# P-07-48

# Oskarshamn site investigation

# Hydraulic injection tests in borehole KLX08, 2006

**Subarea Laxemar** 

Cristian Enachescu, Stephan Rohs, Philipp Wolf Golder Associates GmbH

January 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



# Oskarshamn site investigation

# Hydraulic injection tests in borehole KLX08, 2006

#### **Subarea Laxemar**

Cristian Enachescu, Stephan Rohs, Philipp Wolf Golder Associates GmbH

January 2007

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

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

Data in SKB's database can be changed for different reasons. Minor changes in SKB's database will not necessarily result in a revised report. Data revisions may also be presented as supplements, available at www.skb.se.

A pdf version of this document can be downloaded from www.skb.se.

# **Abstract**

Hydraulic injection tests have been performed in borehole KLX08 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 KLX08 performed between 28th of September and 11th of October 2006.

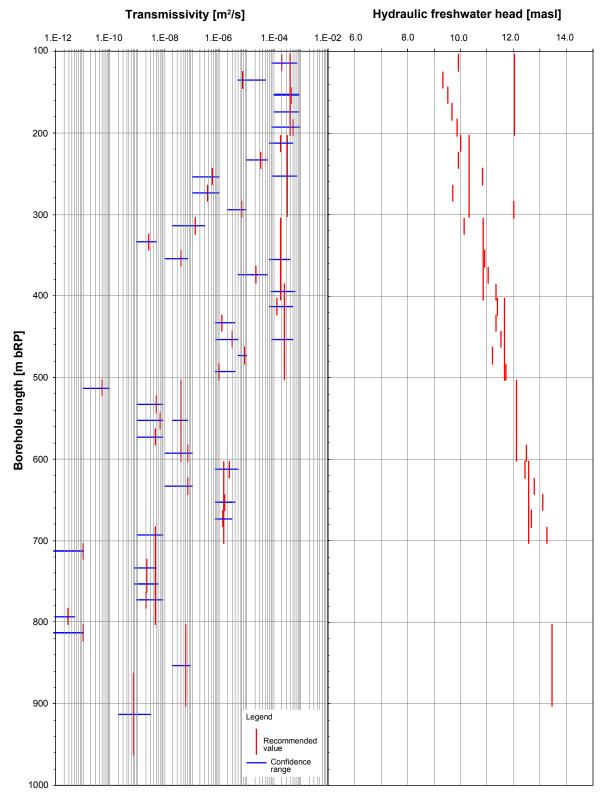
The objective of the hydrotests was to describe the rock around the borehole with respect of hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K) at different measurement scales of 100 m and 20 m sections. Transient evaluation during flow and recovery period provided additional information such as flow regimes, hydraulic boundaries and crossover flows. Constant pressure injection tests were conducted between 103.00–963.00 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 KLX08 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 KLX08. Testerna utfördes mellan den 28 september till den 11 oktober 2006.

Syftet med hydraultesterna var framförallt att beskriva bergets hydrauliska egenskaper runt borrhålet med avseende på hydrauliska parametrar, i huvudsak transmissvitet (T) och hydraulisk konduktivitet (K) vid olika mätskalor av 100 m och 20 m sektioner. Transient utvärdering under injektions- och återhämntningsfasen gav ytterligare information avseende flödesgeometri, hydrauliska gränser och sprickläckage. Injektionstester utfördes mellan 103,00–963,00 m borrhålslängd. Resultaten av testutvärderingen presenteras som transmissivitet, hydraulisk konduktivitet och grundvattennivå uttryckt i ekvivalent sötvattenpelare (fresh-water head).



Borehole KLX08 – summary of results.

# Contents

1	Introd	luction	7
2	Objec	tive and scope	9
2.1	Boreh		9
2.2		on tests	11
2.3	Contro	ol of equipment	11
3	Equip		13
3.1		ption of equipment	13
3.2	Sensor		17
3.3	Data a	cquisition system	18
4	Execu		19
4.1	Prepar		19
4.2	_	n correction	19
4.3		tion of field work	19
	4.3.1	Test principle Test procedure	19 21
4.4		andling/post processing	22
4.5		ses and interpretations	22
т.Э	4.5.1	Analysis software	22
		Analysis approach	22
		Analysis methodology	22
		Correlation between Storativity and Skin factor	24
	4.5.5	Determination of the ri-index and calculation of the radius	
		of influence (ri)	25
	4.5.6	Steady state analysis	26
	4.5.7	Flow models used for analysis	26
	4.5.8	1	
		freshwater head	26
	4.5.9	Derivation of the recommended transmissivity and the	
1.0	N	confidence range	27
4.6	Nonco	onformities	28
5	Result		29
5.1		single-hole injection tests	29
	5.1.1	Section 103.00–203.00 m, test no. 1, injection	29
	5.1.2	Section 203.00–303.00 m, test no. 1, injection	30
	5.1.3	Section 305.00–405.00 m, test no. 1, injection	30
	5.1.4	Section 403.00–503.00 m, test no. 1, injection	31
	5.1.5 5.1.6	Section 503.00–603.00 m, test no. 1 and 2, injection Section 603.00–703.00 m, test no. 1, injection	32 32
	5.1.7	Section 703.00–703.00 m, test no. 1, injection	33
	5.1.8	Section 803.00–803.00 m, test no. 1, injection	34
	5.1.9	Section 863.00–963.00 m, test no. 1, injection	34
5.2		single-hole injection tests	35
	5.2.1	Section 104.00–124.00 m, test no. 1, injection	35
	5.2.2	Section 125.00–145.00 m, test no. 1, injection	36
	5.2.3	Section 144.00–164.00 m, test no. 1, injection	36
	5.2.4	Section 164.00–184.00 m, test no. 1, injection	37
	5.2.5	Section 183.50–203.50 m, test no. 1, injection	38
	5.2.6	Section 203.00–223.00 m, test no. 1, injection	38
	5.2.7	Section 223.50–243.50 m, test no. 1, injection	39

5.2.9	Section 264.00–284.00 m, test no. 1, injection	40	
5.2.10	Section 284.00–304.00 m, test no. 1, injection	41	
5.2.11	Section 304.00–324.00 m, test no. 1, injection	42	
		42	
		43	
	, , ,		
5.2.36	Section 803.00–823.00 m, test no. 1, injection	58	
Summ	ary of results	59	
		60	
Correla	ation analysis	68	
	•		
	storage coefficient	68	
Concl	isions	71	
	•		
_			
		13	
ndices (	on CD		
ndix 1	File description table		
ndix 2	Test analyses diagrams		
ndix 3	Test summary sheets		
ndix 4	Nomenclature		
ndix 5	SICADA data tables		
	5.2.10 5.2.11 5.2.12 5.2.13 5.2.14 5.2.15 5.2.16 5.2.17 5.2.18 5.2.19 5.2.20 5.2.21 5.2.22 5.2.23 5.2.24 5.2.25 5.2.26 5.2.27 5.2.28 5.2.29 5.2.30 5.2.31 5.2.32 5.2.33 5.2.34 5.2.35 5.2.36 Summ Genera Correla 6.2.1 6.2.2  Conclutransin Equiva Flow re Refere ndices of the condity 1 ndix 2 ndix 3 ndix 4	5.2.10 Section 284.00–304.00 m, test no. 1, injection 5.2.11 Section 304.00–324.00 m, test no. 1, injection 5.2.12 Section 324.00–344.00 m, test no. 1, injection 5.2.13 Section 344.00–364.00 m, test no. 1, injection 5.2.14 Section 364.00–384.00 m, test no. 1, injection 5.2.15 Section 385.00–405.00 m, test no. 1, injection 5.2.16 Section 403.00–423.00 m, test no. 1, injection 5.2.17 Section 423.00–443.00 m, test no. 1, injection 5.2.18 Section 443.00–463.00 m, test no. 1, injection 5.2.19 Section 463.00–483.00 m, test no. 1, injection 5.2.20 Section 483.00–503.00 m, test no. 1, injection 5.2.21 Section 503.00–523.00 m, test no. 1, injection 5.2.22 Section 503.00–523.00 m, test no. 1, injection 5.2.23 Section 523.00–543.00 m, test no. 1, injection 5.2.24 Section 563.00–583.00 m, test no. 1, injection 5.2.25 Section 583.00–603.00 m, test no. 1, injection 5.2.26 Section 603.00–623.00 m, test no. 1, injection 5.2.27 Section 603.00–623.00 m, test no. 1, injection 5.2.28 Section 643.00–663.00 m, test no. 1, injection 5.2.29 Section 663.00–683.00 m, test no. 1, injection 5.2.30 Section 683.00–703.00 m, test no. 1, injection 5.2.31 Section 703.00–723.00 m, test no. 1, injection 5.2.33 Section 703.00–723.00 m, test no. 1, injection 5.2.34 Section 743.00–763.00 m, test no. 1, injection 5.2.35 Section 783.00–803.00 m, test no. 1, injection 5.2.36 Section 783.00–803.00 m, test no. 1, injection 5.2.37 Section 783.00–783.00 m, test no. 1, injection 5.2.38 Section 783.00–783.00 m, test no. 1, injection 5.2.39 Section 783.00–823.00 m, test no. 1, injection 5.2.31 Section 783.00–823.00 m, test no. 1, injection 5.2.33 Section 783.00–823.00 m, test no. 1, injection 5.2.34 Section 783.00–823.00 m, test no. 1, injection 5.2.35 Section 783.00–823.00 m, test no. 1, injection 5.2.36 Section 783.00–823.00 m, test no. 1, injection 5.2.37 Section 783.00–823.00 m, test no. 1, injection 5.2.38 Section 783.00–823.00 m, test no. 1, injection 5.2.39 Section 783.00–783.00 m, test no. 1, injection 5.2.30 Section 783.00–783.00 m, test no. 1, inje	5.2.10 Section 284.00–304.00 m, test no. 1, injection 5.2.11 Section 304.00–324.00 m, test no. 1, injection 42 5.2.13 Section 344.00–344.00 m, test no. 1, injection 43 5.2.14 Section 344.00–364.00 m, test no. 1, injection 44 5.2.15 Section 385.00–405.00 m, test no. 1, injection 44 5.2.16 Section 403.00–423.00 m, test no. 1, injection 45 5.2.17 Section 403.00–423.00 m, test no. 1, injection 46 5.2.18 Section 423.00–443.00 m, test no. 1, injection 47 5.2.19 Section 423.00–433.00 m, test no. 1, injection 48 5.2.19 Section 433.00–433.00 m, test no. 1, injection 49 5.2.10 Section 433.00–503.00 m, test no. 1, injection 40 5.2.11 Section 433.00–503.00 m, test no. 1, injection 41 5.2.22 Section 483.00–503.00 m, test no. 1, injection 42 5.2.23 Section 503.00–523.00 m, test no. 1, injection 43 5.2.24 Section 503.00–523.00 m, test no. 1, injection 48 5.2.25 Section 523.00–543.00 m, test no. 1, injection 49 5.2.26 Section 53.00–533.00 m, test no. 1, injection 50 5.2.27 Section 53.00–533.00 m, test no. 1, injection 50 5.2.28 Section 633.00–633.00 m, test no. 1, injection 50 5.2.29 Section 623.00–633.00 m, test no. 1, injection 51 5.2.20 Section 623.00–633.00 m, test no. 1, injection 52 5.2.21 Section 623.00–633.00 m, test no. 1, injection 52 5.2.22 Section 633.00–633.00 m, test no. 1, injection 53 5.2.23 Section 633.00–633.00 m, test no. 1, injection 53 5.2.29 Section 633.00–630.00 m, test no. 1, injection 53 5.2.30 Section 633.00–703.00 m, test no. 1, injection 53 5.2.31 Section 703.00–730.00 m, test no. 1, injection 54 5.2.33 Section 703.00–730.00 m, test no. 1, injection 55 5.2.34 Section 703.00–730.00 m, test no. 1, injection 57 5.2.35 Section 703.00–730.00 m, test no. 1, injection 58  Summary of results 68 69 60.21 Comparison of steady state and transient analysis results 68 6.2.1 Comparison of steady state and transient analysis results 68 6.2.2 Comparison between the matched and theoretical wellbore storage coefficient 68  Conclusions 71 71 71 71 72 72 73 74 75 74 75 75 75 75 75 75 75 75 75 75 75 75 75

# 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 in borehole KLX08 during 28<sup>th</sup> of September and 11<sup>th</sup> of October 2006 following the methodology described in SKB MD 323.001 and in the activity plan AP PS 400-06-001 (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 KLX08. The commission was conducted by Golder Associates AB and Golder Associates GmbH.

Borehole KLX08 is situated in the Laxemar area approximately 2.5 km north-west of the nuclear power plant of Simpevarp, Figure 1-1. The borehole was drilled from January 2005 to June 2005 at 1,000.41 m length with an inner diameter of 76 mm and an inclination of –60.252°. The upper 12.20 m is cased with large diameter telescopic casing ranging from diameter (outer diameter) 208 mm–323 mm.

The work was carried out in accordance with activity plan AP PS 400-06-001. 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 KLX08	AP PS 400-06-001	1.0
Method descriptions	Number	Version
Hydraulic injection tests	SKB MD 323.001	1.0
Instruktion för rengöring av borrhålsutrustning och viss markbaserad utrustning	SKB MD 600.004	1.0
Instruktion för längdkalibrering vid undersökningar I kärnborrhål	SKB MD 620.010	1.0
Allmäna ordning-, skydds- och miljöregler för platsundersökningar Oskarshamn	SKB SDPO-003	1.0
Miljökontrollprogram Platsundersökningar	SKB SDP-301	1.0
Hantering av primärdata vid platsundersökningar	SKB SDP-508	1.0

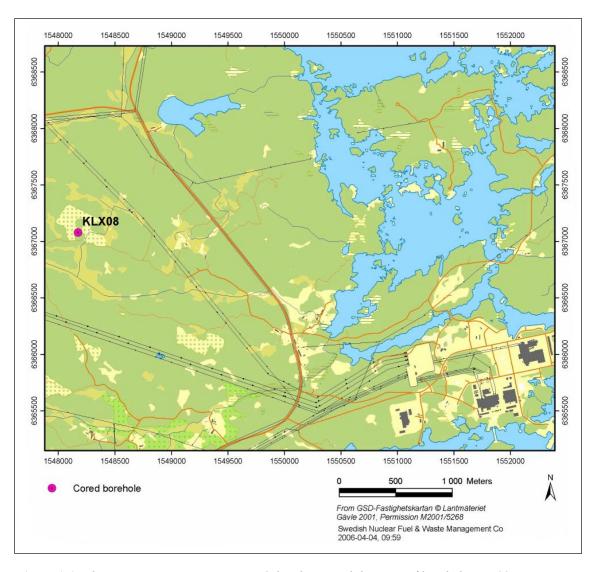


Figure 1-1. The investigation area Laxemar, Oskarshamn with location of borehole KLX08.

# 2 Objective and scope

The objective of the hydrotests in borehole KLX08 is to describe the rock around the borehole with respect to hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K). This is done at different measurement scales of 100 m and 20 m sections. Among these parameters transient evaluation during the flow and recovery period provides additional information such as flow regimes, hydraulic boundaries and cross-over flows.

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

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

The following hydraulic injection tests were performed between 28<sup>th</sup> September and 11<sup>th</sup> October 2006.

Table 2-1. Performed injection tests at borehole KLX08.

No. of injection tests	Interval	Positions	Time/test	Total test time
9	100 m	103.00–963.00 m	125 min	18.75 hrs
36	20 m	104.00-823.00 m	90 min	54.0 hrs
Total:				72.75 hrs

<sup>\*</sup> excluding repeated tests.

#### 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 the table below. The Swedish National coordinate system (RT90) is used in the x-y direction and RHB70 in the z-direction. Northing and Easting refer to the top of the boreholes at the ground surface. The borehole diameter in Table 2-2 refers to the final diameter of the drill bit after drilling to full depth.

Table 2-2. Information about KLX08 (from SICADA 2006-07-10).

Title	Value				
Old idcode name(s): Comment: Borehole length (m): Reference level:	KLX08 No comment 1,000.410 TOC	exists			
Drilling Period(s):	From Date 2005-01-12 2005-04-04	To Date 2005-01-24 2005-06-13	Secup (m) 0.000 100.330	Seclow (m) 100.330 1,000.410	Drilling Type Percussion drilling Core drilling
Starting point coordinate: (centerpoint of TOC)	Length (m) 0.000	Northing (m) 6367079.103	Easting (m) 1548176.713	Elevation (m.a.s.l.) 24.314	Coord System RT90-RHB70
Angles:	Length (m) 0.000	Bearing 199.172	Inclination (– = –60.252	down)	RT90-RHB70
Borehole diameter:	Secup (m) 0.300 12.200 100.200 100.330 101.010	Seclow (m) 12.200 100.200 100.330 101.010 1,000.410	Hole Diam (m) 0.343 0.197 0.165 0.086 0.076		
Core diameter:	Secup (m) 100.330 101.010	Seclow (m) 101.010 1,000.410	Core Diam (m) 0.072 0.050		
Casing diameter:	Secup (m) 0.000 0.300	Seclow (m) 12.200 12.200	Case In (m) 0.200 0.310	Case Out (m) 0.208 0.323	
Cone dimensions:	Secup (m) 96.150 99.250	Seclow (m) 99.250 100.850	Cone In (m) 0.100 0.080	Cone Out (m) 0.104 0.084	
Grove milling:	Length (m) 111.000 150.000 200.000 250.000 300.000 350.000 400.000 550.000 600.000 650.000 700.000 750.000 800.000 850.000 900.000 950.000	Trace detectable YES	ole		

# 2.2 Injection tests

Injection tests were conducted according to the Activity Plan AP PS 400-06-001 and the method description for hydraulic injection tests, SKB MD 323.001 (SKB internal documents). Tests were done in 100 m test sections between 103.00-963.00 m below ToC and in 20 m test sections between 104.00-823.00 m below ToC (see Table 2-3). The initial criteria for performing injection tests in 20 m sections was a measurable flow of Q > 0.001 L/min in the previous measured 100 m tests covering the smaller test sections (see Figure 2-1). The measurements were performed with SKB's custom made equipment for hydraulic testing called PSS2.

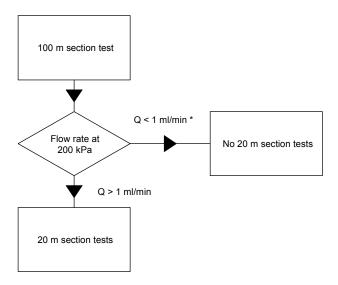
No other additional measurements except the actual hydraulic tests and related measurements of packer position and water level in annulus of borehole KLX08 were conducted.

# 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 "Mätsystembeskrivning" SKB MD 345.101-123 which is composed of two parts 1) management description, 2) drawings and technical documents of the modified PSS2 tool.

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

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



<sup>\*</sup> eventually tests performed after specific discussion with SKB

Figure 2-1. Flow chart for test sections.

Table 2-3. Tests performed.

Bh ID	Test section (m bToC)	Test type <sup>1)</sup>	Test no	Test start Date, Time	Test stop Date, Time
KLX08	103.00-203.00	3	1	060928 07:55	061006 12:05
KLX08	203.00-303.00	3	1	060928 11:37	061006 16:06
KLX08	305.00-405.00	3	1	060928 15:27	061006 20:40
KLX08	403.00-503.00	3	1	060928 19:13	061007 00:54
KLX08	403.00-503.00	3	2	061006 09:32	061007 09:02
KLX08	503.00-603.00	3	1	061006 14:05	061008 08:32
KLX08	603.00-703.00	3	1	061006 17:48	061008 10:41
KLX08	703.00-803.00	3	1	061006 22:17	061008 12:38
KLX08	803.00-903.00	3	1	061007 06:04	061008 14:42
KLX08	863.00-963.00	3	1	061008 07:04	061008 16:36
KLX08	104.00-124.00	3	1	061008 09:13	061008 18:30
KLX08	125.00-145.00	3	1	061008 11:12	061008 20:26
KLX08	144.00-164.00	3	1	061008 13:19	061008 22:36
KLX08	164.00-184.00	3	1	061008 15:14	061009 00:33
KLX08	183.50-203.50	3	1	061008 17:07	061009 02:31
KLX08	203.00-223.00	3	1	061008 19:00	061009 07:50
KLX08	223.50-243.50	3	1	061008 21:09	061009 10:04
KLX08	243.50-263.50	3	1	061008 23:10	061009 12:08
KLX08	264.00-284.00	3	1	061009 01:07	061009 14:27
KLX08	284.00-304.00	3	1	061009 06:17	061009 16:25
KLX08	304.00-324.00	3	1	061009 08:23	061006 12:05
KLX08	324.00-344.00	3	1	061009 10:41	061006 16:06
KLX 08	344.00-364.00	3	1	061009 12:57	061006 20:40
KLX08	364.00-384.00	3	1	061009 15:01	061007 00:54
KLX08	385.00-405.00	3	1	060928 07:55	061007 09:02
KLX08	403.00-423.00	3	1	061009 16:55	061009 18:19
KLX08	423.00-443.00	3	1	061009 18:50	000100 20:17
KLX08	443.00-463.00	3	1	061009 21:00	061009 22:23
KLX08	463.00-483.00	3	1	061009 23:36	061010 00:35
KLX08	463.00-483.00	3	2	061010 01:14	061010 02:38
KLX08	483.00-503.00	3	1	061010 06:13	061010 08:07
KLX08	503.00-523.00	4B	1	061010 08:37	061010 10:22
KLX08	523.00-543.00	3	1	061010 10:59	061010 12:41
KLX08	543.00-563.00	3	1	061010 13:25	061010 15:01
KLX08	563.00-583.00	3	1	061010 15:33	061010 16:58
KLX08	583.00-603.00	3	1	061010 17:32	061010 18:55
KLX08	603.00–623.00	3	1	061010 19:25	061010 20:50
KLX08	623.00-643.00	3	1	061010 21:30	061010 22:54
KLX08	643.00–663.00	3	1	061010 23:25	061011 00:49
KLX08	663.00–683.00	3	1	061011 01:25	061011 03:01
KLX08	683.00–703.00	3	1	061011 05:22	061011 06:11
KLX08	703.00–723.00	3	1	061011 06:43	061011 08:51
KLX08	723.00–743.00	3	1	061011 09:27	061011 11:47
KLX08	743.00–763.00	3	1	061011 12:33	061011 14:52
KLX08	763.00–783.00	3	1	061011 15:28	061011 17:14
KLX08	783.00–803.00	3 4B	1	061011 17:47	061011 18:34
KLX08	803.00–823.00	3	1	061009 16:55	061009 18:19

<sup>&</sup>lt;sup>1)</sup> 3: Injection test; 4B: Pulse injection test.

# 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.

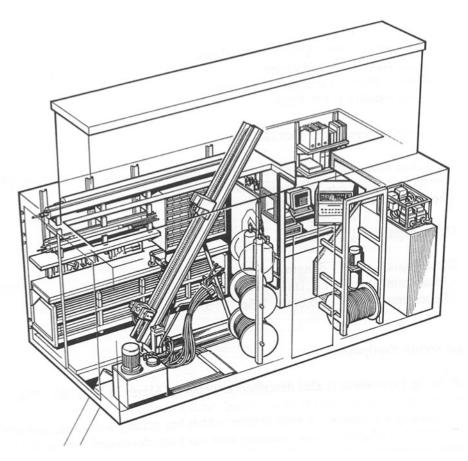


Figure 3-1. A view of the layout and equipment of PSS2.



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

The tool scheme is presented in Figure 3-2.

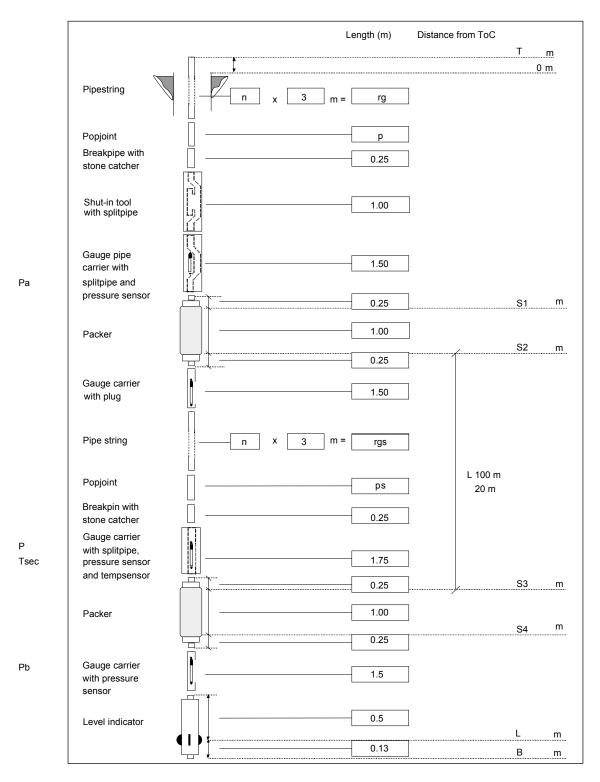


Figure 3-2. Schematic drawing of the down-hole equipment in the PSS2 system.

# 3.2 Sensors

Table 3-1. Technical specifications of sensors.

Keyword	Sensor	Name	Value/range	Unit	Comments
P <sub>sec,a,b</sub>	Pressure	Druck PTX 162- 1464abs	9–30 4–20 0–13,5 +0,1	VDC mA MPa % of FS	
$T_{\text{sec,surf,air}}$	Temperature	BGI	18–24 4–20 0–32 +0,1	VDC mA °C °C	
$Q_{\text{big}}$	Flow	Micro motion Elite sensor	0–100 +0,1	kg/min %	Massflow
$Q_{\text{small}} \\$	Flow	Micro motion Elite sensor	0–1,8 +0,1	kg/min %	Massflow
P <sub>air</sub>	Pressure	Druck PTX 630	9–30 4–20 0–120 +0,1	VDC mA KPa % of FS	
$p_{pack}$	Pressure	Druck PTX 630	9–30 4–20 0–4 +0,1	VDC mA MPa % of FS	
$p_{\text{in,out}}$	Pressure	Druck PTX 1400	9–28 4–20 0–2,5 +0,15	VDC mA MPa % of FS	
L	Level Indicator				Length correction

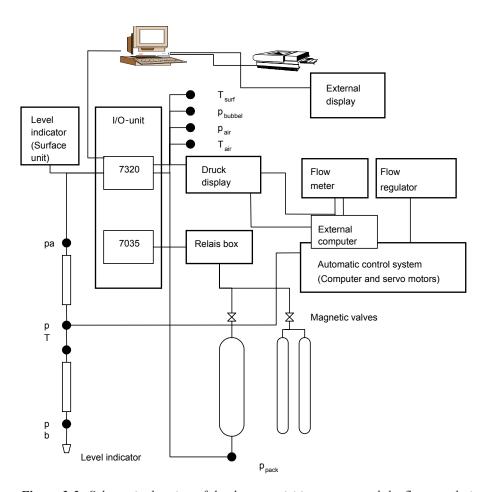
Table 3-2. Sensor positions and wellbore storage (WBS) controlling factors.

Boreho	le information	Senso	ors	Equipment affecting WBS coefficient			
ID	Test section (m)	Type	Position (m fr ToC)	Position	Function	Outer diameter (mm)	Volume in test section (m³)
KLX08	104.00–204.00	p <sub>a</sub>	102.11	Test section	Signal cable	9.1	
		р Т	203.37 203.20		Pump string	33	0.454
		p <sub>b</sub> L	206.01 206.25		Packer line	6	
KLX08	104.00-124.00	$p_{a}$	102.11	Test section	Signal cable	9.1	
		p 123.37 T 123.20		Pump string	33	0.091	
		p <sub>b</sub>	126.01 126.25		Packer line	6	

# 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 and disinfect 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. Only the CHi and CHir phases were analysed quantitatively.

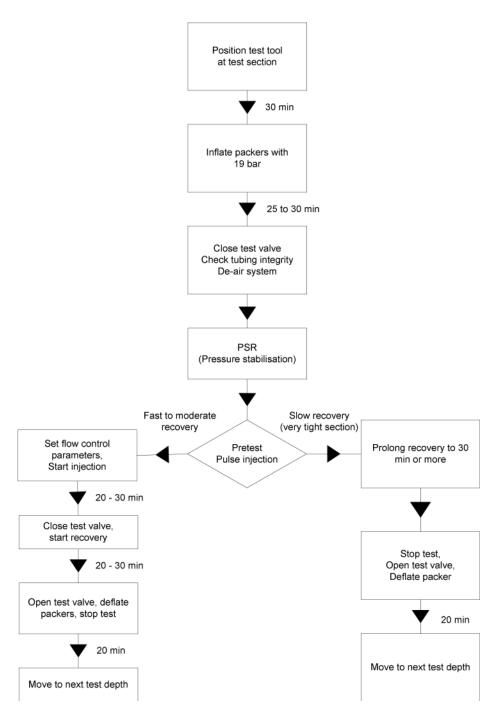


Figure 4-1. Flow chart for test performance.

### 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.

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.

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	<ul> <li>Inflate packers with appr. 1,900 kPa</li> </ul>	25 min.
3	Close test valve	10 min.
	Check tubing integrity with appr. 800 kPa	5 min.
	De-air system	2 min.
4	<ul> <li>Pretest, pulse injection (duration depends on the formation transmissivity)</li> </ul>	-
5*	<ul> <li>Set automatic flow control parameters or setting for manual test</li> </ul>	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	_

<sup>\*</sup> Step 5 and 6 conducted if the preliminary pulse indicates a formation transmissivity with a sufficient flow.

# 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 concistency reviews.

# 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/ and /Bourdet et al. 1989/ by using type curve derivatives calculated for different flow models.

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

#### 4.5.3 Analysis methodology

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

#### Injection Tests

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

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

#### • Pre-test for the Injection Tests

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 low (indicating low transmissivity) the pulse phase is extended and analysed as the main phase of 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 show 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.

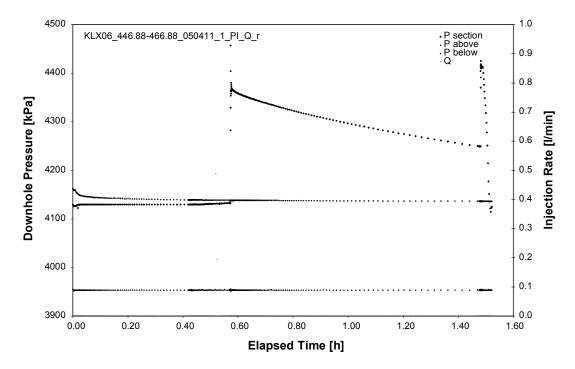


Figure 4-2. Typical pressure versus time plot of a Pulse injection test.

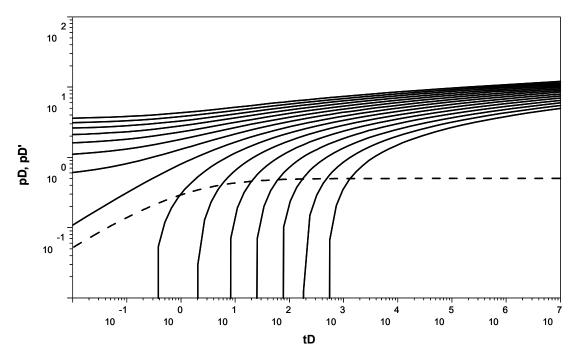


Figure 4-3. Deconvolution type curve set for pulse test analysis.

#### 4.5.4 Correlation between Storativity and Skin factor

For the analysis of the conducted hydraulic tests below 100 m depth a storativity of  $1 \cdot 10^{-6}$  is assumed (SKB MD 320.004e). Based on this assumption the skin will be 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  $e^{2s}$  / 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:

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

The equation above has two unknowns, the storativity (S) and the skin factor (s) 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<sub>P</sub>.
- 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<sub>2</sub>.
- 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<sub>2</sub>.

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 et al. 2006/.

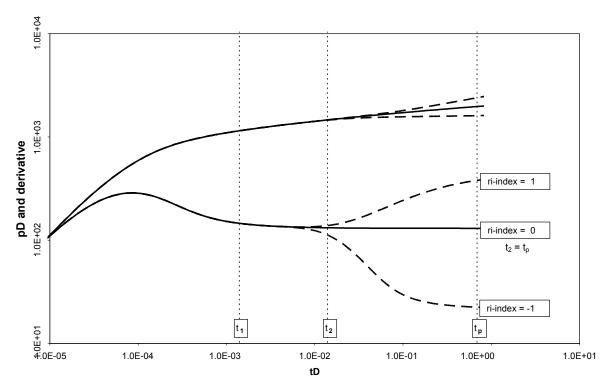


Figure 4-4. Schematic plot of the assignments for the ri-indices.

#### Calculation of the radius of influence

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

$$ri = 1.89 * \sqrt{\frac{T_T}{S_T} * t_2}$$
 (m)

 $T_T$  recommended inner zone transmissivity (m<sup>2</sup>/s)

- t<sub>2</sub> 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 /SKB 2006/:

$$S_T = 0.0007 * T_T^{0.5} (-)$$

### 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 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 athmospheric 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/m³ (freshwater). The equivalent freshwater head is the static water level an individual test interval would show if isolated and connected to the surface by tubing full of freshwater. Figure 4-5 shows the methodology schematically.

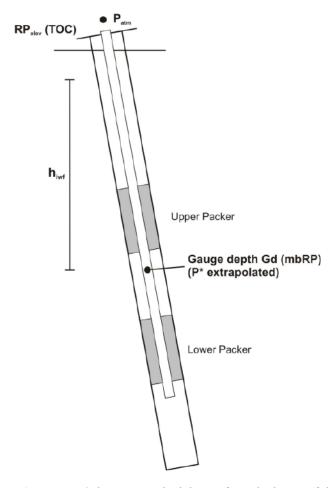


Figure 4-5. Schematic methodologies for calculation of the freshwater head.

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

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

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

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

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

# 4.5.9 Derivation of the recommended transmissivity and the confidence range

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

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

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

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

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

#### 4.6 Nonconformities

Difference flow logging was carried out in KLX08 from July to October 2005, including measurements of electric conductivity and temperature. After getting stuck in the borehole, parts of the flow logging device still remain in the borehole. Therefore the borehole was accessible only until a final depth of 970 m below TOC.

At a test depth of 823 m a malfunction at the shut in tool was observed. It was decided to abort the injection tests because no unknown major inflows and anomalies were expected in the remaining depth of 823.00 m–963.00 m. This decision was made by SKB.

# 5 Results

In the following, results of all tests are presented and analysed. Section 5.1 presents the 100 m tests, 5.2 the 20 m tests. The results are given as general comments to test performance, the identified flow regimes and calculated parameters and finally the parameters which are considered as most representative are chosen and justification is given. All results are also summarised in Table 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 400-06-001; SKB controlling document).

# 5.1 100 m single-hole injection tests

In the following, the 100 m section tests conducted in borehole KLX08 are presented and analysed.

### 5.1.1 Section 103.00-203.00 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 fast recovery of the pulse test indicated a very 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 11 kPa. Due to the high formation transmissivity and the slight pressure difference the pressure control of the automatic regulation system worked very poor. However, the CHi phase is amenable for qualitative analysis. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 55 L/min at start of the CHi phase to 54 L/min at the end, indicating a very high interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, indicating radial flow. A two shell composite flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows stabilization at middle times and a homogeneous radial flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-1.

#### Selected representative parameters

The recommended transmissivity of  $4.2 \cdot 10^{-4}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase, which shows the better derivative quality. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-4}$  m<sup>2</sup>/s to  $8.0 \cdot 10^{-4}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,696.5 kPa.

The analyses of the CHi and CHir phases show some inconsistency as far as the flow models concerned. This can be attributed to the poor pressure control during the CHi phase. No further analysis is recommended.

#### 5.1.2 Section 203.00-303.00 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 fast recovery of the pulse test indicated a very 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 42 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 45 L/min at start of the CHi phase to 41 L/min at the end, indicating a very high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows an upward trend at early and late times, indicating a change of transmissivity at some distance from the borehole. A two shell composite flow model with decreasing transmissivity was used for the analysis of the CHi phase. The derivative of the CHir phase shows slight stabilization at middle times followed by an upward trend at late times. A two shell composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-2.

#### Selected representative parameters

The recommended transmissivity of  $3.2 \cdot 10^{-4}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $9.0 \cdot 10^{-5}$  m<sup>2</sup>/s to  $7.0 \cdot 10^{-4}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2.528.2 kPa.

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

#### 5.1.3 Section 305.00–405.00 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 fast recovery of the pulse test indicated a very 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 46 kPa. No hydraulic connection to the adjacent zones was observed. The automatic regulation system worked well. However, the recorded data is noisy. The injection rate decreased from 31 L/min at start of the CHi phase to 28 L/min at the end, indicating a very high interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy but relative flat derivative. A homogeneous flow model was chosen for the analysis of the CHi phase. The early time derivative of the CHir phase is not very conclusive. However, the derivative shows a horizontal stabilization at middle times and was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-3.

#### Selected representative parameters

The recommended transmissivity of  $1.7 \cdot 10^{-4}$  m²/s was derived from the analysis of the CHir phase, which shows the better derivative stabilization. The confidence range for the interval transmissivity is estimated to be  $7.0 \cdot 10^{-5}$  m²/s to  $4.0 \cdot 10^{-4}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,394.0 kPa.

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

#### 5.1.4 Section 403.00-503.00 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 fast recovery of the pulse test indicated a very 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 25 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 40 L/min at start of the CHi phase to 34 L/min at the end, indicating a very high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows an upward trend at middle and late times, indicating a decrease of transmissivity at some distance from the borehole. A two shell composite flow model was chosen for the analysis of the CHi phase. The early time derivative of the CHir phase is not very conclusive. However, the derivative shows a horizontal stabilization at middle times and was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-4.

#### Selected representative parameters

The recommended transmissivity of  $2.5 \cdot 10^{-4}$  m²/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $9.0 \cdot 10^{-5}$  m²/s to  $5.0 \cdot 10^{-4}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,226.5 kPa.

The analyses of the CHi and CHir phases show inconsistency regarding the chosen flow models. The negative skin derived from the CHir phase is consistent with the behaviour of the CHi derivative (decreasing transmissivity at some distance from the borehole). However, regarding the derived transmissivities the analyses show consistency. No further analysis is recommended.

#### 5.1.5 Section 503.00–603.00 m, test no. 1 and 2, injection

#### Comments to test

The first test was aborted due to a technical problem with the flowmeter. After replacing the flowmeter and new calibration a second test was conducted in this section.

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

The CHi phase was conducted using a pressure difference of 201 kPa. No hydraulic connection to the adjacent zones was observed. The automatic regulation system worked well. However, the recorded early time data is noisy. The injection rate decreased from 50 mL/min at start of the CHi phase to 40 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The CHir phase and the late time data of the CHi phase show no problems and are adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a relative flat derivative at middle and late times, indicating radial flow. The CHi phase was analysed using an infinite acting homogeneous radial flow model. The derivative of the CHir phase shows a downward trend at middle and late times. A two shell composite model with increasing transmissivity was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-5.

#### Selected representative parameters

The recommended transmissivity of  $4.1\cdot10^{-8}$  m²/s was derived from the analysis of the CHi phase, which shows a horizontal stabilization. The confidence range for the interval transmissivity is estimated to be  $2.0\cdot10^{-8}$  m²/s to  $7.0\cdot10^{-8}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,070.9 kPa.

The analyses of the CHi and CHir phases show inconsistency regarding the chosen flow models. However, regarding the derived transmissivities the analyses show consistency. No further analysis is recommended.

#### 5.1.6 Section 603.00-703.00 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 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 automatic regulation system worked well. However, the recorded early time data is noisy. The injection rate decreased from 8 L/min at start of the CHi phase to 4 L/min at the end, indicating a relative high interval transmissivity (consistent with the pulse recovery). The CHir phase and the middle to late time data of the CHi phase show no problems and are adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal stabilization at middle times followed by a downward trend at late times. This behaviour indicates an increase of transmissivity at some distance from the borehole. The CHi phase was analysed using a two shell composite radial flow model. The response of the CHir derivative is consistent to the CHi phase. A two shell composite model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-6.

#### Selected representative parameters

The recommended transmissivity of  $1.5 \cdot 10^{-6}$  m²/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $8.0 \cdot 10^{-7}$  m²/s to  $4.0 \cdot 10^{-6}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5.914.3 kPa.

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

#### 5.1.7 Section 703.00-803.00 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 recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 195 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 65 mL/min at start of the CHi phase to 14 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows an upward trend at middle times followed by a horizontal stabilization at late times, indicating a change of transmissivity at some distance from the section and radial flow. A two shell composite flow model with decreasing transmissivity was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows an upward trend at middle and late times. The CHir phase was matched using a two shell composite flow model with wellbore storage and skin. The analysis is presented in Appendix 2-7.

#### Selected representative parameters

The recommended transmissivity of  $4.5 \cdot 10^{-9}$  m²/s was derived from the analysis of the CHi phase (outer zone), which shows a clear horizontal stabilization. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-9}$  m²/s to  $6.0 \cdot 10^{-9}$  m²/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the very low transmissivity.

The analyses of the CHi and CHir phases show some inconsistency as far as the inner zone transmissivities concerned. However, regarding the flow models and outer zone transmissivities the analyses show consistency. No further analysis is recommended.

#### 5.1.8 Section 803.00–903.00 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 recovery of the pulse test indicated a medium formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 197 kPa. No hydraulic connection to the adjacent zones was observed. The automatic regulation system functioned well, with the exception of some oscillations at the start of the CHi phase. The injection rate decreased from 110 mL/min at start of the CHi phase to 90 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a horizontal stabilization, which is indicative for radial flow. A homogeneous radial flow model was chosen for the analysis of the CHi phase. The CHir derivative shows an upward trend at middle and late times, indicating a transition from wellbore storage and skin dominated flow to pure formation flow. The CHir phase was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-8.

### Selected representative parameters

The recommended transmissivity of  $6.0\cdot10^{-8}$  m²/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $2.0\cdot10^{-8}$  m²/s to  $9.0\cdot10^{-8}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 7,591.3 kPa.

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

#### 5.1.9 Section 863.00–963.00 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 recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 206 kPa. No hydraulic connection to the adjacent zones was observed. Due to the expected small injection rate, the CHi phase was conducted without the automatic regulation, directly from the injection vessel with  $N_2$  backpressure. Because of this, the pressure decreased during the injection by approx. 2 kPa. The injection rate decreased from 6 mL/min at start of the CHi phase to 2 mL/min at the end,

indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate the recorded data of the flow rate is a little bit noisy. The CHir phase shows no problems and is adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a relative flat derivative and a homogeneous flow model was chosen for the analysis. No clear flow stabilization was reached during the CHir phase and the data is still influenced by near wellbore effects like wellbore storage and skin. The CHir phase was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-9.

#### Selected representative parameters

The recommended transmissivity of  $7.3 \cdot 10^{-10}$  m<sup>2</sup>/s was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be  $2.0 \cdot 10^{-10}$  m<sup>2</sup>/s to  $3.0 \cdot 10^{-9}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the very low transmissivity.

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

# 5.2 20 m single-hole injection tests

In the following, the 20 m section tests conducted in borehole KLX08 are presented and analysed.

#### 5.2.1 Section 104.00–124.00 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 fast recovery of the pulse test indicated a very 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 88 kPa. No hydraulic connection to the adjacent zones was observed. The automatic regulation system worked well, with the exception of some oscillations at early times. The injection rate decreased from 33 L/min at start of the CHi phase to 28 L/min at the end, indicating a very high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal stabilization at middle times and a downward trend at late times. A two shell composite flow model with decreasing transmissivity away from the borehole was used for the analysis of the CHi phase. The derivative of the CHir phase shows a downward trend at middle and late times. A two shell composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-10.

