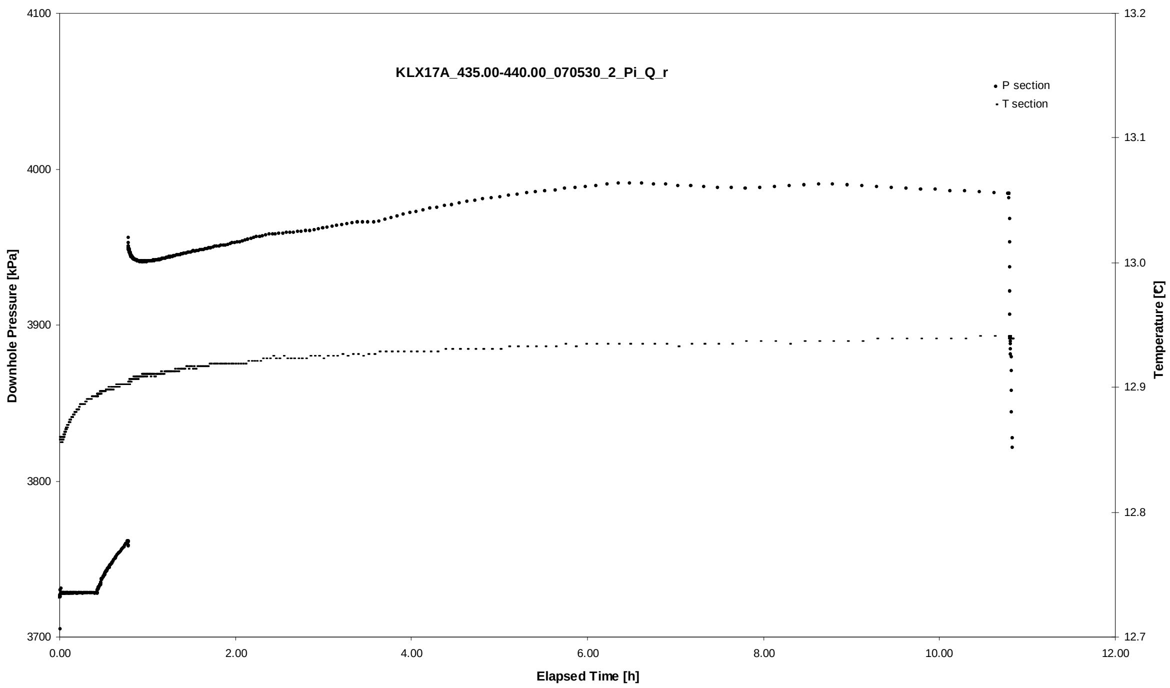
Pressure and flow rate vs. time; cartesian plot (repeated)



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

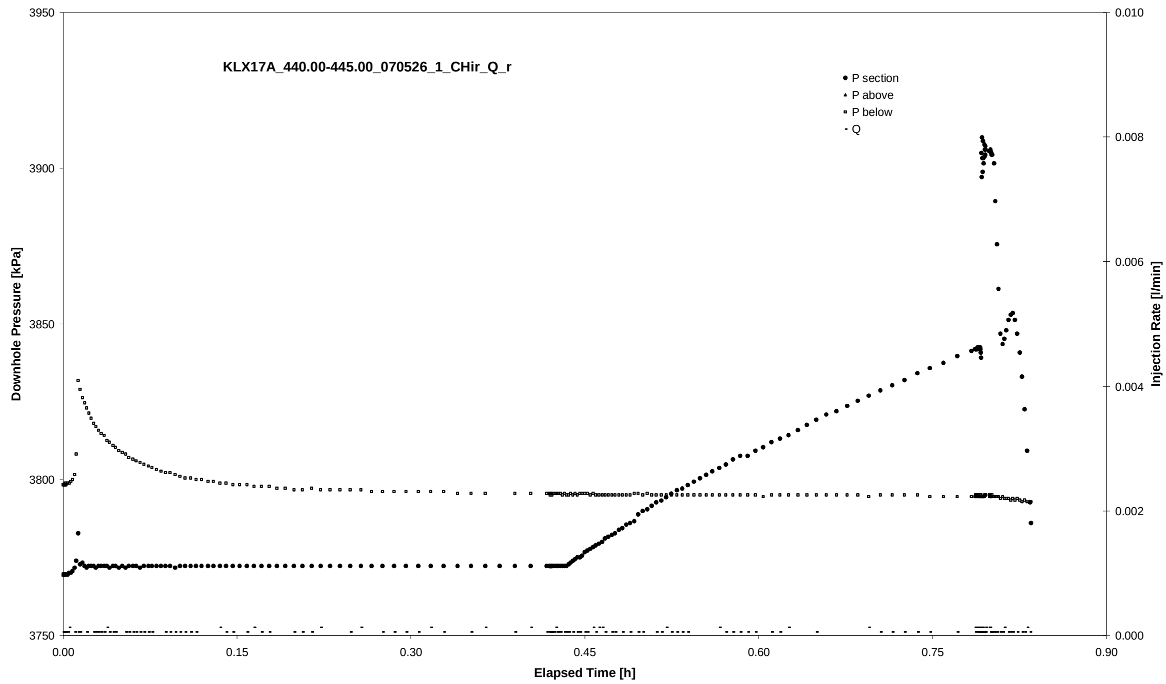
Not analysed

Pulse injection; deconvolution match

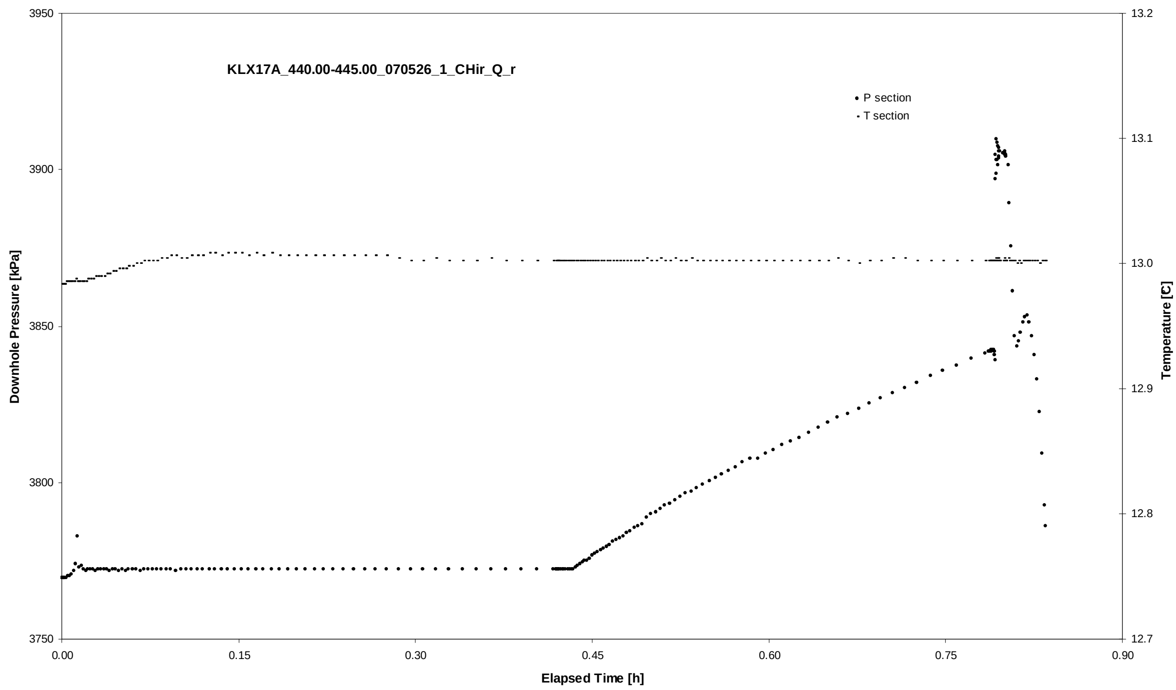
APPENDIX 2-59

Test 440.00 – 445.00 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

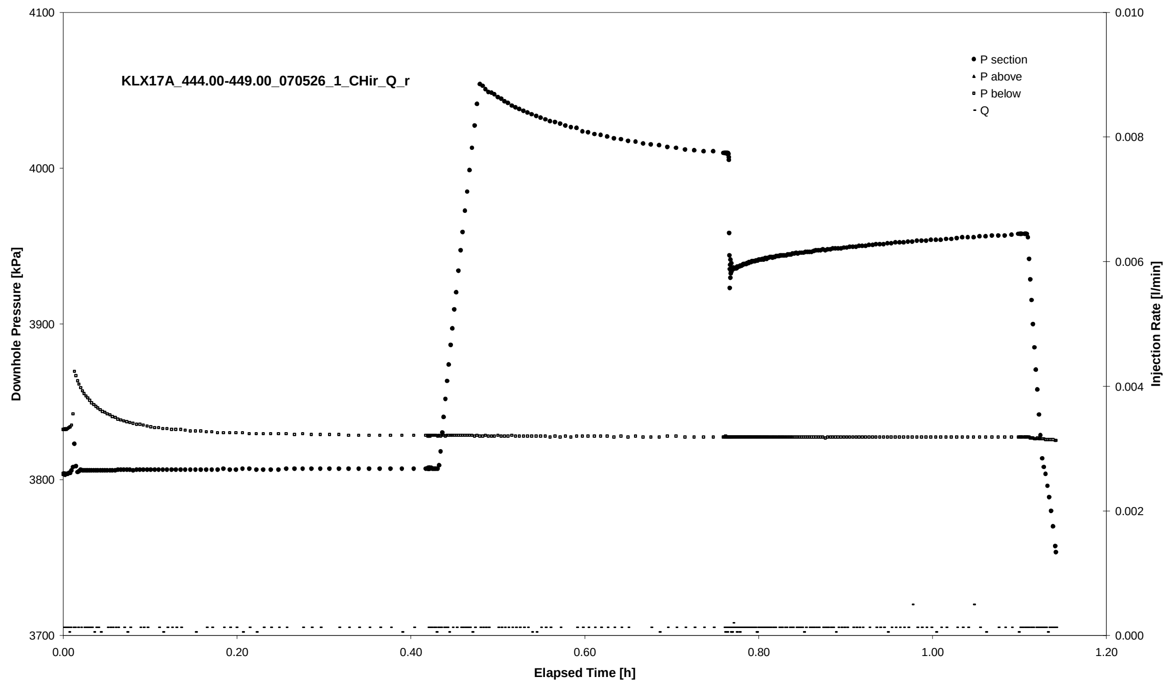
Not analysed

CHIR phase; HORNER match

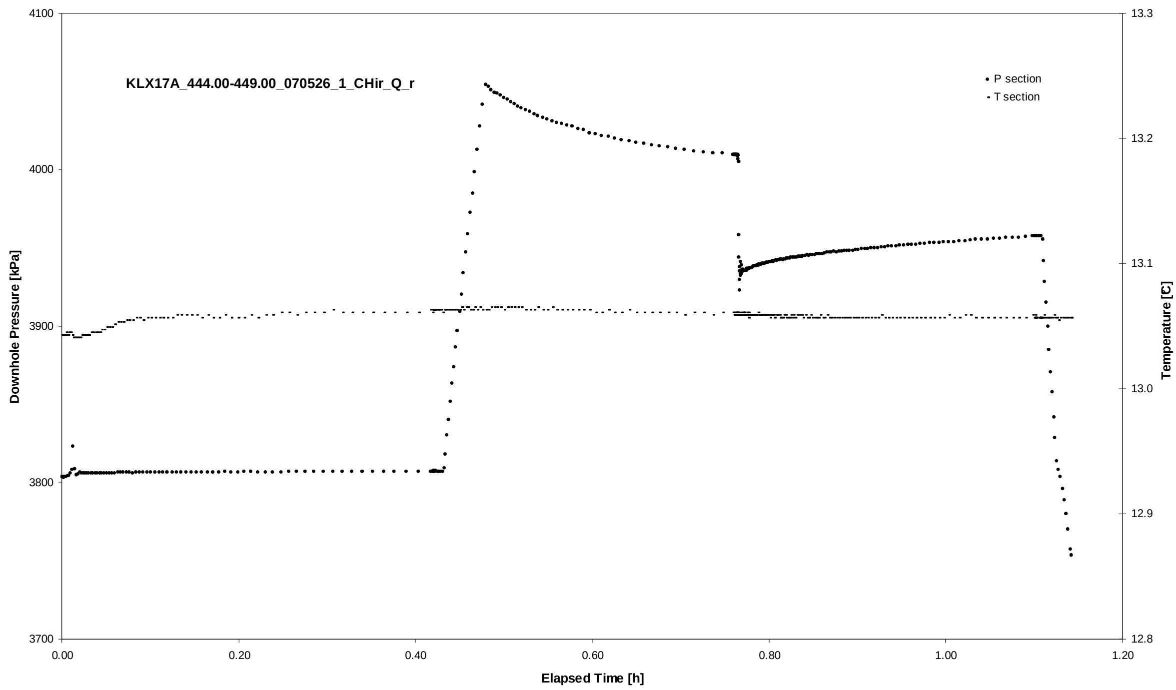
APPENDIX 2-60

Test 444.00 – 449.00 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

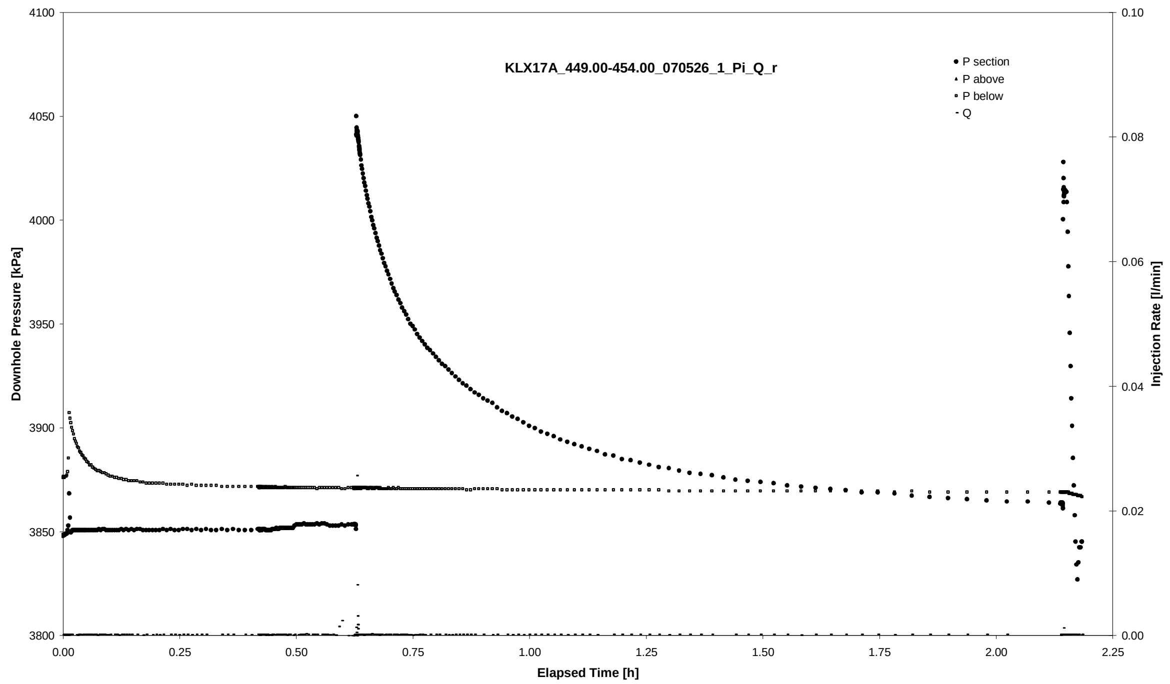
Not analysed

CHIR phase; HORNER match

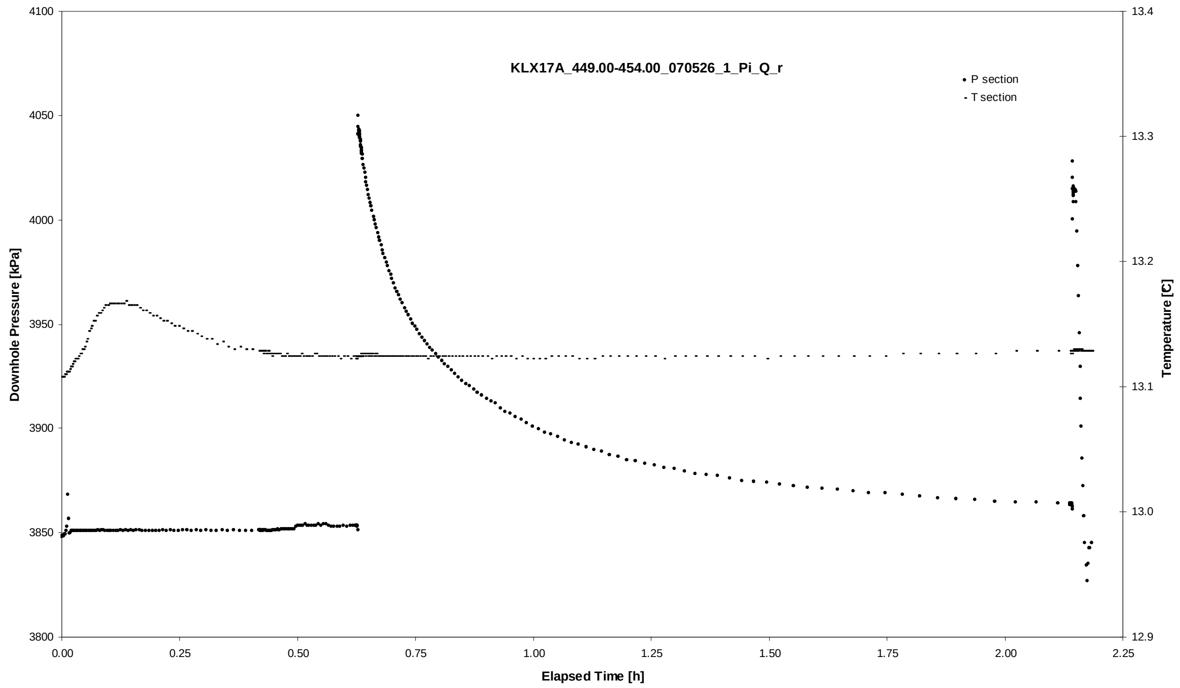
APPENDIX 2-61

Test 449.00 – 454.00 m

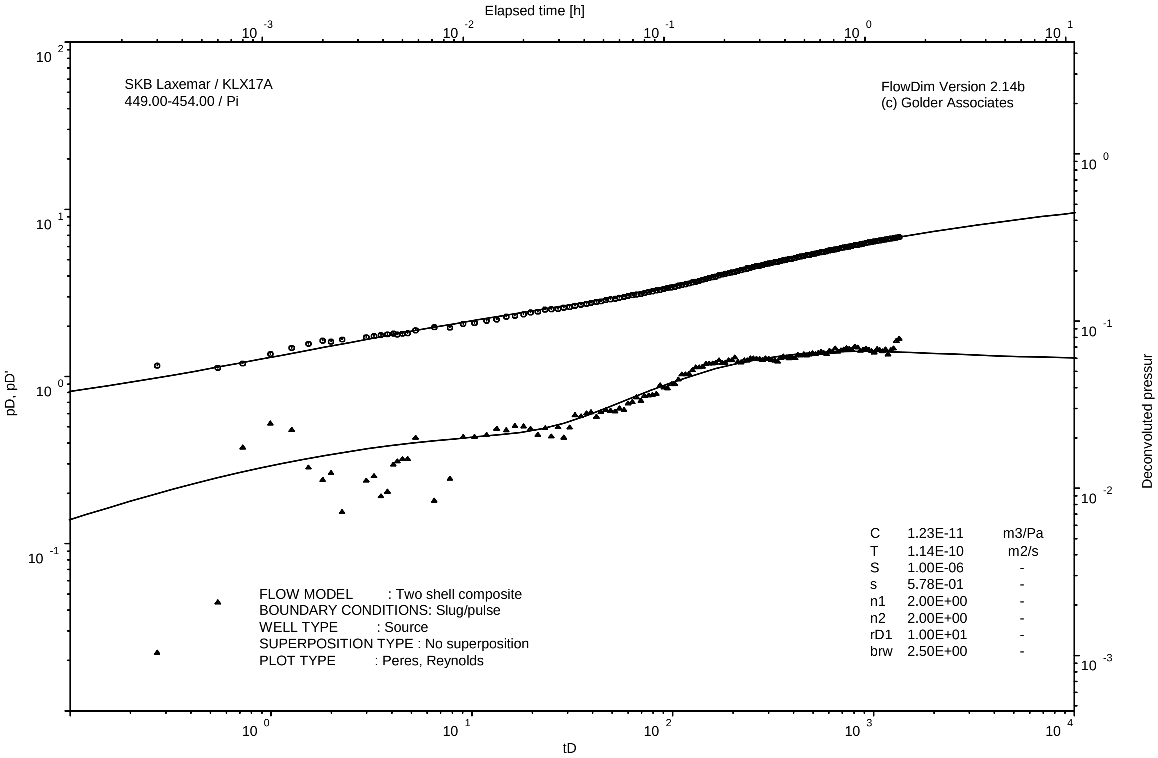
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

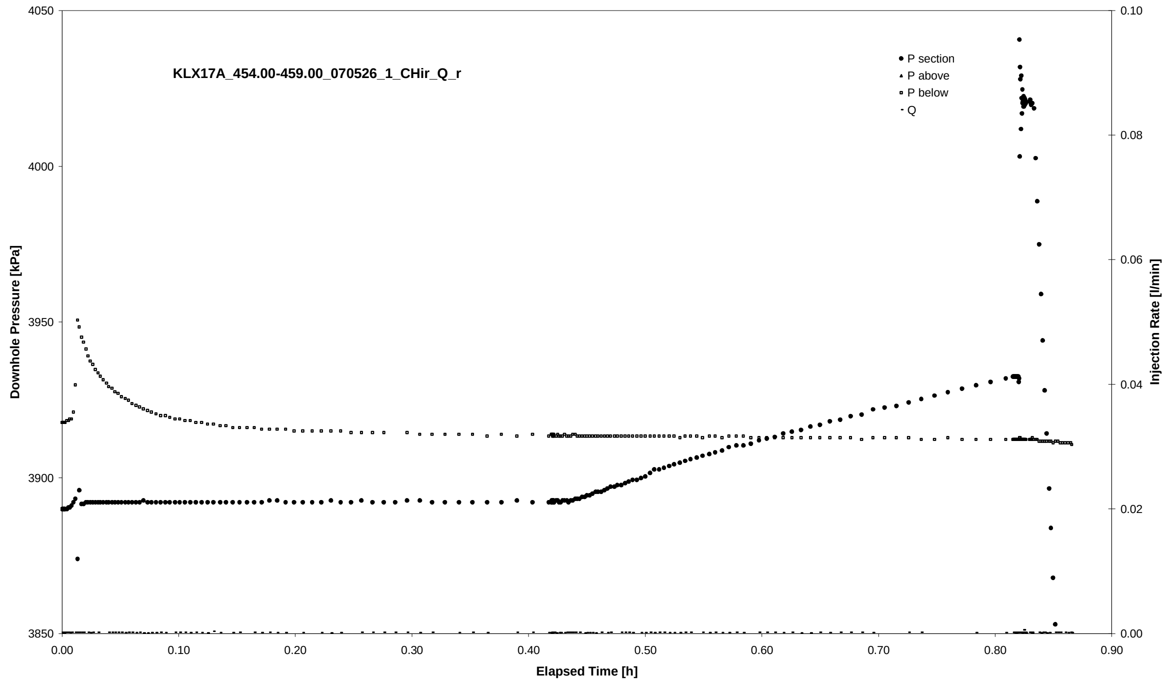


Pulse injection; deconvolution match

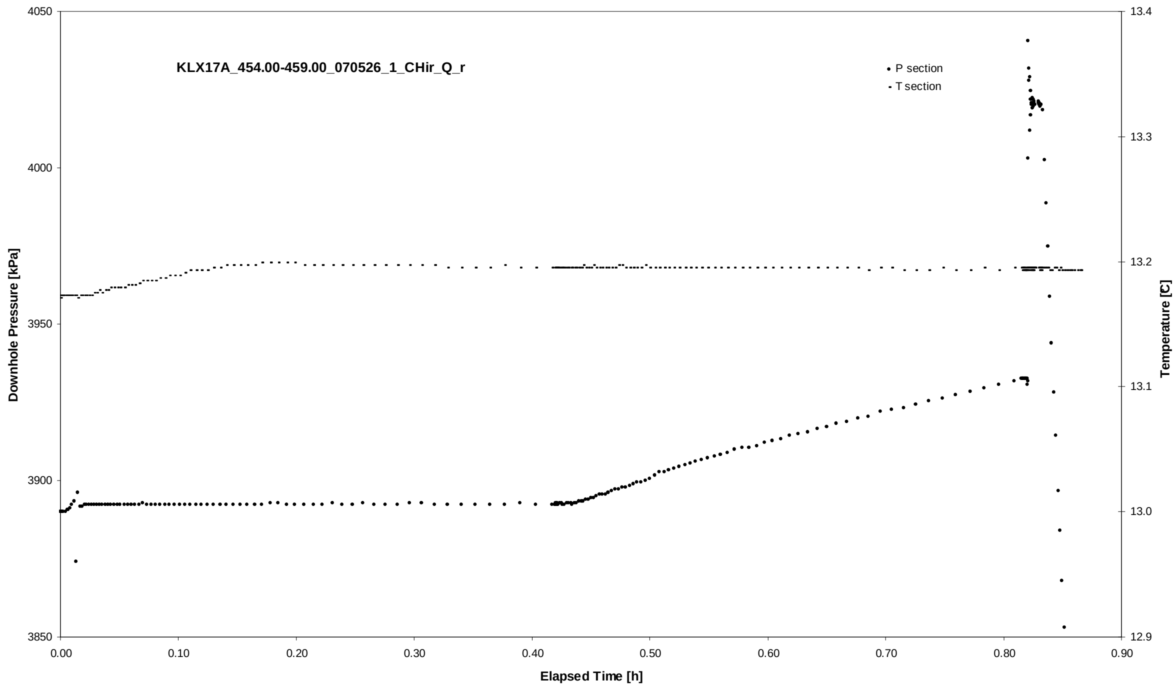
APPENDIX 2-62

Test 454.00 – 459.00 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

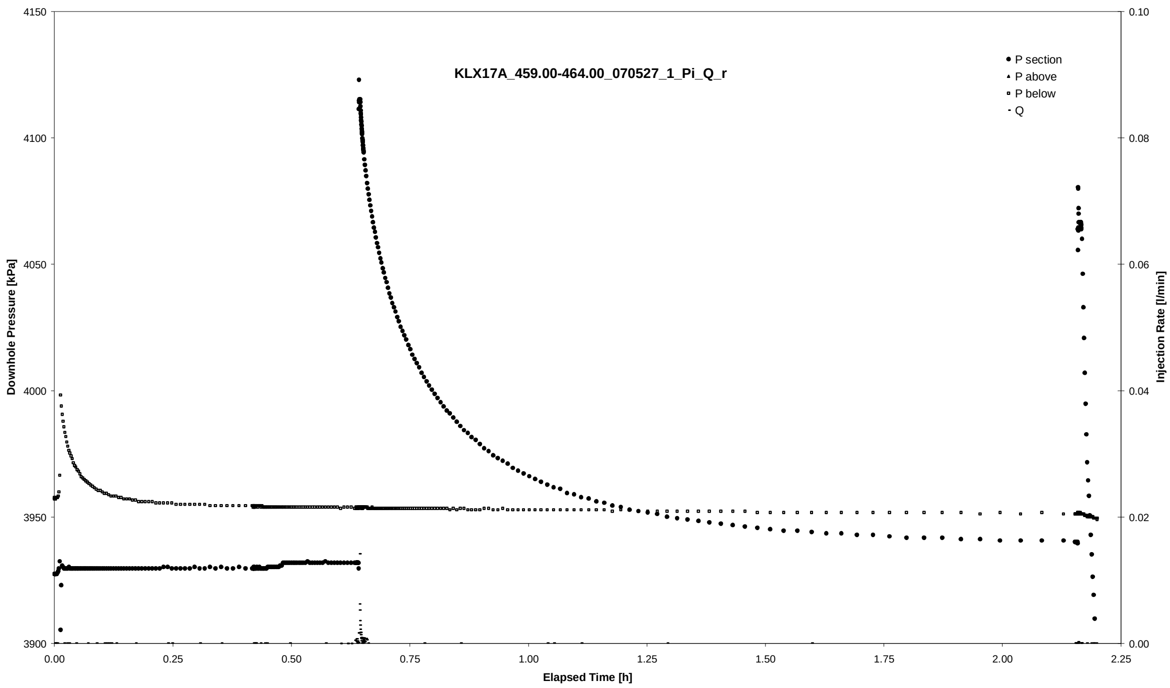
Not analysed

CHIR phase; HORNER match

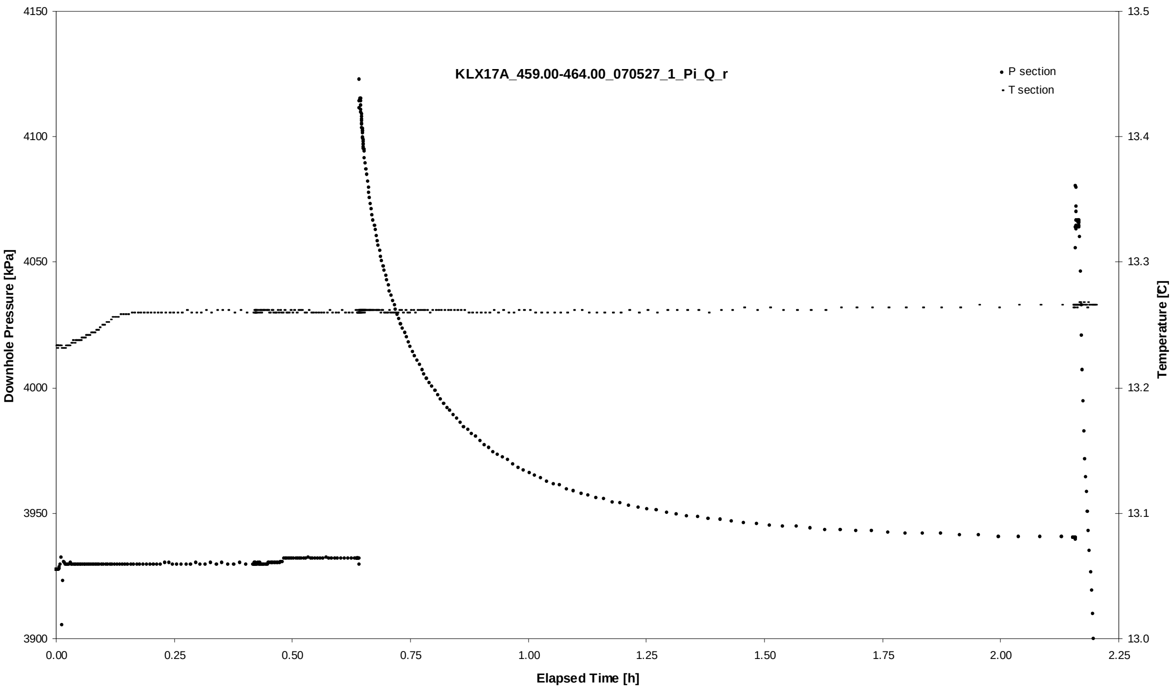
APPENDIX 2-63

Test 459.00 – 464.00 m

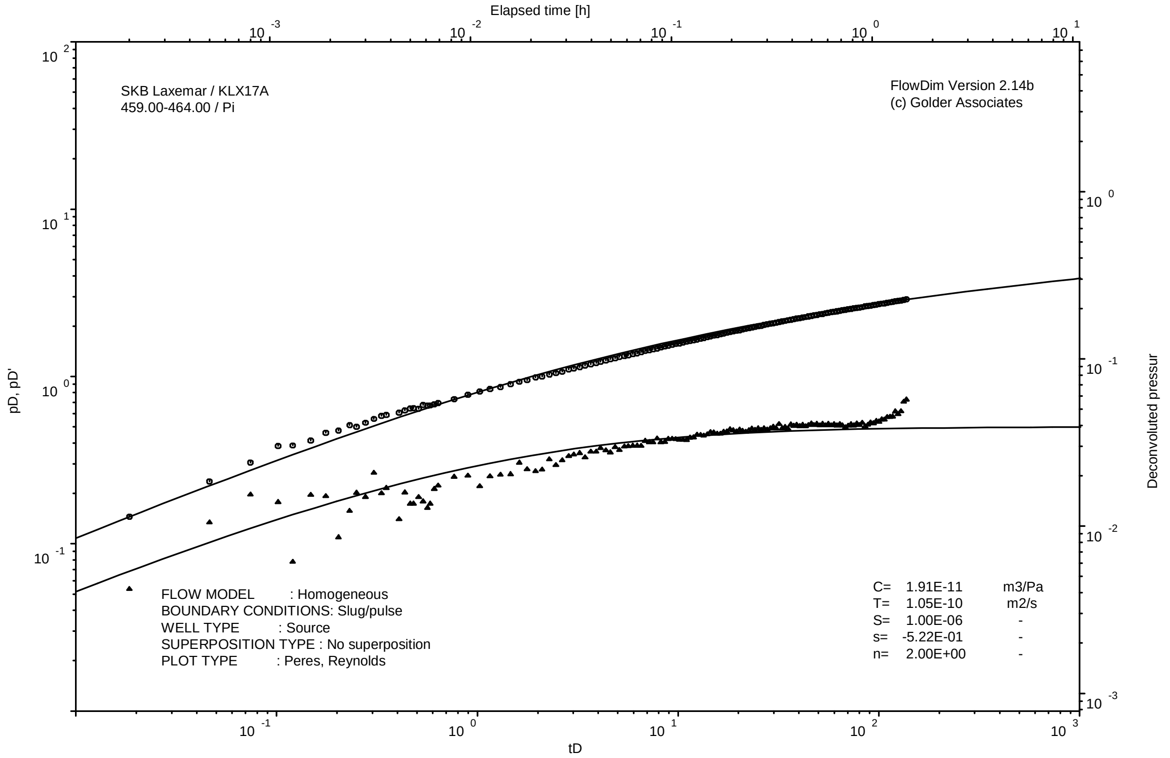
Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

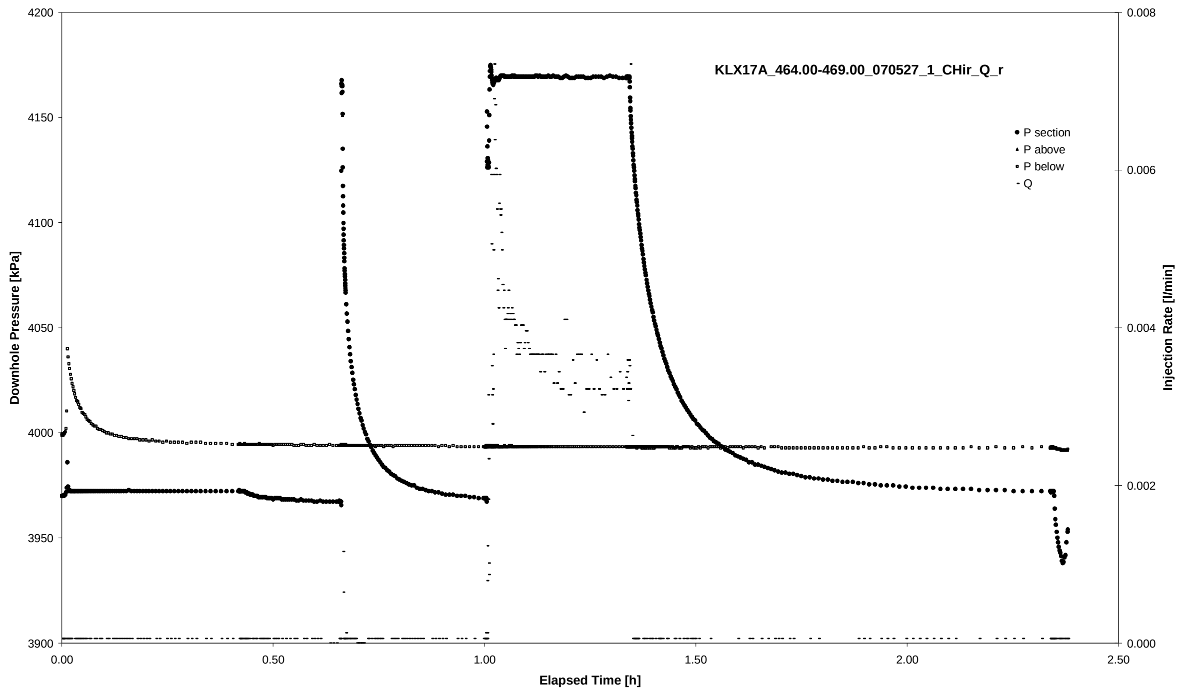


Pulse injection; deconvolution match

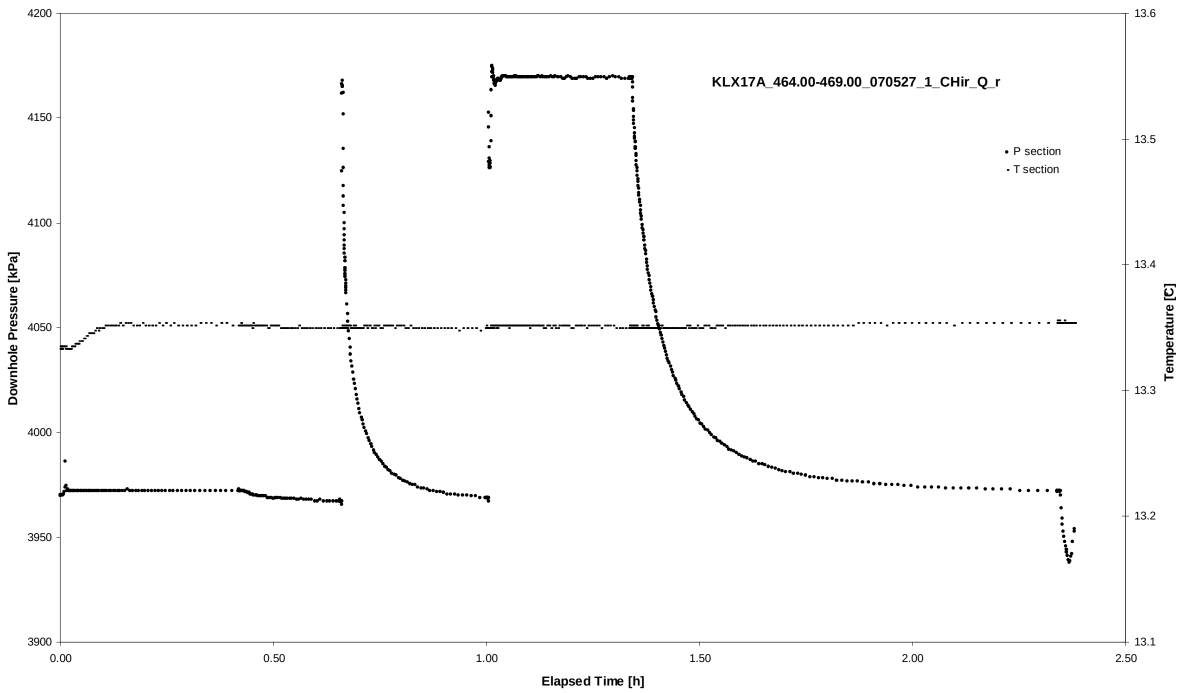
APPENDIX 2-64

Test 464.00 – 469.00 m

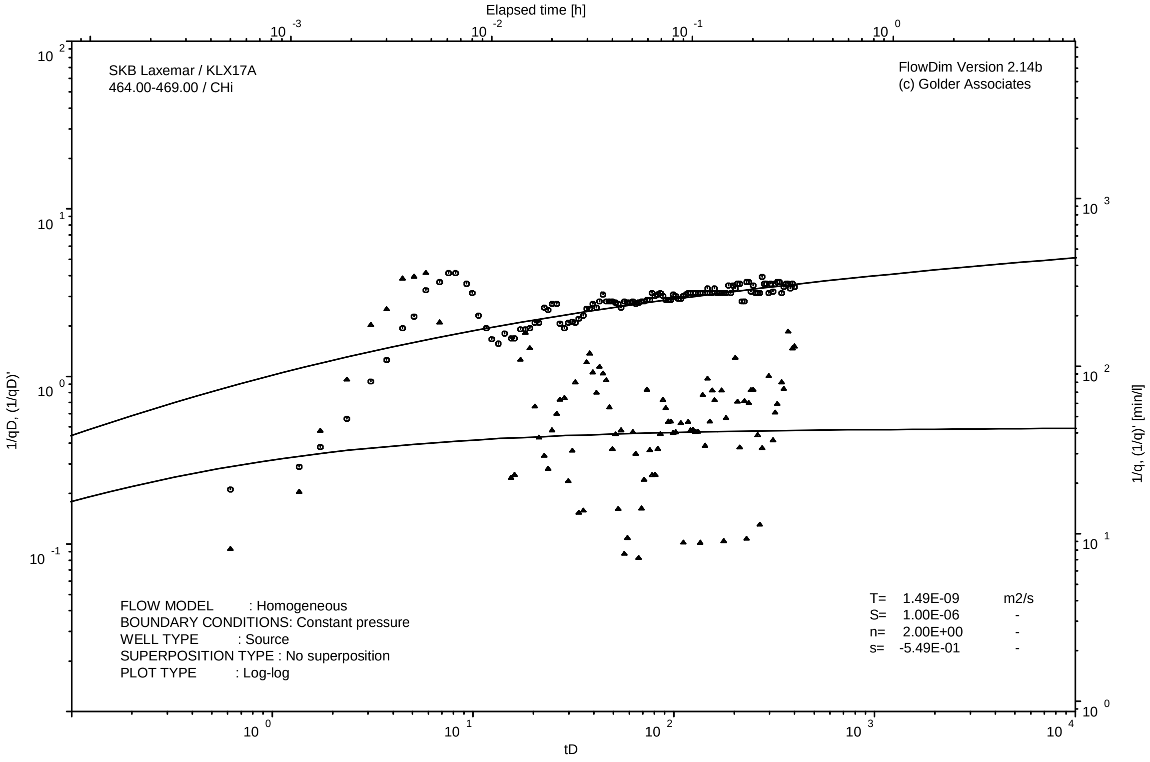
Analysis diagrams



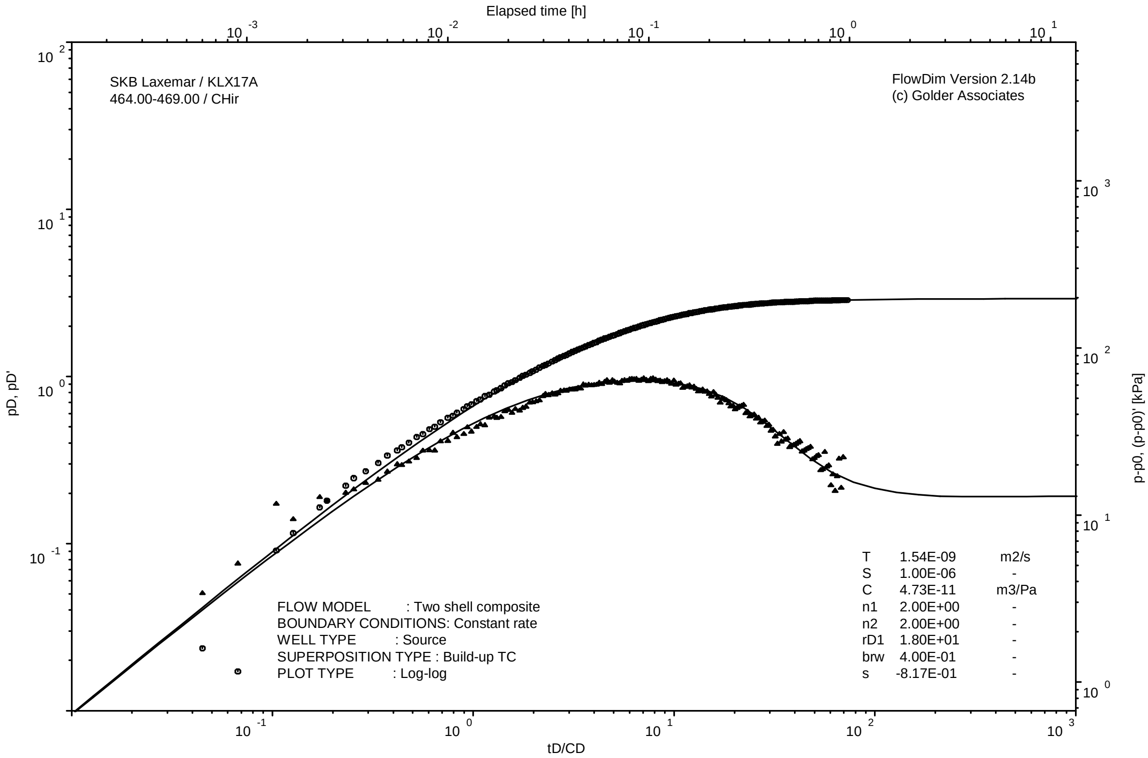
Pressure and flow rate vs. time; cartesian plot



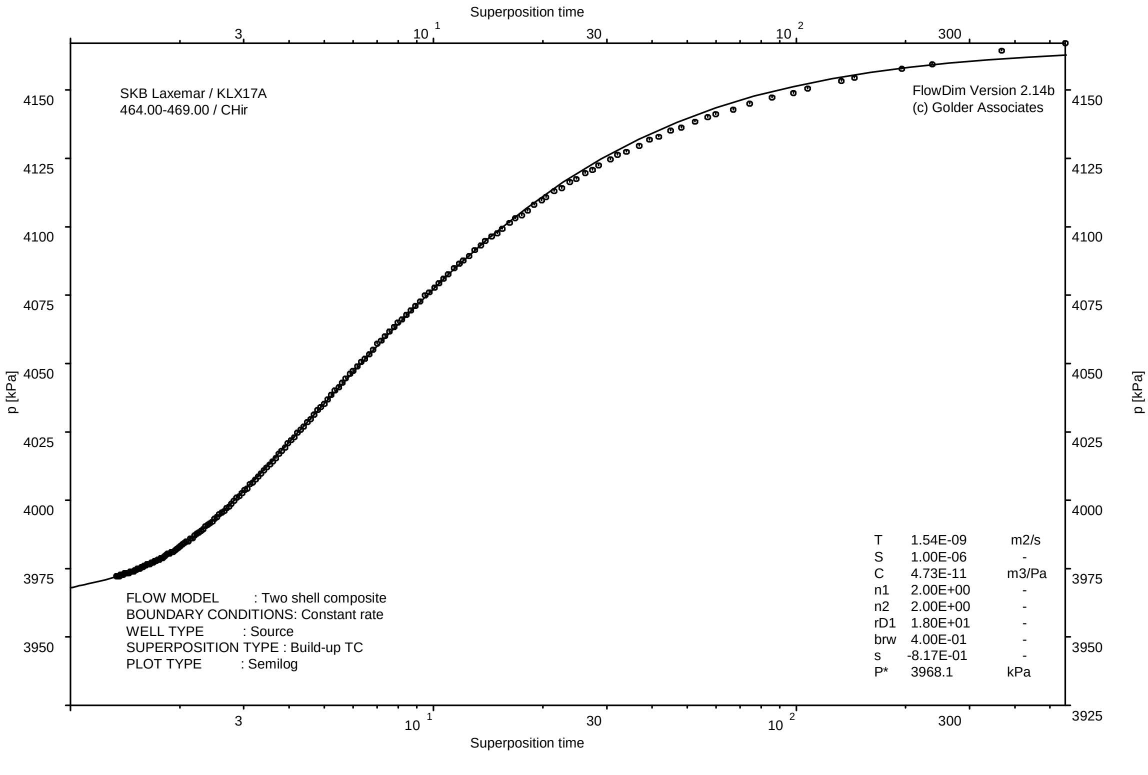
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

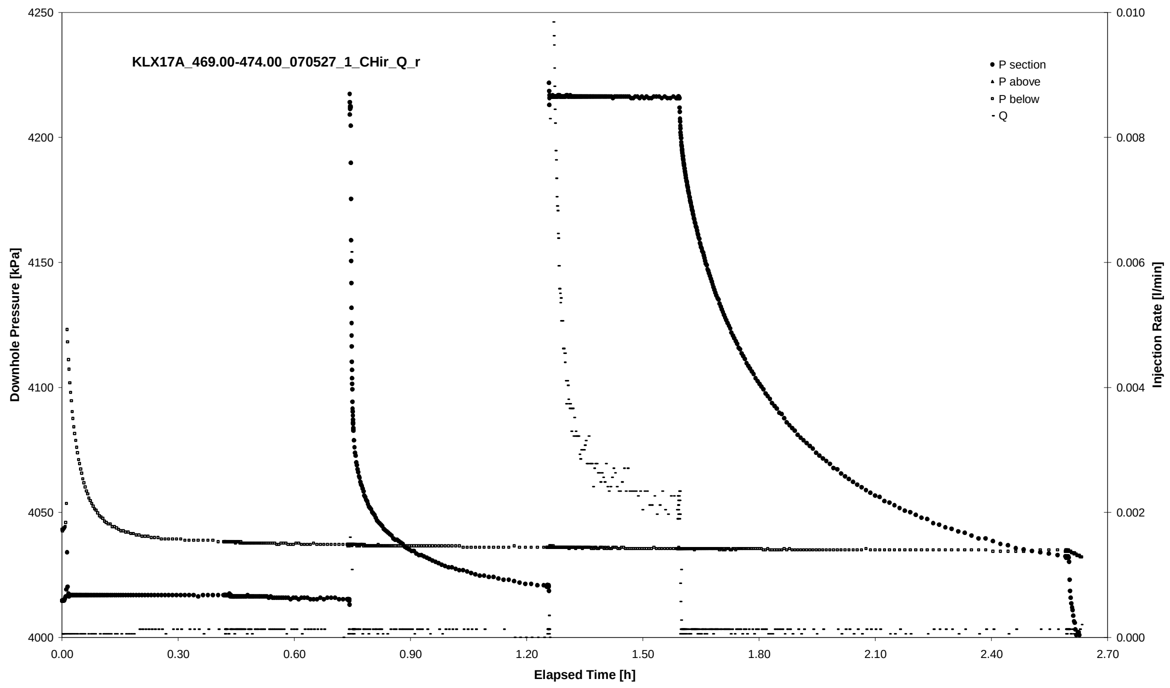


CHIR phase; HORNER match

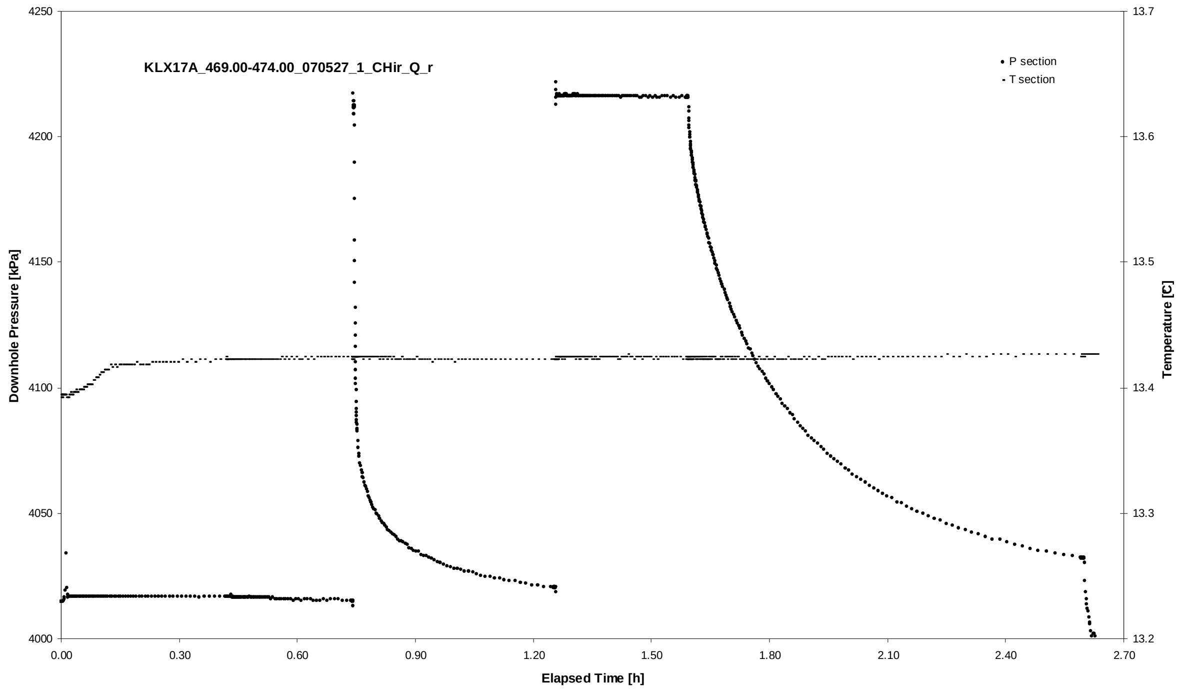
APPENDIX 2-65

Test 469.00 – 474.00 m

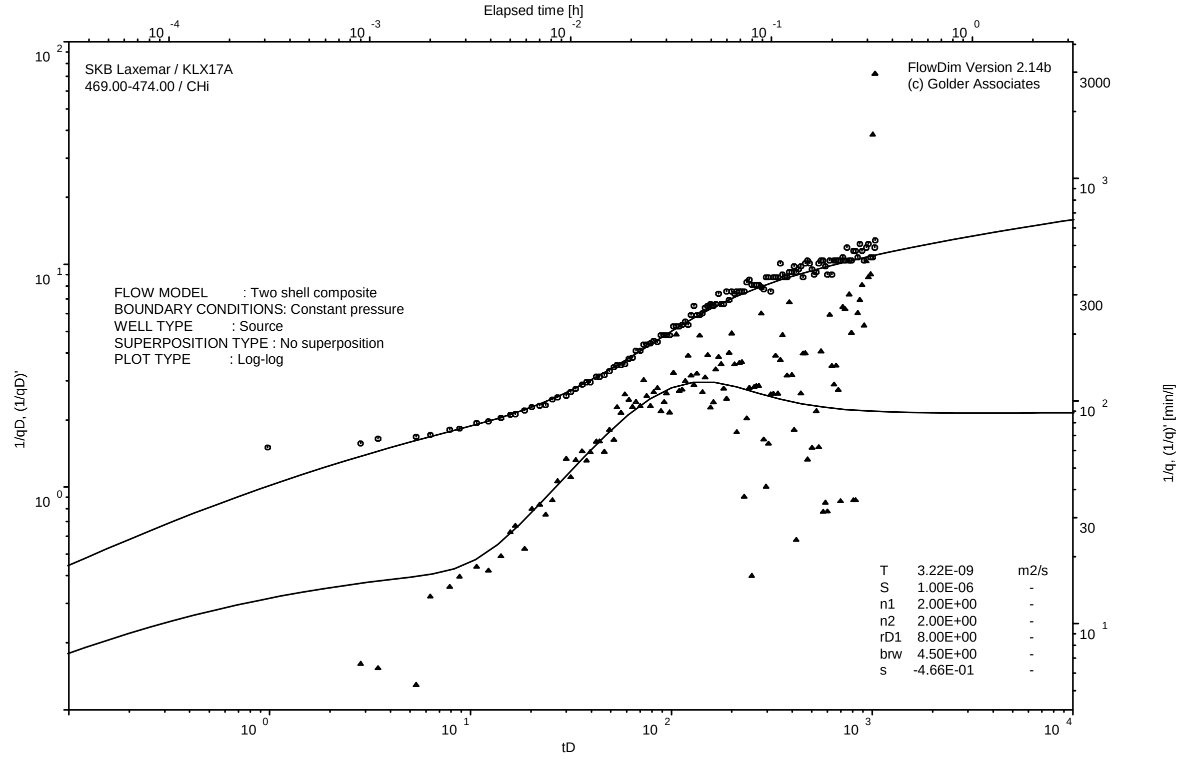
Analysis diagrams



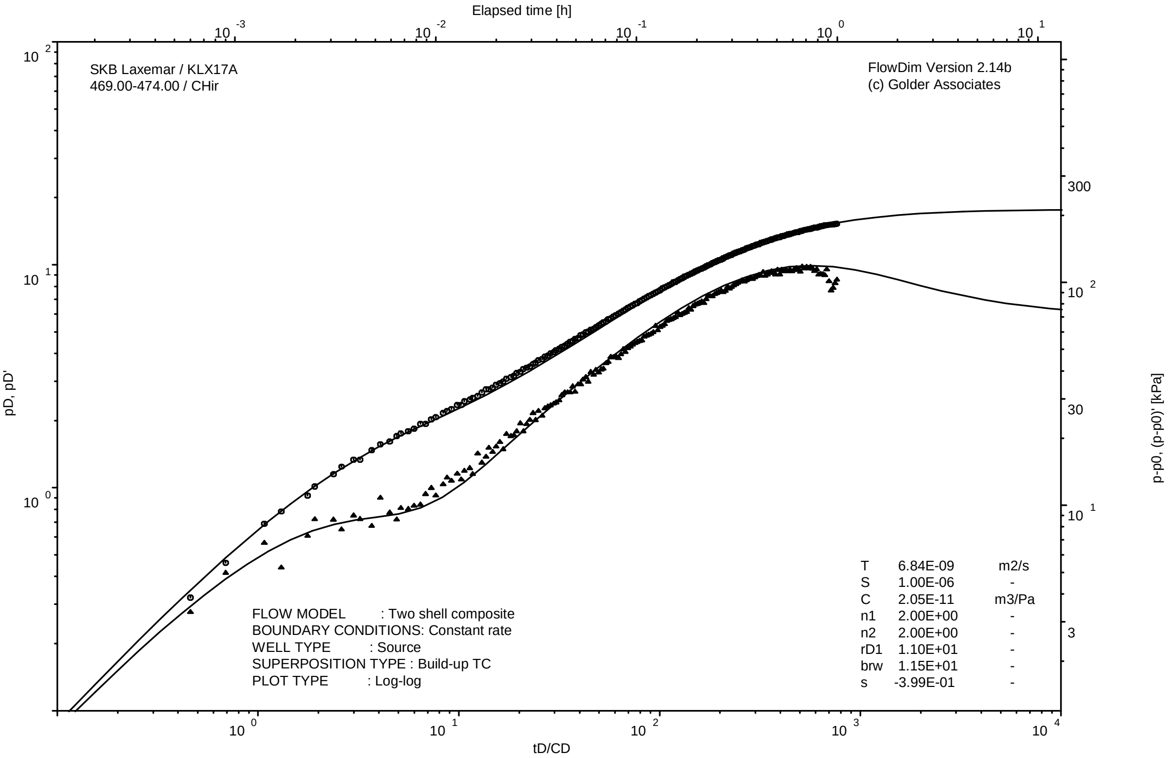
Pressure and flow rate vs. time; cartesian plot