#### Selected representative parameters

The recommended transmissivity of  $2.0 \cdot 10^{-4}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase (outer zone), which shows the better derivative quality. The confidence range for the interval transmissivity is estimated to be  $9.0 \cdot 10^{-5}$  m<sup>2</sup>/s to  $7.0 \cdot 10^{-4}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,003.6 kPa.

The analyses of the CHi and CHir phases show some inconsistency as far as the derived inner zone transmissivities concerned. However, regarding the outer zone transmissivities the analyses show consistency. No further analysis is recommended.

#### 5.2.2 Section 125.00-145.00 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 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 201 kPa. No hydraulic connection to the adjacent zones was observed. The automatic regulation system worked well. However, the recorded data is a little bit noisy. The injection rate decreased from 1.9 L/min at start of the CHi phase to 1.8 L/min at the end, indicating a relative high interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows (although noisy) a relative flat derivative and a homogeneous flow model was used for the analysis. The derivative of the CHir phase shows a downward trend at middle times followed by a kind of horizontal stabilization at late times. This is indicative for an increase of transmissivity at some distance from the borehole. A two shell composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-11.

#### Selected representative parameters

The recommended transmissivity of  $7.3 \cdot 10^{-6}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $5.0 \cdot 10^{-6}$  m<sup>2</sup>/s to  $5.0 \cdot 10^{-5}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,176.3 kPa.

The analyses of the CHi and CHir phases show some inconsistencies regarding the chosen flow models. This can be attributed to the noise in the recorded data of the CHi phase. No further analysis is recommended.

#### 5.2.3 Section 144.00–164.00 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 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 34 kPa. A slight reaction in the bottom zone was observed, indicating a connection to the test interval. The injection rate decreased from 37 L/min at start of the CHi phase to 29 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows horizontal stabilization at middle times followed by an upward trend at late times, indicating a decrease of transmissivity at some distance from the borehole. The response of the CHir phase is similar to the response of the CHi phase. A two shell composite flow model was used for the analysis of both phases. The analysis is presented in Appendix 2-12.

# Selected representative parameters

The recommended transmissivity of  $4.3 \cdot 10^{-4}$  m²/s was derived from the analysis of the CHi phase (inner zone), which shows the clearest horizontal stabilization. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-4}$  m²/s to  $8.0 \cdot 10^{-4}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,339.6 kPa.

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

# 5.2.4 Section 164.00-184.00 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 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 17 kPa. A slight reaction in the annulus was observed, indicating a connection to the test interval. The recorded data of the CHi phase shows some oscillations at early times. The injection rate decreased from 33 L/min at start of the CHi phase to 29 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a slight horizontal stabilization at middle times followed by an upward trend at late times, indicating a decrease of transmissivity at some distance from the borehole. A two shell composite flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilization at middle times and an upward trend at late times. The CHir phase was matched using a two shell composite flow model with wellbore storage and skin. The analysis is presented in Appendix 2-13.

# Selected representative parameters

The recommended transmissivity of  $4.2 \cdot 10^{-4}$  m²/s was derived from the analysis of the CHir phase (inner zone), which shows a horizontal stabilization. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-4}$  m²/s to  $8.0 \cdot 10^{-4}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,511.6 kPa.

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

# 5.2.5 Section 183.50–203.50 m, test no. 1, injection

#### Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 11 kPa. A slight hydraulic connection to the annulus and bottom zone was observed. The automatic regulation system worked well. However, the recorded data is a little bit noisy. The injection rate decreased from 33 L/min at start of the CHi phase to 28 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The small pressure difference during the CHi phase and the following fast recovery adds some ambiguity to the 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 were matched using an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-14.

# Selected representative parameters

The recommended transmissivity of  $5.0 \cdot 10^{-4}$  m²/s was derived from the analysis of the CHi phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $9.0 \cdot 10^{-5}$  m²/s to  $9.0 \cdot 10^{-4}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,679.3 kPa.

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

# 5.2.6 Section 203.00-223.00 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 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 32 kPa. A slight hydraulic connection to the annulus was observed. The automatic regulation system worked well. However, the recorded data is noisy. The injection rate decreased from 35 L/min at start of the CHi phase

to 32 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative. However, a homogeneous radial flow model was used for the analysis of the CHi phase. The derivative of the CHir phase is not very conclusive at early times. At middle times the CHir derivative shows a horizontal stabilization. The analysis is presented in Appendix 2-15.

# Selected representative parameters

The recommended transmissivity of  $1.8 \cdot 10^{-4}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $7.0 \cdot 10^{-5}$  m<sup>2</sup>/s to  $5.0 \cdot 10^{-4}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 1,846.7 kPa.

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

# 5.2.7 Section 223.50-243.50 m, test no. 1, injection

#### Comments to test

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

The CHi phase was conducted using a pressure difference of 199 kPa. No hydraulic connection to the adjacent zones was observed. The injection rate decreased from 11 L/min at start of the CHi phase to 9 L/min at the end, indicating a relative high interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relative fast recovery. Both phases are adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal stabilization at middle and late times. A composite radial flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows a steep downward trend at middle times, which is consistent with a high positive skin. At late times the CHir derivative shows a horizontal stabilization. The CHir phase was analysed using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-16.

#### Selected representative parameters

The recommended transmissivity of  $3.4 \cdot 10^{-5}$  m²/s was derived from the analysis of the CHi phase (outer zone), which shows the clearest derivative stabilization. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-5}$  m²/s to  $6.0 \cdot 10^{-5}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,020.3 kPa.

The analyses of the CHi and CHir phases show some discrepancy regarding the chosen flow models. However, regarding the derived transmissivities the analyses show consistency. No further analysis is recommended.

# 5.2.8 Section 243.50-263.50 m, test no. 1, injection

#### Comments to test

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 automatic regulation system functioned well, but the recorded data is however noisy. The injection rate decreased from 25 mL/min at start of the CHi phase to 21 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relative fast recovery.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative. However, a composite radial flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows a steep downward trend at middle times, which is consistent with a high positive skin. At late times the CHir derivative shows a horizontal stabilization. The CHir phase was analysed using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-17.

# Selected representative parameters

The recommended transmissivity of  $5.8\cdot10^{-7}$  m²/s was derived from the analysis of the CHir phase, which shows a derivative stabilization at late times. The confidence range for the interval transmissivity is estimated to be  $1.0\cdot10^{-7}$  m²/s to  $1.0\cdot10^{-6}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,189.7 kPa.

The analyses of the CHi and CHir phases show some discrepancy regarding the chosen flow models. This can be attributed to the noise in the recorded data of the CHi phase. However, regarding the derived transmissivities the analyses show consistency. No further analysis is recommended.

# 5.2.9 Section 264.00-284.00 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 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 automatic regulation system functioned well, but the recorded data is however very noisy. The injection rate decreased from 1.3 L/min at start of the CHi phase to 0.6 L/min at the end, indicating a medium interval transmissivity (consistent

with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a noisy derivative, which is not very conclusive and does not allow flow model identification. However, an infinite acting homogeneous radial flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilization at middle times followed by a downward trend at late times, indicating an increase of transmissivity at some distance of the borehole. The CHir phase was analysed using a two shell composite radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-18.

# Selected representative parameters

The recommended transmissivity of  $3.8 \cdot 10^{-7}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase (inner zone), which shows a derivative stabilization. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-7}$  m<sup>2</sup>/s to  $1.0 \cdot 10^{-6}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,361.3 kPa.

The analyses of the CHi and CHir phases show some discrepancy regarding the chosen flow models. This can be attributed to the noise in the recorded data of the CHi phase. However, regarding the derived transmissivities the analyses show consistency. No further analysis is recommended.

# 5.2.10 Section 284.00-304.00 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 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 automatic regulation system functioned well. However, the recorded data is a little bit noisy. The injection rate decreased from 6 L/min at start of the CHi phase to 2 L/min at the end, indicating a relative high interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

#### Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test both phases were matched using a two shell composite flow model with increasing transmissivity away from the borehole. The analysis is presented in Appendix 2-19.

# Selected representative parameters

The recommended transmissivity of  $6.6 \cdot 10^{-6}$  m<sup>2</sup>/s was derived from the analysis of the CHi phase (outer zone), which shows a better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $2.0 \cdot 10^{-6}$  m<sup>2</sup>/s to  $9.0 \cdot 10^{-6}$  m<sup>2</sup>/s. The flow

dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,533.2 kPa.

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

# 5.2.11 Section 304.00–324.00 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 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 automatic regulation system functioned well. However, the recorded data is a little bit noisy. The injection rate decreased from 40 mL/min at start of the CHi phase to 37 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relative fast recovery.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows (although noisy) a relative flat derivative at late times. A two shell composite flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows a steep downward trend at middle times and a slight stabilization at late times. A composite radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-20.

#### Selected representative parameters

The recommended transmissivity of  $1.3 \cdot 10^{-7}$  m²/s was derived from the analysis of the CHi phase (outer zone), which shows a better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $2.0 \cdot 10^{-8}$  m²/s to  $3.0 \cdot 10^{-7}$  m²/s (this range includes the inner zone transmissivity). The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2.703.6 kPa.

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

# 5.2.12 Section 324.00-344.00 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 recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 200 kPa. No hydraulic connection to the adjacent zones was observed. The automatic regulation system was not able to maintain stable pressure conditions in the formation. The recorded data of the CHi phase is very noise

and not analysable. The average injection rate was approx. 3 mL/min, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase is not analysable. The derivative of the CHir phase shows a downward trend at middle times and late times, indicating a transition from wellbore storage and skin dominated flow to pure formation flow. A composite radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-21.

# Selected representative parameters

The recommended transmissivity of  $2.7 \cdot 10^{-9}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase (inner zone). The confidence range for the interval transmissivity is estimated to be  $9.0 \cdot 10^{-10}$  m<sup>2</sup>/s to  $5.0 \cdot 10^{-9}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the low transmissivity.

No further analysis is recommended.

# 5.2.13 Section 344.00-364.00 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 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 CHir phase shows no problems and is adequate for quantitative analysis. The injection rate decreased from 56 mL/min at start of the CHi phase to 44 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relative fast recovery.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at early and late times, indicating radial flow. The middle time data show some disturbances, but does not influence the analysis. A homogeneous flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows a steep downward trend at middle times and a kind of stabilization at late times. A composite radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-22.

#### Selected representative parameters

The recommended transmissivity of  $4.0 \cdot 10^{-8}$  m<sup>2</sup>/s was derived from the analysis of the CHi phase, which shows a horizontal stabilization of the derivative. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-8}$  m<sup>2</sup>/s to  $7.0 \cdot 10^{-8}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,048.7 kPa.

The analyses of the CHi and CHir phases show some inconsistency regarding the chosen flow models. This may attributed to the relative fast recovery of the CHir phase. No further analysis is recommended.

# 5.2.14 Section 364.00-384.00 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 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 201 kPa. No hydraulic connection to the adjacent zones was observed. The CHir phase shows no problems and is adequate for quantitative analysis. The injection rate decreased from 5.0 L/min at start of the CHi phase to 4.7 L/min at the end, indicating a relative high interval transmissivity (consistent with the pulse recovery). The CHir phase shows a fast recovery.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a kind of a downward trend at early times, followed by a horizontal stabilization at middle and late times. This behaviour is consistent with an increase of transmissivity at some distance from the borehole. A two shell composite flow model was used for the analysis of the CHi phase. Due to fast recovery the early time data of the CHir phase is not very conclusive. However, a composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-23.

# Selected representative parameters

The recommended transmissivity of  $2.3\cdot10^{-5}$  m²/s was derived from the analysis of the CHi phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $5.0\cdot10^{-6}$  m²/s to  $6.0\cdot10^{-5}$  m²/s (this range includes the inner zone transmissivity). The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3.218.8 kPa.

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

# 5.2.15 Section 385.00-405.00 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 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 52 kPa. During the injection the pressure rose by 8 kPa in the bottom zone, indicating a connection to the test section. The injection rate decreased from 32 L/min at start of the CHi phase to 29 L/min at the end, indicating a relative high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal stabilization at middle and late times, which is indicative for radial flow. A homogeneous flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows stabilization at middle times and an upward trend at late times. A two shell composite flow model with decreasing transmissivity was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-24.

# Selected representative parameters

The recommended transmissivity of  $2.4 \cdot 10^{-4}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $8.0 \cdot 10^{-5}$  m<sup>2</sup>/s to  $6.0 \cdot 10^{-4}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3.398.8 kPa.

The analyses of the CHi and CHir phases show a discrepancy as far as the late time responses of the two phases are concerned. In case further analysis is planned, a total test simulation should help resolving this inconsistency. No further analysis is recommended.

# 5.2.16 Section 403.00-423.00 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 fast recovery of the pulse test indicated a high formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 11 kPa. A slight hydraulic connection to the adjacent zones was observed. The injection rate decreased from 30 L/min at start of the CHi phase to 24 L/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The small pressure difference during the CHi phase and the following fast recovery adds some ambiguity to the analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows an upward trend at middle and late times, indicating a decrease of transmissivity at some distance from the borehole. A two shell composite flow model was chosen for the analysis of the CHi phase. Due to the fast recovery and small pressure response in the test section the early time data of the CHir phase is not very conclusive, but a horizontal stabilization of the derivative can be observed at middle times. The CHir phase was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-25.

# Selected representative parameters

The recommended transmissivity of  $1.3 \cdot 10^{-4}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase. The confidence range for the interval transmissivity is estimated to be  $7.0 \cdot 10^{-5}$  m<sup>2</sup>/s to  $5.0 \cdot 10^{-4}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,550.9 kPa.

The analyses of the CHi and CHir phases show inconsistency regarding the chosen flow models. The negative skin derived from the CHir phase is consistent with the behaviour of the CHi derivative (decreasing transmissivity at some distance from the borehole). However, regarding the derived transmissivities the analyses show consistency. No further analysis is recommended.

# 5.2.17 Section 423.00-443.00 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 connection to the adjacent zones was observed. The automatic regulation system functioned well. However, the recorded data of the CHi phase is noisy. The injection rate decreased from 390 mL/min at start of the CHi phase to 370 mL/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relative fast recovery.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase was analysed using an infinite acting homogeneous flow model. The derivative of the CHir phase shows a steep downward trend at early times, indicating a relative high positive skin. The behaviour of the late time derivative (horizontal stabilization) is consistent with radial flow. A homogeneous radial flow model was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-26.

# Selected representative parameters

The recommended transmissivity of  $1.3\cdot10^{-6}$  m²/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $7.0\cdot10^{-7}$  m²/s to  $4.0\cdot10^{-6}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3.718.9 kPa.

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

# 5.2.18 Section 443.00-463.00 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 connection to the adjacent zones was observed. The automatic regulation system functioned well. However, the recorded data of the CHi phase is very noisy. The injection rate decreased from 1 L/min at start of the CHi phase to 0.9 L/min at the end, indicating a medium interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relative fast recovery.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is very noisy and does not allow flow model identification. However, an infinite acting homogeneous flow model was used for the analysis of the CHi phase. The response of the CHir derivative is consistent with a high positive skin. A homogeneous radial flow model was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-27.

# Selected representative parameters

The recommended transmissivity of  $3.1\cdot10^{-6}$  m²/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $8.0\cdot10^{-7}$  m²/s to  $5.0\cdot10^{-6}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,888.9 kPa.

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

# 5.2.19 Section 463.00-483.00 m, test no. 1 and 2, injection

#### Comments to test

After the conduction of the preliminary pulse the test was stopped and repeated. Only the second test includes all test phases and was evaluated and analysed.

The test design consisted of a preliminary pulse injection test conducted with the goal of deriving a first estimate of the formation transmissivity. The 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 connection to the adjacent zones was observed. The injection rate decreased from 5.4 L/min at start of the CHi phase to 4.1 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 flat derivative, indicating radial flow. An infinite acting homogeneous radial flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows a horizontal stabilization at late times, also indicating radial flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-28.

# Selected representative parameters

The recommended transmissivity of  $8.7 \cdot 10^{-6}$  m²/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $5.0 \cdot 10^{-6}$  m²/s to  $1.0 \cdot 10^{-5}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,054.0 kPa.

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

# 5.2.20 Section 483.00-503.00 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 connection to the adjacent zones was observed. The CHi phase shows some oscillations at the beginning due to the adjustments of the regulation unit, but is still adequate for quantitative analysis. The injection rate decreased from 410 mL/min at start of the CHi phase to 390 mL/min at the end, indicating a high interval transmissivity (consistent with the pulse recovery). The CHir phase recovers relatively fast.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is not very conclusive at early times, but it shows a horizontal stabilization at late times. A two shell composite flow model with increasing transmissivity at some distance from the borehole was used for the analysis of the CHi phase. Mainly caused by the fast recovery and the resulting data quality the derivative of the CHir phase is not very conclusive. However, the CHir phase was matched using a two shell composite flow model with wellbore storage and skin. The analysis is presented in Appendix 2-29.

# Selected representative parameters

The recommended transmissivity of  $1.0 \cdot 10^{-6}$  m<sup>2</sup>/s was derived from the analysis of the CHi phase (outer zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $7.0 \cdot 10^{-7}$  m<sup>2</sup>/s to  $4.0 \cdot 10^{-6}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4.226.9 kPa.

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

# 5.2.21 Section 503.00-523.00 m, test no. 1, pulse injection

# Comments to test

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

During the brief injection phase of the pulse injection a total volume of about 13 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 217 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to  $4.9 \cdot 10^{-11}$  m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the deconvolved PI pressure derivative shows a continuing upward trend which can be interpreted to the fact that the dimensionless test time is to small and semi-logarithmic asymptotic solution was not achieved (due to the relative small transmissivity). The PI phase was analysed using a radial homogeneous flow model. The analysis is presented in Appendix 2-30.

# Selected representative parameters

The recommended transmissivity of  $4.9 \cdot 10^{-11}$  m<sup>2</sup>/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-11}$  to  $9.0 \cdot 10^{-11}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the very low transmissivity.

No further analysis is recommended.

# 5.2.22 Section 523.00-543.00 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 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 connection to the adjacent zones was observed. The CHi phase shows some oscillations at the beginning due to the adjustments of the regulation unit, but is still adequate for quantitative analysis. The injection rate decreased from 17 mL/min at start of the CHi phase to 10 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows flat derivative at late times, which is indicative for radial flow. An infinite acting radial flow model was chosen for the analysis of the CHi phase. No clear flow stabilization was reached during the CHir phase and the data is still influenced by near wellbore effects like wellbore storage and skin. However, a homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-31.

#### Selected representative parameters

The recommended transmissivity of  $5.1 \cdot 10^{-9}$  m<sup>2</sup>/s was derived from the analysis of the CHi phase, which shows a horizontal stabilisation. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-9}$  m<sup>2</sup>/s to  $9.0 \cdot 10^{-9}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the low transmissivity.

The analyses of the CHi and CHir phases show little inconsistency in the derived transmissivity, which can be attributed to fact that no flow stabilization was reached during the CHir phase. No further analysis is recommended.

# 5.2.23 Section 543.00-563.00 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 low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 206 kPa. No connection to the adjacent zones was observed. The automatic regulation system worked well with the exception of some oscillations at the beginning. However, the recorded flow rate is very noisy. The CHi phase is amenable for qualitative analysis. The injection rate decreased from approx. 10 mL/min at start of the CHi phase to 5 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase does not allow flow model identification. The analysis of the CHi phase was conducted using an infinite acting homogeneous flow model. The CHir phase shows a horizontal stabilization at middle times, followed by an upward trend at late times, which is indicative for a decrease of transmissivity at some distance from the borehole. The CHir phase was matched using a two shell composite flow model with wellbore storage and skin. The analysis is presented in Appendix 2-32.

# Selected representative parameters

The recommended transmissivity of  $6.6 \cdot 10^{-9}$  m²/s was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-9}$  m²/s to  $9.0 \cdot 10^{-9}$  m²/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the low transmissivity.

The analyses of the CHi and CHir phases show inconsistency as far as the flow models concerned. This inconsistency can be attributed to poor data quality of the CHi phase. No further analysis is recommended.

# 5.2.24 Section 563.00-583.00 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 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 connection to the adjacent zones was observed. The automatic regulation system worked well. However, the recorded flow rate is noisy. The CHi phase is amenable for qualitative analysis. The injection rate decreased from approx. 7 mL/min at start of the CHi phase to 5 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

The 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 relative flat derivative. The CHi phase was matched using an infinite acting homogeneous flow model. The CHir phase shows a downward trend at late times. The behaviour of the CHir phase is typical for transition from wellbore storage and skin dominated flow to pure formation flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-33.

# Selected representative parameters

The recommended transmissivity of  $4.7 \cdot 10^{-9}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-9}$  m<sup>2</sup>/s to  $9.0 \cdot 10^{-9}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the low transmissivity.

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

# 5.2.25 Section 583.00-603.00 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 connection to the adjacent zones was observed. The automatic regulation system functioned well. However, the recorded data of the CHi phase is very noisy. The injection rate decreased from 30 mL/min at start of the CHi phase to 25 mL/min at the end, indicating a relative low interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relative fast recovery, but is still adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is very noisy and does not allow flow model identification. However, an infinite acting homogeneous flow model was used for the analysis of the CHi phase. The response of the CHir derivative (unit sloop downward trend at middle times) is consistent with a high positive skin. The late time derivative shows a horizontal stabilization, which is indicative for radial flow. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-34.

# Selected representative parameters

The recommended transmissivity of  $6.9 \cdot 10^{-8}$  m²/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-8}$  m²/s to  $1.0 \cdot 10^{-7}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,074.5 kPa.

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

# 5.2.26 Section 603.00-623.00 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 connection to the adjacent zones was observed. The automatic regulation system functioned well. However, the recorded data of the CHi phase is a little bit noisy. The injection rate decreased from 1.3 L/min at start of the CHi phase to 1.2 L/min at the end, indicating medium interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows (although noisy) a relative flat derivative. An infinite acting homogeneous flow model was used for the analysis of the CHi phase. The CHir phase shows horizontal flow stabilization at late times and was matched using a homogeneous radial flow model with wellbore storage and skin. The analysis is presented in Appendix 2-35.

#### Selected representative parameters

The recommended transmissivity of  $2.4 \cdot 10^{-6}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $7.0 \cdot 10^{-7}$  m<sup>2</sup>/s to  $5.0 \cdot 10^{-6}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5.241.9 kPa.

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

# 5.2.27 Section 623.00-643.00 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 connection to the adjacent zones was observed. The automatic regulation system functioned well. However, the recorded data of the CHi phase is very noisy. The injection rate decreased from 22 mL/min at start of the CHi phase to 20 mL/min at the end, indicating a relative low interval transmissivity (consistent with the pulse recovery). The CHir phase shows a relative fast recovery, but is still adequate for quantitative analysis.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is very noisy and does not allow flow model identification. However, the analysis of the CHi phase was conducted using a homogeneous radial flow model. The response of the CHir derivative (unit sloop downward trend at middle times) is consistent with a high positive skin. A homogeneous radial flow model with wellbore storage and skin was used for the analysis of the CHir phase. The analysis is presented in Appendix 2-36.

# Selected representative parameters

The recommended transmissivity of  $7.1 \cdot 10^{-8}$  m<sup>2</sup>/s was derived from the analysis of the CHir phase, which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-8}$  m<sup>2</sup>/s to  $1.0 \cdot 10^{-7}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,413.0 kPa.

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

# 5.2.28 Section 643.00-663.00 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. The pressure in the bottom zone rose by approx. 160 kPa, indicating a connection to the test zone. The injection rate decreased from 6.9 L/min at start of the CHi phase to 2.6 L/min at the end, indicating a relative 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 both phases were matched using a homogeneous radial flow model. The analysis is presented in Appendix 2-37.

# Selected representative parameters

The recommended transmissivity of  $1.5\cdot10^{-6}$  m²/s was derived from the analysis of the CHi phase, which shows the slight better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $7.0\cdot10^{-7}$  m²/s to  $3.0\cdot10^{-6}$  m²/s (This range includes the derived transmissivity from the CHir phase). The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,583.9 kPa.

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

# 5.2.29 Section 663.00-683.00 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 connection to the adjacent zones was observed. The injection rate decreased from 7.8 L/min at start of the CHi phase to 2.8 L/min at the end, indicating a relative high interval transmissivity (consistent with the pulse recovery). Both phases show no problems and are adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows a horizontal stabilization at early times, followed by a downward trend at middle times and a new stabilization at late times. This behaviour is typical for an increase of transmissivity at some distance from the borehole. The CHir response is similar to the response of the CHi phase, whereas the late time stabilization was not observed. Both phases were matched using a two shell composite radial flow model. The analysis is presented in Appendix 2-38.

# Selected representative parameters

The recommended transmissivity of  $1.3 \cdot 10^{-6}$  m<sup>2</sup>/s was derived from the analysis of the CHi phase (inner zone), which shows the clearest horizontal stabilization. The confidence range for the interval transmissivity is estimated to be  $7.0 \cdot 10^{-7}$  m<sup>2</sup>/s to  $3.0 \cdot 10^{-6}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5.747.7 kPa.

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

# 5.2.30 Section 683.00-703.00 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 183 kPa. No connection to the adjacent zones was observed. The pressure control during the CHi phase was very poor. The injection rate decreased from 5 mL/min at start of the CHi phase to 3 mL/min at the end, indicating a relative low interval transmissivity (consistent with the pulse recovery). The CHir phase shows no problems and is adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase is very noisy and does not allow flow model identification. However, the analysis of the CHi phase was conducted using a

homogeneous radial flow model. The derivative of the CHir phase shows a unit slope downward trend, indicating a transition from wellbore storage and skin dominated flow to pure formation flow. A composite flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-39.

# Selected representative parameters

The recommended transmissivity of  $4.6 \cdot 10^{-9}$  m²/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $1.0 \cdot 10^{-9}$  m²/s to  $9.0 \cdot 10^{-9}$  m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5.921.1 kPa.

The analyses of the CHi and CHir phases show some inconsistency regarding the chosen flow models. This inconsistency is caused to the poor data quality of the CHi phase. No further analysis is recommended.

# 5.2.31 Section 703.00-723.00 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 approx. 70 kPa in 20 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

The measured data is presented in Appendix 2-40.

# Selected representative parameters

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

No further analysis recommended.

# 5.2.32 Section 723.00-743.00 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 slow recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 205 kPa. No hydraulic connection to the adjacent zones was observed. Due to the expected small injection rate, the CHi phase was conducted without the automatic regulation, directly from the injection vessel with  $N_2$  backpressure. However, no pressure loss occurred during the injection phase. The injection rate decreased from 8 mL/min at start of the CHi phase to 3 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate the recorded data of the flow rate is noisy and the results of the CHi phase should be regarded carefully. The CHir shows no problems and is adequate for quantitative analysis.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. Due to the poor data quality the CHi phase is not very conclusive. However, in case of the present test an infinite acting homogenous radial flow model was used for the analysis of the CHi phase. The response of the CHir phase indicates a transition from wellbore storage and skin dominated flow to pure formation flow. A composite radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-41.

# Selected representative parameters

The recommended transmissivity of  $2.2 \cdot 10^{-9}$  m²/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $8.0 \cdot 10^{-10}$  m²/s to  $5.0 \cdot 10^{-9}$  m²/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the low transmissivity.

The analyses of the CHi and CHir phases show some inconsistency regarding the chosen flow models. This inconsistency is caused to the poor data quality of the CHi phase. No further analysis recommended.

# 5.2.33 Section 743.00-763.00 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 slow recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 207 kPa. No hydraulic connection to the adjacent zones was observed. Due to the expected small injection rate, the CHi phase was conducted without the automatic regulation, directly from the injection vessel with  $N_2$  backpressure. However, a pressure loss of approx. 4 kPa occurred during the injection phase. The injection rate decreased from 4 mL/min at start of the CHi phase to 1 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Due to the low flow rate the recorded data of the flow rate is noisy and the results of the CHi phase should be regarded carefully. The CHir shows no problems and is adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. Due to the poor data quality the CHi phase is not very conclusive, but the derivative shows an upward trend at middle times. An infinite acting homogenous radial flow model was used for the analysis of the CHi phase. The derivative of the CHir phase shows an upward trend and a two shell composite flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-42.

# Selected representative parameters

The recommended transmissivity of  $2.2 \cdot 10^{-9}$  m²/s was derived from the analysis of the CHir phase (inner zone), which shows the better data and derivative quality. The confidence range for the interval transmissivity is estimated to be  $8.0 \cdot 10^{-10}$  m²/s to  $5.0 \cdot 10^{-9}$  m²/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the low transmissivity.

# 5.2.34 Section 763.00-783.00 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 slow recovery of the pulse test indicated a low formation transmissivity. Based on this result a sequence consisting of a constant pressure injection phase (CHi) and a recovery phase (CHir) was conducted. Only the CHi and CHir phases were analysed quantitatively.

The CHi phase was conducted using a pressure difference of 201 kPa. No hydraulic connection to the adjacent zones was observed. Due to the expected small injection rate, the CHi phase was conducted without the automatic regulation, directly from the injection vessel with  $N_2$  backpressure. However, a pressure loss of approx. 6 kPa occurred during the injection phase. The injection rate decreased from 100 mL/min at start of the CHi phase to 13 mL/min at the end, indicating a low interval transmissivity (consistent with the pulse recovery). Both phases are adequate for quantitative analysis.

# Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative of the CHi phase shows an upward trend at middle times followed by a horizontal stabilization at late times. This is indicative for a decrease of transmissivity at some distance from the borehole and radial flow. A two shell composite flow model was chosen for the analysis of the CHi phase. The derivative of the CHir phase shows an upward trend and a two shell composite flow model with wellbore storage and skin was chosen for the analysis. The analysis is presented in Appendix 2-43.

# Selected representative parameters

The recommended transmissivity of  $2.1 \cdot 10^{-9}$  m²/s was derived from the analysis of the CHi phase (outer zone), which shows the clearest horizontal stabilization. The confidence range for the interval transmissivity is estimated to be  $9.0 \cdot 10^{-10}$  m²/s to  $9.0 \cdot 10^{-9}$  m²/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the low transmissivity.

No further analysis recommended.

# 5.2.35 Section 783.00-803.00 m, test no. 1, pulse injection

# Comments to test

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

During the brief injection phase of the pulse injection a total volume of about 8 mL was injected (derived from the flow meter readings). This injected volume produced a pressure increase of 173 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to  $2.8 \cdot 10^{-12}$  m³/Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

For the interpretation a flow dimension of 2 (radial flow) was assumed. In case of the present test the deconvolved PI pressure derivative shows a continuing upward trend which can be interpreted to the fact that the dimensionless test time is to small and semi-logarithmic asymptotic solution was not achieved (due to the relative small transmissivity). The PI phase was analysed using a radial homogeneous flow model. The analysis is presented in Appendix 2-44.

# Selected representative parameters

The recommended transmissivity of  $2.8 \cdot 10^{-12}$  m<sup>2</sup>/s was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be  $9.0 \cdot 10^{-13}$  to  $5.0 \cdot 10^{-12}$  m<sup>2</sup>/s. The flow dimension displayed during the test is 2. The static pressure could not be extrapolated due to the very low transmissivity.

No further analysis is recommended.

# 5.2.36 Section 803.00-823.00 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 approx. 72 kPa in 20 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). None of the test phases is analysable.

The measured data is presented in Appendix 2-45.

# Selected representative parameters

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

No further analysis 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.

Table 6-1. General test data from hydraulic tests in KLX08 (for nomenclature see Appendix 4).

Borehole secup	Borehole seclow	Date and time for test, start	Date and time for test, stop	$\mathbf{Q}_{p}$	$\mathbf{Q}_{m}$	tp	t <sub>F</sub>	$p_0$	$p_i$	$\mathbf{p}_{p}$	p <sub>F</sub>	Te <sub>w</sub>	Test phases measured
(m)	(m)	YYYYMMDD hh:mm	YYYYMMDD hh:mm	(m**3/s)	(m**3/s)	(s)	(s)	(kPa)	(kPa)	(kPa)	(kPa)	(oC)	Analysed test phases marked bold
103.00	203.00	060928 07:55	060928 10:12	8.92E-04	9.05E-04	1800	1800	1695	1696	1707	1697	9.2	CHi / CHir
203.00	303.00	060928 11:37	060928 14:04	6.86E-04	7.19E-04	1800	1800	2526	2526	2568	2529	10.6	CHi / CHir
305.00	405.00	060928 15:27	060928 17:28	4.70E-04	4.89E-04	1800	1800	3393	3393	3439	3394	11.3	CHi / CHir
403.00	503.00	060928 19:13	060928 21:27	5.69E-04	6.13E-04	1800	1800	4225	4226	4251	4227	13.5	CHi / CHir
503.00	603.00	061006 09:32	061006 12:05	6.53E-07	7.32E-07	1800	1800	5074	5077	5278	5082	14.8	CHi / CHir
603.00	703.00	061006 14:05	061006 16:06	6.08E-05	6.98E-05	1800	1800	5923	5923	6123	5938	16.1	CHi / CHir
703.00	803.00	061006 17:48	061006 20:40	2.33E-07	3.28E-07	1800	1800	6766	6775	6970	6864	17.5	CHi / CHir
803.00	903.00	061006 22:17	061007 00:54	1.48E-06	1.72E-06	1800	1800	7605	7607	7804	7616	18.9	CHi / CHir
863.00	963.00	061007 06:04	061007 09:02	3.17E-08	4.11E-08	1800	1800	8110	8116	8322	8221	19.7	CHi / CHir
104.00	124.00	061008 07:04	061008 08:32	4.73E-04	4.94E-04	1200	1200	999	1003	1091	1005	8.4	CHi / CHir
125.00	145.00	061008 09:13	061008 10:41	2.96E-05	3.08E-05	1200	1200	1179	1176	1377	1176	8.9	CHi / CHir
144.00	164.00	061008 11:12	061008 12:38	4.86E-04	5.03E-04	1200	1200	1341	1339	1373	1340	8.8	CHi / CHir
164.00	184.00	061008 13:19	061008 14:42	4.79E-04	5.05E-04	1200	1200	1511	1511	1528	1512	9.1	CHi / CHir
183.50	203.50	061008 15:14	061008 16:36	4.61E-04	5.06E-04	1200	1200	1679	1679	1690	1679	9.2	CHi / CHir
203.00	223.00	061008 17:07	061008 18:30	5.30E-04	5.51E-04	1200	1200	1846	1847	1879	1847	9.5	CHi / CHir
223.50	243.50	061008 19:00	061008 20:26	1.55E-04	1.60E-04	1200	1200	2021	2021	2220	2021	9.9	CHi / CHir
243.50	263.50	061008 21:09	061008 22:36	3.43E-06	3.62E-06	1200	1200	2191	2191	2391	2190	10.2	CHi / CHir
264.00	284.00	061008 23:10	061009 00:33	9.65E-06	1.07E-05	1200	1200	2365	2364	2564	2364	10.5	CHi / CHir
284.00	304.00	061009 01:07	061009 02:31	4.16E-05	4.26E-05	1200	1200	2536	2534	2734	2534	10.7	CHi / CHir
304.00	324.00	061009 06:17	061009 07:50	6.17E-07	6.25E-07	1200	1200	2706	2705	2905	2704	11.0	CHi / CHir
324.00	344.00	061009 08:23	061009 10:04	5.17E-08	6.06E-08	1200	1200	2877	2887	3087	2893	11.2	CHi / CHir
344.00	364.00	061009 10:41	061009 12:08	7.27E-07	7.94E-07	1200	1200	3048	3048	3248	3048	11.5	CHi / CHir
364.00	384.00	061009 12:57	061009 14:27	7.96E-05	8.13E-05	1200	1200	3218	3218	3419	3219	11.6	CHi / CHir
385.00	405.00	061009 15:01	061009 16:25	4.97E-04	5.10E-04	1200	1200	3397	3398	3450	3399	11.4	CHi / CHir
403.00	423.00	061009 16:55	061009 18:19	4.01E-04	4.47E-04	1200	1200	3550	3550	3561	3551	12.3	CHi / CHir
423.00	443.00	061009 18:50	060109 20:17	6.08E-06	6.25E-06	1200	1200	3719	3719	3919	3719	12.6	CHi / CHir

443.00	463.00	061009 21:00	061009 22:23	1.48E-05	1.51E-05	1200	1200	3889	3889	4089	3888	12.9	CHi / CHir
463.00	483.00	061009 23:36	061010 00:35	6.82E-05	7.17E-05	1200	1200	4060	4060	4260	4059	13.2	CHi / CHir
483.00	503.00	061010 01:14	061010 02:38	6.45E-06	6.66E-06	1200	1200	4227	4227	4427	4227	13.4	CHi / CHir
503.00	523.00	061010 06:13	061010 08:07	#NV	#NV	10	3659	4396	4410	4627	4479	13.7	Pi
523.00	543.00	061010 08:37	061010 10:22	1.70E-07	2.04E-07	1200	1200	4567	4574	4775	4604	14.0	CHi / CHir
543.00	563.00	061010 10:59	061010 12:41	8.33E-08	1.14E-07	1200	1200	4737	4746	4952	4788	14.2	CHi / CHir
563.00	583.00	061010 13:25	061010 15:01	9.00E-08	1.13E-07	1200	1200	4906	4912	5113	4920	14.5	CHi / CHir
583.00	603.00	061010 15:33	061010 16:58	4.17E-07	4.33E-07	1200	1200	5076	5077	5278	5077	14.7	CHi / CHir
603.00	623.00	061010 17:32	061010 18:55	1.93E-05	1.98E-05	1200	1200	5245	5246	5446	5247	15.0	CHi / CHir
623.00	643.00	061010 19:25	061010 20:50	3.33E-07	3.50E-07	1200	1200	5415	5418	5618	5418	15.3	CHi / CHir
643.00	663.00	061010 21:30	061010 22:54	4.37E-05	4.98E-05	1200	1200	5585	5587	5789	5600	15.5	CHi / CHir
663.00	683.00	061010 23:25	061011 00:49	4.68E-05	5.28E-05	1200	1200	5755	5764	5964	5774	15.8	CHi / CHir
683.00	703.00	061011 01:25	061011 03:01	5.50E-08	6.48E-08	1200	3600	5925	5931	6114	5925	16.0	CHi / CHir
703.00	723.00	061011 05:22	061011 06:11	#NV	#NV	#NV	#NV	6091	#NV	#NV	#NV	16.4	#NV
723.00	743.00	061011 06:43	061011 08:51	4.50E-08	5.07E-08	1200	1200	6261	6272	6477	6317	16.6	CHi / CHir
743.00	763.00	061011 09:27	061011 11:47	2.33E-08	2.92E-08	1200	1200	6432	6439	6646	6575	16.9	CHi / CHir
763.00	783.00	061011 12:33	061011 14:52	2.17E-07	5.28E-07	1200	1200	6603	6604	6805	6713	17.2	CHi / CHir
783.00	803.00	061011 15:28	061011 17:14	#NV	#NV	10	3630	6770	6786	6959	6927	17.5	Pi
803.00	823.00	061011 17:47	061011 18:34	#NV	#NV	#NV	#NV	6938	#NV	#NV	#NV	17.7	#NV

#### Nomenclature

Q<sub>p</sub> Flow in test section immediately before stop of flow (m³/s).

Q<sub>m</sub> Arithmetical mean flow during perturbation phase (m³/s).

Duration of perturbation phase (s).

t<sub>f</sub> Duration of recovery phase (s).

p<sub>0</sub> Pressure in borehole before packer inflation (kPa).

p<sub>i</sub> Pressure in test section before start of flowing (kPa).

p<sub>p</sub> Pressure in test section before stop of flowing (kPa).

p<sub>F</sub> Pressure in test section at the end of the recovery (kPa).

Te<sub>w</sub> 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 KLX08 (for nomenclature see Appendix 4).

Interval position		Stationary flow parameters		•			ient analys		parameters	1									Static co	onditions
up m btoc	low m btoc	Q/s m²/s	T <sub>M</sub> m²/s	Per- turb. phase	Recov- ery phase	T <sub>f1</sub> m²/s	T <sub>f2</sub> m²/s	T <sub>s1</sub> m²/s	T <sub>s2</sub> m²/s	T <sub>T</sub> m²/s	T <sub>TMIN</sub> m²/s	T <sub>TMAX</sub> m²/s	C m³/Pa	ξ -	dt₁ min	dt <sub>2</sub> min	p* kPa	h <sub>wif</sub> m.a.s.l.		
103.00	203.00	7.96E-04	1.04E-03	22	WBS2	6.1E-04	8.7E-03	4.2E-04	#NV	4.2E-04	1.0E-04	8.0E-04	4.6E-07	-6.0	0.43	0.53	1696.5	12.04		
203.00	303.00	1.60E-04	2.09E-04	2	WBS22	3.9E-04	1.4E-04	3.2E-04	1.5E-04	3.2E-04	9.0E-05	7.0E-04	1.7E-07	0.8	0.83	2.32	2528.2	10.31		
305.00	405.00	1.00E-04	1.31E-04	2	WBS2	3.2E-04	#NV	1.7E-04	#NV	1.7E-04	7.0E-05	4.0E-04	4.0E-08	1.6	0.76	4.64	3394.0	10.86		
403.00	503.00	2.23E-04	2.91E-04	22	WBS2	6.9E-04	2.3E-04	2.5E-04	#NV	2.5E-04	9.0E-05	5.0E-04	7.7E-08	-5.1	0.35	4.34	4226.5	11.66		
503.00	603.00	3.19E-08	4.15E-08	2	WBS22	4.1E-08	#NV	3.3E-08	6.6E-08	4.1E-08	2.0E-08	7.0E-08	4.0E-10	2.2	4.15	24.11	5070.9	12.12		
603.00	703.00	2.98E-06	3.89E-06	2	WBS22	2.4E-06	4.05E-06	1.5E-06	2.5E-06	1.5E-06	8.0E-07	4.0E-06	7.6E-09	-4.5	0.62	2.84	5914.3	12.58		
703.00	803.00	1.17E-08	1.53E-08	22	WBS22	9.9E-09	4.5E-09	1.8E-08	2.5E-09	4.5E-09	1.0E-09	6.0E-09	3.9E-10	-1.8	4.53	25.22	#NV	#NV		
803.00	903.00	7.39E-08	9.62E-08	2	WBS2	6.3E-08	#NV	6.0E-08	#NV	6.0E-08	2.0E-08	9.0E-08	2.1E-09	-1.6	#NV	#NV	7591.3	13.44		
863.00	963.00	1.51E-09	1.96E-09	2	WBS22	7.3E-10	#NV	2.5E-10	#NV	7.3E-10	2.0E-10	3.0E-09	1.9E-10	-1.0	0.78	13.12	#NV	#NV		
104.00	124.00	5.27E-05	5.52E-05	22	WBS22	1.4E-04	2.0E-04	5.8E-05	1.9E-04	2.0E-04	9.0E-05	7.0E-04	6.6E-08	7.0	#NV	#NV	1003.6	9.92		
125.00	145.00	1.45E-06	1.51E-06	2	WBS22	2.9E-06	#NV	1.5E-06	7.3E-06	7.3E-06	5.0E-06	5.0E-05	8.3E-10	0.0	2.34	6.47	1176.3	9.32		
144.00	164.00	1.40E-04	1.47E-04	22	WBS22	4.3E-04	2.9E-04	3.4E-04	1.4E-04	4.3E-04	1.0E-04	8.0E-04	1.6E-07	8.7	2.18	6.07	1339.6	9.51		
164.00	184.00	2.76E-04	2.89E-04	2	WBS22	5.5E-04	3.4E-04	4.2E-04	2.1E-04	4.2E-04	1.0E-04	8.0E-04	9.7E-08	1.1	0.43	3.20	1511.6	9.69		
183.50	203.50	4.11E-04	4.30E-04	2	WBS2	5.0E-04	#NV	1.1E-04	#NV	5.0E-04	9.0E-05	9.0E-04	1.1E-08	-3.1	2.65	19.97	1679.3	9.86		
203.00	223.00	1.62E-04	1.70E-04	2	WBS2	3.6E-04	#NV	1.8E-04	#NV	1.8E-04	7.0E-05	5.0E-04	1.1E-07	-2.4	0.82	3.73	1846.7	10.00		
223.50	243.50	7.63E-06	7.98E-06	22	WBS2	1.7E-05	3.4E-05	3.4E-05	#NV	3.4E-05	1.0E-05	6.0E-05	4.1E-09	5.9	1.54	16.37	2020.3	9.93		
243.50	263.50	1.68E-07	1.76E-07	22	WBS2	5.6E-07	3.3E-07	5.8E-07	#NV	5.8E-07	1.0E-07	1.0E-06	8.3E-11	15.0	1.17	16.40	2198.7	10.84		
264.00	284.00	4.73E-07	4.95E-07	2	WBS22	4.6E-07	#NV	3.8E-07	1.3E-06	3.8E-07	1.0E-07	1.0E-06	8.1E-11	-1.1	0.14	0.62	2361.3	9.70		
284.00	304.00	2.04E-06	2.13E-06	22	WBS22	1.3E-06	6.6E-06	2.2E-06	9.0E-06	6.6E-06	2.0E-06	9.0E-06	1.2E-09	1.0	0.94	11.20	2553.2	12.00		
304.00	324.00	3.02E-08	3.16E-08	22	WBS22	2.0E-08	1.3E-07	1.8E-08	1.8E-07	1.3E-07	2.0E-08	3.0E-07	4.6E-11	-0.1	4.80	17.92	2703.6	10.13		
324.00	344.00	2.53E-09	2.65E-09	#NV	WBS22	#NV	#NV	2.7E-09	3.8E-09	2.7E-09	9.0E-10	5.0E-09	7.1E-11	2.4	#NV	#NV	#NV	#NV		
344.00	364.00	3.56E-08	3.73E-08	2	WBS22	4.0E-08	#NV	6.2E-08	2.1E-07	4.0E-08	1.0E-08	7.0E-08	5.7E-11	-1.0	0.82	19.54	3048.7	10.90		
364.00	384.00	3.88E-06	4.06E-06	22	WBS22	5.7E-06	2.3E-05	3.9E-06	3.9E-05	2.3E-05	5.0E-06	6.0E-05	4.0E-10	2.3	0.79	11.86	3218.8	11.05		
385.00	405.00	9.38E-05	9.81E-05	2	WBS22	3.0E-04	#NV	2.4E-04	1.4E-04	2.4E-04	8.0E-05	6.0E-04	3.2E-08	6.3	0.38	2.27	3398.8	11.35		
403.00	423.00	3.57E-04	3.74E-04	22	WBS2	1.3E-03	2.3E-04	1.3E-04	#NV	1.3E-04	7.0E-05	5.0E-04	5.5E-09	-6.1	0.69	6.59	3550.9	11.38		
423.00	443.00	2.98E-07	3.12E-07	2	WBS2	9.7E-07	#NV	1.3E-06	#NV	1.3E-06	7.0E-07	4.0E-06	7.7E-11	20.8	0.33	12.94	3718.9	11.34		
443.00	463.00	7.23E-07	7.57E-07	2	WBS2	9.0E-07	#NV	3.1E-06	#NV	3.1E-06	8.0E-07	5.0E-06	2.0E-10	20.3	0.58	3.71	3888.9	11.52		
463.00	483.00	3.34E-06	3.50E-06	2	WBS2	5.8E-06	#NV	8.7E-06	#NV	8.7E-06	5.0E-06	1.0E-05	1.3E-09	7.9	0.71	18.67	4054.0	11.21		
483.00	503.00	3.16E-07	3.31E-07	22	WBS22	4.1E-07	1.0E-06	4.6E-07	1.3E-06	1.0E-06	7.0E-07	4.0E-06	1.0E-10	2.2	5.78	16.13	4226.9	11.70		

503.00	523.00	#NV	#NV	#NV	WBS2	#NV	#NV	4.9E-11	#NV	4.9E-11	1.0E-11	9.0E-11	5.9E-11	-0.5	#NV	#NV	#NV	#NV
523.00	543.00	8.30E-09	8.68E-09	2	WBS2	5.1E-09	#NV	9.0E-10	#NV	5.1E-09	1.0E-09	9.0E-09	1.4E-10	-0.9	3.52	17.54	#NV	#NV
543.00	563.00	3.97E-09	4.15E-09	2	WBS22	2.24E-09	#NV	6.6E-09	2.0E-09	6.6E-09	1.0E-09	9.0E-09	8.6E-11	1.2	1.57	6.34	#NV	#NV
563.00	583.00	4.39E-09	4.59E-09	2	WBS2	3.3E-09	#NV	4.7E-09	#NV	4.7E-09	1.0E-09	9.0E-09	9.3E-11	1.2	#NV	#NV	#NV	#NV
583.00	603.00	2.03E-08	2.13E-08	2	WBS2	4.3E-08	#NV	6.9E-08	#NV	6.9E-08	1.0E-08	1.0E-07	5.1E-11	15.3	3.32	13.85	5074.5	12.49
603.00	623.00	9.48E-07	9.92E-07	2	WBS2	2.2E-06	#NV	2.4E-06	#NV	2.4E-06	7.0E-07	5.0E-06	3.5E-10	8.5	0.62	17.95	5241.9	12.44
623.00	643.00	1.64E-08	1.71E-08	2	WBS2	2.6E-08	#NV	7.1E-08	#NV	7.1E-08	1.0E-08	1.0E-07	7.4E-11	20.8	6.39	16.69	5413.0	12.78
643.00	663.00	2.12E-06	2.22E-06	2	WBS2	1.5E-06	#NV	7.4E-07	#NV	1.5E-06	7.0E-07	3.0E-06	4.4E-10	-3.1	0.83	17.71	5583.9	13.10
663.00	683.00	2.30E-06	2.40E-06	22	WBS22	1.3E-06	2.0E-06	7.3E-07	1.5E-06	1.3E-06	7.0E-07	3.0E-06	5.5E-09	-3.7	0.31	2.80	5747.7	12.68
683.00	703.00	2.95E-09	3.08E-09	2	WBS22	2.3E-09	#NV	4.6E-09	9.2E-09	4.6E-09	1.0E-09	9.0E-09	7.2E-11	4.7	3.07	6.86	5921.1	13.27
703.00	723.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E-11	1.0E-13	1.0E-11	#NV	#NV	#NV	#NV	#NV	#NV
723.00	743.00	2.2E-09	2.3E-09	2	WBS22	1.6E-09	#NV	2.2E-09	1.3E-09	2.2E-09	8.0E-10	5.0E-09	8.4E-11	1.2	6.32	16.62	#NV	#NV
743.00	763.00	1.1E-09	1.2E-09	22	WBS22	9.6E-10	4.8E-10	2.2E-09	1.1E-09	2.2E-09	8.0E-10	5.0E-09	1.5E-10	0.9	#NV	#NV	#NV	#NV
763.00	783.00	1.1E-08	1.1E-08	22	WBS22	1.0E-08	2.1E-09	1.8E-08	3.5E-09	2.1E-09	9.0E-10	9.0E-09	6.8E-10	-3.9	2.82	17.44	#NV	#NV
783.00	803.00	#NV	#NV	#NV	WBS2	#NV	#NV	2.8E-12	#NV	2.8E-12	9.0E-13	5.0E-12	4.8E-11	-1.4	#NV	#NV	#NV	#NV
803.00	823.00	#NV	#NV	#NV	#NV	#NV	#NV	#NV	#NV	1.0E-11	1.0E-13	1.0E-11	#NV	#NV	#NV	#NV	#NV	#NV

#### Nomenclature

Q/s Specific capacity.

T<sub>M</sub> Transmissivity according to /Moye 1967/.

Transmissivity according to hilloge 1307

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.

Transmissivity derived from the analysis of the perturbation phase (CHi). In case a homogeneous flow model was used only one T<sub>f</sub> value is reported, in case a two zone composite flow model was used both T<sub>f1</sub> (inner zone) and T<sub>f2</sub> (outer zone) are given.

Transmissivity derived from the analysis of the recovery phase (CHir or Pi). In case a homogeneous flow model was used only one T<sub>s</sub> value is reported, in case a two zone composite flow model was used both T<sub>s1</sub> (inner zone) and T<sub>s2</sub> (outer zone) are given.

 $\begin{array}{ll} T_{\text{T}} & \text{Recommended transmissivity.} \\ T_{\text{TMIN}} & \text{Confidence range lower limit.} \\ T_{\text{TMAX}} & \text{Confidence range upper limit.} \\ C & \text{Wellbore storage coefficient.} \end{array}$ 

Skin factor (calculated based on a Storativity of 1·10<sup>-6</sup>).

dt<sub>1</sub> Estimated start time of evaluation.
 dt<sub>2</sub> 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<sub>wif</sub> 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 KLX08 (see Section 4.5.5 for details and nomenclature).

Borehole secup			Time t₂ for radius of influence calculation	ri-index	Radius of Influence
(m)	(m)	(m²/s)	(s)	(-)	(m)
103.00	203.00	4.2E-04	1800	0	432.57
203.00	303.00	3.2E-04	139	1	112.37
305.00	405.00	1.7E-04	1800	0	348.09
403.00	503.00	2.5E-04	1800	0	382.61
503.00	603.00	4.1E-08	1800	0	43.13
603.00	703.00	1.5E-06	170	-1	32.52
703.00	803.00	4.5E-09	272	1	9.65
803.00	903.00	6.0E-08	1800	0	47.33
863.00	963.00	7.3E-10	1800	0	15.75
104.00	124.00	2.0E-04	1200	-1	294.28
125.00	145.00	7.3E-06	1200	-1	128.63
144.00	164.00	4.3E-04	364.2	1	196.08
164.00	184.00	4.2E-04	192	1	141.70
183.50	203.50	5.0E-04	1200	0	369.67
203.00	223.00	1.8E-04	1200	0	287.82
223.50	243.50	3.4E-05	1200	<b>-1</b>	188.40
243.50	263.50	5.8E-07	1200	0	68.38
264.00	284.00	3.8E-07	37.2	<b>-1</b>	10.79
284.00	304.00	6.6E-06	1200	<b>-1</b>	125.43
304.00	324.00	1.3E-07	1200	-1	28.46
324.00	344.00	2.7E-09	1200	-1	17.84
344.00	364.00	4.0E-08	1200	0	34.95
364.00	384.00	2.3E-05	1200	-1	171.37
385.00	405.00	2.4E-04	136.2	1	103.87
403.00	423.00	1.3E-04	1200	0	262.70
423.00	443.00	1.3E-06	1200	0	83.56
443.00	463.00	3.1E-06	1200	0	104.09
463.00	483.00	8.7E-06	1200	0	134.28
483.00	503.00	1.0E-06	1200	-1	78.25
503.00	523.00	4.9E-11	3659	0	11.43
523.00	543.00	5.1E-09	1200	0	20.93
543.00	563.00	6.6E-09	380.4	1	12.56
563.00	583.00	4.7E-09	1200	-1	20.49
583.00	603.00	6.9E-08	1200	0	40.03
603.00	623.00	2.4E-06	1200	0	97.50
623.00	643.00	7.1E-08	1200	0	40.41
643.00	663.00	1.5E-06	1200	0	87.03
663.00	683.00	1.3E-06	168	<b>–</b> 1	31.32
683.00	703.00	4.6E-09	411.6	<b>-1</b>	11.94
703.00	723.00	1.0E-11	#NV	#NV	#NV
723.00	743.00	2.2E-09	997.2	1	15.45
743.00	763.00	2.2E-09	#NV	1	#NV
763.00	783.00	2.1E-09	1200	1	16.71
783.00	803.00	2.8E-12	3630	1	5.54
803.00	823.00	1.0E-11	#NV	#NV	#NV

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

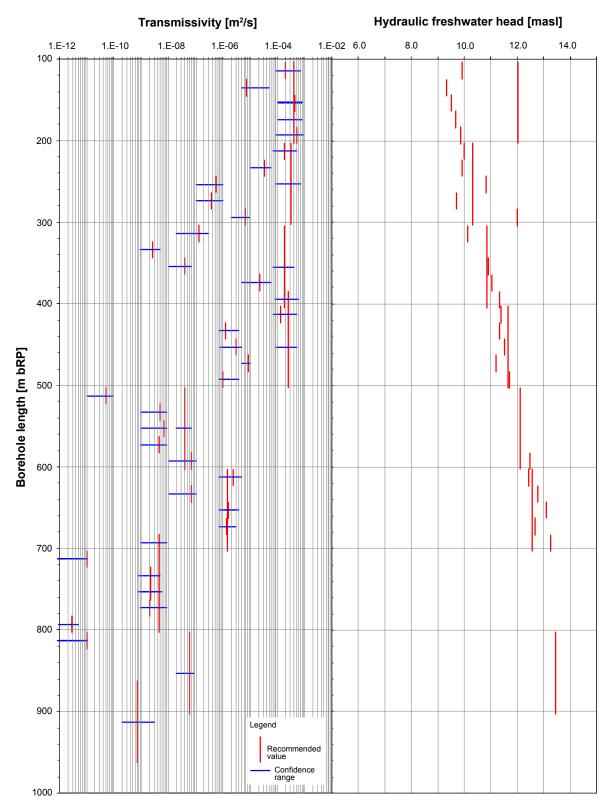


Figure 6-1. Results summary – profiles of transmissivity and equivalent freshwater head, transmissivities derived from injection tests, freshwater head extrapolated.

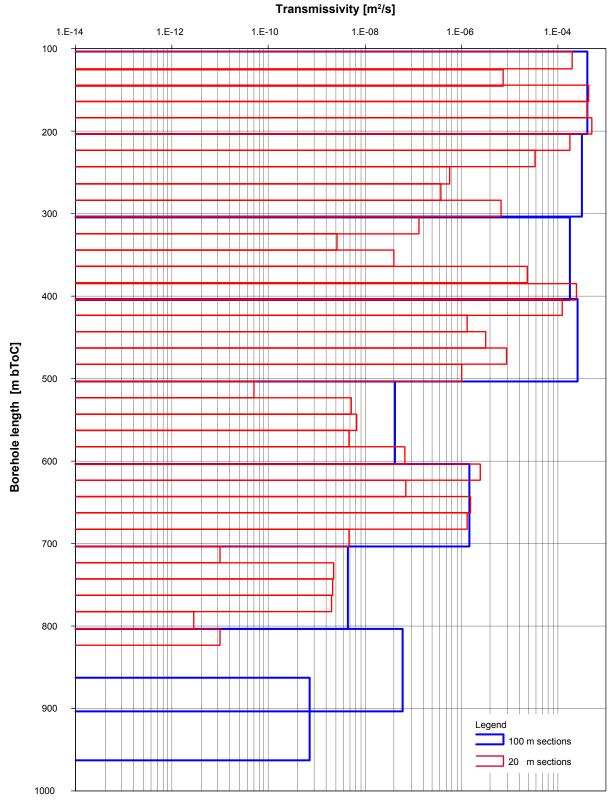


Figure 6-2. Results summary – profile of transmissivity.

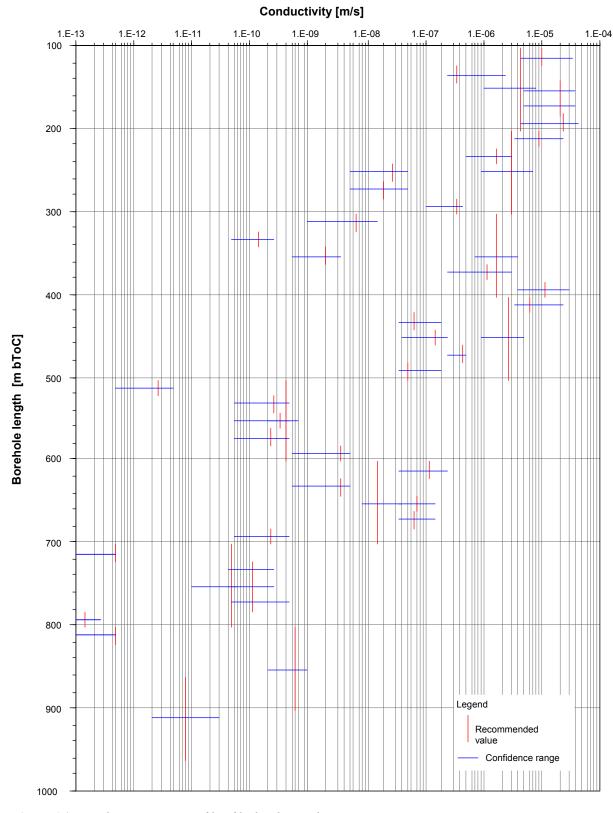


Figure 6-3. Results summary – profile of hydraulic conductivity.

# 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 Figure 6-4).

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 to an unit pressure change in the interval. For a closed system (i.e. closed downhole valve) the theoretical value of the wellbore storage coefficient is given by the product between the interval volume and the test zone compressibility. The interval volume is calculated from the borehole radius and interval length. There are uncertainties concerning the interval volume calculation. Cavities or high transmissivity fractures intersecting the interval may enlarge the effective volume of the interval.

The test zone compressibility is given by the sum of compressibilities of the individual components present in the interval (water, packer elements, other test tool components, and the borehole wall). 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.

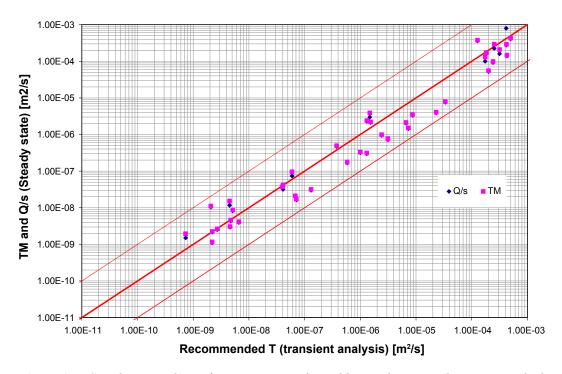


Figure 6-4. Correlation analysis of transmissivities derived by steady state and transient methods.

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:

$$c = \frac{\Delta V}{\Delta p} * \frac{1}{V} \quad (1/\text{Pa})$$

 $\Delta V$  Volume change of 2 Packers (The volume change was estimated at  $7 \cdot 10^{-7}$  m<sup>3</sup>/100 kPa based on the results of laboratory tests conducted by GEOSIGMA) (m<sup>3</sup>).

 $\Delta p$  Pressure change in test section (usually 2·10<sup>5</sup> Pa) (Pa).

V Volume in test section (m<sup>3</sup>).

The following table presents the calculated compressibilities for each relevant section length. The average value for the test tool compressibility based on different section length is  $5 \cdot 10^{-11}$  1/Pa.

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

Length of test section (m)	Volume in test section (m³)	Compressibility (1/Pa)				
20	0.091	8·10 <sup>-11</sup>				
100	0.454	2·10 <sup>-11</sup>				
Average compressibility:		5·10 <sup>-11</sup>				

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.

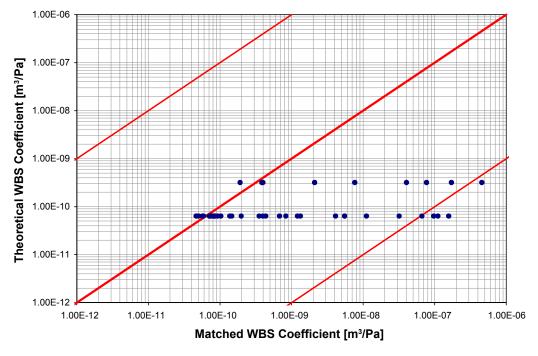


Figure 6-5. Correlation analysis of theoretical and matched wellbore storage coefficients.

It can be seen that the matched wellbore storage coefficients differ up to three 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.

# 7 Conclusions

# 7.1 Transmissivity

Figure 6-1 presents a profile of transmissivity, including the confidence ranges derived from the transient analysis. The method used for deriving the recommended transmissivity and its confidence range is described in Section 4.5.9.

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

In few cases the tests were not analysable because the compliance phase following the packer inflation was to long or because the conducted preliminary pulse did not recover. Both responses are indicative for a very low interval transmissivity and a transmissivity value of  $1 \cdot 10^{-11}$  m<sup>2</sup>/s was recommended (regarded as the upper limit of the confidence range).

If the conducted preliminary pulse injection (PI) showed a slow recovery the pulse test was prolonged and no further injection test was performed. The pulse test was used for a quantitative analysis. In two cases the preliminary pulse was prolonged and the recommended transmissivities is  $4.9 \cdot 10^{-11}$  m<sup>2</sup>/s and  $2.8 \cdot 10^{-12}$  m<sup>2</sup>/s, respectively.

The recommended transmissivities derived from the conducted injection tests (CHi and CHir) range between  $2.1 \cdot 10^{-09}$  m<sup>2</sup>/s and  $5.0 \cdot 10^{-04}$  m<sup>2</sup>/s.

A few 20 m sections show larger transmissivities than the appropriate longer interval. The most of the differences are relatively small and are covered by the confidence range. Additionally, this can be explained by crossflow and connections to the adjacent zones.

# 7.2 Equivalent freshwater head

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

The head profile shows that the freshwater head ranges from 9.3 m to 13.4 m and an increase with increasing depth. This can be explained by higher salinity of the water.

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.

# 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<sup>2</sup>/s (which imply low flow rates) seems to speak against this hypothesis.

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

#### 8 References

**Bourdet D, Ayoub J A, Pirard Y M, 1989.** Use of pressure derivative in well-test interpretation. Coc. Of Petroleum Engineers, SPE Formation Evaluation. pp. 293–302.

**Chakrabarty C, Enachescu C, 1997.** Using the Devolution Approach for Slug Test Analysis: Theory and Application. Ground Water Sept.–Oct. 1997. pp. 797–806.

Gringarten A C, 1986. Computer-aided well-test analysis. SPE Paper 14099.

Horne R N, 1990. Modern well test analysis. Petroway, Inc., Palo Alto, Calif.

**Horner D R, 1951.** Pressure build-up in wells. Third World Pet. Congress, E.J. Brill, Leiden II, pp. 503–521.

**Jacob C E, Lohman S W, 1952.** Nonsteady flow to a well of constant drawdown in an extensive aquifer. Transactions, American Geophysical Union, Volume 33, No 4, pp. 559–569.

**Moye D G, 1967.** Diamond drilling for foundation exploration. Civil Eng. Trans., Inst. Eng. Australia, Apr. 1967, pp. 95–100.

Peres A M M, Onur M, Reynolds A C, 1989. A new analysis procedure for determining aquifer properties from slug test data. Water Resour. Res. v. 25, no. 7, pp. 1591–1602.

**Rhén I, Forsmark T, Forssman I, Zetterlund M, 2006.** Evaluation of hydrogeological properties for Hydraulic Conductor Domains (HCD) and Hydraulic Rock Domains (HRD). Laxemar subarea – version 1.2. SKB R-06-22, Svensk Kärnbränslehantering AB.

**SKB**, **2001.** Platsundersökningar. Undersökningsmetoder och generellt genomförandeprogram. SKB R-01-10, Svensk Kärnbränslehantering AB.

**SKB**, **2002.** Execution programme for the initial site investigations at Simpevarp. SKB P-02-06, Svensk Kärnbränslehantering AB.

**SKB, 2006.** Program för fortsatta undersökningar av berggrund, mark, vatten och miljö inom delområde Laxemar. Platsundersökning Oskarshamn. SKB R-05-37, Svensk Kärnbränslehantering AB.

## **APPENDIX 1**

File Description Table

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX08						
TEST- AND FILEPROTOCOL					Testorder dated: 2006-09-27						
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.		
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)			
2006-09-28	07:55	103.00	203.00	KLX08_0103.00_200609280755.ht2	KLX08_103.00-203.00_060928_1_CHir_Q_r.csv	Chir	2006-10-12	2006-09-28			
2006-09-28	11:37	203.00	303.00	KLX08_0203.00_200609281137.ht2	KLX08_203.00-303.00_060928_1_CHir_Q_r.csv	Chir	2006-10-12	2006-09-28			
2006-09-28	15:27	305.00	405.00	KLX08_0305.00_200609281527.ht2	KLX08_305.00-405.00_060928_1_CHir_Q_r.csv	Chir	2006-10-12	2006-09-28			
2006-09-28	19:13	403.00	503.00	KLX08_0403.00_200609281913.ht2	KLX08_403.00-503.00_060928_1_CHir_Q_r.csv	Chir	2006-10-12	2006-09-28			
2006-09-28	23:13	503.00	603.00	KLX08_0503.00_200609282313.ht2	KLX08_503.00-603.00_060928_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-06			
2006-10-06	09:32	503.00	603.00	KLX08_0503.00_200610060932.ht2	KLX08_503.00-603.00_061006_2_CHir_Q_r.csv	Chir	2006-10-12	2006-10-06			
2006-10-06	14:05	603.00	703.00	KLX08_0603.00_200610061405.ht2	KLX08_603.00-703.00_061006_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-06			
2006-10-06	17:48	703.00	803.00	KLX08_0703.00_200610061748.ht2	KLX08_703.00-803.00_061006_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-06			
2006-10-06	22:17	803.00	903.00	KLX08_0803.00_200610062217.ht2	KLX08_803.00-903.00_061006_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-07			
2006-10-07	06:04	863.00	963.00	KLX08_0863.00_200610070604.ht2	KLX08_863.00-963.00_061007_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-07			
2006-10-08	07:04	104.00	124.00	KLX08_0104.00_200610080704.ht2	KLX08_104.00-124.00_061008_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-08			
2006-10-08	09:13	125.00	145.00	KLX08_0125.00_200610080913.ht2	KLX08_125.00-145.00_061008_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-08			
2006-10-08	11:12	144.00	164.00	KLX08_0144.00_200610081112.ht2	KLX08_144.00-164.00_061008_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-08			
2006-10-08	13:19	164.00	184.00	KLX08_0164.00_200610081319.ht2	KLX08_164.00-184.00_061008_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-08			
2006-10-08	15:14	183.50	203.50	KLX08_0183.50_200610081514.ht2	KLX08_183.50-203.50_061008_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-08			

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX08						
TEST- AND FILEPROTOCOL					Testorder dated: 2006-09-27						
Teststart		Interval boundaries		Name	e of Datafiles	Testtype	Copied to	Plotted	Sign.		
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)			
2006-10-08	17:07	203.00	223.00	KLX08_0203.00_200610081707.ht2	KLX08_203.00-223.00_061008_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-08			
2006-10-08	19:00	223.50	243.50	KLX08_0223.50_200610081900.ht2	KLX08_223.50-243.50_061008_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-08			
2006-10-08	21:09	243.50	263.50	KLX08_0243.50_200610082109.ht2	KLX08_243.50-263.50_061008_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-08			
2006-10-08	23:10	264.00	284.00	KLX08_0264.00_200610082310.ht2	KLX08_264.00-284.00_061008_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	01:07	284.00	304.00	KLX08_0284.00_200610090107.ht2	KLX08_284.00-304.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	06:17	304.00	324.00	KLX08_0304.00_200610090617.ht2	KLX08_304.00-324.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	08:23	324.00	344.00	KLX08_0324.00_200610090823.ht2	KLX08_324.00-344.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	10:41	344.00	364.00	KLX08_0344.00_200610091041.ht2	KLX08_344.00-364.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	12:57	364.00	384.00	KLX08_0364.00_200610091257.ht2	KLX08_364.00-384.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	15:01	385.00	405.00	KLX08_0385.00_200610091501.ht2	KLX08_385.00-405.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	16:55	403.00	423.00	KLX08_0403.00_200610091655.ht2	KLX08_403.00-423.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	18:50	423.00	443.00	KLX08_0423.00_200610091850.ht2	KLX08_423.00-443.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	21:00	443.00	463.00	KLX08_0443.00_200610092100.ht2	KLX08_443.00-463.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-09			
2006-10-09	22:55	463.00	483.00	KLX08_0463.00_200610092255.ht2	KLX08_463.00-483.00_061009_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			
2006-10-09	23:36	463.00	483.00	KLX08_0463.00_200610092336.ht2	KLX08_463.00-483.00_061009_2_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			
2006-10-10	01:14	483.00	503.00	KLX08_0483.00_200610100114.ht2	KLX08_483.00-503.00_061010_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX08						
TEST- AND FILEPROTOCOL					Testorder dated: 2006-09-27						
Teststart		Interval boundaries		Name of Datafiles		Testtype	Copied to	Plotted	Sign.		
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)			
2006-10-10	06:13	503.00	523.00	KLX08_0503.00_200610100613.ht2	KLX08_503.00-523.00_061010_1_Pi_Q_r.csv	Pi	2006-10-12	2006-10-10			
2006-10-10	08:37	523.00	543.00	KLX08_0523.00_200610100837.ht2	KLX08_523.00-543.00_061010_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			
2006-10-10	10:59	543.00	563.00	KLX08_0543.00_200610101059.ht2	KLX08_543.00-563.00_061010_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			
2006-10-10	13:25	563.00	583.00	KLX08_0563.00_200610101325.ht2	KLX08_563.00-583.00_061010_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			
2006-10-10	15:33	583.00	603.00	KLX08_0583.00_200610101533.ht2	KLX08_583.00-603.00_061010_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			
2006-10-10	17:32	603.00	623.00	KLX08_0603.00_200610101732.ht2	KLX08_603.00-623.00_061010_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			
2006-10-10	19:25	623.00	643.00	KLX08_0623.00_200610101925.ht2	KLX08_623.00-643.00_061010_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			
2006-10-10	21:30	643.00	663.00	KLX08_0643.00_200610102130.ht2	KLX08_643.00-663.00_061010_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-10			
2006-10-10	23:25	663.00	683.00	KLX08_0663.00_200610102325.ht2	KLX08_663.00-683.00_061010_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-11			
2006-10-11	01:25	683.00	703.00	KLX08_0683.00_200610110125.ht2	KLX08_683.00-703.00_061011_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-11			
2006-10-11	05:22	703.00	723.00	KLX08_0703.00_200610110522.ht2	KLX08_703.00-723.00_061011_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-11			
2006-10-11	06:43	723.00	743.00	KLX08_0723.00_200610110643.ht2	KLX08_723.00-743.00_061011_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-11			
2006-10-11	09:27	743.00	763.00	KLX08_0743.00_200610110927.ht2	KLX08_743.00-763.00_061011_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-11			
2006-10-11	12:33	763.00	783.00	KLX08_0763.00_200610111233.ht2	KLX08_763.00-783.00_061011_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-11			
2006-10-11	15:28	783.00	803.00	KLX08_0783.00_200610111528.ht2	KLX08_783.00-803.00_061011_1_Pi_Q_r.csv	Pi	2006-10-12	2006-10-11			

HYDROTESTING WITH PSS					DRILLHOLE IDENTIFICATION NO.: KLX08						
TEST- AND FILEPROTOCOL				OCOL	Testorder dated: 2006-09-27						
Teststart		Interval boundaries		Name	of Datafiles	Testtype	Copied to	Plotted	Sign.		
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)			
2006-10-11	17:57	803.00	823.00	KLX08_0803.00_200610111747.ht2	KLX08_803.00-823.00_061011_1_CHir_Q_r.csv	Chir	2006-10-12	2006-10-11			

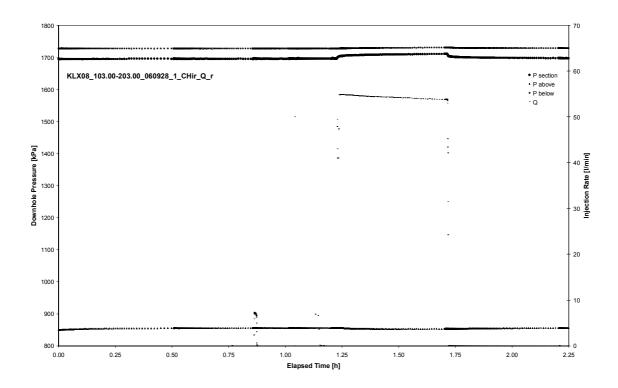
# **APPENDIX 2**

Test: 103.00 – 203.00 m

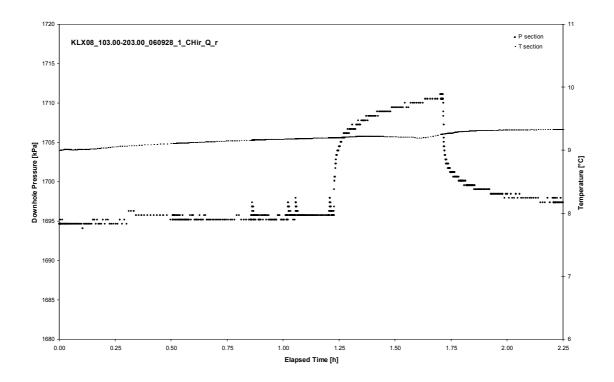
## **APPENDIX 2-1**

Test 103.00 – 203.00 m

Test: 103.00 – 203.00 m

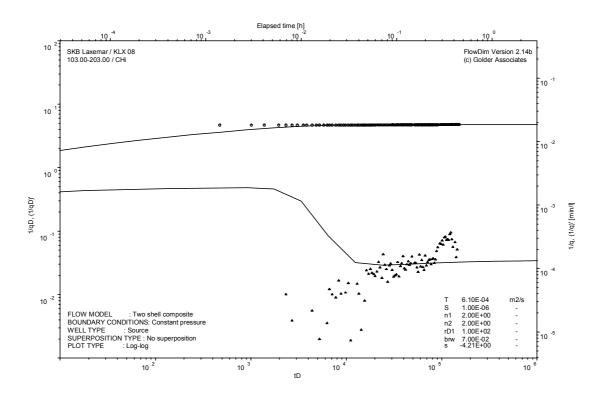


Pressure and flow rate vs. time; cartesian plot



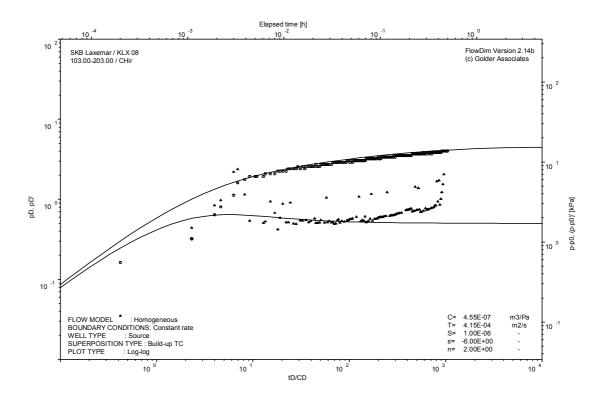
Interval pressure and temperature vs. time; cartesian plot

Test: 103.00 – 203.00 m

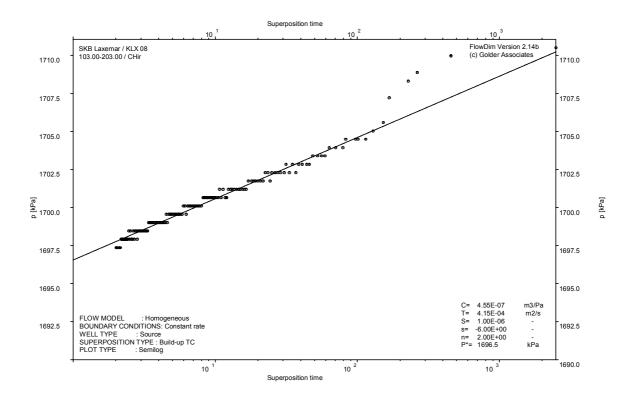


CHI phase; log-log match

Test: 103.00 - 203.00 m



CHIR phase; log-log match



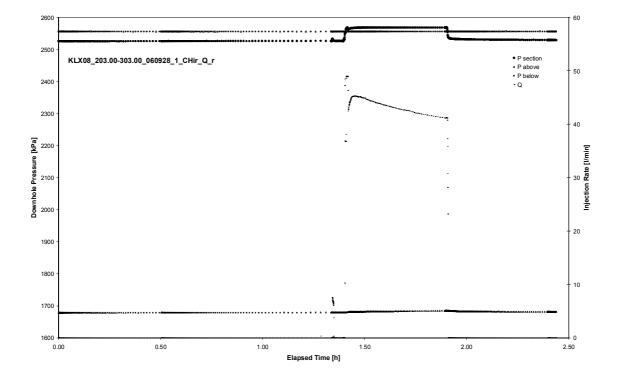
CHIR phase; HORNER match

Test: 203.00 – 303.00 m

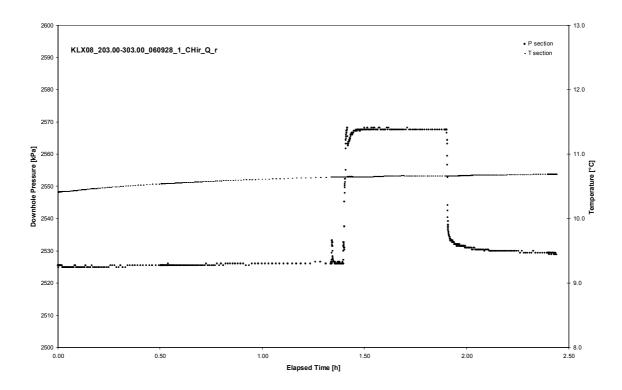
## **APPENDIX 2-2**

Test 203.00 – 303.00 m

Test: 203.00 – 303.00 m

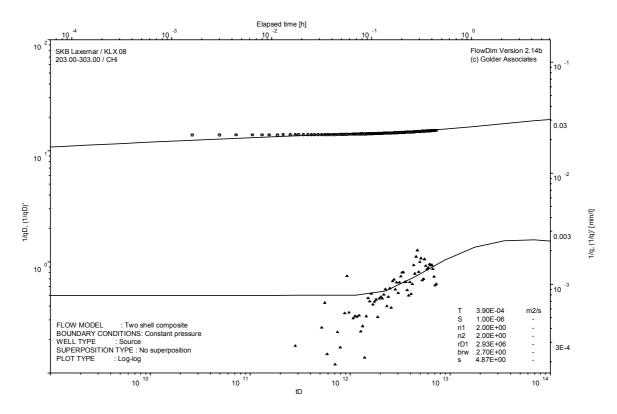


Pressure and flow rate vs. time; cartesian plot



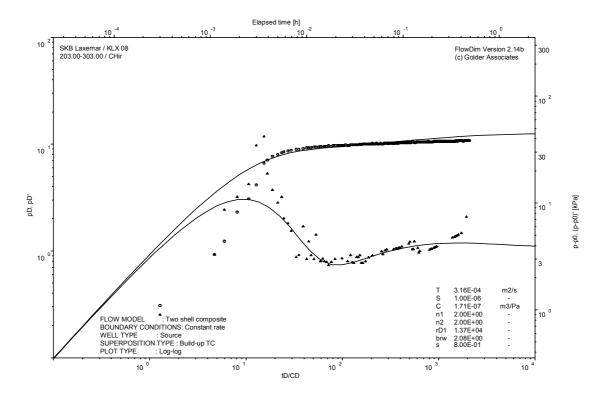
Interval pressure and temperature vs. time; cartesian plot

Test: 203.00 – 303.00 m

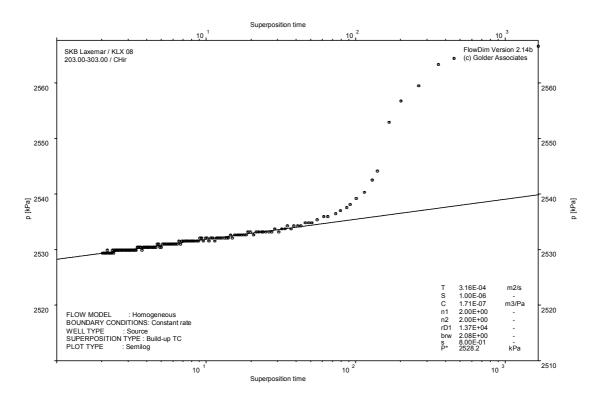


CHI phase; log-log match

Test: 203.00 – 303.00 m



CHIR phase; log-log match



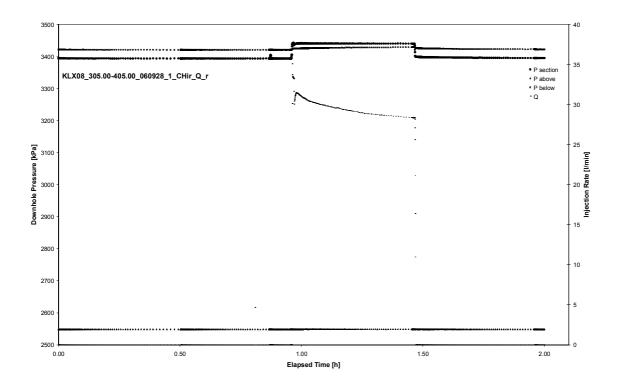
CHIR phase; HORNER match

Test: 305.00 – 405.00 m

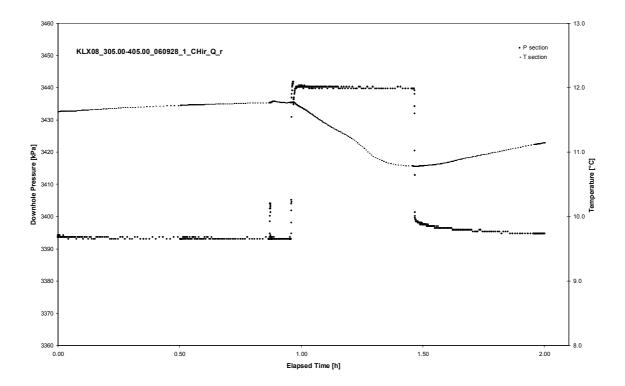
## **APPENDIX 2-3**

Test 305.00 – 405.00 m

Test: 305.00 – 405.00 m

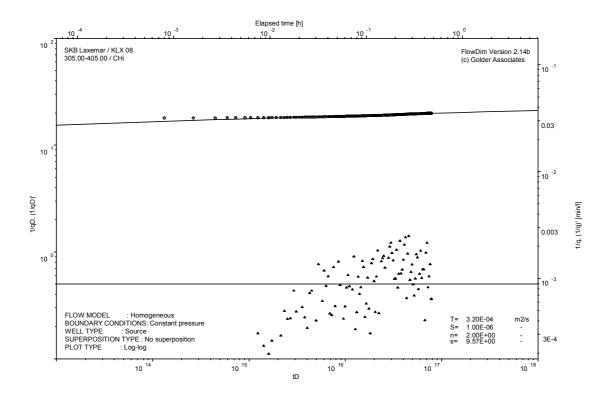


Pressure and flow rate vs. time; cartesian plot



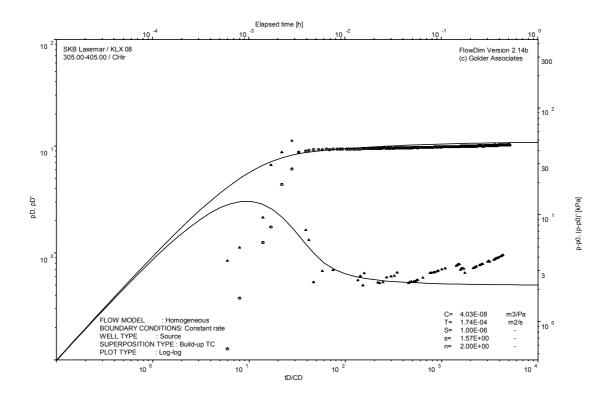
Interval pressure and temperature vs. time; cartesian plot