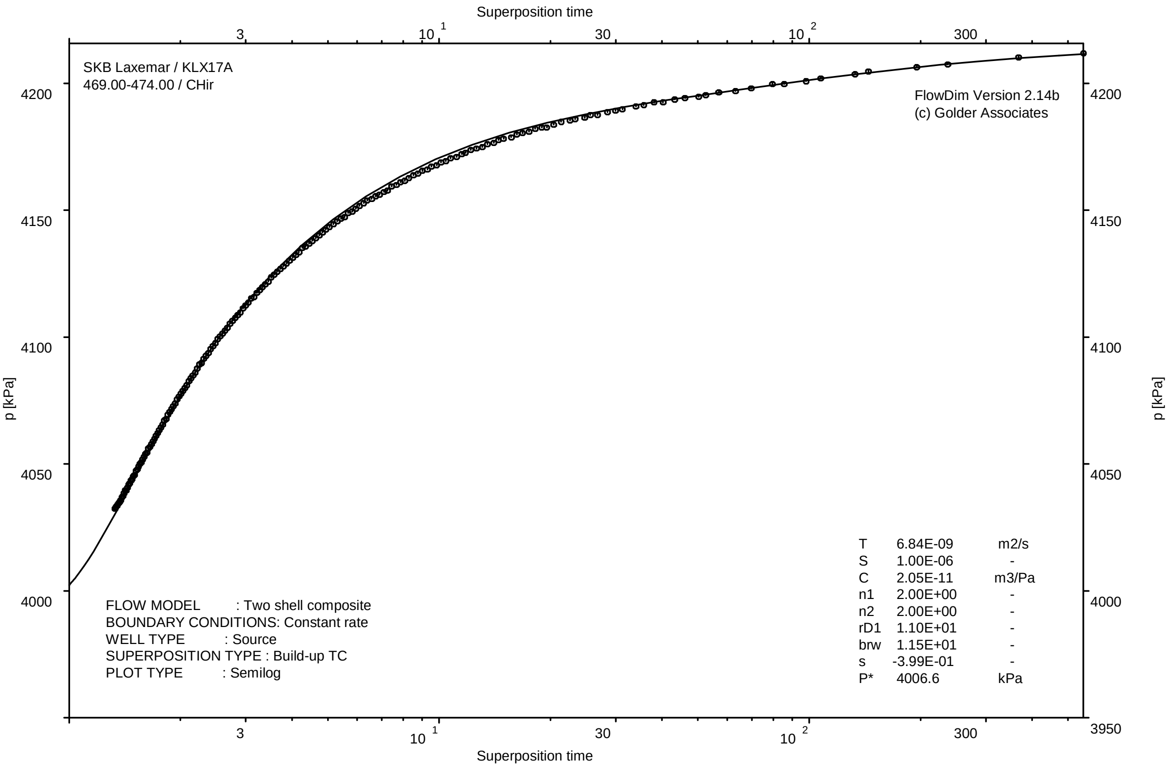
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

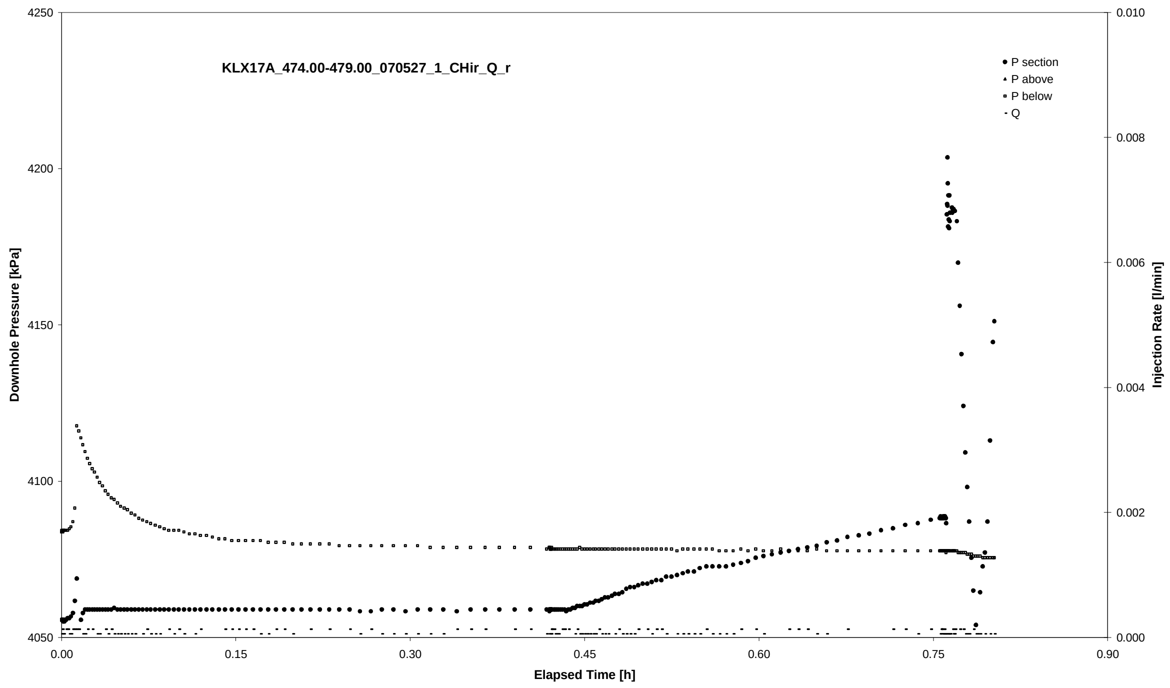


CHIR phase; HORNER match

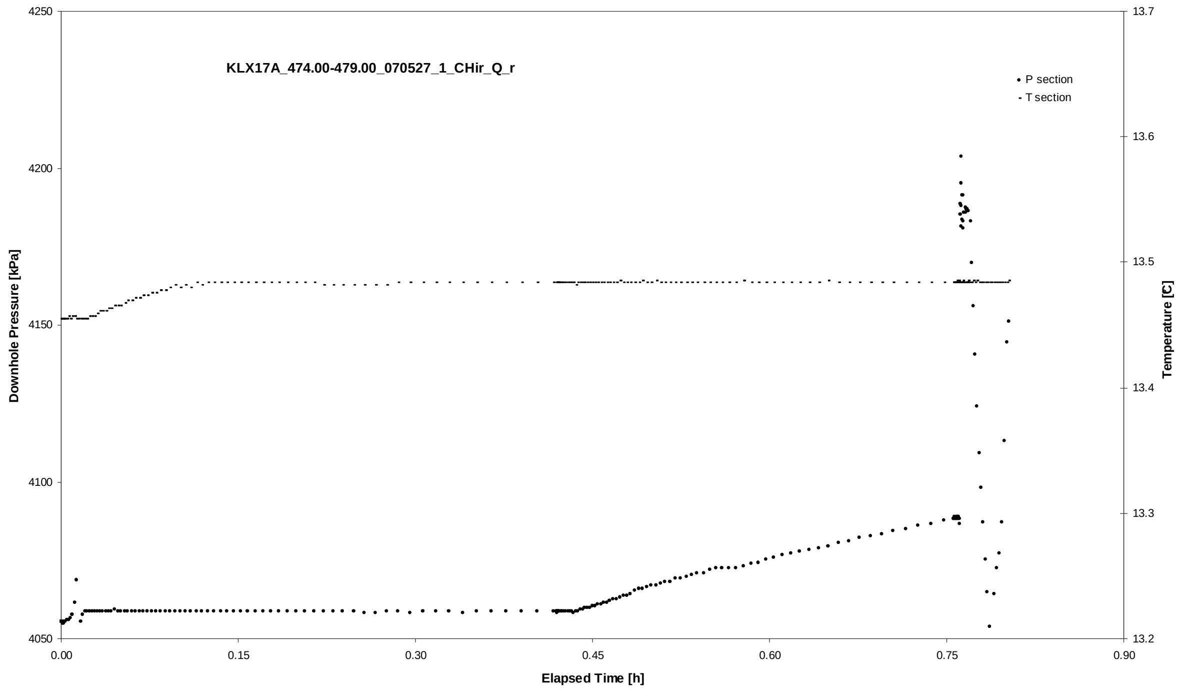
APPENDIX 2-66

Test 474.00 – 479.00 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

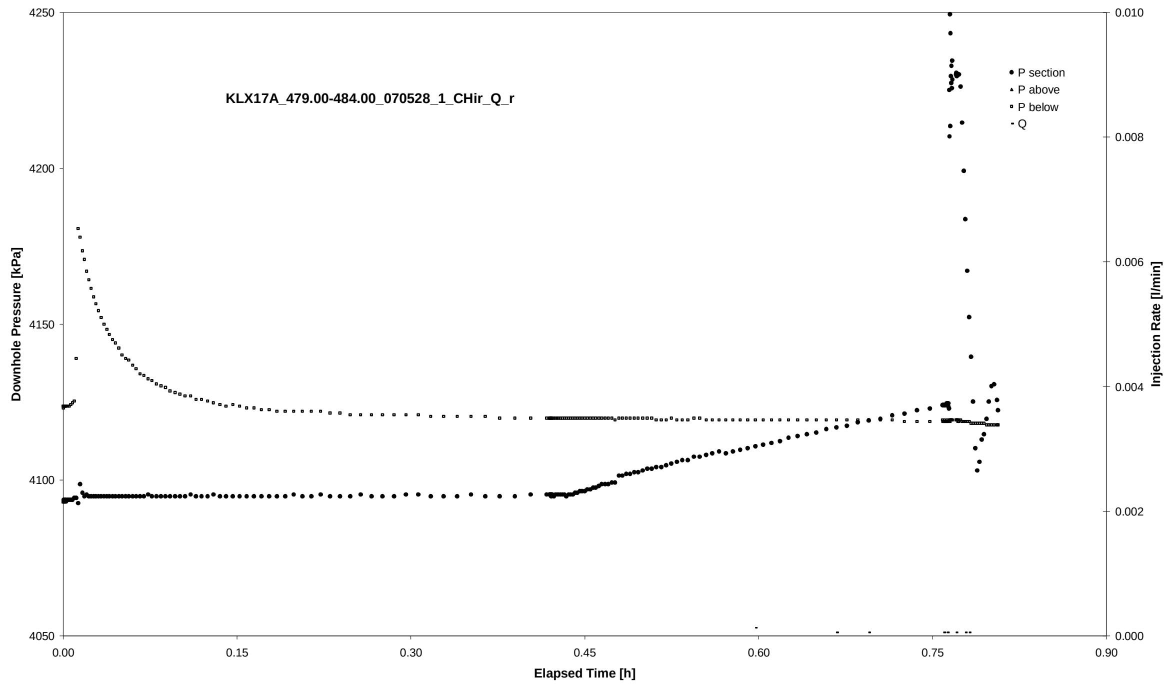
Not analysed

CHIR phase; HORNER match

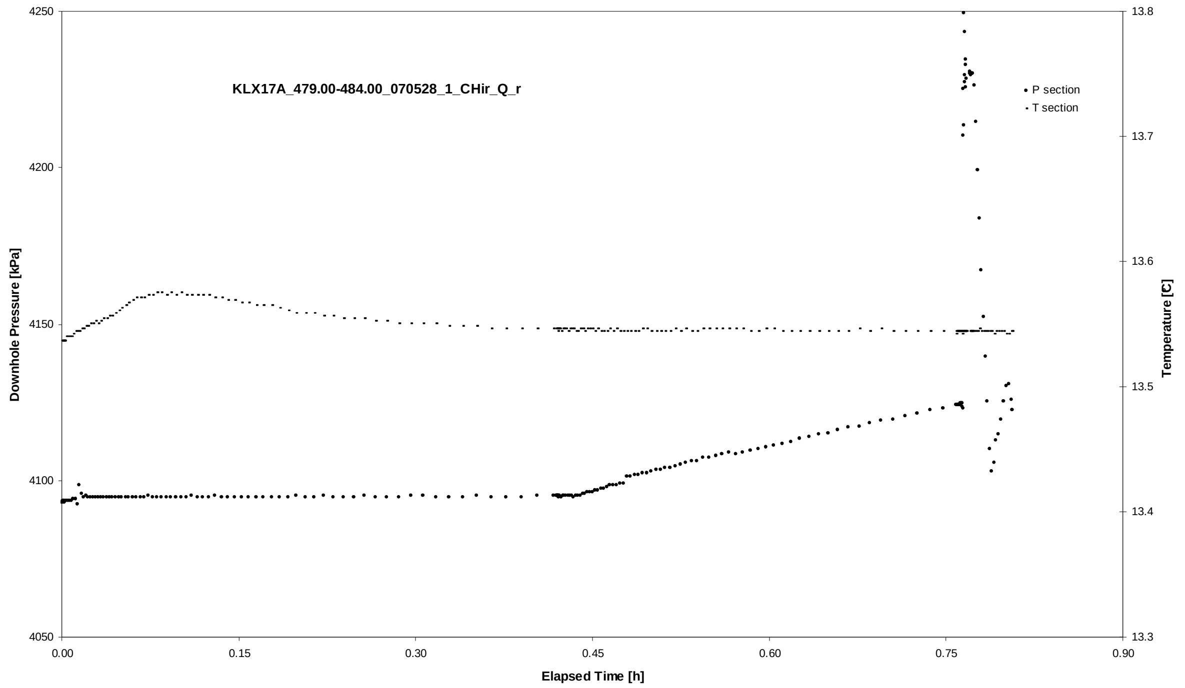
APPENDIX 2-67

Test 479.00 – 484.00 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

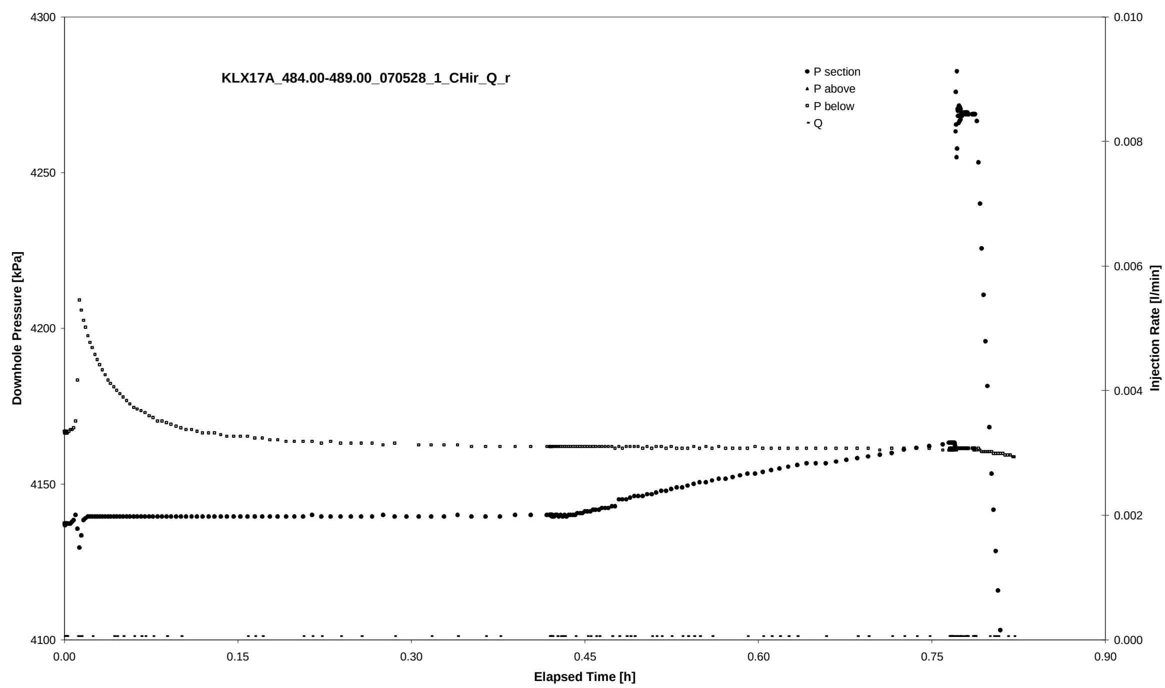
Not analysed

CHIR phase; HORNER match

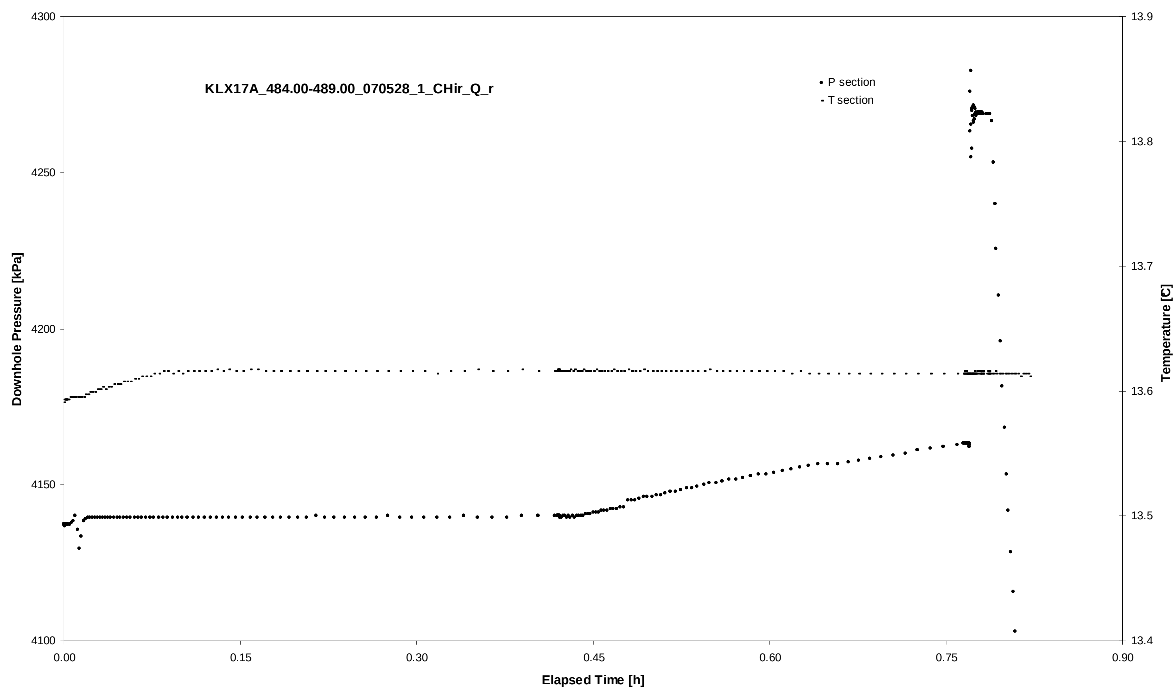
APPENDIX 2-68

Test 484.00 – 489.00 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

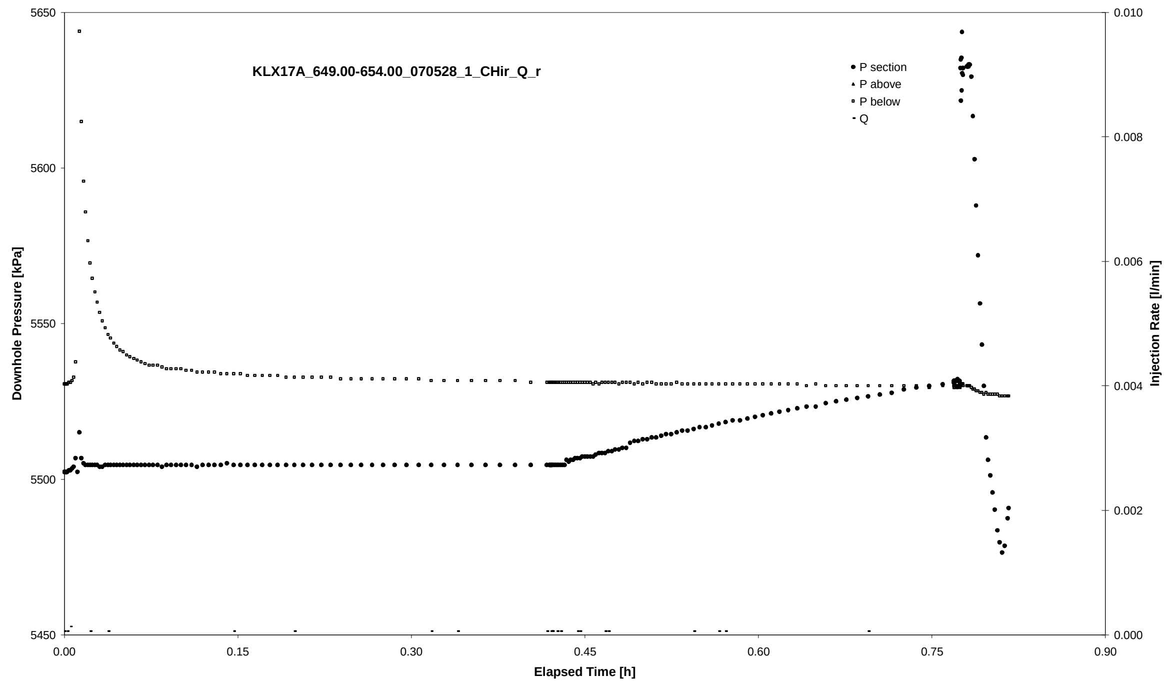
Not analysed

CHIR phase; HORNER match

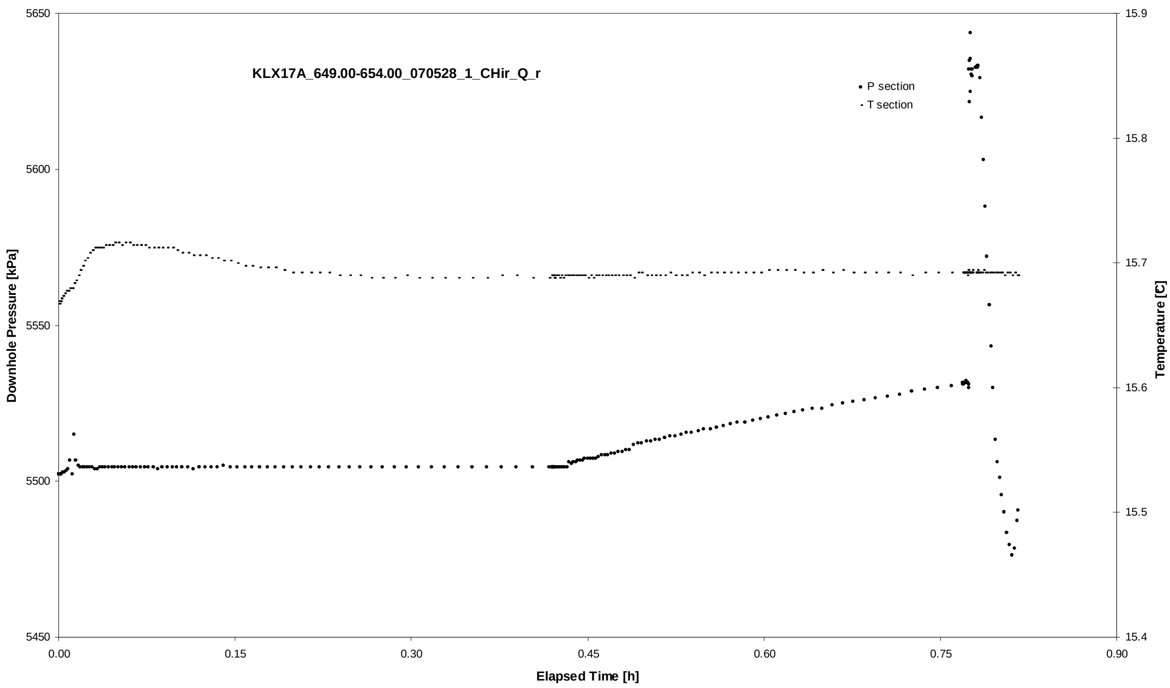
APPENDIX 2-69

Test 649.00 – 654.00 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

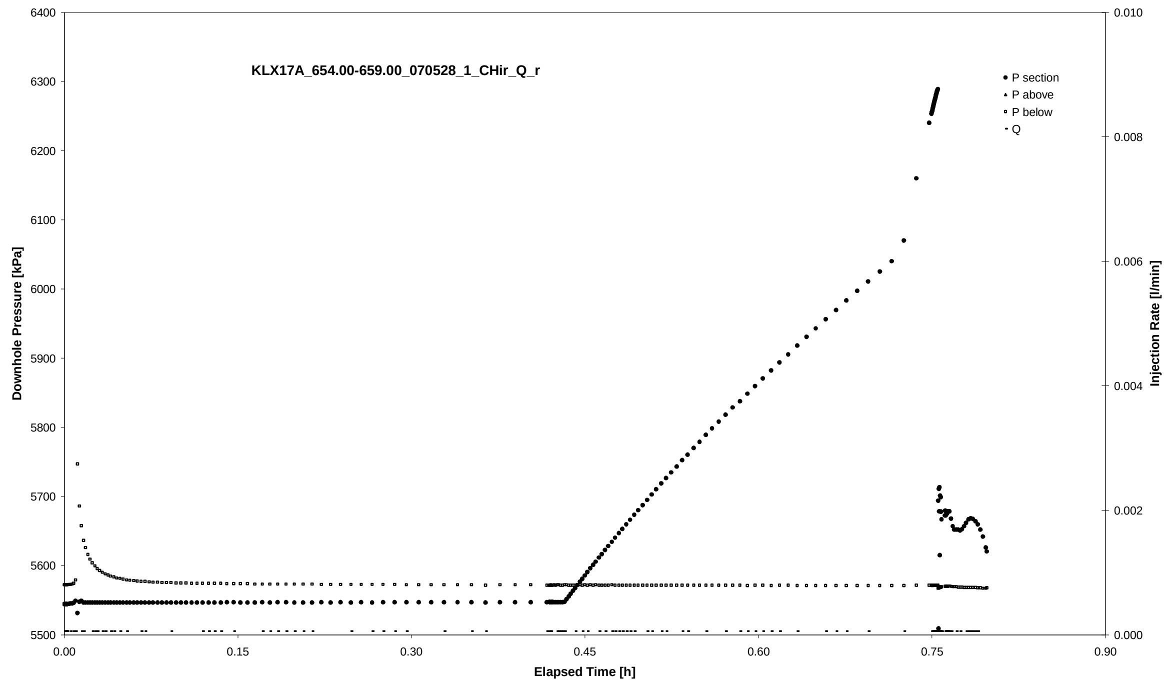
Not analysed

CHIR phase; HORNER match

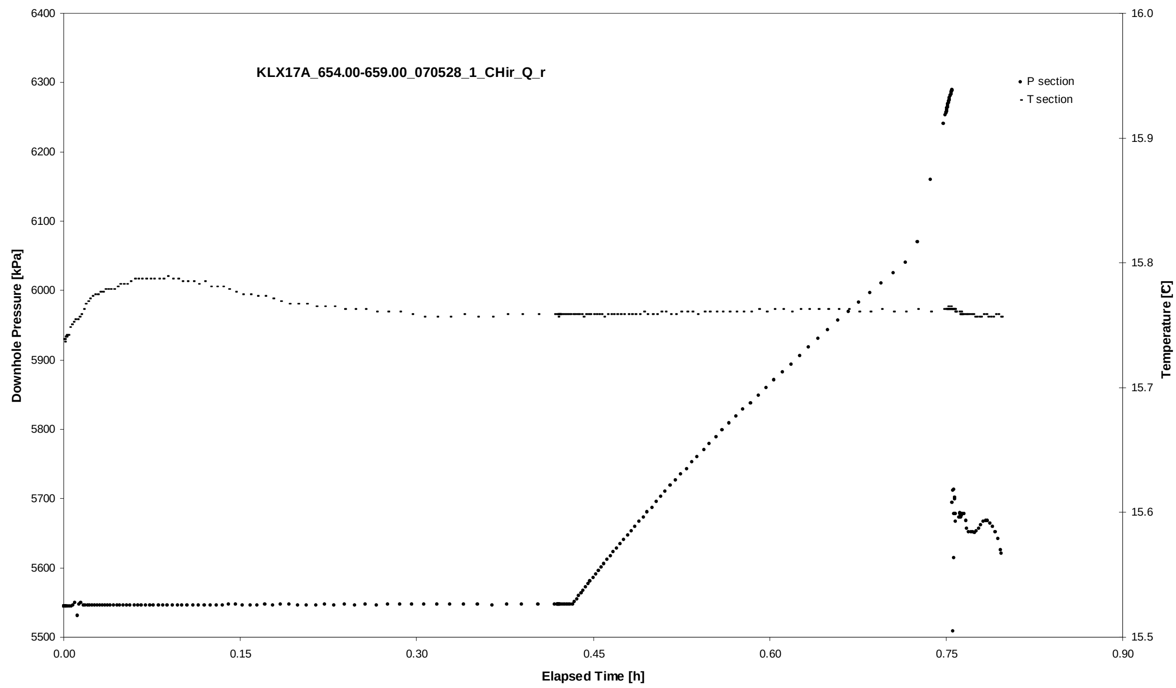
APPENDIX 2-70

Test 654.00 – 659.00 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

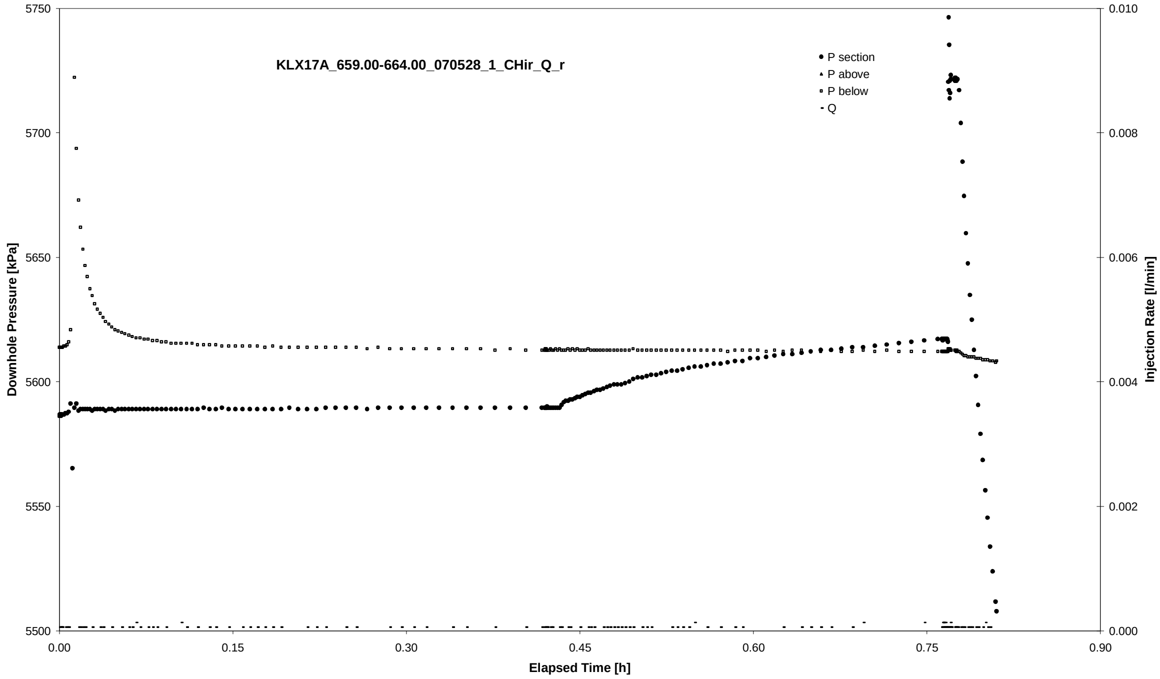
Not analysed

CHIR phase; HORNER match

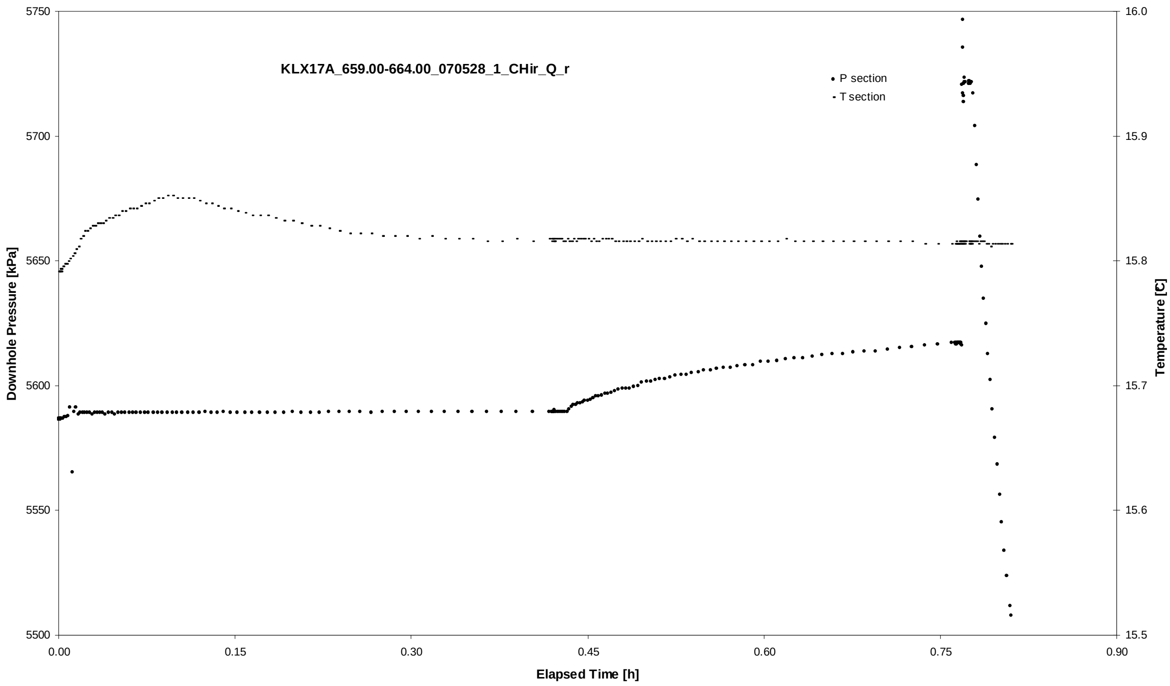
APPENDIX 2-71

Test 659.00 – 664.00 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

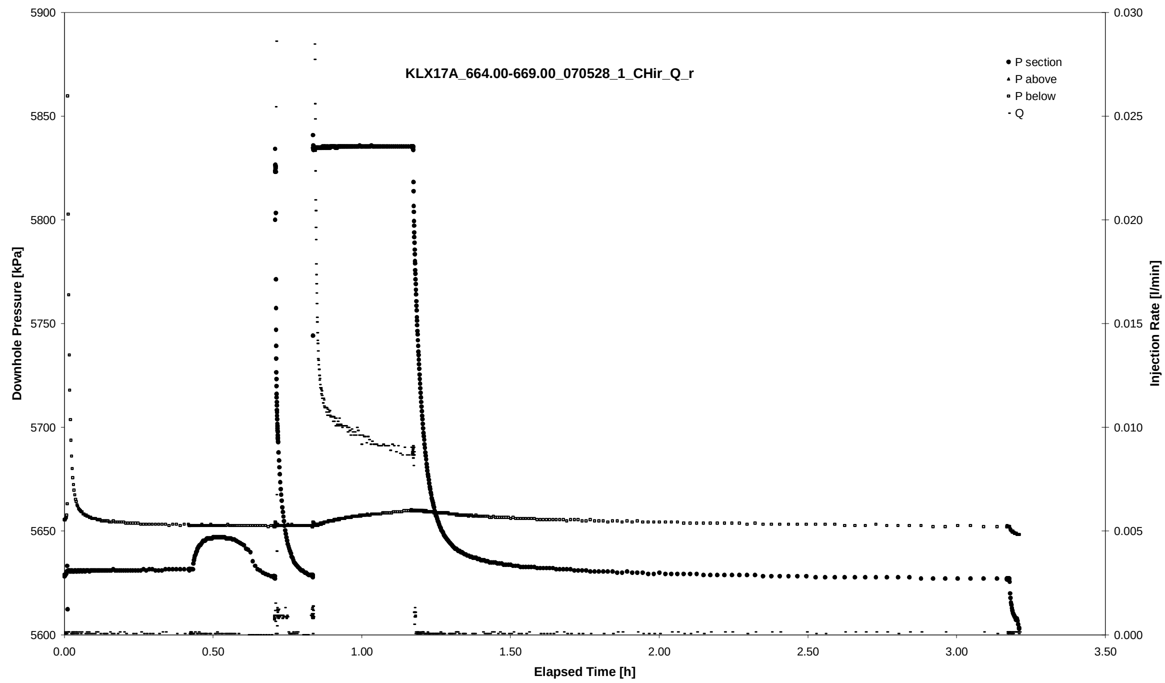
Not analysed

CHIR phase; HORNER match

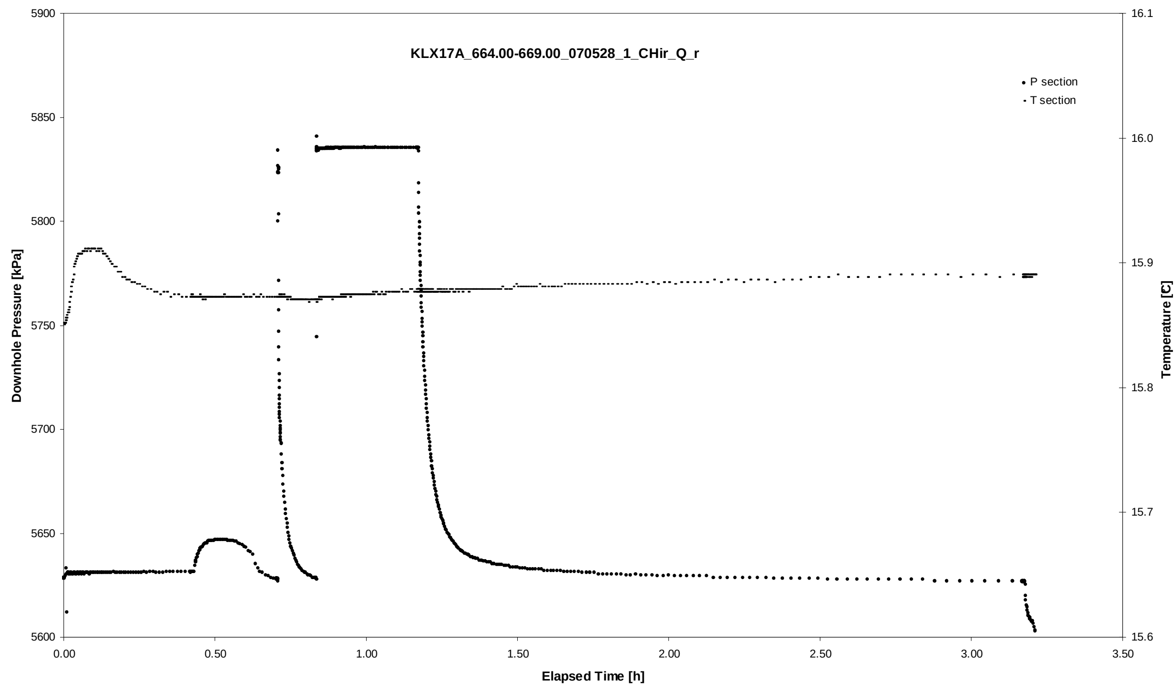
APPENDIX 2-72

Test 664.00 – 669.00 m

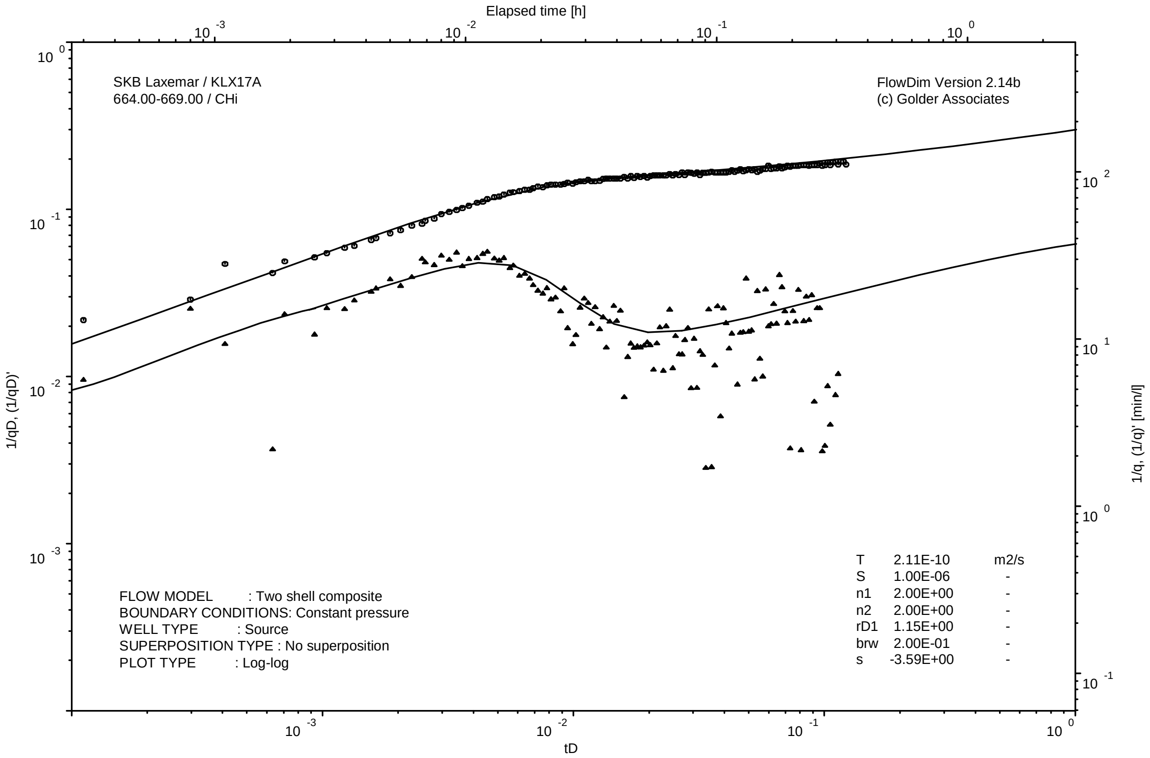
Analysis diagrams



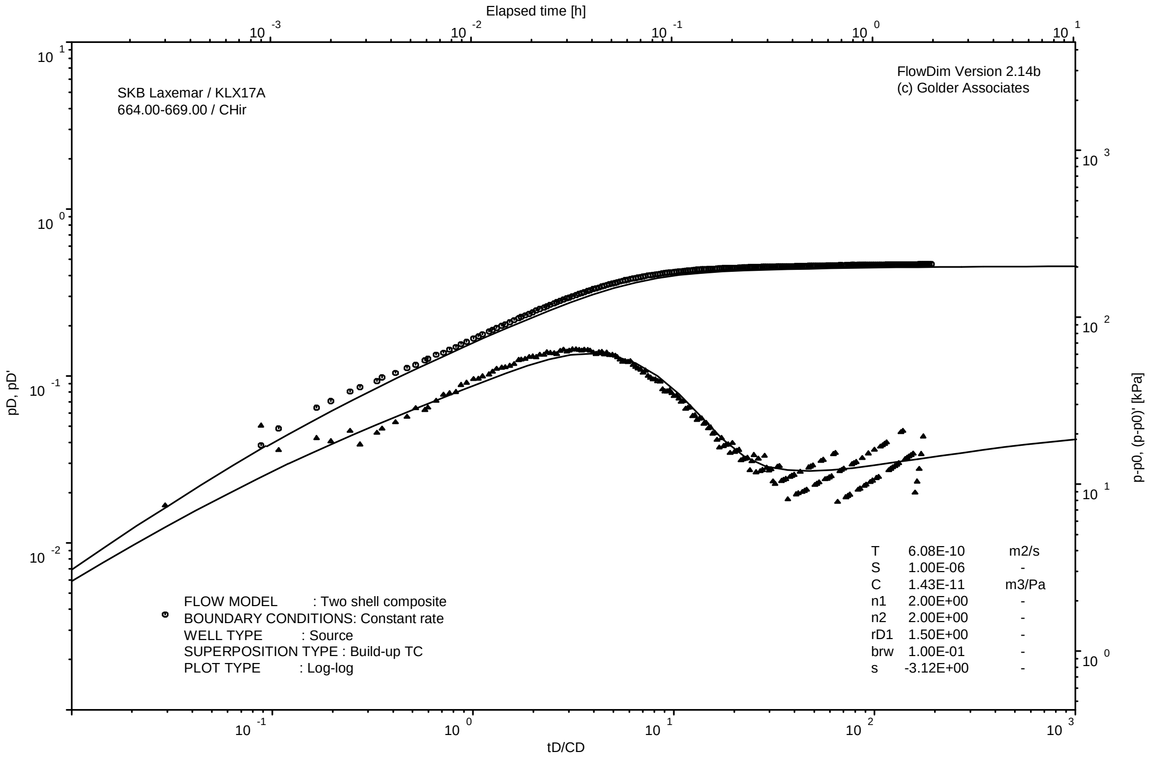
Pressure and flow rate vs. time; cartesian plot



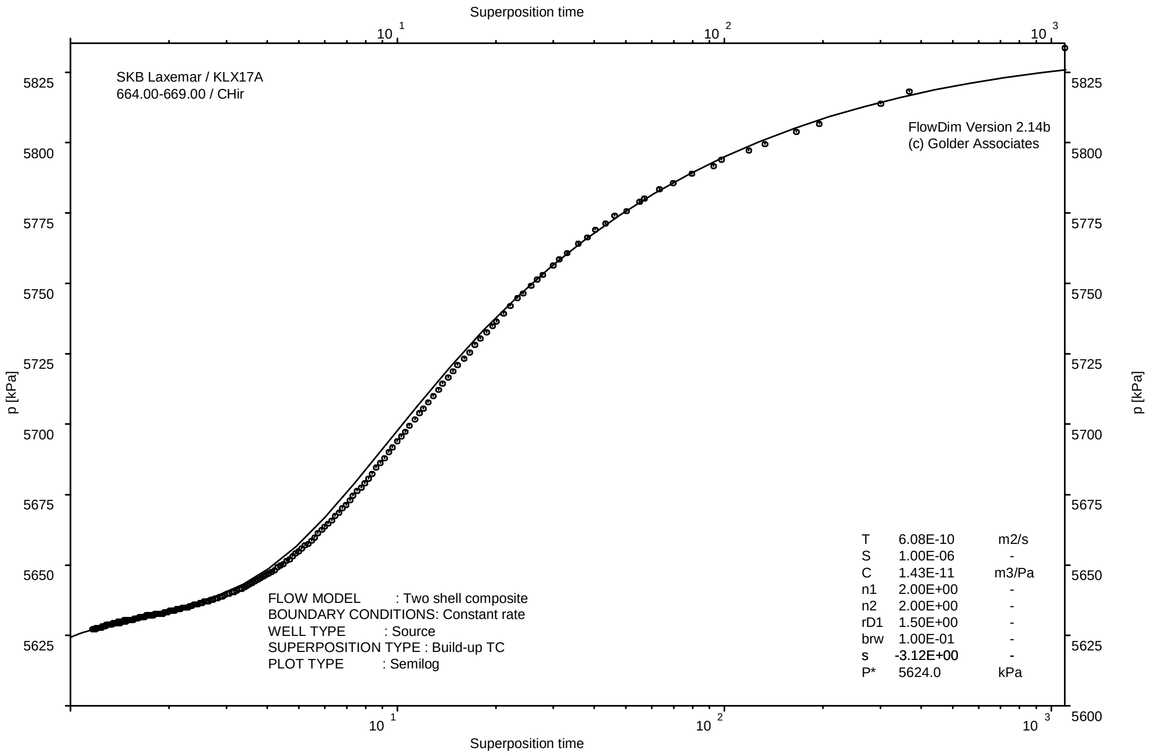
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

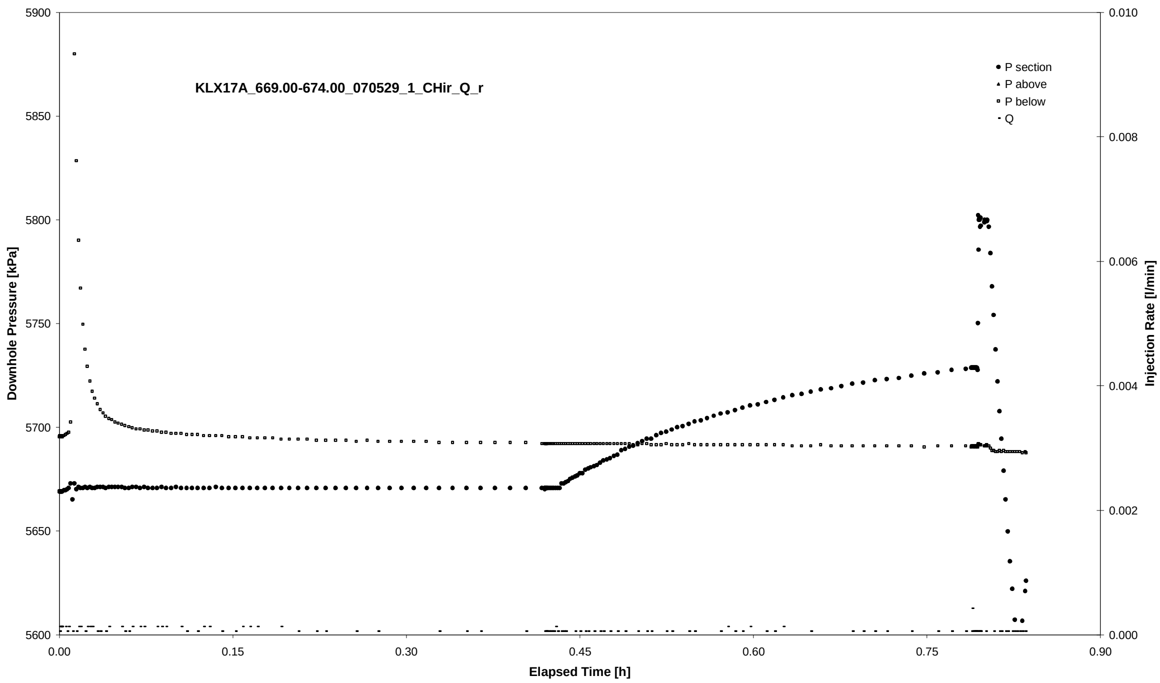


CHIR phase; HORNER match

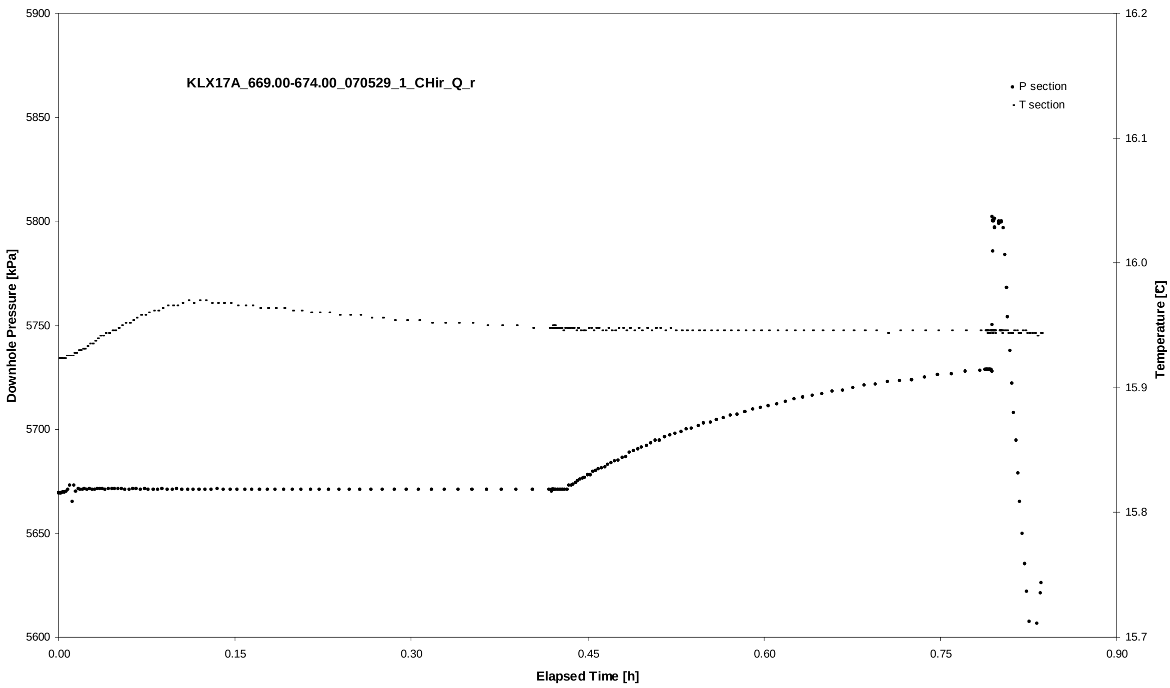
APPENDIX 2-73

Test 669.00 – 674.00 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

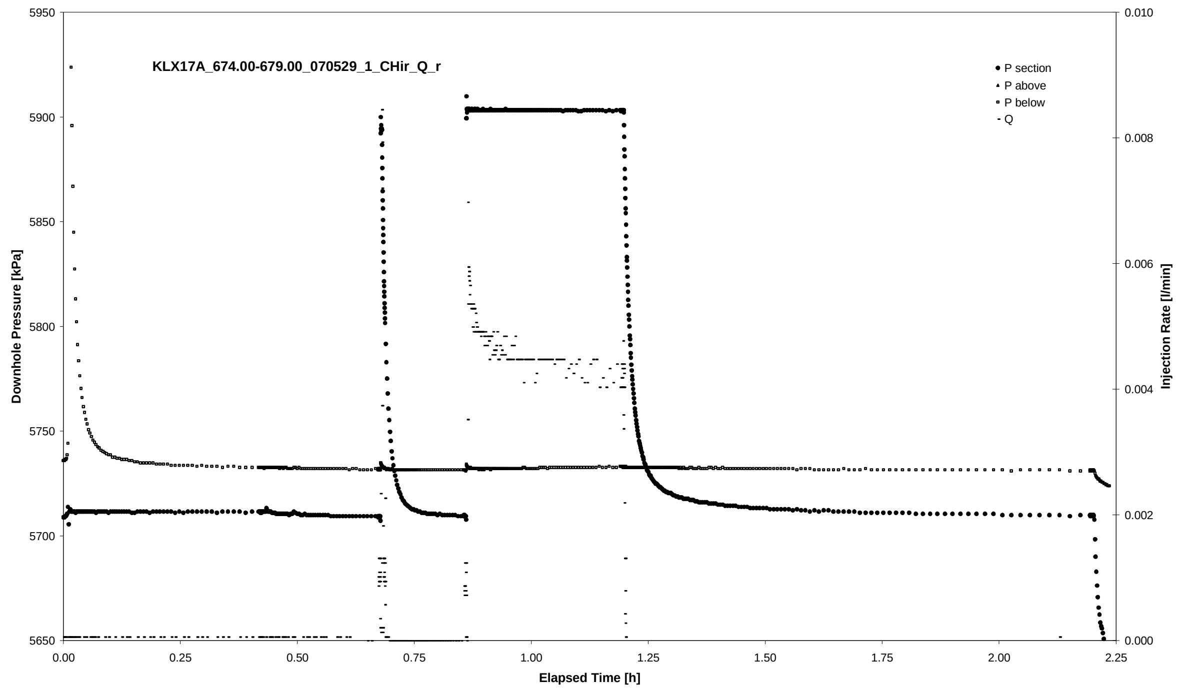
Not analysed

CHIR phase; HORNER match

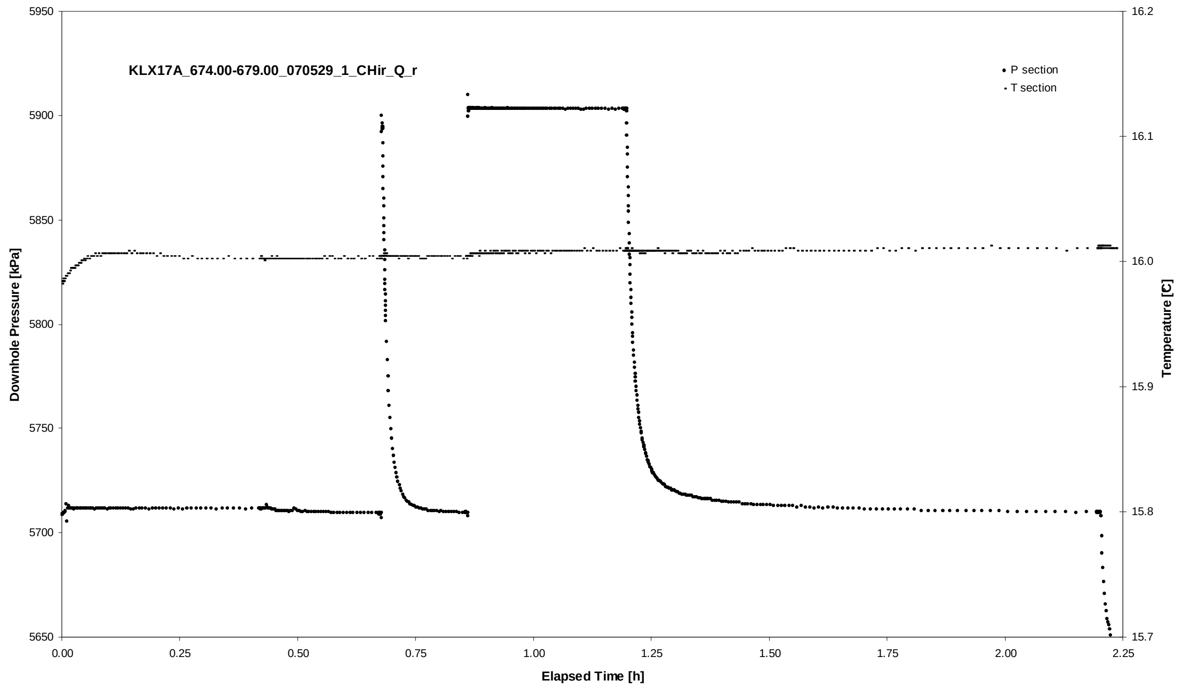
APPENDIX 2-74

Test 674.00 – 679.00 m

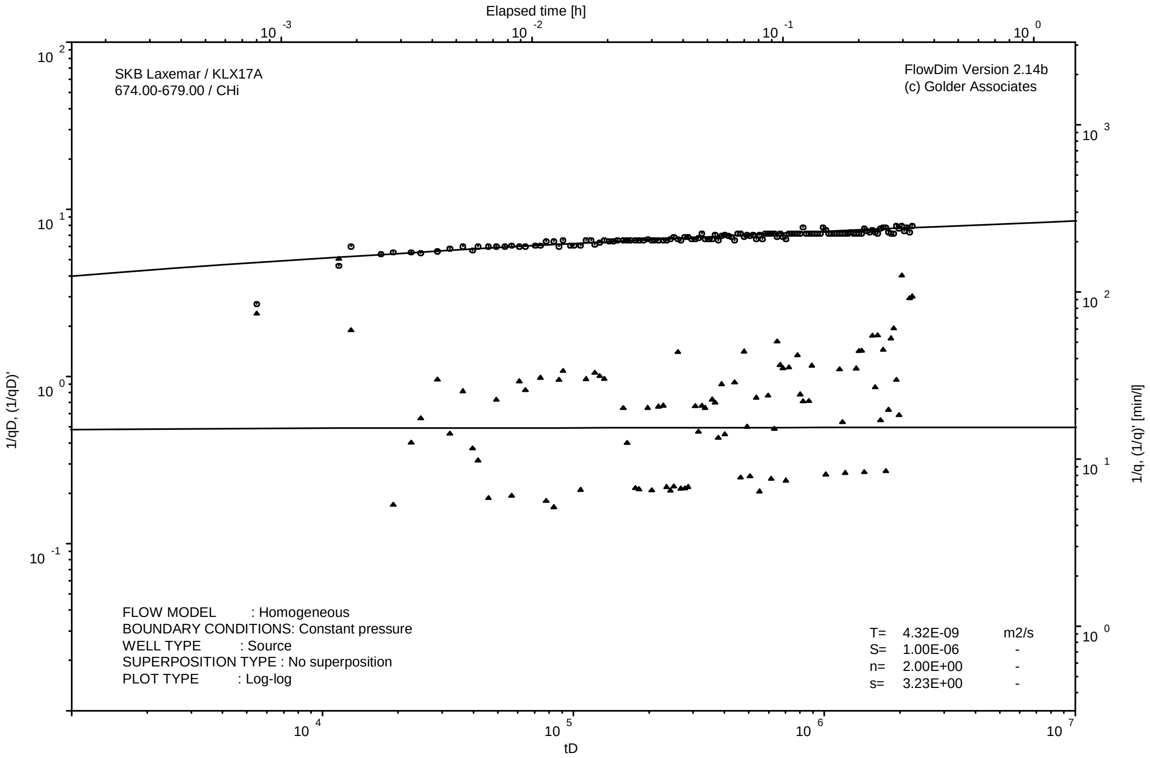
Analysis diagrams



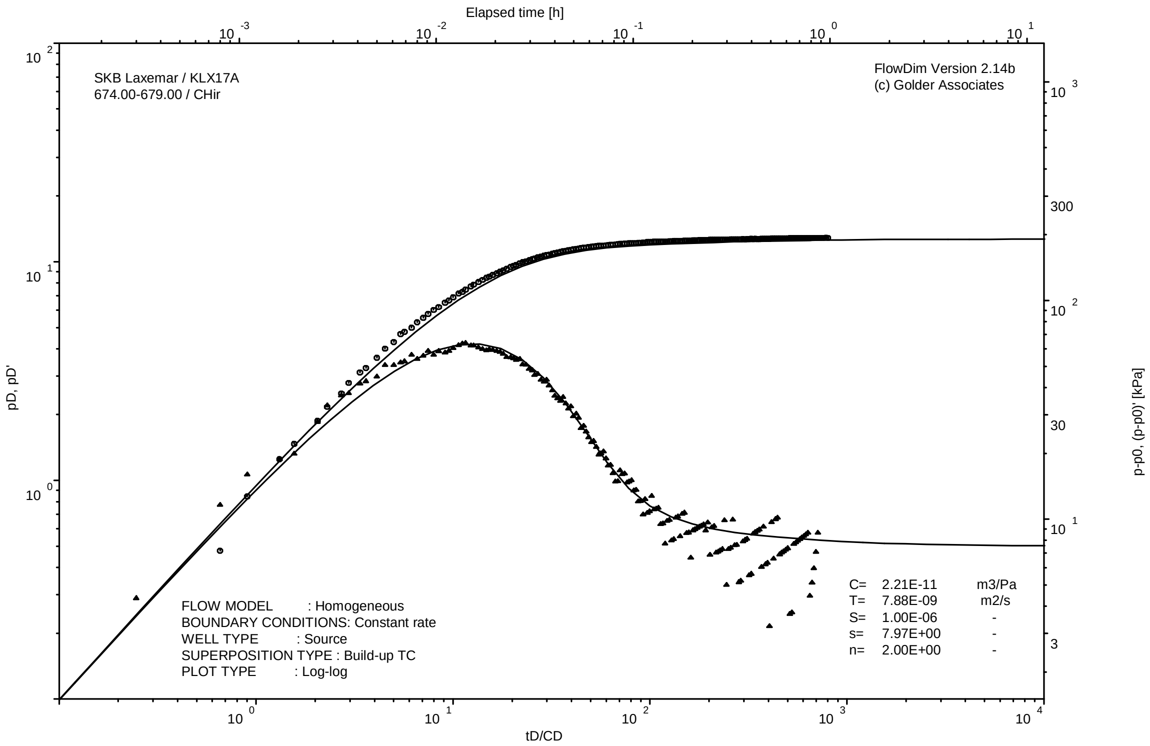
Pressure and flow rate vs. time; cartesian plot