Test: 305.00 – 405.00 m

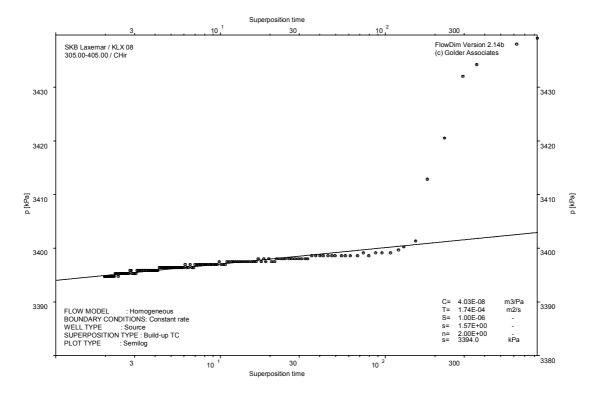


CHI phase; log-log match

Test: 305.00 – 405.00 m



CHIR phase; log-log match



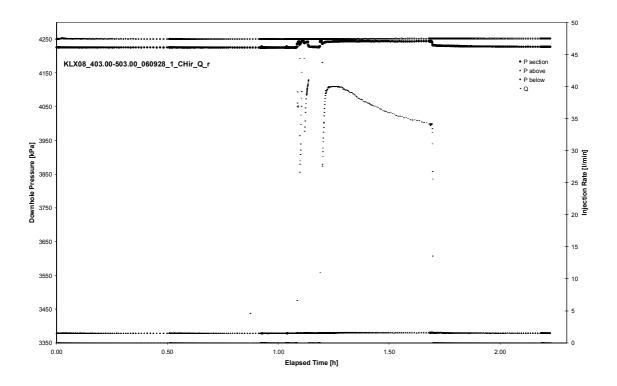
CHIR phase; HORNER match

Test: 403.00 – 503.00 m

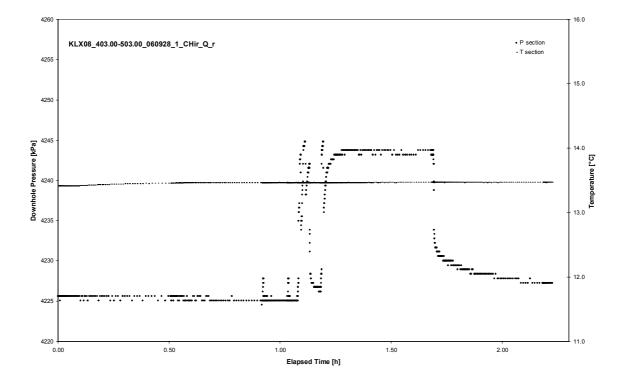
## **APPENDIX 2-4**

Test 403.00 – 503.00 m

Test: 403.00 – 503.00 m

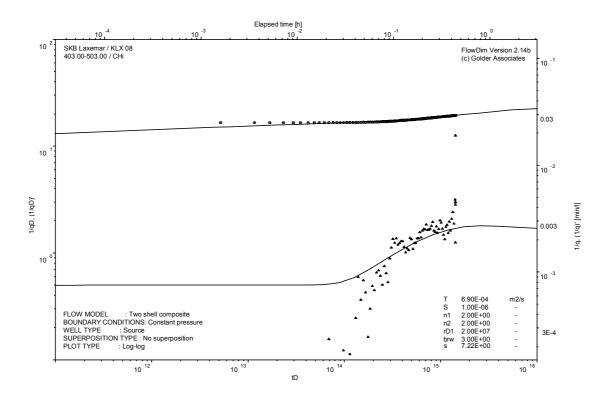


Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Test: 403.00 – 503.00 m

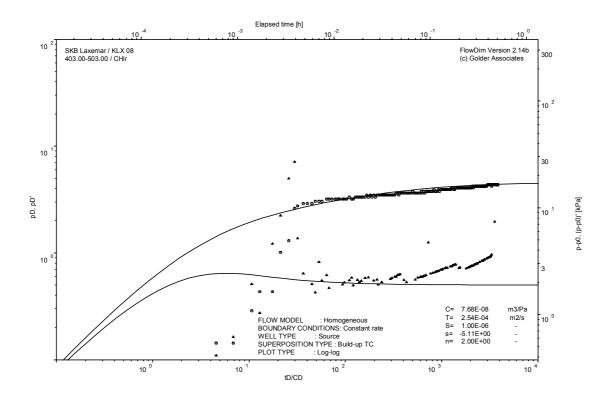


CHI phase; log-log match

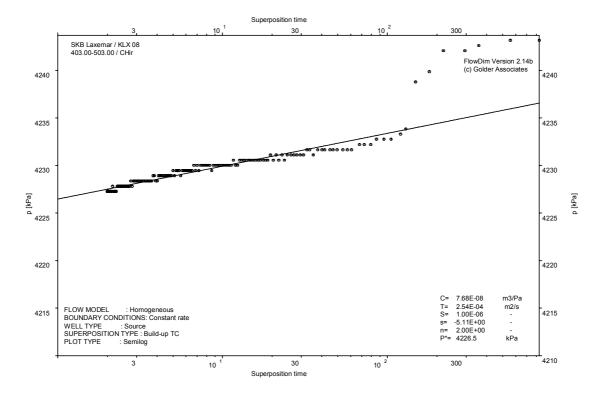
Page 2-4/4

Borehole: KLX08

Test: 403.00 – 503.00 m



CHIR phase; log-log match



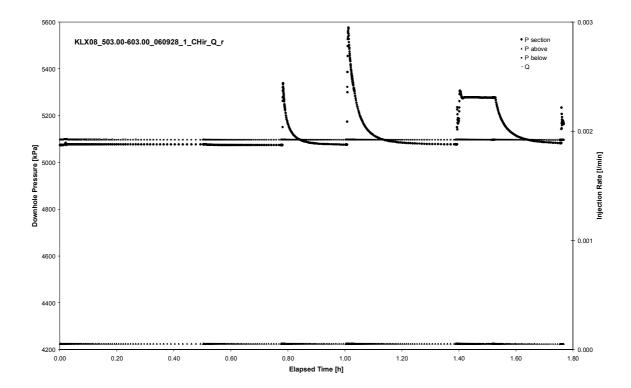
CHIR phase; HORNER match

Test: 503.00 – 603.00m

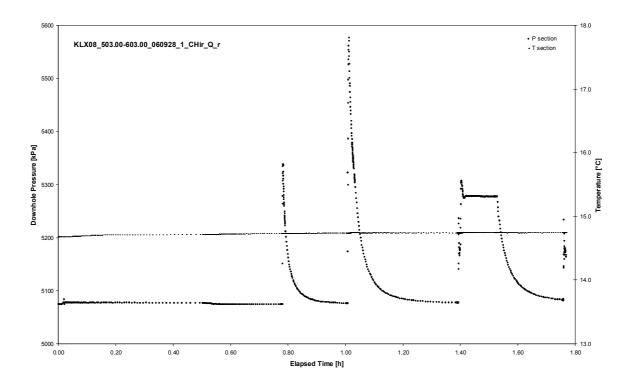
## **APPENDIX 2-5**

Test 503.00 – 603.00 m

Test: 503.00 – 603.00m

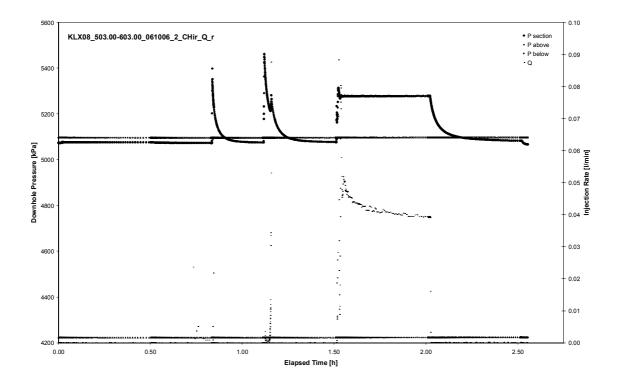


Pressure and flow rate vs. time; cartesian plot (test repeated)

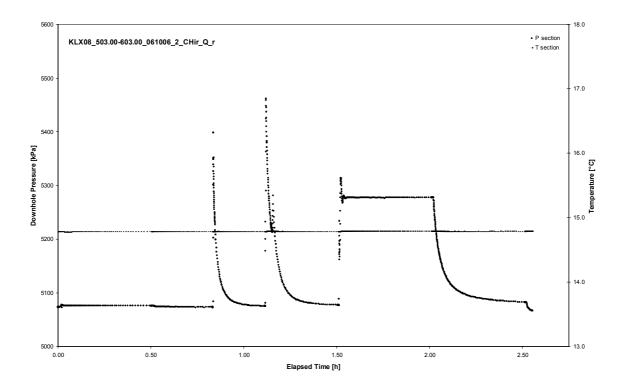


Interval pressure and temperature vs. time; cartesian plot (test repeated)

Test: 503.00 – 603.00m

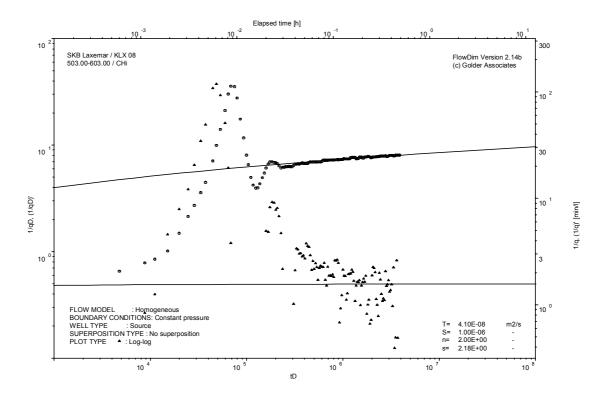


Pressure and flow rate vs. time; cartesian plot (analysed)



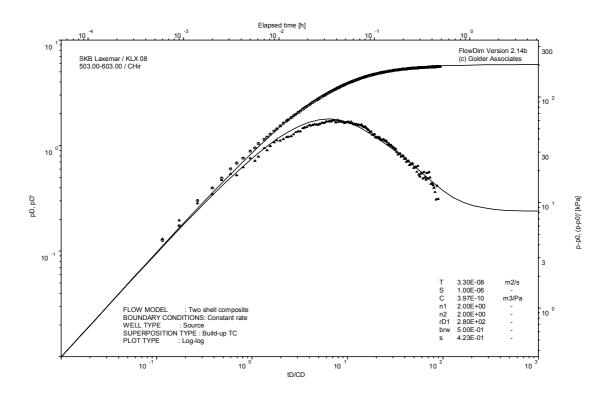
Interval pressure and temperature vs. time; cartesian plot (analysed)

Test: 503.00 – 603.00m

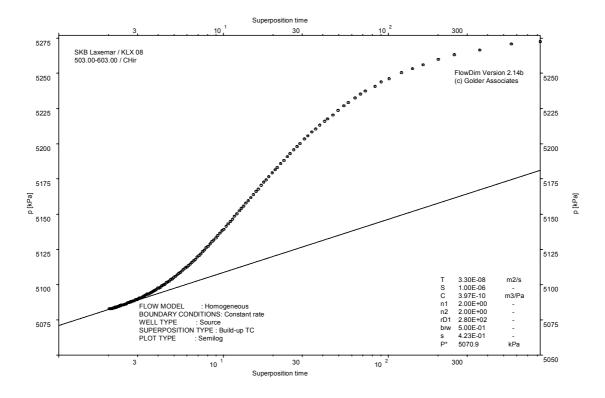


CHI phase; log-log match

Test: 503.00 – 603.00m



#### CHIR phase; log-log match



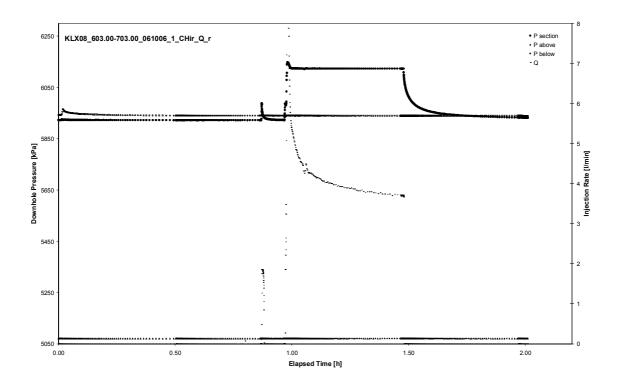
CHIR phase; HORNER match

Test: 603.00 – 703.00 m

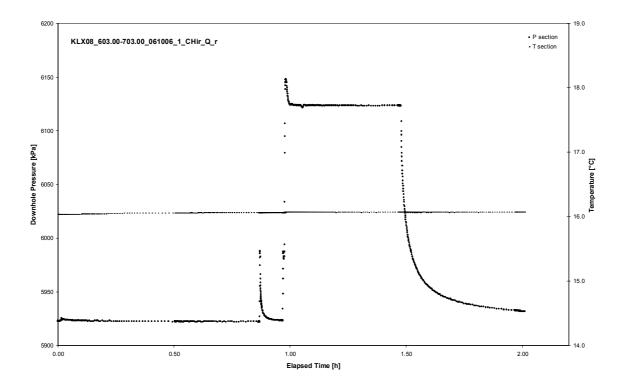
## **APPENDIX 2-6**

Test 603.00 – 703.00 m

Test: 603.00 – 703.00 m

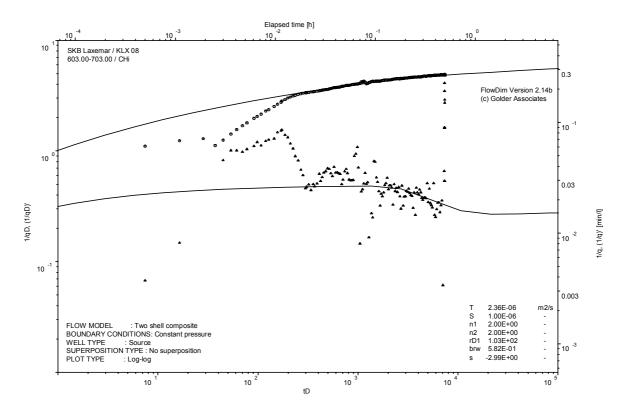


Pressure and flow rate vs. time; cartesian plot



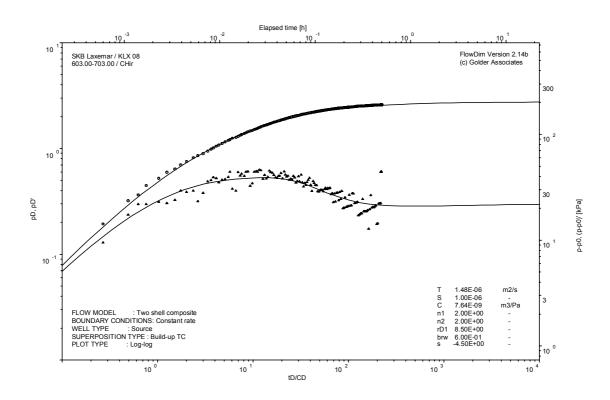
Interval pressure and temperature vs. time; cartesian plot

Test: 603.00 – 703.00 m

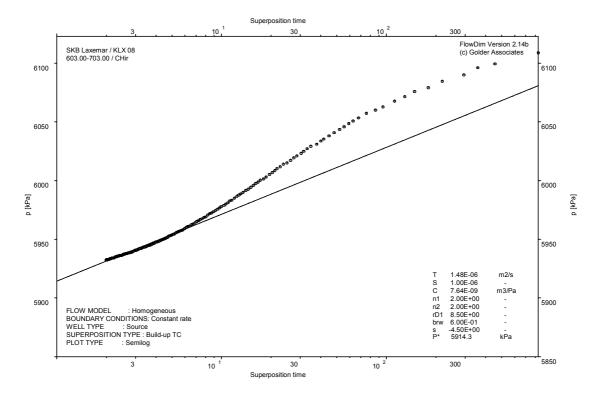


CHI phase; log-log match

Test: 603.00 – 703.00 m



#### CHIR phase; log-log match



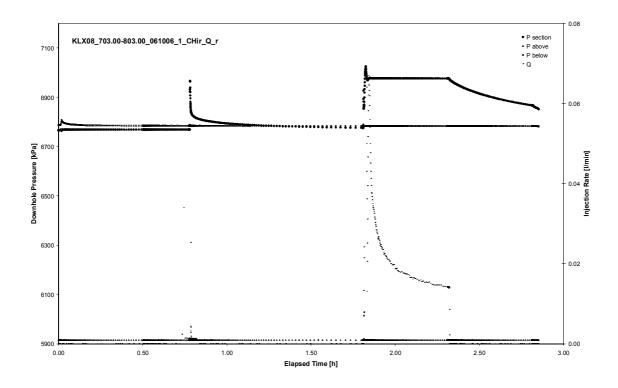
CHIR phase; HORNER match

Test: 703.00 – 803.00 m

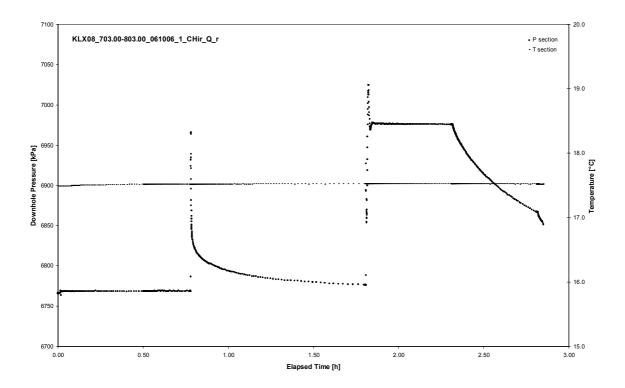
## **APPENDIX 2-7**

Test 703.00 – 803.00 m

Test: 703.00 – 803.00 m

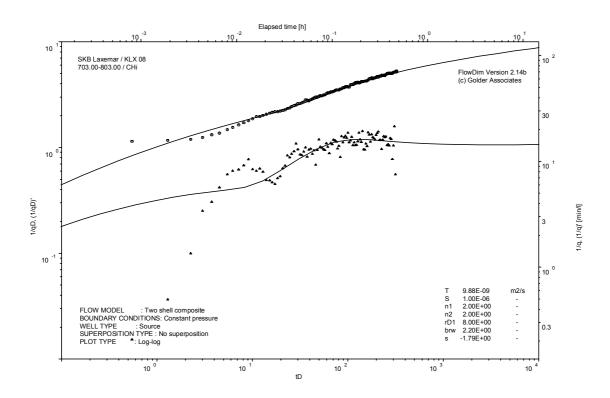


Pressure and flow rate vs. time; cartesian plot



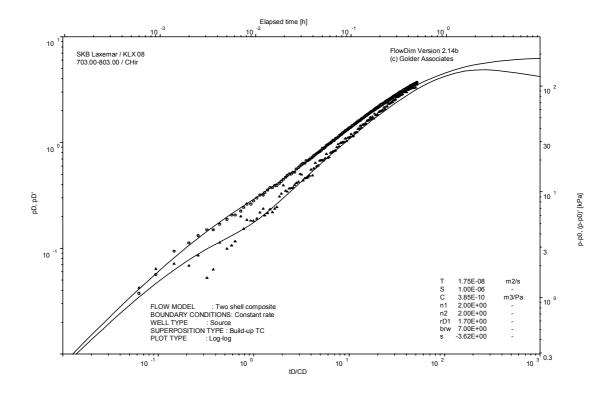
Interval pressure and temperature vs. time; cartesian plot

Test: 703.00 – 803.00 m



CHI phase; log-log match

Test: 703.00 – 803.00 m



CHIR phase; log-log match

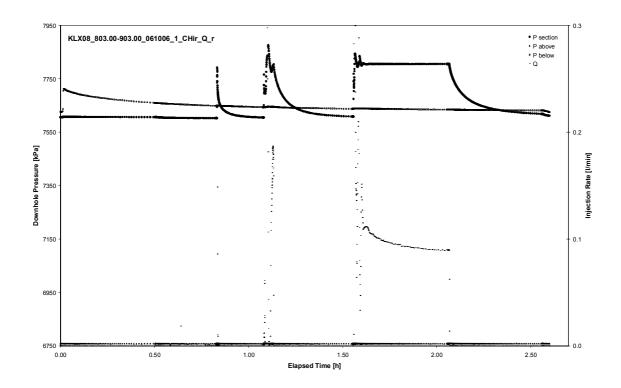
Not analysable

Test: 803.00 – 903.00 m

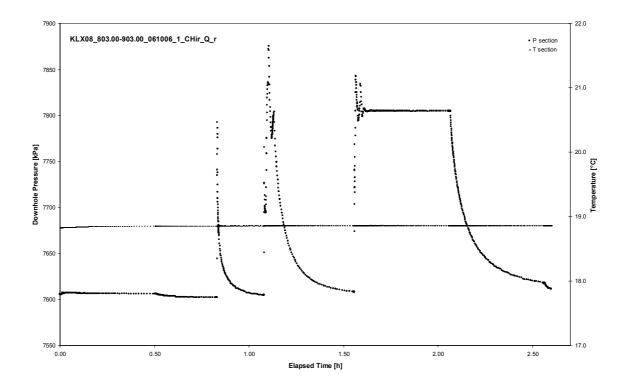
# **APPENDIX 2-8**

Test 803.00 – 903.00 m

Test: 803.00 – 903.00 m

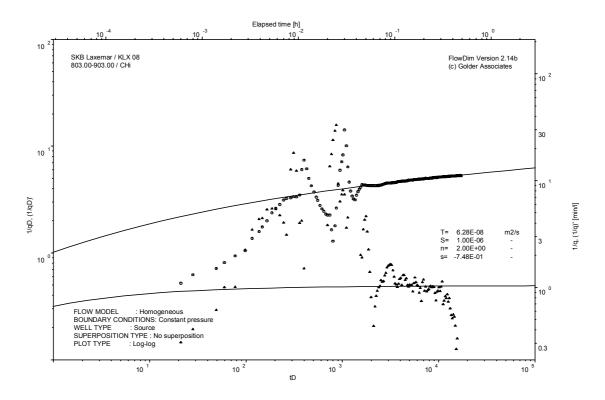


Pressure and flow rate vs. time; cartesian plot

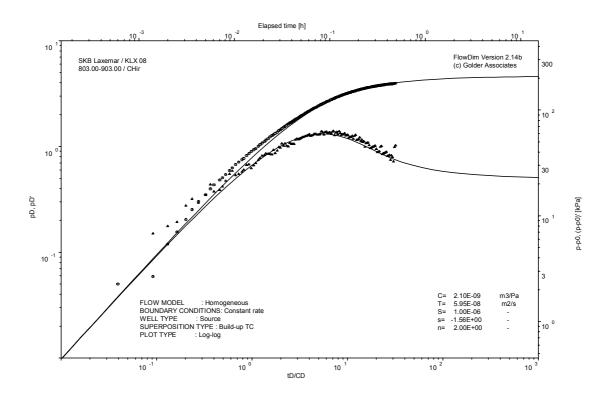


Interval pressure and temperature vs. time; cartesian plot

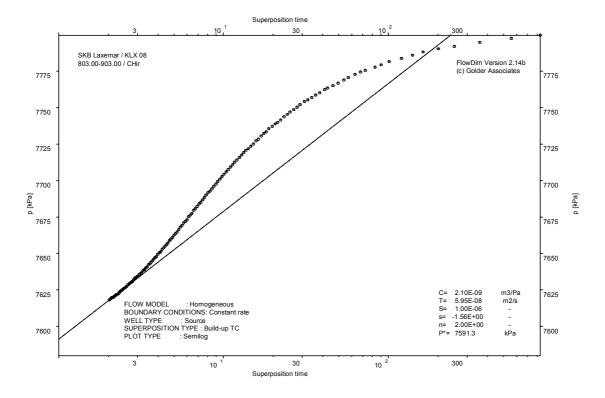
Test: 803.00 – 903.00 m



Test: 803.00 – 903.00 m



CHIR phase; log-log match



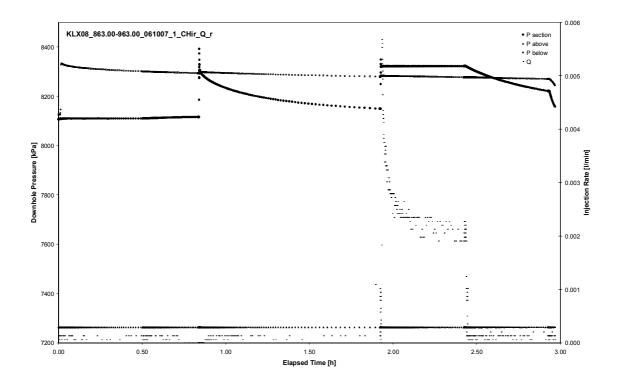
CHIR phase; HORNER match

Test: 863.00 – 963.00 m

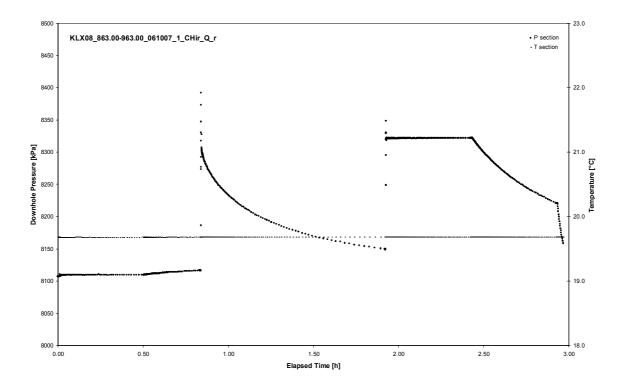
# **APPENDIX 2-9**

Test 863.00 – 963.00 m

Test: 863.00 – 963.00 m

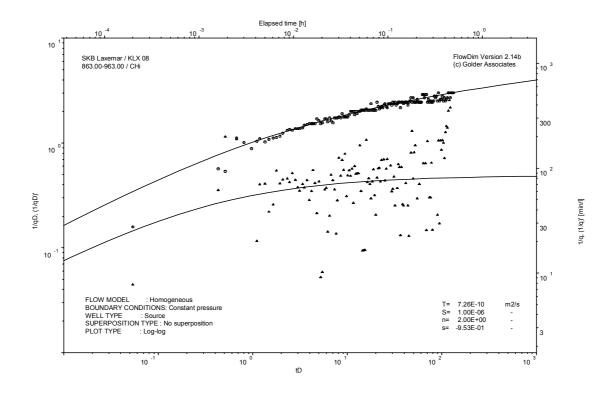


### Pressure and flow rate vs. time; cartesian plot

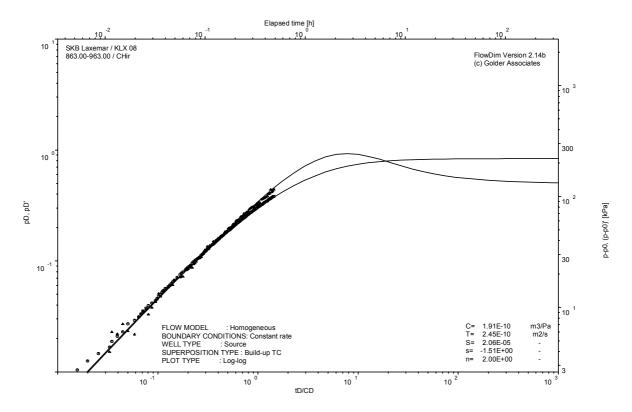


Interval pressure and temperature vs. time; cartesian plot

Test: 863.00 – 963.00 m



Test: 863.00 – 963.00 m



CHIR phase; log-log match

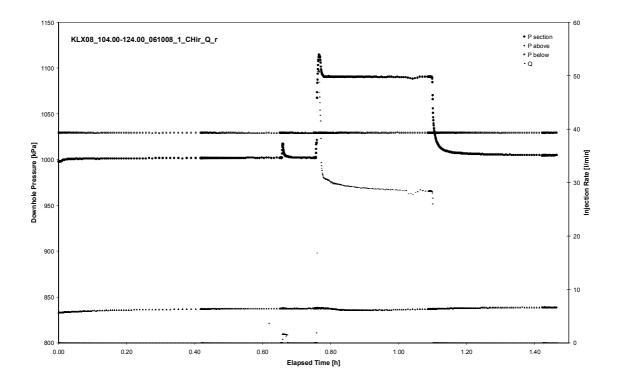
Not analysable

Test: 104.00 – 124.00 m

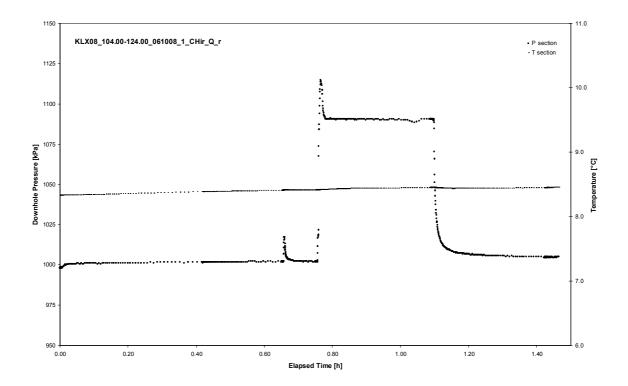
# **APPENDIX 2-10**

Test 104.00 – 124.00 m

Test: 104.00 – 124.00 m

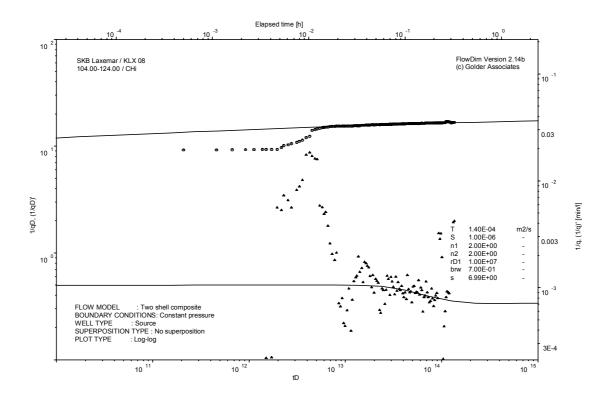


Pressure and flow rate vs. time; cartesian plot

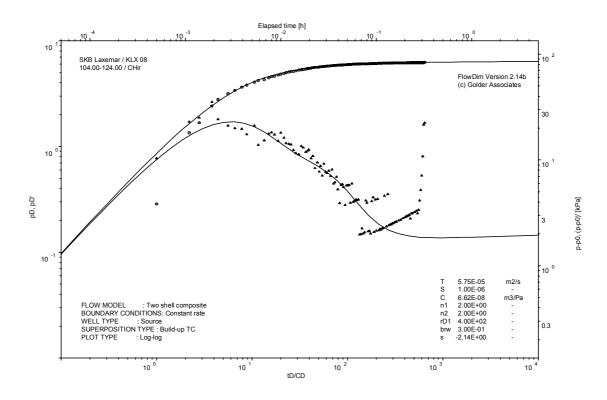


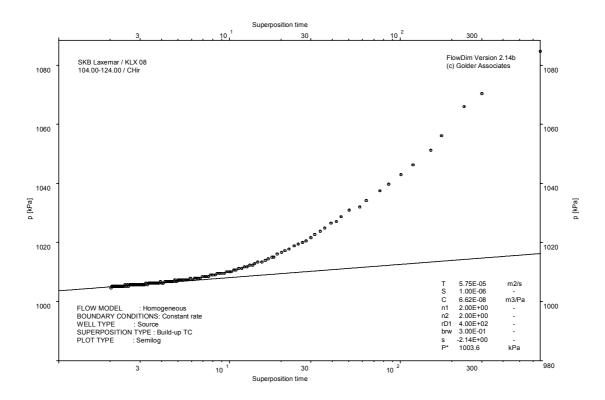
Interval pressure and temperature vs. time; cartesian plot

Test: 104.00 – 124.00 m



Test: 104.00 – 124.00 m





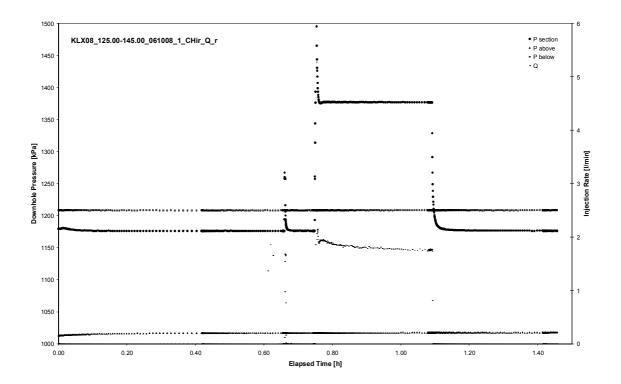
CHIR phase; HORNER match

Test: 125.00 – 145.00 m

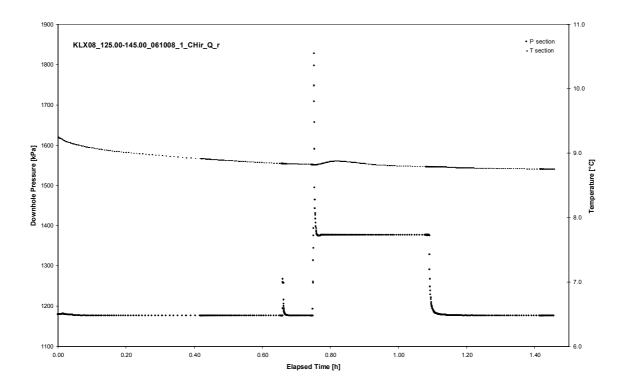
# **APPENDIX 2-11**

Test 125.00 – 145.00 m

Test: 125.00 – 145.00 m

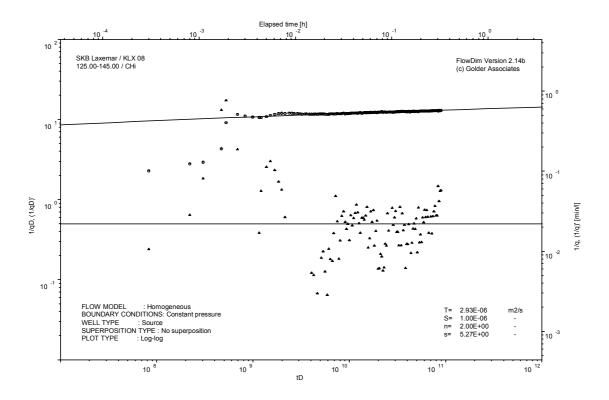


Pressure and flow rate vs. time; cartesian plot



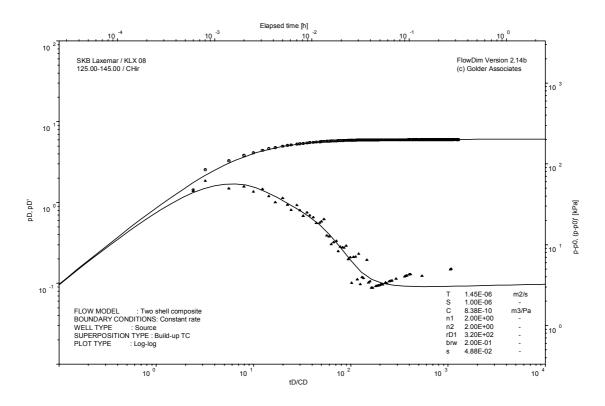
Interval pressure and temperature vs. time; cartesian plot

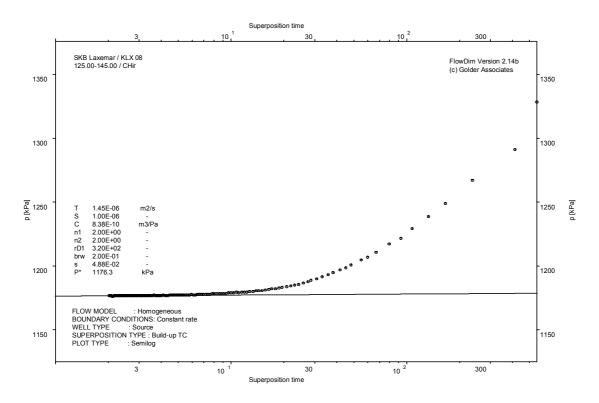
Test: 125.00 – 145.00 m



CHI phase; log-log match

Test: 125.00 – 145.00 m





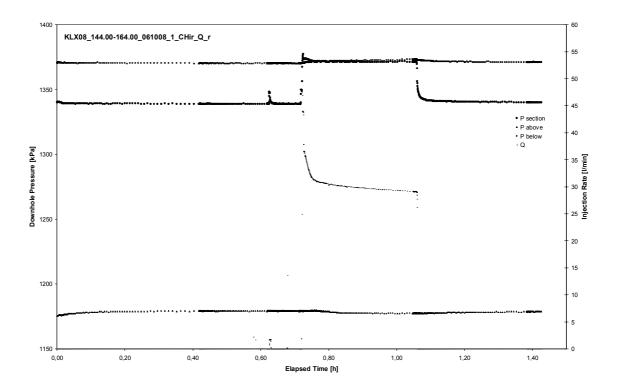
CHIR phase; HORNER match

Test: 144.00 – 164.00 m

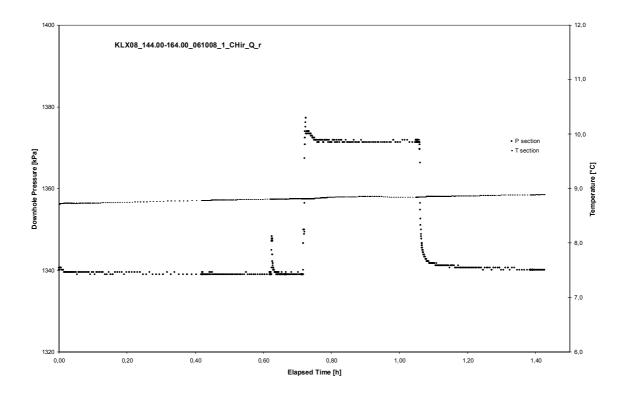
# **APPENDIX 2-12**

Test 144.00 – 164.00 m

Test: 144.00 – 164.00 m

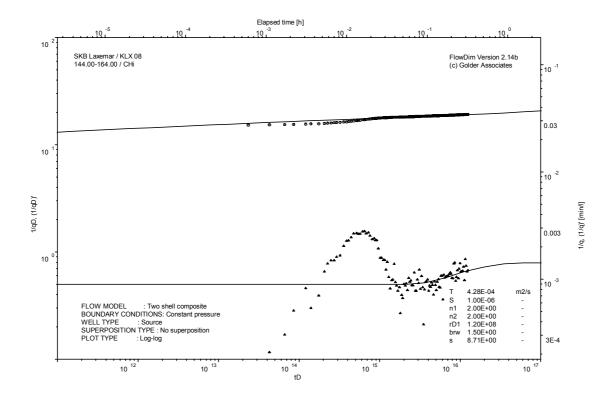


Pressure and flow rate vs. time; cartesian plot

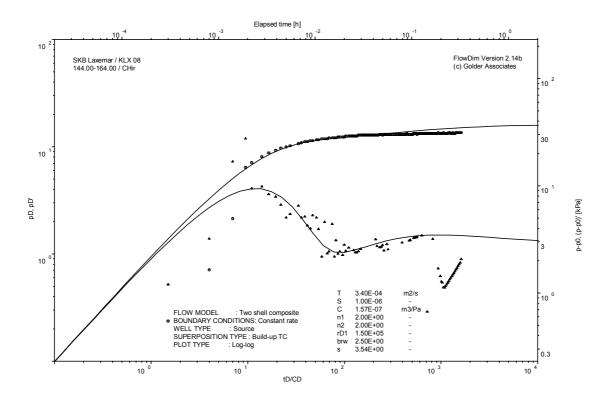


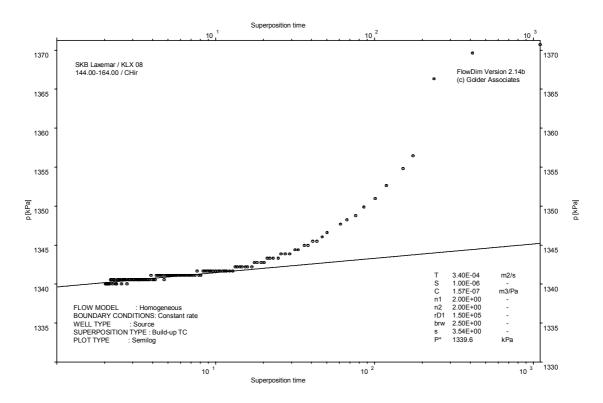
Interval pressure and temperature vs. time; cartesian plot

Test: 144.00 – 164.00 m



Test: 144.00 – 164.00 m





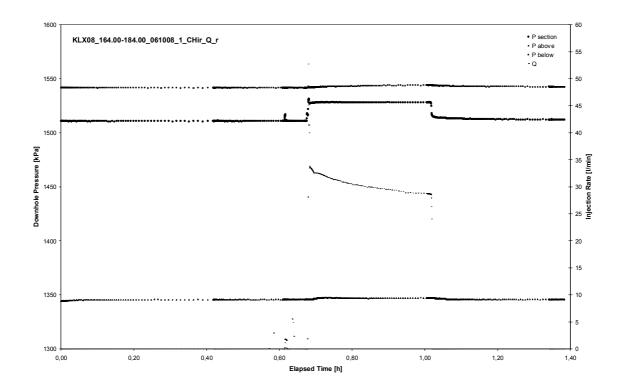
CHIR phase; HORNER match

Test: 164.00 – 184.00 m

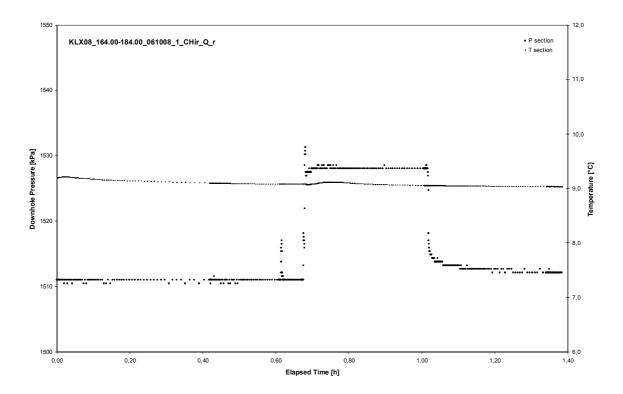
# **APPENDIX 2-13**

Test 164.00 – 184.00 m

Test: 164.00 – 184.00 m

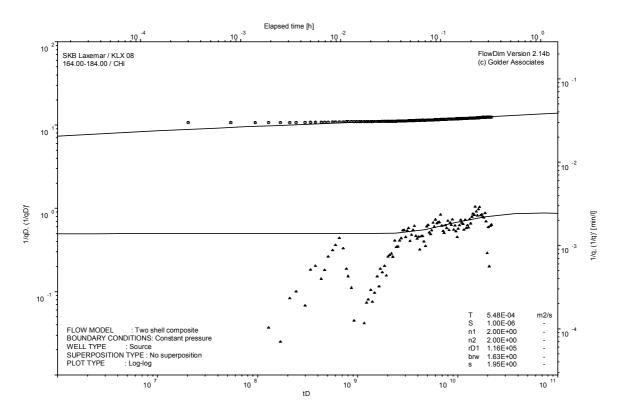


Pressure and flow rate vs. time; cartesian plot

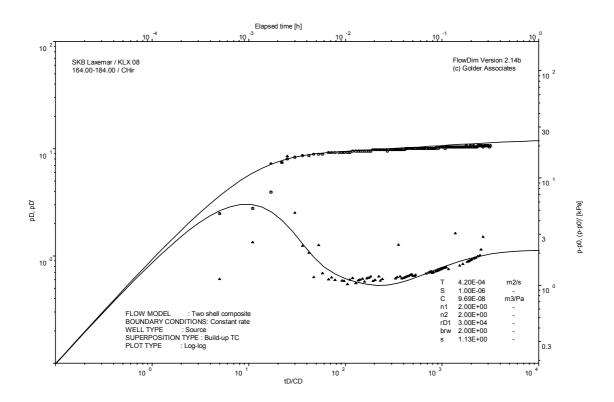


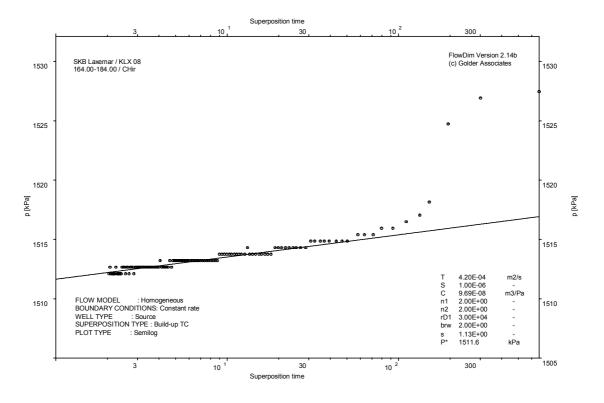
Interval pressure and temperature vs. time; cartesian plot