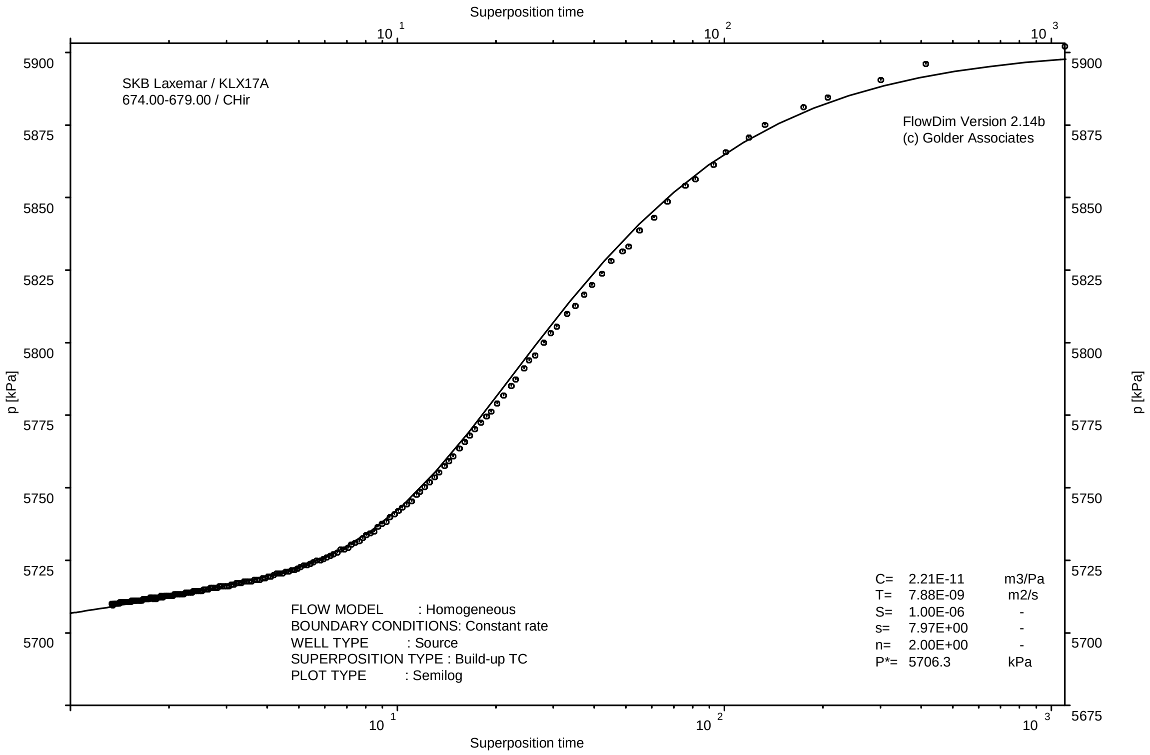
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

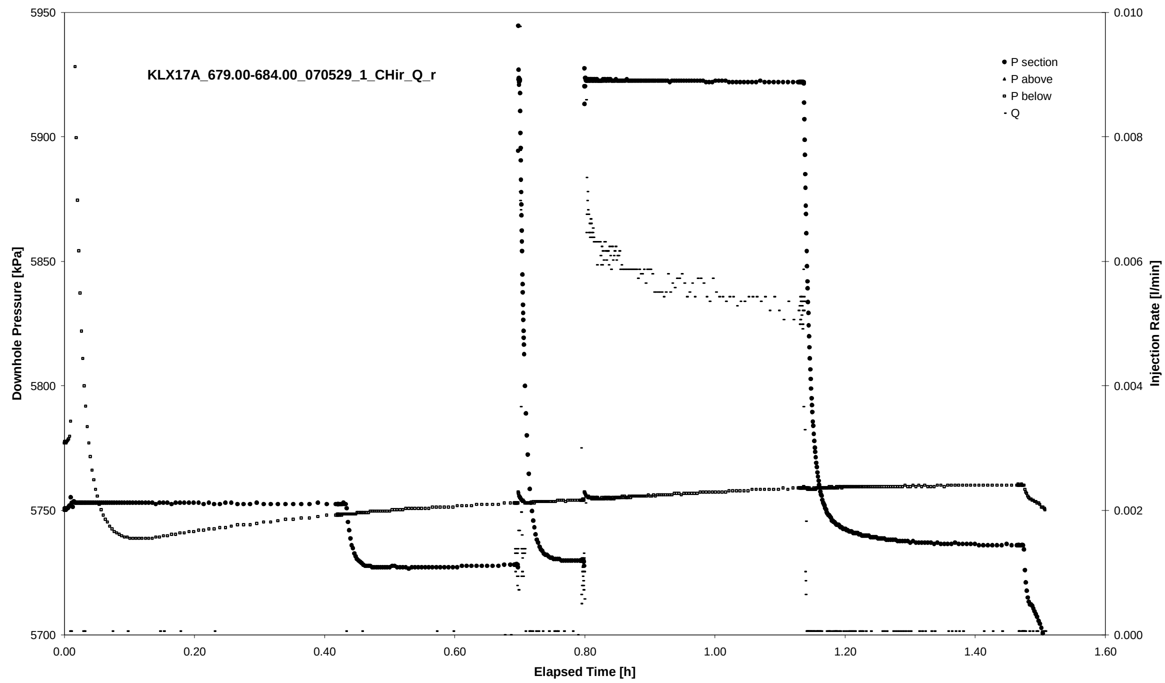


CHIR phase; HORNER match

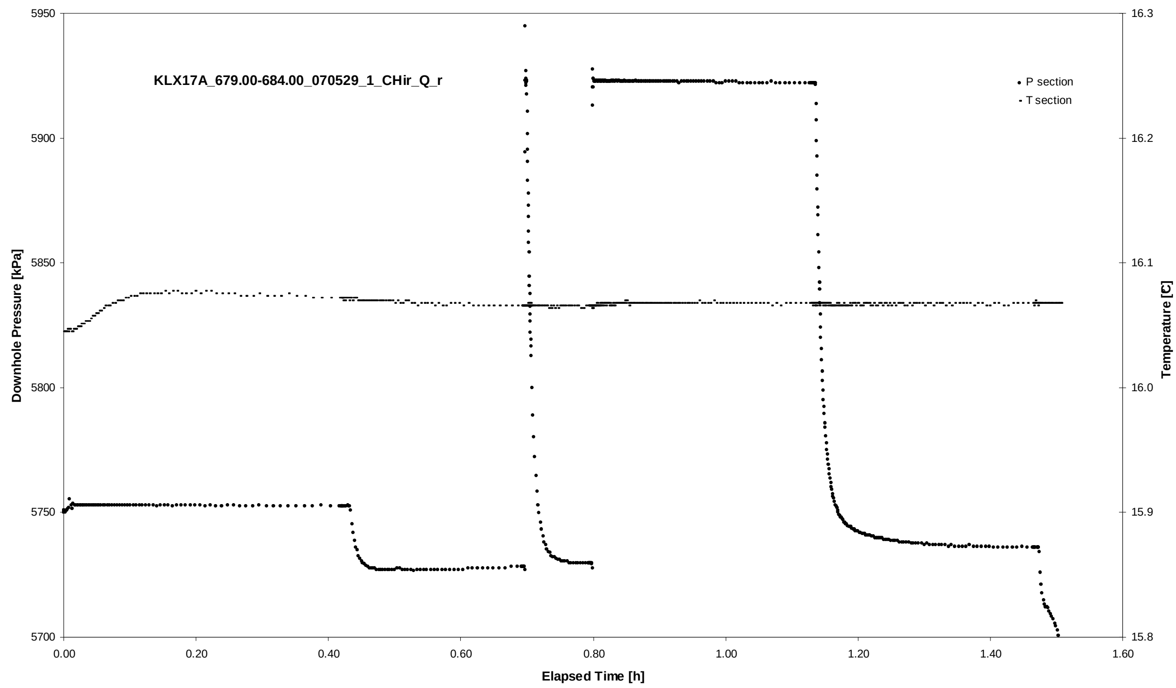
APPENDIX 2-75

Test 679.00 – 684.00 m

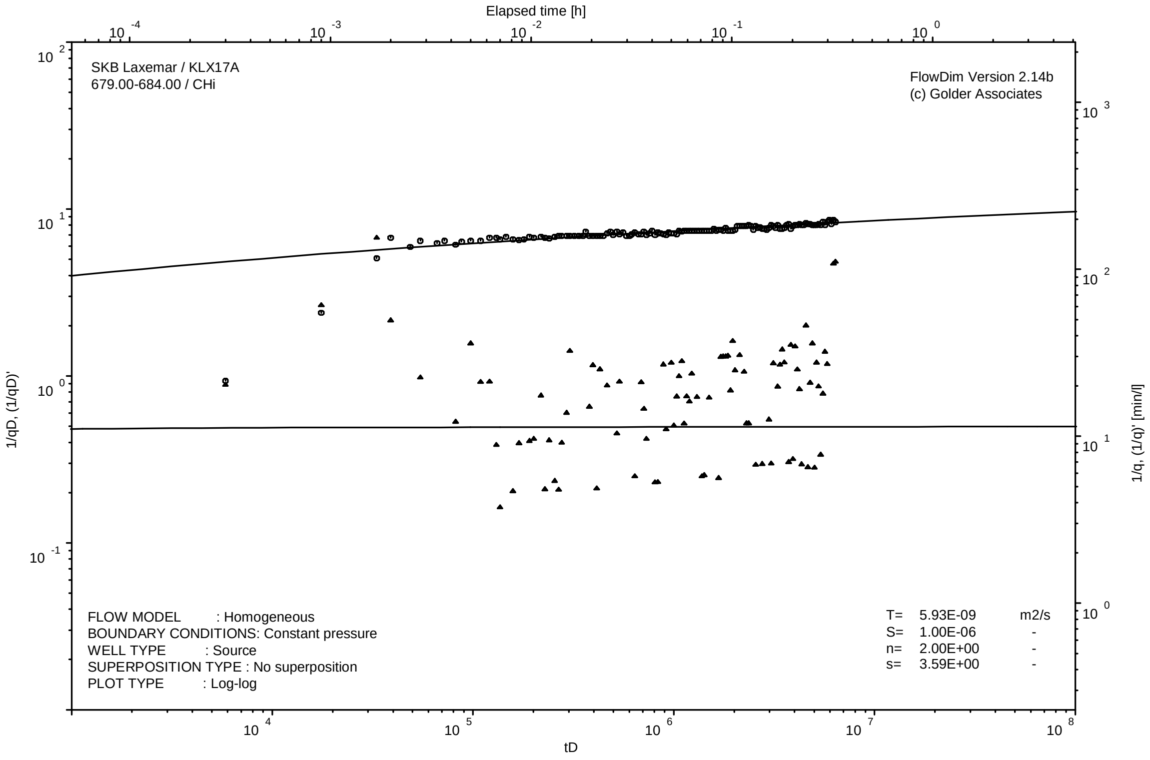
Analysis diagrams



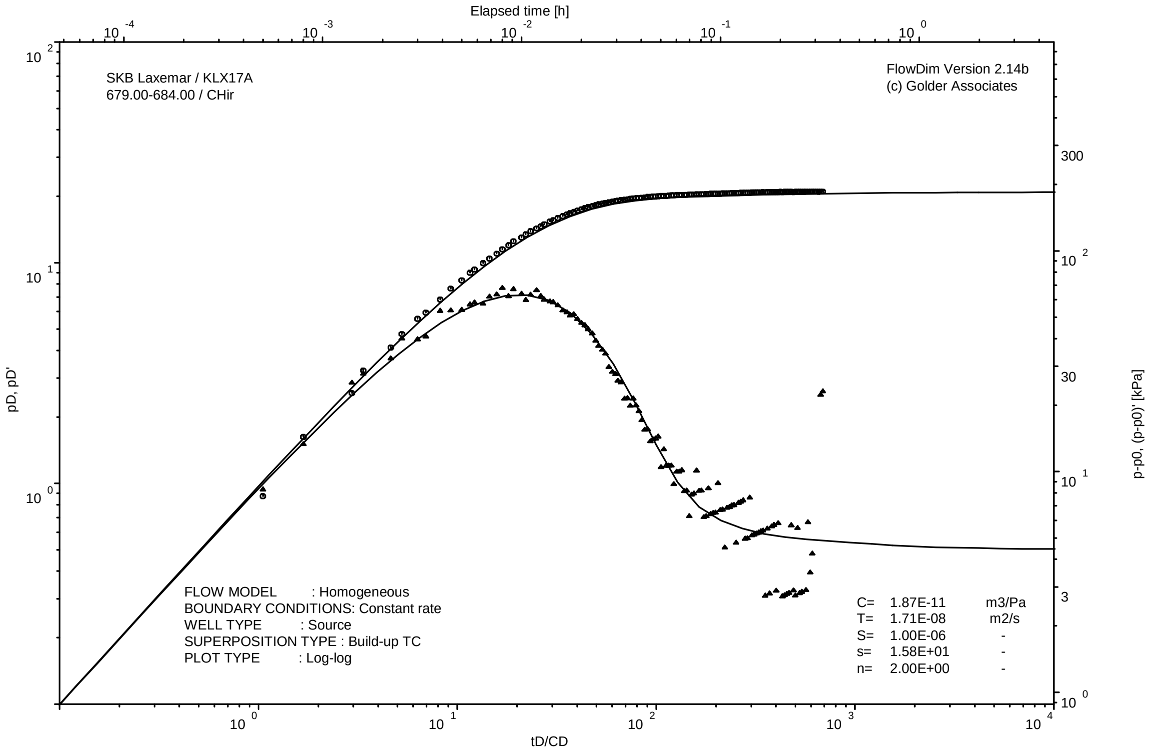
Pressure and flow rate vs. time; cartesian plot



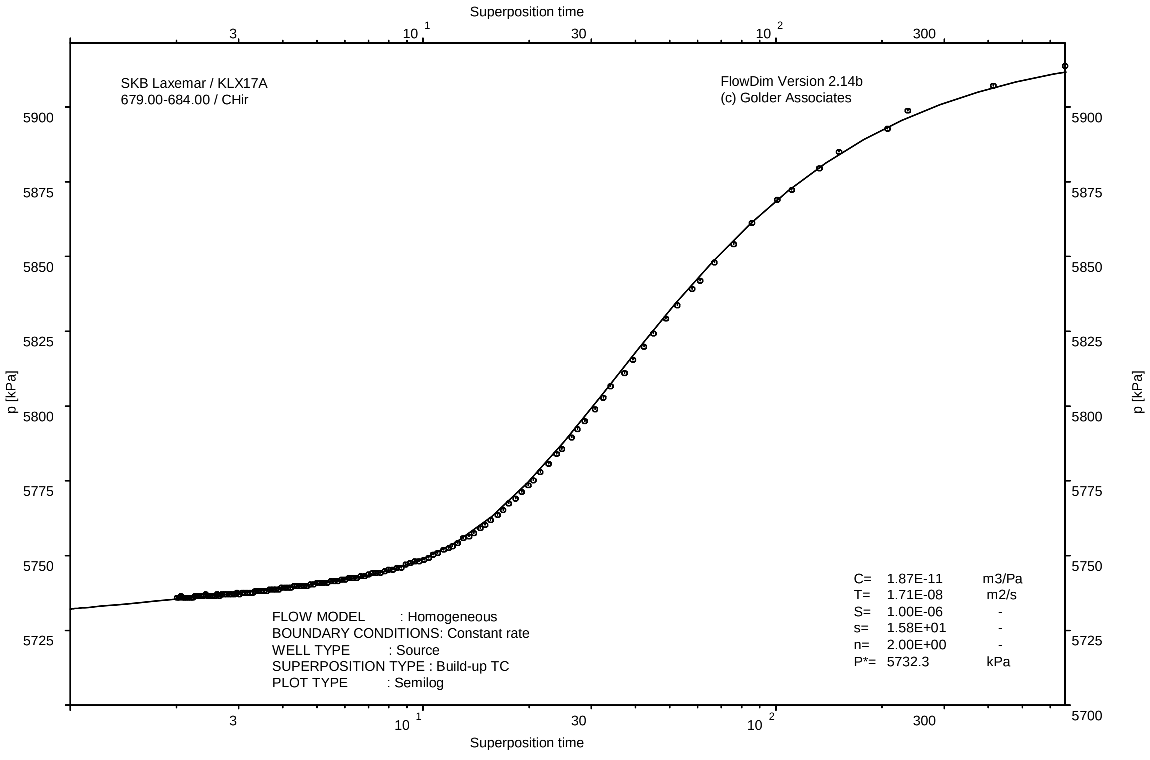
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

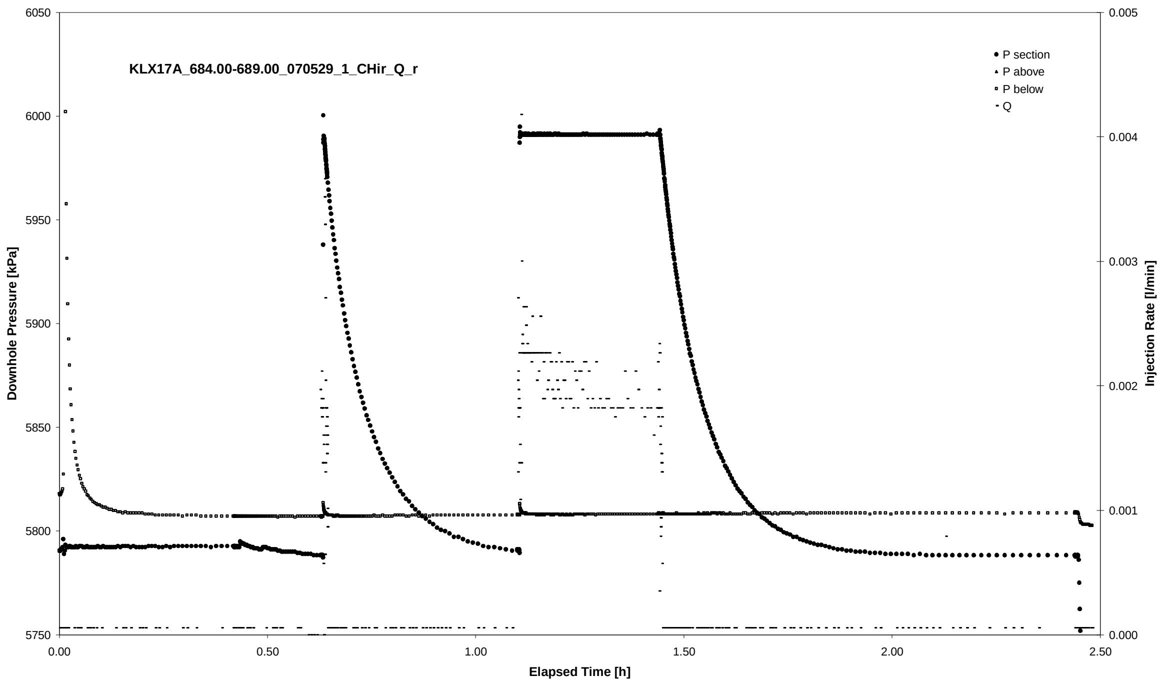


CHIR phase; HORNER match

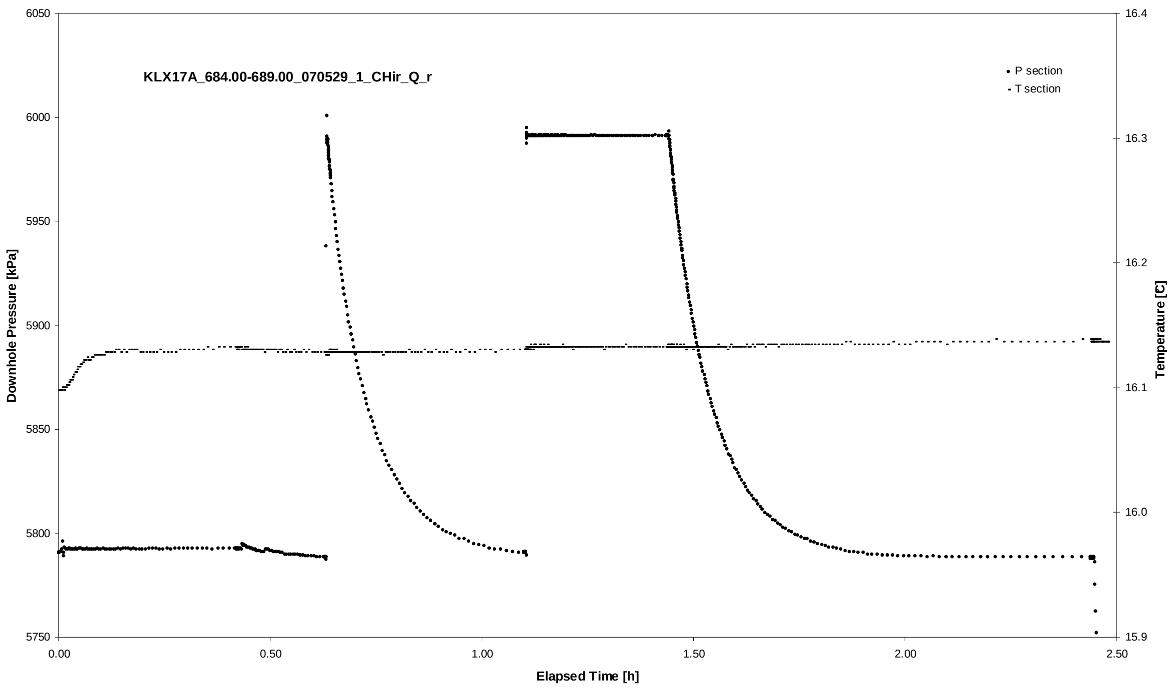
APPENDIX 2-76

Test 684.00 – 689.00 m

Analysis diagrams



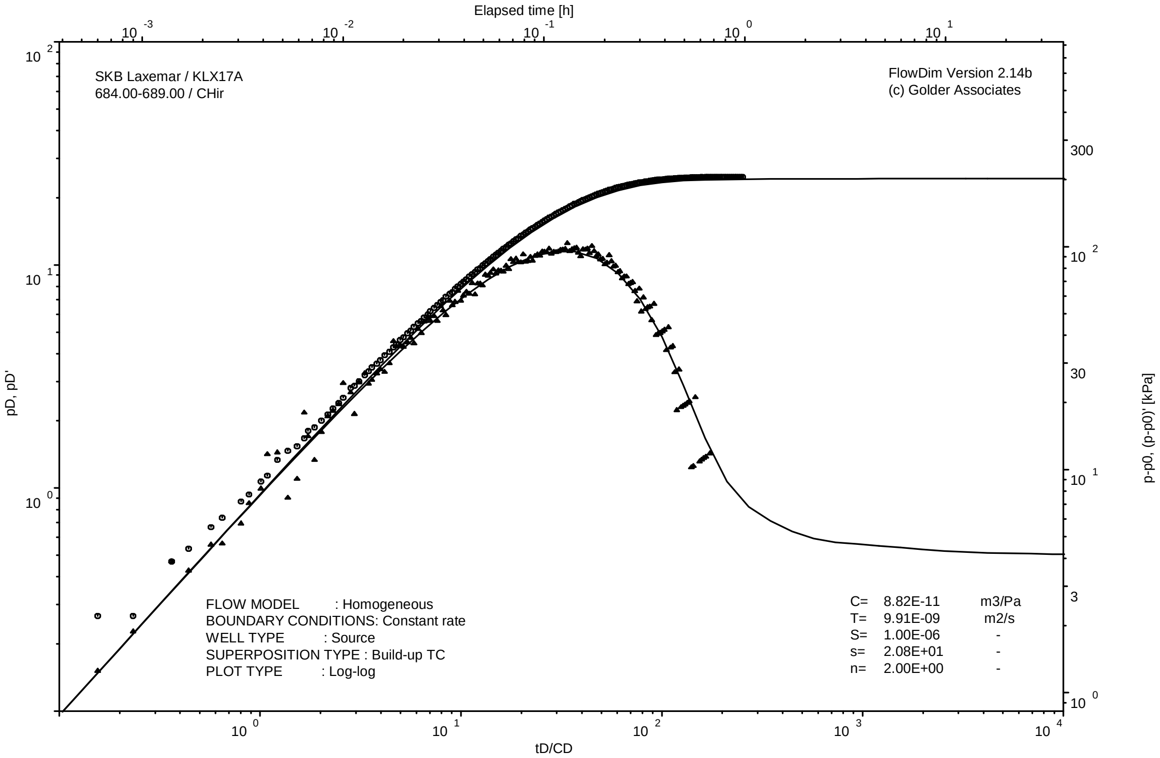
Pressure and flow rate vs. time; cartesian plot



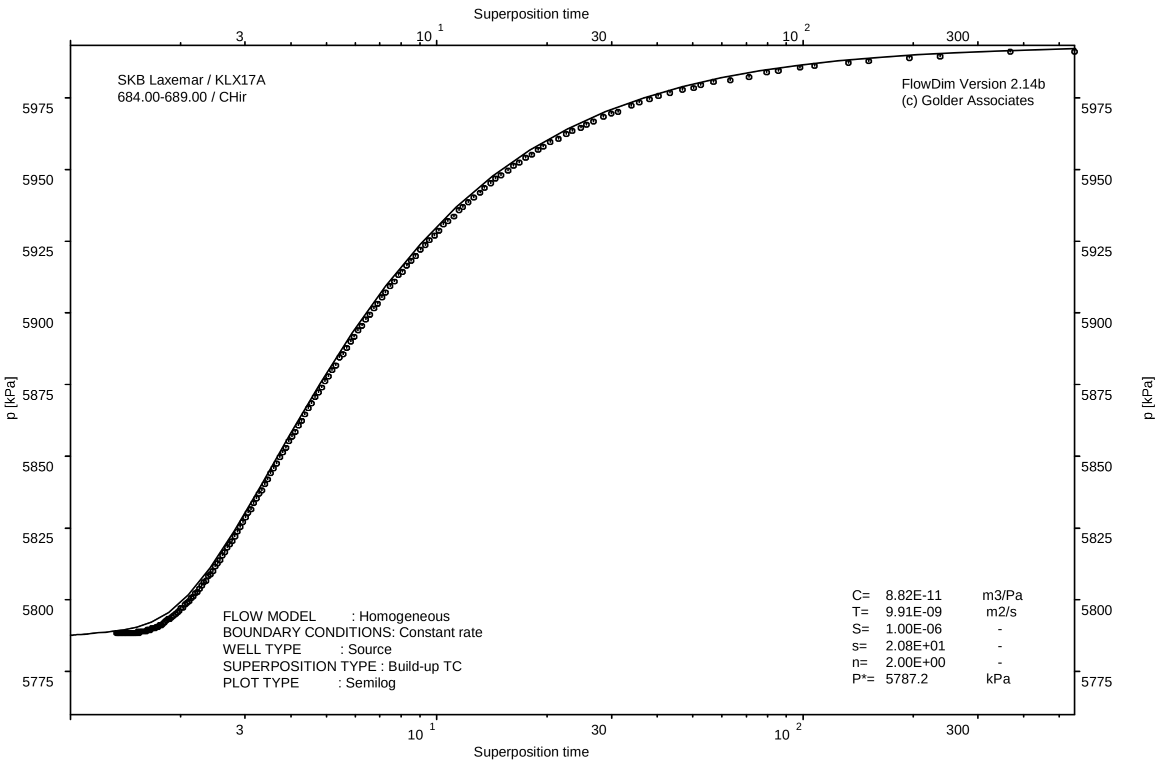
Interval pressure and temperature vs. time; cartesian plot

Not analysed

CHI phase; log-log match



CHIR phase; log-log match

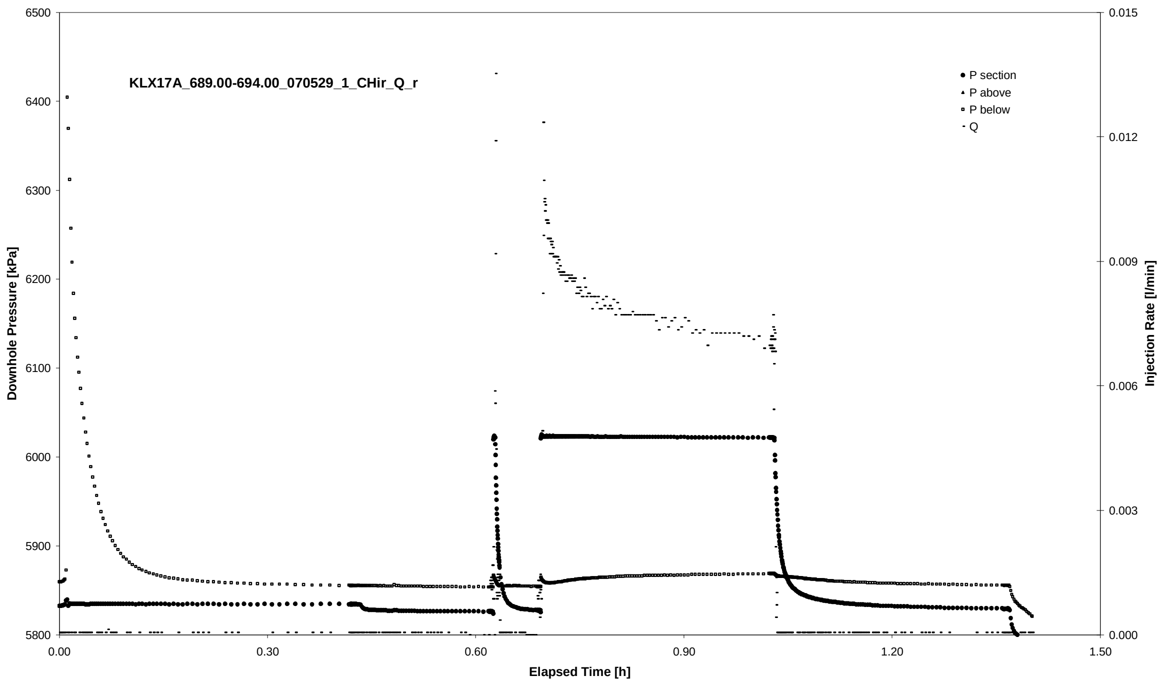


CHIR phase; HORNER match

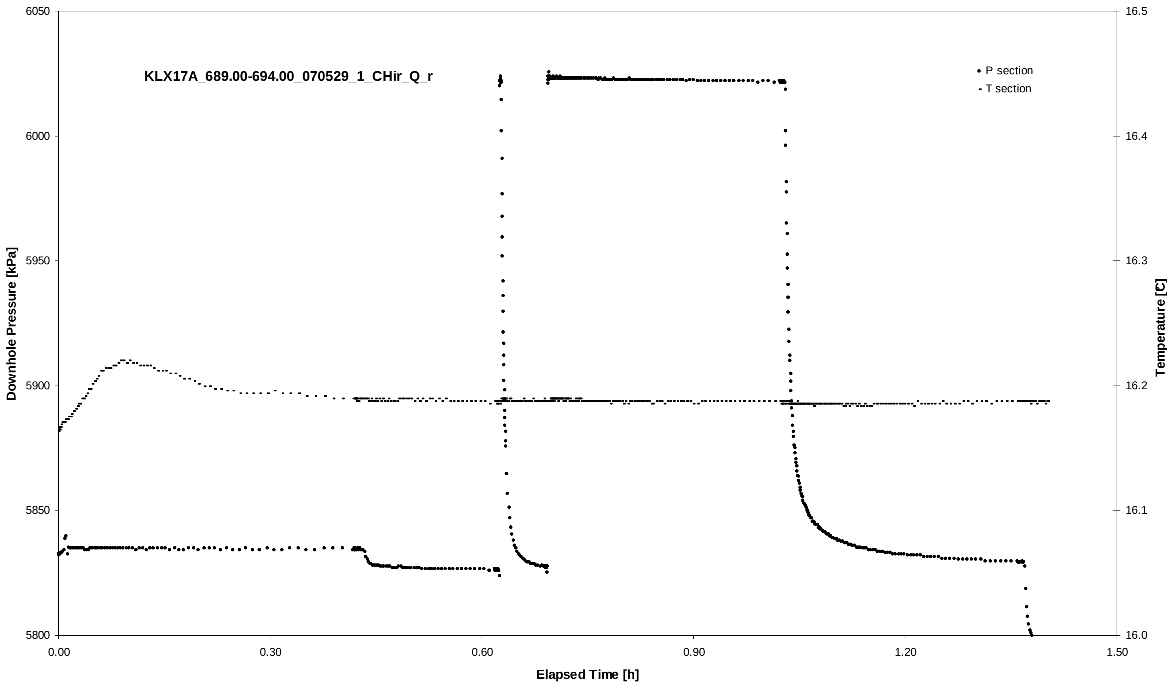
APPENDIX 2-77

Test 689.00 – 694.00 m

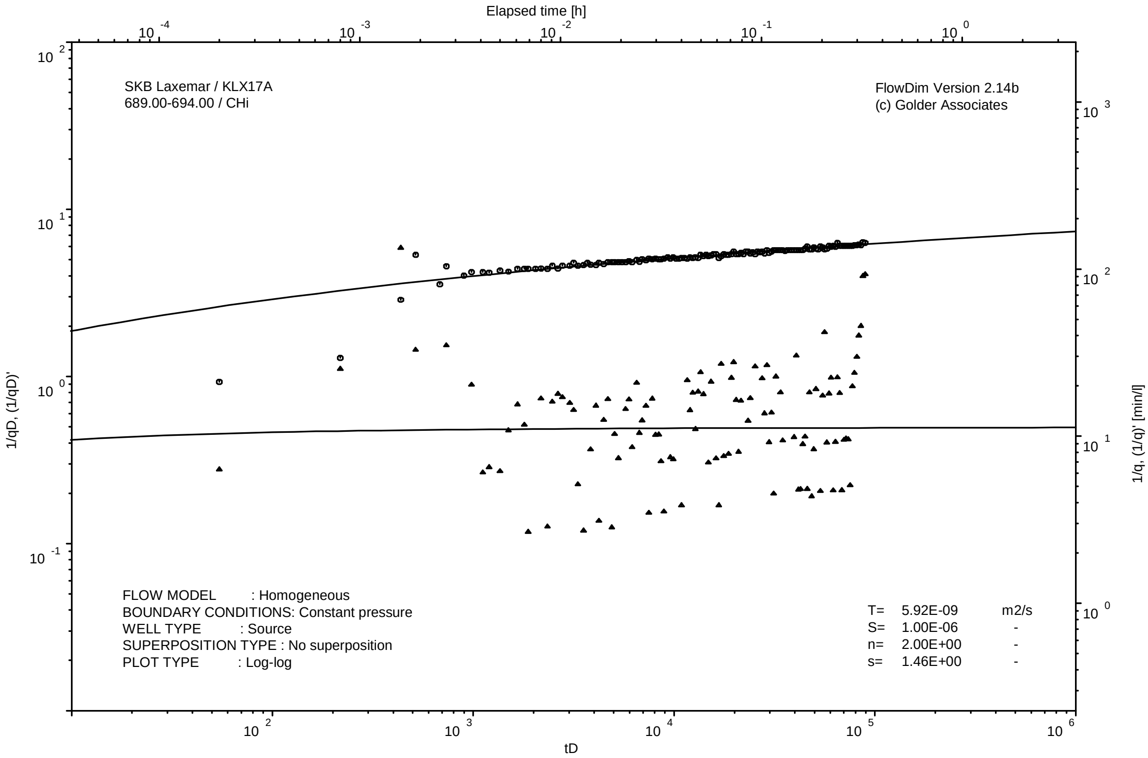
Analysis diagrams



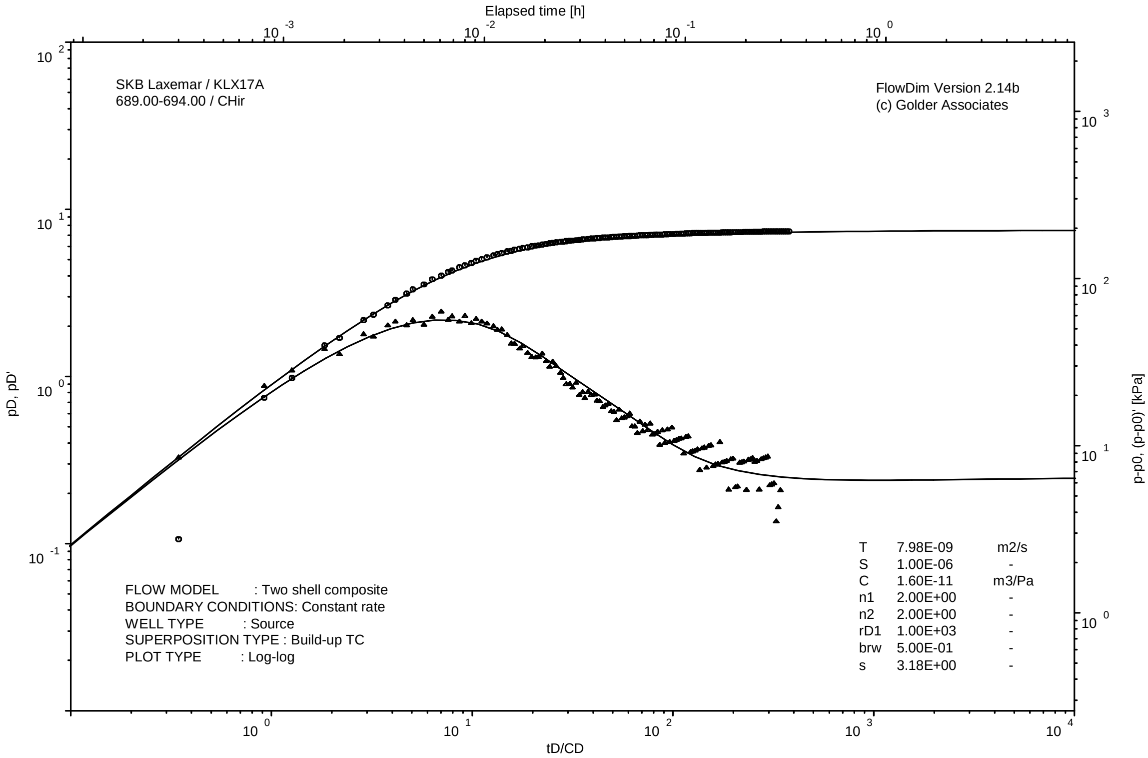
Pressure and flow rate vs. time; cartesian plot



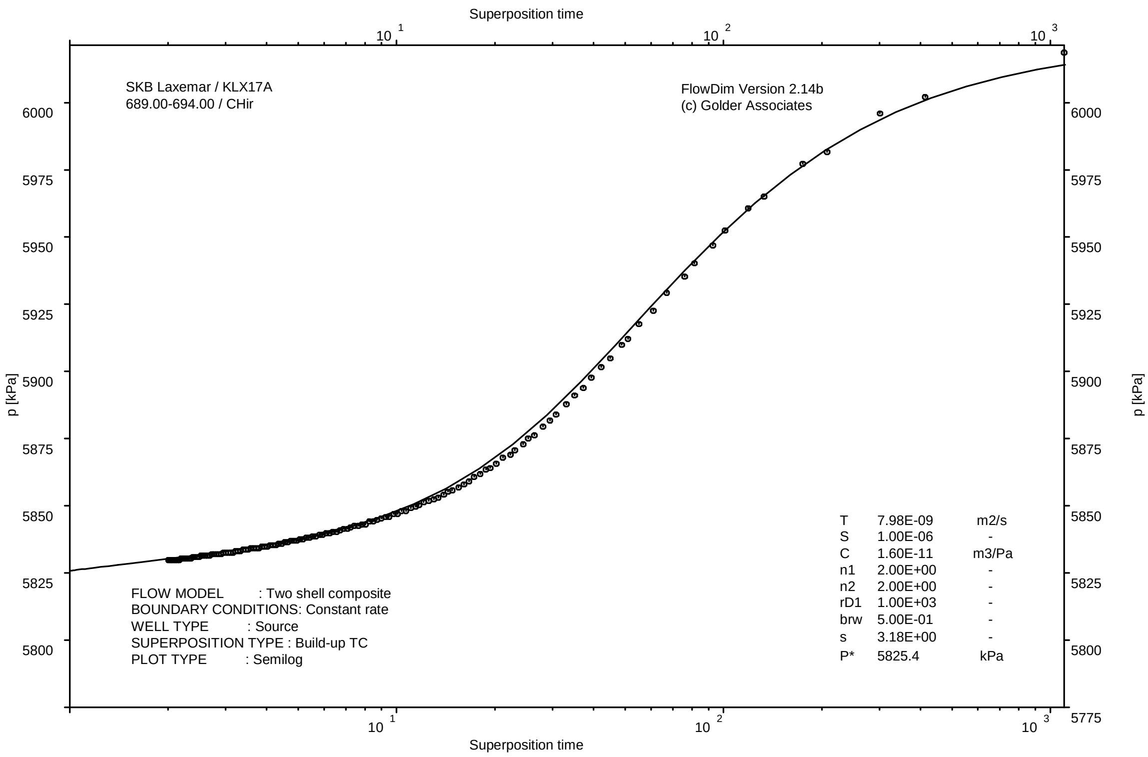
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match

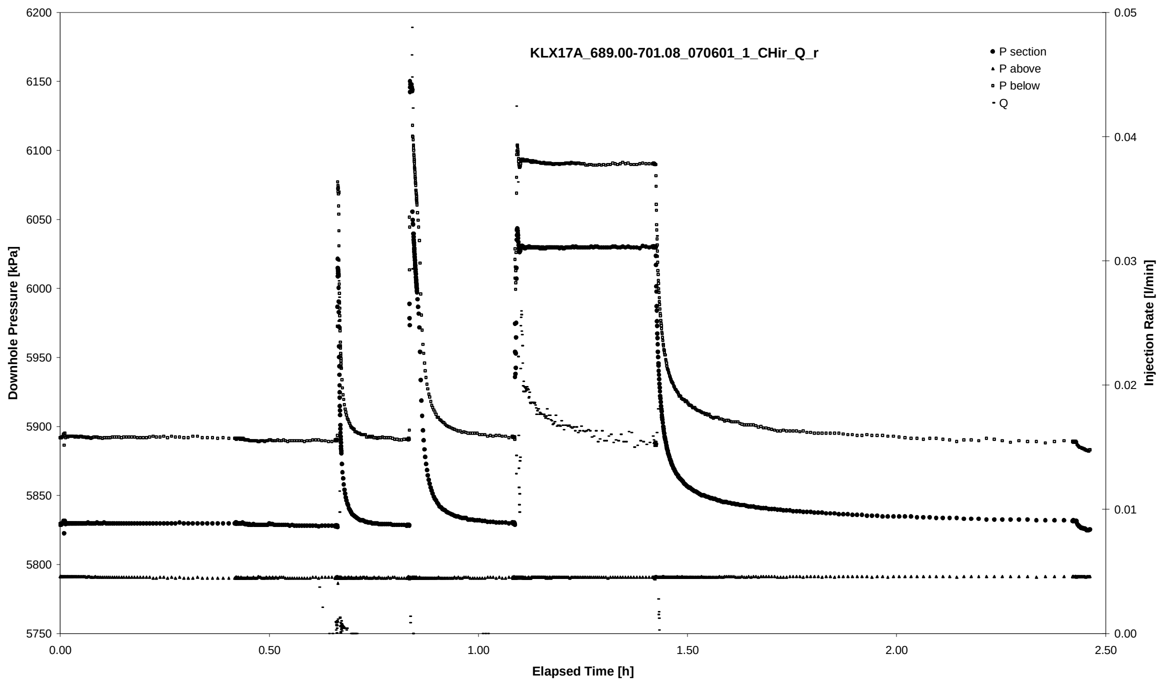


CHIR phase; HORNER match

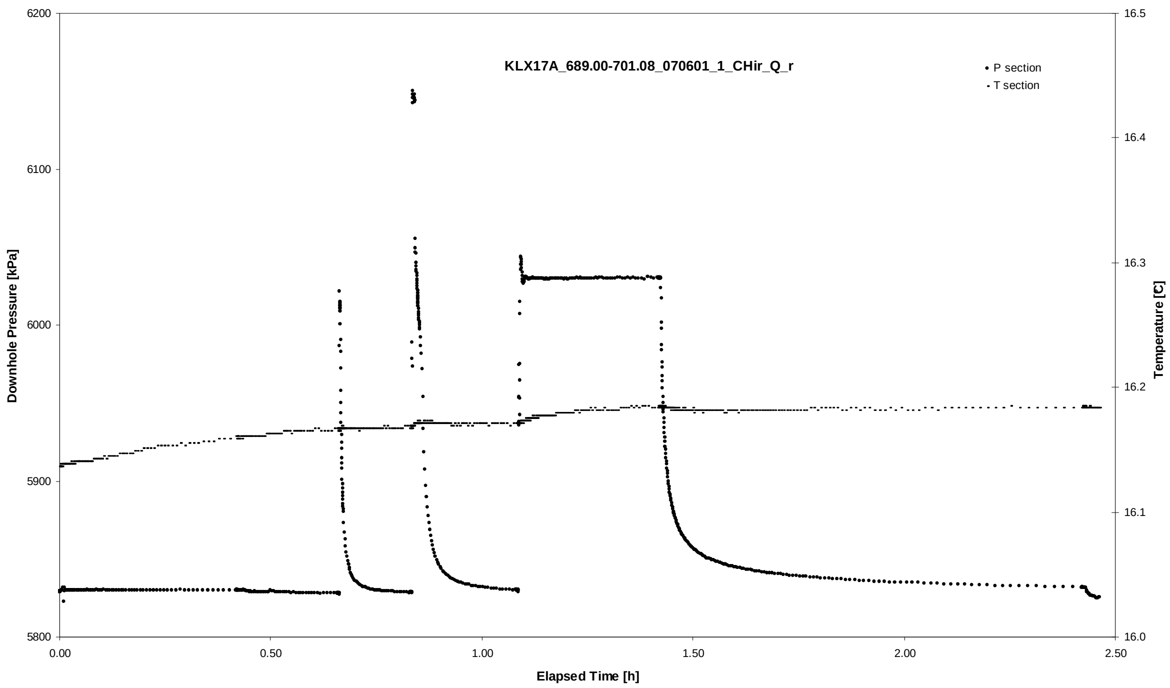
APPENDIX 2-78

Test 689.00 – 701.08 m

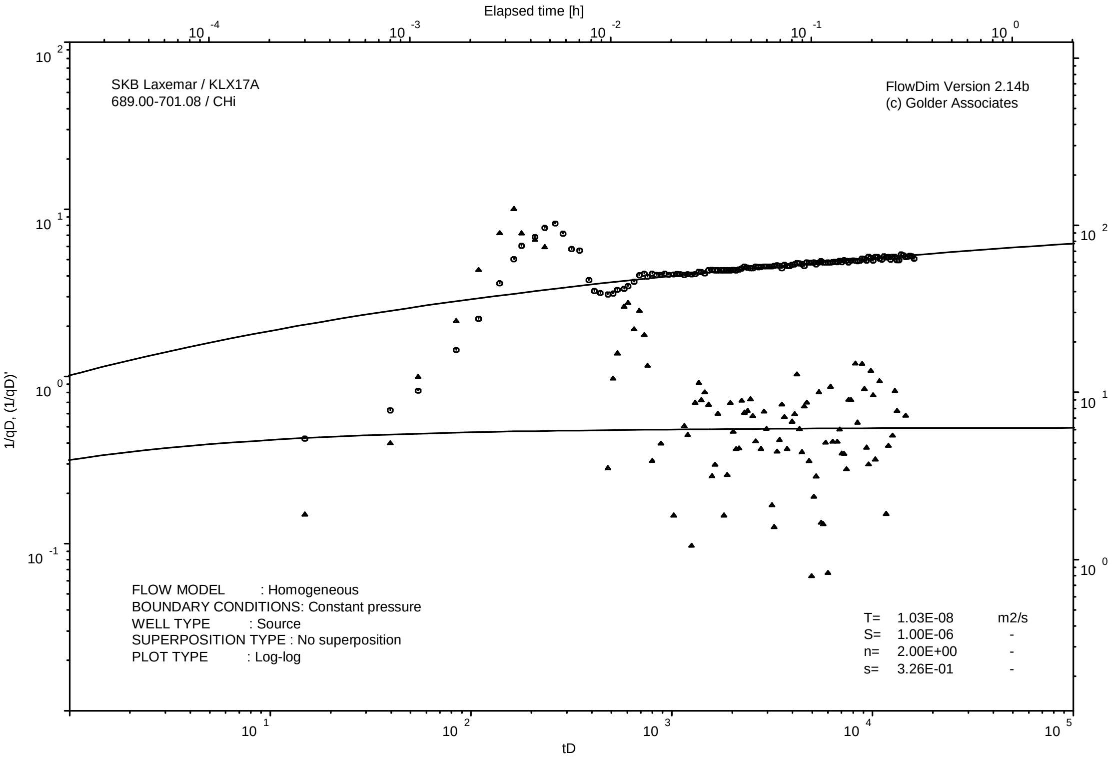
Analysis diagrams



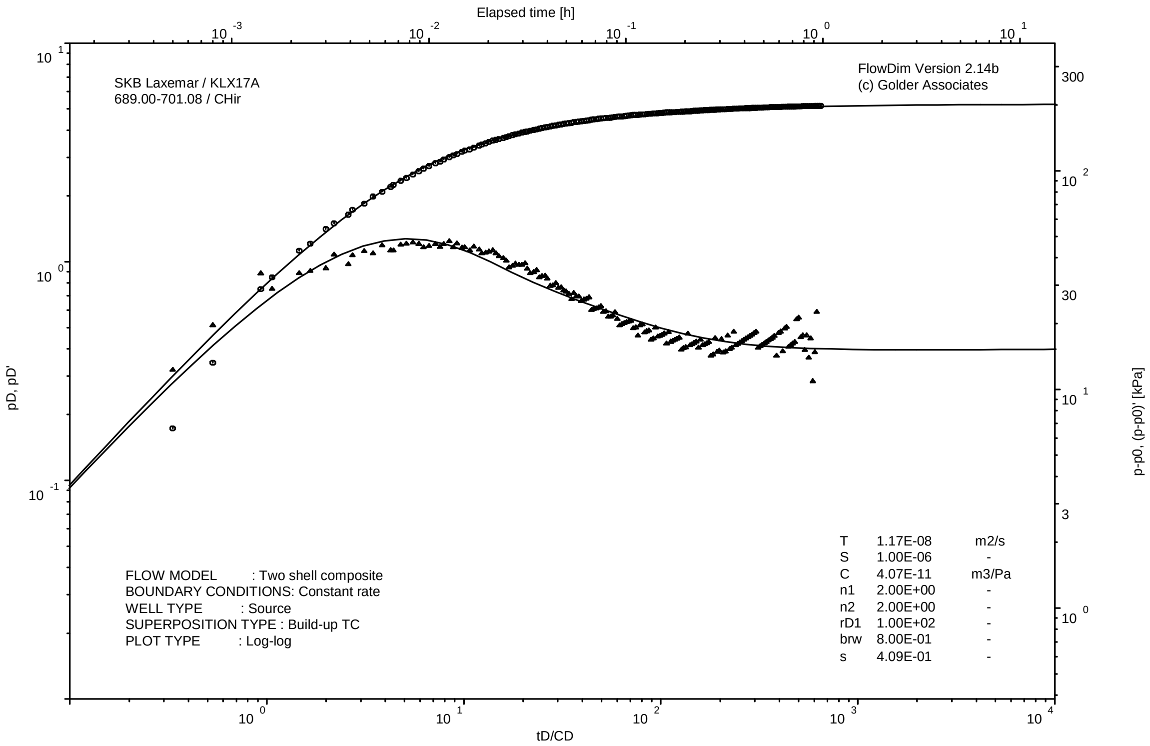
Pressure and flow rate vs. time; cartesian plot



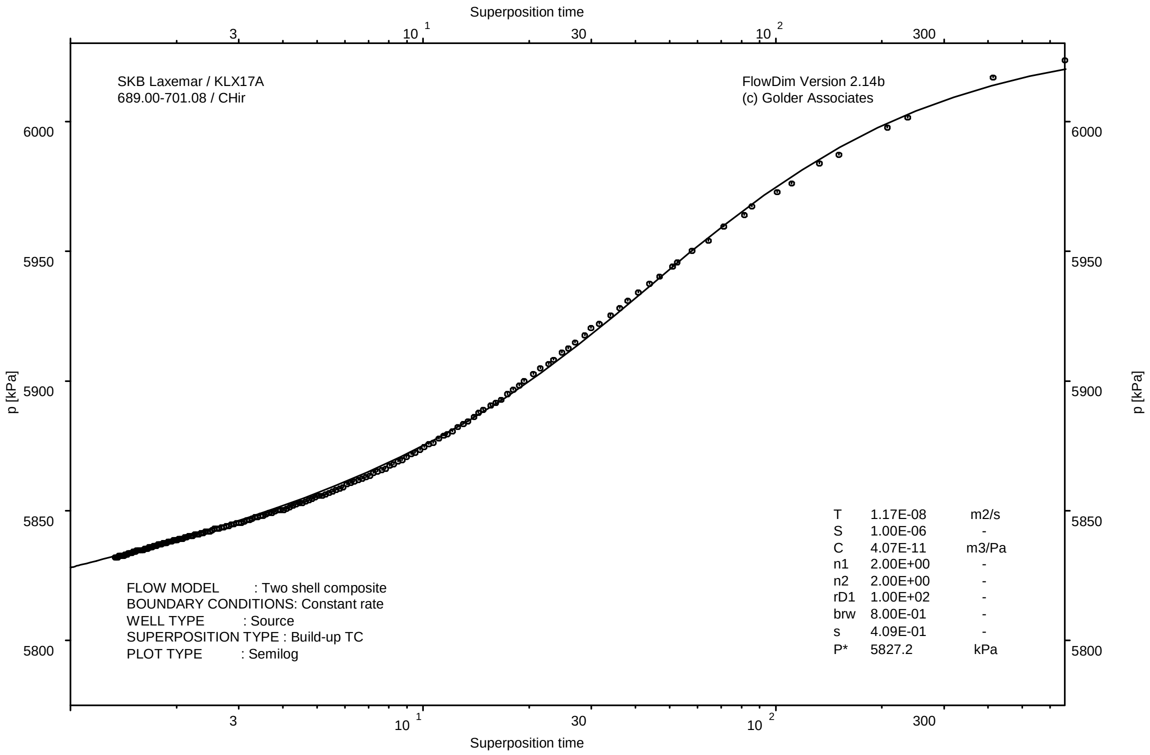
Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

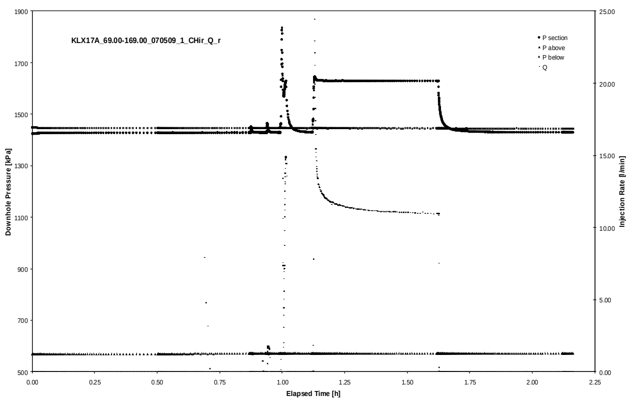
APPENDIX 3

Test Summary Sheets

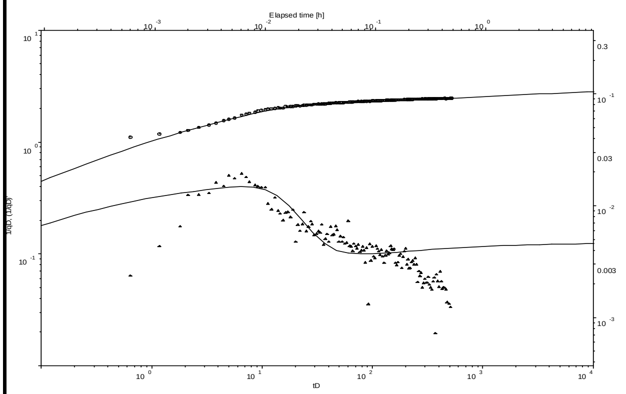
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070509 13:47
Test section from - to (m):	69.00-169.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

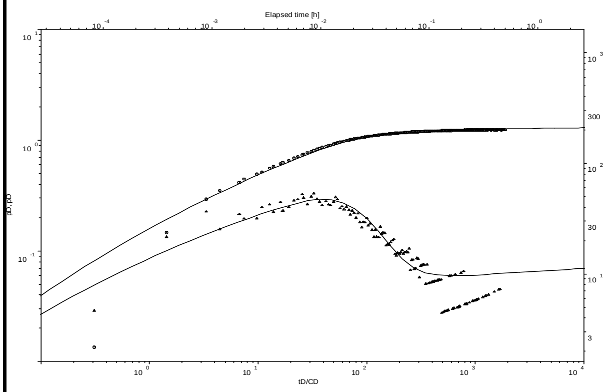
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1423		
p_i (kPa) =	1431		
p_p(kPa) =	1630	p_F (kPa) =	1429
Q_p (m^3/s)=	1.83E-04		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.1		
Derivative fact.=	0.08	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.0E-06		
T_M (m^2/s)=	1.2E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.78	dt_1 (min) =	4.49
dt_2 (min) =	10.92	dt_2 (min) =	12.36
T (m^2/s) =	1.4E-05	T (m^2/s) =	1.2E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.4E-07	K_s (m/s) =	1.2E-07
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-09
C_D (-) =	NA	C_D (-) =	1.2E-01
ξ (-) =	-4.50	ξ (-) =	-5.31
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) =	2.78	C (m^3/Pa) =	1.1E-09
dt_2 (min) =	10.92	C_D (-) =	1.2E-01
T_T (m^2/s) =	1.4E-05	ξ (-) =	-4.50
S (-) =	1.0E-06		
K_s (m/s) =	1.4E-07		
S_s (1/m) =	1.0E-08		

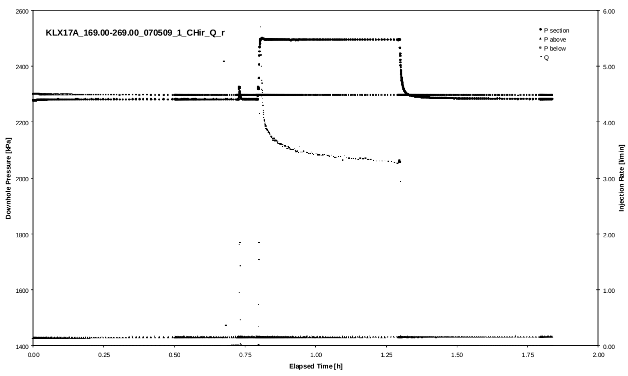
Comments:

The recommended transmissivity of 1.4•10-5 m2/s was derived from the analysis of the CHi phase (outer zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0•10-6 m2/s to 4.0•10-5 m2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,424.8 kPa.

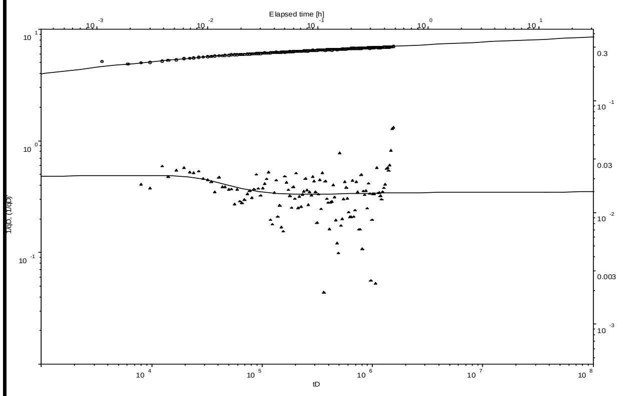
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070509 17:46
Test section from - to (m):	169.00-269.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

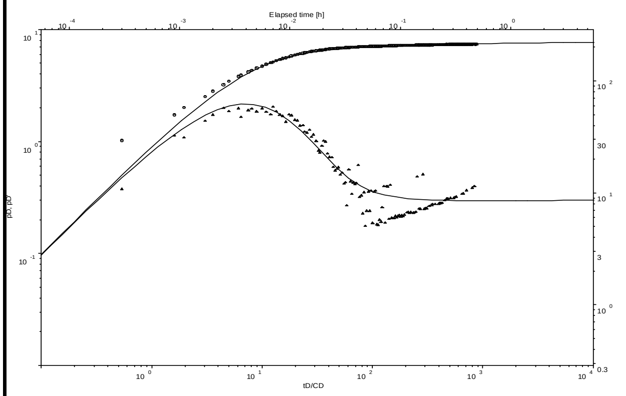
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2278		
p_i (kPa) =	2282		
p_p(kPa) =	2496	p_F (kPa) =	2283
Q_p (m^3/s)=	5.47E-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)=	10.4		
Derivative fact.=	0.06	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	2.5E-06		
T_M (m^2/s)=	3.3E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.38	dt_1 (min) =	2.18
dt_2 (min) =	21.54	dt_2 (min) =	15.12
T (m^2/s) =	4.0E-06	T (m^2/s) =	5.2E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.0E-08	K_s (m/s) =	5.2E-08
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.0E-09
C_D (-) =	NA	C_D (-) =	4.4E-01
ξ (-) =	-0.39	ξ (-) =	0.42
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) =	1.38	C (m^3/Pa) =	4.0E-09
dt_2 (min) =	21.54	C_D (-) =	4.4E-01
T_T (m^2/s) =	4.0E-06	ξ (-) =	-0.39
S (-) =	1.0E-06		
K_s (m/s) =	4.0E-08		
S_s (1/m) =	1.0E-08		

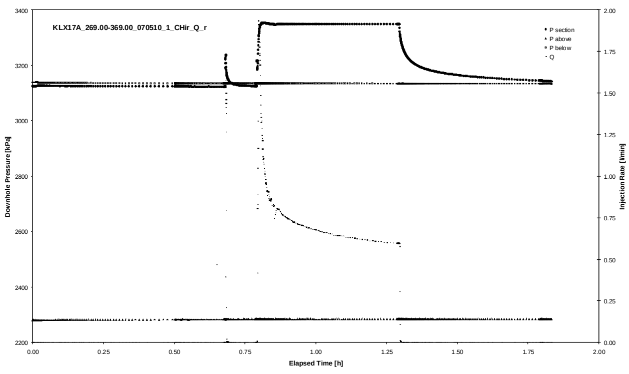
Comments:

The recommended transmissivity of 4.0•10-6 m2/s was derived from the analysis of the CHi phase (outer zone), which shows a very good horizontal derivative stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-6 m2/s to 8.0•10-6 m2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,278.8 kPa.

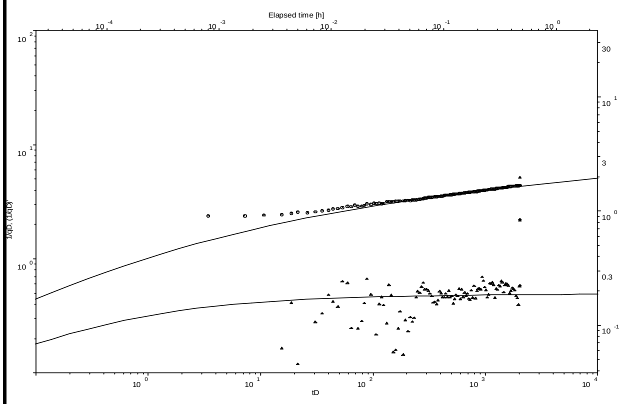
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070510 09:35
Test section from - to (m):	269.00-369.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

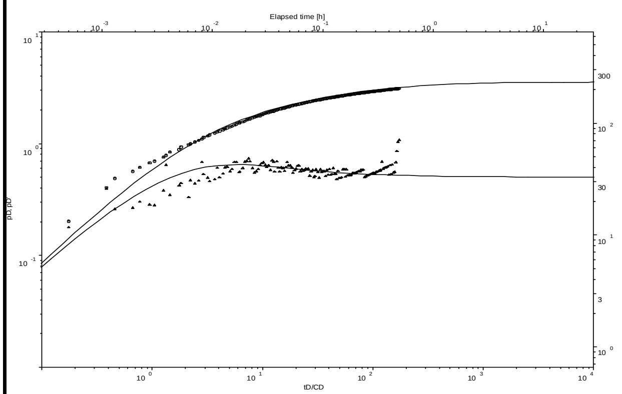
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3124		
p_i (kPa) =	3125		
p_p(kPa) =	3349	p_F (kPa) =	3144
Q_p (m^3/s)=	9.97E-06		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.7		
Derivative fact.=	0.05	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.4E-07		
T_M (m^2/s)=	5.7E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.56	dt_1 (min) =	2.36
dt_2 (min) =	25.68	dt_2 (min) =	26.22
T (m^2/s) =	3.0E-07	T (m^2/s) =	2.7E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.0E-09	K_s (m/s) =	2.7E-09
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.8E-09
C_D (-) =	NA	C_D (-) =	2.0E-01
ξ (-) =	-2.59	ξ (-) =	-3.23
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) =	2.36	C (m^3/Pa) =	1.8E-09
dt_2 (min) =	26.22	C_D (-) =	2.0E-01
T_T (m^2/s) =	2.7E-07	ξ (-) =	-3.23
S (-) =	1.0E-06		
K_s (m/s) =	2.7E-09		
S_s (1/m) =	1.0E-08		

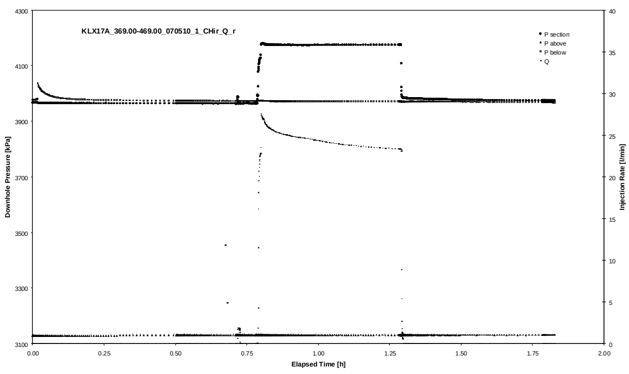
Comments:

The recommended transmissivity of 2.7•10-7 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0•10-7 m2/s to 5.0•10-7 m2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,119.6 kPa.

Test Summary Sheet

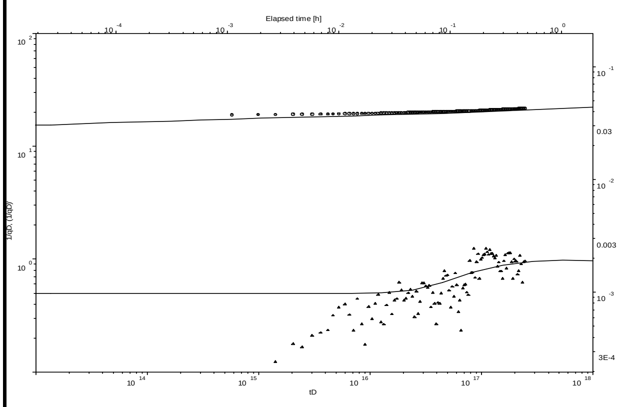
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070510 13:23
Test section from - to (m):	369.00-469.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

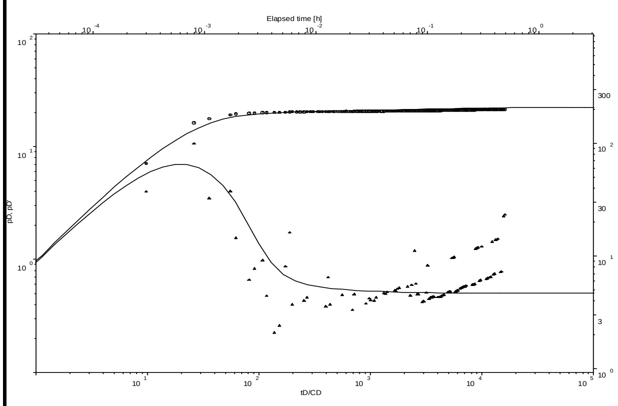


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3977		
p_i (kPa) =	3965		
p_p(kPa) =	4175	p_F (kPa) =	3974
Q_p (m^3/s)=	3.89E-04		
tp (s) =	1800	t_F (s) =	1800
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.3		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.8E-05		
T_M (m^2/s)=	2.4E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.68	dt_1 (min) =	0.50
dt_2 (min) =	2.41	dt_2 (min) =	11.16
T (m^2/s) =	6.3E-05	T (m^2/s) =	6.8E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.3E-07	K_s (m/s) =	6.8E-07
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.8E-09
C_D (-) =	NA	C_D (-) =	5.3E-01
ξ (-) =	10.90	ξ (-) =	12.90
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) =	0.50	C (m^3/Pa) =	4.8E-09
dt_2 (min) =	11.16	C_D (-) =	5.3E-01
T_T (m^2/s) =	6.8E-05	ξ (-) =	12.90
S (-) =	1.0E-06		
K_s (m/s) =	6.8E-07		
S_s (1/m) =	1.0E-08		

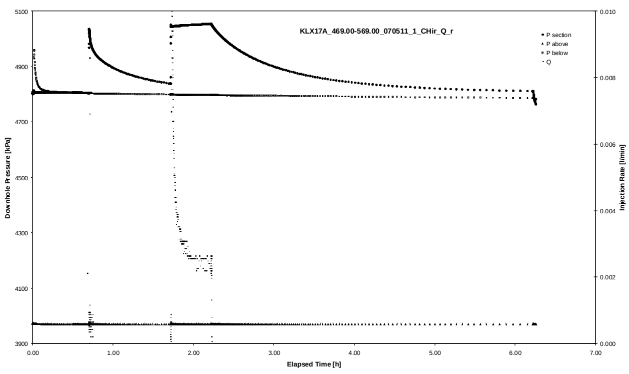
Comments:

The recommended transmissivity of 6.8•10-5 m2/s was derived from the analysis of the CHir phase. The confidence range for the interval transmissivity is estimated to be 2.0•10-5 m2/s to 1.0•10-4 m2/s. The flow dimension displayed during the test was 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,970.6 kPa.

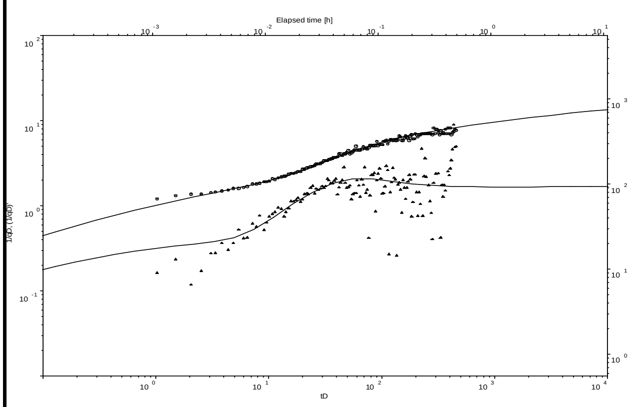
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070510 16:42
Test section from - to (m):	469.00-569.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

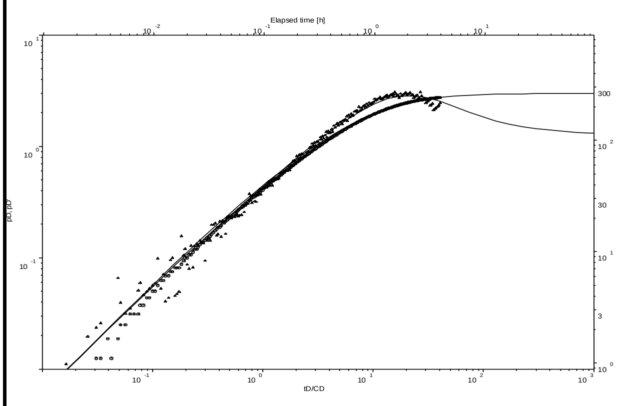
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	4808		
p_i (kPa) =	4838		
p_p(kPa) =	5053	p_F (kPa) =	4811
Q_p (m^3/s)=	3.83E-08		
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)=	14.6		
Derivative fact.=	0.1	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.7E-09		
T_M (m^2/s)=	2.3E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	7.86	dt_1 (min) =	#NV
dt_2 (min) =	23.10	dt_2 (min) =	#NV
T (m^2/s) =	6.2E-10	T (m^2/s) =	3.8E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.2E-12	K_s (m/s) =	3.8E-12
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.1E-10
C_D (-) =	NA	C_D (-) =	2.3E-02
ξ (-) =	-0.88	ξ (-) =	-0.41
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) =	7.86	C (m^3/Pa) =	2.1E-10
dt_2 (min) =	23.10	C_D (-) =	2.3E-02
T_T (m^2/s) =	6.2E-10	ξ (-) =	-0.88
S (-) =	1.0E-06		
K_s (m/s) =	6.2E-12		
S_s (1/m) =	1.0E-08		

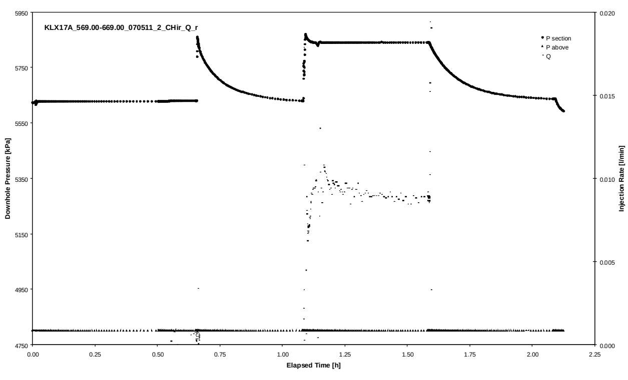
Comments:

The recommended transmissivity of 6.2•10-10 m2/s was derived from the analysis of the CHi phase (outer zone). The confidence range for the interval transmissivity is estimated to be 2.0•10-10 m2/s to 4.0•10-9 m2/s. The flow dimension displayed during the test was 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 4,789.1 kPa.

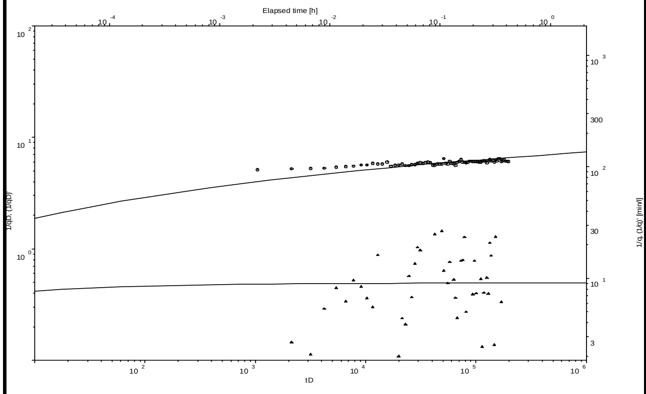
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX17A	Test start:	070511 14:16
Test section from - to (m):	569.00-669.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

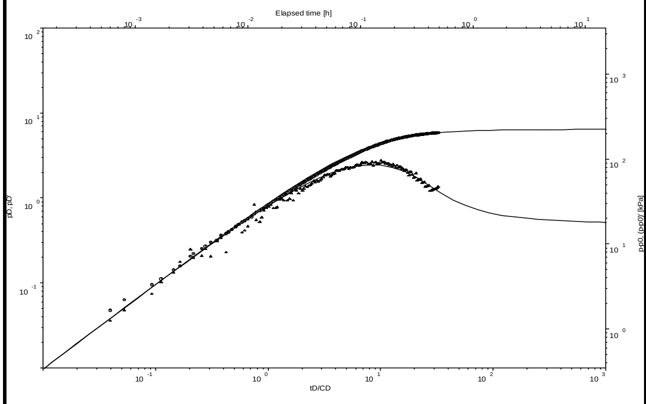
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5623		
p_i (kPa) =	5628		
p_p(kPa) =	5840	p_F (kPa) =	5636
Q_p (m^3/s)=	1.47E-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)=	15.6		
Derivative fact.=	0.12	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	6.8E-09		
T_M (m^2/s)=	8.8E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.68	dt_1 (min) =	#NV
dt_2 (min) =	21.54	dt_2 (min) =	#NV
T (m^2/s) =	6.7E-09	T (m^2/s) =	7.5E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.7E-11	K_s (m/s) =	7.5E-12
S_s (1/m) =	1.0E-08	S_s (1/m) =	1.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.6E-11
C_D (-) =	NA	C_D (-) =	2.9E-03
ξ (-) =	1.67	ξ (-) =	2.93
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) =	0.68	C (m^3/Pa) =	2.6E-11
dt_2 (min) =	21.54	C_D (-) =	2.9E-03
T_T (m^2/s) =	6.7E-09	ξ (-) =	1.67
S (-) =	1.0E-06		
K_s (m/s) =	6.7E-11		
S_s (1/m) =	1.0E-08		

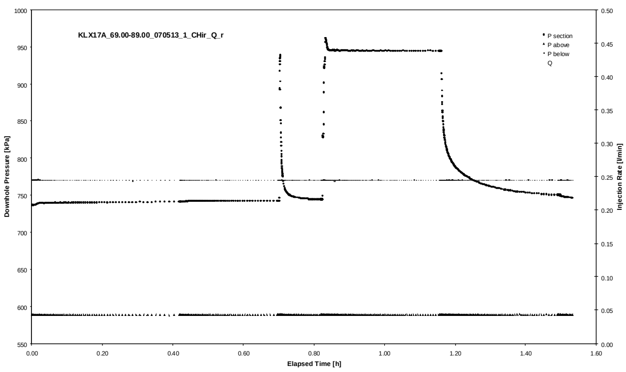
Comments:

The recommended transmissivity of 6.7•10-9 m2/s was derived from the analysis of the CHi phase which shows a horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be 5.0•10-10 m2/s to 1.0•10-8 m2/s. The flow dimension displayed during the test was 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 5,617.6 kPa.

Test Summary Sheet

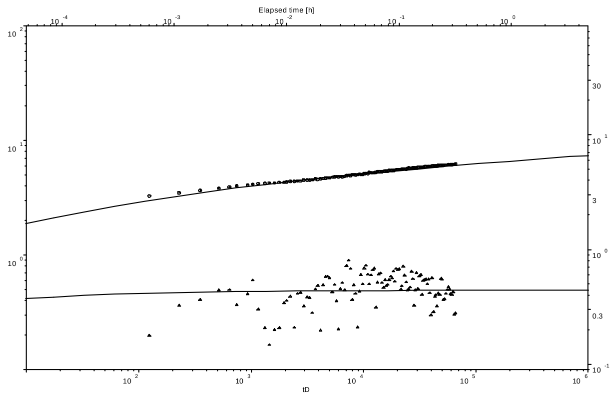
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070513 11:15
Test section from - to (m):	69.00-89.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

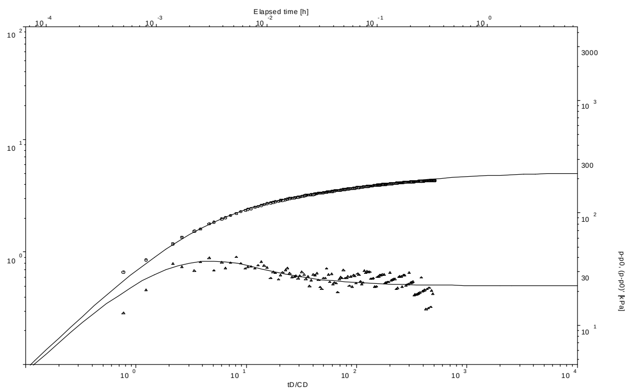


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	736		
p_i (kPa) =	744		
p_p(kPa) =	944	p_F (kPa) =	750
Q_p (m^3/s)=	3.00E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-03	S el S^* (-)=	1.00E-03
EC_w (mS/m)=			
$Temp_w$(gr C)=	8.0		
Derivative fact.=	0.04	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.5E-07		
T_M (m^2/s)=	1.5E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.15	dt_1 (min) =	1.42
dt_2 (min) =	18.18	dt_2 (min) =	12.72
T (m^2/s) =	1.5E-07	T (m^2/s) =	1.2E-07
S (-) =	1.0E-03	S (-) =	1.0E-03
K_s (m/s) =	7.5E-09	K_s (m/s) =	6.0E-09
S_s (1/m) =	5.0E-05	S_s (1/m) =	5.0E-05
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.8E-10
C_D (-) =	NA	C_D (-) =	2.0E-05
(-) =	4.32	(-) =	1.98
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) =	1.42	C (m^3/Pa) =	1.8E-10
dt_2 (min) =	12.72	C_D (-) =	2.0E-05
T_T (m^2/s) =	1.2E-07	(-) =	1.98
S (-) =	1.0E-03		
K_s (m/s) =	6.0E-09		
S_s (1/m) =	5.0E-05		

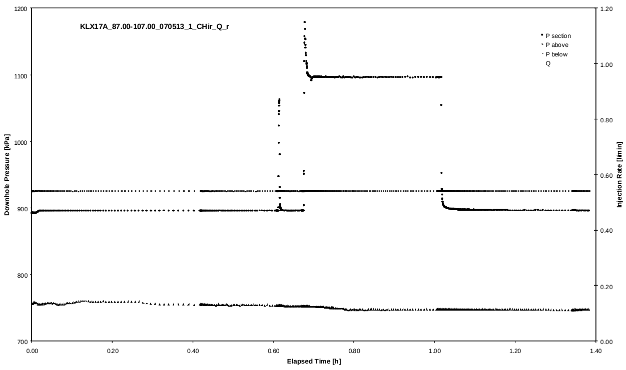
Comments:

The recommended transmissivity of 1.2•10-7 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 8.0•10-8 m2/s to 3.0•10-7 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 734.3 kPa.

Test Summary Sheet

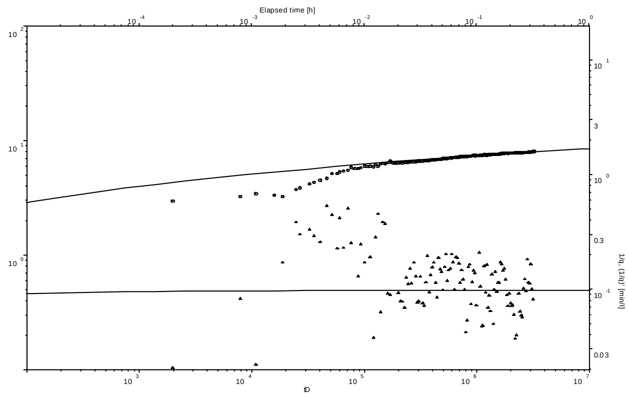
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070513 14:08
Test section from - to (m):	87.00-107.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

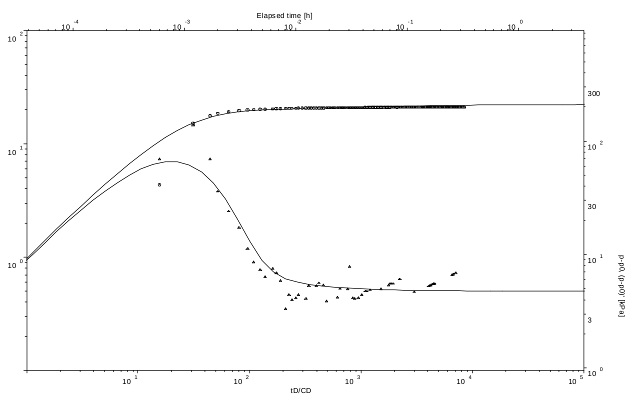


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	892		
p_i (kPa) =	896		
p_p(kPa) =	1096	p_F (kPa) =	896
Q_p (m^3/s)=	1.05E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-03	S el S^* (-)=	1.00E-03
EC_w (mS/m)=			
$Temp_w$(gr C)=	8.3		
Derivative fact.=	0.03	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	5.2E-07		
T_M (m^2/s)=	5.4E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.98	dt_1 (min) =	0.44
dt_2 (min) =	19.08	dt_2 (min) =	10.14
T (m^2/s) =	6.6E-07	T (m^2/s) =	1.9E-06
S (-) =	1.0E-03	S (-) =	1.0E-03
K_s (m/s) =	3.3E-08	K_s (m/s) =	9.5E-08
S_s (1/m) =	5.0E-05	S_s (1/m) =	5.0E-05
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.7E-10
C_D (-) =	NA	C_D (-) =	1.9E-05
□ (-) =	4.35	□ (-) =	18.10
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.			
dt_1 (min) =	0.98	C (m^3/Pa) =	1.7E-10
dt_2 (min) =	19.08	C_D (-) =	1.9E-05
T_T (m^2/s) =	6.6E-07	□ (-) =	4.35
S (-) =	1.0E-03		
K_s (m/s) =	3.3E-08		
S_s (1/m) =	5.0E-05		

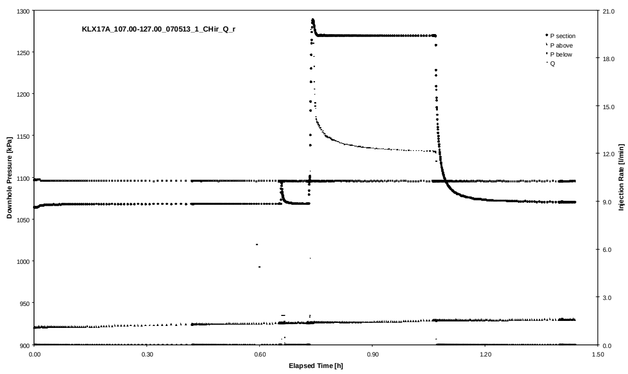
Comments:

The recommended transmissivity of 6.6•10-7 m2/s was derived from the analysis of the CHi phase, which shows a noisy but clear horizontal stabilisation with less skin. The confidence range for the interval transmissivity is estimated to be 3.0•10-7 m2/s to 3.0•10-6 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 895.3 kPa.

Test Summary Sheet

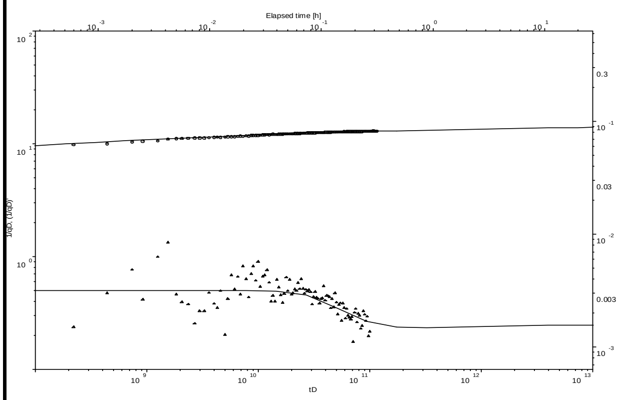
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070513 16:09
Test section from - to (m):	107.00-127.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

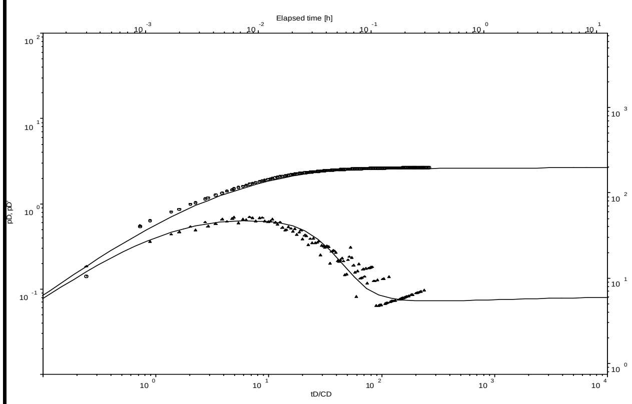


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1064		
p_i (kPa) =	1068		
p_p(kPa) =	1269	p_F (kPa) =	1070
Q_p (m^3/s)=	2.02E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	8.5		
Derivative fact.=	0.07	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.9E-06		
T_M (m^2/s)=	1.0E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.07	dt_1 (min) =	0.32
dt_2 (min) =	3.02	dt_2 (min) =	0.88
T (m^2/s) =	2.0E-05	T (m^2/s) =	4.4E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.0E-06	K_s (m/s) =	2.2E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-08
C_D (-) =	NA	C_D (-) =	1.4E+00
ξ (-) =	4.44	ξ (-) =	-4.31
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) =	0.07	C (m^3/Pa) =	1.3E-08
dt_2 (min) =	3.02	C_D (-) =	1.4E+00
T_T (m^2/s) =	2.0E-05	ξ (-) =	4.44
S (-) =	1.0E-06		
K_s (m/s) =	1.0E-06		
S_s (1/m) =	5.0E-08		

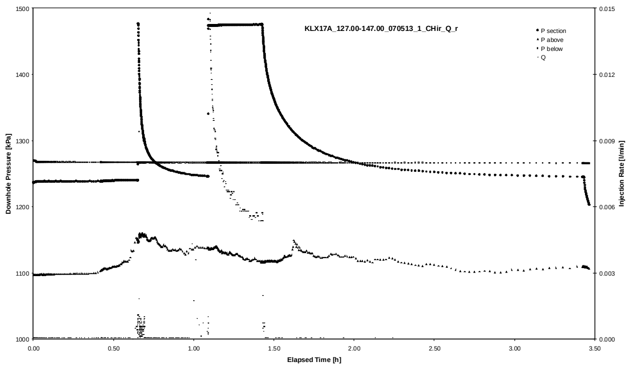
Comments:

The recommended transmissivity of 2.0•10-5 m2/s was derived from the analysis of the CHi phase (inner zone), which shows a noisy but clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 2.0•10-6 m2/s to 4.0•10-5 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 1,065.6 kPa.

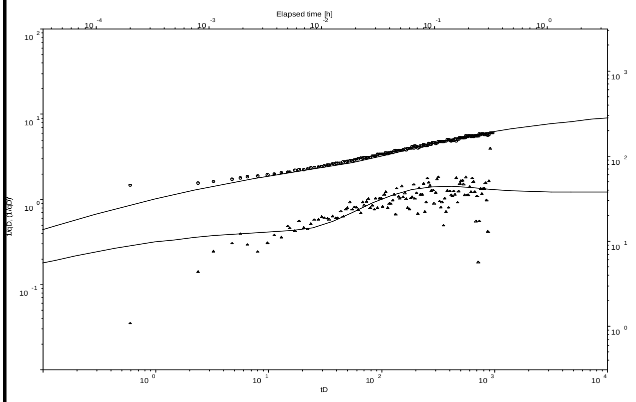
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070513 18:16
Test section from - to (m):	127.00-147.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, 2·r_w (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

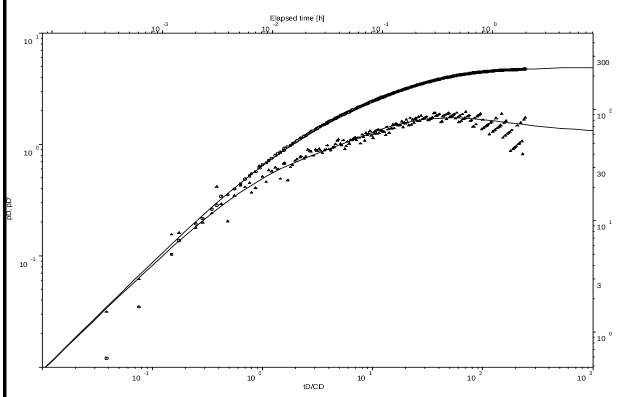
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1237		
p_i (kPa) =	1245		
p_p(kPa) =	1475	p_F (kPa) =	1244
Q_p (m^3/s)=	9.50E-08		
tp (s) =	1200	t_F (s) =	7200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	8.7		
Derivative fact.=	0.08	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.1E-09		
T_M (m^2/s)=	4.2E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	3.21	dt_1 (min) =	32.52
dt_2 (min) =	16.02	dt_2 (min) =	93.00
T (m^2/s) =	1.5E-09	T (m^2/s) =	1.5E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.5E-11	K_s (m/s) =	7.5E-11
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 (-) =	-0.57	ξ (-) =	-1.01
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) =	32.52	C (m^3/Pa) =	7.0E-11
dt_2 (min) =	93.00	C_D (-) =	7.7E-03
T_T (m^2/s) =	1.5E-09	ξ (-) =	-1.01
S (-) =	1.0E-06		
K_s (m/s) =	7.5E-11		
S_s (1/m) =	5.0E-08		

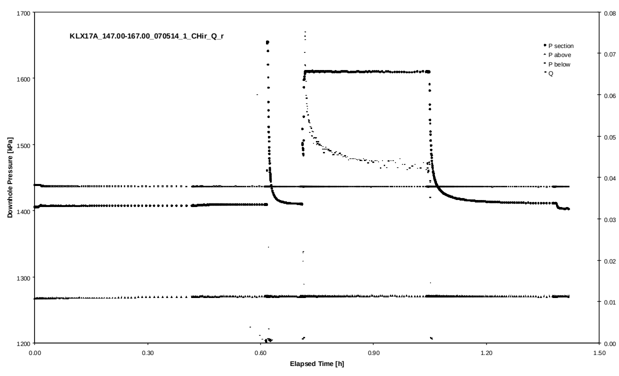
Comments:

The recommended transmissivity of 1.5•10-9 m2/s was derived from the analysis of the CHir phase (outer zone), which shows a good data quality and clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-9 m2/s to 6.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 1,235.4 kPa.

Test Summary Sheet

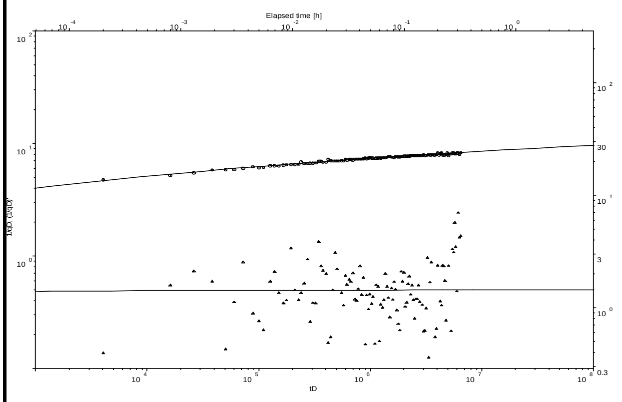
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070514 08:51
Test section from - to (m):	147.00-167.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

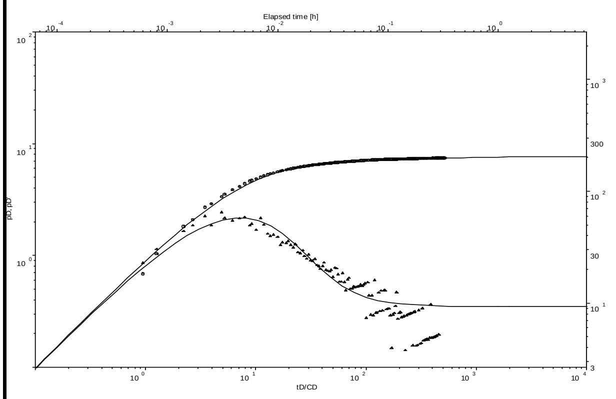


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1406		
p_i (kPa) =	1409		
p_p(kPa) =	1610	p_F (kPa) =	1411
Q_p (m^3/s)=	7.17E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.0		
Derivative fact.=	0.08	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	3.5E-08		
T_M (m^2/s)=	3.7E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.05	dt_1 (min) =	#NV
dt_2 (min) =	17.94	dt_2 (min) =	#NV
T (m^2/s) =	4.5E-08	T (m^2/s) =	4.4E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.3E-09	K_s (m/s) =	2.2E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.4E-11
C_D (-) =	NA	C_D (-) =	7.1E-03
ξ (-) =	2.60	ξ (-) =	2.49
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) =	0.05	C (m^3/Pa) =	6.4E-11
dt_2 (min) =	17.94	C_D (-) =	7.1E-03
T_T (m^2/s) =	4.5E-08	ξ (-) =	2.60
S (-) =	1.0E-06		
K_s (m/s) =	2.3E-09		
S_s (1/m) =	5.0E-08		

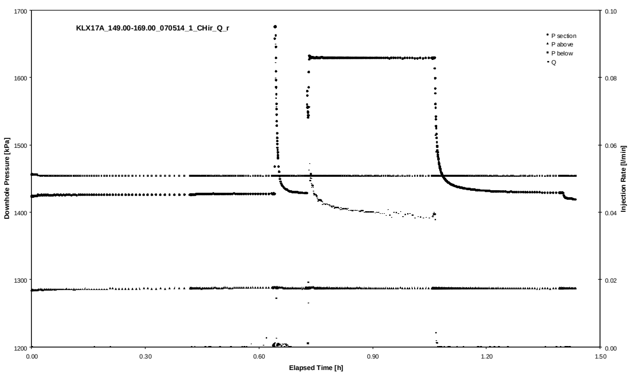
Comments:

The recommended transmissivity of 4.5•10-8 m2/s was derived from the analysis of the CHi phase, which shows a noisy but clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 2.0•10-8 m2/s to 1.0•10-7 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,407.3 kPa.

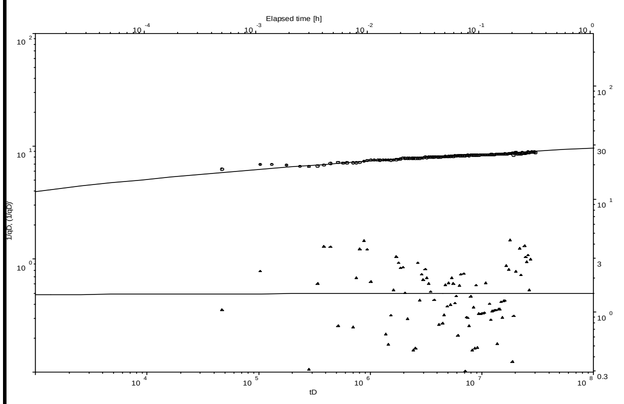
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070514 10:40
Test section from - to (m):	149.00-169.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

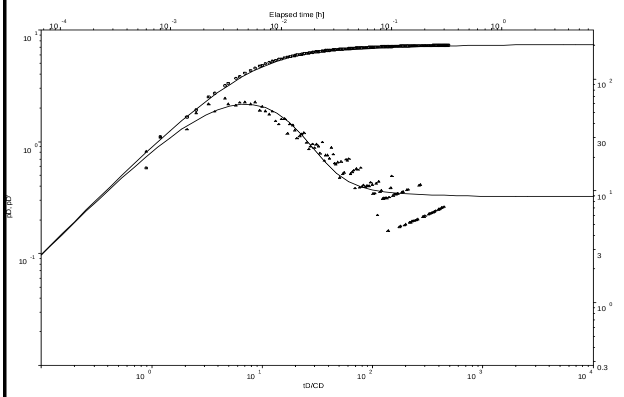
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	1424		
p_i (kPa) =	1428		
p_p(kPa) =	1628	p_F (kPa) =	1428
Q_p (m^3/s)=	6.50E-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)=	9.0		
Derivative fact.=	0.05	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	3.2E-08		
T_M (m^2/s)=	3.3E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.21	dt_1 (min) =	#NV
dt_2 (min) =	17.10	dt_2 (min) =	#NV
T (m^2/s) =	4.5E-08	T (m^2/s) =	3.8E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.3E-09	K_s (m/s) =	1.9E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.9E-11
C_D (-) =	NA	C_D (-) =	6.5E-03
ξ (-) =	3.37	ξ (-) =	2.52
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) =	0.21	C (m^3/Pa) =	5.9E-11
dt_2 (min) =	17.10	C_D (-) =	6.5E-03
T_T (m^2/s) =	4.5E-08	ξ (-) =	3.37
S (-) =	1.0E-06		
K_s (m/s) =	2.3E-09		
S_s (1/m) =	5.0E-08		

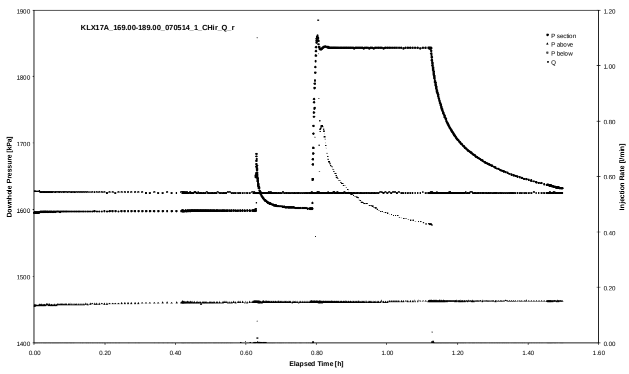
Comments:

The recommended transmissivity of 4.5•10-8 m2/s was derived from the analysis of the CHi phase, which shows a noisy but clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 2.0•10-8 m2/s to 1.0•10-7 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,424.8 kPa.

Test Summary Sheet

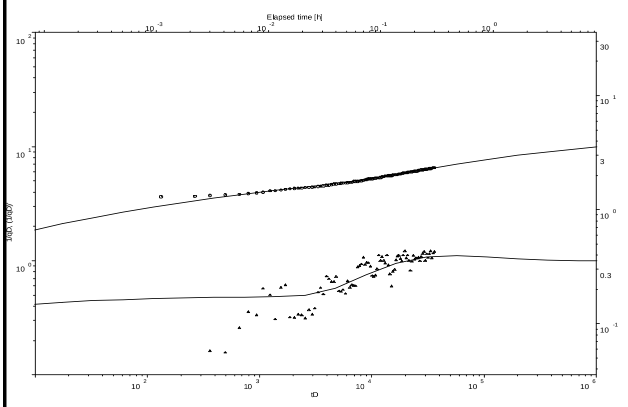
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070514 13:27
Test section from - to (m):	169.00-189.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

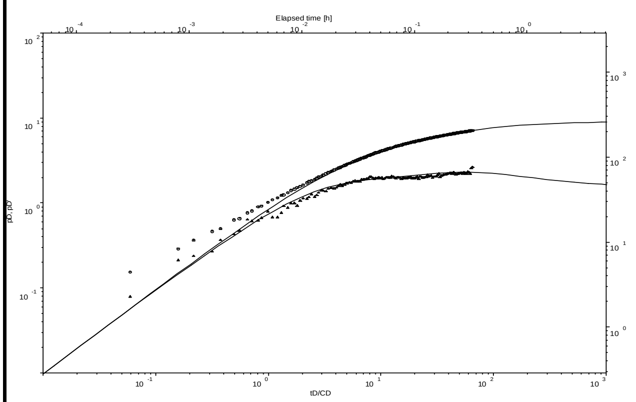


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1596		
p_i (kPa) =	1601		
p_p(kPa) =	1842	p_F (kPa) =	1632
Q_p (m^3/s)=	7.15E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.3		
Derivative fact.=	0.05	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	2.9E-07		
T_M (m^2/s)=	3.0E-07		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.40	dt_1 (min) =	2.25
dt_2 (min) =	1.65	dt_2 (min) =	6.72
T (m^2/s) =	3.0E-07	T (m^2/s) =	4.6E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.5E-08	K_s (m/s) =	2.3E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.4E-09
C_D (-) =	NA	C_D (-) =	5.9E-01
ξ (-) =	-0.92	ξ (-) =	-0.88
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) =	2.25	C (m^3/Pa) =	5.4E-09
dt_2 (min) =	6.72	C_D (-) =	5.9E-01
T_T (m^2/s) =	4.6E-07	ξ (-) =	-0.88
S (-) =	1.0E-06		
K_s (m/s) =	2.3E-08		
S_s (1/m) =	5.0E-08		

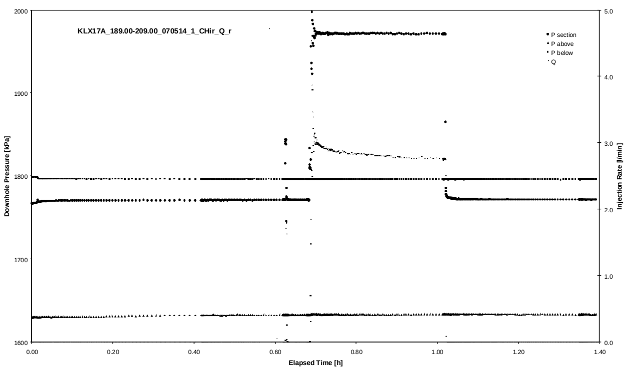
Comments:

The recommended transmissivity of 4.6•10-7 m2/s was derived from the analysis of the CHir phase (inner zone), which shows the most clear horizontal derivative stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-7 m2/s to 8.0•10-7 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 1,584.2 kPa.

Test Summary Sheet

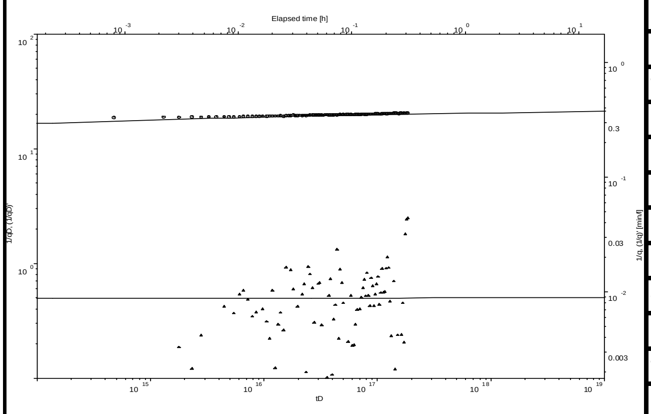
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070514 15:33
Test section from - to (m):	189.00-209.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

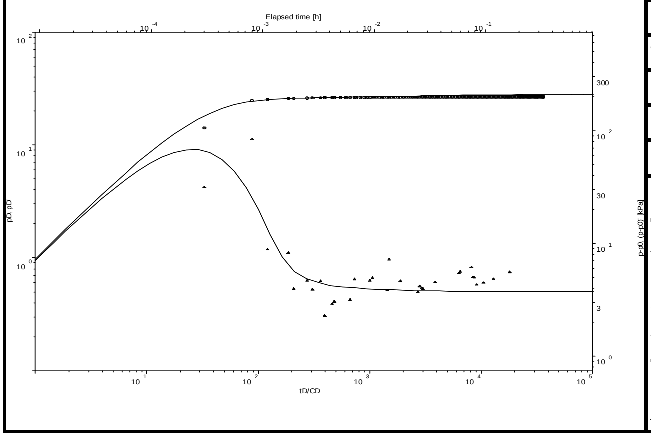


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1767		
p_i (kPa) =	1771		
p_p(kPa) =	1971	p_F (kPa) =	1771
Q_p (m^3/s)=	4.60E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.6		
Derivative fact.=	0.05	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.3E-06		
T_M (m^2/s)=	2.4E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.62	dt_1 (min) =	0.15
dt_2 (min) =	16.92	dt_2 (min) =	5.74
T (m^2/s) =	7.3E-06	T (m^2/s) =	9.9E-06
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.7E-07	K_s (m/s) =	4.9E-07
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.1E-10
C_D (-) =	NA	C_D (-) =	2.3E-02
ξ (-) =	12.10	ξ (-) =	20.30
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) =	0.62	C (m^3/Pa) =	2.1E-10
dt_2 (min) =	16.92	C_D (-) =	2.3E-02
T_T (m^2/s) =	7.3E-06	ξ (-) =	12.10
S (-) =	1.0E-06		
K_s (m/s) =	3.7E-07		
S_s (1/m) =	5.0E-08		

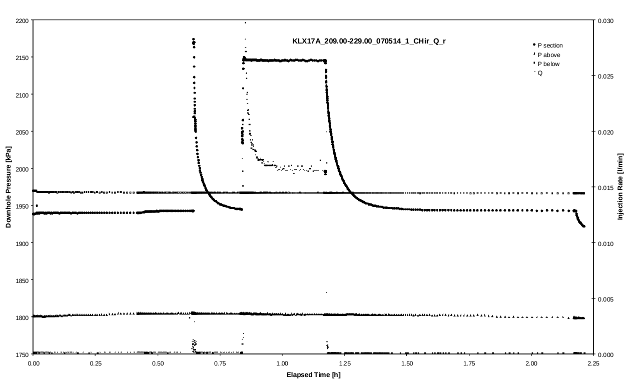
Comments:

The recommended transmissivity of 7.3•10-6 m2/s was derived from the analysis of the CHi phase, which shows the most clear horizontal derivative stabilisation by less skin effect. The confidence range for the interval transmissivity is estimated to be 4.0•10-6 m2/s to 2.0•10-5 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,771.4 kPa.

Test Summary Sheet

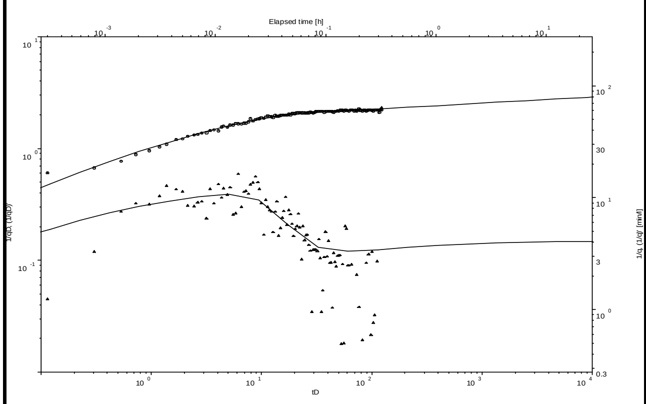
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070514 17:32
Test section from - to (m):	209.00-229.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

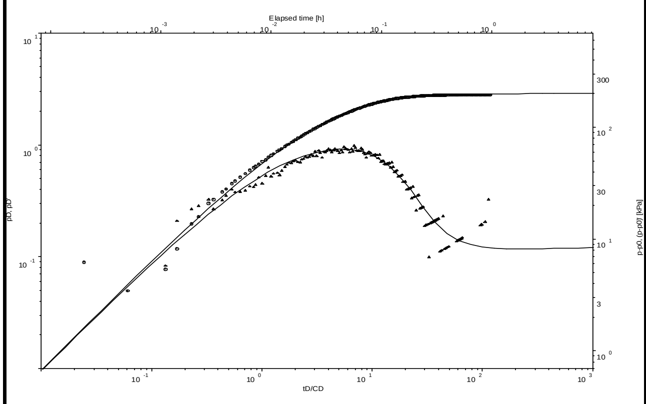


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	1938		
p_i (kPa) =	1944		
p_p(kPa) =	2145	p_F (kPa) =	1942
Q_p (m^3/s)=	2.67E-07		
tp (s) =	1200	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	9.9		
Derivative fact.=	0.10	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.3E-08		
T_M (m^2/s)=	1.4E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	5.03	dt_1 (min) =	#NV
dt_2 (min) =	15.84	dt_2 (min) =	#NV
T (m^2/s) =	1.6E-08	T (m^2/s) =	2.6E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.0E-10	K_s (m/s) =	1.3E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-10
C_D (-) =	NA	C_D (-) =	1.4E-02
ξ (-) =	-1.71	ξ (-) =	-1.31
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) =	5.03	C (m^3/Pa) =	1.3E-10
dt_2 (min) =	15.84	C_D (-) =	1.4E-02
T_T (m^2/s) =	1.6E-08	ξ (-) =	-1.71
S (-) =	1.0E-06		
K_s (m/s) =	8.0E-10		
S_s (1/m) =	5.0E-08		

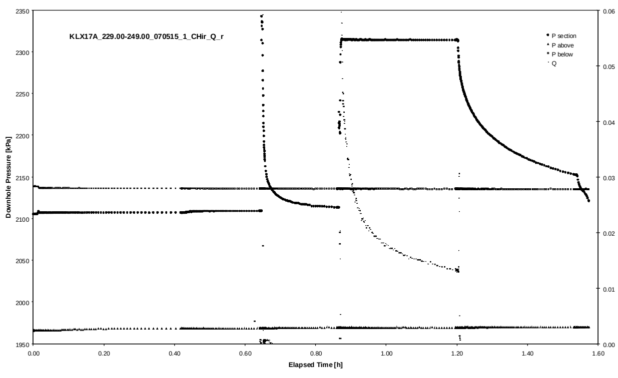
Comments:

The recommended transmissivity of 1.6•10-8 m2/s was derived from the analysis of the CHi phase (outer zone), which shows the better horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 2.0•10-9 m2/s to 4.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 1,938.5 kPa.