Test: 164.00 – 184.00 m



Test: 164.00 – 184.00 m





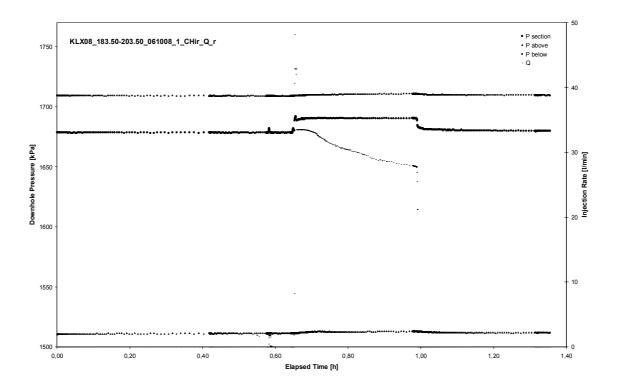
CHIR phase; HORNER match

Test: 183.50 – 203.50 m

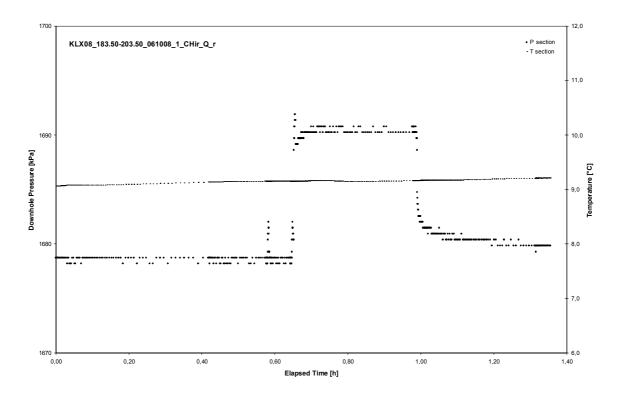
### **APPENDIX 2-14**

Test 183.50 – 203.50 m

Test: 183.50 – 203.50 m

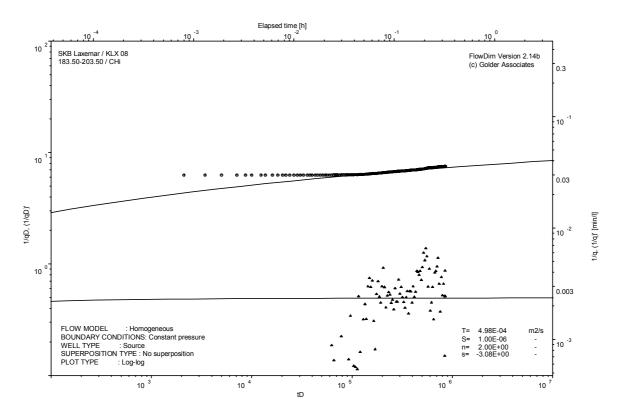


Pressure and flow rate vs. time; cartesian plot

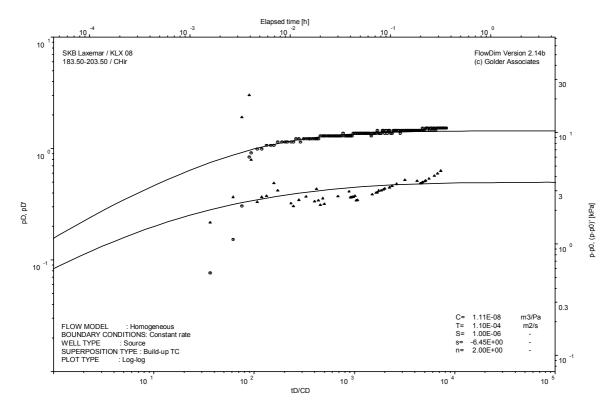


Interval pressure and temperature vs. time; cartesian plot

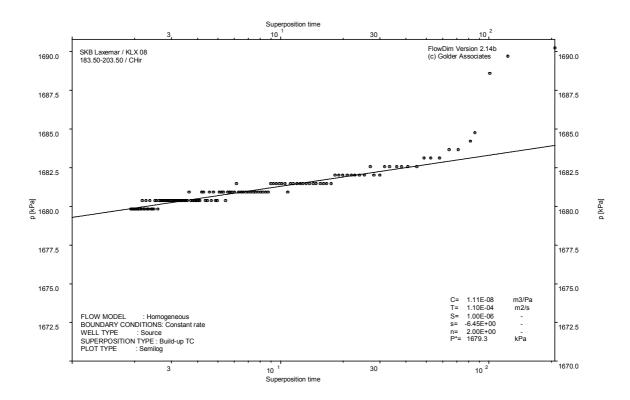
Test: 183.50 – 203.50 m



Test: 183.50 – 203.50 m



CHIR phase; log-log match



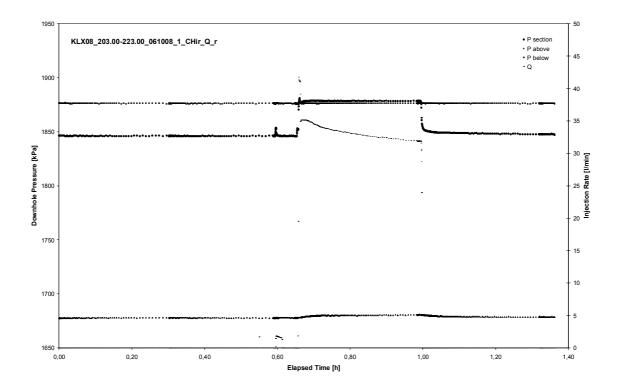
CHIR phase; HORNER match

Test: 203.00 – 223.00 m

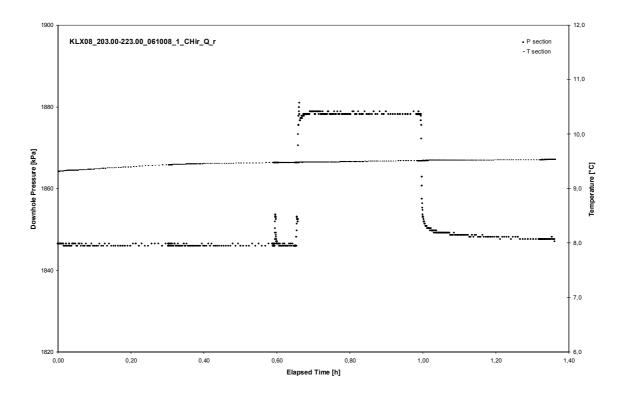
# **APPENDIX 2-15**

Test 203.00 – 223.00 m

Test: 203.00 – 223.00 m

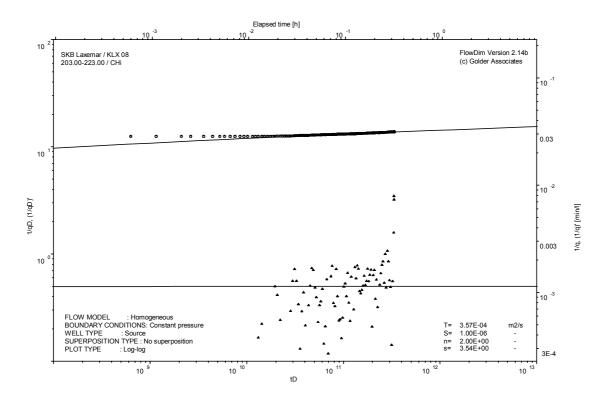


Pressure and flow rate vs. time; cartesian plot

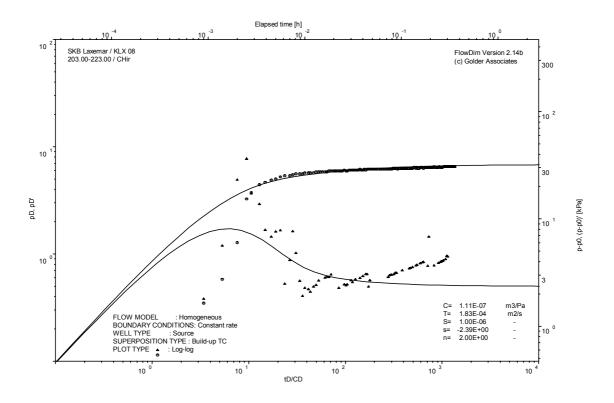


Interval pressure and temperature vs. time; cartesian plot

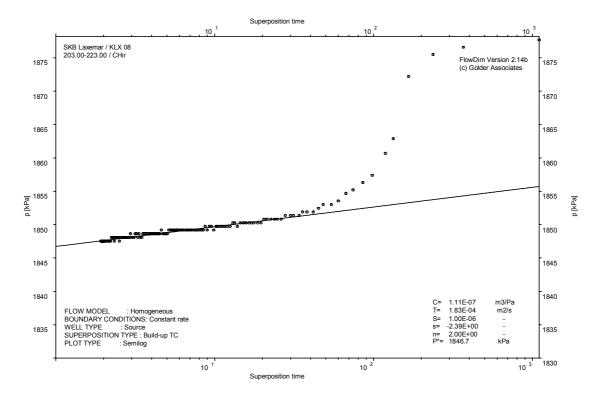
Test: 203.00 – 223.00 m



Test: 203.00 – 223.00 m



CHIR phase; log-log match



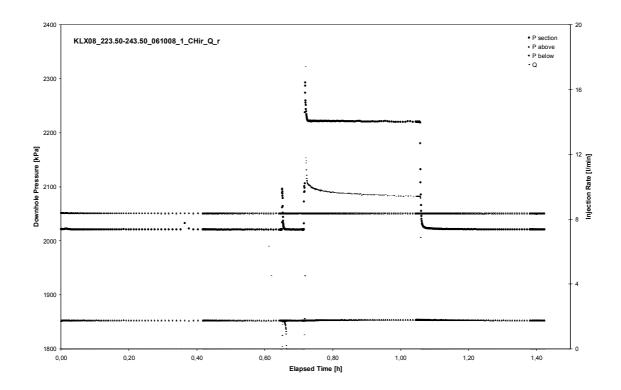
CHIR phase; HORNER match

Test: 223.50 – 243.50 m

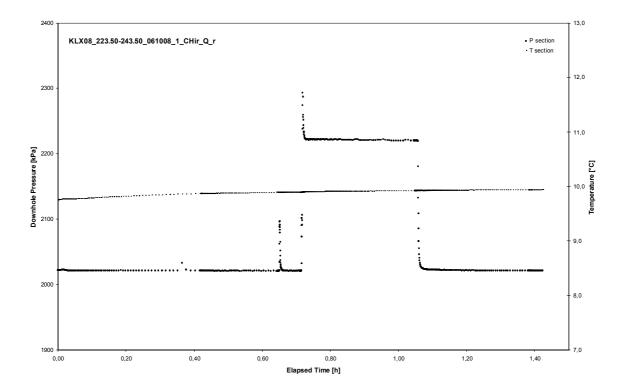
# **APPENDIX 2-16**

Test 223.50 – 243.50 m

Test: 223.50 – 243.50 m

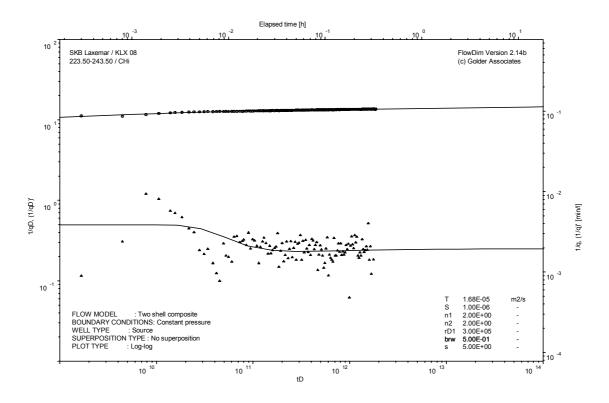


Pressure and flow rate vs. time; cartesian plot

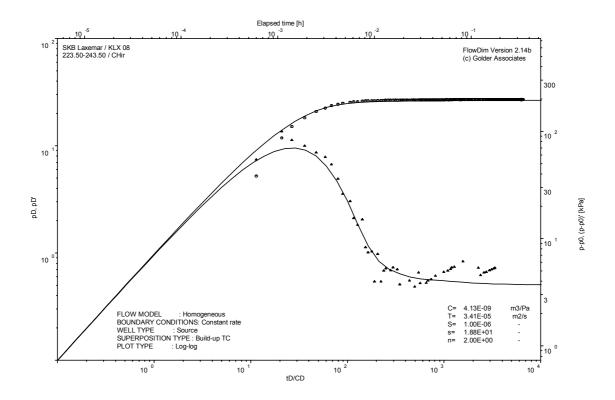


Interval pressure and temperature vs. time; cartesian plot

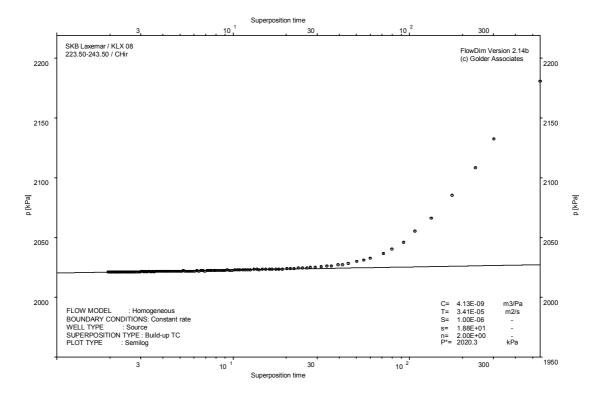
Test: 223.50 – 243.50 m



Test: 223.50 – 243.50 m



CHIR phase; log-log match



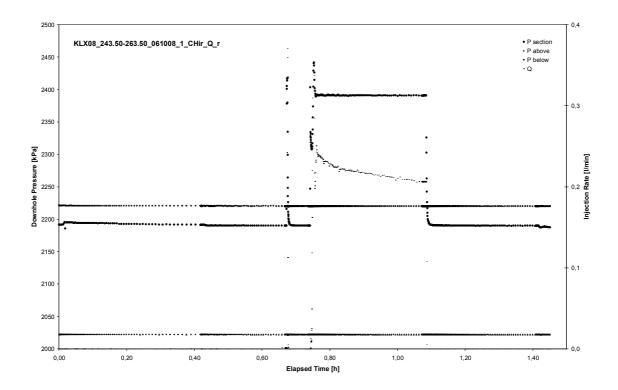
CHIR phase; HORNER match

Test: 243.50 – 263.50 m

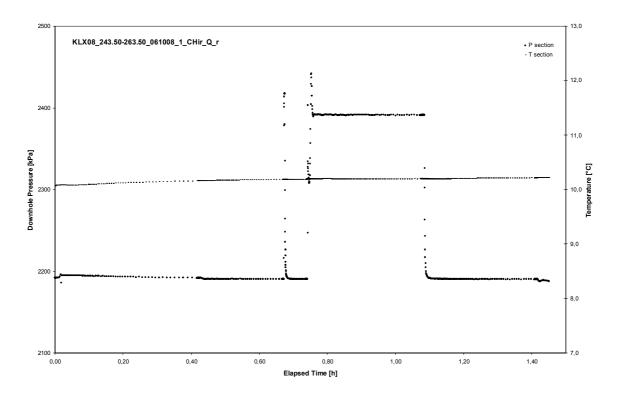
# **APPENDIX 2-17**

Test 243.50 – 263.50 m

Test: 243.50 – 263.50 m

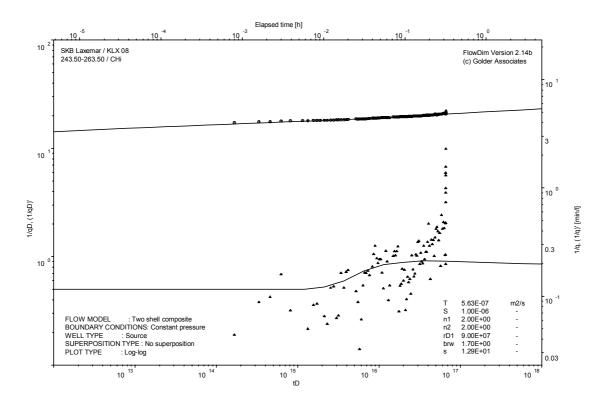


Pressure and flow rate vs. time; cartesian plot

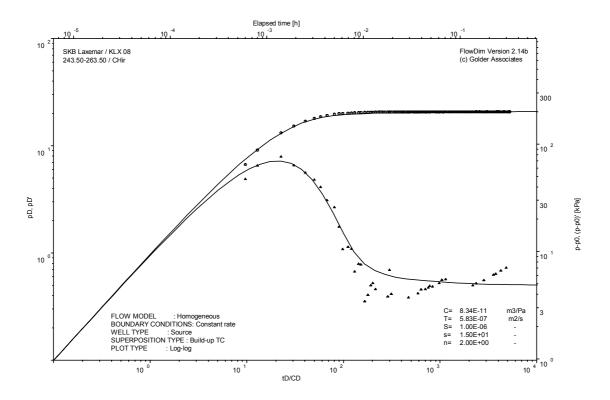


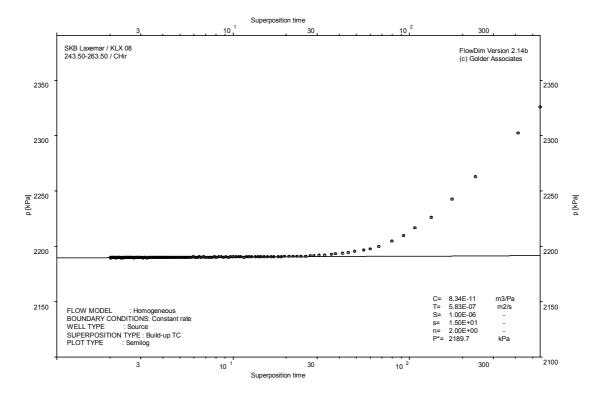
Interval pressure and temperature vs. time; cartesian plot

Test: 243.50 – 263.50 m



Test: 243.50 – 263.50 m





CHIR phase; HORNER match

Test: 264.00 – 284.00 m

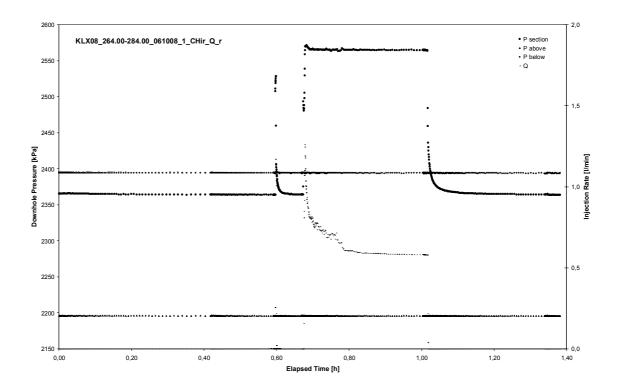
# **APPENDIX 2-18**

Test 264.00 – 284.00 m

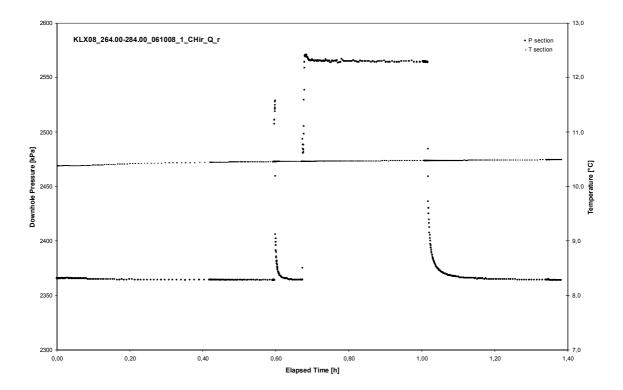
Page 2-18/2

Borehole: KLX08

Test: 264.00 – 284.00 m

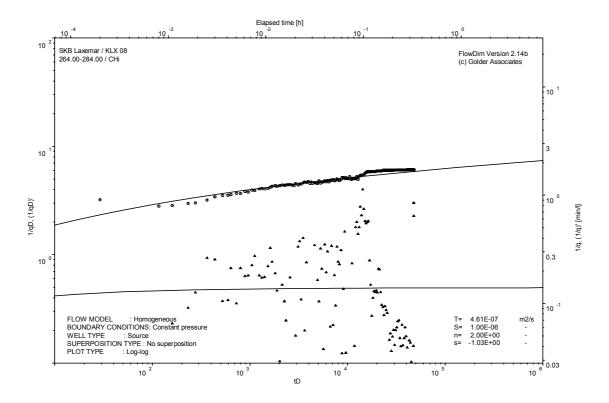


Pressure and flow rate vs. time; cartesian plot

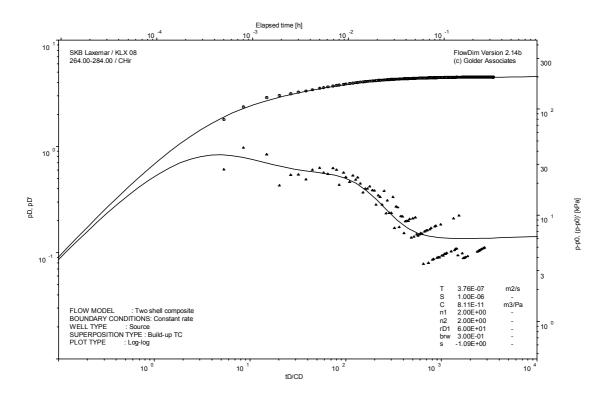


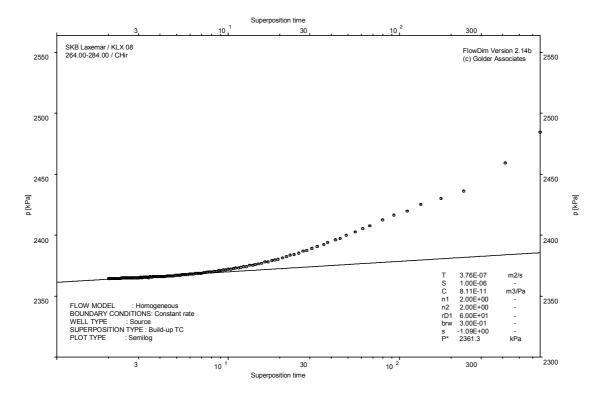
Interval pressure and temperature vs. time; cartesian plot

Test: 264.00 – 284.00 m



Test: 264.00 - 284.00 m





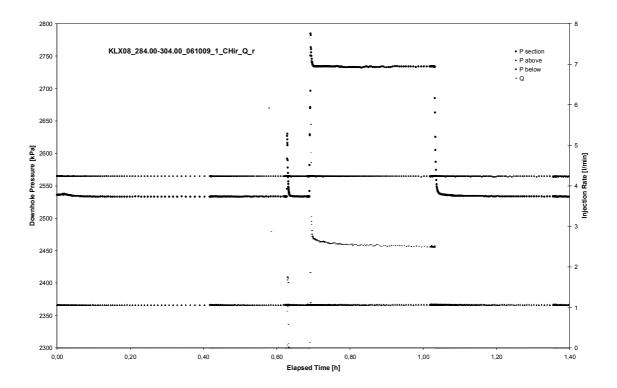
CHIR phase; HORNER match

Test: 284.00 – 304.00 m

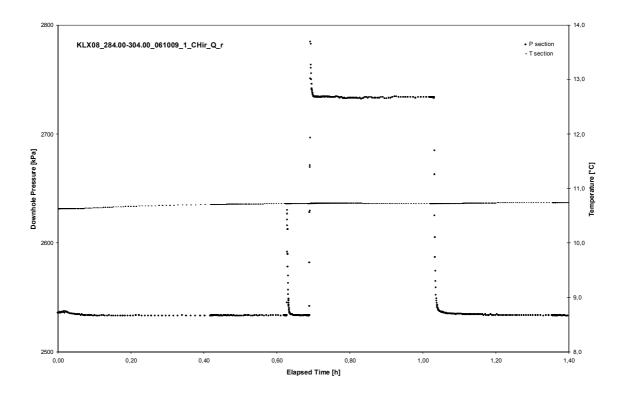
# **APPENDIX 2-19**

Test 284.00 – 304.00 m

Test: 284.00 – 304.00 m

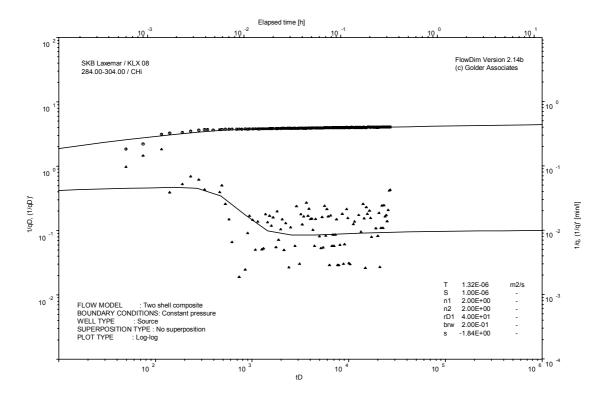


Pressure and flow rate vs. time; cartesian plot

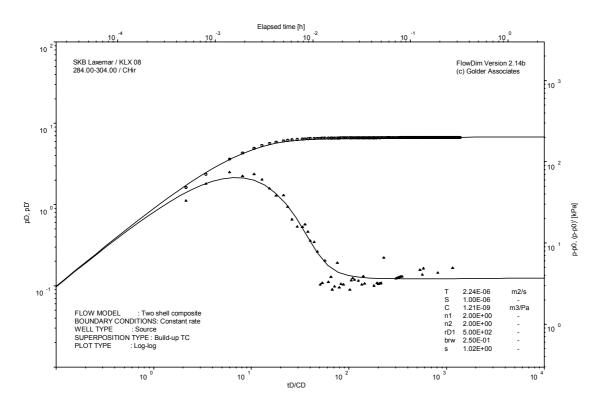


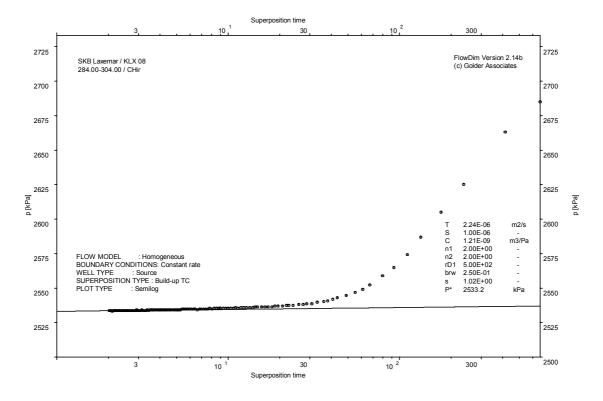
Interval pressure and temperature vs. time; cartesian plot

Test: 284.00 – 304.00 m



Test: 284.00 - 304.00 m





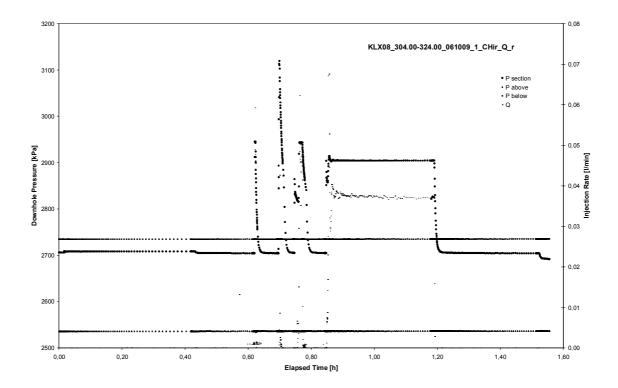
CHIR phase; HORNER match

Test: 304.00 - 324.00 m

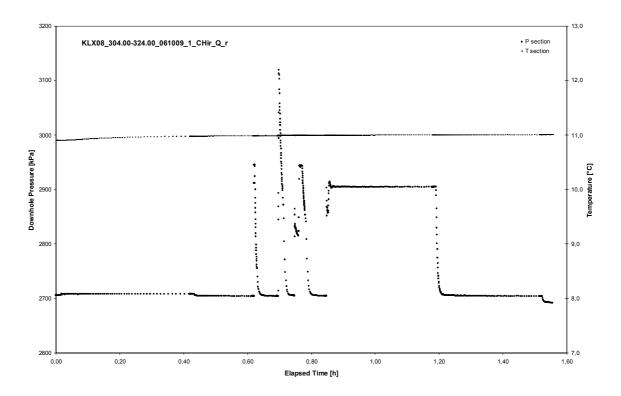
# **APPENDIX 2-20**

Test 304.00 – 324.00 m

Test: 304.00 – 324.00 m

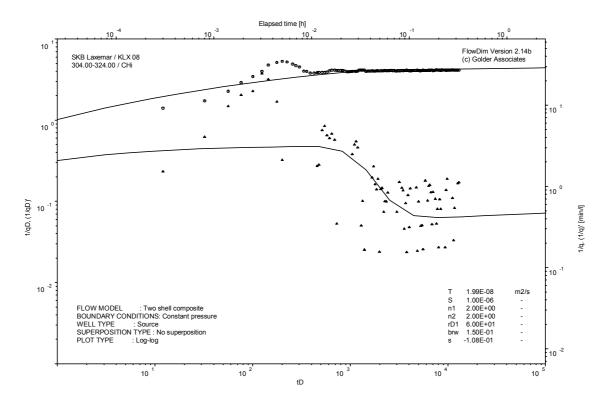


Pressure and flow rate vs. time; cartesian plot

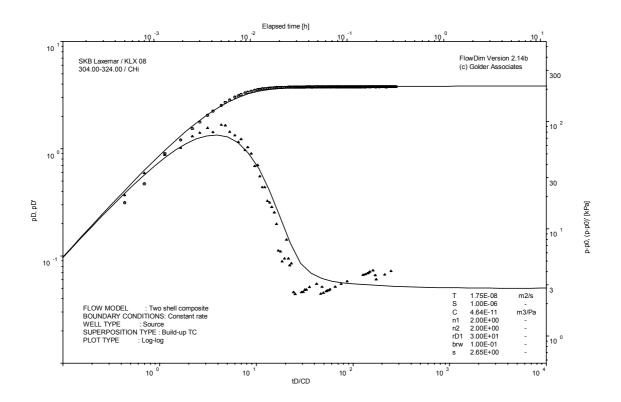


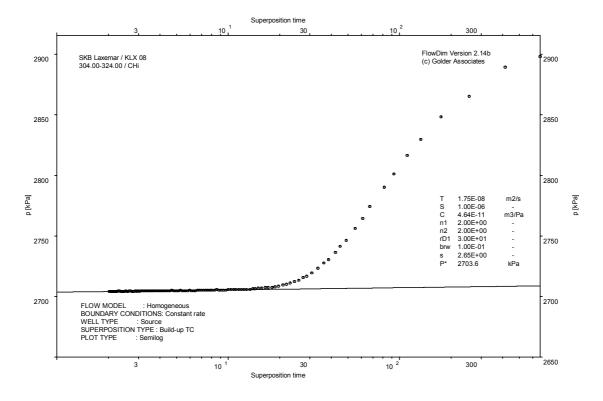
Interval pressure and temperature vs. time; cartesian plot

Test: 304.00 - 324.00 m



Test: 304.00 – 324.00 m





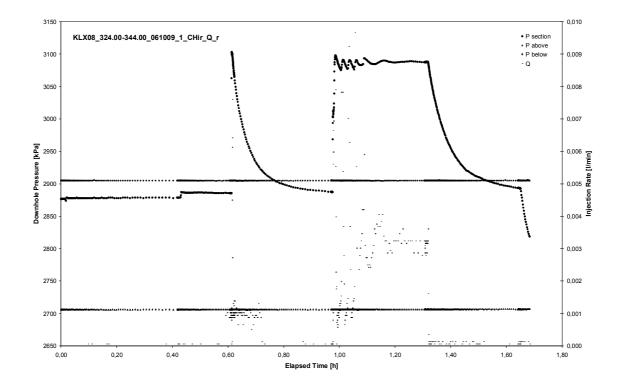
CHIR phase; HORNER match

Test: 324.00 – 344.00 m

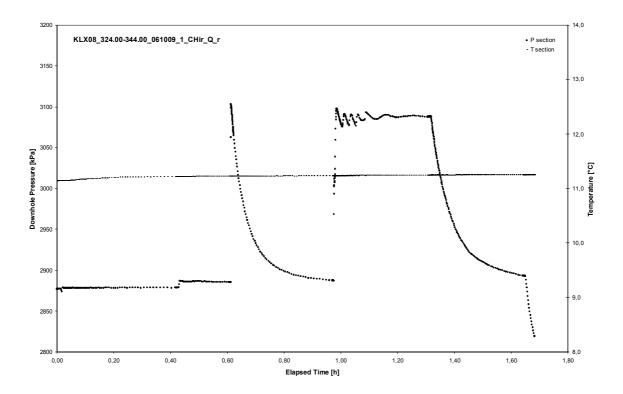
# **APPENDIX 2-21**

Test 324.00 – 344.00 m

Test: 324.00 – 344.00 m



Pressure and flow rate vs. time; cartesian plot

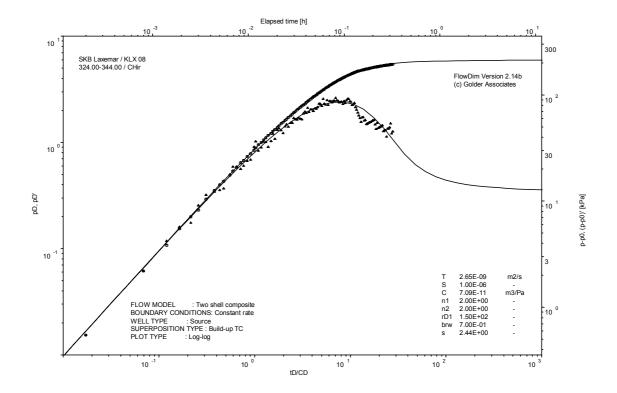


Interval pressure and temperature vs. time; cartesian plot

Test: 324.00 – 344.00 m

Not Analysed

Test: 324.00 – 344.00 m



CHIR phase; log-log match

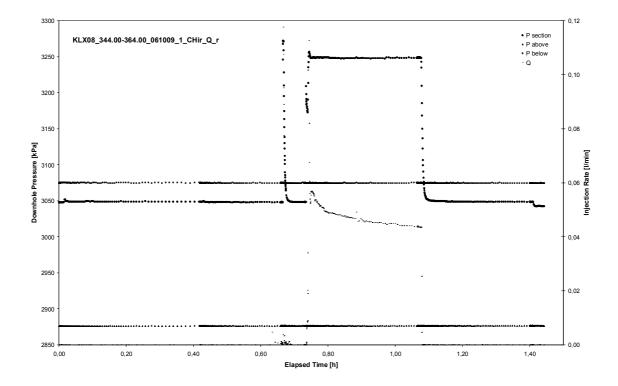
Not analysable

Test: 344.00 – 364.00 m

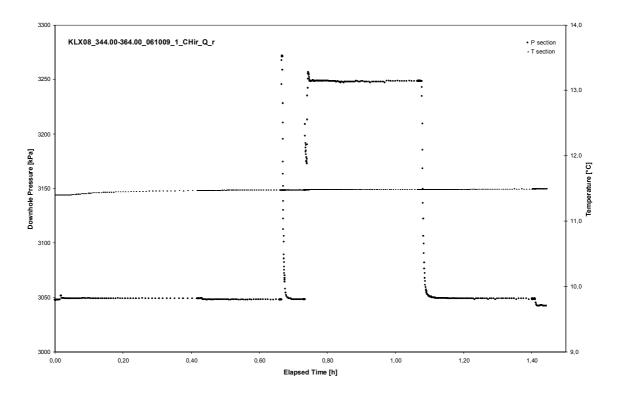
# **APPENDIX 2-22**

Test 344.00 – 364.00 m

Test: 344.00 – 364.00 m

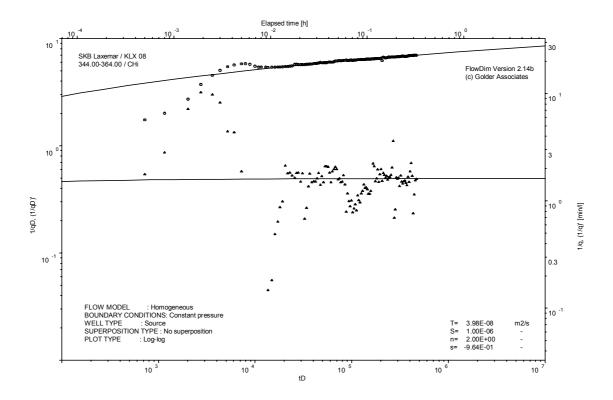


Pressure and flow rate vs. time; cartesian plot

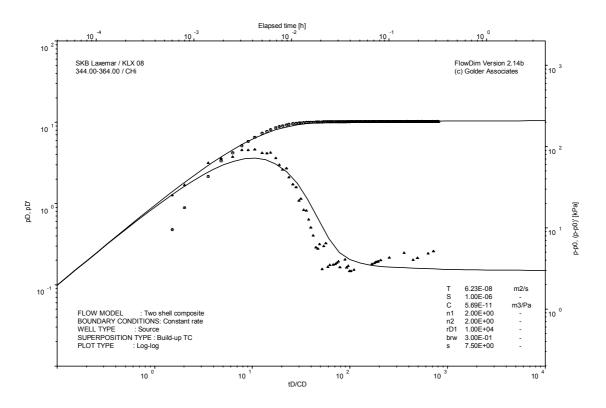


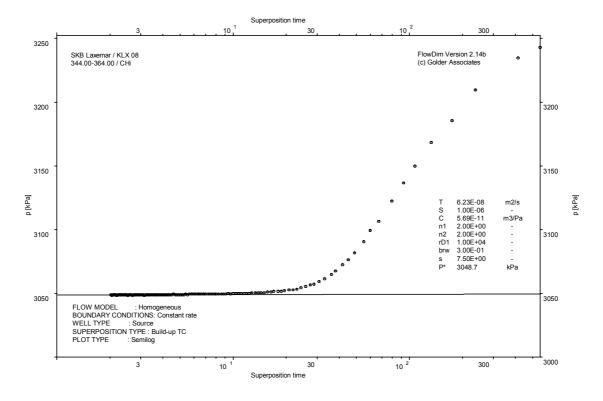
Interval pressure and temperature vs. time; cartesian plot

Test: 344.00 – 364.00 m



Test: 344.00 – 364.00 m





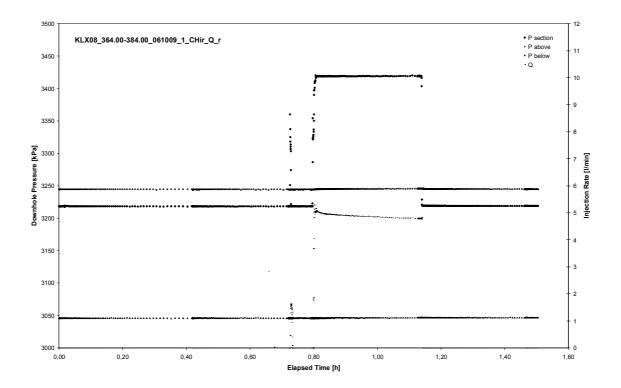
CHIR phase; HORNER match

Test: 364.00 – 384.00 m

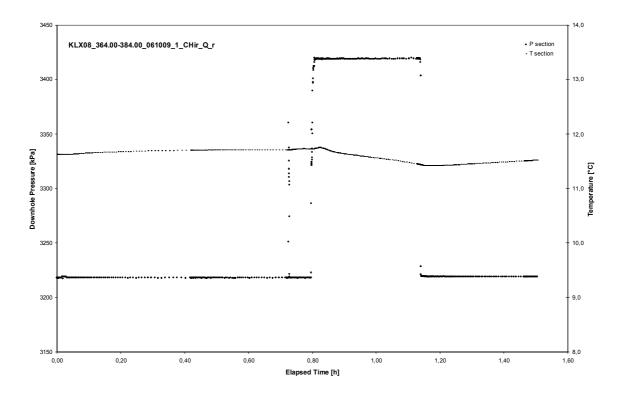
# **APPENDIX 2-23**

Test 364.00 – 384.00 m

Test: 364.00 – 384.00 m

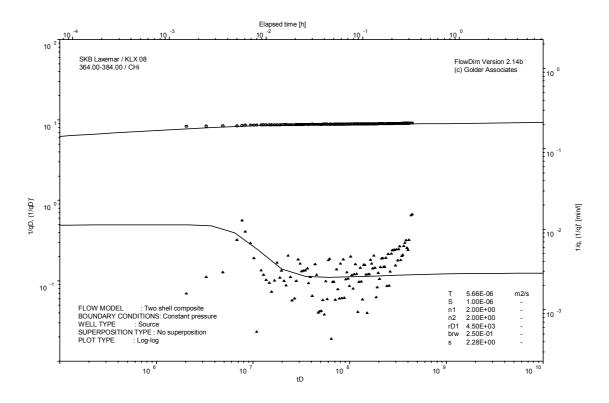


Pressure and flow rate vs. time; cartesian plot

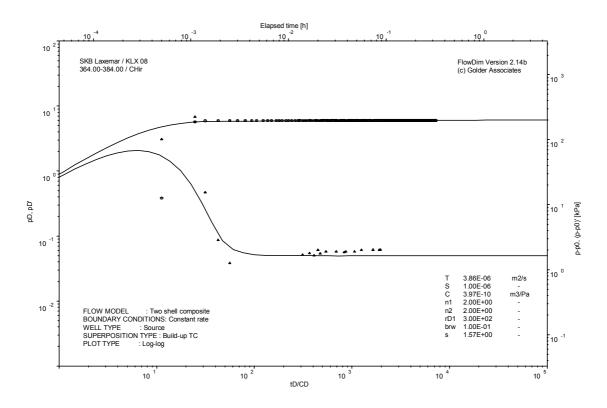


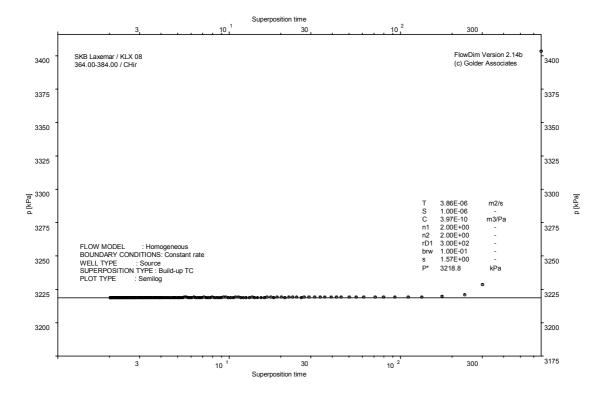
Interval pressure and temperature vs. time; cartesian plot