Test Summary Sheet

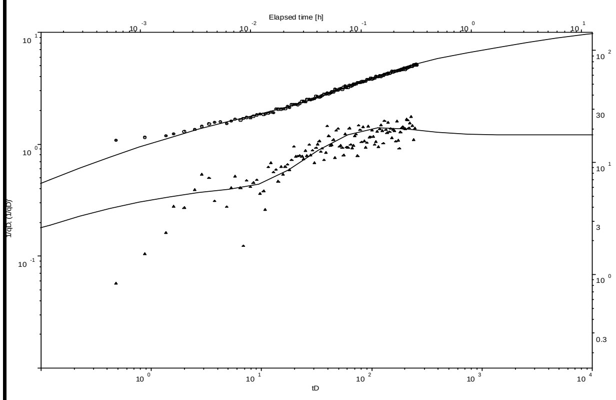
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070515 08:47
Test section from - to (m):	229.00-249.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

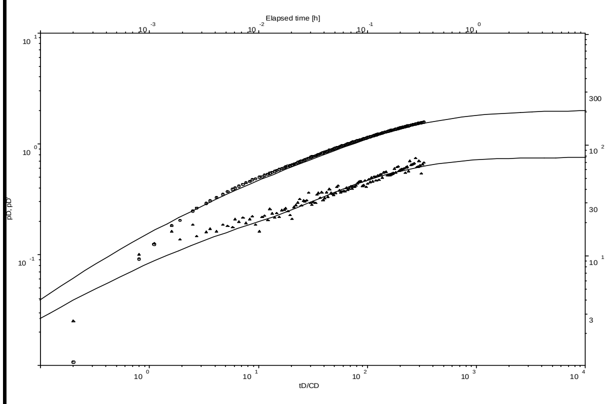


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2105		
p_i (kPa) =	2113		
p_p(kPa) =	2313	p_F (kPa) =	2152
Q_p (m^3/s)=	2.17E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.1		
Derivative fact.=	0.06	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.1E-08		
T_M (m^2/s)=	1.1E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	4.32	dt_1 (min) =	9.36
dt_2 (min) =	18.48	dt_2 (min) =	19.68
T (m^2/s) =	3.6E-09	T (m^2/s) =	3.2E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.8E-10	K_s (m/s) =	1.6E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-11
C_D (-) =	NA	C_D (-) =	1.2E-03
ξ (-) =	-1.66	ξ (-) =	-2.99
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Selected representative parameters.

dt_1 (min) =	4.32	C (m^3/Pa) =	1.1E-11
dt_2 (min) =	18.48	C_D (-) =	1.2E-03
T_T (m^2/s) =	3.6E-09	ξ (-) =	-1.66
S (-) =	1.0E-06		
K_s (m/s) =	1.8E-10		
S_s (1/m) =	5.0E-08		

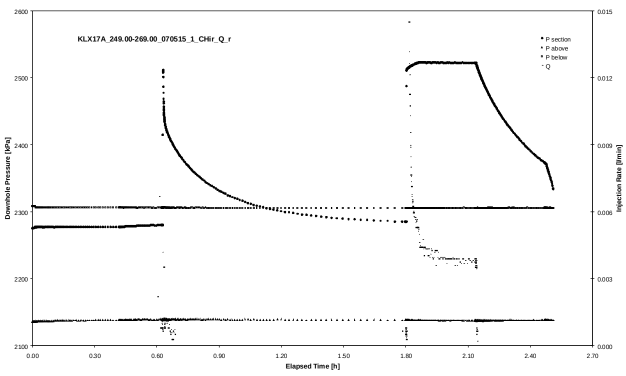
Comments:

The recommended transmissivity of 3.6•10-9 m2/s was derived from the analysis of the CHi phase (outer zone), which shows the better horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 2.0•10-9 m2/s to 2.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,105.7 kPa.

Test Summary Sheet

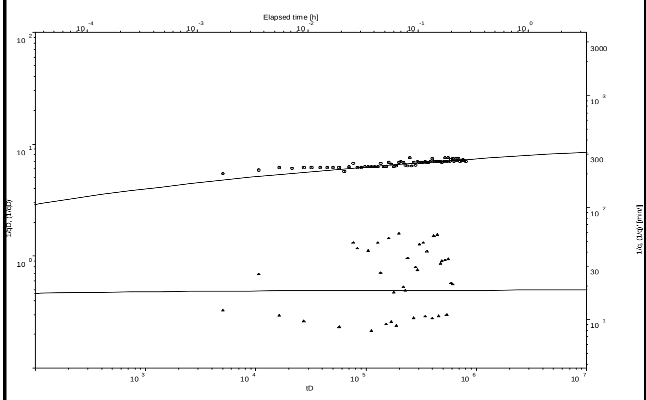
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070515 10:58
Test section from - to (m):	249.00-269.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

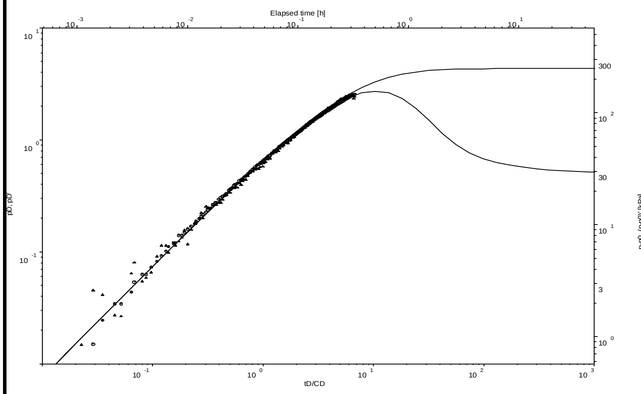


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2275		
p_i (kPa) =	2285		
p_p(kPa) =	2522	p_F (kPa) =	2370
Q_p (m^3/s)=	6.33E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.4		
Derivative fact.=	0.09	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	2.6E-09		
T_M (m^2/s)=	2.7E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.42	dt_1 (min) =	#NV
dt_2 (min) =	12.36	dt_2 (min) =	#NV
T (m^2/s) =	3.0E-09	T (m^2/s) =	2.7E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.5E-10	K_s (m/s) =	1.3E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.0E-10
C_D (-) =	NA	C_D (-) =	3.3E-02
ξ (-) =	3.00	ξ (-) =	1.72
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) =	1.42	C (m^3/Pa) =	3.0E-10
dt_2 (min) =	12.36	C_D (-) =	3.3E-02
T_T (m^2/s) =	3.0E-09	ξ (-) =	3.00
S (-) =	1.0E-06		
K_s (m/s) =	1.5E-10		
S_s (1/m) =	5.0E-08		

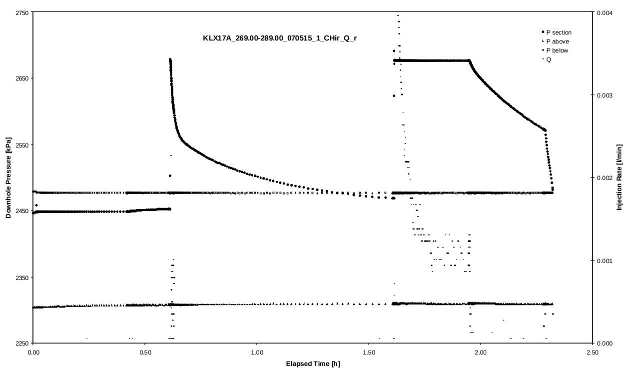
Comments:

The recommended transmissivity of 3.0•10-9 m2/s was derived from the analysis of the CHi phase, which shows a very noisy but already clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-9 m2/s to 6.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,284.7 kPa.

Test Summary Sheet

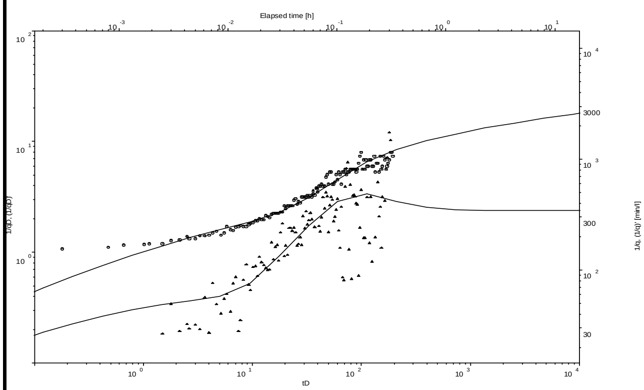
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070515 14:02
Test section from - to (m):	269.00-289.00 m	Responsible for test execution:	Pilipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

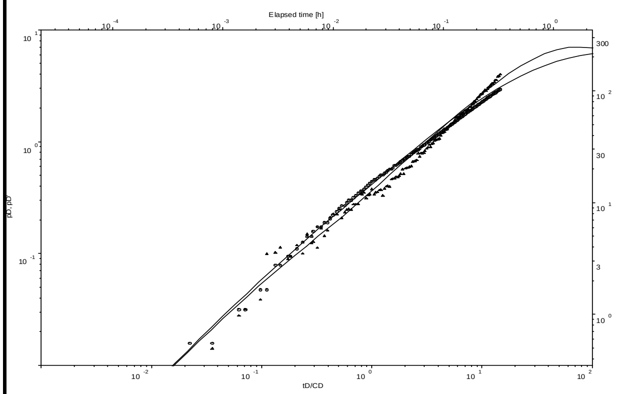


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2447		
p_i (kPa) =	2469		
p_p(kPa) =	2676	p_F (kPa) =	2482
Q_p (m^3/s)=	1.83E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	10.7		
Derivative fact.=	0.11	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	8.7E-10		
T_M (m^2/s)=	9.1E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.18	dt_1 (min) =	1.15
dt_2 (min) =	0.63	dt_2 (min) =	1.95
T (m^2/s) =	8.7E-10	T (m^2/s) =	1.2E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.4E-11	K_s (m/s) =	6.0E-11
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.2E-11
C_D (-) =	NA	C_D (-) =	6.8E-03
ξ (-) =	-0.65	ξ (-) =	-0.95
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) =	0.18	C (m^3/Pa) =	6.2E-11
dt_2 (min) =	0.63	C_D (-) =	6.8E-03
T_T (m^2/s) =	8.7E-10	ξ (-) =	-0.65
S (-) =	1.0E-06		
K_s (m/s) =	4.4E-11		
S_s (1/m) =	5.0E-08		

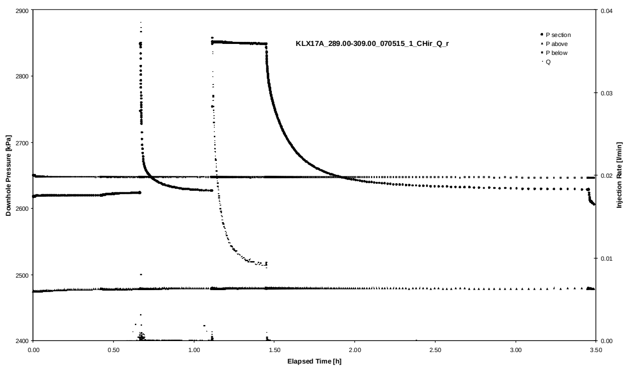
Comments:

The recommended transmissivity of 8.7•10-10 m2/s was derived from the analysis of the CHi phase (inner zone), which shows a very noisy but relative clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-10 m2/s to 2.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,450.0 kPa.

Test Summary Sheet

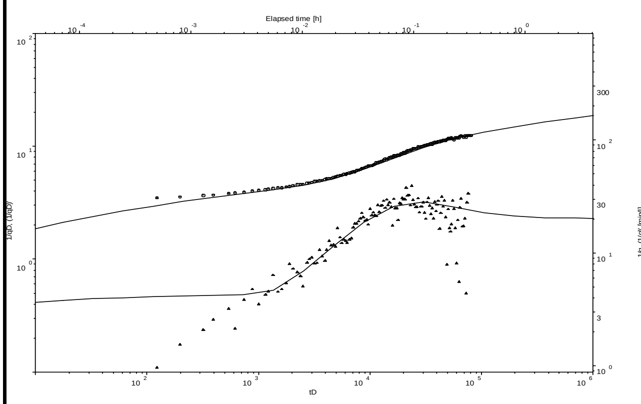
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070515 16:55
Test section from - to (m):	289.00-309.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

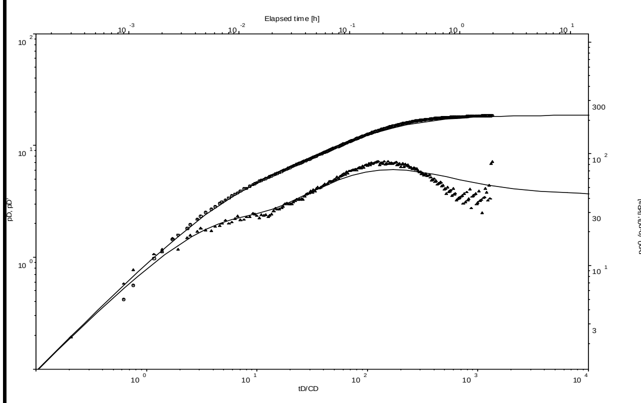


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2618		
p_i (kPa) =	2627		
p_p(kPa) =	2849	p_F (kPa) =	2628
Q_p (m^3/s)=	1.50E-07		
tp (s) =	1200	t_F (s) =	7200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.0		
Derivative fact.=	0.05	Derivative fact.=	0.06
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) =	3.56	dt_1 (min) =	44.22
dt_2 (min) =	18.18	dt_2 (min) =	112.20
T (m^2/s) =	2.8E-09	T (m^2/s) =	3.7E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.4E-10	K_s (m/s) =	1.9E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.8E-11
C_D (-) =	NA	C_D (-) =	9.7E-03
ξ (-) =	1.00	ξ (-) =	2.33
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) =	3.56	C (m^3/Pa) =	8.8E-11
dt_2 (min) =	18.18	C_D (-) =	9.7E-03
T_T (m^2/s) =	2.8E-09	ξ (-) =	1.00
S (-) =	1.0E-06		
K_s (m/s) =	1.4E-10		
S_s (1/m) =	5.0E-08		

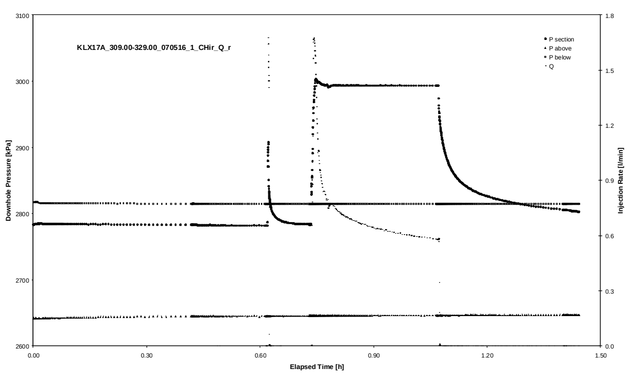
Comments:

The recommended transmissivity of 2.8•10-9 m2/s was derived from the analysis of the CHi phase (outer zone), which shows a noisy but relative clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-9 m2/s to 4.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,621.4 kPa.

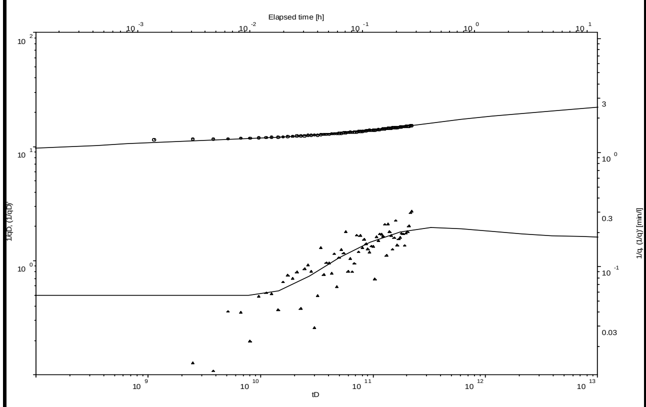
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070516 08:46
Test section from - to (m):	309.00-329.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

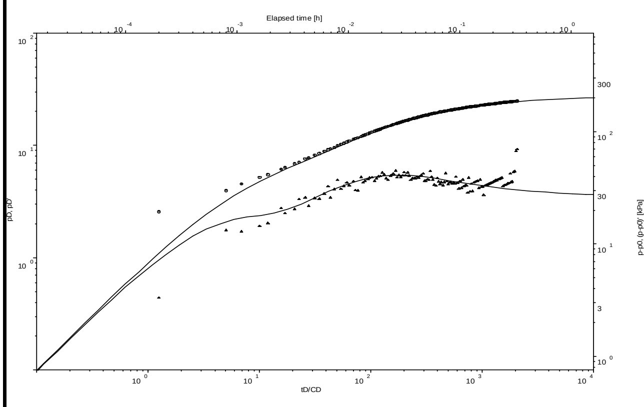
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2784		
p_i (kPa) =	2784		
p_p(kPa) =	2993	p_F (kPa) =	2807
Q_p (m^3/s)=	9.67E-06		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.2		
Derivative fact.=	0.03	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) =	9.18	dt_1 (min) =	1.72
dt_2 (min) =	15.12	dt_2 (min) =	17.88
T (m^2/s) =	3.4E-07	T (m^2/s) =	3.2E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.7E-08	K_s (m/s) =	1.6E-08
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.1E-10
C_D (-) =	NA	C_D (-) =	8.9E-02
ξ (-) =	6.29	ξ (-) =	1.22
T_{GRF}(m^2/s) =		T_{GRF}(m^2/s) =	
S_{GRF}(-) =		S_{GRF}(-) =	
D_{GRF} (-) =		D_{GRF} (-) =	

Selected representative parameters.

dt_1 (min) =	1.72	C (m^3/Pa) =	8.1E-10
dt_2 (min) =	17.88	C_D (-) =	8.9E-02
T_T (m^2/s) =	3.2E-07	ξ (-) =	1.22
S (-) =	1.0E-06		
K_s (m/s) =	1.6E-08		
S_s (1/m) =	5.0E-08		

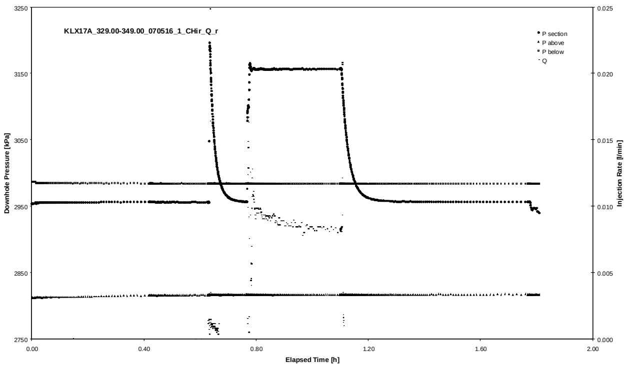
Comments:

The recommended transmissivity of 3.2•10-7 m2/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0•10-7 m2/s to 3.0•10-6 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,786.2 kPa.

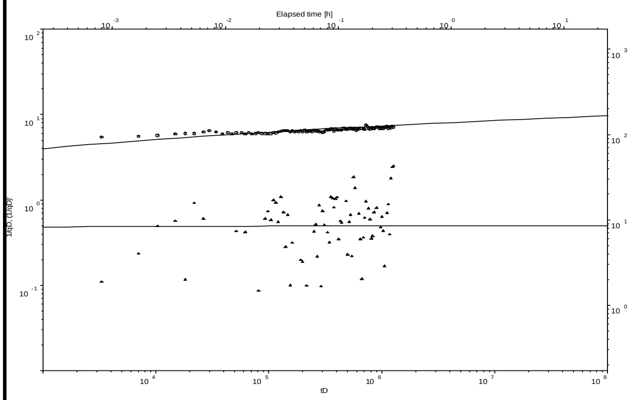
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070516 10:45
Test section from - to (m):	329.00-349.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2\cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

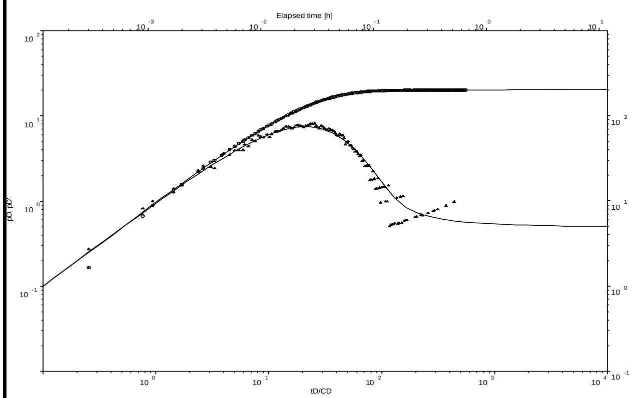
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2953		
p_i (kPa) =	2956		
p_p(kPa) =	3157	p_F (kPa) =	2956
Q_p (m^3/s)=	1.37E-07		
tp (s) =	1200	t_F (s) =	2400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.5		
Derivative fact.=	0.10	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	6.7E-09		
T_M (m^2/s)=	7.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.15	dt_1 (min) =	7.86
dt_2 (min) =	16.26	dt_2 (min) =	26.28
T (m^2/s) =	7.6E-09	T (m^2/s) =	2.3E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.8E-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) =	6.2E-11
C_D (-) =	NA	C_D (-) =	6.8E-03
ξ (-) =	2.70	ξ (-) =	15.20
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) =	0.15	C (m^3/Pa) =	6.2E-11
dt_2 (min) =	16.26	C_D (-) =	6.8E-03
T_T (m^2/s) =	7.6E-09	ξ (-) =	2.70
S (-) =	1.0E-06		
K_s (m/s) =	3.8E-10		
S_s (1/m) =	5.0E-08		

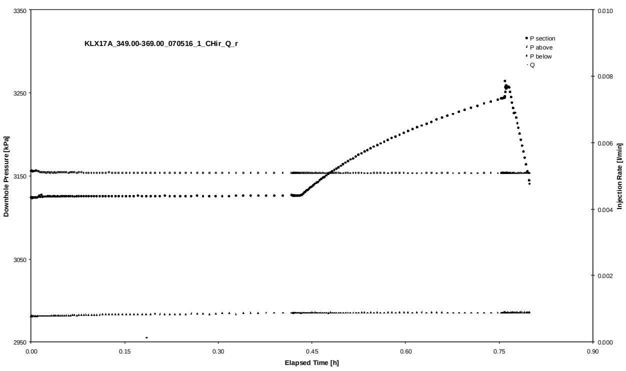
Comments:

The recommended transmissivity of 7.6•10-9 m2/s was derived from the analysis of the CHi phase, which shows the better horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be 4.0•10-9 m2/s to 3.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,955.4 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070516 13:20
Test section from - to (m):	349.00-369.00 m	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) =	3123		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.8		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	5.0E-13	K_s (m/s) =	NA
S_s (1/m) =	5.0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

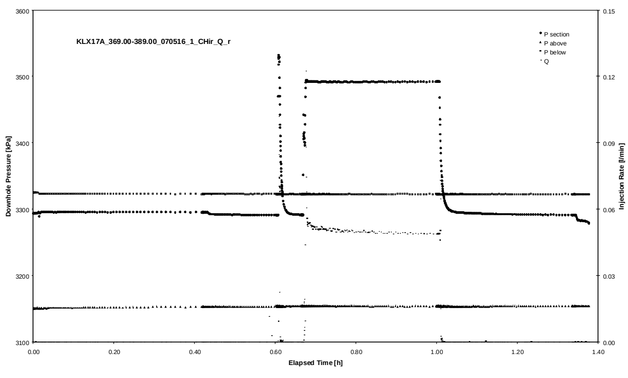
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

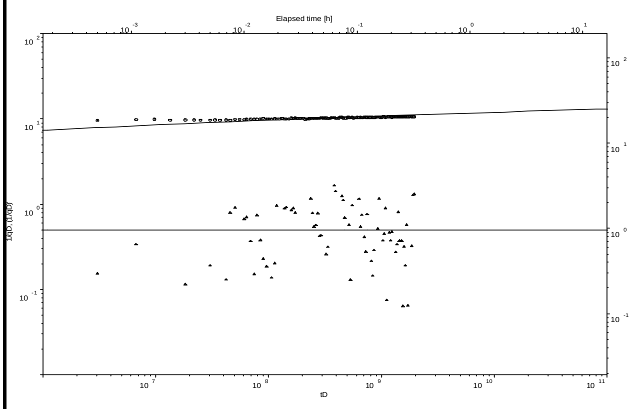
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070516 14:43
Test section from - to (m):	369.00-389.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

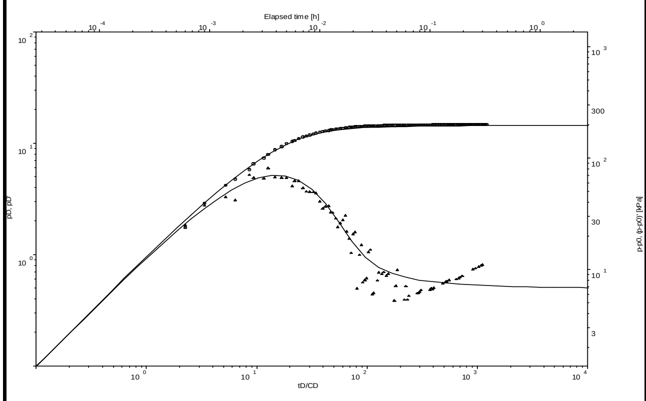
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3293		
p_i (kPa) =	3291		
p_p(kPa) =	3491	p_F (kPa) =	3291
Q_p (m^3/s)=	8.17E-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)=	12.1		
Derivative fact.=	0.04	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	4.0E-08		
T_M (m^2/s)=	4.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.45	dt_1 (min) =	1.54
dt_2 (min) =	16.56	dt_2 (min) =	11.70
T (m^2/s) =	6.8E-08	T (m^2/s) =	9.5E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.4E-09	K_s (m/s) =	4.8E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.9E-11
C_D (-) =	NA	C_D (-) =	6.5E-03
ξ (-) =	5.25	ξ (-) =	9.44
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) =	1.54	C (m^3/Pa) =	5.9E-11
dt_2 (min) =	11.70	C_D (-) =	6.5E-03
T_T (m^2/s) =	9.5E-08	ξ (-) =	9.44
S (-) =	1.0E-06		
K_s (m/s) =	4.8E-09		
S_s (1/m) =	5.0E-08		

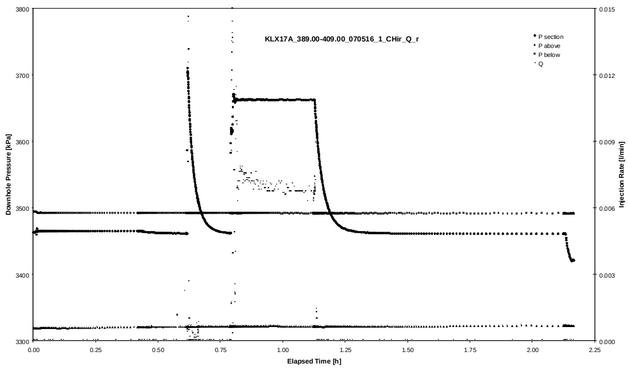
Comments:

The recommended transmissivity of 9.5•10-8 m2/s was derived from the analysis of the CHir phase, which shows the better horizontal stabilisation of the derivative and less background noise. The confidence range for the interval transmissivity is estimated to be 3.0•10-8 m2/s to 2.0•10-7 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,290.3 kPa.

Test Summary Sheet

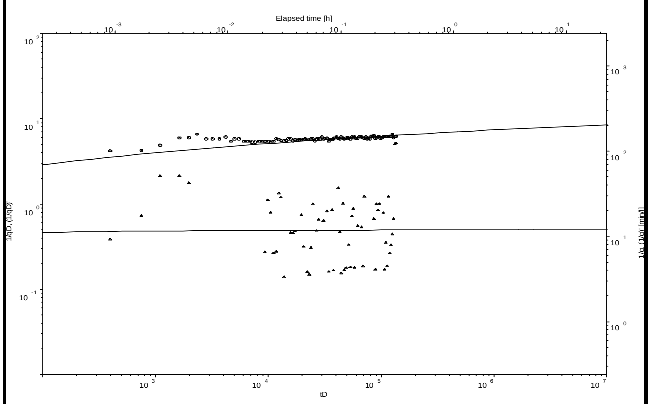
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070516 16:39
Test section from - to (m):	389.00-409.00 m	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

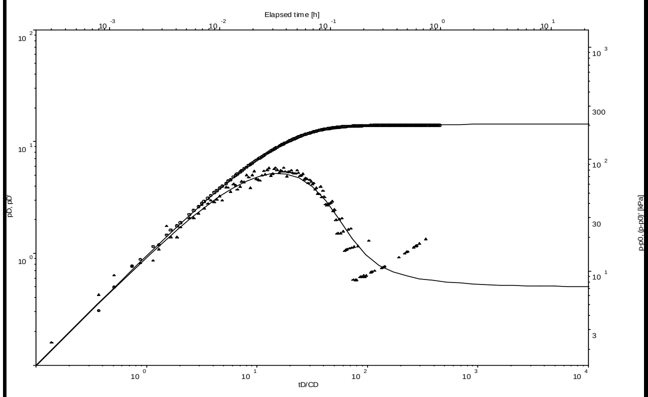


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3463		
p_i (kPa) =	3461		
p_p(kPa) =	3661	p_F (kPa) =	3460
Q_p (m^3/s)=	1.13E-07		
tp (s) =	1200	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.3		
Derivative fact.=	0.07	Derivative fact.=	0.01
Results		**Results**	
Q/s (m^2/s)=	5.6E-09		
T_M (m^2/s)=	5.8E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.43	dt_1 (min) =	11.52
dt_2 (min) =	17.58	dt_2 (min) =	25.08
T (m^2/s) =	5.4E-09	T (m^2/s) =	1.3E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.7E-10	K_s (m/s) =	6.4E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	6.3E-11
C_D (-) =	NA	C_D (-) =	7.0E-03
ξ (-) =	1.74	ξ (-) =	9.40
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) =	1.43	C (m^3/Pa) =	6.3E-11
dt_2 (min) =	17.58	C_D (-) =	7.0E-03
T_T (m^2/s) =	5.4E-09	ξ (-) =	1.74
S (-) =	1.0E-06		
K_s (m/s) =	2.7E-10		
S_s (1/m) =	5.0E-08		

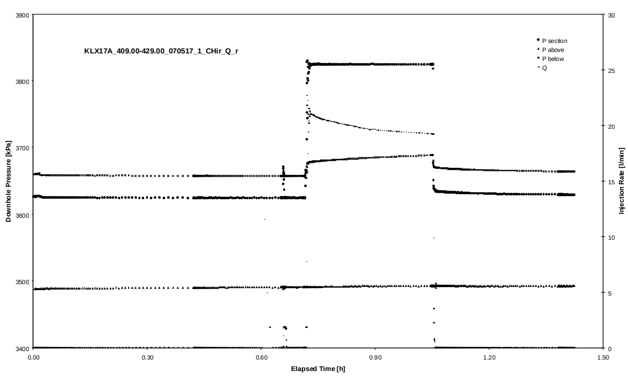
Comments:

The recommended transmissivity of 5.4•10-9 m2/s was derived from the analysis of the CHi phase, which shows a still noisy but better horizontal derivative stabilisation. The confidence range for the interval transmissivity is estimated to be 3.0•10-9 m2/s to 2.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,459.6 kPa.

Test Summary Sheet

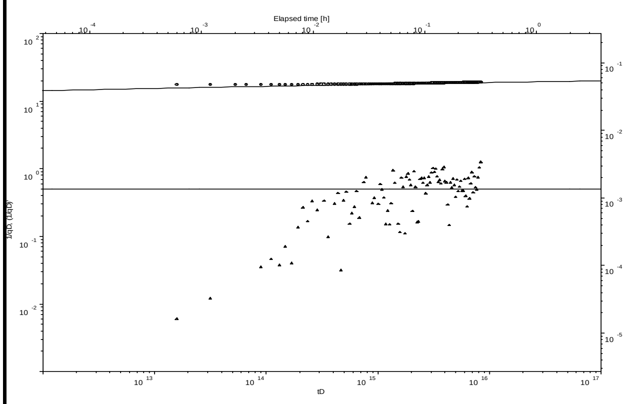
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070517 08:43
Test section from - to (m):	409.00-429.00	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

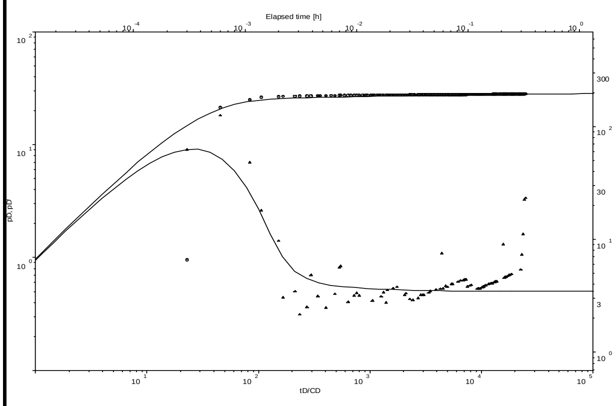


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3627		
p_i (kPa) =	3624		
p_p(kPa) =	3824	p_F (kPa) =	3629
Q_p (m^3/s)=	3.21E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.2		
Derivative fact.=	0.01	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	1.6E-05		
T_M (m^2/s)=	1.6E-05		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.49	dt_1 (min) =	0.17
dt_2 (min) =	17.52	dt_2 (min) =	14.76
T (m^2/s) =	4.8E-05	T (m^2/s) =	7.5E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.4E-06	K_s (m/s) =	3.7E-06
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.3E-09
C_D (-) =	NA	C_D (-) =	2.5E-01
ξ (-) =	9.60	ξ (-) =	19.10
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) =	0.17	C (m^3/Pa) =	2.3E-09
dt_2 (min) =	14.76	C_D (-) =	2.5E-01
T_T (m^2/s) =	7.5E-05	ξ (-) =	19.10
S (-) =	1.0E-06		
K_s (m/s) =	3.7E-06		
S_s (1/m) =	5.0E-08		

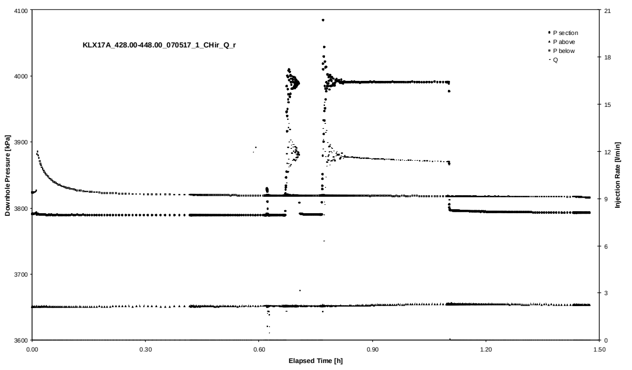
Comments:

The recommended transmissivity of 7.5•10-5 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality at horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 2.0•10-5 m2/s to 1.0•10-4 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,627.6 kPa.

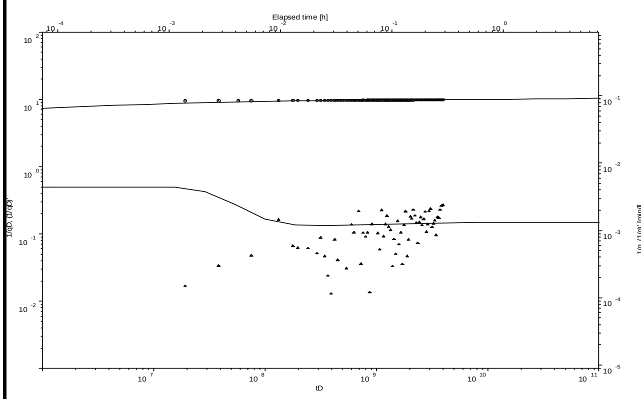
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070517 10:43
Test section from - to (m):	428.00-448.00	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

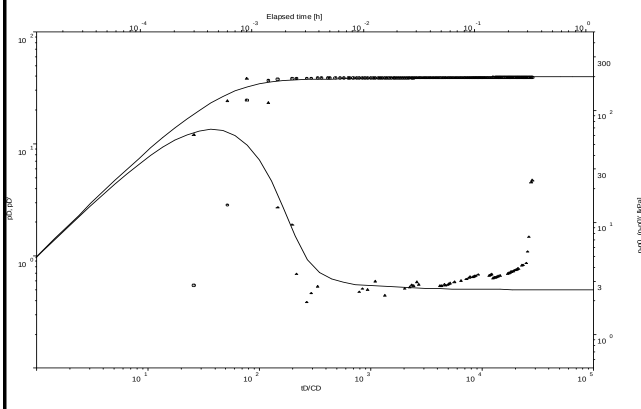
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3791		
p_i (kPa) =	3790		
p_p(kPa) =	3990	p_F (kPa) =	3793
Q_p (m^3/s)=	1.89E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.0		
Derivative fact.=	0.04	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	9.3E-06		
T_M (m^2/s)=	9.7E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.78	dt_1 (min) =	0.20
dt_2 (min) =	15.90	dt_2 (min) =	14.76
T (m^2/s) =	1.5E-05	T (m^2/s) =	5.9E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.5E-07	K_s (m/s) =	3.0E-06
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.6E-09
C_D (-) =	NA	C_D (-) =	1.8E-01
ξ (-) =	2.96	ξ (-) =	30.80
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) =	0.20	C (m^3/Pa) =	1.6E-09
dt_2 (min) =	14.76	C_D (-) =	1.8E-01
T_T (m^2/s) =	5.9E-05	ξ (-) =	30.80
S (-) =	1.0E-06		
K_s (m/s) =	3.0E-06		
S_s (1/m) =	5.0E-08		

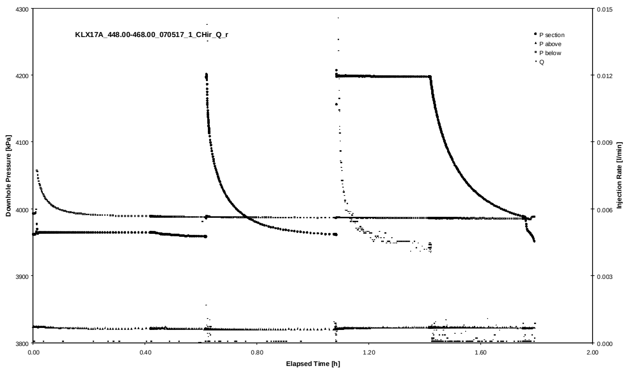
Comments:

The recommended transmissivity of 5.9•10-5 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality at horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 8.0•10-6 m2/s to 8.0•10-5 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,791.9 kPa.

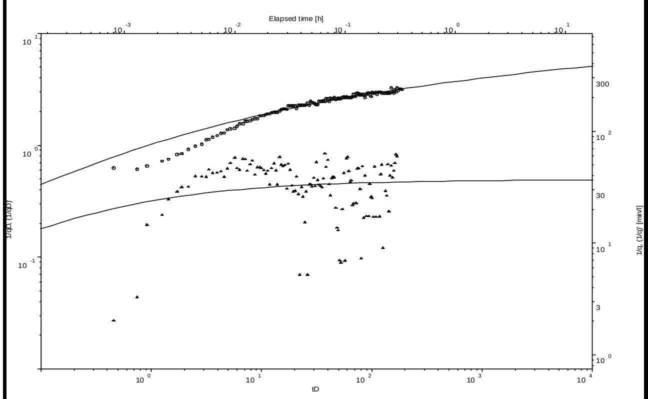
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070517 13:34
Test section from - to (m):	448.00-468.00	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

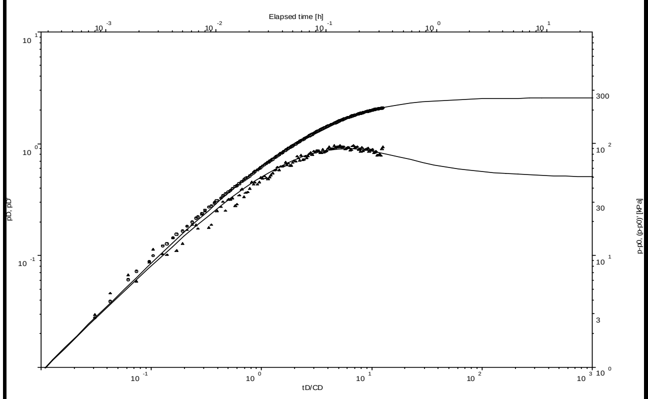
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3963		
p_i (kPa) =	3962		
p_p(kPa) =	4198	p_F (kPa) =	3986
Q_p (m^3/s)=	7.00E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.3		
Derivative fact.=	0.08	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.9E-09		
T_M (m^2/s)=	3.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.25	dt_1 (min) =	#NV
dt_2 (min) =	16.14	dt_2 (min) =	#NV
T (m^2/s) =	1.5E-09	T (m^2/s) =	1.4E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.4E-11	K_s (m/s) =	6.8E-11
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.1E-11
C_D (-) =	NA	C_D (-) =	8.9E-03
ξ (-) =	-0.93	ξ (-) =	-1.09
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) =	1.25	C (m^3/Pa) =	8.1E-11
dt_2 (min) =	16.14	C_D (-) =	8.9E-03
T_T (m^2/s) =	1.5E-09	ξ (-) =	-0.93
S (-) =	1.0E-06		
K_s (m/s) =	7.4E-11		
S_s (1/m) =	5.0E-08		

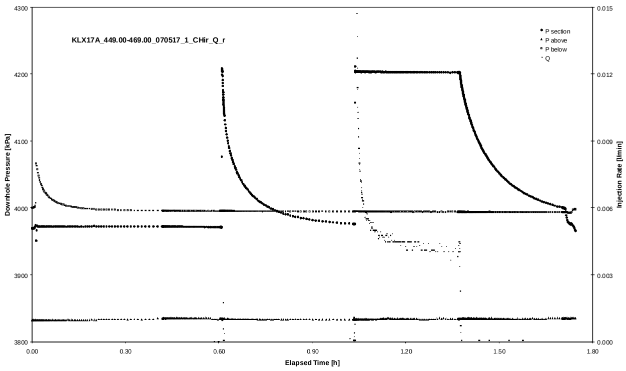
Comments:

The recommended transmissivity of 1.5•10-9 m2/s was derived from the analysis of the CHi phase, which shows a clear horizontal stabilisation of the late time data. The confidence range for the interval transmissivity is estimated to be 8.0•10-10 m2/s to 3.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,944.3 kPa.

Test Summary Sheet

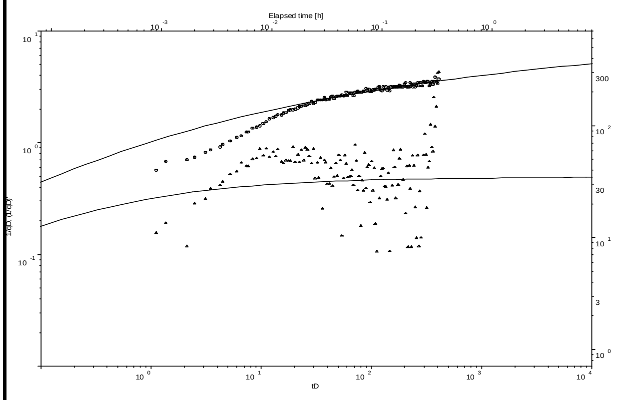
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070517 15:47
Test section from - to (m):	449.00-469.00	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

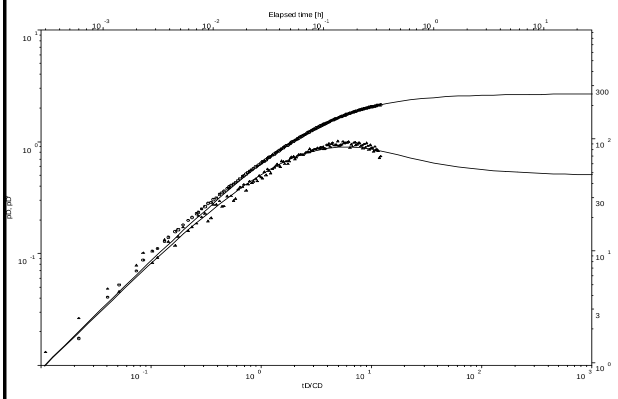


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3969		
p_i (kPa) =	3976		
p_p(kPa) =	4202	p_F (kPa) =	4000
Q_p (m^3/s)=	6.67E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.3		
Derivative fact.=	0.09	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.9E-09		
T_M (m^2/s)=	3.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.49	dt_1 (min) =	#NV
dt_2 (min) =	15.78	dt_2 (min) =	#NV
T (m^2/s) =	1.6E-09	T (m^2/s) =	1.4E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.2E-11	K_s (m/s) =	6.8E-11
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.4E-11
C_D (-) =	NA	C_D (-) =	9.3E-03
ξ (-) =	-0.59	ξ (-) =	-1.11
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) =	1.49	C (m^3/Pa) =	8.4E-11
dt_2 (min) =	15.78	C_D (-) =	9.3E-03
T_T (m^2/s) =	1.6E-09	ξ (-) =	-0.59
S (-) =	1.0E-06		
K_s (m/s) =	8.2E-11		
S_s (1/m) =	5.0E-08		

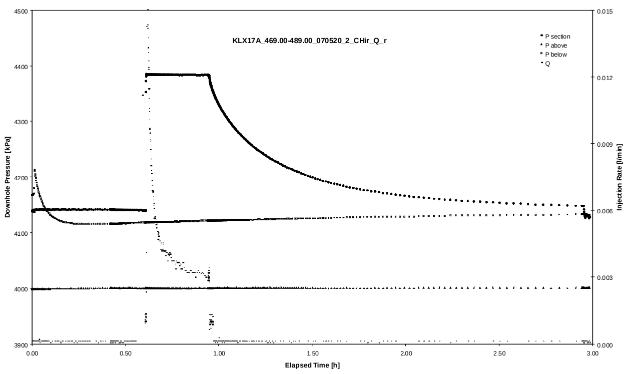
Comments:

The recommended transmissivity of 1.6•10-9 m2/s was derived from the analysis of the CHi phase, which shows a noisy but clear horizontal stabilisation of the late time data. The confidence range for the interval transmissivity is estimated to be 8.0•10-10 m2/s to 3.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,955.4 kPa.

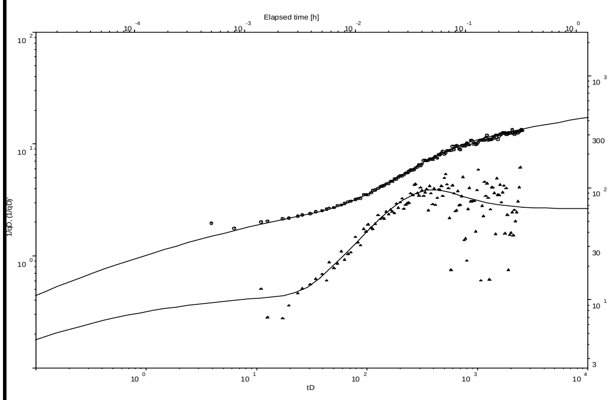
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	2
Borehole ID:	KLX17A	Test start:	070520 17:54
Test section from - to (m):	469.00-489.00	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

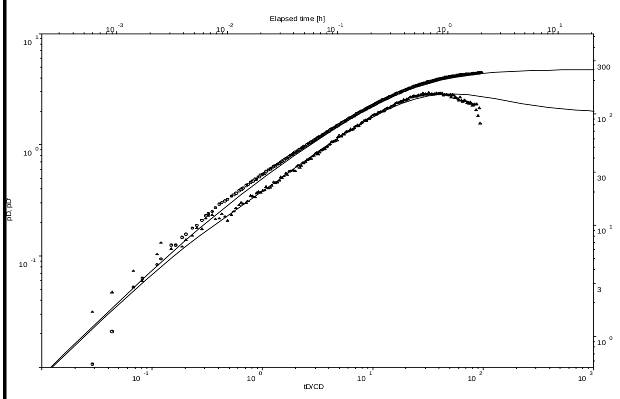
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4140		
p_i (kPa) =	4140		
p_p(kPa) =	4383	p_F (kPa) =	4148
Q_p (m^3/s)=	5.17E-08		
tp (s) =	1200	t_F (s) =	7200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.6		
Derivative fact.=	0.07	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	2.1E-09		
T_M (m^2/s)=	2.2E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	5.51	dt_1 (min) =	77.40
dt_2 (min) =	17.82	dt_2 (min) =	109.80
T (m^2/s) =	7.9E-10	T (m^2/s) =	6.0E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.0E-11	K_s (m/s) =	3.0E-11
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 (-) =	-0.16	ξ (-) =	-1.67
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) =	5.51	C (m^3/Pa) =	1.1E-10
dt_2 (min) =	17.82	C_D (-) =	1.2E-02
T_T (m^2/s) =	7.9E-10	ξ (-) =	-0.16
S (-) =	1.0E-06		
K_s (m/s) =	4.0E-11		
S_s (1/m) =	5.0E-08		

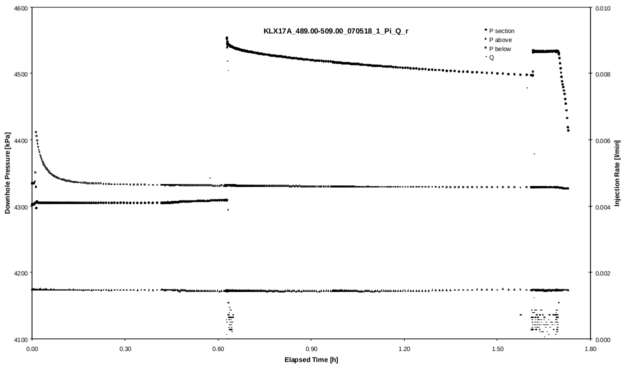
Comments:

The recommended transmissivity of 7.9•10-10 m2/s was derived from the analysis of the CHi phase (outer zone), which shows a noisy but horizontal stabilisation of the late time data. The confidence range for the interval transmissivity is estimated to be 4.0•10-10 m2/s to 6.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 4,126.4 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070518 08:47
Test section from - to (m):	489.00-509.00	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) =	4302		
p_i (kPa) =	4309		
p_p(kPa) =	4553	p_F (kPa) =	4497
Q_p (m^3/s)=	#NV		
tp (s) =	10.2	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.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	5.0E-13	K_s (m/s) =	NA
S_s (1/m) =	5.0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

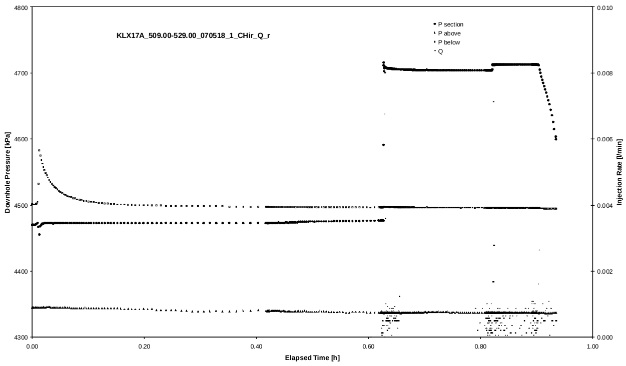
Comments:

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070518 11:04
Test section from - to (m):	509.00-529.00	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) =	4470		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.1		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	5.0E-13	K_s (m/s) =	NA
S_s (1/m) =	5.0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

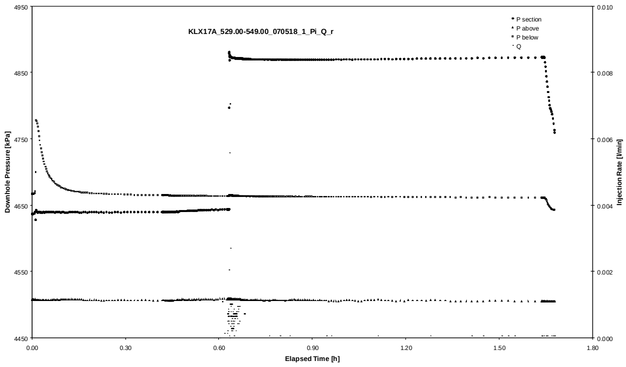
Comments:

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070518 12:36
Test section from - to (m):	529.00-549.00	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) =	4637		
p_i (kPa) =	4644		
p_p(kPa) =	4874	p_F (kPa) =	4873
Q_p (m^3/s)=	#NV		
tp (s) =	10.02	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.4		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	5.0E-13	K_s (m/s) =	NA
S_s (1/m) =	5.0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

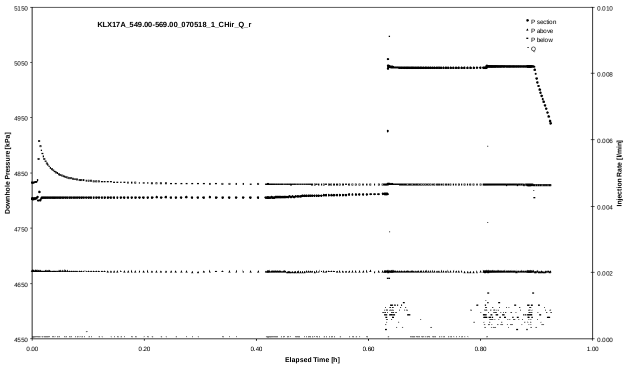
Comments:

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070518 15:13
Test section from - to (m):	549.00-569.00	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) =	4803		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	14.6		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	5.0E-13	K_s (m/s) =	NA
S_s (1/m) =	5.0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

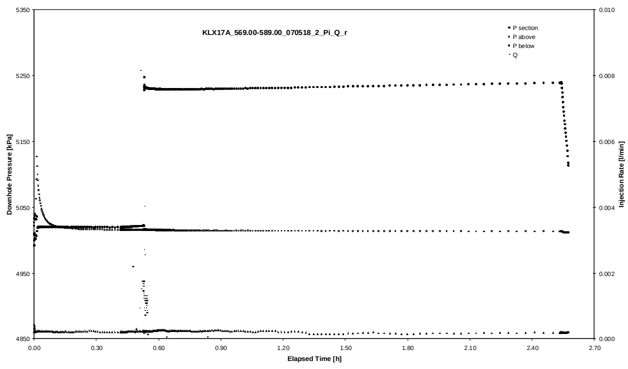
Comments:

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	2
Borehole ID:	KLX17A	Test start:	070518 18:44
Test section from - to (m):	569.00-589.00	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) =	5019		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	1.67E-04		
tp (s) =	0	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.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#DIV/0!		
T_M (m^2/s)=	#DIV/0!		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	5.0E-13	K_s (m/s) =	NA
S_s (1/m) =	5.0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

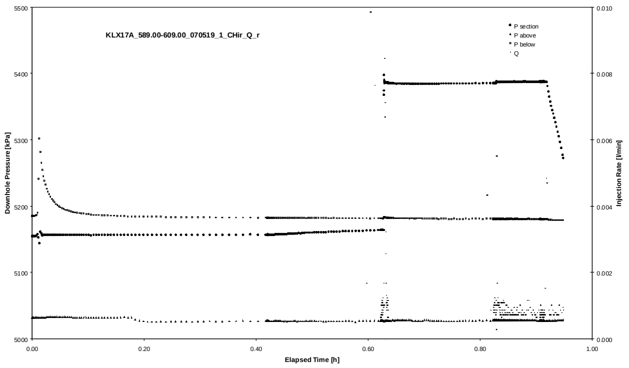
Comments:

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070519 08:59
Test section from - to (m):	589.00-609.00	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) =	5154		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.2		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	5.0E-13	K_s (m/s) =	NA
S_s (1/m) =	5.0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

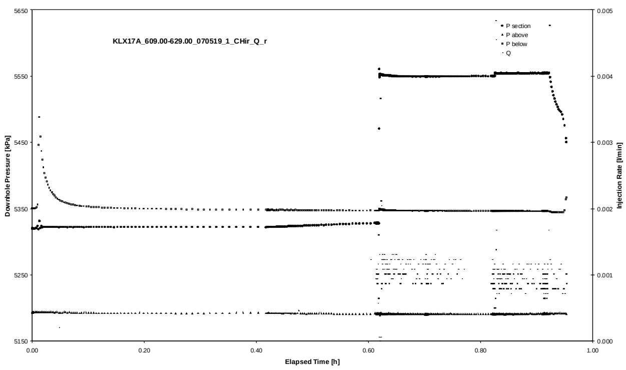
Comments:

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070519 10:33
Test section from - to (m):	609.00-629.00	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) =	5320		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.4		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	5.0E-13	K_s (m/s) =	NA
S_s (1/m) =	5.0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

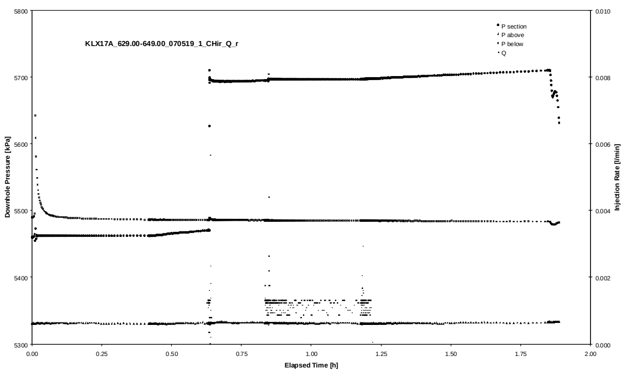
Comments:

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070519 12:19
Test section from - to (m):	629.00-649.00	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) =	5460		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.6		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	5.0E-13	K_s (m/s) =	NA
S_s (1/m) =	5.0E-08	S_s (1/m) =	NA
C (m^3/Pa) =	NA	C (m^3/Pa) =	NA
C_D (-) =	NA	C_D (-) =	NA
ξ (-) =	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

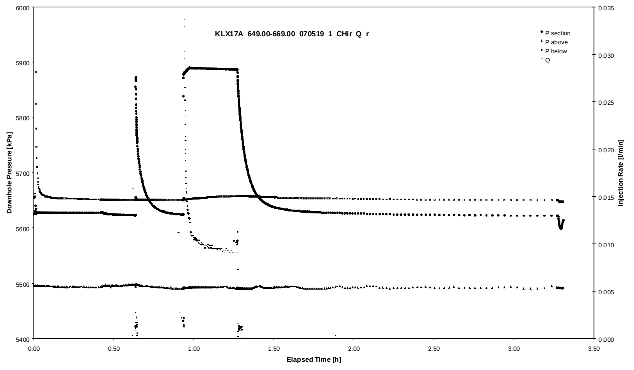
Comments:

Based on the test response (very slow pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

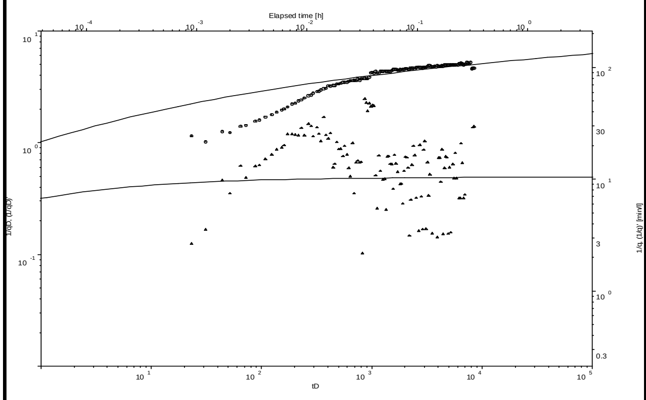
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070519 15:31
Test section from - to (m):	649.00-669.00	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

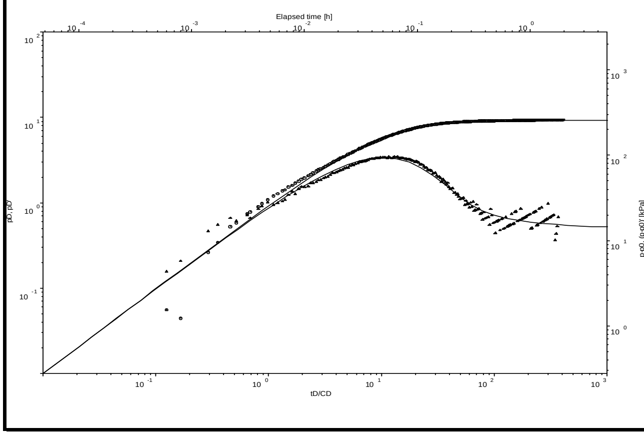


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5630		
p_i (kPa) =	5624		
p_p(kPa) =	5886	p_F (kPa) =	5622
Q_p (m^3/s)=	1.50E-07		
tp (s) =	1200	t_F (s) =	7200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.9		
Derivative fact.=	0.04	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	5.6E-09		
T_M (m^2/s)=	5.9E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.49	dt_1 (min) =	23.28
dt_2 (min) =	15.42	dt_2 (min) =	105.00
T (m^2/s) =	4.7E-09	T (m^2/s) =	1.0E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.3E-10	K_s (m/s) =	5.0E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.1E-10
C_D (-) =	NA	C_D (-) =	1.2E-02
ξ (-) =	0.39	ξ (-) =	4.51
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) =	23.28	C (m^3/Pa) =	1.1E-10
dt_2 (min) =	105.00	C_D (-) =	1.2E-02
T_T (m^2/s) =	1.0E-08	ξ (-) =	4.51
S (-) =	1.0E-06		
K_s (m/s) =	5.0E-10		
S_s (1/m) =	5.0E-08		

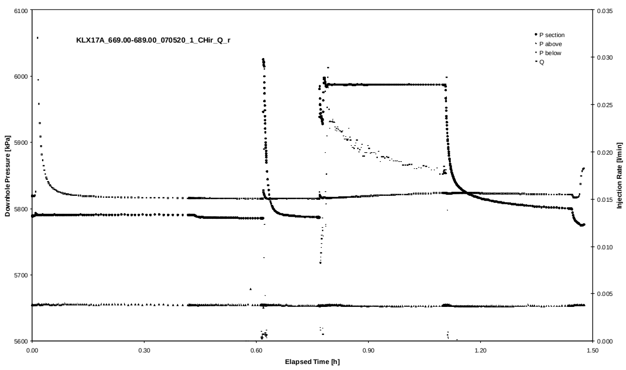
Comments:

The recommended transmissivity of 1.0•10-8 m2/s was derived from the analysis of the CHir phase, which shows the best quality of late time derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 2.0•10-9 m2/s to 2.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,619.1 kPa.