Test: 364.00 – 384.00 m



Test: 364.00 - 384.00 m





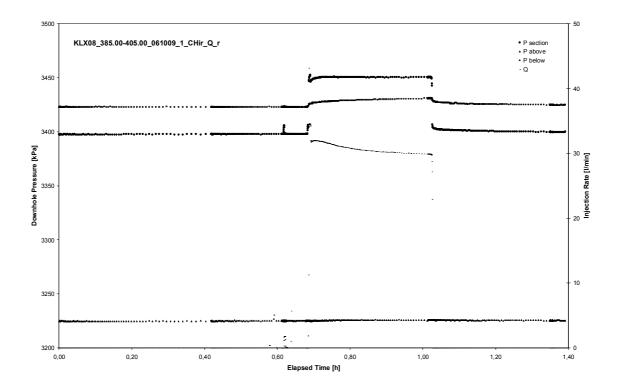
CHIR phase; HORNER match

Test: 385.00 – 405.00 m

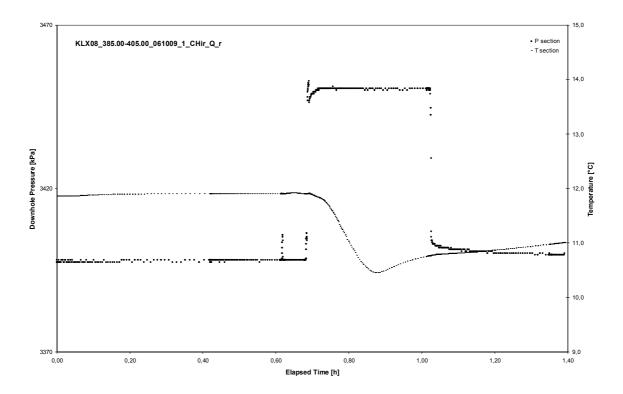
# **APPENDIX 2-24**

Test 385.00 – 405.00 m

Test: 385.00 – 405.00 m

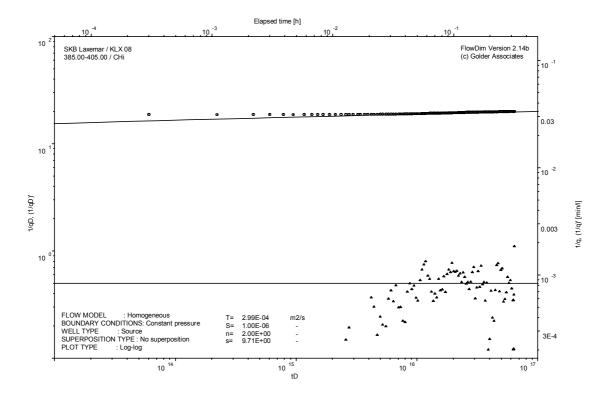


Pressure and flow rate vs. time; cartesian plot

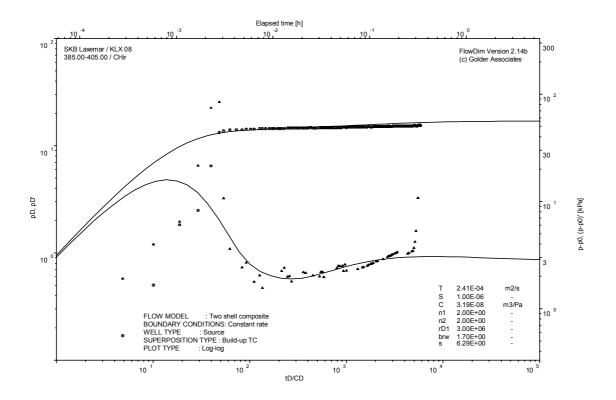


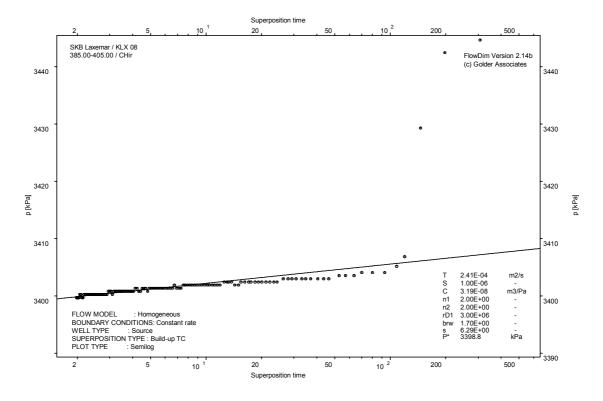
Interval pressure and temperature vs. time; cartesian plot

Test: 385.00 – 405.00 m



Test: 385.00 – 405.00 m





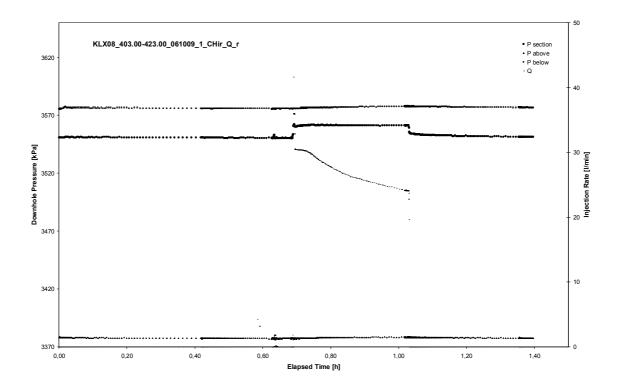
CHIR phase; HORNER match

Test: 403.00 – 423.00 m

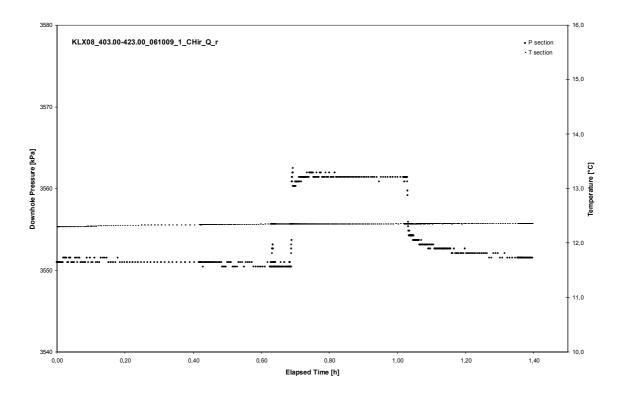
# **APPENDIX 2-25**

Test 403.00 – 423.00 m

Test: 403.00 – 423.00 m

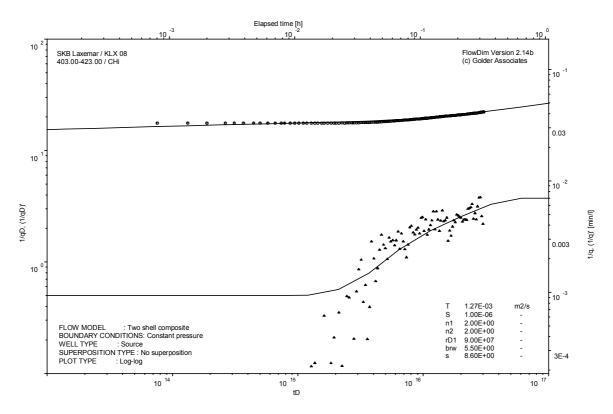


Pressure and flow rate vs. time; cartesian plot

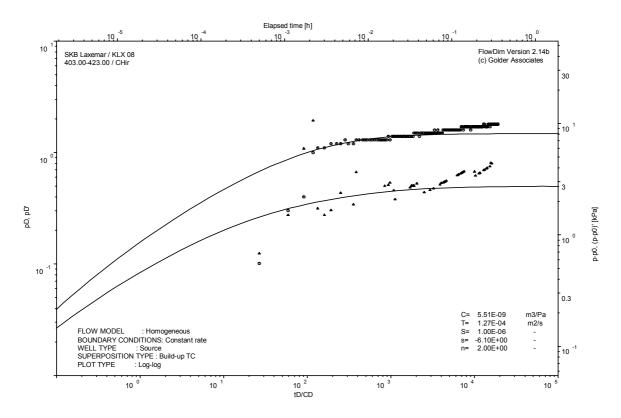


Interval pressure and temperature vs. time; cartesian plot

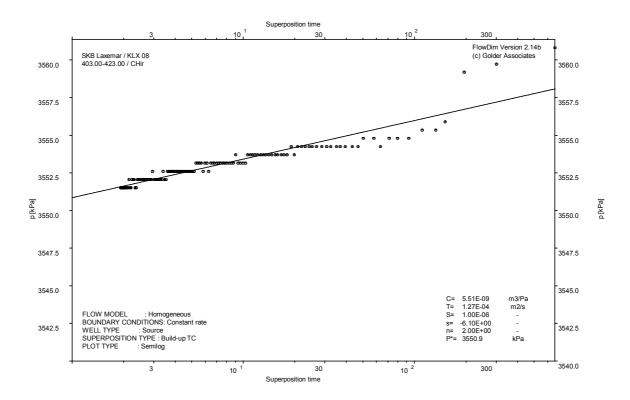
Test: 403.00 – 423.00 m



Test: 403.00 – 423.00 m



CHIR phase; log-log match



CHIR phase; HORNER match

Test: 423.00 – 443.00 m

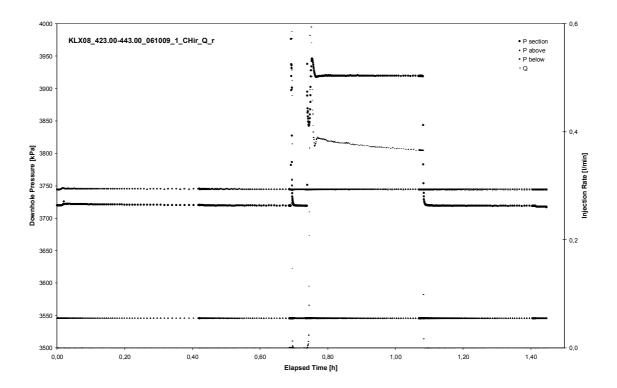
# **APPENDIX 2-26**

Test 423.00 – 443.00 m

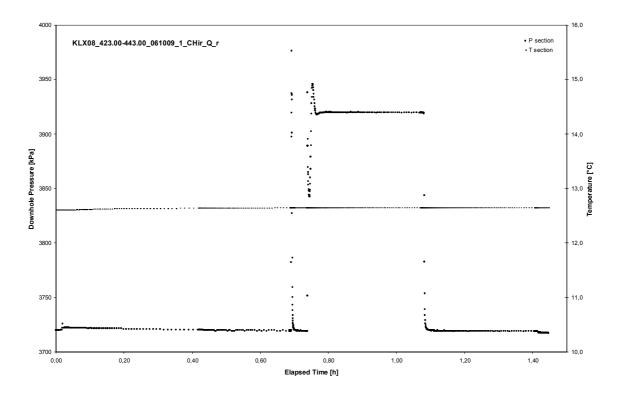
Page 2-26/2

Borehole: KLX08

Test: 423.00 – 443.00 m

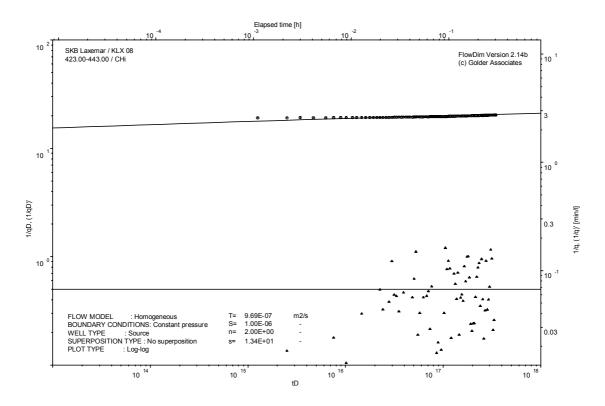


Pressure and flow rate vs. time; cartesian plot

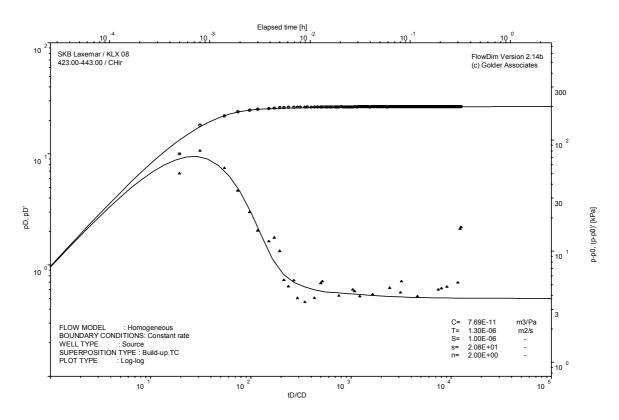


Interval pressure and temperature vs. time; cartesian plot

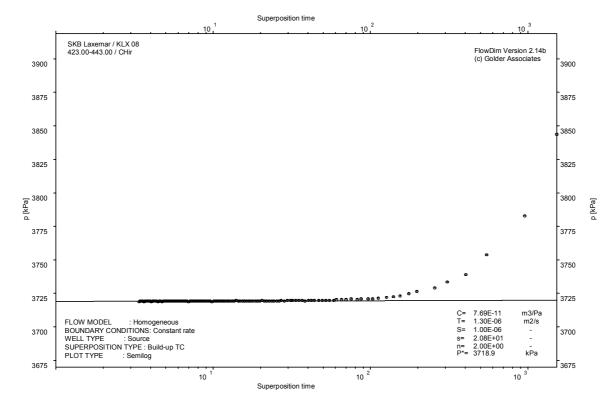
Test: 423.00 – 443.00 m



Test: 423.00 – 443.00 m



CHIR phase; log-log match



CHIR phase; HORNER match

Test: 443.00 – 463.00 m

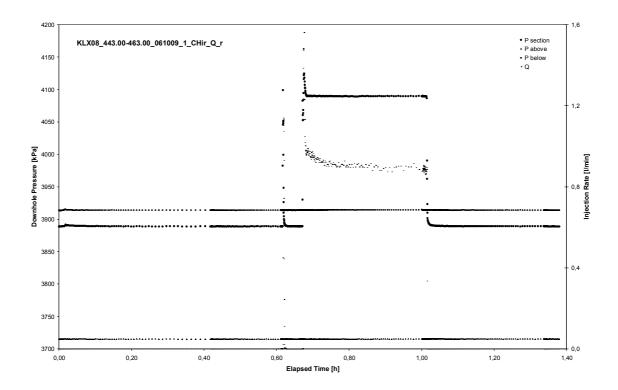
# **APPENDIX 2-27**

Test 443.00 – 463.00 m

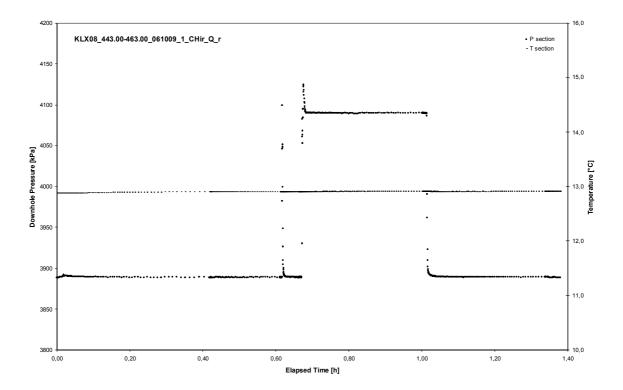
Page 2-27/2

Borehole: KLX08

Test: 443.00 – 463.00 m

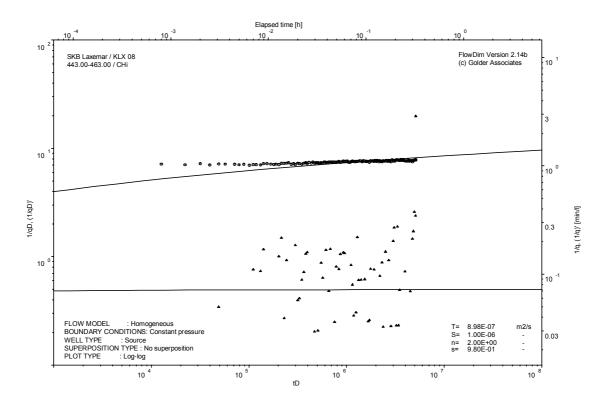


Pressure and flow rate vs. time; cartesian plot

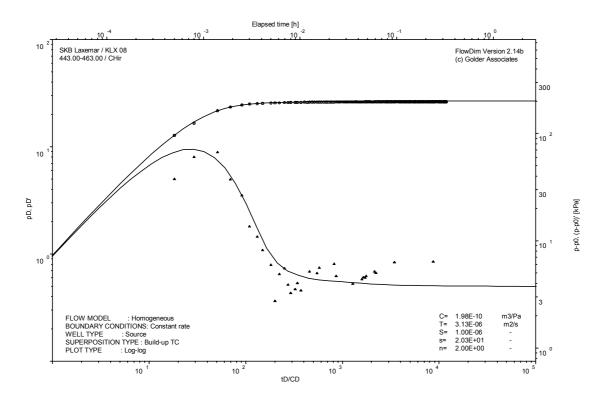


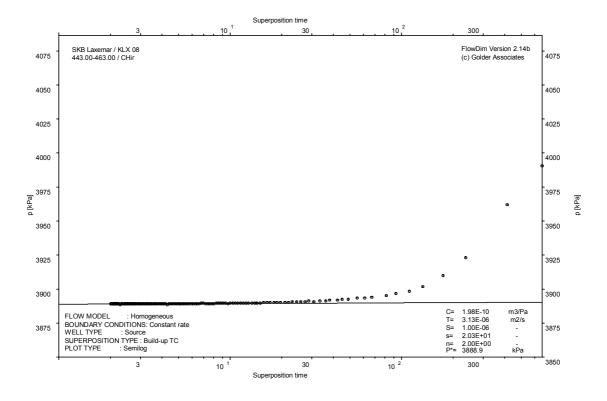
Interval pressure and temperature vs. time; cartesian plot

Test: 443.00 – 463.00 m



Test: 443.00 – 463.00 m





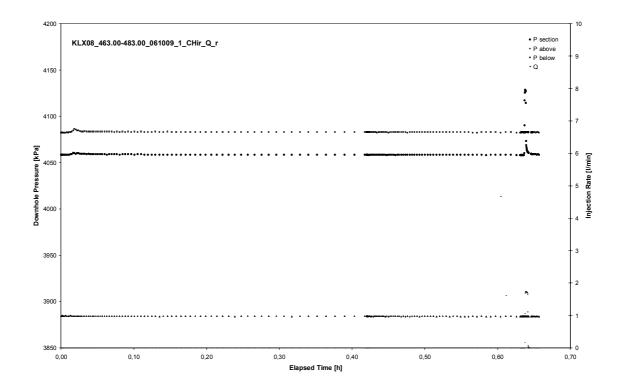
CHIR phase; HORNER match

Test: 463.00 – 483.00m

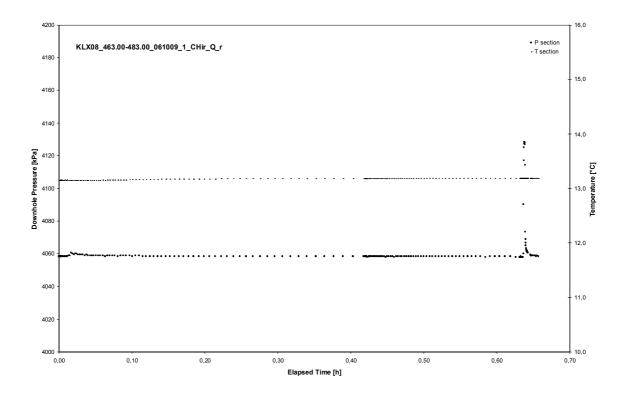
# **APPENDIX 2-28**

Test 463.00 – 483.00 m

Test: 463.00 – 483.00m

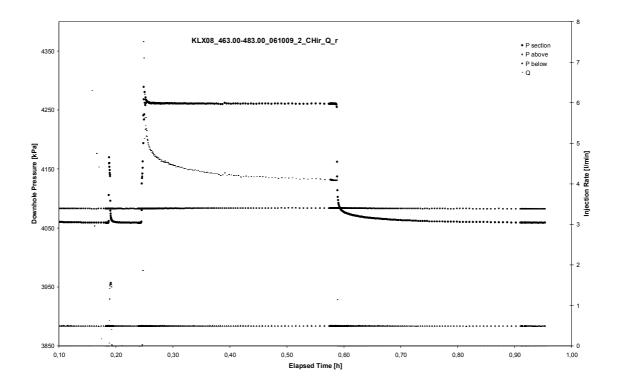


Pressure and flow rate vs. time; cartesian plot (test repeated)

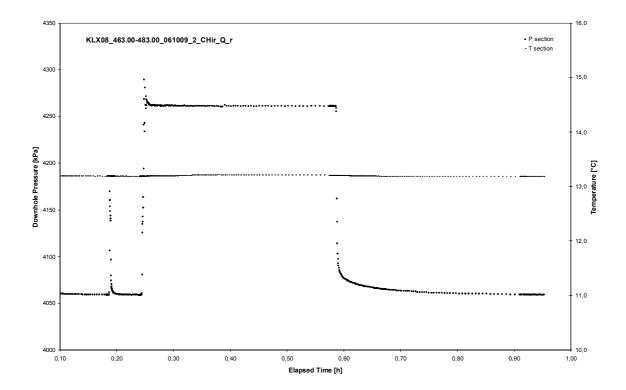


Interval pressure and temperature vs. time; cartesian plot (test repeated)

Test: 463.00 – 483.00m

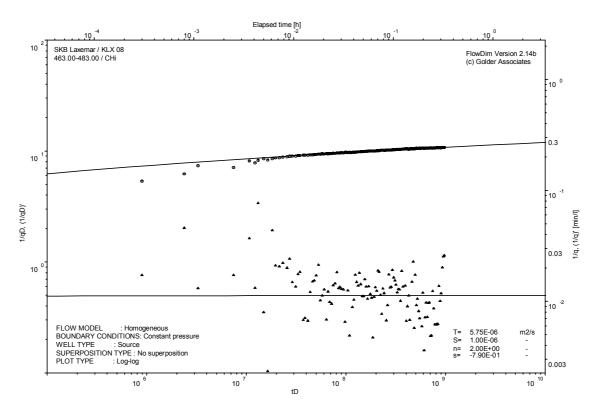


Pressure and flow rate vs. time; cartesian plot (analysed)

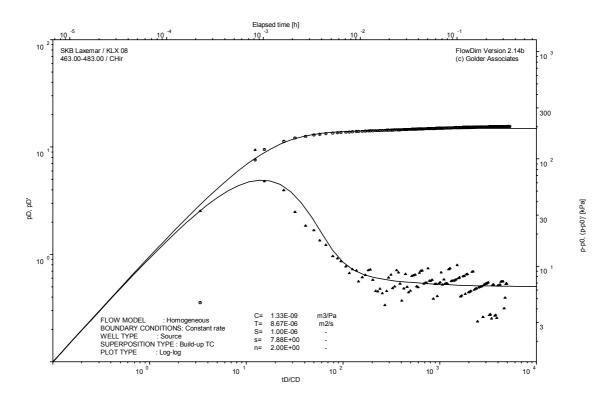


Interval pressure and temperature vs. time; cartesian plot (analysed)

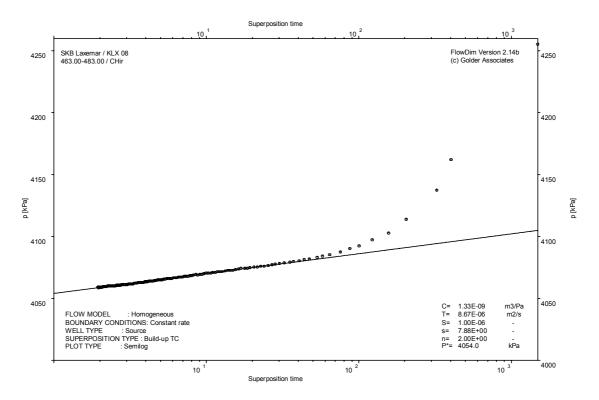
Test: 463.00 – 483.00m



Test: 463.00 – 483.00m



CHIR phase; log-log match



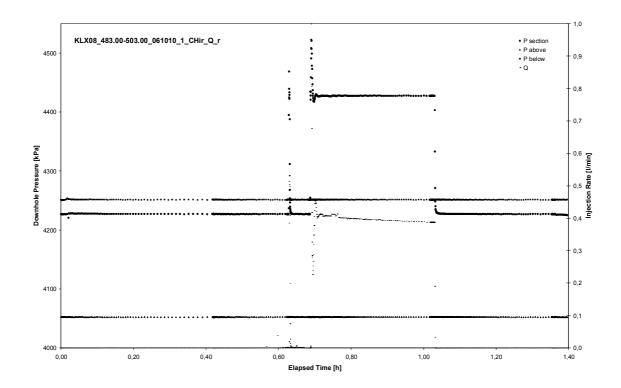
CHIR phase; HORNER match

Test: 483.00 – 503.00 m

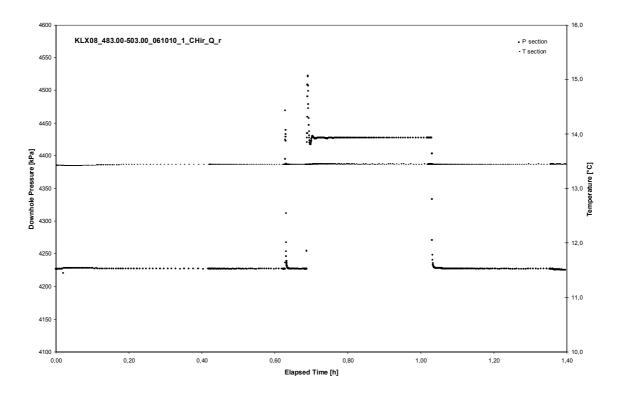
# **APPENDIX 2-29**

Test 483.00 – 503.00 m

Test: 483.00 – 503.00 m

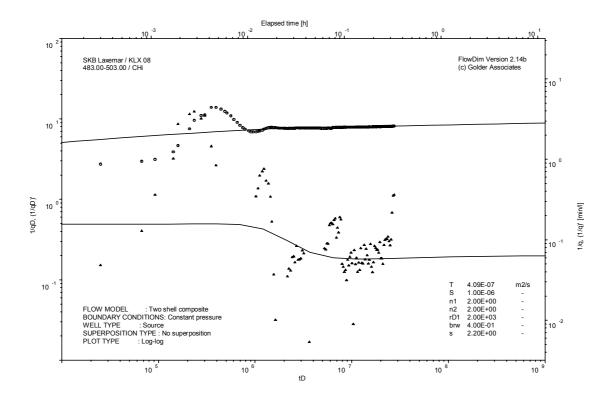


Pressure and flow rate vs. time; cartesian plot

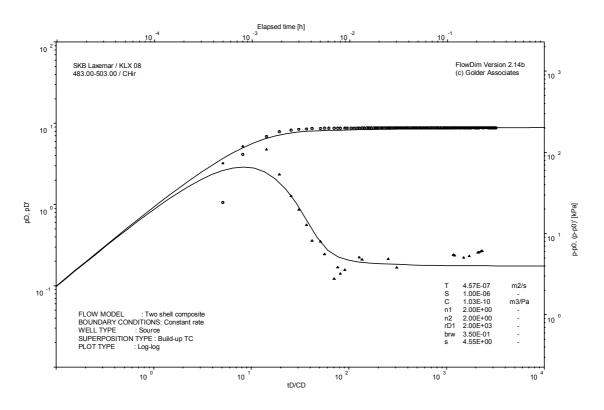


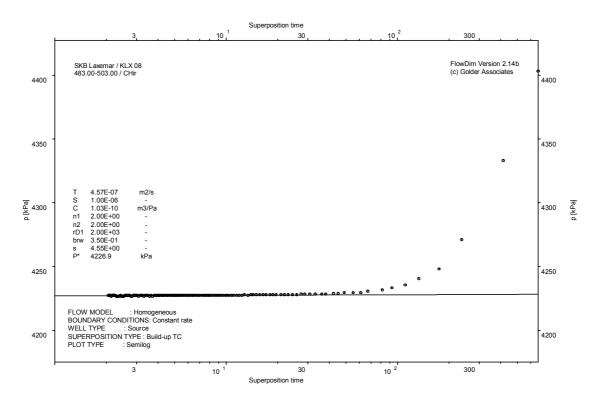
Interval pressure and temperature vs. time; cartesian plot

Test: 483.00 – 503.00 m



Test: 483.00 – 503.00 m





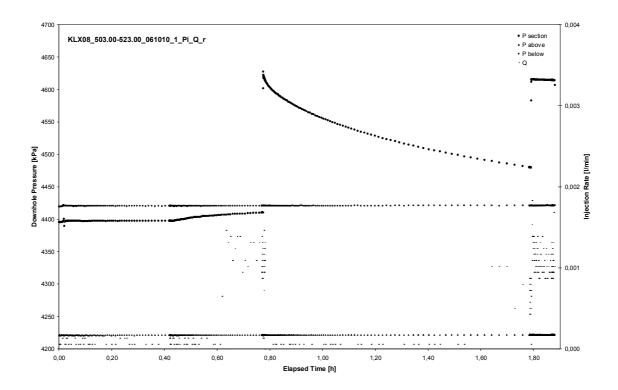
CHIR phase; HORNER match

Test: 503.00 – 523.00 m

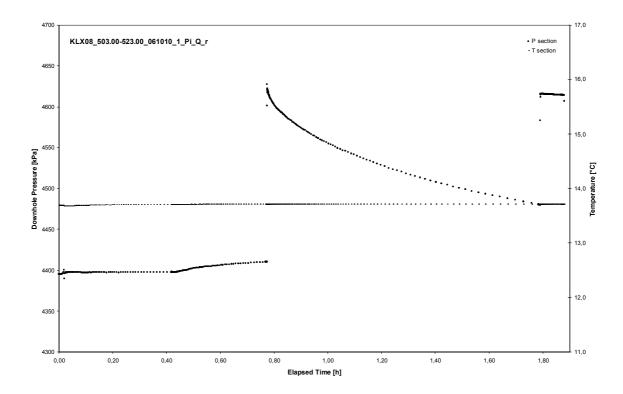
# **APPENDIX 2-30**

Test 503.00 – 523.00 m

Test: 503.00 – 523.00 m

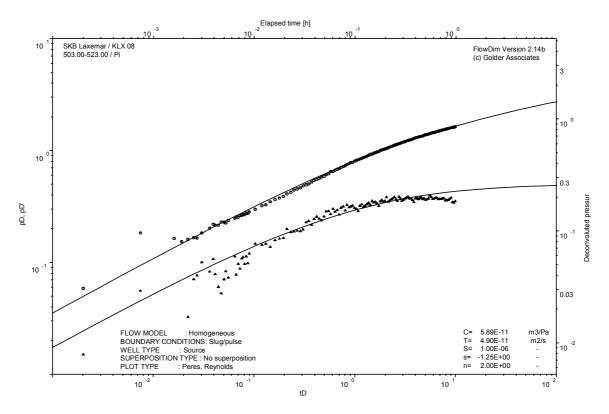


Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Test: 503.00 – 523.00 m



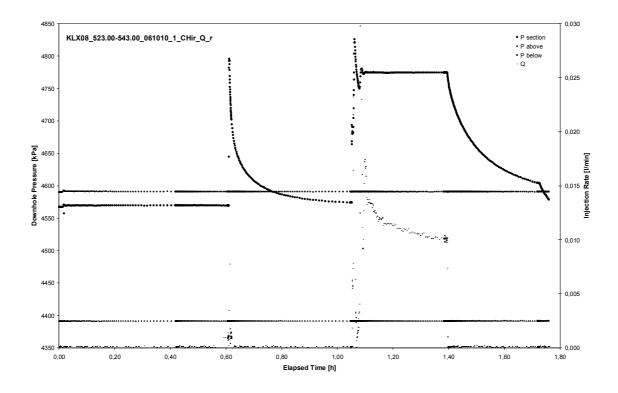
Pulse injection; deconvolution match

Test: 523.00 – 543.00 m

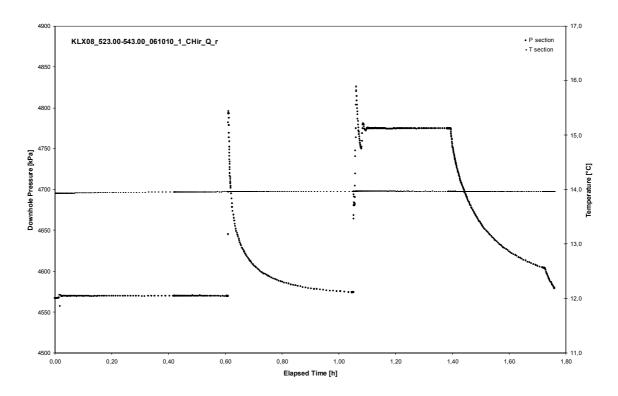
# **APPENDIX 2-31**

Test 523.00 – 543.00 m

Test: 523.00 – 543.00 m

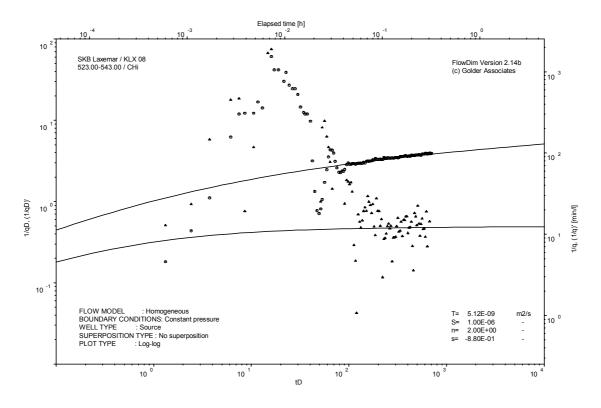


Pressure and flow rate vs. time; cartesian plot

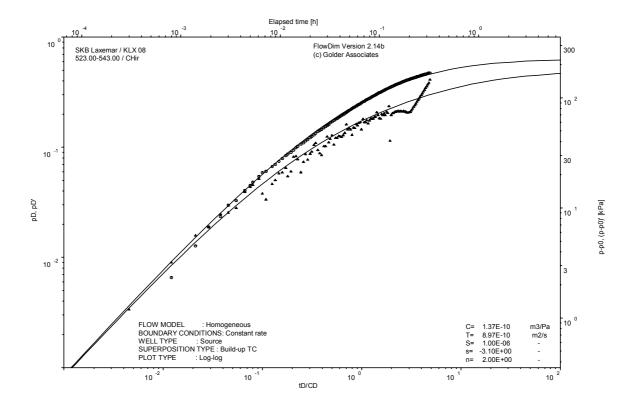


Interval pressure and temperature vs. time; cartesian plot

Test: 523.00 – 543.00 m



Test: 523.00 – 543.00 m



CHIR phase; log-log match

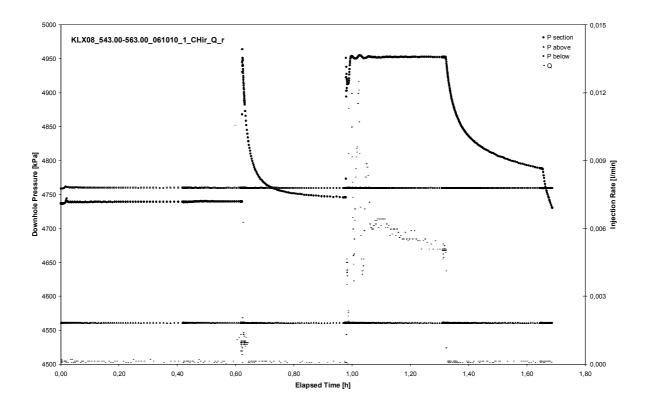
Not analysable

Test: 543.00 – 563.00 m

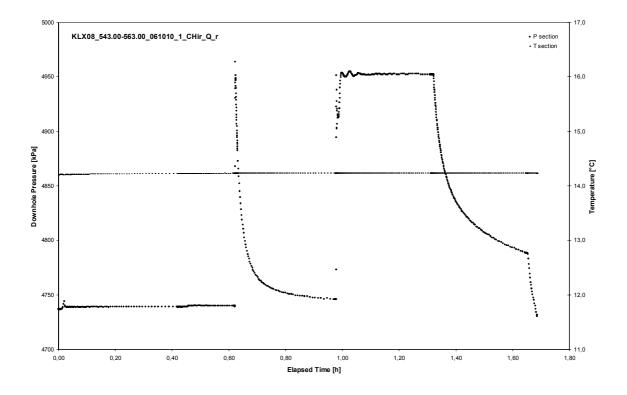
# **APPENDIX 2-32**

Test 543.00 – 563.00 m

Test: 543.00 – 563.00 m

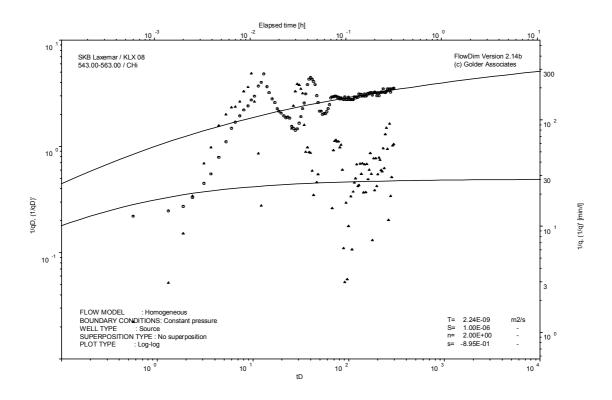


Pressure and flow rate vs. time; cartesian plot

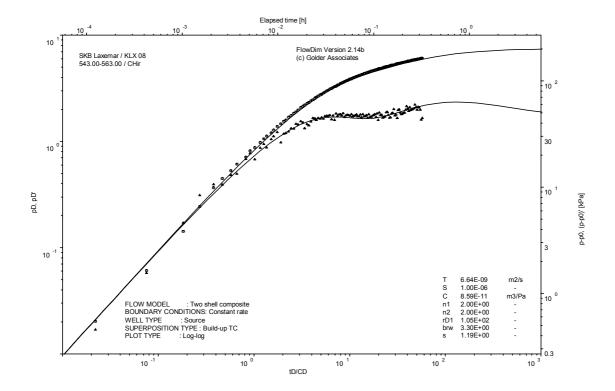


Interval pressure and temperature vs. time; cartesian plot

Test: 543.00 – 563.00 m



Test: 543.00 – 563.00 m



CHIR phase; log-log match

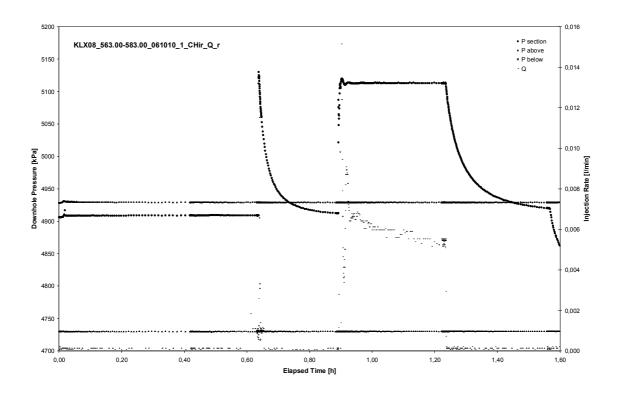
Not analysable

Test: 563.00 – 583.00 m

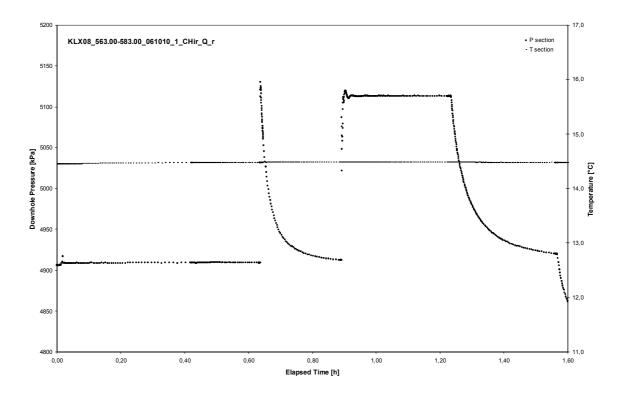
# **APPENDIX 2-33**

Test 563.00 – 583.00 m

Test: 563.00 – 583.00 m

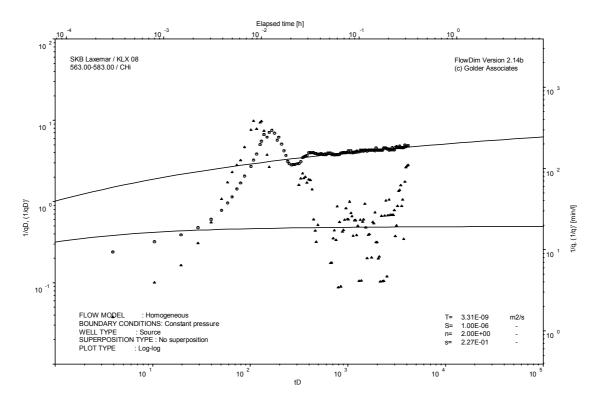


Pressure and flow rate vs. time; cartesian plot

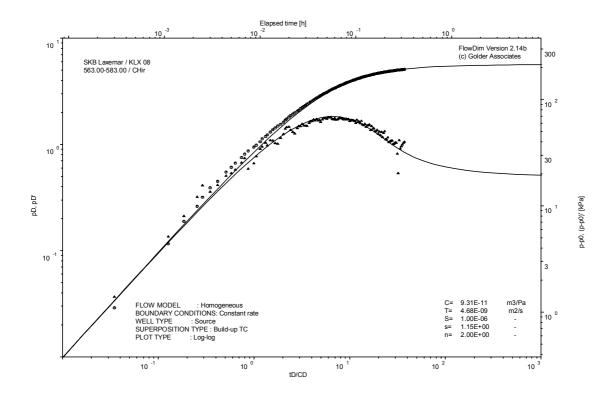


Interval pressure and temperature vs. time; cartesian plot

Test: 563.00 – 583.00 m



Test: 563.00 – 583.00 m



CHIR phase; log-log match

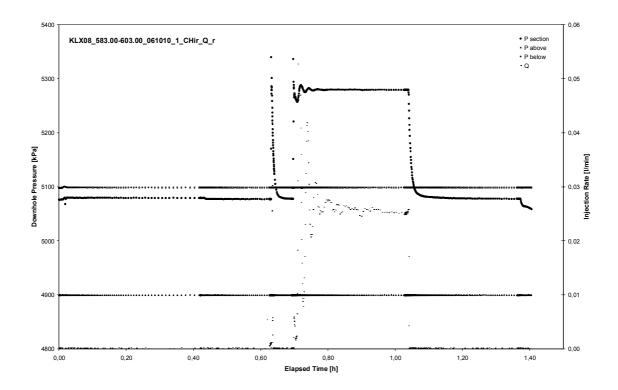
Not analysable

Test: 583.00 – 603.00 m

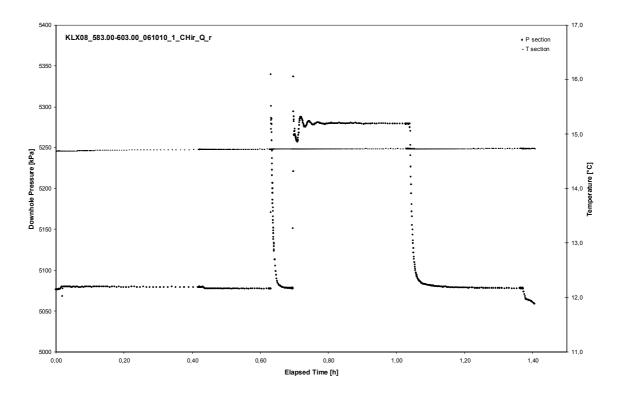
# **APPENDIX 2-34**

Test 583.00 – 603.00 m

Test: 583.00 – 603.00 m

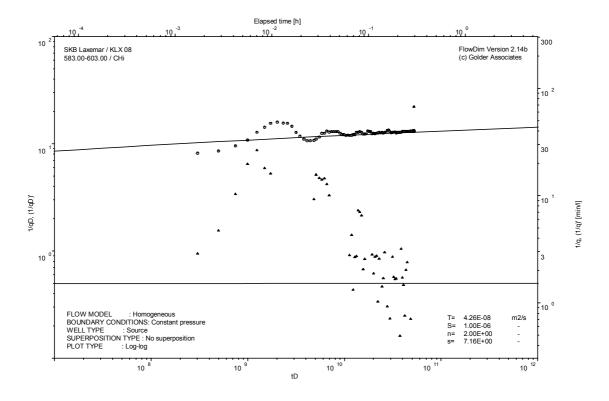


Pressure and flow rate vs. time; cartesian plot

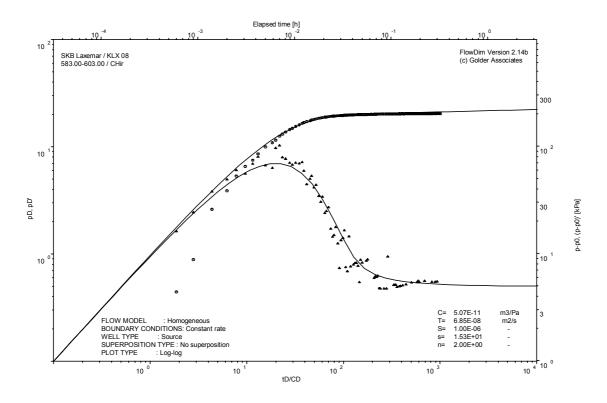


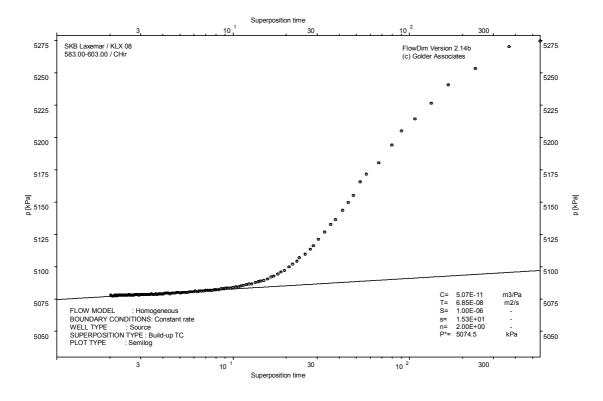
Interval pressure and temperature vs. time; cartesian plot