Test Summary Sheet

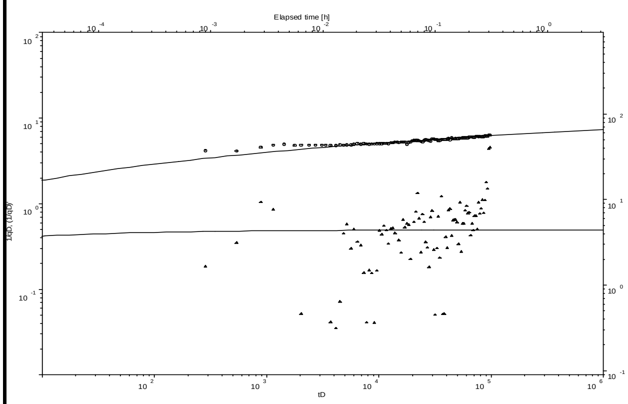
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070520 08:53
Test section from - to (m):	669.00-689.00	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

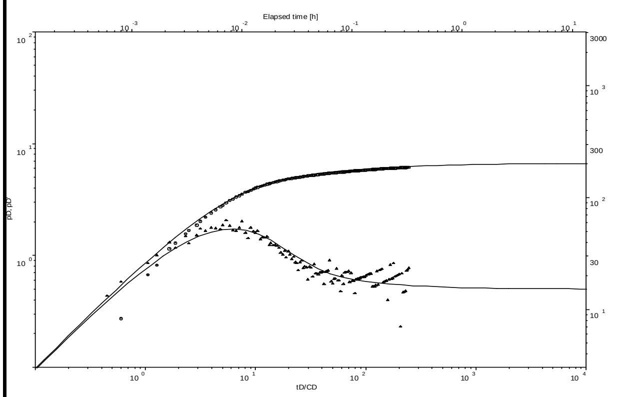


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5789		
p_i (kPa) =	5787		
p_p(kPa) =	5987	p_F (kPa) =	5800
Q_p (m^3/s)=	3.00E-07		
tp (s) =	1200	t_F (s) =	1200
S el S* (-)=	1.00E-06	S el S* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.1		
Derivative fact.=	0.08	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.5E-08		
T_M (m^2/s)=	1.5E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.92	dt_1 (min) =	3.45
dt_2 (min) =	14.16	dt_2 (min) =	18.30
T (m^2/s) =	1.5E-08	T (m^2/s) =	1.7E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.3E-10	K_s (m/s) =	8.5E-10
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.2E-11
C_D (-) =	NA	C_D (-) =	5.7E-03
ξ (-) =	1.09	ξ (-) =	1.44
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) =	3.45	C (m^3/Pa) =	5.2E-11
dt_2 (min) =	18.30	C_D (-) =	5.7E-03
T_T (m^2/s) =	1.7E-08	ξ (-) =	1.44
S (-) =	1.0E-06		
K_s (m/s) =	8.5E-10		
S_s (1/m) =	5.0E-08		

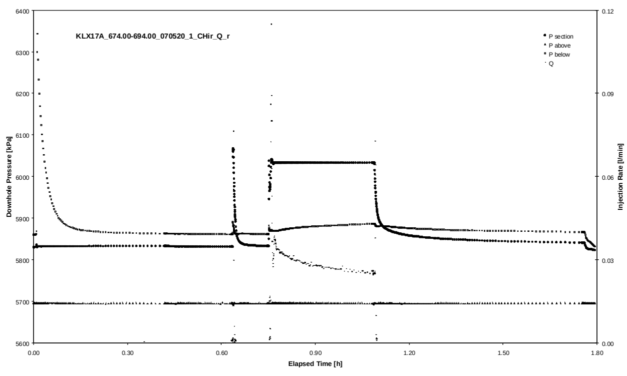
Comments:

The recommended transmissivity of 1.7•10-8 m2/s was derived from the analysis of the CHir phase, which shows the best quality of the derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 8.0•10-9 m2/s to 3.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,787.1 kPa.

Test Summary Sheet

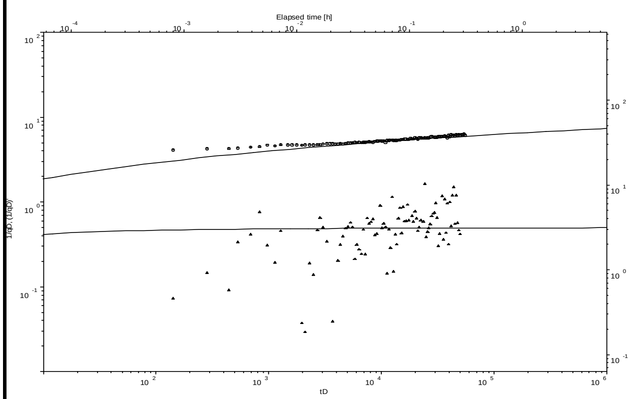
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070520 11:04
Test section from - to (m):	674.00-694.00	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2\cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

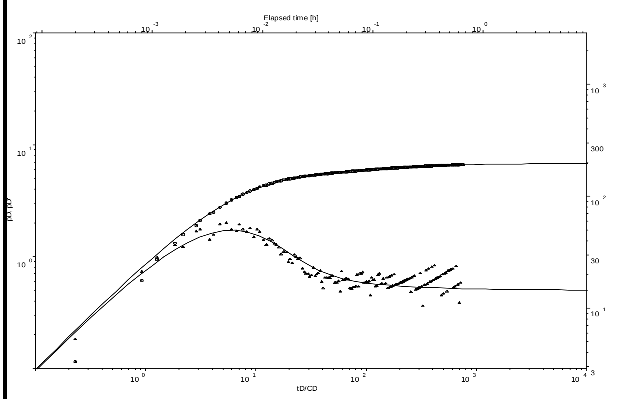


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5831		
p_i (kPa) =	5833		
p_p(kPa) =	6034	p_F (kPa) =	5842
Q_p (m^3/s)=	4.17E-07		
tp (s) =	1200	t_F (s) =	2400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.2		
Derivative fact.=	0.05	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	2.0E-08		
T_M (m^2/s)=	2.1E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.92	dt_1 (min) =	2.85
dt_2 (min) =	16.50	dt_2 (min) =	34.86
T (m^2/s) =	2.1E-08	T (m^2/s) =	2.5E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.0E-09	K_s (m/s) =	1.3E-09
S_s (1/m) =	5.0E-08	S_s (1/m) =	5.0E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	5.1E-11
C_D (-) =	NA	C_D (-) =	5.6E-03
ξ (-) =	0.62	ξ (-) =	1.45
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) =	2.85	C (m^3/Pa) =	5.1E-11
dt_2 (min) =	34.86	C_D (-) =	5.6E-03
T_T (m^2/s) =	2.5E-08	ξ (-) =	1.45
S (-) =	1.0E-06		
K_s (m/s) =	1.3E-09		
S_s (1/m) =	5.0E-08		

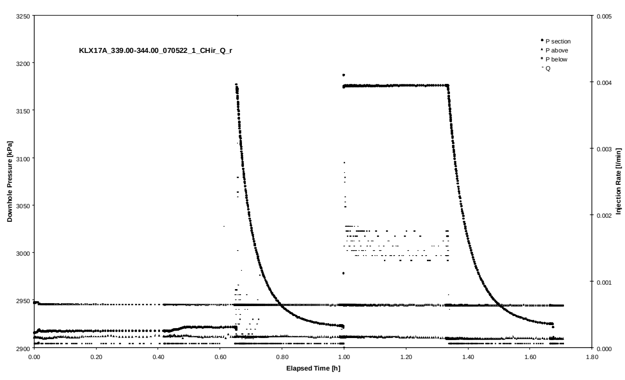
Comments:

The recommended transmissivity of 2.5•10-8 m2/s was derived from the analysis of the CHir phase, which shows the best quality of the derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-8 m2/s to 5.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,833.7 kPa.

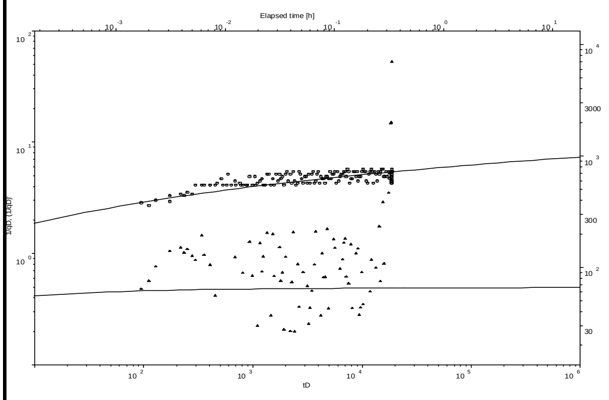
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070522 13:43
Test section from - to (m):	339.00-344.00	Responsible for test execution:	Philipp Wolf Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

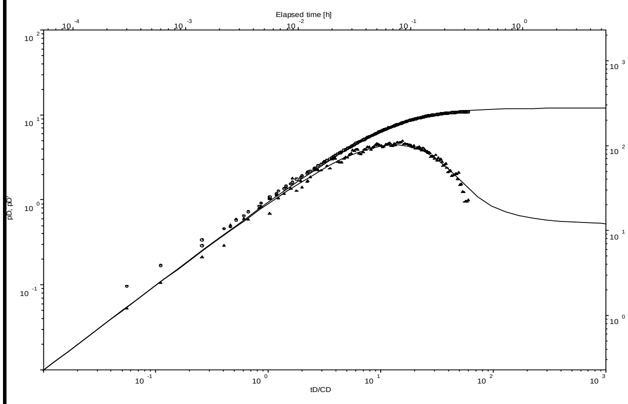
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	2916		
p_i (kPa) =	2923		
p_p(kPa) =	3176	p_F (kPa) =	2925
Q_p (m^3/s)=	2.50E-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)=	11.4		
Derivative fact.=	0.18	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.7E-10		
T_M (m^2/s)=	8.0E-10		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.49	dt_1 (min) =	#NV
dt_2 (min) =	15.90	dt_2 (min) =	#NV
T (m^2/s) =	7.7E-10	T (m^2/s) =	1.7E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.5E-10	K_s (m/s) =	3.5E-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 (-) =	1.68	ξ (-) =	7.98
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) =	0.49	C (m^3/Pa) =	2.2E-11
dt_2 (min) =	15.90	C_D (-) =	2.4E-03
T_T (m^2/s) =	7.7E-10	ξ (-) =	1.68
S (-) =	1.0E-06		
K_s (m/s) =	1.5E-10		
S_s (1/m) =	2.0E-07		

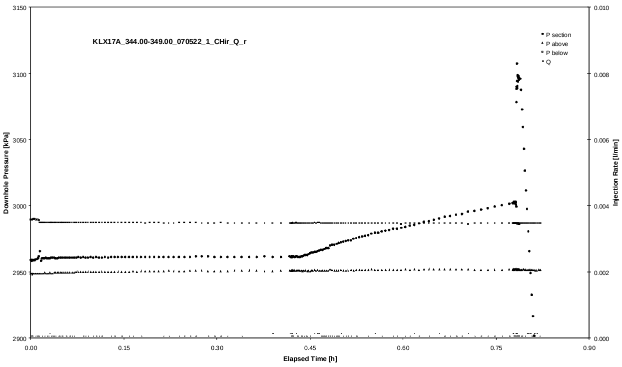
Comments:

The recommended transmissivity of 7.7•10-10 m2/s was derived from the analysis of the CHi phase, which shows a very noisy but already clear derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 4.0•10-10 m2/s to 3.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 2,908.0 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070522 15:54
Test section from - to (m):	344.00-349.00	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) =	2958		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	11.5		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

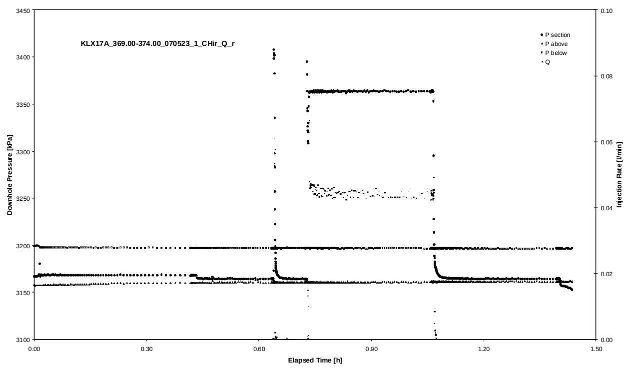
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

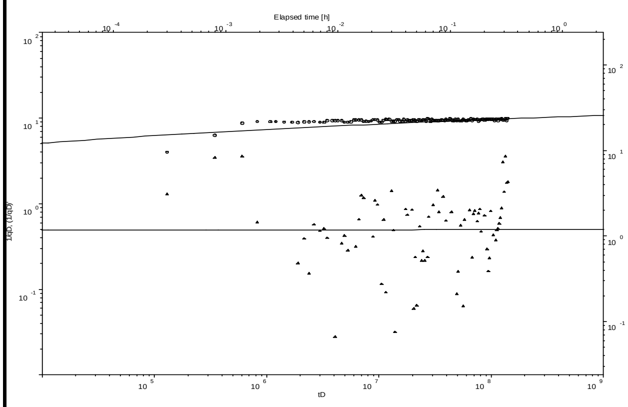
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070523 09:07
Test section from - to (m):	369.00-374.00	Responsible for test execution:	Reinder van der Wall Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

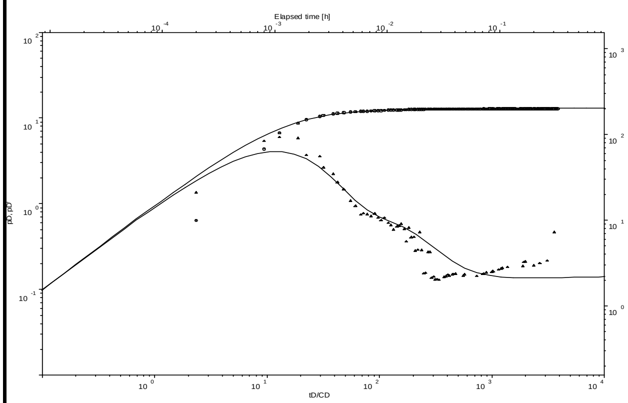
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3167		
p_i (kPa) =	3163		
p_p(kPa) =	3364	p_F (kPa) =	3164
Q_p (m^3/s)=	7.27E-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)=	11.9		
Derivative fact.=	0.10	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	3.5E-08		
T_M (m^2/s)=	2.9E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.30	dt_1 (min) =	0.37
dt_2 (min) =	15.96	dt_2 (min) =	1.03
T (m^2/s) =	5.4E-08	T (m^2/s) =	7.4E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-08	K_s (m/s) =	1.5E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	4.04	ξ (-) =	8.18
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) =	0.30	C (m^3/Pa) =	1.5E-11
dt_2 (min) =	15.96	C_D (-) =	1.6E-03
T_T (m^2/s) =	5.4E-08	ξ (-) =	4.04
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-08		
S_s (1/m) =	2.0E-07		

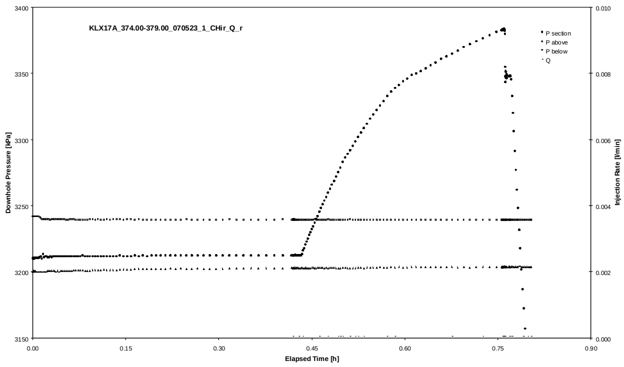
Comments:

The recommended transmissivity of 5.4•10-8 m2/s was derived from the analysis of the CHi phase, which shows a very noisy but already clear derivative horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 3.0•10-8 m2/s to 4.0•10-7 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,164.3 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070523 10:58
Test section from - to (m):	374.00-379.00	Responsible for test execution:	Reinder van der Wall 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) =	3210		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.0		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

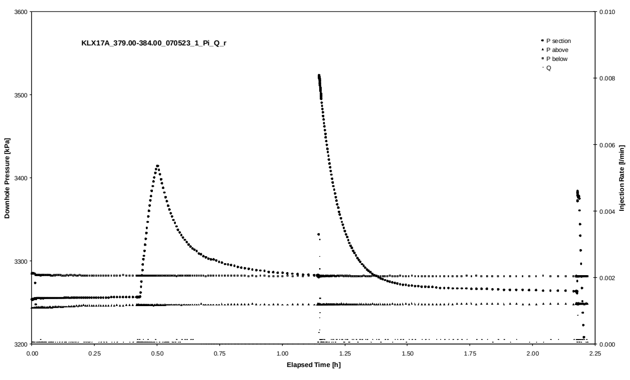
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070523 13:07
Test section from - to (m):	379.00-384.00	Responsible for test execution:	Reinder van der Wall Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

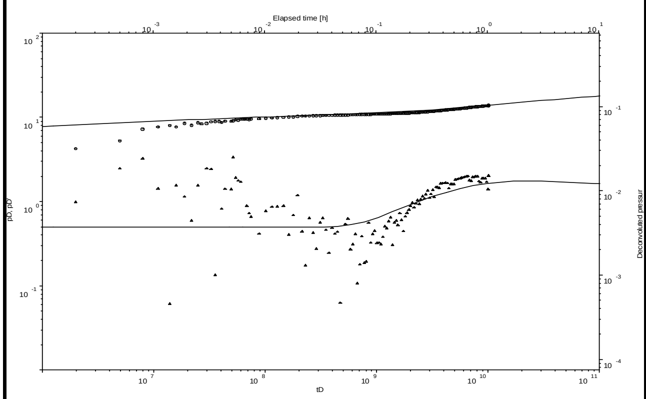


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3254		
p_i (kPa) =	3283		
p_p(kPa) =	3522	p_F (kPa) =	3264
Q_p (m^3/s)=	#NV		
tp (s) =	10	t_F (s) =	3660
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.0		
Derivative fact.=	#NV	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	#NV	dt_1 (min) =	16.86
dt_2 (min) =	#NV	dt_2 (min) =	58.98
T (m^2/s) =	NA	T (m^2/s) =	2.9E-10
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	5.9E-11
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.5E-11
C_D (-) =	NA	C_D (-) =	1.7E-03
ξ (-) =	NA	ξ (-) =	7.66
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) =	16.86	C (m^3/Pa) =	1.5E-11
dt_2 (min) =	58.98	C_D (-) =	1.7E-03
T_T (m^2/s) =	2.9E-10	ξ (-) =	7.66
S (-) =	1.0E-06		
K_s (m/s) =	5.9E-11		
S_s (1/m) =	2.0E-07		

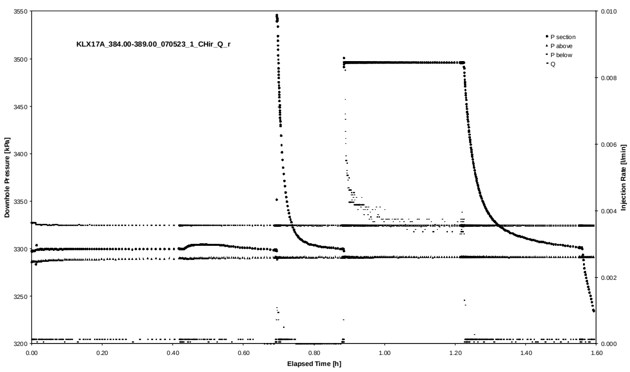
Comments:

The recommended transmissivity of 2.9•10-10 m2/s was derived from the analysis of the PI phase (outer zone) where the data are not too noisy and the derivative shows a clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-10 m2/s to 1.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth could not be extrapolated from the analysis.

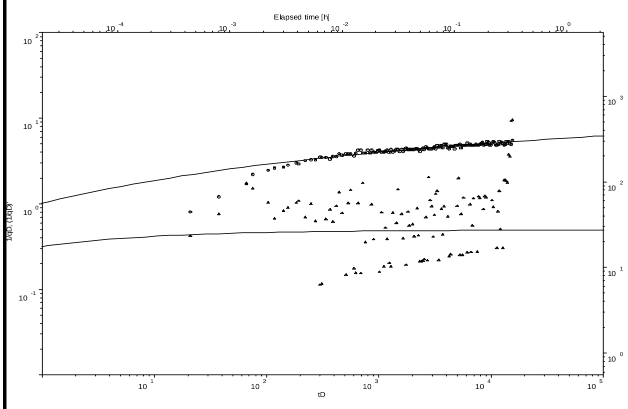
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070523 15:49
Test section from - to (m):	384.00-389.00	Responsible for test execution:	Reinder van der Wall Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

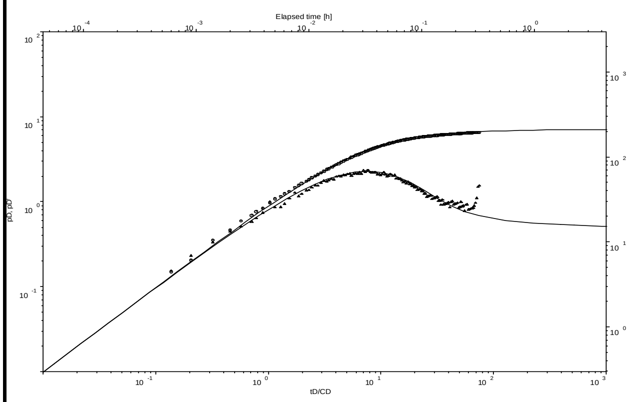
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3297		
p_i (kPa) =	3300		
p_p(kPa) =	3496	p_F (kPa) =	3301
Q_p (m^3/s)=	5.83E-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)=	12.1		
Derivative fact.=	0.07	Derivative fact.=	0.04
Results		**Results**	
Q/s (m^2/s)=	2.9E-09		
T_M (m^2/s)=	2.4E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.35	dt_1 (min) =	9.90
dt_2 (min) =	15.42	dt_2 (min) =	17.70
T (m^2/s) =	2.4E-09	T (m^2/s) =	3.4E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.8E-10	K_s (m/s) =	6.8E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.4E-11
C_D (-) =	NA	C_D (-) =	3.8E-03
ξ (-) =	1.03	ξ (-) =	2.80
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) =	9.90	C (m^3/Pa) =	3.4E-11
dt_2 (min) =	17.70	C_D (-) =	3.8E-03
T_T (m^2/s) =	3.4E-09	ξ (-) =	2.80
S (-) =	1.0E-06		
K_s (m/s) =	6.8E-10		
S_s (1/m) =	2.0E-07		

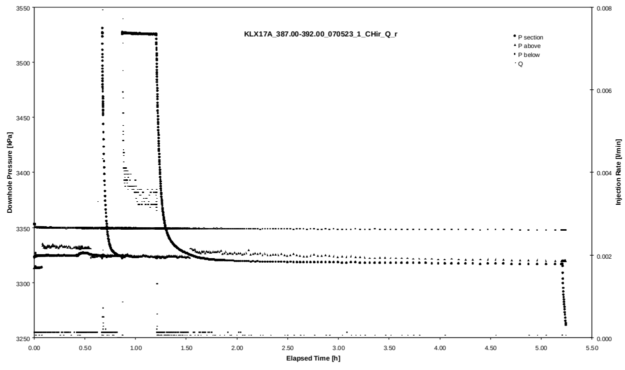
Comments:

The recommended transmissivity of 3.4•10-9 m2/s was derived from the analysis of the CHir phase, which shows a much better data quality and a nearly horizontal stabilisation at late times. The confidence range for the interval transmissivity is estimated to be 1.0•10-9 m2/s to 6.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,288.7 kPa.

Test Summary Sheet

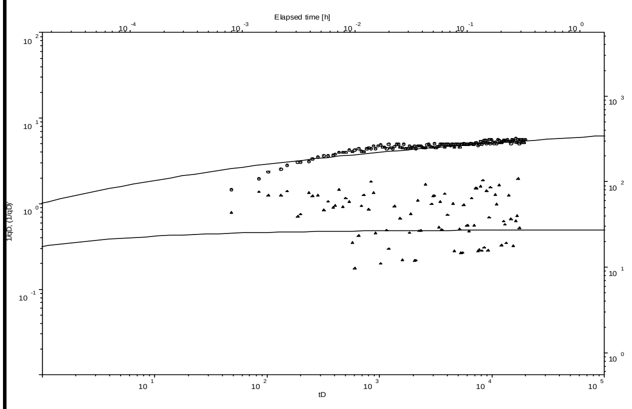
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070523 17:48
Test section from - to (m):	387.00-392.00	Responsible for test execution:	Reinder van der Wall Linda Höckert
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

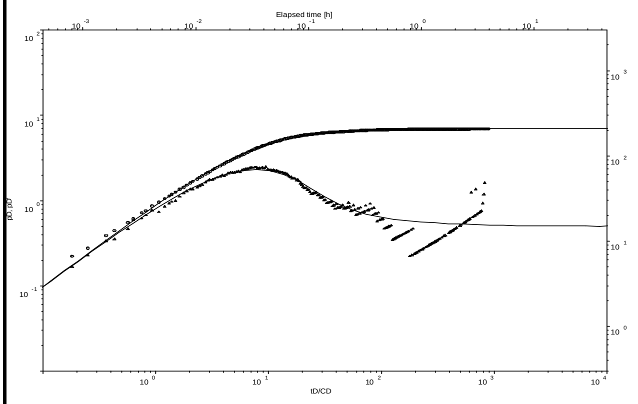


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3324		
p_i (kPa) =	3323		
p_p(kPa) =	3524	p_F (kPa) =	3317
Q_p (m^3/s)=	5.67E-08		
tp (s) =	1200	t_F (s) =	14400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.2		
Derivative fact.=	0.07	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	2.8E-09		
T_M (m^2/s)=	2.3E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.65	dt_1 (min) =	11.76
dt_2 (min) =	17.46	dt_2 (min) =	145.20
T (m^2/s) =	2.3E-09	T (m^2/s) =	3.2E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	4.7E-10	K_s (m/s) =	6.3E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	3.2E-11
C_D (-) =	NA	C_D (-) =	3.6E-03
ξ (-) =	1.17	ξ (-) =	2.83
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) =	11.76	C (m^3/Pa) =	3.2E-11
dt_2 (min) =	145.20	C_D (-) =	3.6E-03
T_T (m^2/s) =	3.2E-09	ξ (-) =	2.83
S (-) =	1.0E-06		
K_s (m/s) =	6.3E-10		
S_s (1/m) =	2.0E-07		

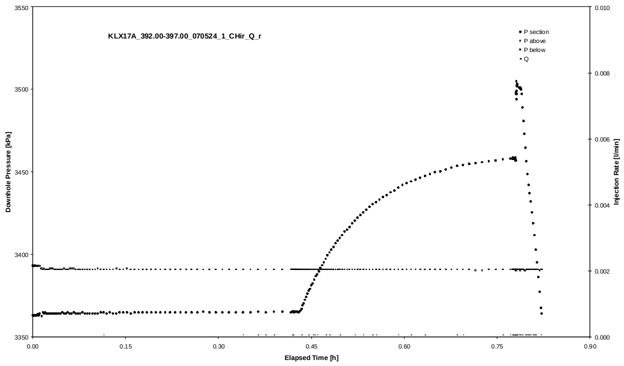
Comments:

The recommended transmissivity of 3.2•10-9 m2/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality and an already horizontal derivative stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-9 m2/s to 6.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,315.8 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070524 10:35
Test section from - to (m):	392.00-397.00	Responsible for test execution:	Reinder van der Wall 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) =	3363		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.2		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

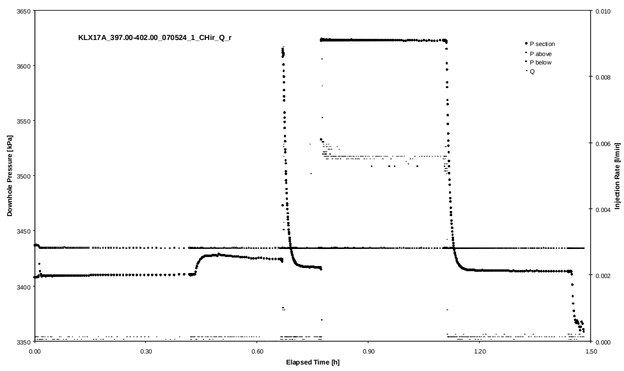
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

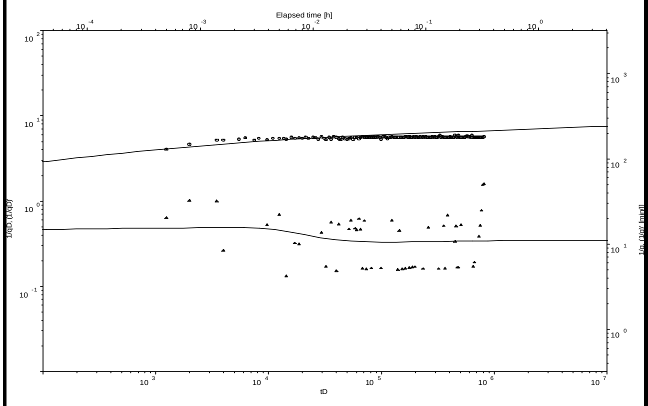
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070524 13:08
Test section from - to (m):	397.00-402.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

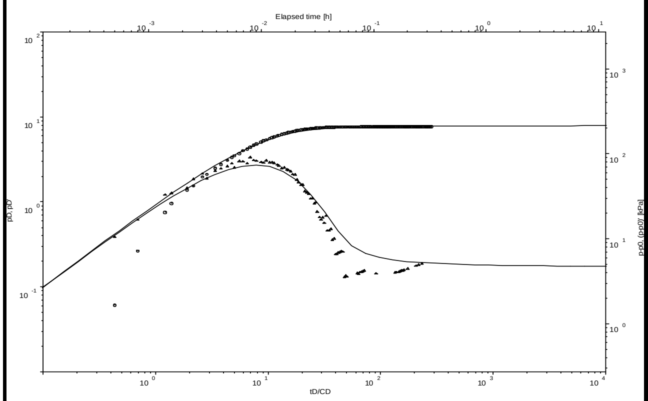


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3408		
p_i (kPa) =	3415		
p_p(kPa) =	3622	p_F (kPa) =	3413
Q_p (m^3/s)=	9.27E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.3		
Derivative fact.=	0.09	Derivative fact.=	0.03
Results		**Results**	
Q/s (m^2/s)=	4.4E-09		
T_M (m^2/s)=	3.6E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.71	dt_1 (min) =	3.20
dt_2 (min) =	17.82	dt_2 (min) =	16.14
T (m^2/s) =	5.6E-09	T (m^2/s) =	1.5E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.1E-09	K_s (m/s) =	3.0E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	2.77	ξ (-) =	8.19
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) =	0.71	C (m^3/Pa) =	1.4E-11
dt_2 (min) =	17.82	C_D (-) =	1.6E-03
T_T (m^2/s) =	5.6E-09	ξ (-) =	2.77
S (-) =	1.0E-06		
K_s (m/s) =	1.1E-09		
S_s (1/m) =	2.0E-07		

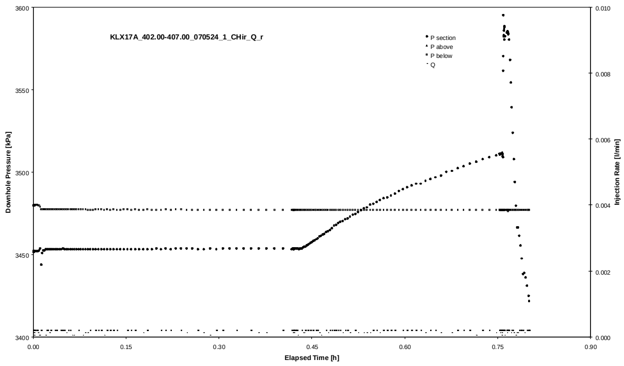
Comments:

The recommended transmissivity of 5.6•10-9 m2/s was derived from the analysis of the CHi phase (outer zone), which shows a noisy but still clear horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be 3.0•10-9 m2/s to 4.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,412.9 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070524 15:07
Test section from - to (m):	402.00-407.00	Responsible for test execution:	Reinder van der Wall 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) =	3452		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.4		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

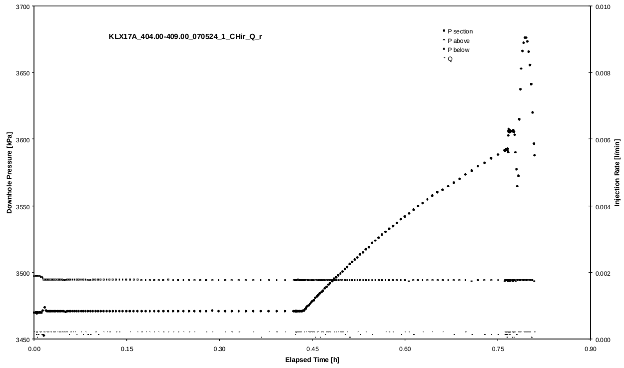
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070524 16:22
Test section from - to (m):	404.00-409.00	Responsible for test execution:	Reinder van der Wall 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) =	3469		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.4		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

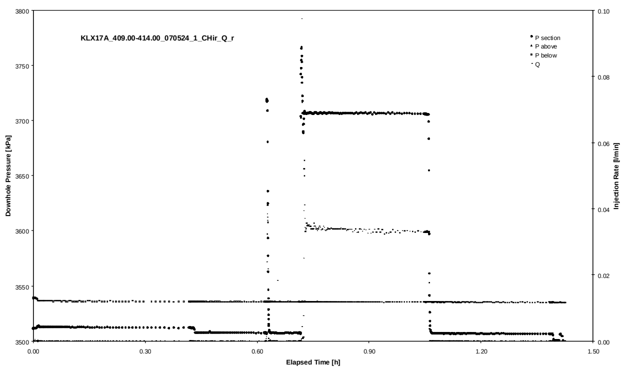
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

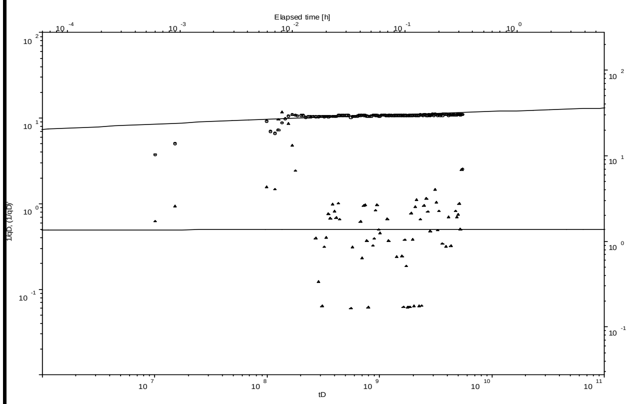
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070524 17:35
Test section from - to (m):	409.00-414.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

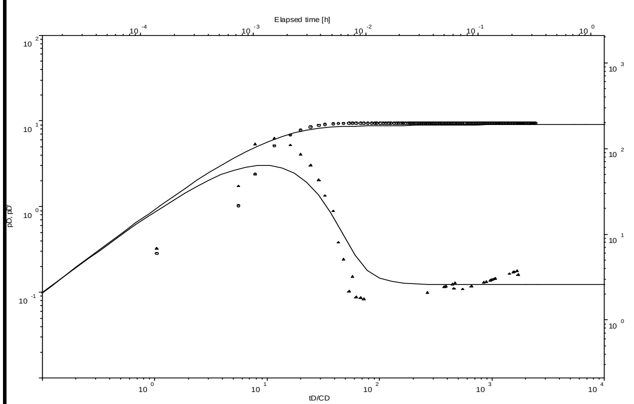
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3512		
p_i (kPa) =	3507		
p_p(kPa) =	3705	p_F (kPa) =	3506
Q_p (m^3/s)=	5.50E-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)=	12.5		
Derivative fact.=	0.07	Derivative fact.=	0.05
Results		**Results**	
Q/s (m^2/s)=	2.7E-08		
T_M (m^2/s)=	2.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.97	dt_1 (min) =	0.46
dt_2 (min) =	18.72	dt_2 (min) =	13.68
T (m^2/s) =	4.8E-08	T (m^2/s) =	1.7E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	9.6E-09	K_s (m/s) =	3.4E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-11
C_D (-) =	NA	C_D (-) =	1.4E-03
ξ (-) =	5.93	ξ (-) =	5.59
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) =	0.97	C (m^3/Pa) =	1.3E-11
dt_2 (min) =	18.72	C_D (-) =	1.4E-03
T_T (m^2/s) =	4.8E-08	ξ (-) =	5.93
S (-) =	1.0E-06		
K_s (m/s) =	9.6E-09		
S_s (1/m) =	2.0E-07		

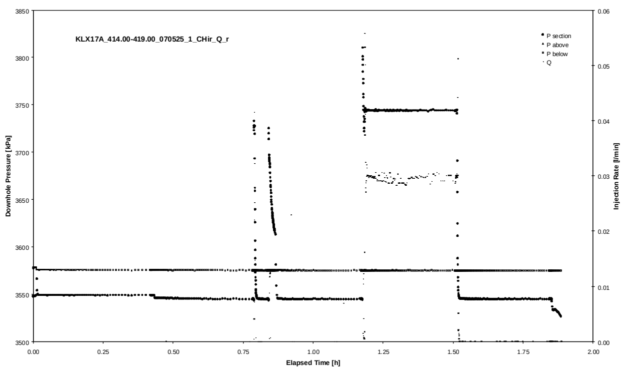
Comments:

The recommended transmissivity of 4.8•10-8 m2/s was derived from the analysis of the CHi phase, which shows a good horizontal stabilisation of the derivative and the more simple flow model. The confidence range for the interval transmissivity is estimated to be 2.0•10-8 m2/s to 3.0•10-7 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,506.6 kPa.

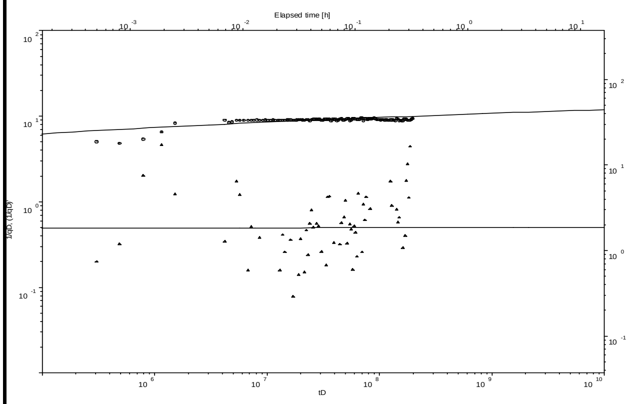
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070525 08:18
Test section from - to (m):	414.00-419.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

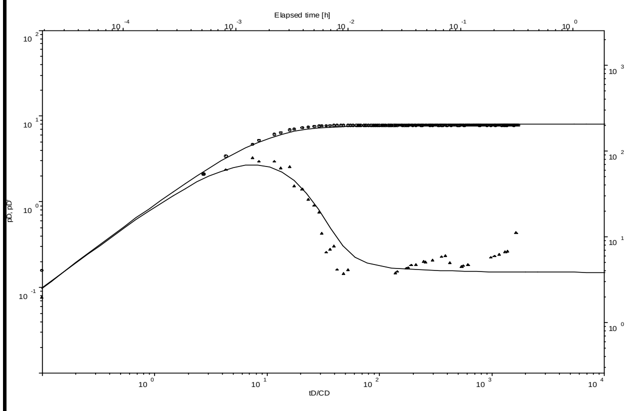
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3549		
p_i (kPa) =	3544		
p_p(kPa) =	3744	p_F (kPa) =	3544
Q_p (m^3/s)=	5.00E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.5		
Derivative fact.=	0.05	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	2.5E-08		
T_M (m^2/s)=	2.0E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.71	dt_1 (min) =	0.48
dt_2 (min) =	16.68	dt_2 (min) =	7.02
T (m^2/s) =	3.5E-08	T (m^2/s) =	1.0E-07
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	7.0E-09	K_s (m/s) =	2.0E-08
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.3E-11
C_D (-) =	NA	C_D (-) =	1.5E-03
ξ (-) =	4.43	ξ (-) =	5.57
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) =	0.71	C (m^3/Pa) =	1.3E-11
dt_2 (min) =	16.68	C_D (-) =	1.5E-03
T_T (m^2/s) =	3.5E-08	ξ (-) =	4.43
S (-) =	1.0E-06		
K_s (m/s) =	7.0E-09		
S_s (1/m) =	2.0E-07		

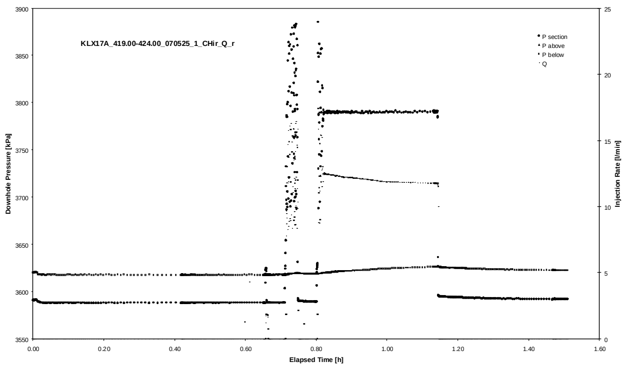
Comments:

The recommended transmissivity of 3.5•10-8 m2/s was derived from the analysis of the CHi phase, which shows a horizontal stabilisation of the derivative and the more simple flow model. The confidence range for the interval transmissivity is estimated to be 2.0•10-8 m2/s to 2.0•10-7 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,544.9 kPa.

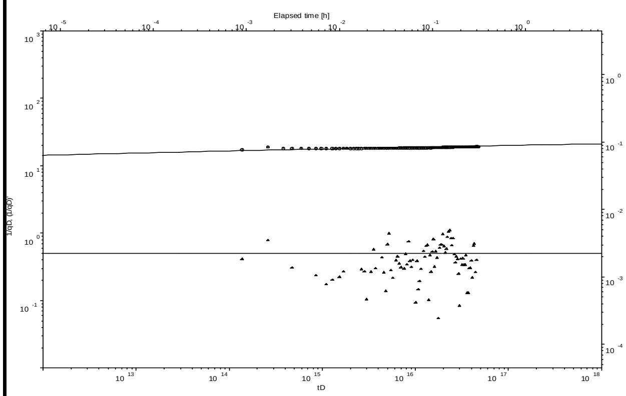
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070525 10:36
Test section from - to (m):	419.00-424.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

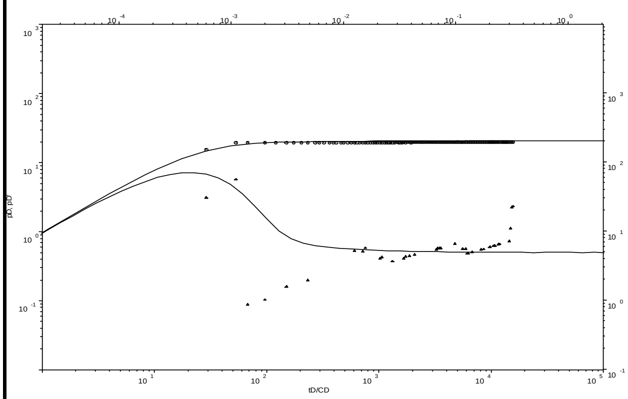
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3591		
p_i (kPa) =	3590		
p_p(kPa) =	3791	p_F (kPa) =	3592
Q_p (m^3/s)=	1.96E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.3		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.6E-06		
T_M (m^2/s)=	7.9E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.72	dt_1 (min) =	0.75
dt_2 (min) =	17.82	dt_2 (min) =	14.76
T (m^2/s) =	2.9E-05	T (m^2/s) =	3.2E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	5.8E-06	K_s (m/s) =	6.4E-06
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-09
C_D (-) =	NA	C_D (-) =	1.7E-01
ξ (-) =	10.73	ξ (-) =	13.57
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) =	0.75	C (m^3/Pa) =	1.5E-09
dt_2 (min) =	14.76	C_D (-) =	1.7E-01
T_T (m^2/s) =	3.2E-05	ξ (-) =	13.57
S (-) =	1.0E-06		
K_s (m/s) =	6.4E-06		
S_s (1/m) =	2.0E-07		

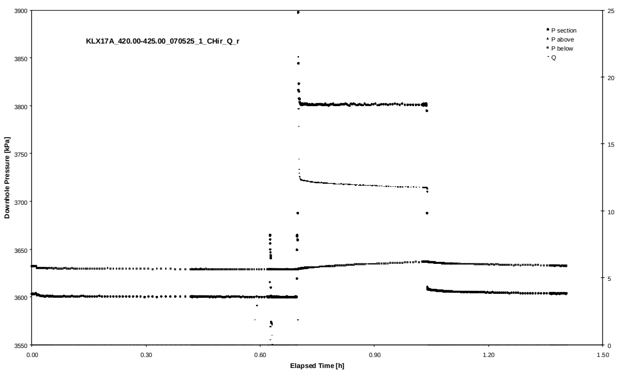
Comments:

The recommended transmissivity of 3.2•10-5 m2/s was derived from the analysis of the CHir phase, which shows a good horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be 1.0•10-5 m2/s to 6.0•10-5 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,591.5 kPa.

Test Summary Sheet

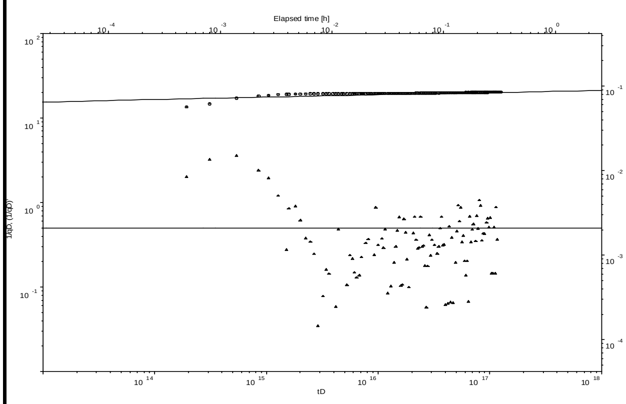
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070525 12:56
Test section from - to (m):	420.00 - 425.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

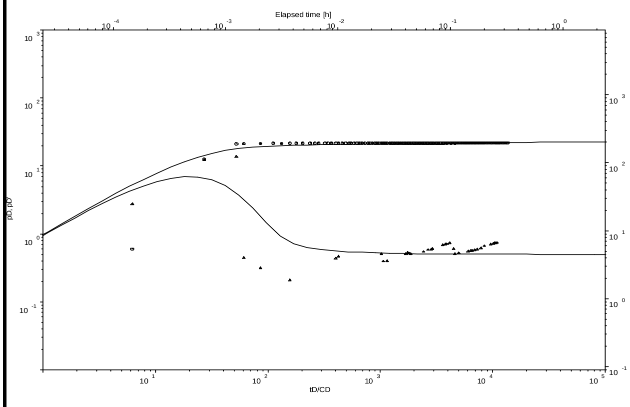


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3604		
p_i (kPa) =	3600		
p_p(kPa) =	3802	p_F (kPa) =	3604
Q_p (m^3/s)=	1.94E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.3		
Derivative fact.=	0.01	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	9.4E-06		
T_M (m^2/s)=	7.8E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.68	dt_1 (min) =	0.57
dt_2 (min) =	16.86	dt_2 (min) =	15.48
T (m^2/s) =	3.1E-05	T (m^2/s) =	3.5E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	6.1E-06	K_s (m/s) =	7.0E-06
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 (-) =	11.17	ξ (-) =	13.45
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) =	0.57	C (m^3/Pa) =	1.9E-09
dt_2 (min) =	15.48	C_D (-) =	2.1E-01
T_T (m^2/s) =	3.5E-05	ξ (-) =	13.45
S (-) =	1.0E-06		
K_s (m/s) =	7.0E-06		
S_s (1/m) =	2.0E-07		

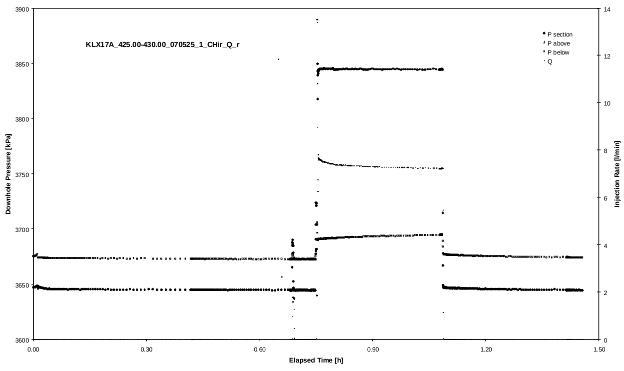
Comments:

The recommended transmissivity of 3.5•10-5 m2/s was derived from the analysis of the CHir phase, which shows a good and less noisy horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be 4.0•10-6 m2/s to 6.0•10-5 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,602.3 kPa.

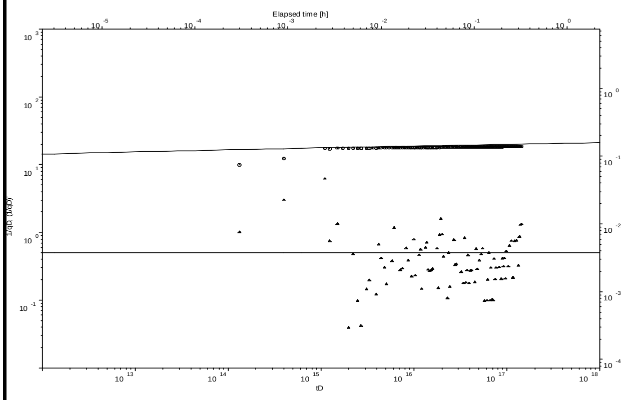
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070525 14:50
Test section from - to (m):	425.00-430.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

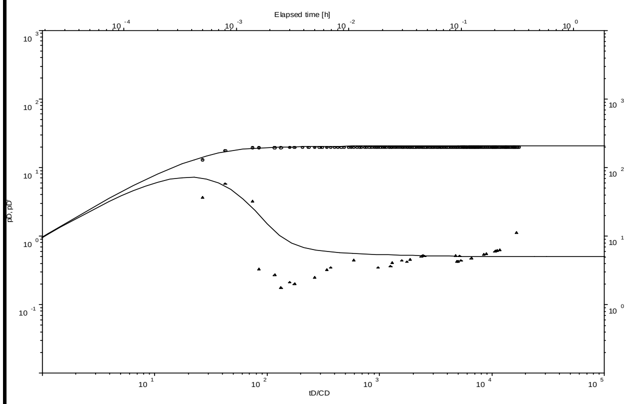
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3649		
p_i (kPa) =	3644		
p_p(kPa) =	3844	p_F (kPa) =	3644
Q_p (m^3/s)=	1.20E-04		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.4		
Derivative fact.=	0.01	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	5.9E-06		
T_M (m^2/s)=	4.9E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.30	dt_1 (min) =	0.41
dt_2 (min) =	13.44	dt_2 (min) =	13.26
T (m^2/s) =	1.7E-05	T (m^2/s) =	1.9E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.5E-06	K_s (m/s) =	3.8E-06
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.2E-10
C_D (-) =	NA	C_D (-) =	9.0E-02
ξ (-) =	11.52	ξ (-) =	13.87
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) =	0.41	C (m^3/Pa) =	8.2E-10
dt_2 (min) =	13.26	C_D (-) =	9.0E-02
T_T (m^2/s) =	1.9E-05	ξ (-) =	13.87
S (-) =	1.0E-06		
K_s (m/s) =	3.8E-06		
S_s (1/m) =	2.0E-07		

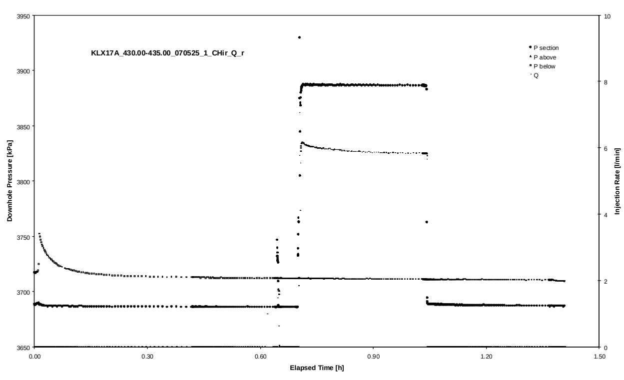
Comments:

The recommended transmissivity of 1.9•10-5 m2/s was derived from the analysis of the CHir phase, which shows a good and less noisy horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be 1.0•10-5 m2/s to 4.0•10-5 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,645.1 kPa.

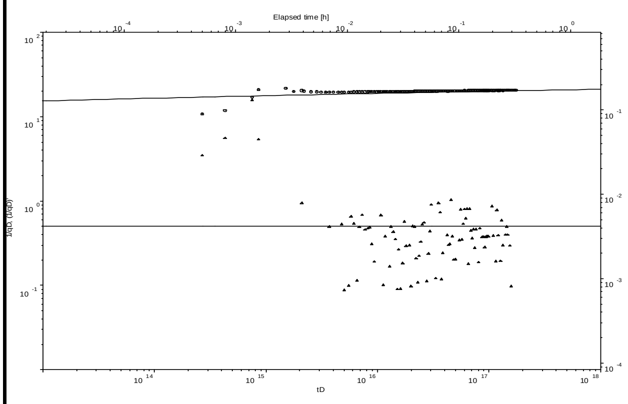
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070525 16:44
Test section from - to (m):	430.00-435.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

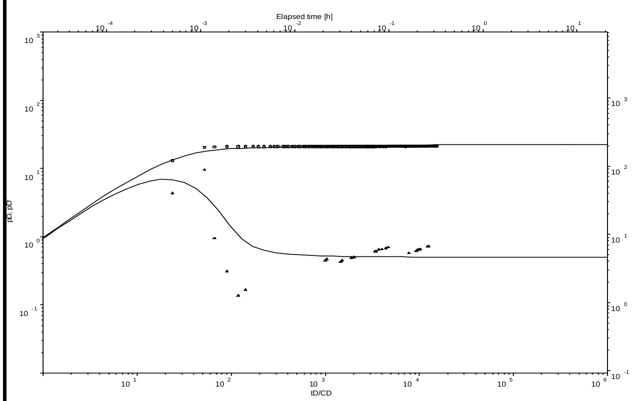
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3689		
p_i (kPa) =	3686		
p_p(kPa) =	3886	p_F (kPa) =	3687
Q_p (m^3/s)=	9.73E-05		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.8		
Derivative fact.=	0.02	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	4.8E-06		
T_M (m^2/s)=	3.9E-06		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.41	dt_1 (min) =	1.27
dt_2 (min) =	16.08	dt_2 (min) =	15.90
T (m^2/s) =	1.6E-05	T (m^2/s) =	1.7E-05
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.1E-06	K_s (m/s) =	3.4E-06
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.1E-10
C_D (-) =	NA	C_D (-) =	9.0E-02
ξ (-) =	11.67	ξ (-) =	13.88
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) =	1.27	C (m^3/Pa) =	8.1E-10
dt_2 (min) =	15.90	C_D (-) =	9.0E-02
T_T (m^2/s) =	1.7E-05	ξ (-) =	13.88
S (-) =	1.0E-06		
K_s (m/s) =	3.4E-06		
S_s (1/m) =	2.0E-07		

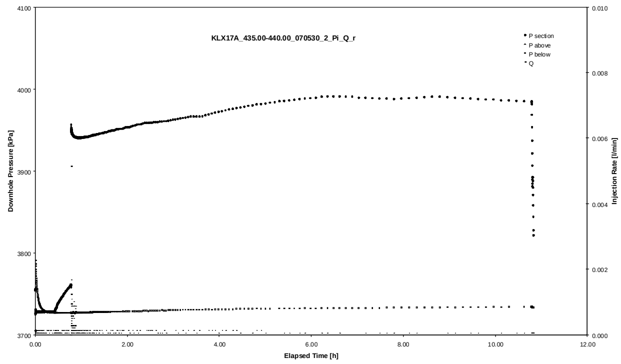
Comments:

The recommended transmissivity of 1.7•10-5 m2/s was derived from the analysis of the CHir phase, which shows a good and less noisy horizontal stabilisation of the derivative. The confidence range for the interval transmissivity is estimated to be 4.0•10-6 m2/s to 4.0•10-5 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,686.0 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	2
Borehole ID:	KLX17A	Test start:	070530 16:22
Test section from - to (m):	435.00-440.00	Responsible for test execution:	Reinder van der Wall 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

Not analysed

Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	3728		
p_i (kPa) =	3761		
p_p(kPa) =	3951	p_F (kPa) =	3985
Q_p (m^3/s)=	#NV		
tp (s) =	10	t_F (s) =	36000
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	12.9		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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

Selected representative parameters.			
dt_1 (min) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

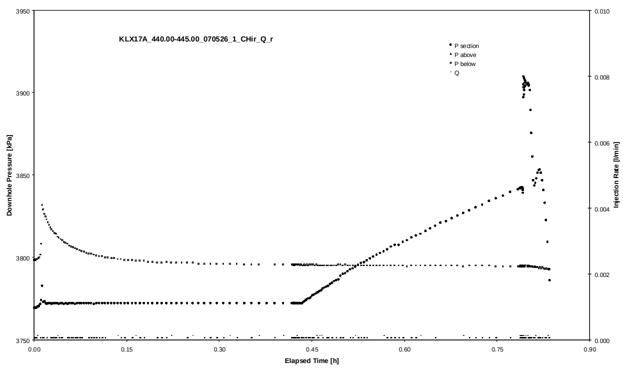
Comments:

Based on the test response (no pulse recovery and flow rate below of 0.001 L/min) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070526 09:56
Test section from - to (m):	440.00-445.00	Responsible for test execution:	Reinder van der Wall 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) =	3770		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.0		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

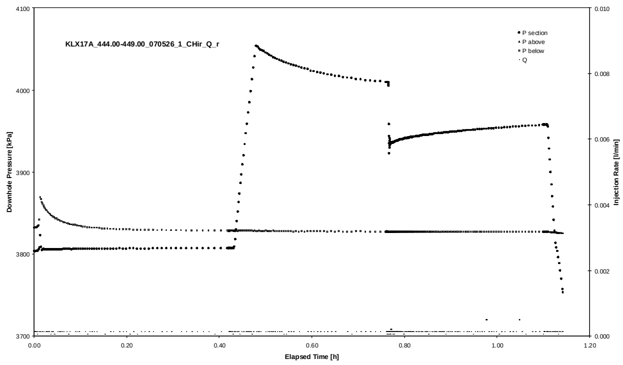
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070526 11:16
Test section from - to (m):	444.00-449.00	Responsible for test execution:	Reinder van der Wall 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) =	3804		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.1		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

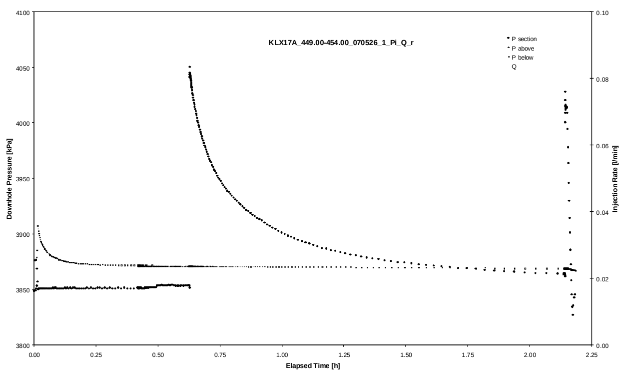
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070526 13:34
Test section from - to (m):	449.00-454.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

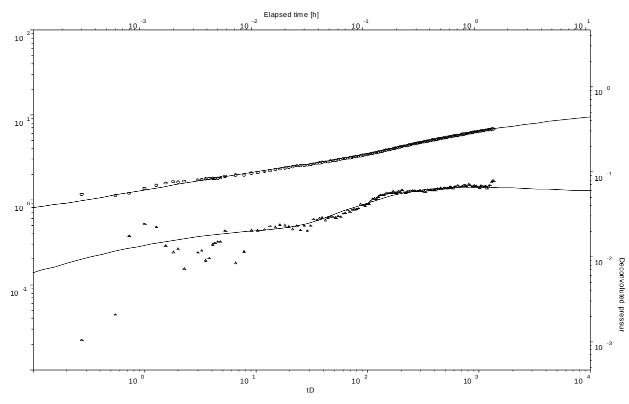


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3849		
p_i (kPa) =	3853		
p_p(kPa) =	4043	p_F (kPa) =	3862
Q_p (m^3/s)=	#NV		
tp (s) =	10	t_F (s) =	5400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.1		
Derivative fact.=	#NV	Derivative fact.=	0.09
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	#NV	dt_1 (min) =	10.08
dt_2 (min) =	#NV	dt_2 (min) =	83.40
T (m^2/s) =	NA	T (m^2/s) =	4.6E-11
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	9.2E-12
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.2E-11
C_D (-) =	NA	C_D (-) =	1.4E-03
ξ (-) =	NA	ξ (-) =	0.58
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) =	10.08	C (m^3/Pa) =	1.2E-11
dt_2 (min) =	83.40	C_D (-) =	1.4E-03
T_T (m^2/s) =	4.6E-11	ξ (-) =	0.58
S (-) =	1.0E-06		
K_s (m/s) =	9.2E-12		
S_s (1/m) =	2.0E-07		

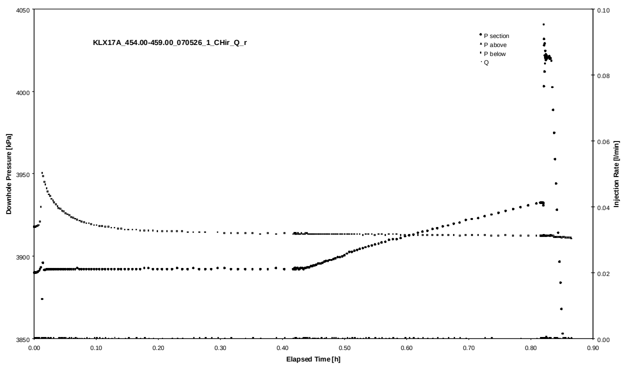
Comments:

The recommended transmissivity of 4.6•10-11 m2/s was derived from the analysis of the Pi phase (outer zone) where the data are of good quality and the derivative shows a clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 2.0•10-11 m2/s to 2.0•10-10 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth could not be extrapolated from the analysis.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070526 16:14
Test section from - to (m):	454.00-459.00	Responsible for test execution:	Reinder van der Wall 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) =	3890		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.2		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

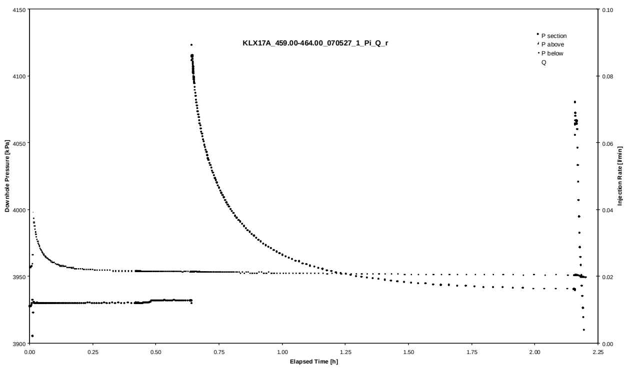
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	Pi
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070527 08:14
Test section from - to (m):	459.00-464.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

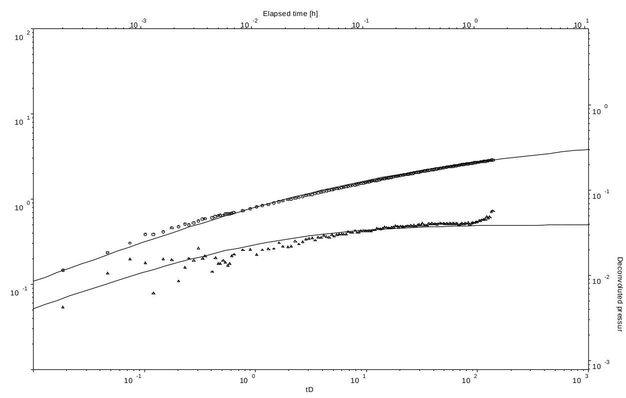


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3929		
p_i (kPa) =	3932		
p_p(kPa) =	4115	p_F (kPa) =	3940
Q_p (m^3/s)=	#NV		
tp (s) =	10	t_F (s) =	5400
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.2		
Derivative fact.=	#NV	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	#NV	dt_1 (min) =	0.16
dt_2 (min) =	#NV	dt_2 (min) =	64.80
T (m^2/s) =	NA	T (m^2/s) =	1.1E-10
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.1E-11
S_s (1/m) =	NA	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
□ (-) =	NA	□ (-) =	-0.52
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) =	0.16	C (m^3/Pa) =	1.9E-11
dt_2 (min) =	64.80	C_D (-) =	2.1E-03
T_T (m^2/s) =	1.1E-10	□ (-) =	-0.52
S (-) =	1.0E-06		
K_s (m/s) =	2.1E-11		
S_s (1/m) =	2.0E-07		

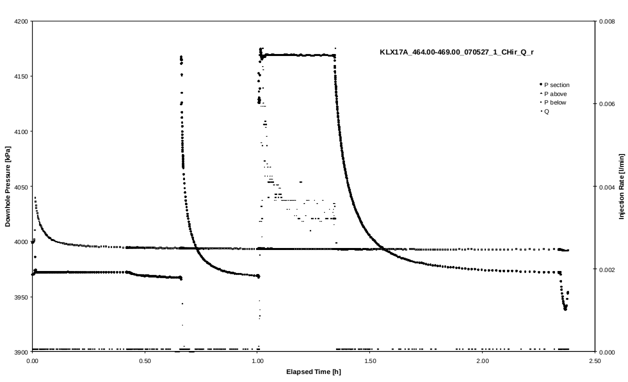
Comments:

The recommended transmissivity of 1.1•10-10 m2/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 6.0•10-11 m2/s to 2.0•10-10 m2/s. The flow dimension displayed during the test is 2 (radial flow). The static pressure measured at transducer depth could not be extrapolated from the analysis.

Test Summary Sheet

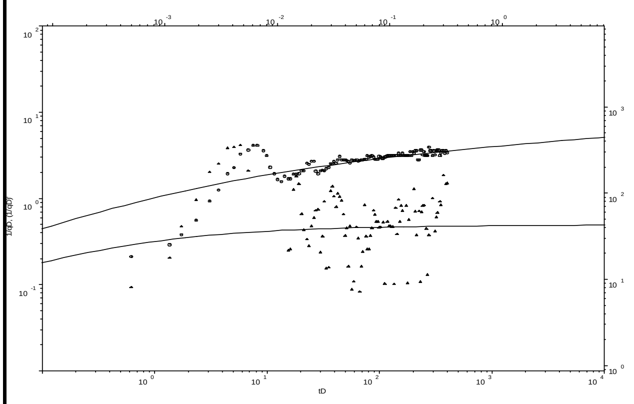
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070527 10:58
Test section from - to (m):	464.00-469.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

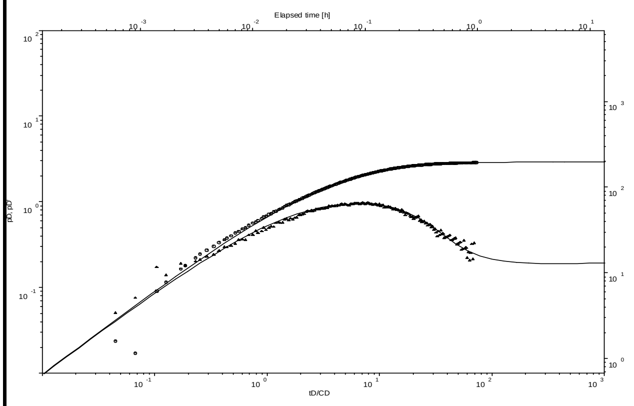


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	3972		
p_i (kPa) =	3969		
p_p(kPa) =	4169	p_F (kPa) =	3970
Q_p (m^3/s)=	5.67E-08		
tp (s) =	1200	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.4		
Derivative fact.=	0.12	Derivative fact.=	0.07
Results		**Results**	
Q/s (m^2/s)=	2.8E-09		
T_M (m^2/s)=	2.3E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.03	dt_1 (min) =	#NV
dt_2 (min) =	15.48	dt_2 (min) =	#NV
T (m^2/s) =	1.5E-09	T (m^2/s) =	1.5E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	3.0E-10	K_s (m/s) =	3.1E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.7E-11
C_D (-) =	NA	C_D (-) =	5.2E-03
ξ (-) =	-0.55	ξ (-) =	-0.82
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) =	4.7E-11
dt_2 (min) =	#NV	C_D (-) =	5.2E-03
T_T (m^2/s) =	1.5E-09	ξ (-) =	-0.82
S (-) =	1.0E-06		
K_s (m/s) =	3.1E-10		
S_s (1/m) =	2.0E-07		

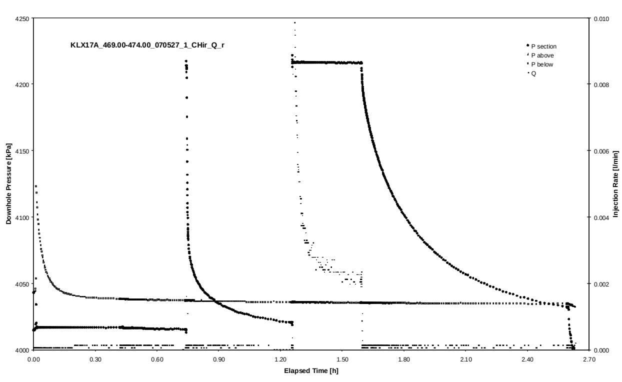
Comments:

The recommended transmissivity of 1.5•10-9 m2/s was derived from the analysis of the CHir phase (inner zone) which shows the best match with the type curve. The confidence range for the interval transmissivity is estimated to be 8.0•10-10 m2/s to 8.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 3,968.1 kPa.

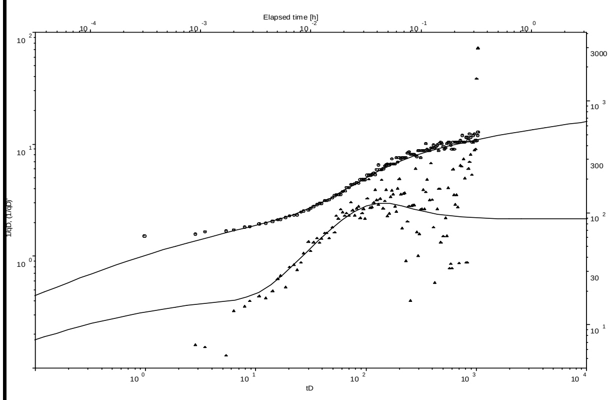
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070527 14:03
Test section from - to (m):	469.00-474.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

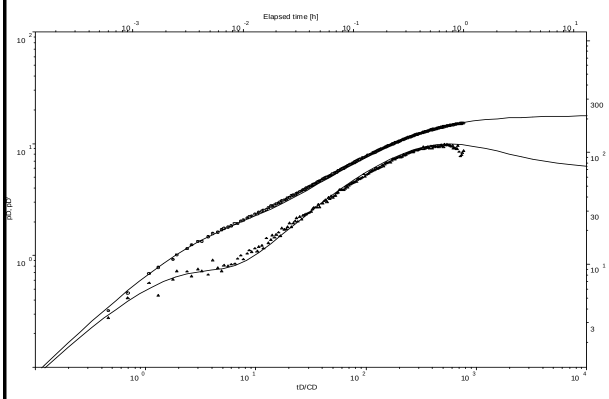
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4016		
p_i (kPa) =	4019		
p_p(kPa) =	4216	p_F (kPa) =	4034
Q_p (m^3/s)=	4.08E-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)=	13.4		
Derivative fact.=	0.08	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	2.0E-09		
T_M (m^2/s)=	1.7E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.15	dt_1 (min) =	27.54
dt_2 (min) =	12.90	dt_2 (min) =	59.82
T (m^2/s) =	7.2E-10	T (m^2/s) =	5.9E-10
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.4E-10	K_s (m/s) =	1.2E-10
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	2.1E-11
C_D (-) =	NA	C_D (-) =	2.3E-03
ξ (-) =	-0.47	ξ (-) =	-0.40
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) =	27.54	C (m^3/Pa) =	2.1E-11
dt_2 (min) =	59.82	C_D (-) =	2.3E-03
T_T (m^2/s) =	5.9E-10	ξ (-) =	-0.40
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-10		
S_s (1/m) =	2.0E-07		

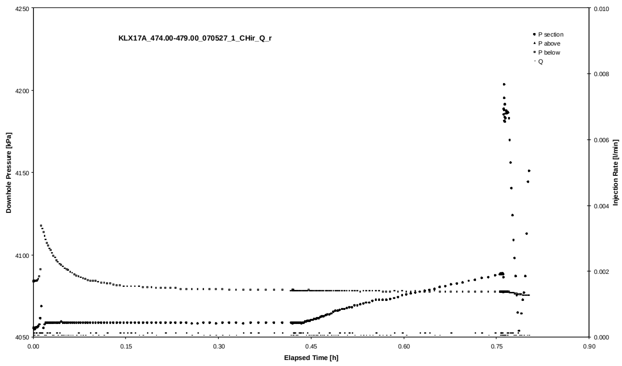
Comments:

The recommended transmissivity of 5.9•10-10 m2/s was derived from the analysis of the CHir phase (outer zone) which shows the best match with the type curve and horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 4.0•10-10 m2/s to 8.0•10-9 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 4,006.6 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070527 17:09
Test section from - to (m):	474.00-479.00	Responsible for test execution:	Reinder van der Wall 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) =	4055		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.5		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

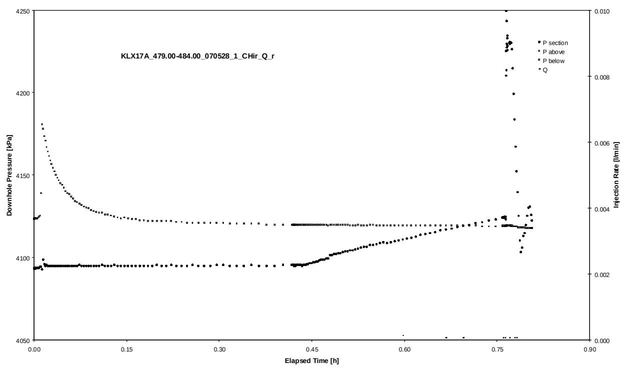
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070528 08:04
Test section from - to (m):	479.00-484.00	Responsible for test execution:	Reinder van der Wall 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

Not analysed

Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	4093		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.6		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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

Selected representative parameters.			
dt_1 (min) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

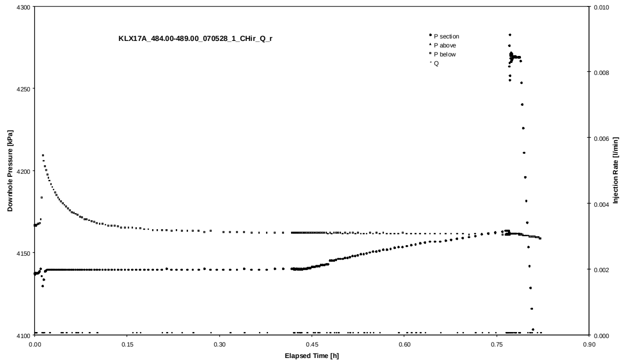
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070528 09:21
Test section from - to (m):	484.00-489.00	Responsible for test execution:	Reinder van der Wall 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) =	4237		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	13.6		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

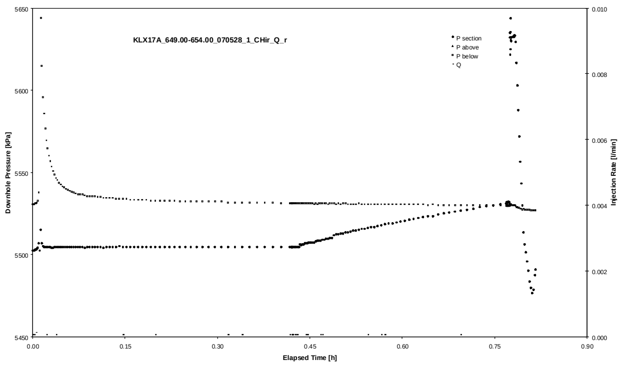
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070528 13:43
Test section from - to (m):	649.00-654.00	Responsible for test execution:	Reinder van der Wall 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) =	5503		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.7		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

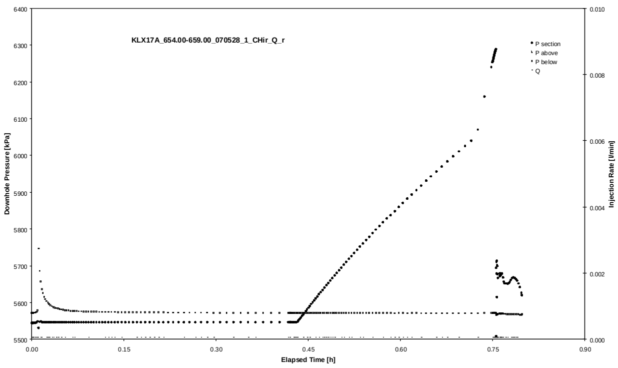
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070528 15:01
Test section from - to (m):	654.00-659.00	Responsible for test execution:	Reinder van der Wall 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

Not analysed

Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5544		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.8		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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

Selected representative parameters.

dt_1 (min) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

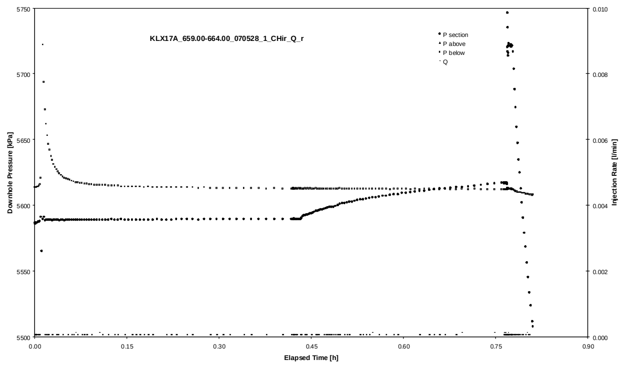
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070528 16:16
Test section from - to (m):	659.00-664.00	Responsible for test execution:	Reinder van der Wall 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) =	5587		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.8		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

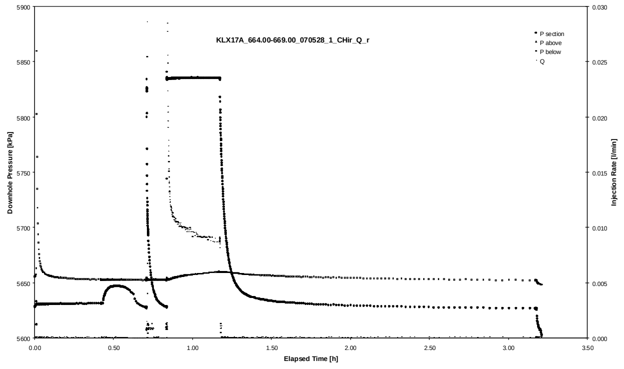
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

Test Summary Sheet

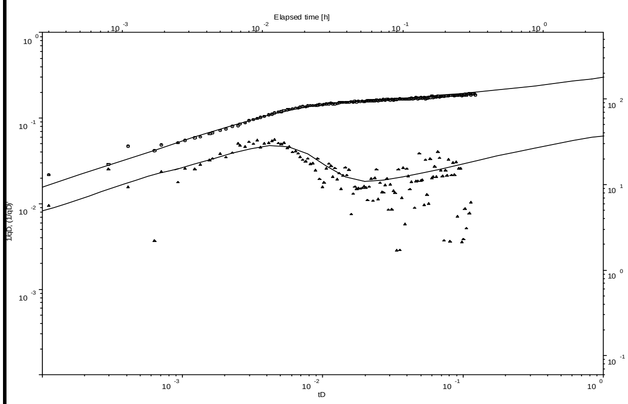
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070528 17:28
Test section from - to (m):	664.00-669.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

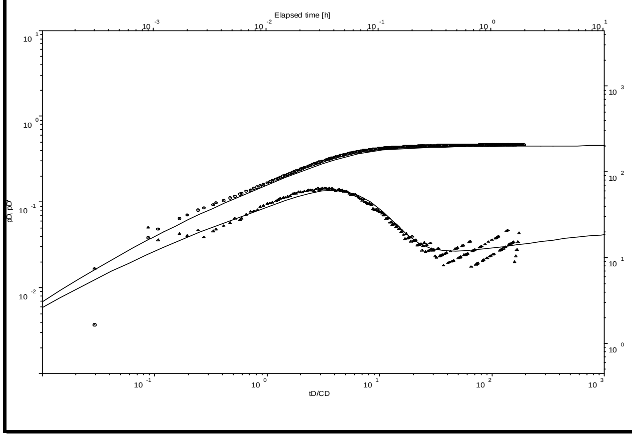


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5631		
p_i (kPa) =	5627		
p_p(kPa) =	5834	p_F (kPa) =	5625
Q_p (m^3/s)=	1.45E-07		
tp (s) =	1200	t_F (s) =	7200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	15.9		
Derivative fact.=	0.08	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	6.9E-09		
T_M (m^2/s)=	5.7E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	2.73	dt_1 (min) =	14.70
dt_2 (min) =	15.48	dt_2 (min) =	105.00
T (m^2/s) =	1.1E-09	T (m^2/s) =	6.1E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	2.2E-10	K_s (m/s) =	1.2E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.4E-11
C_D (-) =	NA	C_D (-) =	1.6E-03
ξ (-) =	-3.59	ξ (-) =	-3.12
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) =	14.70	C (m^3/Pa) =	1.4E-11
dt_2 (min) =	105.00	C_D (-) =	1.6E-03
T_T (m^2/s) =	6.1E-09	ξ (-) =	-3.12
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-09		
S_s (1/m) =	2.0E-07		

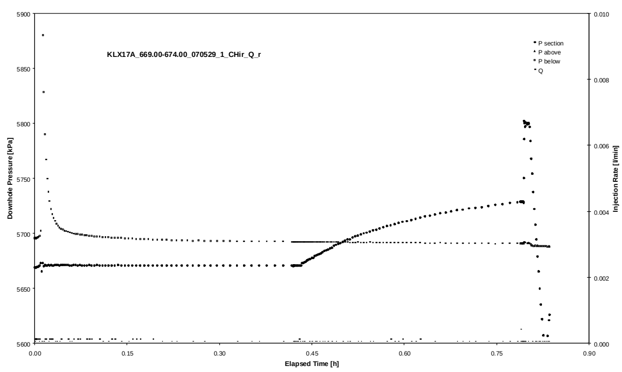
Comments:

The recommended transmissivity of 6.1•10-9 m2/s was derived from the analysis of the CHir phase (outer zone) which shows the best match with the type curve and horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 1.0•10-10 m2/s to 1.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,624.0 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070529 08:10
Test section from - to (m):	669.00-674.00	Responsible for test execution:	Reinder van der Wall 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) =	5670		
p_i (kPa) =	#NV		
p_p(kPa) =	#NV	p_F (kPa) =	#NV
Q_p (m^3/s)=	#NV		
tp (s) =	#NV	t_F (s) =	#NV
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.0		
Derivative fact.=	#NV	Derivative fact.=	#NV
Results		**Results**	
Q/s (m^2/s)=	#NV		
T_M (m^2/s)=	#NV		
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) =	1.0E-11	T (m^2/s) =	NA
S (-) =	1.0E-06	S (-) =	NA
K_s (m/s) =	2.0E-12	K_s (m/s) =	NA
S_s (1/m) =	2.0E-07	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) =	#NV	C (m^3/Pa) =	NA
dt_2 (min) =	#NV	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		

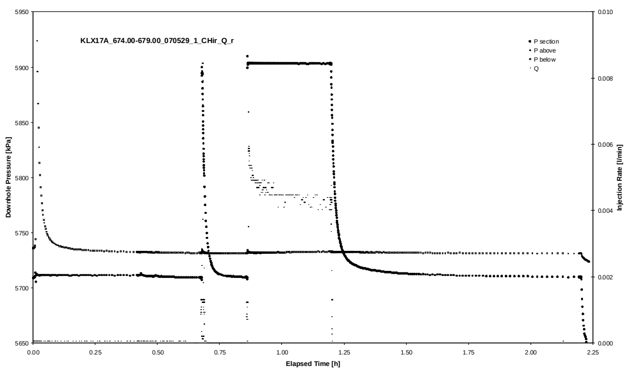
Comments:

Based on the test response (prolonged packer compliance) the interval transmissivity is set to 1.0•10-11 m2/s.

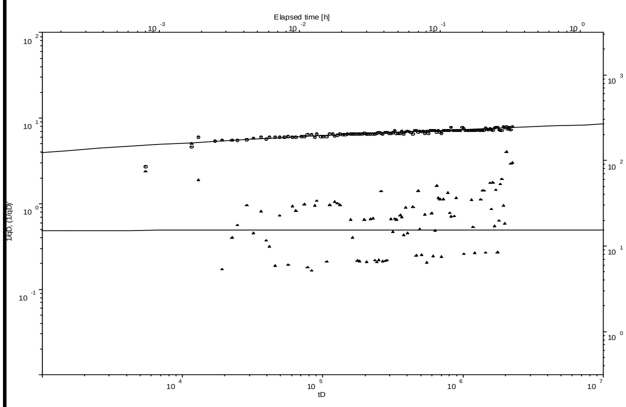
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070529 09:34
Test section from - to (m):	674.00-679.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

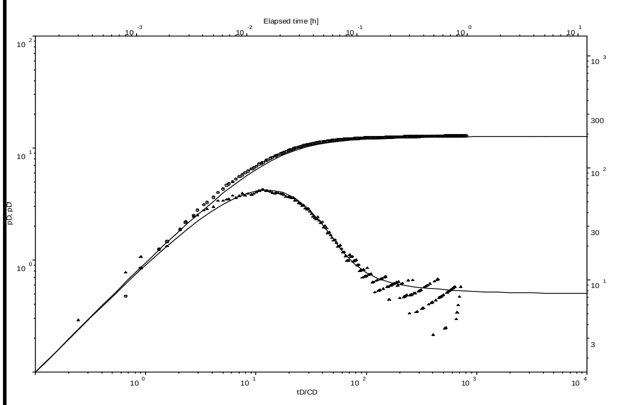
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5711		
p_i (kPa) =	5709		
p_p(kPa) =	5902	p_F (kPa) =	5709
Q_p (m^3/s)=	7.17E-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)=	16.0		
Derivative fact.=	0.09	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	3.6E-09		
T_M (m^2/s)=	3.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.22	dt_1 (min) =	8.52
dt_2 (min) =	17.40	dt_2 (min) =	52.08
T (m^2/s) =	4.3E-09	T (m^2/s) =	7.9E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.6E-10	K_s (m/s) =	1.6E-09
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 (-) =	3.23	ξ (-) =	7.97
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) =	8.52	C (m^3/Pa) =	2.2E-11
dt_2 (min) =	52.08	C_D (-) =	2.4E-03
T_T (m^2/s) =	7.9E-09	ξ (-) =	7.97
S (-) =	1.0E-06		
K_s (m/s) =	1.6E-09		
S_s (1/m) =	2.0E-07		

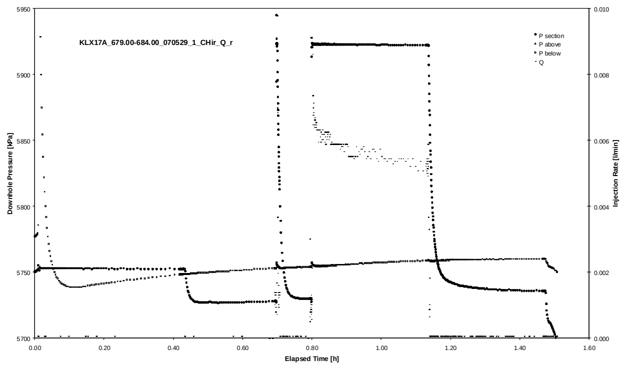
Comments:

The recommended transmissivity of 7.9•10-9 m2/s was derived from the analysis of the CHir phase which shows the best match with the type curve and a good horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 2.0•10-9 m2/s to 2.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,706.3 kPa.

Test Summary Sheet

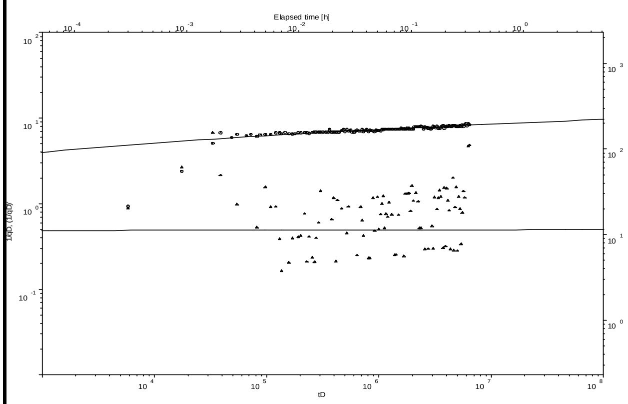
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070529 13:00
Test section from - to (m):	679.00-684.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

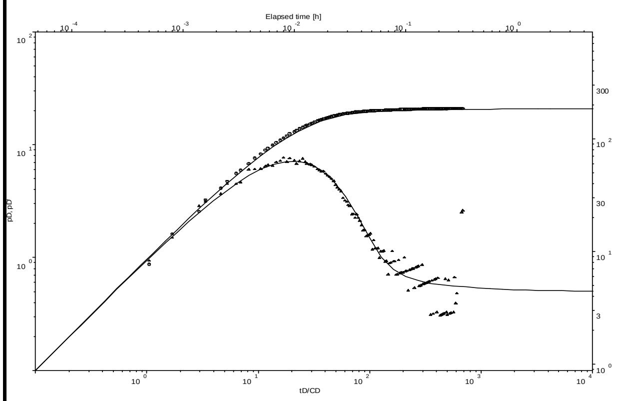


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5751		
p_i (kPa) =	5730		
p_p(kPa) =	5921	p_F (kPa) =	5736
Q_p (m^3/s)=	8.67E-08		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.1		
Derivative fact.=	0.07	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	4.5E-09		
T_M (m^2/s)=	3.7E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.25	dt_1 (min) =	6.30
dt_2 (min) =	17.04	dt_2 (min) =	17.40
T (m^2/s) =	5.9E-09	T (m^2/s) =	1.7E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.2E-09	K_s (m/s) =	3.4E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.9E-11
C_D (-) =	NA	C_D (-) =	2.1E-03
ξ (-) =	3.59	ξ (-) =	15.77
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) =	6.30	C (m^3/Pa) =	1.9E-11
dt_2 (min) =	17.40	C_D (-) =	2.1E-03
T_T (m^2/s) =	1.7E-08	ξ (-) =	15.77
S (-) =	1.0E-06		
K_s (m/s) =	3.4E-09		
S_s (1/m) =	2.0E-07		

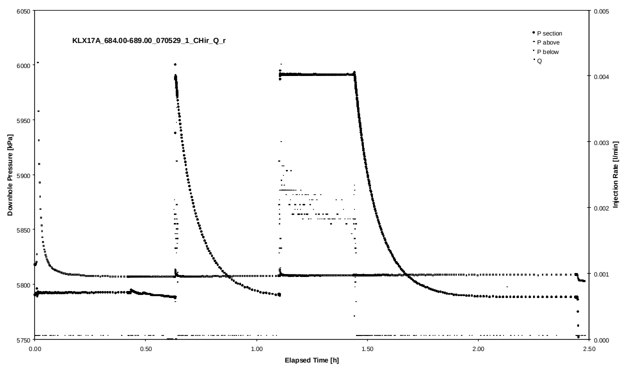
Comments:

The recommended transmissivity of 1.7•10-8 m2/s was derived from the analysis of the CHir phase which shows the best match with the type curve and a good horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 3.0•10-9 m2/s to 3.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,732.3 kPa.

Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070529 15:01
Test section from - to (m):	684.00-689.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, 2·r_w (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

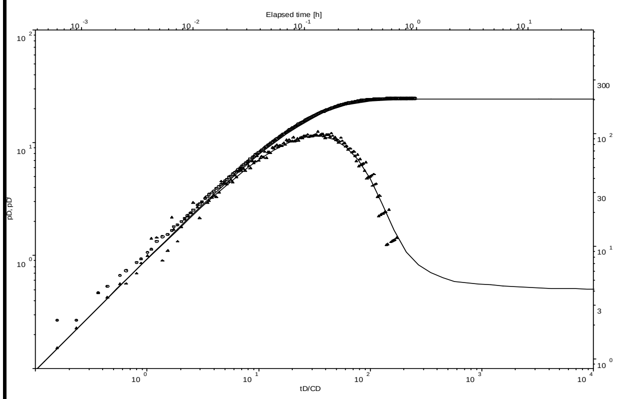


Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5792		
p_i (kPa) =	5791		
p_p(kPa) =	5989	p_F (kPa) =	5786
Q_p (m^3/s)=	3.28E-08		
tp (s) =	1200	t_F (s) =	3600
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.1		
Derivative fact.=	#NV	Derivative fact.=	0.02
Results		**Results**	
Q/s (m^2/s)=	1.6E-09		
T_M (m^2/s)=	1.3E-09		
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) =	NA	T (m^2/s) =	9.9E-09
S (-) =	NA	S (-) =	1.0E-06
K_s (m/s) =	NA	K_s (m/s) =	2.0E-09
S_s (1/m) =	NA	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	8.8E-11
C_D (-) =	NA	C_D (-) =	9.7E-03
ξ (-) =	NA	ξ (-) =	20.75
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) =	#NV	C (m^3/Pa) =	8.8E-11
dt_2 (min) =	#NV	C_D (-) =	9.7E-03
T_T (m^2/s) =	9.9E-09	ξ (-) =	20.75
S (-) =	1.0E-06		
K_s (m/s) =	2.0E-09		
S_s (1/m) =	2.0E-07		

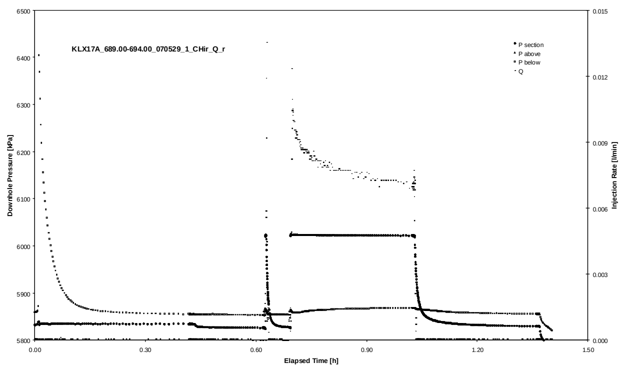
Comments:

The recommended transmissivity of 9.9•10-9 m2/s was derived from the analysis of the CHir phase which shows a good match with the type curve. The confidence range for the interval transmissivity is estimated to be 5.0•10-9 m2/s to 2.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,787.2 kPa.

Test Summary Sheet

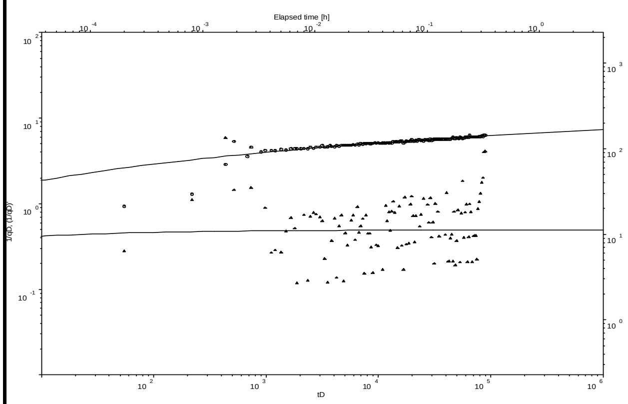
Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070529 17:58
Test section from - to (m):	689.00-694.00	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

Linear plot Q and p

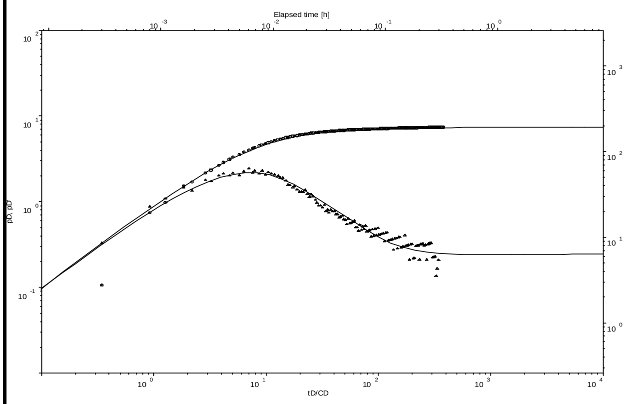


Flow period		**Recovery period**	
Indata		**Indata**	
p_0 (kPa) =	5833		
p_i (kPa) =	5828		
p_p(kPa) =	6021	p_F (kPa) =	5829
Q_p (m^3/s)=	1.18E-07		
tp (s) =	1200	t_F (s) =	1200
S el S^* (-)=	1.00E-06	S el S^* (-)=	1.00E-06
EC_w (mS/m)=			
$Temp_w$(gr C)=	16.2		
Derivative fact.=	0.05	Derivative fact.=	0.06
Results		**Results**	
Q/s (m^2/s)=	6.0E-09		
T_M (m^2/s)=	5.0E-09		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	0.33	dt_1 (min) =	1.65
dt_2 (min) =	16.20	dt_2 (min) =	3.18
T (m^2/s) =	5.9E-09	T (m^2/s) =	8.0E-09
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	1.2E-09	K_s (m/s) =	1.6E-09
S_s (1/m) =	2.0E-07	S_s (1/m) =	2.0E-07
C (m^3/Pa) =	NA	C (m^3/Pa) =	1.6E-11
C_D (-) =	NA	C_D (-) =	1.8E-03
ξ (-) =	1.46	ξ (-) =	3.18
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) =	0.33	C (m^3/Pa) =	1.6E-11
dt_2 (min) =	16.20	C_D (-) =	1.8E-03
T_T (m^2/s) =	5.9E-09	ξ (-) =	1.46
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-09		
S_s (1/m) =	2.0E-07		

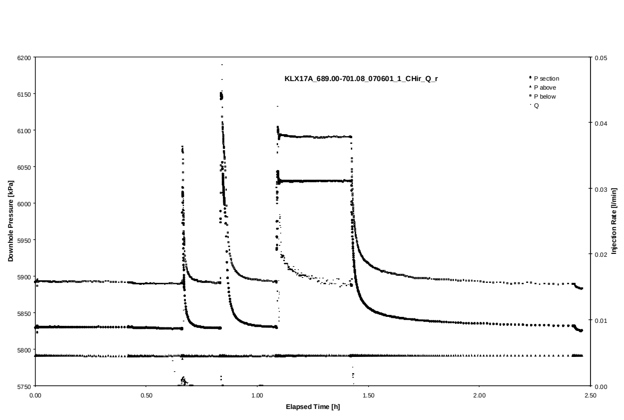
Comments:

The recommended transmissivity of 5.9•10-9 m2/s was derived from the analysis of the CHi phase which shows a noisy derivative but still a clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 3.0•10-9 m2/s to 3.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,825.4 kPa.

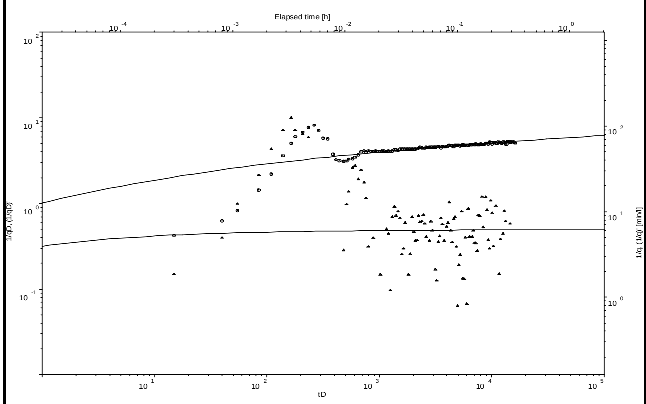
Test Summary Sheet

Project:	Oskarshamn site investigation	Test type:[1]	CHir
Area:	Laxemar	Test no:	1
Borehole ID:	KLX17A	Test start:	070601 16:46
Test section from - to (m):	689.00-701.08	Responsible for test execution:	Reinder van der Wall Erik Löfgren
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachescu

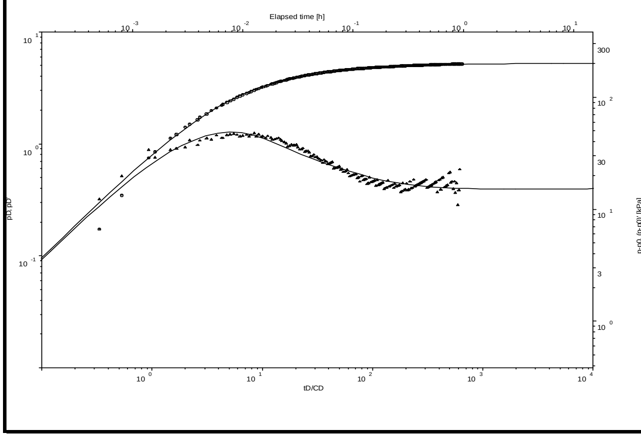
Linear plot Q and p



Log-Log plot incl. derivates- flow period



Log-Log plot incl. derivatives- recovery period



Flow period		Recovery period	
Indata		**Indata**	
p_0 (kPa) =	5831		
p_i (kPa) =	5829		
p_p(kPa) =	6031	p_F (kPa) =	5831
Q_p (m^3/s)=	2.53E-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)=	16.2		
Derivative fact.=	0.06	Derivative fact.=	0.08
Results		**Results**	
Q/s (m^2/s)=	1.2E-08		
T_M (m^2/s)=	1.2E-08		
Flow regime:	transient	Flow regime:	transient
dt_1 (min) =	1.07	dt_1 (min) =	11.22
dt_2 (min) =	16.20	dt_2 (min) =	54.60
T (m^2/s) =	1.0E-08	T (m^2/s) =	1.5E-08
S (-) =	1.0E-06	S (-) =	1.0E-06
K_s (m/s) =	8.5E-10	K_s (m/s) =	1.2E-09
S_s (1/m) =	8.3E-08	S_s (1/m) =	8.3E-08
C (m^3/Pa) =	NA	C (m^3/Pa) =	4.1E-11
C_D (-) =	NA	C_D (-) =	4.5E-03
ξ (-) =	0.33	ξ (-) =	0.41
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) =	11.22	C (m^3/Pa) =	4.1E-11
dt_2 (min) =	54.60	C_D (-) =	4.5E-03
T_T (m^2/s) =	1.5E-08	ξ (-) =	0.41
S (-) =	1.0E-06		
K_s (m/s) =	1.2E-09		
S_s (1/m) =	8.3E-08		

Comments:

The recommended transmissivity of 1.5•10-8 m2/s was derived from the analysis of the CHir phase (outer zone) which shows the best data quality and clear horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be 6.0•10-9 m2/s to 3.0•10-8 m2/s. The flow dimension displayed during the test is 2 (radial flow). 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 5,827.2 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

File Identity	
Created By	
Created	

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Activity Type	KLX 17A KLX 17A - Injection test

Project	AP PS 400-07-009

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**
KLX 17A	2007-05-07 08:00	2007-06-04 08:30	69.00	701.08		Golder Associates	Philipp Wolf, Reinder van der Wall	Philipp Wolf, Linda Höckert, Reinder van der Wall, Erik Löfgren	Philipp Wolf, Reinder van der Wall, Jörg Böhner	Reinder van der Wall

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 17A	2007-05-09 13:47:00	2007-05-09 15:57:00	69.00	169.00		3	1	2007-05-09 14:55:16	2007-05-09 15:25:16	1.83E-04	0	1.67E-04	1.67E-08	8.33E-04	3.00E-01
KLX 17A	2007-05-09 17:46:00	2007-05-09 19:36:00	169.00	269.00		3	1	2007-05-09 18:34:34	2007-05-09 19:04:34	5.47E-05	0	5.76E-05	1.67E-08	8.33E-04	1.04E-01
KLX 17A	2007-05-10 09:35:00	2007-05-10 11:25:00	269.00	369.00		3	1	2007-05-10 10:23:28	2007-05-10 10:53:28	9.97E-06	0	1.14E-05	1.67E-08	8.33E-04	2.05E-02
KLX 17A	2007-05-10 13:23:00	2007-05-10 15:12:00	369.00	469.00		3	1	2007-05-10 14:10:59	2007-05-10 14:40:59	3.89E-04	0	4.04E-04	1.67E-08	8.33E-04	7.28E-01
KLX 17A	2007-05-10 16:42:00	2007-05-10 22:58:00	469.00	569.00		3	1	2007-05-10 18:26:05	2007-05-10 18:56:05	3.83E-08	0	5.33E-08	1.67E-08	8.33E-04	9.60E-05
KLX 17A	2007-05-11 14:16:00	2007-05-11 16:24:00	569.00	669.00		3	1	2007-05-11 15:22:02	2007-05-11 15:52:02	1.47E-07	0	1.52E-07	1.67E-08	8.33E-04	2.73E-04
KLX 17A	2007-05-13 11:15:00	2007-05-13 12:47:00	69.00	89.00		3	1	2007-05-13 12:05:49	2007-05-13 12:25:49	3.00E-06	0	3.33E-06	1.67E-08	8.33E-04	4.00E-03
KLX 17A	2007-05-13 14:08:00	2007-05-13 15:31:00	87.00	107.00		3	1	2007-05-13 14:49:18	2007-05-13 15:09:18	1.05E-05	0	1.15E-05	1.67E-08	8.33E-04	1.38E-02
KLX 17A	2007-05-13 16:09:00	2007-05-13 17:35:00	107.00	127.00		3	1	2007-05-13 16:53:59	2007-05-13 17:13:59	2.02E-04	0	2.09E-04	1.67E-08	8.33E-04	2.50E-01
KLX 17A	2007-05-13 18:16:00	2007-05-13 21:44:00	127.00	147.00		3	1	2007-05-13 19:22:34	2007-05-13 19:42:34	9.50E-08	0	1.17E-07	1.67E-08	8.33E-04	1.40E-04
KLX 17A	2007-05-14 08:51:00	2007-05-14 10:16:00	147.00	167.00		3	1	2007-05-14 09:34:16	2007-05-14 09:54:16	7.17E-07	0	7.52E-07	1.67E-08	8.33E-04	9.02E-04
KLX 17A	2007-05-14 10:40:00	2007-05-14 12:06:00	149.00	169.00		3	1	2007-05-14 11:24:18	2007-05-14 11:44:18	6.50E-07	0	6.77E-07	1.67E-08	8.33E-04	8.12E-04
KLX 17A	2007-05-14 13:27:00	2007-05-14 14:56:00	169.00	189.00		3	1	2007-05-14 14:14:56	2007-05-14 14:34:56	7.15E-06	0	8.47E-06	1.67E-08	8.33E-04	1.02E-02
KLX 17A	2007-05-14 15:33:00	2007-05-14 16:57:00	189.00	209.00		3	1	2007-05-14 16:15:10	2007-05-14 16:35:10	4.60E-05	0	4.70E-05	1.67E-08	8.33E-04	5.64E-02
KLX 17A	2007-05-14 17:32:00	2007-05-14 19:44:00	209.00	229.00		3	1	2007-05-14 18:22:46	2007-05-14 18:42:46	2.67E-07	0	2.95E-07	1.67E-08	8.33E-04	3.54E-04
KLX 17A	2007-05-15 08:47:00	2007-05-15 10:21:00	229.00	249.00		3	1	2007-05-15 19:39:41	2007-05-15 19:59:41	2.17E-07	0	3.17E-07	1.67E-08	8.33E-04	3.80E-04
KLX 17A	2007-05-15 10:58:00	2007-05-15 13:29:00	249.00	269.00		3	1	2007-05-15 12:47:00	2007-05-15 13:07:00	6.33E-08	0	9.87E-08	1.67E-08	8.33E-04	1.18E-04
KLX 17A	2007-05-15 14:02:00	2007-05-15 16:21:00	269.00	289.00		3	1	2007-05-15 15:39:33	2007-05-15 15:59:33	1.83E-08	0	2.67E-08	1.67E-08	8.33E-04	3.20E-05
KLX 17A	2007-05-15 16:55:00	2007-05-15 20:24:00	289.00	309.00		3	1	2007-05-15 18:02:33	2007-05-15 18:22:33	1.50E-07	0	2.00E-07	1.67E-08	8.33E-04	2.40E-04
KLX 17A	2007-05-16 08:46:00	2007-05-16 10:12:00	309.00	329.00		3	1	2007-05-16 09:30:55	2007-05-16 09:50:55	9.67E-06	0	1.07E-05	1.67E-08	8.33E-04	1.28E-02
KLX 17A	2007-05-16 10:45:00	2007-05-16 12:34:00	329.00	349.00		3	1	2007-05-16 11:32:03	2007-05-16 11:52:03	1.37E-07	0	1.45E-07	1.67E-08	8.33E-04	1.74E-04
KLX 17A	2007-05-16 13:20:00	2007-05-16 14:09:00	349.00	369.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-16 14:43:00	2007-05-16 16:06:00	369.00	389.00		3	1	2007-05-16 15:24:18	2007-05-16 15:44:18	8.17E-07	0	8.32E-07	1.67E-08	8.33E-04	9.98E-04
KLX 17A	2007-05-16 16:39:00	2007-05-16 18:49:00	389.00	409.00		3	1	2007-05-16 17:27:32	2007-05-16 17:47:32	1.13E-07	0	1.17E-07	1.67E-08	8.33E-04	1.40E-04
KLX 17A	2007-05-17 08:43:00	2007-05-17 10:09:00	409.00	429.00		3	1	2007-05-17 09:27:05	2007-05-17 09:47:05	3.21E-04	0	3.30E-04	1.67E-08	8.33E-04	3.96E-01
KLX 17A	2007-05-17 10:43:00	2007-05-17 12:11:00	428.00	448.00		3	1	2007-05-17 11:29:56	2007-05-17 11:49:56	1.89E-04	0	1.92E-04	1.67E-08	8.33E-04	2.30E-01
KLX 17A	2007-05-17 13:34:00	2007-05-17 15:21:00	448.00	468.00		3	1	2007-05-17 14:39:34	2007-05-17 14:59:34	7.00E-08	0	8.67E-08	1.67E-08	8.33E-04	1.04E-04
KLX 17A	2007-05-17 15:47:00	2007-05-17 17:32:00	449.00	469.00		3	1	2007-05-17 16:50:27	2007-05-17 17:10:27	6.67E-08	0	8.17E-07	1.67E-08	8.33E-04	9.80E-04
KLX 17A	2007-05-20 17:54:00	2007-05-20 20:53:00	469.00	489.00		3	1	2007-05-20 18:31:42	2007-05-20 18:51:42	5.17E-08	0	7.50E-08	1.67E-08	8.33E-04	9.00E-05
KLX 17A	2007-05-18 11:04:00	2007-05-18 12:01:00	509.00	529.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-18 15:13:00	2007-05-18 16:08:00	549.00	569.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-18 16:44:00	2007-05-18 17:35:00	569.00	589.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-19 08:59:00	2007-05-19 09:57:00	589.00	609.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-19 10:33:00	2007-05-19 11:30:00	609.00	629.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-19 12:19:00	2007-05-19 14:12:00	629.00	649.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-19 15:31:00	2007-05-19 18:47:00	649.00	669.00		3	1	2007-05-19 16:25:47	2007-05-19 16:45:47	1.50E-07	0	1.78E-07	1.67E-08	8.33E-04	2.14E-04
KLX 17A	2007-05-20 08:53:00	2007-05-20 10:21:00	669.00	689.00		3	1	2007-05-20 09:39:55	2007-05-20 09:59:55	3.00E-07	0	3.30E-07	1.67E-08	8.33E-04	3.96E-04
KLX 17A	2007-05-20 11:04:00	2007-05-20 12:51:00	674.00	694.00		3	1	2007-05-20 11:49:40	2007-05-20 12:09:40	4.17E-07	0	4.70E-07	1.67E-08	8.33E-04	5.64E-04
KLX 17A	2007-05-22 13:43:00	2007-05-22 15:25:00	339.00	344.00		3	1	2007-05-22 14:43:18	2007-05-22 15:03:18	2.50E-08	0	2.53E-08	1.67E-08	8.33E-04	3.04E-05
KLX 17A	2007-05-22 15:54:00	2007-05-22 16:44:00	344.00	349.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-23 09:07:00	2007-05-23 10:33:00	369.00	374.00		3	1	2007-05-23 09:51:17	2007-05-23 10:11:17	7.27E-07	0	7.37E-07	1.67E-08	8.33E-04	8.84E-04
KLX 17A	2007-05-23 10:58:00	2007-05-23 11:47:00	374.00	379.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-23 15:49:00	2007-05-23 17:24:00	384.00	389.00		3	1	2007-05-23 16:42:33	2007-05-23 17:02:33	5.83E-08	0	6.45E-08	1.67E-08	8.33E-04	7.74E-05
KLX 17A	2007-05-23 17:48:00	2007-05-23 23:02:00	387.00	392.00		3	1	2007-05-23 18:40:42	2007-05-23 19:00:42	5.67E-08	0	6.05E-08	1.67E-08	8.33E-04	7.26E-05
KLX 17A	2007-05-24 10:35:00	2007-05-24 11:24:00	392.00	397.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-24 13:08:00	2007-05-24 14:37:00	397.00	402.00		3	1	2007-05-24 13:55:12	2007-05-24 14:15:12	9.27E-08	0	9.27E-08	1.67E-08	8.33E-04	1.11E-04
KLX 17A	2007-05-24 15:07:00	2007-05-24 15:56:00	402.00	407.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-24 16:22:00	2007-05-24 17:11:00	404.00	409.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-24 17:35:00	2007-05-24 19:01:00	409.00	414.00		3	1	2007-05-24 18:19:01	2007-05-24 18:39:01	5.50E-07	0	5.67E-07	1.67E-08	8.33E-04	6.80E-04
KLX 17A	2007-05-25 08:18:00	2007-05-25 10:11:00	414.00	419.00		3	1	2007-05-25 09:29:01	2007-05-25 09:49:01	5.00E-07	0	4.95E-07	1.67E-08	8.33E-04	5.94E-04