Test: 583.00 – 603.00 m



Test: 583.00 – 603.00 m





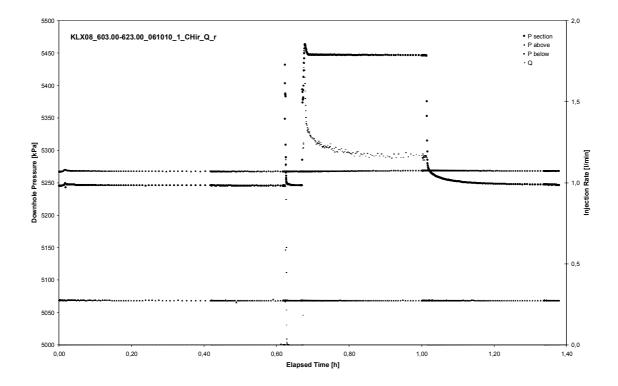
CHIR phase; HORNER match

Test: 603.00 – 623.00 m

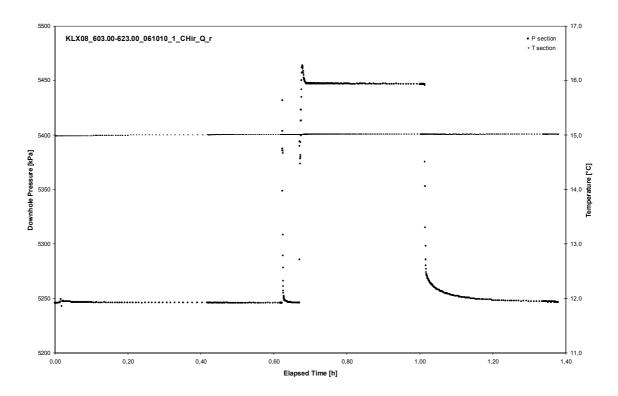
# **APPENDIX 2-35**

Test 603.00 – 623.00 m

Test: 603.00 – 623.00 m

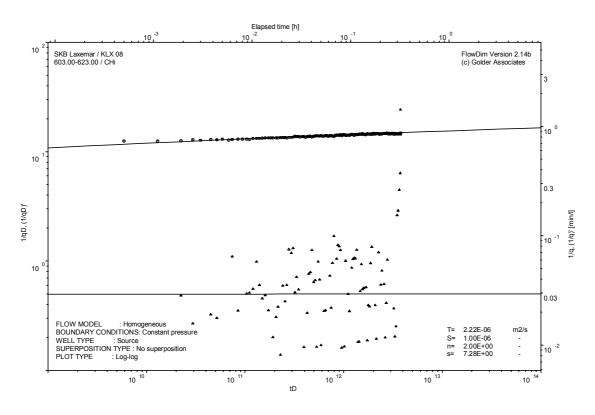


Pressure and flow rate vs. time; cartesian plot

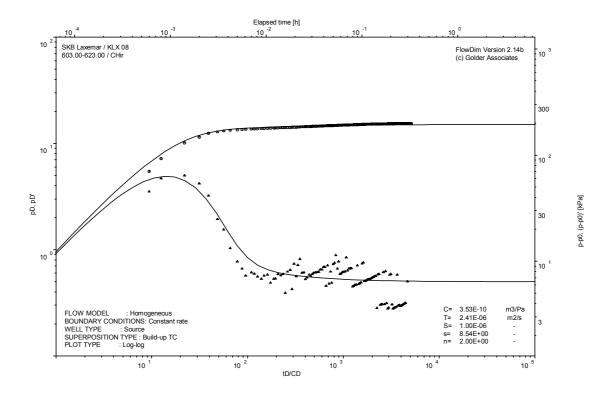


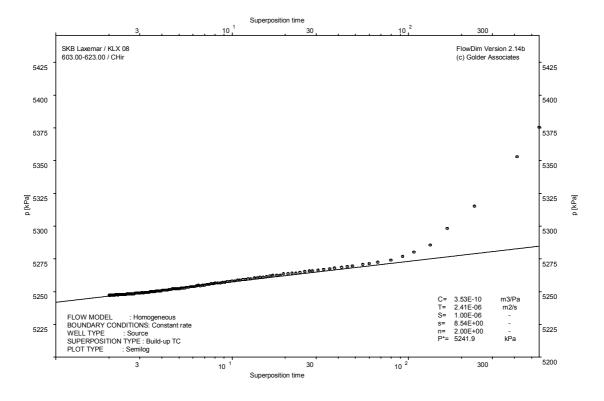
Interval pressure and temperature vs. time; cartesian plot

Test: 603.00 – 623.00 m



Test: 603.00 – 623.00 m





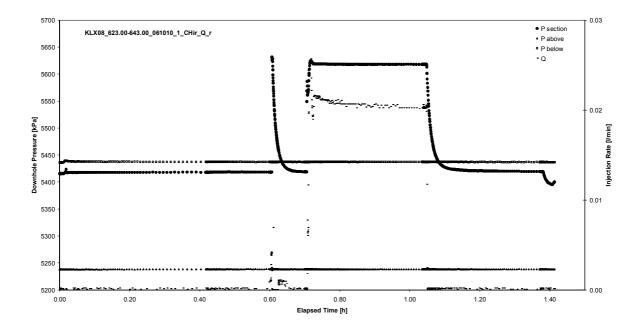
CHIR phase; HORNER match

Test: 623.00 – 643.00 m

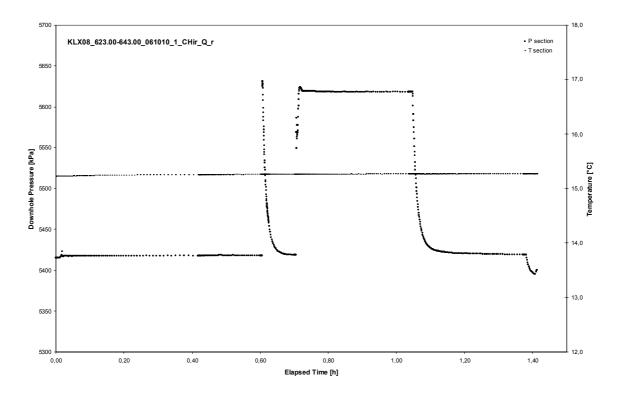
# **APPENDIX 2-36**

Test 623.00 – 643.00 m

Test: 623.00 – 643.00 m

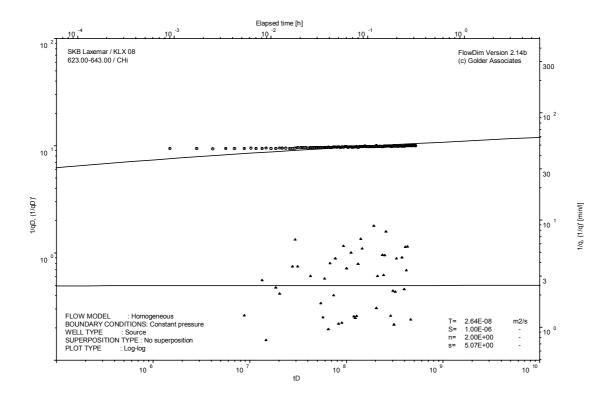


## Pressure and flow rate vs. time; cartesian plot

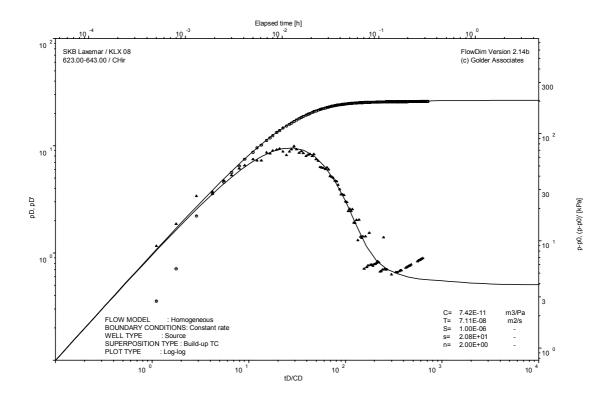


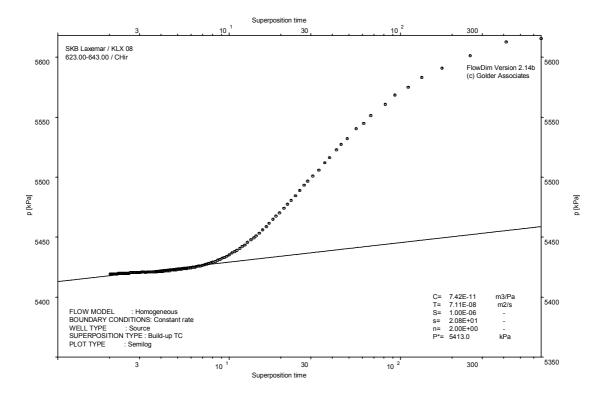
Interval pressure and temperature vs. time; cartesian plot

Test: 623.00 – 643.00 m



Test: 623.00 – 643.00 m





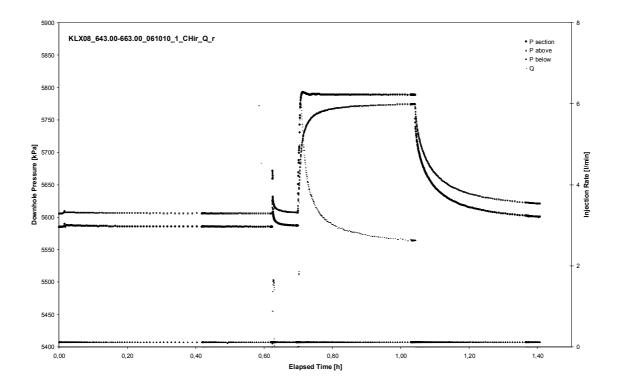
CHIR phase; HORNER match

Test: 643.00 – 663.00 m

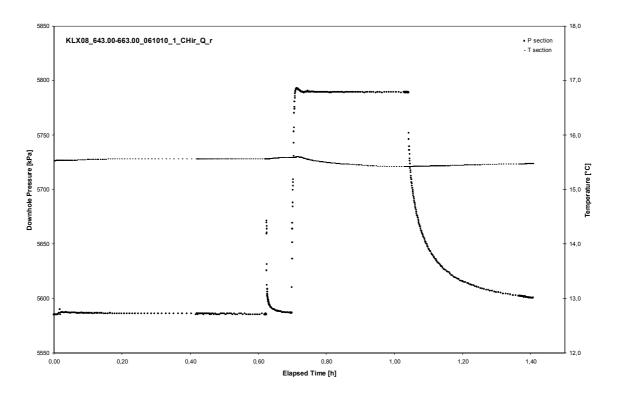
# **APPENDIX 2-37**

Test 643.00 – 663.00 m

Test: 643.00 – 663.00 m

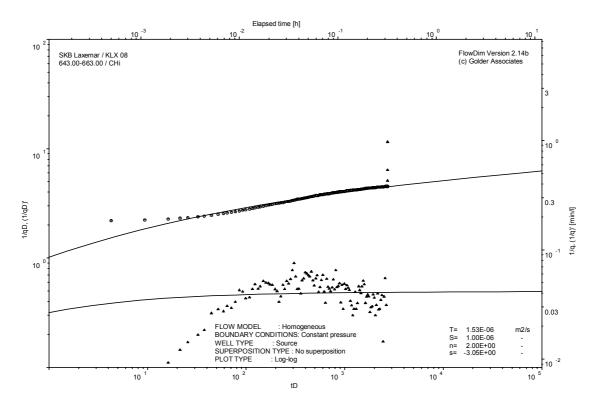


Pressure and flow rate vs. time; cartesian plot

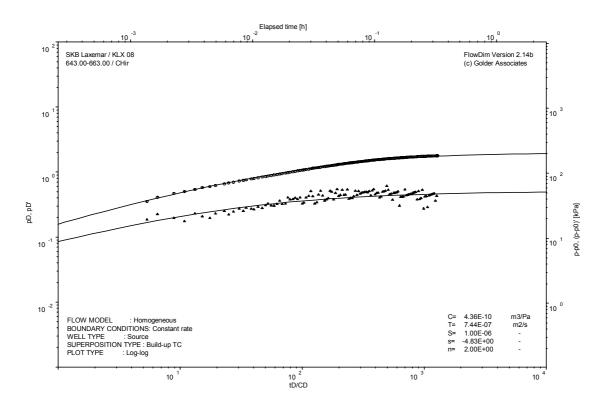


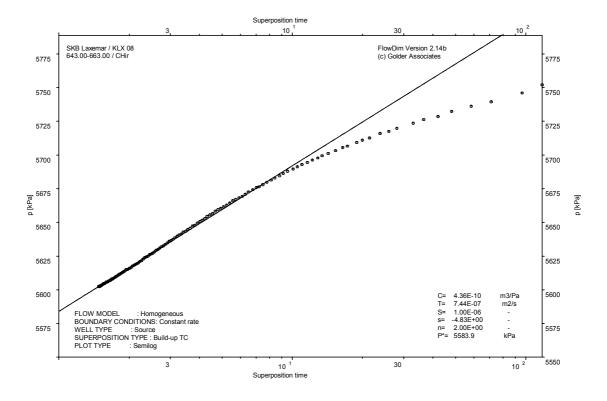
Interval pressure and temperature vs. time; cartesian plot

Test: 643.00 – 663.00 m



Test: 643.00 – 663.00 m





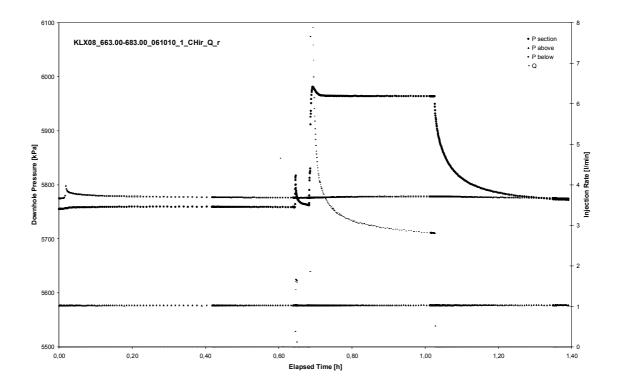
CHIR phase; HORNER match

Test: 663.00 – 683.00 m

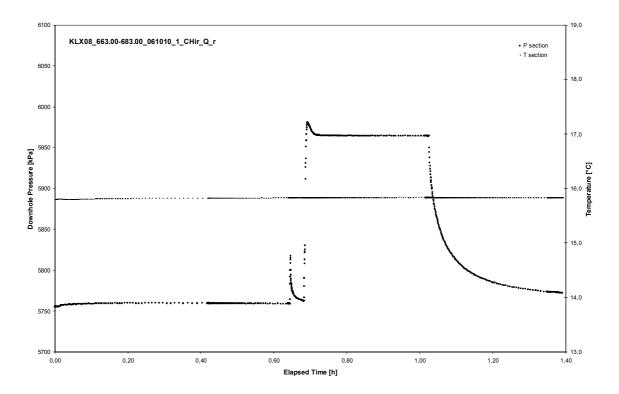
# **APPENDIX 2-38**

Test 663.00 – 683.00 m

Test: 663.00 – 683.00 m

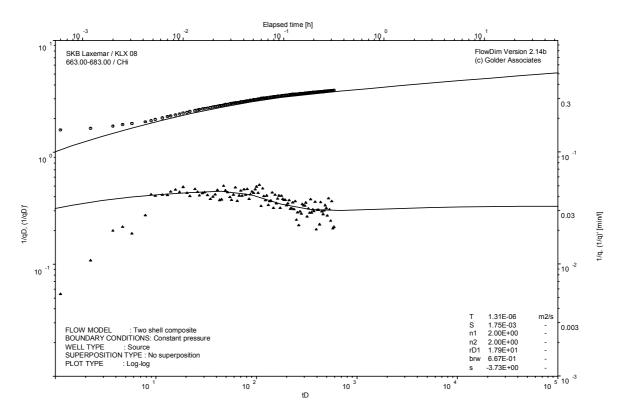


Pressure and flow rate vs. time; cartesian plot

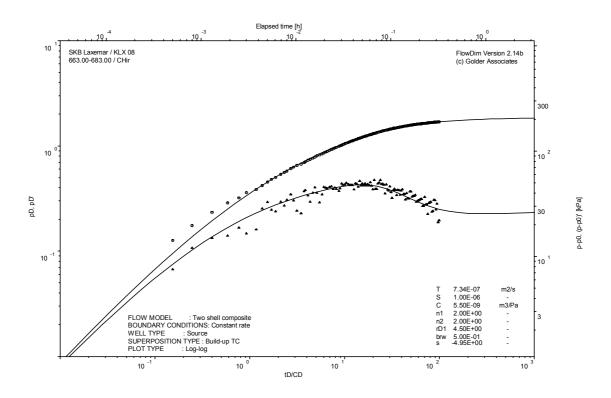


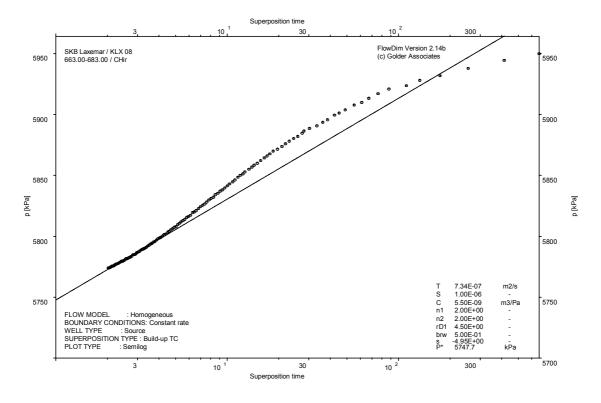
Interval pressure and temperature vs. time; cartesian plot

Test: 663.00 – 683.00 m



Test: 663.00 – 683.00 m





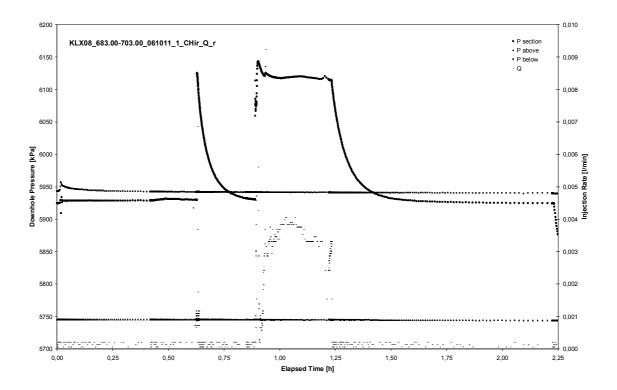
CHIR phase; HORNER match

Test: 683.00 – 703.00 m

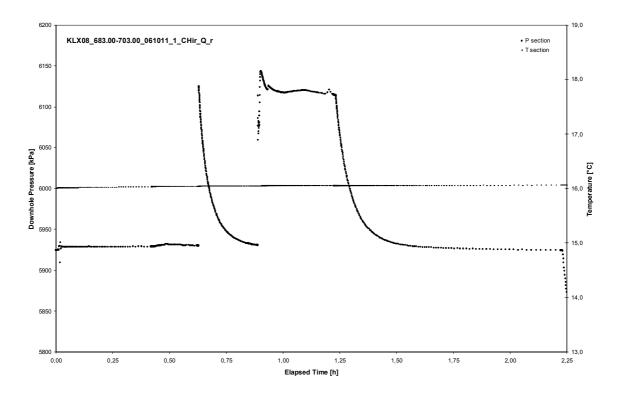
# **APPENDIX 2-39**

Test 683.00 – 703.00 m

Test: 683.00 – 703.00 m

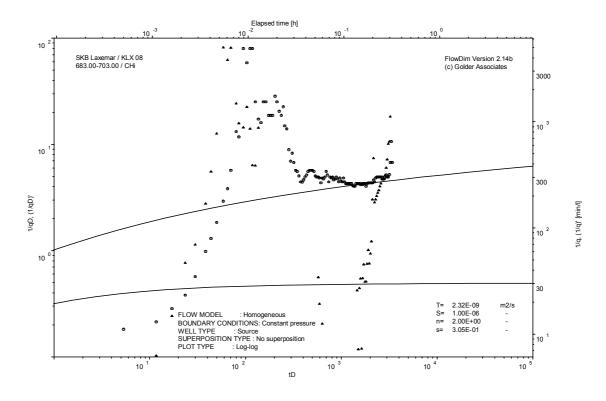


Pressure and flow rate vs. time; cartesian plot

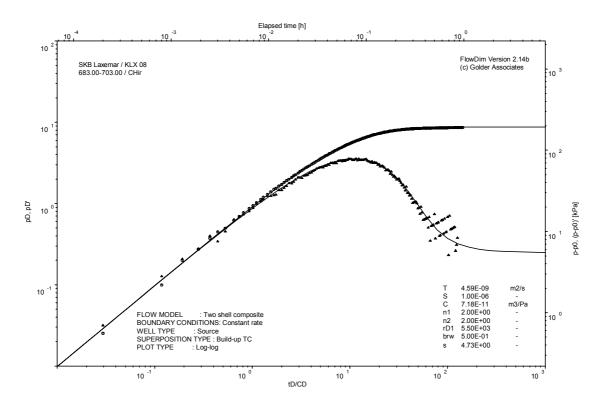


Interval pressure and temperature vs. time; cartesian plot

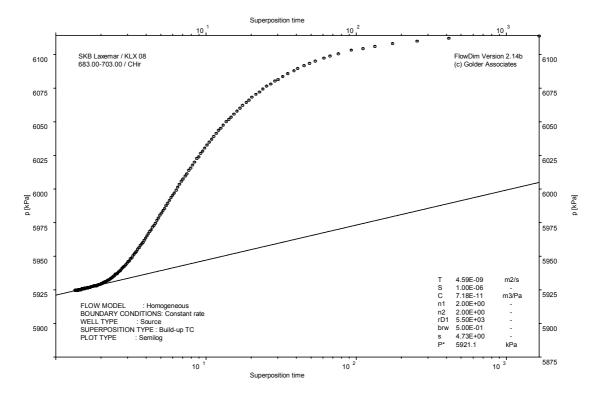
Test: 683.00 – 703.00 m



Test: 683.00 – 703.00 m



CHIR phase; log-log match



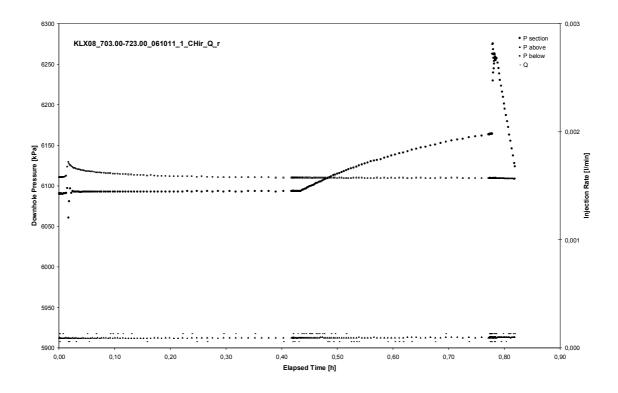
CHIR phase; HORNER match

Test: 703.00 – 723.00 m

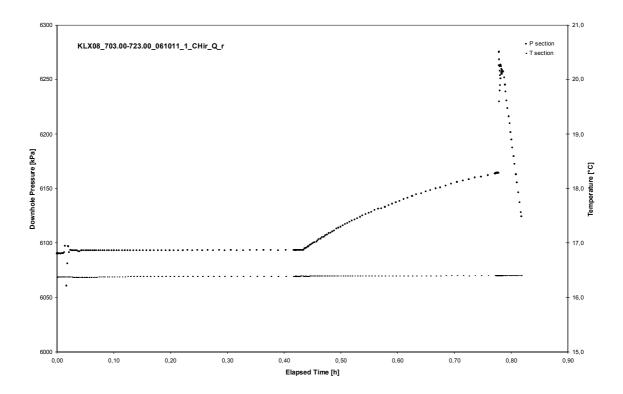
# **APPENDIX 2-40**

Test 703.00 – 723.00 m

Test: 703.00 – 723.00 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Test: 703.00 – 723.00 m

Not Analysed

Borehole: Test:	KLX08 703.00 – 723.00 m		Page 2-40/4
		Not Analysed	
CHIR pha	se; log-log match		
		Not Analysed	

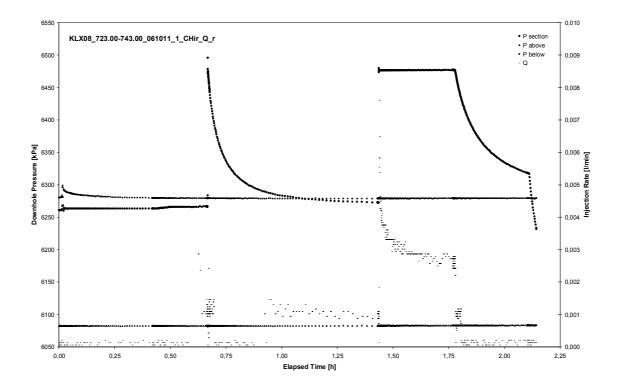
CHIR phase; HORNER match

Test: 723.00 – 743.00 m

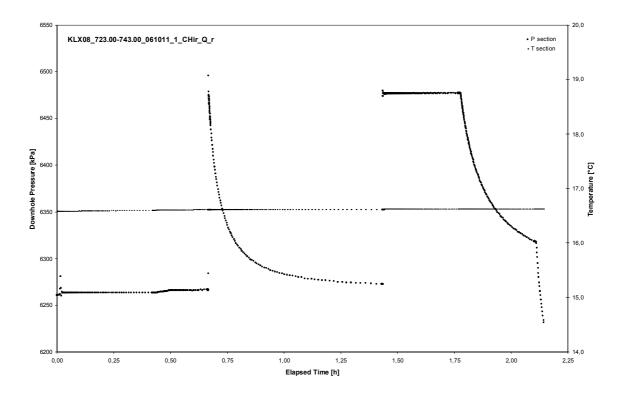
# **APPENDIX 2-41**

Test 723.00 – 743.00 m

Test: 723.00 – 743.00 m

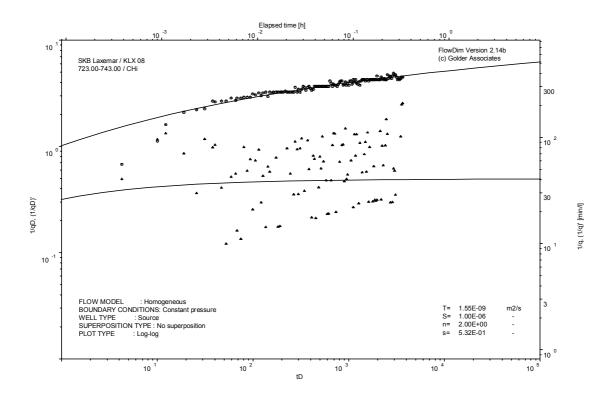


Pressure and flow rate vs. time; cartesian plot

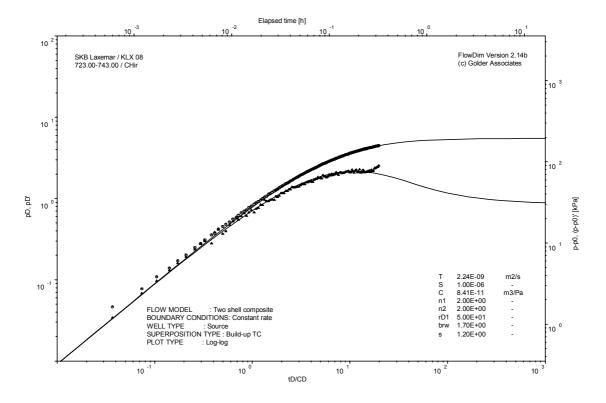


Interval pressure and temperature vs. time; cartesian plot

Test: 723.00 – 743.00 m



Test: 723.00 – 743.00 m



CHIR phase; log-log match

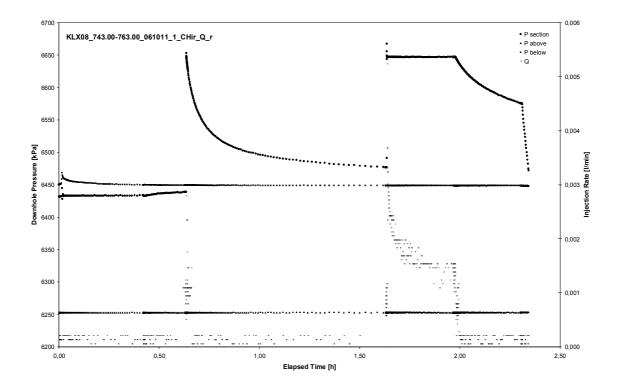
Not analysable

Test: 743.00 – 763.00 m

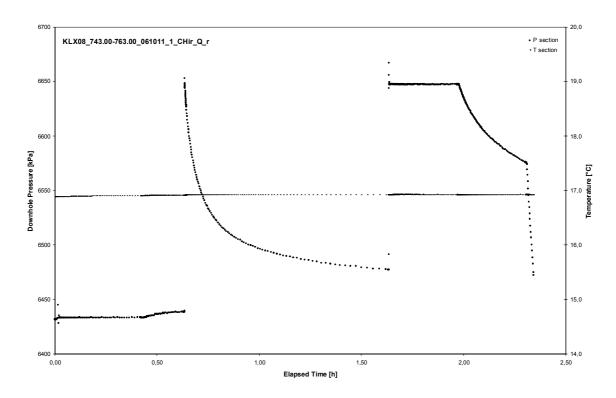
# **APPENDIX 2-42**

Test 743.00 – 763.00 m

Test: 743.00 – 763.00 m

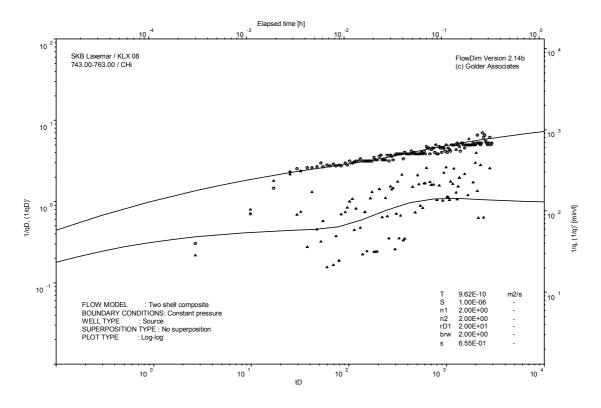


Pressure and flow rate vs. time; cartesian plot

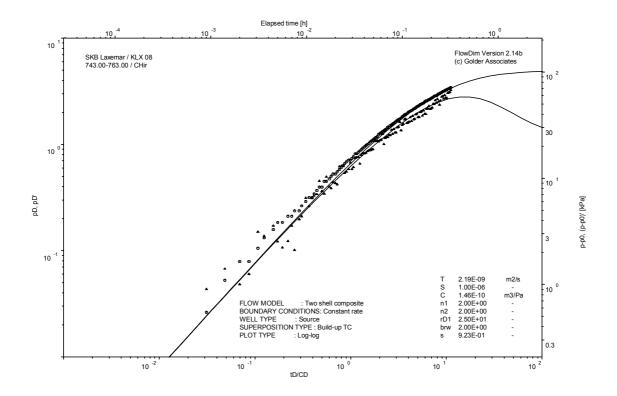


Interval pressure and temperature vs. time; cartesian plot

Test: 743.00 – 763.00 m



Test: 743.00 – 763.00 m



CHIR phase; log-log match

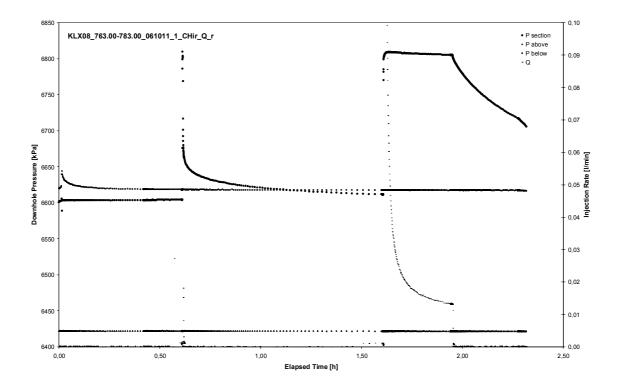
Not analysable

Test: 763.00 – 783.00 m

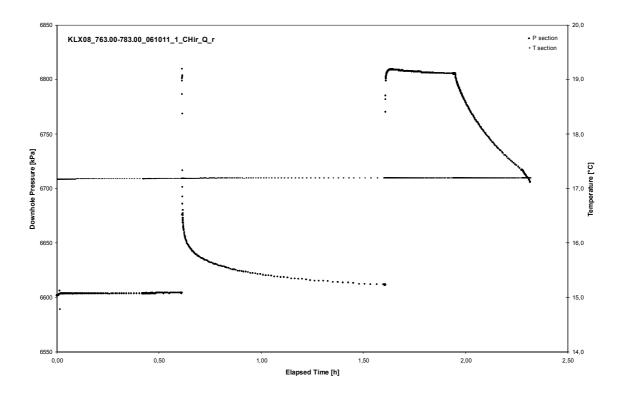
# **APPENDIX 2-43**

Test 763.00 – 783.00 m

Test: 763.00 – 783.00 m

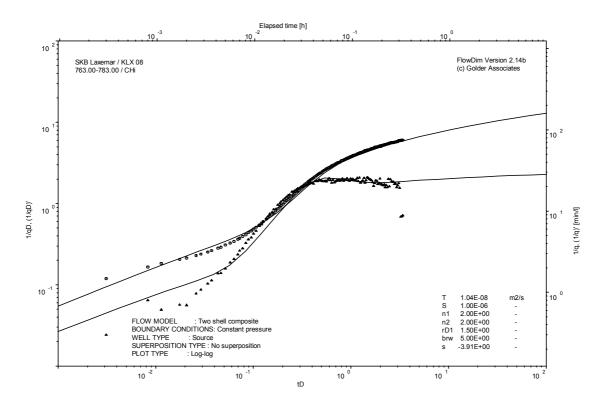


Pressure and flow rate vs. time; cartesian plot

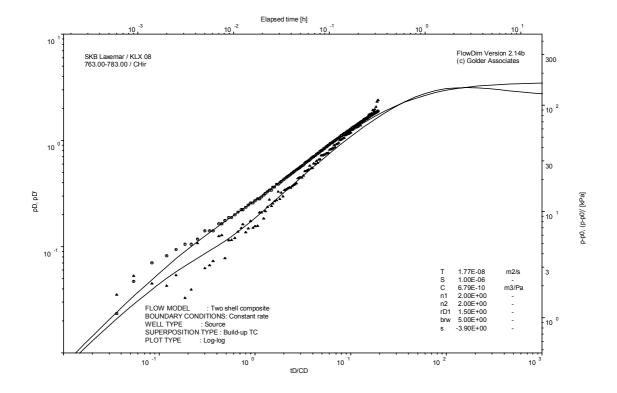


Interval pressure and temperature vs. time; cartesian plot

Test: 763.00 – 783.00 m



Test: 763.00 – 783.00 m



CHIR phase; log-log match

Not analysable

Borehole: KLX08 Page 2-44/1

Test: 783.00 – 803.00 m

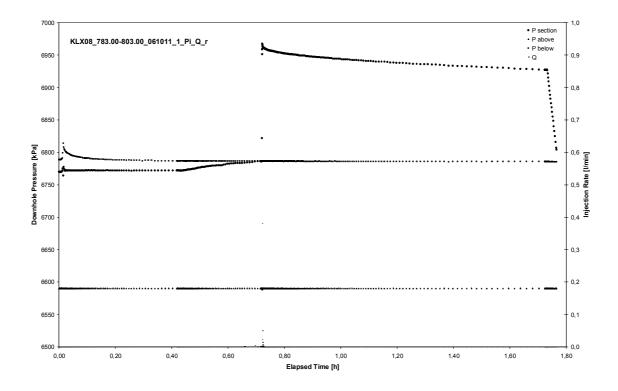
## **APPENDIX 2-44**

Test 783.00 – 803.00 m

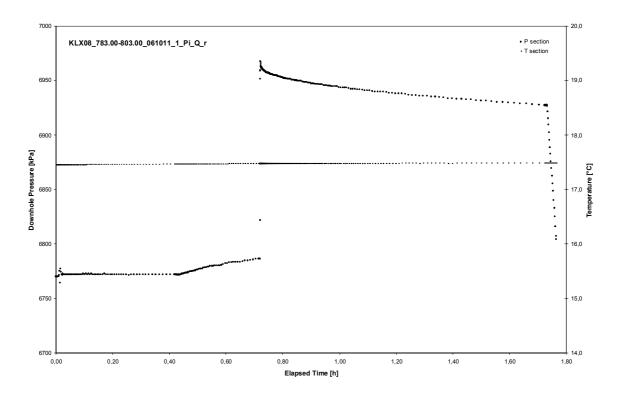
Analysis diagrams

Borehole: KLX08 Page 2-44/2

Test: 783.00 – 803.00 m



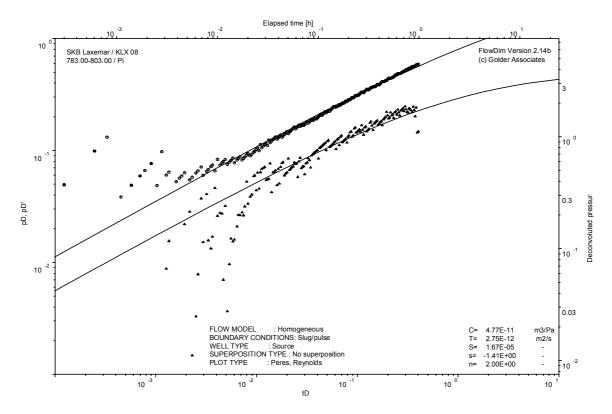
Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Borehole: KLX08 Page 2-44/3

Test: 783.00 – 803.00 m



Pulse injection; deconvolution match

Borehole: KLX08 Page 2-45/1

Test: 803.00 – 823.00 m

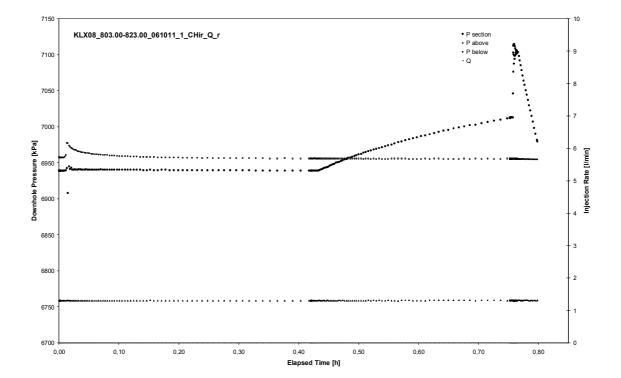
## **APPENDIX 2-45**

Test 803.00 – 823.00 m

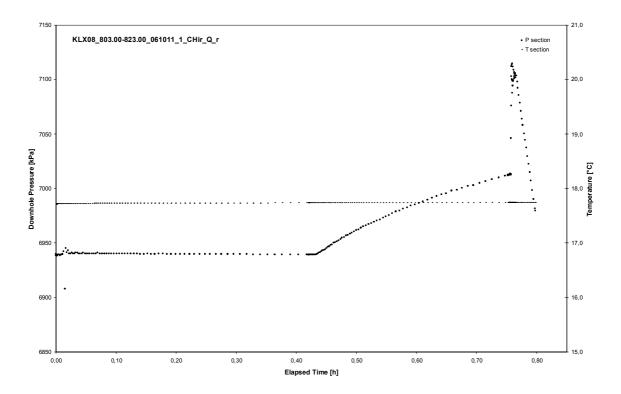
Analysis diagrams

Borehole: KLX08 Page 2-45/2

Test: 803.00 – 823.00 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Borehole: KLX08 Page 2-45/3

Test: 803.00 – 823.00 m

Not Analysed

CHI phase; log-log match

Borehole: Test:	KLX08 803.00 -	- 823.00 m		Page 2-45/4
			Not Analysed	
CHIR pha	se; log-lo	g match		
			Not Analysed	