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 17A	69.00	169.00	1800	1800			15.85	1431	1630	1429	9.1						119.00
KLX 17A	169.00	269.00	1800	1800			15.95	2282	2496	2283	10.4						219.00
KLX 17A	269.00	369.00	1800	1800			15.61	3125	3349	3144	11.7						319.00
KLX 17A	369.00	469.00	1800	1800			16.98	3965	4175	3974	13.3						419.00
KLX 17A	469.00	569.00	1800	14400			16.13	4838	5053	4811	14.6						519.00
KLX 17A	569.00	669.00	1800	1800			17.31	5628	5840	5636	15.6						619.00
KLX 17A	69.00	89.00	1200	1200			15.16	744	944	750	8.0						79.00
KLX 17A	87.00	107.00	1200	1200			15.85	896	1096	896	8.3						97.00
KLX 17A	107.00	127.00	1200	1200			15.76	1068	1269	1070	8.5						117.00
KLX 17A	127.00	147.00	1200	7200			15.62	1245	1475	1244	8.7						137.00
KLX 17A	147.00	167.00	1200	1200			15.71	1409	1610	1411	9.0						157.00
KLX 17A	149.00	169.00	1200	1200			15.75	1428	1628	1428	9.0						159.00
KLX 17A	169.00	189.00	1200	1200			14.59	1601	1842	1632	9.3						179.00
KLX 17A	189.00	209.00	1200	1200			16.28	1771	1971	1771	9.6						199.00
KLX 17A	209.00	229.00	1200	3600			15.93	1944	2145	1942	9.9						219.00
KLX 17A	229.00	249.00	1200	1200			15.61	2113	2313	2152	10.1						239.00
KLX 17A	249.00	269.00	1200	1200			16.55	2285	2522	2370	10.4						259.00
KLX 17A	269.00	289.00	1200	1200			16.13	2469	2676	2482	10.7						279.00
KLX 17A	289.00	309.00	1200	7200			16.36	2627	2849	2628	11.0						299.00
KLX 17A	309.00	329.00	1200	1200			15.94	2784	2993	2807	11.2						319.00
KLX 17A	329.00	349.00	1200	2400			16.02	2956	3157	2956	11.5						339.00
KLX 17A	349.00	369.00	#NV	#NV			#NV	#NV	#NV	#NV	11.8						359.00
KLX 17A	369.00	389.00	1200	1200			15.89	3291	3491	3291	12.1						379.00
KLX 17A	389.00	409.00	1200	3600			16.06	3461	3661	3460	12.3						399.00
KLX 17A	409.00	429.00	1200	1200			16.10	3624	3824	3629	12.2						419.00
KLX 17A	428.00	448.00	1200	1200			16.64	3790	3990	3793	13.0						438.00
KLX 17A	448.00	468.00	1200	1200			15.15	3962	4198	3986	13.3						458.00
KLX 17A	449.00	469.00	1200	1200			15.43	3976	4202	4000	13.3						459.00
KLX 17A	469.00	489.00	1200	7200			15.86	4140	4383	4148	13.6						479.00
KLX 17A	509.00	529.00	#NV	#NV			#NV	#NV	#NV	#NV	14.1						519.00
KLX 17A	549.00	569.00	#NV	#NV			#NV	#NV	#NV	#NV	14.6						559.00
KLX 17A	569.00	589.00	#NV	#NV			#NV	#NV	#NV	#NV	14.9						579.00
KLX 17A	589.00	609.00	#NV	#NV			#NV	#NV	#NV	#NV	15.2						599.00
KLX 17A	609.00	629.00	#NV	#NV			#NV	#NV	#NV	#NV	15.4						619.00
KLX 17A	629.00	649.00	#NV	#NV			#NV	#NV	#NV	#NV	15.6						639.00
KLX 17A	649.00	669.00	1200	7200			17.46	5624	5886	5622	15.9						659.00
KLX 17A	669.00	689.00	1200	1200			17.99	5787	5987	5800	16.1						679.00
KLX 17A	674.00	694.00	1200	2400			18.60	5833	6034	5842	16.2						684.00
KLX 17A	339.00	344.00	1200	1200			15.48	2923	3176	2925	11.4						341.50
KLX 17A	344.00	349.00	#NV	#NV			#NV	#NV	#NV	#NV	11.5						346.50
KLX 17A	369.00	374.00	1200	1200			15.89	3163	3364	3164	11.9						371.50
KLX 17A	374.00	379.00	#NV	#NV			#NV	#NV	#NV	#NV	12.0						376.50
KLX 17A	384.00	389.00	1200	1200			15.73	3300	3496	3301	12.1						386.50
KLX 17A	387.00	392.00	1200	14400			15.92	3323	3524	3317	12.2						389.50
KLX 17A	392.00	397.00	#NV	#NV			#NV	#NV	#NV	#NV	12.2						394.50
KLX 17A	397.00	402.00	1200	1200			17.28	3415	3622	3413	12.3						399.50
KLX 17A	402.00	407.00	#NV	#NV			#NV	#NV	#NV	#NV	12.4						404.50
KLX 17A	404.00	409.00	#NV	#NV			#NV	#NV	#NV	#NV	12.4						406.50
KLX 17A	409.00	414.00	1200	1200			16.57	3507	3705	3506	12.5						411.50
KLX 17A	414.00	419.00	1200	1200			16.21	3544	3744	3544	12.5						416.50

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 17A	2007-05-25 10:36:00	2007-05-25 12:07:00	419.00	424.00		3	1	2007-05-25 11:25:01	2007-05-25 11:45:01	1.96E-04	0	2.00E-04	1.67E-08	8.33E-04	2.40E-01
KLX 17A	2007-05-25 12:56:00	2007-05-25 14:20:00	420.00	425.00		3	1	2007-05-25 13:38:36	2007-05-25 13:58:36	1.94E-04	0	2.00E-04	1.67E-08	8.33E-04	2.40E-01
KLX 17A	2007-05-25 14:50:00	2007-05-25 16:17:00	425.00	430.00		3	1	2007-05-25 15:35:15	2007-05-25 15:55:15	1.20E-04	0	1.22E-04	1.67E-08	8.33E-04	1.47E-01
KLX 17A	2007-05-25 16:44:00	2007-05-25 18:08:00	430.00	435.00		3	1	2007-05-25 17:26:29	2007-05-25 17:46:29	9.73E-05	0	9.88E-05	1.67E-08	8.33E-04	1.19E-01
KLX 17A	2007-05-26 09:56:00	2007-05-26 10:47:00	440.00	445.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-26 11:16:00	2007-05-26 12:24:00	444.00	449.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-26 16:14:00	2007-05-26 17:07:00	454.00	459.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-27 10:58:00	2007-05-27 12:40:00	464.00	469.00		3	1	2007-05-27 11:58:46	2007-05-27 12:18:46	5.67E-08	0	6.63E-08	1.67E-08	8.33E-04	7.96E-05
KLX 17A	2007-05-27 14:03:00	2007-05-27 16:41:00	469.00	474.00		3	1	2007-05-27 15:19:09	2007-05-27 15:39:09	4.08E-08	0	5.25E-08	1.67E-08	8.33E-04	6.30E-05
KLX 17A	2007-05-27 17:09:00	2007-05-27 17:57:00	474.00	479.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-28 08:04:00	2007-05-28 08:53:00	479.00	484.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-28 09:21:00	2007-05-28 10:11:00	484.00	489.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-28 13:43:00	2007-05-28 14:32:00	649.00	654.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-28 15:01:00	2007-05-28 15:50:00	654.00	659.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-28 16:16:00	2007-05-28 17:05:00	659.00	664.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-28 17:28:00	2007-05-28 20:41:00	664.00	669.00		3	1	2007-05-27 18:19:03	2007-05-27 18:39:03	1.45E-07	0	1.73E-07	1.67E-08	8.33E-04	2.08E-04
KLX 17A	2007-05-29 08:10:00	2007-05-29 09:01:00	669.00	674.00		3	1	#NV	#NV	#NV	-1	#NV	1.67E-08	8.33E-04	#NV
KLX 17A	2007-05-29 09:34:00	2007-05-29 11:48:00	674.00	679.00		3	1	2007-05-29 10:26:27	2007-05-29 10:46:27	7.17E-08	0	7.58E-08	1.67E-08	8.33E-04	9.10E-05
KLX 17A	2007-05-29 13:00:00	2007-05-29 14:30:00	679.00	684.00		3	1	2007-05-29 13:48:24	2007-05-29 14:08:24	8.67E-08	0	9.65E-08	1.67E-08	8.33E-04	1.16E-04
KLX 17A	2007-05-29 15:01:00	2007-05-29 17:29:00	684.00	689.00		3	1	2007-05-29 16:07:46	2007-05-29 16:27:46	3.28E-08	0	3.70E-08	1.67E-08	8.33E-04	4.44E-05
KLX 17A	2007-05-29 17:58:00	2007-05-29 19:22:00	689.00	694.00		3	1	2007-05-29 18:40:52	2007-05-29 19:00:52	1.18E-07	0	1.33E-07	1.67E-08	8.33E-04	1.59E-04
KLX 17A	2007-06-01 16:46:00	2007-06-01 19:13:00	689.00	701.08		3	1	2007-06-01 17:51:58	2007-06-01 18:11:58	2.53E-07	0	2.88E-07	1.67E-08	8.33E-04	3.46E-04

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 17A	419.00	424.00	1200	1200			16.69	3590	3791	3592	12.3						421.50
KLX 17A	420.00	425.00	1200	1200			16.94	3600	3802	3604	12.3						422.50
KLX 17A	425.00	430.00	1200	1200			17.03	3644	3844	3644	12.4						427.50
KLX 17A	430.00	435.00	1200	1200			16.93	3686	3886	3687	12.8						432.50
KLX 17A	440.00	445.00	#NV	#NV			#NV	#NV	#NV	#NV	13.0						442.50
KLX 17A	444.00	449.00	#NV	#NV			#NV	#NV	#NV	#NV	13.1						446.50
KLX 17A	454.00	459.00	#NV	#NV			#NV	#NV	#NV	#NV	13.2						456.50
KLX 17A	464.00	469.00	1200	3600			16.72	3969	4169	3970	13.4						466.50
KLX 17A	469.00	474.00	1200	3600			16.39	4019	4216	4034	13.4						471.50
KLX 17A	474.00	479.00	#NV	#NV			#NV	#NV	#NV	#NV	13.5						476.50
KLX 17A	479.00	484.00	#NV	#NV			#NV	#NV	#NV	#NV	13.6						481.50
KLX 17A	484.00	489.00	#NV	#NV			#NV	#NV	#NV	#NV	13.6						486.50
KLX 17A	649.00	654.00	#NV	#NV			#NV	#NV	#NV	#NV	15.7						651.50
KLX 17A	654.00	659.00	#NV	#NV			#NV	#NV	#NV	#NV	15.8						656.50
KLX 17A	659.00	664.00	#NV	#NV			#NV	#NV	#NV	#NV	15.8						661.50
KLX 17A	664.00	669.00	1200	7200			17.96	5627	5834	5625	15.9						666.50
KLX 17A	669.00	674.00	#NV	#NV			#NV	#NV	#NV	#NV	16.0						671.50
KLX 17A	674.00	679.00	1200	3600			18.05	5709	5902	5709	16.0						676.50
KLX 17A	679.00	684.00	1200	1200			16.55	5730	5921	5736	16.1						681.50
KLX 17A	684.00	689.00	1200	3600			18.00	5791	5989	5786	16.1						686.50
KLX 17A	689.00	694.00	1200	1200			17.75	5828	6021	5829	16.2						691.50
KLX 17A	689.00	701.08	1200	3600			17.93	5829	6031	5831	16.2						695.04

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 17A	2007-05-09 13:47:00	2007-05-09 15:57:00	69.00	169.00		3	1	119.00	100	9.00E-06	0				2.17E-05
KLX 17A	2007-05-09 17:46:00	2007-05-09 19:36:00	169.00	269.00		3	1	219.00	100	2.51E-06	0				3.26E-06
KLX 17A	2007-05-10 09:35:00	2007-05-10 11:25:00	269.00	369.00		3	1	319.00	100	4.36E-07	0				5.68E-07
KLX 17A	2007-05-10 13:23:00	2007-05-10 15:12:00	369.00	469.00		3	1	419.00	100	1.82E-05	0				2.37E-05
KLX 17A	2007-05-10 16:42:00	2007-05-10 22:58:00	469.00	569.00		3	1	519.00	100	1.75E-09	0				2.28E-09
KLX 17A	2007-05-11 14:16:00	2007-05-11 16:24:00	569.00	669.00		3	1	619.00	100	6.79E-09	0				8.84E-09
KLX 17A	2007-05-13 11:15:00	2007-05-13 12:47:00	69.00	89.00		3	1	79.00	20	1.47E-07	0				1.54E-07
KLX 17A	2007-05-13 14:08:00	2007-05-13 15:31:00	87.00	107.00		3	1	97.00	20	5.15E-07	0				5.39E-07
KLX 17A	2007-05-13 16:09:00	2007-05-13 17:35:00	107.00	127.00		3	1	117.00	20	9.87E-06	0				1.03E-05
KLX 17A	2007-05-13 18:16:00	2007-05-13 21:44:00	127.00	147.00		3	1	137.00	20	4.05E-09	0				4.24E-09
KLX 17A	2007-05-14 08:51:00	2007-05-14 10:16:00	147.00	167.00		3	1	157.00	20	3.50E-08	0				3.66E-08
KLX 17A	2007-05-14 10:40:00	2007-05-14 12:06:00	149.00	169.00		3	1	159.00	20	3.19E-08	0				3.34E-08
KLX 17A	2007-05-14 13:27:00	2007-05-14 14:56:00	169.00	189.00		3	1	179.00	20	2.91E-07	0				3.04E-07
KLX 17A	2007-05-14 15:33:00	2007-05-14 16:57:00	189.00	209.00		3	1	199.00	20	2.26E-06	0				2.36E-06
KLX 17A	2007-05-14 17:32:00	2007-05-14 19:44:00	209.00	229.00		3	1	219.00	20	1.30E-08	0				1.36E-08
KLX 17A	2007-05-15 08:47:00	2007-05-15 10:21:00	229.00	249.00		3	1	239.00	20	1.06E-08	0				1.11E-08
KLX 17A	2007-05-15 10:58:00	2007-05-15 13:29:00	249.00	269.00		3	1	259.00	20	2.62E-09	0				2.74E-09
KLX 17A	2007-05-15 14:02:00	2007-05-15 16:21:00	269.00	289.00		3	1	279.00	20	8.69E-10	0				9.09E-10
KLX 17A	2007-05-15 16:55:00	2007-05-15 20:24:00	289.00	309.00		3	1	299.00	20	6.63E-09	0				6.93E-09
KLX 17A	2007-05-16 08:46:00	2007-05-16 10:12:00	309.00	329.00		3	1	319.00	20	4.54E-07	0				4.75E-07
KLX 17A	2007-05-16 10:45:00	2007-05-16 12:34:00	329.00	349.00		3	1	339.00	20	6.67E-09	0				6.98E-09
KLX 17A	2007-05-16 13:20:00	2007-05-16 14:09:00	349.00	369.00		3	1	359.00	20	#NV	-1				#NV
KLX 17A	2007-05-16 14:43:00	2007-05-16 16:06:00	369.00	389.00		3	1	379.00	20	4.01E-08	0				4.19E-08
KLX 17A	2007-05-16 16:39:00	2007-05-16 18:49:00	389.00	409.00		3	1	399.00	20	5.56E-09	0				5.82E-09
KLX 17A	2007-05-17 08:43:00	2007-05-17 10:09:00	409.00	429.00		3	1	419.00	20	1.58E-05	0				1.65E-05
KLX 17A	2007-05-17 10:43:00	2007-05-17 12:11:00	428.00	448.00		3	1	438.00	20	9.28E-06	0				9.71E-06
KLX 17A	2007-05-17 13:34:00	2007-05-17 15:21:00	448.00	468.00		3	1	458.00	20	2.91E-09	0				3.04E-09
KLX 17A	2007-05-17 15:47:00	2007-05-17 17:32:00	449.00	469.00		3	1	459.00	20	2.89E-09	0				3.03E-09
KLX 17A	2007-05-20 17:54:00	2007-05-20 20:53:00	469.00	489.00		3	1	479.00	20	2.09E-09	0				2.18E-09
KLX 17A	2007-05-18 11:04:00	2007-05-18 12:01:00	509.00	529.00		3	1	519.00	20	#NV	-1				#NV
KLX 17A	2007-05-18 15:13:00	2007-05-18 16:08:00	549.00	569.00		3	1	559.00	20	#NV	-1				#NV
KLX 17A	2007-05-18 16:44:00	2007-05-18 17:35:00	569.00	589.00		3	1	579.00	20	#NV	-1				#NV
KLX 17A	2007-05-19 08:59:00	2007-05-19 09:57:00	589.00	609.00		3	1	599.00	20	#NV	-1				#NV
KLX 17A	2007-05-19 10:33:00	2007-05-19 11:30:00	609.00	629.00		3	1	619.00	20	#NV	-1				#NV
KLX 17A	2007-05-19 12:19:00	2007-05-19 14:12:00	629.00	649.00		3	1	639.00	20	#NV	-1				#NV
KLX 17A	2007-05-19 15:31:00	2007-05-19 18:47:00	649.00	669.00		3	1	659.00	20	5.62E-09	0				5.88E-09
KLX 17A	2007-05-20 08:53:00	2007-05-20 10:21:00	669.00	689.00		3	1	679.00	20	1.47E-08	0				1.54E-08
KLX 17A	2007-05-20 11:04:00	2007-05-20 12:51:00	674.00	694.00		3	1	684.00	20	2.03E-08	0				2.13E-08
KLX 17A	2007-05-22 13:43:00	2007-05-22 15:25:00	339.00	344.00		3	1	341.50	5	9.69E-10	0				8.00E-10
KLX 17A	2007-05-22 15:54:00	2007-05-22 16:44:00	344.00	349.00		3	1	346.50	5	#NV	-1				#NV
KLX 17A	2007-05-23 09:07:00	2007-05-23 10:33:00	369.00	374.00		3	1	371.50	5	3.55E-08	0				2.93E-08
KLX 17A	2007-05-23 10:58:00	2007-05-23 11:47:00	374.00	379.00		3	1	376.50	5	#NV	-1				#NV
KLX 17A	2007-05-23 15:49:00	2007-05-23 17:24:00	384.00	389.00		3	1	386.50	5	2.92E-09	0				2.41E-09
KLX 17A	2007-05-23 17:48:00	2007-05-23 23:02:00	387.00	392.00		3	1	389.50	5	2.77E-09	0				2.28E-09
KLX 17A	2007-05-24 10:35:00	2007-05-24 11:24:00	392.00	397.00		3	1	394.50	5	#NV	-1				#NV
KLX 17A	2007-05-24 13:08:00	2007-05-24 14:37:00	397.00	402.00		3	1	399.50	5	4.42E-09	0				3.65E-09
KLX 17A	2007-05-24 15:07:00	2007-05-24 15:56:00	402.00	407.00		3	1	404.50	5	#NV	-1				#NV
KLX 17A	2007-05-24 16:22:00	2007-05-24 17:11:00	404.00	409.00		3	1	406.50	5	#NV	-1				#NV
KLX 17A	2007-05-24 17:35:00	2007-05-24 19:01:00	409.00	414.00		3	1	411.50	5	2.73E-08	0				2.25E-08
KLX 17A	2007-05-25 08:18:00	2007-05-25 10:11:00	414.00	419.00		3	1	416.50	5	2.45E-08	0				2.02E-08

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 17A	69.00	169.00	0	0	2.17E-07									1.40E-05	0	1	2.00E-06	4.00E-05
KLX 17A	169.00	269.00	0	0	3.26E-08									4.00E-06	0	1	1.00E-06	8.00E-06
KLX 17A	269.00	369.00	0	0	5.68E-09									2.70E-07	0	1	1.00E-07	5.00E-07
KLX 17A	369.00	469.00	0	0	2.37E-07									6.76E-05	0	1	2.00E-05	1.00E-04
KLX 17A	469.00	569.00	0	0	2.28E-11									6.20E-10	0	1	2.00E-10	4.00E-09
KLX 17A	569.00	669.00	0	0	8.84E-11									6.70E-09	0	1	5.00E-10	1.00E-08
KLX 17A	69.00	89.00	0	0	7.70E-09									1.16E-07	0	1	8.00E-08	3.00E-07
KLX 17A	87.00	107.00	0	0	2.70E-08									6.60E-07	0	1	3.00E-07	3.00E-06
KLX 17A	107.00	127.00	0	0	5.15E-07									2.03E-05	0	1	2.00E-06	4.00E-05
KLX 17A	127.00	147.00	0	0	2.12E-10									1.50E-09	0	1	1.00E-09	6.00E-09
KLX 17A	147.00	167.00	0	0	1.83E-09									4.49E-08	0	1	2.00E-08	1.00E-07
KLX 17A	149.00	169.00	0	0	1.67E-09									4.45E-08	0	1	2.00E-08	1.00E-07
KLX 17A	169.00	189.00	0	0	1.52E-08									4.60E-07	0	1	1.00E-07	8.00E-07
KLX 17A	189.00	209.00	0	0	1.18E-07									7.34E-06	0	1	4.00E-06	2.00E-05
KLX 17A	209.00	229.00	0	0	6.80E-10									1.60E-08	0	1	2.00E-09	4.00E-08
KLX 17A	229.00	249.00	0	0	5.55E-10									3.60E-09	0	1	2.00E-09	2.00E-08
KLX 17A	249.00	269.00	0	0	1.37E-10									2.99E-09	0	1	1.00E-09	6.00E-09
KLX 17A	269.00	289.00	0	0	4.55E-11									8.72E-10	0	1	1.00E-10	2.00E-09
KLX 17A	289.00	309.00	0	0	3.47E-10									2.80E-09	0	1	1.00E-09	4.00E-08
KLX 17A	309.00	329.00	0	0	2.38E-08									3.20E-07	0	1	2.00E-07	3.00E-06
KLX 17A	329.00	349.00	0	0	3.49E-10									7.60E-09	0	1	4.00E-09	3.00E-08
KLX 17A	349.00	369.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	369.00	389.00	0	0	2.10E-09									9.54E-08	0	1	3.00E-08	2.00E-07
KLX 17A	389.00	409.00	0	0	2.91E-10									5.41E-09	0	1	3.00E-09	2.00E-08
KLX 17A	409.00	429.00	0	0	8.25E-07									7.46E-05	0	1	2.00E-05	1.00E-04
KLX 17A	428.00	448.00	0	0	4.86E-07									5.94E-05	0	1	8.00E-06	8.00E-05
KLX 17A	448.00	468.00	0	0	1.52E-10									1.47E-09	0	1	8.00E-10	3.00E-09
KLX 17A	449.00	469.00	0	0	1.52E-10									1.63E-09	0	1	8.00E-10	3.00E-09
KLX 17A	469.00	489.00	0	0	1.09E-10									7.90E-10	0	1	4.00E-10	6.00E-09
KLX 17A	509.00	529.00	0	-1	#NV									1.00E-13	-1	1	1.00E-13	1.00E-11
KLX 17A	549.00	569.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	569.00	589.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	589.00	609.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	609.00	629.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	629.00	649.00	0	-1	#NV									1.00E-13	-1	1	1.00E-13	1.00E-11
KLX 17A	649.00	669.00	0	0	2.94E-10									1.00E-08	0	1	2.00E-09	2.00E-08
KLX 17A	669.00	689.00	0	0	7.70E-10									1.69E-08	0	1	8.00E-09	3.00E-08
KLX 17A	674.00	694.00	0	0	1.07E-09									2.54E-08	0	1	1.00E-08	5.00E-08
KLX 17A	339.00	344.00	0	0	1.60E-10									7.74E-10	0	1	4.00E-10	3.00E-09
KLX 17A	344.00	349.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	369.00	374.00	0	0	5.86E-09									5.44E-08	0	1	3.00E-08	4.00E-07
KLX 17A	374.00	379.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	384.00	389.00	0	0	4.82E-10									3.40E-09	0	1	1.00E-09	6.00E-09
KLX 17A	387.00	392.00	0	0	4.56E-10									3.17E-09	0	1	1.00E-09	6.00E-09
KLX 17A	392.00	397.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	397.00	402.00	0	0	7.30E-10									5.61E-09	0	1	3.00E-09	4.00E-08
KLX 17A	402.00	407.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	404.00	409.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	409.00	414.00	0	0	4.50E-09									4.78E-08	0	1	2.00E-08	3.00E-07
KLX 17A	414.00	419.00	0	0	4.04E-09									3.50E-08	0	1	2.00E-08	2.00E-07

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 17A	69.00	169.00	1.00E-06	1.00E-06		112.03	-1								1.13E-09	1.2E-01	-4.50	167	655
KLX 17A	169.00	269.00	1.00E-06	1.00E-06		135.28	0								4.03E-09	4.4E-01	-0.39	83	1292
KLX 17A	269.00	369.00	1.00E-06	1.00E-06		69.09	0								1.77E-09	2.0E-01	-3.23	142	1573
KLX 17A	369.00	469.00	1.00E-06	1.00E-06		274.81	0								4.79E-09	5.3E-01	12.90	30	670
KLX 17A	469.00	569.00	1.00E-06	1.00E-06		42.83	0								2.10E-10	2.3E-02	-0.88	472	1386
KLX 17A	569.00	669.00	1.00E-06	1.00E-06		27.39	0								2.61E-11	2.9E-03	1.67	41	1292
KLX 17A	69.00	89.00	1.00E-03	1.00E-03		45.67	0								1.75E-10	1.9E-05	1.98	85	763
KLX 17A	87.00	107.00	1.00E-03	1.00E-03		70.53	0								1.68E-10	1.9E-05	4.35	59	1145
KLX 17A	107.00	127.00	1.00E-06	1.00E-06		64.51	-1								1.26E-08	1.4E+00	4.44	4	181
KLX 17A	127.00	147.00	1.00E-06	1.00E-06		37.72	0								6.97E-11	7.7E-03	-1.01	1951	5580
KLX 17A	147.00	167.00	1.00E-06	1.00E-06		36.02	0								6.42E-11	7.1E-03	2.60	3	1076
KLX 17A	149.00	169.00	1.00E-06	1.00E-06		35.94	0								5.94E-11	6.5E-03	3.37	13	1026
KLX 17A	169.00	189.00	1.00E-06	1.00E-06		37.35	1								5.35E-09	5.9E-01	-0.88	135	403
KLX 17A	189.00	209.00	1.00E-06	1.00E-06		128.80	0								2.08E-10	2.3E-02	12.10	37	1015
KLX 17A	209.00	229.00	1.00E-06	1.00E-06		24.65	-1								1.26E-10	1.4E-02	-1.71	302	950
KLX 17A	229.00	249.00	1.00E-06	1.00E-06		3.40	1								1.11E-11	1.2E-03	-1.66	7	38
KLX 17A	249.00	269.00	1.00E-06	1.00E-06		18.30	0								2.99E-10	3.3E-02	3.00	85	742
KLX 17A	269.00	289.00	1.00E-06	1.00E-06		2.39	1								6.16E-11	6.8E-03	-0.65	11	38
KLX 17A	289.00	309.00	1.00E-06	1.00E-06		18.05	0								8.81E-11	9.7E-03	1.00	214	1091
KLX 17A	309.00	329.00	1.00E-06	1.00E-06		58.67	0								8.08E-10	8.9E-02	1.22	103	1073
KLX 17A	329.00	349.00	1.00E-06	1.00E-06		23.09	0								5.84E-11	6.4E-03	2.70	9	976
KLX 17A	349.00	369.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	369.00	389.00	1.00E-06	1.00E-06		43.49	0								5.88E-11	6.5E-03	9.44	92	702
KLX 17A	389.00	409.00	1.00E-06	1.00E-06		21.22	0								6.33E-11	7.0E-03	1.74	86	1055
KLX 17A	409.00	429.00	1.00E-06	1.00E-06		229.98	0								2.27E-09	2.5E-01	19.10	10	886
KLX 17A	428.00	448.00	1.00E-06	1.00E-06		217.25	0								1.59E-09	1.8E-01	30.80	12	886
KLX 17A	448.00	468.00	1.00E-06	1.00E-06		15.32	0								8.11E-11	8.9E-03	-0.93	75	968
KLX 17A	449.00	469.00	1.00E-06	1.00E-06		15.72	0								8.44E-11	9.3E-03	-0.59	89	947
KLX 17A	469.00	489.00	1.00E-06	1.00E-06		13.11	0								1.06E-10	1.2E-02	-0.16	331	1069
KLX 17A	509.00	529.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	549.00	569.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	569.00	589.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	589.00	609.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	609.00	629.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	629.00	649.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	649.00	669.00	1.00E-06	1.00E-06		60.61	0								1.11E-10	1.2E-02	4.51	1397	6300
KLX 17A	669.00	689.00	1.00E-06	1.00E-06		28.21	0								5.20E-11	5.7E-03	1.44	207	1098
KLX 17A	674.00	694.00	1.00E-06	1.00E-06		44.18	0								5.10E-11	5.6E-03	1.45	171	2092
KLX 17A	339.00	344.00	1.00E-06	1.00E-06		13.05	0								2.16E-11	2.4E-03	1.68	29	954
KLX 17A	344.00	349.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	369.00	374.00	1.00E-06	1.00E-06		37.79	0								1.45E-11	1.6E-03	4.04	18	958
KLX 17A	374.00	379.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	384.00	389.00	1.00E-06	1.00E-06		17.78	-1								3.41E-11	3.8E-03	2.80	594	1062
KLX 17A	387.00	392.00	1.00E-06	1.00E-06		64.32	0								3.23E-11	3.6E-03	2.83	706	8712
KLX 17A	392.00	397.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	397.00	402.00	1.00E-06	1.00E-06		21.42	0								1.42E-11	1.6E-03	2.77	43	1069
KLX 17A	402.00	407.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	404.00	409.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	409.00	414.00	1.00E-06	1.00E-06		36.59	0								1.29E-11	1.4E-03	5.93	58	1123
KLX 17A	414.00	419.00	1.00E-06	1.00E-06		33.85	0								1.33E-11	1.5E-03	4.43	43	1001

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 17A	69.00	169.00					1425.8													
KLX 17A	169.00	269.00					2278.8													
KLX 17A	269.00	369.00					3119.6													
KLX 17A	369.00	469.00					3970.6													
KLX 17A	469.00	569.00					4789.1													
KLX 17A	569.00	669.00					5617.6													
KLX 17A	69.00	89.00					734.3													
KLX 17A	87.00	107.00					895.3													
KLX 17A	107.00	127.00					1065.6													
KLX 17A	127.00	147.00					1235.4													
KLX 17A	147.00	167.00					1407.3													
KLX 17A	149.00	169.00					1424.8													
KLX 17A	169.00	189.00					1584.2													
KLX 17A	189.00	209.00					1771.4													
KLX 17A	209.00	229.00					1938.5													
KLX 17A	229.00	249.00					2105.7													
KLX 17A	249.00	269.00					2284.7													
KLX 17A	269.00	289.00					2450.0													
KLX 17A	289.00	309.00					2621.4													
KLX 17A	309.00	329.00					2786.2													
KLX 17A	329.00	349.00					2955.4													
KLX 17A	349.00	369.00					#NV													
KLX 17A	369.00	389.00					3290.3													
KLX 17A	389.00	409.00					3459.6													
KLX 17A	409.00	429.00					3627.6													
KLX 17A	428.00	448.00					3791.9													
KLX 17A	448.00	468.00					3944.3													
KLX 17A	449.00	469.00					3955.4													
KLX 17A	469.00	489.00					4126.4													
KLX 17A	509.00	529.00					#NV													
KLX 17A	549.00	569.00					#NV													
KLX 17A	569.00	589.00					#NV													
KLX 17A	589.00	609.00					#NV													
KLX 17A	609.00	629.00					#NV													
KLX 17A	629.00	649.00					#NV													
KLX 17A	649.00	669.00					5619.1													
KLX 17A	669.00	689.00					5787.1													
KLX 17A	674.00	694.00					5833.7													
KLX 17A	339.00	344.00					2908.0													
KLX 17A	344.00	349.00					#NV													
KLX 17A	369.00	374.00					3164.3													
KLX 17A	374.00	379.00					#NV													
KLX 17A	384.00	389.00					3288.7													
KLX 17A	387.00	392.00					3315.8													
KLX 17A	392.00	397.00					#NV													
KLX 17A	397.00	402.00					3412.9													
KLX 17A	402.00	407.00					#NV													
KLX 17A	404.00	409.00					#NV													
KLX 17A	409.00	414.00					3506.6													
KLX 17A	414.00	419.00					3544.9													

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 17A	2007-05-25 10:36:00	2007-05-25 12:07:00	419.00	424.00		3	1	421.50	5	9.57E-06	0				7.00E-06
KLX 17A	2007-05-25 12:56:00	2007-05-25 14:20:00	420.00	425.00		3	1	422.50	5	9.43E-06	0				7.78E-06
KLX 17A	2007-05-25 14:50:00	2007-05-25 16:17:00	425.00	430.00		3	1	427.50	5	5.89E-06	0				4.87E-06
KLX 17A	2007-05-25 16:44:00	2007-05-25 18:08:00	430.00	435.00		3	1	432.50	5	4.77E-06	0				3.94E-06
KLX 17A	2007-05-26 09:56:00	2007-05-26 10:47:00	440.00	445.00		3	1	442.50	5	#NV	-1				#NV
KLX 17A	2007-05-26 11:16:00	2007-05-26 12:24:00	444.00	449.00		3	1	446.50	5	#NV	-1				#NV
KLX 17A	2007-05-26 16:14:00	2007-05-26 17:07:00	454.00	459.00		3	1	456.50	5	#NV	-1				#NV
KLX 17A	2007-05-27 10:58:00	2007-05-27 12:40:00	464.00	469.00		3	1	466.50	5	2.78E-09	0				2.29E-09
KLX 17A	2007-05-27 14:03:00	2007-05-27 16:41:00	469.00	474.00		3	1	471.50	5	2.03E-09	0				1.68E-09
KLX 17A	2007-05-27 17:09:00	2007-05-27 17:57:00	474.00	479.00		3	1	476.50	5	#NV	-1				#NV
KLX 17A	2007-05-28 08:04:00	2007-05-28 08:53:00	479.00	484.00		3	1	481.50	5	#NV	-1				#NV
KLX 17A	2007-05-28 09:21:00	2007-05-28 10:11:00	484.00	489.00		3	1	486.50	5	#NV	-1				#NV
KLX 17A	2007-05-28 13:43:00	2007-05-28 14:32:00	649.00	654.00		3	1	651.50	5	#NV	-1				#NV
KLX 17A	2007-05-28 15:01:00	2007-05-28 15:50:00	654.00	659.00		3	1	656.50	5	#NV	-1				#NV
KLX 17A	2007-05-28 16:16:00	2007-05-28 17:05:00	659.00	664.00		3	1	661.50	5	#NV	-1				#NV
KLX 17A	2007-05-28 17:28:00	2007-05-28 20:41:00	664.00	669.00		3	1	666.50	5	6.87E-09	0				5.67E-09
KLX 17A	2007-05-29 08:10:00	2007-05-29 09:01:00	669.00	674.00		3	1	671.50	5	#NV	-1				#NV
KLX 17A	2007-05-29 09:34:00	2007-05-29 11:48:00	674.00	679.00		3	1	676.50	5	3.64E-09	0				3.01E-09
KLX 17A	2007-05-29 13:00:00	2007-05-29 14:30:00	679.00	684.00		3	1	681.50	5	4.45E-09	0				3.67E-09
KLX 17A	2007-05-29 15:01:00	2007-05-29 17:29:00	684.00	689.00		3	1	686.50	5	1.63E-09	0				1.34E-09
KLX 17A	2007-05-29 17:58:00	2007-05-29 19:22:00	689.00	694.00		3	1	691.50	5	6.01E-09	0				4.96E-09
KLX 17A	2007-06-01 16:46:00	2007-06-01 19:13:00	689.00	701.08		3	1	695.04	12	1.23E-08	0				1.19E-08

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 17A	419.00	424.00	0	0	1.40E-06									3.21E-05	0	1	1.00E-05	6.00E-05
KLX 17A	420.00	425.00	0	0	1.56E-06									3.48E-05	0	1	4.00E-06	6.00E-05
KLX 17A	425.00	430.00	0	0	9.74E-07									1.90E-05	0	1	1.00E-05	4.00E-05
KLX 17A	430.00	435.00	0	0	7.88E-07									1.68E-05	0	1	4.00E-06	4.00E-05
KLX 17A	440.00	445.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	444.00	449.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	454.00	459.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	464.00	469.00	0	0	4.58E-10									1.54E-09	0	1	8.00E-10	8.00E-09
KLX 17A	469.00	474.00	0	0	3.36E-10									5.95E-10	0	1	4.00E-10	8.00E-09
KLX 17A	474.00	479.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	479.00	484.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	484.00	489.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	649.00	654.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	654.00	659.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	659.00	664.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	664.00	669.00	0	0	1.13E-09									6.08E-09	0	1	1.00E-10	1.00E-08
KLX 17A	669.00	674.00	0	-1	#NV									1.00E-11	-1	1	1.00E-13	1.00E-11
KLX 17A	674.00	679.00	0	0	6.02E-10									7.88E-09	0	1	2.00E-09	2.00E-08
KLX 17A	679.00	684.00	0	0	7.34E-10									1.71E-08	0	1	3.00E-09	3.00E-08
KLX 17A	684.00	689.00	0	0	2.68E-10									9.91E-09	0	1	5.00E-09	2.00E-08
KLX 17A	689.00	694.00	0	0	9.92E-10									5.92E-09	0	1	3.00E-09	3.00E-08
KLX 17A	689.00	701.08	0	0	9.85E-10									1.50E-08	0	1	6.00E-09	3.00E-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 17A	419.00	424.00	1.00E-06	1.00E-06		186.26	0								1.53E-09	1.7E-01	13.57	45	886
KLX 17A	420.00	425.00	1.00E-06	1.00E-06		190.06	0								1.91E-09	2.1E-01	13.45	34	929
KLX 17A	425.00	430.00	1.00E-06	1.00E-06		163.38	0								8.21E-10	9.0E-02	13.87	25	796
KLX 17A	430.00	435.00	1.00E-06	1.00E-06		158.43	0								8.14E-10	9.0E-02	13.90	76	954
KLX 17A	440.00	445.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	444.00	449.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	454.00	459.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	464.00	469.00	1.00E-06	1.00E-06		#NV	-1								4.73E-11	5.2E-03	-0.82	#NV	#NV
KLX 17A	469.00	474.00	1.00E-06	1.00E-06		21.17	0								2.05E-11	2.3E-03	-0.40	1652	3589
KLX 17A	474.00	479.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	479.00	484.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	484.00	489.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	649.00	654.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	654.00	659.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	659.00	664.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	664.00	669.00	1.00E-06	1.00E-06		53.52	0								1.43E-11	1.6E-03	-3.12	882	6300
KLX 17A	669.00	674.00	1.00E-06	1.00E-06		#NV	#NV								#NV	#NV	#NV	#NV	#NV
KLX 17A	674.00	679.00	1.00E-06	1.00E-06		40.38	0								2.21E-11	2.4E-03	7.97	511	3125
KLX 17A	679.00	684.00	1.00E-06	1.00E-06		28.30	0								1.87E-11	2.1E-03	15.77	378	1044
KLX 17A	684.00	689.00	1.00E-06	1.00E-06		#NV	-1								8.82E-11	9.7E-03	20.75	#NV	#NV
KLX 17A	689.00	694.00	1.00E-06	1.00E-06		21.71	0								1.60E-11	1.8E-03	1.46	20	972
KLX 17A	689.00	701.08	1.00E-06	1.00E-06		47.43	0								4.07E-11	4.5E-03	0.41	673	3276

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 17A	419.00	424.00					3591.5													
KLX 17A	420.00	425.00					3602.3													
KLX 17A	425.00	430.00					3645.1													
KLX 17A	430.00	435.00					3686.0													
KLX 17A	440.00	445.00					#NV													
KLX 17A	444.00	449.00					#NV													
KLX 17A	454.00	459.00					#NV													
KLX 17A	464.00	469.00					3968.1													
KLX 17A	469.00	474.00					4006.6													
KLX 17A	474.00	479.00					#NV													
KLX 17A	479.00	484.00					#NV													
KLX 17A	484.00	489.00					#NV													
KLX 17A	649.00	654.00					#NV													
KLX 17A	654.00	659.00					#NV													
KLX 17A	659.00	664.00					#NV													
KLX 17A	664.00	669.00					5624.0													
KLX 17A	669.00	674.00					#NV													
KLX 17A	674.00	679.00					5706.3													
KLX 17A	679.00	684.00					5732.3													
KLX 17A	684.00	689.00					5787.2													
KLX 17A	689.00	694.00					5825.4													
KLX 17A	689.00	701.08					5827.2													

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 17A	2007-05-09 13:47:00	2007-05-09 15:57:00	69.00	169.00		170.00	701.08	570	570	571	1445	1445	1444	
KLX 17A	2007-05-09 17:46:00	2007-05-09 19:36:00	169.00	269.00		270.00	701.08	1429	1430	1430	2297	2297	2297	
KLX 17A	2007-05-10 09:35:00	2007-05-10 11:25:00	269.00	369.00		370.00	701.08	2283	2283	2283	3135	3134	3134	
KLX 17A	2007-05-10 13:23:00	2007-05-10 15:12:00	369.00	469.00		470.00	701.08	3130	3130	3131	3973	3971	3970	
KLX 17A	2007-05-10 16:42:00	2007-05-10 22:58:00	469.00	569.00		570.00	701.08	3969	3969	3970	4799	4797	4786	
KLX 17A	2007-05-11 14:16:00	2007-05-11 16:24:00	569.00	669.00		670.00	701.08	4801	4801	4802	#NV	#NV	#NV	
KLX 17A	2007-05-13 11:15:00	2007-05-13 12:47:00	69.00	89.00		90.00	701.08	589	589	589	771	771	771	
KLX 17A	2007-05-13 14:08:00	2007-05-13 15:31:00	87.00	107.00		108.00	701.08	752	747	746	926	926	926	
KLX 17A	2007-05-13 16:09:00	2007-05-13 17:35:00	107.00	127.00		128.00	701.08	926	929	930	1095	1096	1096	
KLX 17A	2007-05-13 18:16:00	2007-05-13 21:44:00	127.00	147.00		148.00	701.08	1139	1117	1110	1267	1267	1266	
KLX 17A	2007-05-14 08:51:00	2007-05-14 10:16:00	147.00	167.00		168.00	701.08	1270	1270	1270	1436	1436	1436	
KLX 17A	2007-05-14 10:40:00	2007-05-14 12:06:00	149.00	169.00		170.00	701.08	1287	1287	1287	1454	1454	1454	
KLX 17A	2007-05-14 13:27:00	2007-05-14 14:56:00	169.00	189.00		190.00	701.08	1461	1462	1462	1625	1625	1625	
KLX 17A	2007-05-14 15:33:00	2007-05-14 16:57:00	189.00	209.00		210.00	701.08	1632	1633	1633	1796	1796	1796	
KLX 17A	2007-05-14 17:32:00	2007-05-14 19:44:00	209.00	229.00		230.00	701.08	1804	1803	1798	1967	1967	1966	
KLX 17A	2007-05-15 08:47:00	2007-05-15 10:21:00	229.00	249.00		250.00	701.08	1969	1969	1969	2136	2136	2135	
KLX 17A	2007-05-15 10:58:00	2007-05-15 13:29:00	249.00	269.00		270.00	701.08	2138	2137	2138	2306	2306	2306	
KLX 17A	2007-05-15 14:02:00	2007-05-15 16:21:00	269.00	289.00		290.00	701.08	2310	2310	2309	2476	2477	2477	
KLX 17A	2007-05-15 16:55:00	2007-05-15 20:24:00	289.00	309.00		310.00	701.08	2479	2479	2479	2648	2647	2647	
KLX 17A	2007-05-16 08:46:00	2007-05-16 10:12:00	309.00	329.00		330.00	701.08	2646	2646	2647	2815	2814	2814	
KLX 17A	2007-05-16 10:45:00	2007-05-16 12:34:00	329.00	349.00		350.00	701.08	2816	2816	2817	2984	2984	2984	
KLX 17A	2007-05-16 13:20:00	2007-05-16 14:09:00	349.00	369.00		370.00	701.08	2985	2985	2985	3154	3154	3154	
KLX 17A	2007-05-16 14:43:00	2007-05-16 16:06:00	369.00	389.00		390.00	701.08	3154	3154	3154	3323	3323	3323	
KLX 17A	2007-05-16 16:39:00	2007-05-16 18:49:00	389.00	409.00		410.00	701.08	3321	3321	3322	3491	3492	3492	
KLX 17A	2007-05-17 08:43:00	2007-05-17 10:09:00	409.00	429.00		430.00	701.08	3491	3492	3492	3657	3688	3664	
KLX 17A	2007-05-17 10:43:00	2007-05-17 12:11:00	428.00	448.00		449.00	701.08	3652	3655	3654	3819	3818	3818	
KLX 17A	2007-05-17 13:34:00	2007-05-17 15:21:00	448.00	468.00		469.00	701.08	3821	3822	3822	3987	3986	3986	
KLX 17A	2007-05-17 15:47:00	2007-05-17 17:32:00	449.00	469.00		470.00	701.08	3834	3835	3834	3995	3994	3994	
KLX 17A	2007-05-20 17:54:00	2007-05-20 20:53:00	469.00	489.00		490.00	701.08	4000	4000	4001	4119	4122	4134	
KLX 17A	2007-05-18 11:04:00	2007-05-18 12:01:00	509.00	529.00		530.00	701.08	4337	4337	4336	4497	4496	4496	
KLX 17A	2007-05-18 15:13:00	2007-05-18 16:08:00	549.00	569.00		570.00	701.08	4672	4672	4671	4831	4831	4828	
KLX 17A	2007-05-18 16:44:00	2007-05-18 17:35:00	569.00	589.00		590.00	701.08	4836	4836	4837	4995	4995	4993	
KLX 17A	2007-05-19 08:59:00	2007-05-19 09:57:00	589.00	609.00		610.00	701.08	5027	5027	5028	5182	5182	5180	
KLX 17A	2007-05-19 10:33:00	2007-05-19 11:30:00	609.00	629.00		630.00	701.08	5192	5192	5192	5349	5349	5346	
KLX 17A	2007-05-19 12:19:00	2007-05-19 14:12:00	629.00	649.00		650.00	701.08	5332	5332	5333	5486	5486	5485	
KLX 17A	2007-05-19 15:31:00	2007-05-19 18:47:00	649.00	669.00		670.00	701.08	5492	5491	5495	5652	5658	5650	
KLX 17A	2007-05-20 08:53:00	2007-05-20 10:21:00	669.00	689.00		690.00	701.08	5653	5654	5654	5816	5824	5821	
KLX 17A	2007-05-20 11:04:00	2007-05-20 12:51:00	674.00	694.00		695.00	701.08	5695	5695	5695	5870	5887	5867	
KLX 17A	2007-05-22 13:43:00	2007-05-22 15:25:00	339.00	344.00		345.00	701.08	2911	2910	2909	2945	2944	2944	
KLX 17A	2007-05-22 15:54:00	2007-05-22 16:44:00	344.00	349.00		350.00	701.08	2951	2951	2951	2987	2987	2987	
KLX 17A	2007-05-23 09:07:00	2007-05-23 10:33:00	369.00	374.00		375.00	701.08	3161	3161	3161	3197	3197	3197	
KLX 17A	2007-05-23 10:58:00	2007-05-23 11:47:00	374.00	379.00		380.00	701.08	3203	3203	3204	3239	3239	3239	
KLX 17A	2007-05-23 15:49:00	2007-05-23 17:24:00	384.00	389.00		390.00	701.08	3291	3291	3291	3324	3324	3324	
KLX 17A	2007-05-23 17:48:00	2007-05-23 23:02:00	387.00	392.00		393.00	701.08	3324	3323	3319	3349	3349	3348	
KLX 17A	2007-05-24 10:35:00	2007-05-24 11:24:00	392.00	397.00		398.00	701.08	#NV	#NV	#NV	3391	3391	3391	
KLX 17A	2007-05-24 13:08:00	2007-05-24 14:37:00	397.00	402.00		403.00	701.08	#NV	#NV	#NV	3434	3435	3434	
KLX 17A	2007-05-24 15:07:00	2007-05-24 15:56:00	402.00	407.00		408.00	701.08	#NV	#NV	#NV	3477	3477	3477	
KLX 17A	2007-05-24 16:22:00	2007-05-24 17:11:00	404.00	409.00		410.00	701.08	#NV	#NV	#NV	3494	3494	3494	
KLX 17A	2007-05-24 17:35:00	2007-05-24 19:01:00	409.00	414.00		415.00	701.08	#NV	#NV	#NV	3536	3536	3535	
KLX 17A	2007-05-25 08:18:00	2007-05-25 10:11:00	414.00	419.00		420.00	701.08	#NV	#NV	#NV	3575	3575	3575	

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 17A	2007-05-25 10:36:00	2007-05-25 12:07:00	419.00	424.00		425.00	701.08	#NV	#NV	#NV	3619	3626	3623	
KLX 17A	2007-05-25 12:56:00	2007-05-25 14:20:00	420.00	425.00		426.00	701.08	#NV	#NV	#NV	3629	3637	3633	
KLX 17A	2007-05-25 14:50:00	2007-05-25 16:17:00	425.00	430.00		431.00	701.08	#NV	#NV	#NV	3672	3694	3674	
KLX 17A	2007-05-25 16:44:00	2007-05-25 18:08:00	430.00	435.00		436.00	701.08	#NV	#NV	#NV	3712	3711	3711	
KLX 17A	2007-05-26 09:56:00	2007-05-26 10:47:00	440.00	445.00		446.00	701.08	#NV	#NV	#NV	3796	3796	3795	
KLX 17A	2007-05-26 11:16:00	2007-05-26 12:24:00	444.00	449.00		450.00	701.08	#NV	#NV	#NV	3828	3828	3827	
KLX 17A	2007-05-26 16:14:00	2007-05-26 17:07:00	454.00	459.00		460.00	701.08	#NV	#NV	#NV	3913	3913	3912	
KLX 17A	2007-05-27 10:58:00	2007-05-27 12:40:00	464.00	469.00		470.00	701.08	#NV	#NV	#NV	3993	3993	3993	
KLX 17A	2007-05-27 14:03:00	2007-05-27 16:41:00	469.00	474.00		475.00	701.08	#NV	#NV	#NV	4036	4036	4035	
KLX 17A	2007-05-27 17:09:00	2007-05-27 17:57:00	474.00	479.00		480.00	701.08	#NV	#NV	#NV	4078	4078	4078	
KLX 17A	2007-05-28 08:04:00	2007-05-28 08:53:00	479.00	484.00		485.00	701.08	#NV	#NV	#NV	4120	4120	4119	
KLX 17A	2007-05-28 09:21:00	2007-05-28 10:11:00	484.00	489.00		490.00	701.08	#NV	#NV	#NV	4162	4162	4161	
KLX 17A	2007-05-28 13:43:00	2007-05-28 14:32:00	649.00	654.00		655.00	701.08	#NV	#NV	#NV	5531	5531	5530	
KLX 17A	2007-05-28 15:01:00	2007-05-28 15:50:00	654.00	659.00		660.00	701.08	#NV	#NV	#NV	5572	5572	5571	
KLX 17A	2007-05-28 16:16:00	2007-05-28 17:05:00	659.00	664.00		665.00	701.08	#NV	#NV	#NV	5613	5613	5612	
KLX 17A	2007-05-28 17:28:00	2007-05-28 20:41:00	664.00	669.00		670.00	701.08	#NV	#NV	#NV	5654	5660	5652	
KLX 17A	2007-05-29 08:10:00	2007-05-29 09:01:00	669.00	674.00		675.00	701.08	#NV	#NV	#NV	5692	5692	5691	
KLX 17A	2007-05-29 09:34:00	2007-05-29 11:48:00	674.00	679.00		680.00	701.08	#NV	#NV	#NV	5732	5733	5731	
KLX 17A	2007-05-29 13:00:00	2007-05-29 14:30:00	679.00	684.00		685.00	701.08	#NV	#NV	#NV	5754	5759	5760	
KLX 17A	2007-05-29 15:01:00	2007-05-29 17:29:00	684.00	689.00		690.00	701.08	#NV	#NV	#NV	5808	5808	5809	
KLX 17A	2007-05-29 17:58:00	2007-05-29 19:22:00	689.00	694.00		695.00	701.08	#NV	#NV	#NV	5854	5869	5856	
KLX 17A	2007-06-01 16:46:00	2007-06-01 19:13:00	689.00	701.08		702.08	701.08	5791	5791	5791	5892	6090	5890	

APPENDIX 5-2

SICADA data tables (Pulse injection tests)

(Simplified version v1.8)

SICADA/Data Import Template

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 17A

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 17A	2007-05-17 18:06:00	2007-05-31 03:12:00	378.00	589.00		Golder Associates	Golder Associates	PSS 2	Philipp Wolf, Reinder van der Wall	Philipp Wolf, Linda Höckert, Reinder van der Wall, Erik Löfgren	Philipp Wolf, Reinder van der Wall, Jörg Böhner	

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

idcode	start_date	stop_date	secup (m)	seclow (m)	section_no	test_type	formation_type	start_flow_period	dur_flow_phase_tp (s)	dur_rec_phase_tf (s)	initial_head_h0 (m)	initial_displacem_dh0 (m)	displacem_dh0_p (m)	displacem_dh0_f (m)	_ow_end_hp (m)	final_head_hf (m)	initial_press_pi (kPa)	initial_press_diff_dp0 (kPa)
KLX 17A	2007-05-17 18:06:00	2007-05-17 21:46:00	469.00	489.00		4B	1	2007-05-17 18:44:53	10	7200							4138	234
KLX 17A	2007-05-18 08:47:00	2007-05-18 10:32:00	489.00	509.00		4B	1	2007-05-18 09:25:51	10	#NV							4309	244
KLX 17A	2007-05-18 12:36:00	2007-05-18 14:22:00	529.00	549.00		4B	1	2007-05-18 13:15:06	10	#NV							4644	230
KLX 17A	2007-05-18 18:44:00	2007-05-18 21:18:00	569.00	589.00		4B	1	2007-05-18 19:16:24	10	#NV							#NV	#NV
KLX 17A	2007-05-23 13:07:00	2007-05-23 15:21:00	379.00	384.00		4B	1	2007-05-23 14:16:41	10	3706							3283	239
KLX 17A	2007-05-26 08:17:00	2007-05-26 09:21:00	435.00	440.00		4B	1	2007-05-26 08:59:01	10	#NV							#NV	#NV
KLX 17A	2007-05-30 16:22:00	2007-05-31 03:12:00	435.00	440.00		4B	1	2007-05-30 17:09:51	10	#NV							3761	190
KLX 17A	2007-05-26 13:34:00	2007-05-26 15:46:00	449.00	454.00		4B	1	2007-05-26 14:12:39	10	5400							3853	190
KLX 17A	2007-05-27 08:14:00	2007-05-27 10:26:00	459.00	464.00		4B	1	2007-05-26 08:53:24	10	5400							3932	183

idcode	secup (m)	seclow (m)	_hange_dp0_p (kPa)	press_at_flow_end_pp (kPa)	final_press_pf (kPa)	formation_width_b (m)	transmissivity_ts (m**2/s)	value_type_ts	bc_ts	transmissivity_tp (m**2/s)	value_type_tp	bc_tp	l_meas_limit_t (m**2)	u_meas_limit_t (m**2)	storativity_s	assumed_s	skin	assumed_skin	c (m**3/pa)	fluid_temp_tew (oC)	fluid_elcond_ecw (mS/m)	_inity_tdsw (mg/l)	_nity_tdswm (mg/l)	dt1 (s)	dt2 (s)	reference	comments
KLX 17A	469.00	489.00		4372	4136					#NV	-1	0	#NV	#NV	1.00E-06	1.00E-06	#NV		#NV	13.6				#NV	#NV		
KLX 17A	489.00	509.00		4553	4497					1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06	1.00E-06	#NV		#NV	13.9				#NV	#NV		
KLX 17A	529.00	549.00		4874	4873					1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06	1.00E-06	#NV		#NV	14.4				#NV	#NV		
KLX 17A	569.00	589.00		#NV	#NV					1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06	1.00E-06	#NV		#NV	14.9				#NV	#NV		
KLX 17A	379.00	384.00		3522	3264					2.93E-10	0	1	1.00E-10	1.00E-09	1.00E-06	1.00E-06	7.7		1.51E-11	12.0				1012	3539		
KLX 17A	435.00	440.00		#NV	#NV					1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06	1.00E-06	#NV		#NV	12.9				#NV	#NV		
KLX 17A	435.00	440.00		3951	3985					1.00E-11	-1	1	1.00E-13	1.00E-11	1.00E-06	1.00E-06	#NV		#NV	12.9				#NV	#NV		
KLX 17A	449.00	454.00		4043	3862					4.56E-11	0	1	2.00E-11	2.00E-10	1.00E-06	1.00E-06	0.6		1.23E-11	13.1				605	5004		
KLX 17A	459.00	464.00		4115	3940					1.05E-10	0	1	6.00E-11	2.00E-10	1.00E-06	1.00E-06	-0.5		1.91E-11	13.2				10	3888		

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)

			(m)	(m)		(m)	(m)	(kPa)	(kPa)	(kPa)	(kPa)	(kPa)	(kPa)	
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 17A	2007-05-17 18:06:00	2007-05-17 21:46:00	469.00	489.00		490.00	701.08	4003	4002	4003	4163	4162	4159	
KLX 17A	2007-05-18 08:47:00	2007-05-18 10:32:00	489.00	509.00		510.00	701.08	4172	4172	4174	4332	4332	4329	
KLX 17A	2007-05-18 12:36:00	2007-05-18 14:22:00	529.00	549.00		550.00	701.08	4508	4508	4505	4665	4665	4662	
KLX 17A	2007-05-18 18:44:00	2007-05-18 21:18:00	569.00	589.00		590.00	701.08	4861	4861	4859	5015	5015	5013	
KLX 17A	2007-05-23 13:07:00	2007-05-23 15:21:00	379.00	384.00		385.00	701.08	3248	3248	3249	3283	3283	3282	
KLX 17A	2007-05-26 08:17:00	2007-05-26 09:21:00	435.00	440.00		441.00	701.08	#NV	#NV	#NV	3751	3751	3751	
KLX 17A	2007-05-30 16:22:00	2007-05-31 03:12:00	435.00	440.00		441.00	701.08	#NV	#NV	#NV	3728	3728	3734	
KLX 17A	2007-05-26 13:34:00	2007-05-26 15:46:00	449.00	454.00		455.00	701.08	#NV	#NV	#NV	3871	3871	3869	
KLX 17A	2007-05-27 08:14:00	2007-05-27 10:26:00	459.00	464.00		465.00	701.08	#NV	#NV	#NV	3953	3953	3952	