CHIR phase; HORNER match

Borehole: KLX08

## **APPENDIX 3**

**Test Summary Sheets** 

	Test Sun	nmary Sheet			
Project:	Oskarshamn site investigation	on Test type:[1]			CHi
Area:	Laxem	ar Test no:			1
Borehole ID:	KI X	08 Test start:			060928 07:55
Test section from - to (m):	103.00-203.00	m Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.0	76 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation:		Recovery period	
Lillear plot & allu p		Indata		Indata	
1800	70	p <sub>0</sub> (kPa) =	1695		
1700		p <sub>i</sub> (kPa ) =	1696		
KLX08_103.00-203.00_060928_1_CHir_Q_r	Psection     Pabove     Pbilow	$p_p(kPa) =$		p <sub>F</sub> (kPa ) =	169
1500	Q 50	$Q_p (m^3/s) =$	8.92E-04		105
<u></u>	·	to (a) -		t <sub>F</sub> (s) =	1800
2 1300 -	- +40 <u>Fig</u> &	φ (3) –	1	S el S <sup>*</sup> (-)=	1.00E-0
adul	- co	S el S $^*$ (-)= EC $_w$ (mS/m)=	1.00E-00	S el S (-)=	1.00E-00
§ 1200 -		Low (mo/m)	9.2		
1100 -	20	Temp <sub>w</sub> (gr C)= Derivative fact.=		Derivative fact.=	0.0
1000 -	10	Delivative fact.=	0.07	Derivative fact	0.0
900					
0.00 0.25 0.50 0.75 1.00 Elapsed	1.25 1.50 1.75 2.00 2.25 Filma [h]	Results		Results	
		Q/s $(m^2/s)=$	8.0E-04		
Log-Log plot incl. derivates- fl	ow period	$T_M (m^2/s) =$	1.0E-03		
<u> </u>		Flow regime:	transient	Flow regime:	transient
Elapsed time (h	10,-1	$dt_1 (min) =$	3.35	$dt_1 \text{ (min)} =$	0.43
		$dt_2 \text{ (min)} =$	1	$dt_2 \text{ (min)} =$	0.50
1	10 -1	$T (m^2/s) =$		$T (m^2/s) =$	4.2E-04
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	10. 4 to 9 4/1000000000000000000000000000000000000	S (-) =	1.0E-06	. /	1.0E-0
	10 -2	$K_s (m/s) =$		$K_s (m/s) =$	4.2E-0
10 °		$S_s (11/s) = S_s (1/m) = S_s (1/m)$	1	$S_s(11/s) = S_s(1/m) = S_s(1/m)$	1.0E-0
	10 -3	yu.	NA	- ,	4.6E-0
10 <sup>-1</sup>	A.	r /		$C (m^3/Pa) =$	5.1E+0
†	10 4	$^{2}$ $C_{D}$ (-) =	NA	$C_D(-) =$	5. IE+U
1		× ( )	4.0	~ / \	0.1
10 2		ξ (-) =	-4.2	ξ (-) =	-6.0
10 <sup>-3</sup>	10 °				
10 3	10 3	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
		$T_{GRF}(m^2/s) = S_{GRF}(-) =$	NA NA	$T_{GRF}(m^2/s) = S_{GRF}(-) =$	NA NA
10 <sup>2</sup> 10 <sup>2</sup>	10 4 10 5 10 6	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = 0$	NA NA NA	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = 0$	NA
Log-Log plot incl. derivatives-	recovery period	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ Selected represe	NA NA NA NA entative paran	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ neters.	NA NA NA
10 <sup>2</sup> 10 <sup>2</sup>	recovery period	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ Selected represe $dt_1 \text{ (min)} =$	NA NA NA entative paran	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ 1eters. $C(m^3/Pa) =$	NA NA NA 4.6E-0
Log-Log plot incl. derivatives-	recovery period	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ $Selected represent to the selected represent $	NA NA NA entative paran 0.43 0.53	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ <b>neters.</b> $C (m^3/Pa) =$ $C_D (-) =$	NA NA NA 4.6E-0' 5.1E+0
Log-Log plot incl. derivatives-	recovery period	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ <b>Selected represe</b> $dt_1 \text{ (min)} =$ $dt_2 \text{ (min)} =$ $T_T \text{ (m}^2/s) =$	NA NA NA entative paran 0.43 0.53 4.2E-04	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = meters;$ $C(m^3/Pa) = C_D(-) = \xi(-) = 0$	NA NA NA 4.6E-0' 5.1E+0
Log-Log plot incl. derivatives-	recovery period	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ $Selected\ representations of the second se$	NA NA NA entative paran 0.43 0.53 4.2E-04 1.0E-06	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ <b>neters.</b> $C(m^3/Pa) =$ $C_D(-) =$ $\xi(-) =$	NA NA NA 4.6E-0: 5.1E+0
Log-Log plot incl. derivatives-	recovery period	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = Selected represent to the selected represent to the$	NA NA NA entative paran 0.43 0.53 4.2E-04 1.0E-06 4.2E-06	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ neters. $C(m^3/Pa) =$ $C_D(-) =$ $\xi(-) =$	NA NA NA 4.6E-0: 5.1E+0
Log-Log plot incl. derivatives-	recovery period	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = Selected represent to the selected represent to the$	NA NA NA entative paran 0.43 0.53 4.2E-04 1.0E-06	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ neters. $C(m^3/Pa) =$ $C_D(-) =$ $\xi(-) =$	NA NA NA 4.6E-07 5.1E+0
Log-Log plot incl. derivatives-	recovery period	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = Selected represent to the selected represent to the$	NA NA NA entative paran 0.43 0.53 4.2E-04 1.0E-06 4.2E-06	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$ 1eters. $C(m^3/Pa) =$ $C_D(-) =$ $\xi(-) =$	NA NA NA 4.6E-07 5.1E+0
Log-Log plot incl. derivatives-	recovery period	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = Selected represent formula for the selected represent formula for the selected represent for the selected repre$	NA NA NA NA 0.43 0.53 4.2E-04 1.0E-06 4.2E-08 transmissivity of	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$	NA NA NA 4.6E-07 5.1E+0 -6.0
Log-Log plot incl. derivatives-  10 3 Elapsed time [h	recovery period	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = Selected represent formula for the selected represent for the selected repicted represent for the selected represent for the selected repr$	NA NA NA NA O.43 O.53 4.2E-04 1.0E-06 4.2E-06 1.0E-08 transmissivity or phase, which si	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$	NA NA NA 4.6E-07 5.1E+0 -6.0 erived from the vative. The
Log-Log plot incl. derivatives-  10 3 Elapsed time [h	recovery period	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = Selected representation of the selected represen$	NA NA NA NA O.43 O.53 A.2E-04 1.0E-06 A.2E-06 1.0E-08 transmissivity or phase, which so the interval tra	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$	NA NA NA 4.6E-07 5.1E+0 -6.0  erived from the vative. The lated to be 1E-4
Log-Log plot incl. derivatives-  10 3 Elapsed time [h	recovery period	$T_{GRF}(m^2/s) = S_{GRF}(-) = D_{GRF}(-) = Selected representation of the selected represen$	NA NA NA NA O.43 O.53 A.2E-04 1.0E-06 A.2E-06 1.0E-08 transmissivity or r phase, which so the interval tra The flow dimen	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$	NA NA NA 4.6E-07 5.1E+0 -6.0  erived from the vative. The lated to be 1E-4 ag the test is 2.
Log-Log plot incl. derivatives-	recovery period	$T_{GRF}(m^2/s) = S_{GRF}(-) = S_{GRF}(-) = Selected representation of the selected represen$	NA NA NA NA NA NA O.43 O.53  4.2E-04 1.0E-06 4.2E-06 1.0E-08  transmissivity or r phase, which sor the interval transmeasured at transmissived	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$ $D_{GRF}(-) =$	NA  4.6E-07  5.1E+01  -6.0  erived from the vative. The lated to be 1E-4 lag the test is 2. lerived from the

	Test Sum	mary Sheet			
Project:	Oskarshamn site investigation				CHir
Area:	Laxem	ar Test no:			1
Borehole ID:	KLXC	8 Test start:			060928 11:37
Test section from - to (m):	203.00-303.00	m Responsible for			er van der Wal
O-ation diameter O - ()	0.05	test execution:		Oriot	Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.07	'6 Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	ı
		Indata		Indata	
2600		p <sub>0</sub> (kPa) =	2526		
2500 - KLX08_203.00-303.00_060928_1_CHir_Q_r	• P section	p <sub>i</sub> (kPa ) =	2526		
KLAU6_203.00-303.00_060926_1_CHIT_Q_T	P above 50	$p_p(kPa) =$	2568	p <sub>F</sub> (kPa ) =	2529
2300		$Q_p (m^3/s) =$	6.86E-04		
₫ 2200 -		tp(s) =		t <sub>F</sub> (s) =	1800
o mess	oo Pere (Ivmin)	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-06
2 2100 - 4 2 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	injection R	EC <sub>w</sub> (mS/m)=	1.00E-00	S el S (-)=	1.00E-00
8 2000 ·	. 20	Temp <sub>w</sub> (gr C)=	10.6		
1900		Derivative fact.=	10.6		0.00
1800 -	10	Derivative fact	0.02	Derivative fact	0.03
1700					
0.00 0.50 1.00 Elapsed	1.50 2.00 2.50 Time [h]	Results		Results	
		Q/s $(m^2/s)=$	1.6E-04		
Log-Log plot incl. derivates- f	low period	$T_{\rm M}$ (m <sup>2</sup> /s)=	2.1E-04		
<u> </u>	<u> </u>	Flow regime:	transient	Flow regime:	transient
Elapsed time   10, 10, 10, 10, 10, 10, 10, 10, 10, 10,	h)	$dt_1 \text{ (min)} =$	NA	$dt_1 \text{ (min)} =$	0.83
10 1	10 -1	$dt_2 \text{ (min)} =$	NA	$dt_2 \text{ (min)} =$	2.32
		$T (m^2/s) =$		$T (m^2/s) =$	3.2E-04
	0.03	S (-) =	1.0E-06	, ,	1.0E-06
10 1		$K_s (m/s) =$		$K_s (m/s) =$	3.2E-06
	10 -2	S <sub>s</sub> (1/m) =		$S_s (1/m) =$	1.0E-08
		$C_s(n)$	NA	C (m <sup>3</sup> /Pa) =	1.7E-07
1	0.003	· · · · · · · · · · · · · · · · · · ·	NA	` '	1.9E+0
10 0		$\xi(-) = \xi(-)$		C <sub>D</sub> (-) = ξ (-) =	0.8
	10 <sup>3</sup>	S (-) -	4.0	S (-) -	0.0
	*	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
•	3E-4	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
10 <sup>10</sup> 10 <sup>11</sup>	10 <sup>12</sup> 10 <sup>13</sup> 10 <sup>14</sup>	D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives	- recovery period	Selected represe	ntative paran		
	•	$dt_1$ (min) =		C (m <sup>3</sup> /Pa) =	1.7E-07
Elapsed time (h)	0,2	$dt_2 \text{ (min)} =$		$C_D(-) =$	1.9E+01
	300	$T_T (m^2/s) =$	3.2E-04		0.8
	10 <sup>2</sup>	S (-) =	1.0E-06		
		$K_s (m/s) =$	3.2E-06		
10 1	30	$S_s (1/m) =$	1.0E-08		
, ···.		Commonto	1.52 50		
	10 1	≅.	transmissivity o	f 3.2E-4 m2/s was d	erived from the
//	· · · · · · · · · · · · · · · · · · ·	analysis of the CHi		one), which shows the	
10 8	3	and derivative qual	ity. The confide	nee runge for the mit	
	3	transmissivity is est	imated to be 9E	-5 m2/s to 7E-4 m2/	
:	3 10 °	transmissivity is est dimension displaye	imated to be 9E d during the test	-5 m2/s to 7E-4 m2/ is 2. The static pres	ssure measured
10 ° · · · · · · · · · · · · · · · · · ·	10.2 10.3 10.4	transmissivity is est dimension displaye at transducer depth	imated to be 9E d during the test was derived fro	-5 m2/s to 7E-4 m2/	ssure measured sing straight

Project:   Oskarshamn site investigation   Test type_fil		Test Su	ımn	nary Sheet			
Borehole ID:	Project:						CHi
Resider van der Vertreite va	√rea:	Laxe	emar	Test no:			1
Test section from - to (m): 305.00-405.00 m Responsible for test execution:		KL	X08	Test start:	060928		060928 15:27
test execution:   Philipp W							
Cristian Enaches   Cristian En	est section from - to (m):	305.00-405.0				Reinde	er van der Wal Philipp Wol
Flow period   Indata   Indat	Section diameter, 2·r <sub>w</sub> (m):	0		Responsible for		Crist	ian Enachescu
$   \textbf{Indata}   \textbf{p}_0(RPa) = 3393 \\ p_0(RPa) = 3393 \\ p_0(RPa) = 3393 \\ p_0(RPa) = 3439 \\ p_0(RPa) = 3849 \\ p_0(RPa) = 3439 \\ p_0(RPa) = 3849 \\ p_0(RPa) =$	inear plot Q and p					Recovery period	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				1+1+1+1+1+1+1 <del>*</del> 1+1+1+1+1+1+1+1+1+1+1+1+		*(*(*(*(*(*)*(*)*(*)*(*(*(*)*(*)*)*)	
$ \frac{1}{2} \int_{0}^{\infty} \int_{0}$	3500	*	40	p <sub>0</sub> (kPa) =	3393		
	3400	13	35	p <sub>i</sub> (kPa ) =	3393		
		▲ P above		$p_p(kPa) =$	3439	p <sub>F</sub> (kPa ) =	3394
to (s) = 1800 to	3200	- 3	30	$Q_p (m^3/s) =$	4.70E-04		
Temp <sub>w</sub> (gr C)= 11.3   Derivative fact.= 0.00	3100 -		25 [ii]		1800	t <sub>F</sub> (s) =	1800
Temp <sub>w</sub> (gr C)= 11.3   Derivative fact.= 0.00	2 3000 -		70 Rate [[A	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
Derivative fact. = 0.00 Deriv	E 5 2900 ·		Injectio	EC <sub>w</sub> (mS/m)=			
Results $Q/S (m^2/S) = 1.0E-04$	2800		15	Temp <sub>w</sub> (gr C)=	11.3		
	2700		10	Derivative fact.=	0.00	Derivative fact.=	0.0
Results   Resu	2600	- 5	5				
Results   Resu		1.50 2.00	0				
					1.05.04	Results	T
Flow regime: transient Flow regime: transient $dt_1 \text{ (min)} = 2.06 dt_1 \text{ (min)} = 0.0 dt_2 \text{ (min)} = 26.17 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 \text{ (min)} = 4.0 dt_2 dt_2 \text{ (min)} = 3.2 dt_2 dt_2 dt_2 dt_2 dt_2 dt_2 dt_2 dt_$							
$\frac{1}{2} \int_{0.03}^{0.03} \int_{0$	-og-Log plot incl. derivates- ti	ow period				<u> </u>	
$\frac{1}{100} = \frac{1}{100} = \frac{1}$	Elapsed time [h]			•		•	
	10 1	F-10	-1	` '		, ,	0.7
$S(-) = 1.0E-06 \ S(-) = 1.0E-10E-10E-10E-10E-10E-10E-10E-10E-10E-1$						1 1	4.6
$K_{S} (m/s) = 3.2E-06 K_{S} (m/s) = 1.7E-08 S_{S} (1/m) = 1.0E-08 S_{S} (1/m) = 1.0E-0$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.03	13	` /		/	
$S_{S} (1/m) = 1.0E-08 \ S_{S} (1/m) = 1.0E-08 \ S_{S$	10 1						
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		10	-2				
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			) [min/l]			- ,	
$\xi\left(-\right) = 9.6 \; \xi\left(-\right) = $ $T_{GRF}(m^2/s) = NA \qquad T_{GRF}(m^2/s) = NA$ $S_{GRF}(-) = NA \qquad S_{GRF}(-) = NA$ $D_{GRF}(-) = NA \qquad D_{GRF}(-) = NA$ $D_{GRF}(-) = NA \qquad D_{GRF}(-) = NA$ $D_{GRF}(-) = NA \qquad D_{GRF}(-) = NA$ $T_{GRF}(m^2/s) = NA \qquad T_{GRF}(m^2/s) = NA$ $T_{GRF}(-) = NA \qquad T_{GRF}(-) = NA$ $T_{GRF}(-) = NA$		0.00	14. 103 (14	,		. ,	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	10 "	10.	3				4.4E+0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		*		ζ(-) =	9.0	ς (-) =	1.1
$S_{GRF}(-) = NA \qquad S_{GRF}(-) = NA$ $D_{GRF}(-) = NA \qquad D_{GRF}(-) = NA$ $Log-Log plot incl. derivatives- recovery period$ $Selected representative parameters.$ $dt_1 (min) = 0.76 C (m^3/Pa) = 4.0E-$		3E-	E-4	$T_{a=a}(m^2/s) =$	NA	$T_{a=a}(m^2/s) =$	NA
$D_{GRF}(-) = NA \qquad D_{GRF}(-) = NA$ $Log-Log plot incl. derivatives- recovery period$ $Selected representative parameters.$ $dt_1 (min) = 0.76 \text{ C } (m^3/Pa) = 4.0E-$	10 <sup>14</sup> 10 <sup>15</sup>	10 16 10 17 10 16					
Log-Log plot incl. derivatives- recovery period  Selected representative parameters.  dt <sub>1</sub> (min) = 0.76 C (m³/Pa) = 4.0E-							
$dt_1 \text{ (min)} = 0.76 \text{ C (m}^3/\text{Pa)} = 4.0\text{E-}$	og-Log plot incl. derivatives-	recovery period			entative paran		
							4.0E-08
	10 2						4.4E+0
		300	0	- ' '			1.0
S(-) = 1.0E-06		10	2			5 ( )	
$K_{s}$ (m/s) = 1.7E-06				* *			
$S_{\rm s}(1/m) = 1.0E-08$	10	30					
			Pal				ļ
Comments: The recommended transmissivity of 1.7E-4 m2/s was derived from the	·	10	- (pp0), [k		transmissivity o	f 1.7E-4 m2/s was do	erived from the
analysis of the CHir phase, which shows the better derivative	10 0		04-d				
stabilization. The confidence range for the interval transmissivity is		3		stabilization. The c	onfidence range	for the interval trans	smissivity is
estimated to be 7E-5 m2/s to 4E-4 m2/s. The flow dimension display	'	t <sub>en</sub> (	0				
during the test is 2. The static pressure measured at transducer depth was derived from the CHir phase using straight line extrapolation in		10					
was derived from the CHIr phase using straight line extrapolation in Homer plot to a value of 3,394.0 kPa.	10 ° 10 ° tD/CD	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>					rapoiauon in th
For to a value of 5,57 to in a.				p.o	01 2,000 m		

			nary Sheet			
Project:	Oskarshamn site investiga					CHi
Area:	Laxe	emar	Test no:			(
Borehole ID:	KI	_X08	Test start:	060928		060928 19:13
To the distribution (a)						
Test section from - to (m):	403.00-503.0		Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0		Responsible for		Crist	ian Enachescu
Linear plot Q and p			test evaluation:		Recovery period	
			Indata	1+	Indata	1+1+1+1+1+1+1+1+1+1+1+1+1+1+1
4250	5	50	p <sub>0</sub> (kPa) =	4225		
KLX08_403.00-503.00_060928_1_CHir_Q_r	P section	45	p <sub>i</sub> (kPa ) =	4226		
4150	• P above • P below • Q 4	40	$p_p(kPa) =$	4251	p <sub>F</sub> (kPa ) =	422
4050		35	$Q_p (m^3/s) =$	5.69E-04		
3950 . a		30 E	tp (s) =	1800	t <sub>F</sub> (s) =	1800
8 : 393 3850 ·	,	N N Elnjection Rate [l/min]	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	+:	lujection 20	$EC_w (mS/m) =$		0 0. 0 ( )	
3650			Temp <sub>w</sub> (gr C)=	13.5		
3550		15	Derivative fact.=	0.05	Derivative fact.=	0.0
3450	†1	5				
3350 0.00 0.50 1.00	1.50 2.00	0				
Elapsed Ti	ime [h]		Results		Results	
			$Q/s (m^2/s)=$	2.2E-04		
Log-Log plot incl. derivates- fl	ow period		$T_M (m^2/s) =$	2.9E-04		
Elapsed time [h]	1		Flow regime:	transient	Flow regime:	transient
10 2	10		$dt_1$ (min) =	#NV	$dt_1 (min) =$	0.3
	10		$dt_2$ (min) =	#NV	$dt_2$ (min) =	4.3
	0.00	n	$T (m^2/s) =$	2.3E-04	$T (m^2/s) =$	2.5E-0
	4		S (-) =	1.0E-06	S (-) =	1.0E-0
10 1	10	-2	$K_s (m/s) =$	2.3E-06	$K_s (m/s) =$	2.5E-0
ā	<u>.</u>	=	S <sub>s</sub> (1/m) =	1.0E-08	S <sub>s</sub> (1/m) =	1.0E-0
NAD-CHA	0.00	1/q / (min/	C (m <sup>3</sup> /Pa) =	NA	C (m <sup>3</sup> /Pa) =	7.7E-0
10 0		114. (	$C_D(-) =$	NA	$C_D(-) =$	8.5E+0
	10	-3	ξ(-) =		ξ(-) =	-5.
			3()		5()	<u> </u>
	3E	-4	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>12</sup> 10 <sup>13</sup>	10 <sup>14</sup> 10 <sup>12</sup> 10 <sup>18</sup>	-4	$T_{GRF}(m^2/s) = S_{GRF}(-) =$	NA NA	$T_{GRF}(m^2/s) = S_{GRF}(-) =$	NA NA
10 <sup>12</sup> 10 <sup>13</sup>		5-4	$S_{GRF}(-) =$			
Log-Log plot incl. derivatives-	10 <sup>14</sup> 10 <sup>15</sup> 10 <sup>16</sup>	÷4	$S_{GRF}(-) = D_{GRF}(-) =$	NA NA	$S_{GRF}(-) = D_{GRF}(-) =$	NA
ю	10 <sup>14</sup> 10 <sup>15</sup> 10 <sup>16</sup>	54	S <sub>GRF</sub> (-) = D <sub>GRF</sub> (-) = Selected represe	NA NA	S <sub>GRF</sub> (-) = D <sub>GRF</sub> (-) = neters.	NA NA
ю	10 <sup>14</sup> 10 <sup>15</sup> 10 <sup>16</sup>		$S_{GRF}(-) = D_{GRF}(-) = Selected representation = Selected represe$	NA NA entative paran 0.35	$S_{GRF}(-) = D_{GRF}(-) = $ <b>neters.</b> $C (m^3/Pa) = $	NA NA 7.7E-0
ю	10 <sup>14</sup> 10 <sup>15</sup> 10 <sup>16</sup>		$S_{GRF}(-) = D_{GRF}(-) = Selected represent to the selected represe$	NA NA entative param 0.35 4.34	$S_{GRF}(-) = D_{GRF}(-) = 0$ leters. $C(m^3/Pa) = C_D(-) = 0$	NA NA 7.7E-0
ю	10 <sup>14</sup> 10 <sup>15</sup> 10 <sup>16</sup>	0	$S_{GRF}(-) = D_{GRF}(-) = Selected representations of the selected representation of the se$	NA NA entative param 0.35 4.34 2.5E-04	$S_{GRF}(-) = D_{GRF}(-) = 0$ <b>neters.</b> $C (m^3/Pa) = D_{CD}(-) = 0$ $\xi (-) = 0$	NA NA 7.7E-08 8.5E+0
ID.	recovery period	0	$S_{GRF}(-)$ = $D_{GRF}(-)$ = $Selected\ represent dt_1\ (min)$ = $dt_2\ (min)$ = $T_T\ (m^2/s)$ = $S\ (-)$ =	NA NA entative paran 0.35 4.34 2.5E-04 1.0E-06	$S_{GRF}(-) = D_{GRF}(-) = 0$ <b>eters.</b> $C(m^3/Pa) = C_D(-) = 0$ $\xi(-) = 0$	NA NA 7.7E-08 8.5E+0
ю	recovery period	2	$S_{GRF}(-) = D_{GRF}(-) = Selected representations of the content of the conten$	NA NA entative param 0.35 4.34 2.5E-04 1.0E-06 2.5E-06	$S_{GRF}(-) = D_{GRF}(-) = 0$ <b>C</b> (m <sup>3</sup> /Pa) = $C_{D}(-) = 0$ $C_{D}(-) = 0$	NA NA 7.7E-08 8.5E+0
ю	recovery period	2	$S_{GRF}(-) = D_{GRF}(-) = Selected representations of the selection of t$	NA NA entative paran 0.35 4.34 2.5E-04 1.0E-06	$S_{GRF}(-) = D_{GRF}(-) = 0$ <b>C</b> (m <sup>3</sup> /Pa) = $C_{D}(-) = 0$ $C_{D}(-) = 0$	NA NA 7.7E-08 8.5E+00
ю	recovery period	2	$S_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = Selected representation of the content o$	NA NA entative paran 0.35 4.34 2.5E-04 1.0E-06 2.5E-06 1.0E-08	$S_{GRF}(-) = D_{GRF}(-) = 0$ <b>eters.</b> $C (m^3/Pa) = C_D(-) = 0$ $\xi (-) = 0$	7.7E-00 8.5E+00
ю	recovery period		$S_{GRF}(-)$ = $D_{GRF}(-)$ = $Selected\ represent dt_1\ (min)$ = $dt_2\ (min)$ = $T_T\ (m^2/s)$ = $S\ (-)$ = $K_s\ (m/s)$ = $S_s\ (1/m)$ =	NA NA entative param 0.35 4.34 2.5E-04 1.0E-06 2.5E-06 1.0E-08	$S_{GRF}(-) = D_{GRF}(-) = 0$ <b>eters.</b> $C (m^3/Pa) = C_D(-) = 0$ $\xi (-) = 0$	NA  7.7E-0  8.5E+0  -5.  erived from the
ю	recovery period		$S_{GRF}(-)$ = $D_{GRF}(-)$ = $Selected\ representations of the chiral solutions of the CHIRAL soluti$	NA NA entative param 0.35 4.34 2.5E-04 1.0E-06 2.5E-06 1.0E-08 transmissivity of r phase, which slip	$S_{GRF}(-) = D_{GRF}(-) = D_{$	NA 7.7E-0 8.5E+0 -5. erived from the and derivative
ю	recovery period	lead load odd	$S_{GRF}(-)$ = $D_{GRF}(-)$ = $S_{elected}(-)$ =	NA NA O.35 O.35 O.35 O.36 O.37 O.38 O.39 O.39 O.39 O.39 O.39 O.39 O.39 O.39	$S_{GRF}(-) = D_{GRF}(-) = D_{$	NA 7.7E-0 8.5E+0 -5. erived from the and derivative ivity is
ю	recovery period	[tod (pol-) hod	$S_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = Selected representation of the properties of the CHingulity. The confidence of the properties of the pr$	NA NA O.35 A.34 2.5E-04 1.0E-06 2.5E-06 1.0E-08 transmissivity of r phase, which slence range for th 5 m2/s to 5E-4 r	$S_{GRF}(-) = D_{GRF}(-) = D_{$	7.7E-00 8.5E+00 -5. erived from the and derivative ivity is ension displayed
ь	recovery period	lead Joseph Odd	$S_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = Selected representation of the properties o$	NA  NA  O.35  4.34  2.5E-04  1.0E-06  2.5E-06  1.0E-08  transmissivity of r phase, which slence range for the 5 m2/s to 5E-4 r The static pressure CHir phase using CHIR phase u	$S_{GRF}(-) = D_{GRF}(-) = D_{$	7.7E-08 8.5E+00 -5.7 erived from the and derivative ivity is ension displayed asducer depth,

	Test S	umn	nary Sheet			
Project:	Oskarshamn site investiç	gation	Test type:[1]			CHi
Area:	Lax	kemar	Test no:			1
Borehole ID:	K	CLX08	Test start:	0610		061006 09:32
Test section from - to (m):	503 00-603	00 m	Responsible for			er van der Wal
rest section from - to (m).	303.00-003	.00 111	test execution:		Reinder van der Philipp	
Section diameter, 2·r <sub>w</sub> (m):		0.076	Responsible for test evaluation:		Crist	ian Enachescı
Linear plot Q and p			Flow period		Recovery period	
			Indata	*********************	Indata	
KLX08_503.00-603.00_060928_1_CHir_Q_r	• Psecton	0.003	p <sub>0</sub> (kPa) =	5074		
5400	Pabove Pbelow Q		p <sub>i</sub> (kPa ) =	5077		
1	·		$p_p(kPa) =$	5278	p <sub>F</sub> (kPa ) =	5082
5200	· \	0.002	$Q_p (m^3/s) =$	6.53E-07		
- 500		min)	tp (s) =	1800	t <sub>F</sub> (s) =	180
Pressur		njection Rate [l/min	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
76 ± 400 · . 24 400 · .		Injection	EC <sub>w</sub> (mS/m)=			
4500 1		0.001	Temp <sub>w</sub> (gr C)=	14.8		
			Derivative fact.=	0.17	Derivative fact.=	0.0
4400 -						
0.00 0.20 0.40 0.60 0.80 Elapsed Tim	1.00 1.20 1.40 1.60	0.000	Results		Results	
			$Q/s (m^2/s)=$	3.2E-08		
Log-Log plot incl. derivates- flo	ow period		$T_M (m^2/s) =$	4.2E-08		
	•		Flow regime:	transient	Flow regime:	transient
Elapsed time [h]	. 10,-1	300	$dt_1 \text{ (min)} =$	4.15	$dt_1 (min) =$	1.4
			$dt_2$ (min) =		$dt_2 \text{ (min)} =$	3.2
•		10 2	$T (m^2/s) =$	4.1E-08	$T (m^2/s) =$	3.3E-0
			S (-) =	1.0E-06	\ -/	1.0E-0
10	3	30	$K_s (m/s) =$	4.1E-10	$K_s (m/s) =$	3.3E-1
		10 <sup>1</sup>	$S_s (1/m) =$	1.0E-08	S <sub>s</sub> (1/m) =	1.0E-0
		(1/q)'[min/]	C (m <sup>3</sup> /Pa) =	NA	C (m³/Pa) =	4.0E-1
10 °	* * * * * * * * * * * * * * * * * * *	3 Ž	$C_D(-) =$	NA	$C_D(-) =$	4.4E-0
• • • • • • • • • • • • • • • • • • • •			ξ (-) =	2.2	ξ (-) =	0.
•		10 0				
•	÷		$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>4</sup> 10 <sup>5</sup>	10 <sup>6</sup> 10 <sup>7</sup> 10 <sup>8</sup>		$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
			$D_{GRF}$ (-) =	NA	$D_{GRF}$ (-) =	NA
Log-Log plot incl. derivatives-	recovery period		Selected repres	entative paran	neters.	
Elapsed time [h]			$dt_1$ (min) =	4.15	0 (III /I u)	4.0E-1
10 1 10,2	10,-1	300	$dt_2$ (min) =		$C_D(-) =$	4.4E-0
			$T_T (m^2/s) =$	4.1E-08		2.
		10 2	S (-) =	1.0E-06		
3.3 pp. 2.5 pp			$K_s$ (m/s) =	4.1E-10		
<sup>10</sup>	**************************************	30	$S_s (1/m) =$	1.0E-08		
;/	;	10 1 [R	Comments:			
. *		10 10-p0/ (kPa)			f 4.1E-8 m2/s was d	
10 -1		<u>\$</u>			ows a horizontal sta	
					nsmissivity is estim sion displayed durir	
1 /			11114/3 NJ 71750 HIZ/S.	. THE HOW UILLEL	oron aropiayou uulil	15 une wat 18 4.
	1	10 0				erived from the
		10 0	The static pressure	measured at tran traight line extra	nsducer depth, was depolation in the Horn	

	Test Sun	nmary Sheet			
Project:	Oskarshamn site investigati				CHi
Area:	Laxem	ar Test no:			1
Borehole ID:	KLX	08 Test start:	061006 1		061006 14:05
Test section from - to (m):	603.00-703.00	m Responsible for		Reinde	er van der Wal
0 " " ( )		test execution:		6 : .	Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.0	76 Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
	8	p <sub>0</sub> (kPa) =	5923		I
6250 KLX08_603.00-703.00_061006_1_CHir_Q_r	P section P above P below	p <sub>i</sub> (kPa ) =	5923		
6050	7	$p_p(kPa) =$		p <sub>F</sub> (kPa ) =	593
	-6		6.08E-05		3930
6850		$\frac{Q_p (m^3/s)=}{tp (s)} =$		t <sub>F</sub> (s) =	1800
ممريم	[l/mh]			` '	1.00E-0
82 6660 - 90 06	e de la companya de l	S el S* (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-00
DOWN.	3	EC <sub>w</sub> (mS/m)=	16.1		
5450		Temp <sub>w</sub> (gr C)=	16.1		
5250		Derivative fact.=	0.06	Derivative fact.=	0.0
000 0.00 1.00 1.00 2.00 Elapsed Time [b]		Results		Results	<u>.</u>
		Q/s $(m^2/s)=$	3.0E-06		
Log-Log plot incl. derivates- flo	ow period	$T_{\rm M} (m^2/s) =$	3.9E-06		
Elegand King Bal		Flow regime:	transient	Flow regime:	transient
10. <sup>4</sup> 10. <sup>3</sup> casples unite (ii)	10,10	$dt_1$ (min) =	2.84	$dt_1$ (min) =	0.62
1	0.3	$dt_2$ (min) =	14.49	$dt_2$ (min) =	2.84
a coordinate		$T (m^2/s) =$	2.4E-06	$T (m^2/s) =$	1.5E-0
	• [10 -1	S (-) =	1.0E-06	\ /	1.0E-0
10		$K_s (m/s) =$	2.4E-08	$K_s$ (m/s) =	1.5E-08
2,24	0.03	$S_s(1/m) =$		S <sub>s</sub> (1/m) =	1.0E-0
		$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	7.6E-09
A CONTRACTOR OF THE CONTRACTOR	10-2	$C_D(-) = C_D(-)$	NA	$C_D(-) =$	8.4E-0
10 -1	•	ξ(-) =		ξ(-) =	-4.
	0.003				
	10 -3	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
		$S_{GRF}(-) =$	NA	S <sub>GRF</sub> (-) =	NA
10 <sup>1</sup> 10 <sup>2</sup>	10 <sup>3</sup> 10 <sup>4</sup> 10 <sup>5</sup>	D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran		
Elapsed time [h]		$dt_1$ (min) =		$C (m^3/Pa) =$	7.6E-09
10 1 10 1		$dt_2 \text{ (min)} =$		$C_D(-) =$	8.4E-0
	300	$T_T (m^2/s) =$	1.5E-06		-4.
	300	S (-) =	1.0E-06		† · · · · ·
	10 2	$K_s (m/s) =$	1.5E-08		<del>                                     </del>
10 °	_	$S_s (1/m) =$	1.0E-08		
1,000	30	Comments:	1.01-00	<u> </u>	<u> </u>
dina ,		₹	tranemiceivity o	f 1.5E-6 m2/s was d	erived from the
10 -1	10 1			one), which shows the	
				nce range for the int	
‡	3	transmissivity is est	timated to be 8E	-7 m2/s to 4E-6 m2/	s. The flow
				is 2. The static pres	
<u> </u>	10°			om the CHir phase u	
10 0 10 1 tDICD	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>	line extrapolation in	41 1	440 0 1 0 5 0 4 4	

	Test Sum	mary Sheet			
Project:	Oskarshamn site investigatio	n Test type:[1]			CHi
Area:	Laxema	ar Test no:			
Borehole ID:	KI X0	8 Test start:			061006 17:48
Test section from - to (m):	703.00-803.00 r	n Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.07	6 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation:		Recovery period	
Lillear plot & and p		Indata		Indata	
	0.08	p <sub>0</sub> (kPa) =	6766		
KLX08_703.00-803.00_061006_1_CHir_Q_r	P above P below	p <sub>i</sub> (kPa ) =	6775		
6900		$p_p(kPa) =$	6970	p <sub>F</sub> (kPa ) =	686
	0.08	$Q_{p} (m^{3}/s) =$	2.33E-07	,	
₹ 6700 -		tp (s) =	1800	t <sub>F</sub> (s) =	1800
Prossus	la pec 6 on Rate (Umb)	S el S* (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
	In Jec 6 or	$EC_w (mS/m) =$		0 0.0 ( )	
6300 -		Temp <sub>w</sub> (gr C)=	17.5		
	0.02	Derivative fact.=	0.09	Derivative fact.=	0.0
6100 -					
5900	2.00 2.50 3.00				
Elapsed Time (h)		Results		Results	
		$Q/s (m^2/s)=$	1.2E-08		
Log-Log plot incl. derivates- flow	v period	$T_M (m^2/s)=$	1.5E-08		
		Flow regime:	transient	Flow regime:	transient
10 <sup>3</sup> Elapsed time (h)	01	$dt_1$ (min) =		$dt_1 (min) =$	#NV
	10 2	$dt_2$ (min) =		$dt_2$ (min) =	#NV
		$T (m^2/s) =$		$T (m^2/s) =$	2.5E-0
• • • • • • • • • • • • • • • • • • • •	30	S (-) =	1.0E-06		1.0E-0
10.	10 1	$K_s$ (m/s) =		$K_s$ (m/s) =	2.5E-1
		$S_s (1/m) =$	1.0E-08	$S_s(1/m) =$	1.0E-0
,	3	C (m <sup>3</sup> /Pa) =	NA	C (m <sup>3</sup> /Pa) =	3.9E-1
10 4 ]		<sup>E</sup> C <sub>D</sub> (-) =	NA	$C_D(-) =$	4.3E-0
	10 °	ξ (-) =	-1.8	ξ (-) =	-3.
•	0.3				
·		$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 ° 10 ¹	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives- re	ecovery period	Selected represe	-		
Elapsed time [h]	101	$dt_1$ (min) =	4.53	C (m <sup>3</sup> /Pa) =	3.9E-1
10 '		$dt_2$ (min) =	25.22	5 ( )	4.3E-0
	10 <sup>2</sup>	$T_T (m^2/s) =$	4.5E-09		-1.
	A STATE OF THE STA	S (-) =	1.0E-06		
10 0	30 and	$K_s$ (m/s) =	4.5E-11		
		$S_s (1/m) =$	1.0E-08		
A. P. C.	10 1	ু Comments:			
9,5,7,7,7				f 4.5E-9 m2/s was d	
10 4	3			ne), which shows a confor the interval trans	
<i>f</i> / .	10 °			n2/s. The flow dime	
			The static press	ure could not be ext	
10 <sup>4</sup> 10 <sup>0</sup> ID/CD	10 <sup>1</sup> 10 <sup>2</sup> 10 <sup>3</sup> 0.3	the very low transm	nissivity.		

	Test	Sumn	nary Sheet			
Project:	Oskarshamn site inves	stigation	Test type:[1]			CHi
Area:	1	axemar	Test no:	+		
Borehole ID:		KLX08	Test start:			061006 22:17
Test section from - to (m):	803.00-90	03.00 m	Responsible for test execution:		Reinder van Phi	
Section diameter, 2·r <sub>w</sub> (m):		0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p			test evaluation:		Recovery period	
Lillear plot & allu p			Indata		Indata	
7950 KLX08_803.00-903.00_061006_1_CHir_Q_r	. • P sec	0.3	p <sub>0</sub> (kPa) =	7605		
	P abo	ove	p <sub>i</sub> (kPa ) =	7607		
7790	!		$p_p(kPa) =$	7804	p <sub>F</sub> (kPa ) =	761
7550		0.2	$Q_p (m^3/s)=$	1.48E-06		
Pick Market	*	[uim]	tp (s) =	1800	t <sub>F</sub> (s) =	1800
7350	· \$1	injection Rate [l/min]	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0
· · · · · · · · · · · · · · · · · · ·		Injectio	EC <sub>w</sub> (mS/m)=		( )	
7150		- 0.1	Temp <sub>w</sub> (gr C)=	18.9		
			Derivative fact.=	0.1	Derivative fact.=	0.0
6950	•					
	50 2.00 2.50	0.0				
Elapsed Time [b]			Results	7.45.00	Results	1
l and an what impled above to a flav			Q/s $(m^2/s)=$	7.4E-08		
Log-Log plot incl. derivates- flow	w period		$T_M (m^2/s) =$	9.6E-08	Flave va sima s	transiant
Elapsed time [h]		_	Flow regime:	transient	Flow regime:	transient
10 2			$dt_1 (min) = $ $dt_2 (min) = $		$dt_1 (min) = dt_2 (min) =$	#NV #NV
		10 2			2	6.0E-0
	2.	30	T (m2/s) = S (-) =	1.0E-06	\ /	1.0E-0
10 1	* * * * * * * * * * * * * * * * * * * *		$K_s (m/s) =$		$K_s (m/s) =$	6.0E-1
3	1.07	10 1	S <sub>s</sub> (1/m) =		S <sub>s</sub> (1/m) =	1.0E-0
day in the second secon		, (14q7 [min/l]	C (m <sup>3</sup> /Pa) =	NA	C (m <sup>3</sup> /Pa) =	2.1E-0
10 0	•	3 1/4:(1	$C_D(-) =$	NA	$C_D(-) =$	2.3E-0
•		F 10 °	ξ(-) =		ξ(-) =	-1.0
			3()	1	5()	
·	:	0.3	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>1</sup> 10 <sup>2</sup>	10 3 10 4	10 5	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
			D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives- re	ecovery period		Selected repres	entative paran	neters.	
Elapsed time [h]	0,-1 , , , , , , , , , ,	1	dt <sub>1</sub> (min) =	#NV	C (m <sup>3</sup> /Pa) =	2.1E-0
10 '1		300	$dt_2$ (min) =	#NV	$C_D(-) =$	2.3E-0
			$T_T (m^2/s) =$	6.0E-08	ξ (-) =	-1.0
	·	10 2	S (-) =	1.0E-06		
10 °	The state of the s		$K_s$ (m/s) =	6.0E-10		
		30	$S_s (1/m) =$	1.0E-08		
		10 to do	Comments:			
. /		p-p0. (ps			f 6.0E-8 m2/s was d	
10-4		3			hows the better data ne interval transmiss	
					8 m2/s. The flow dir	
		10 0	displayed during th	he test is 2. The s	tatic pressure measu	ired at
10-1 10 0	10 1 10 2	10 3			the CHir phase using value of 7,591.3 kl	
tDICD						

	Test Su	mmary Sheet			
Project:	Oskarshamn site investiga	tion Test type:[1]			CHi
Area:	Laxer	nar Test no:			1
Borehole ID:	KL	K08 Test start:	06		061007 06:04
Test section from - to (m):	863.00-963.00	0 m Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.0	076 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation:		Recovery period	
p. o. q. aa p		Indata		Indata	
KLX08_863.00-963.00_061007_1_CHir_Q_r	0.006	p <sub>0</sub> (kPa) =	8110		
8400	P above P below Q	p <sub>i</sub> (kPa ) =	8116		
8200	0.005	$p_p(kPa) =$	8322	p <sub>F</sub> (kPa ) =	822
8200	··············	$Q_p (m^3/s) =$	3.17E-08		
₹ 800 - 8. 8	0.004	t (-)		t <sub>F</sub> (s) =	1800
d or neso	- 0.003	S el S* (-)=	1	S el S <sup>*</sup> (-)=	1.00E-0
6 7800 · · · · · · · · · · · · · · · · · ·		EC <sub>w</sub> (mS/m)=	1.002 00	3 61 3 (-)-	1.002 0
ő	0.002	Temp <sub>w</sub> (gr C)=	19.7		1
7600	·	Derivative fact.=	0.11	Derivative fact.=	0.0
7400 -	0.001	Delivative fact	0.11	Delivative fact.=	0.0
7200 0.00 0.50 1.90 1.50 Elapsed Tim	200 2.50 3.00 me lhi	Results		Results	
		Q/s (m <sup>2</sup> /s)=	1.5E-09		
Log-Log plot incl. derivates- fl	ow period		2.0E-09		
Log-Log plot incl. derivates- il	ow period	$T_M (m^2/s) =$ Flow regime:	transient	Flow regime:	transient
Elapsed time [h]		$dt_1$ (min) =		dt <sub>1</sub> (min) =	#NV
10 1	10 3	` ,		, ,	#NV
	9.4. V. J. W.	G-12 ()		$dt_2 (min) =$	
س ا	300	$T (m^2/s) =$		$T (m^2/s) =$	2.5E-10
10°		S (-) =	1.0E-06	` '	1.0E-0
	10 2	$K_s$ (m/s) =		$K_s (m/s) =$	2.5E-1
		S <sub>s</sub> (1/m) =		$S_s(1/m) =$	1.0E-0
	30	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	1.9E-1
10 1	· ·	$C_D(-) =$	NA	$C_D(-) =$	2.1E-0
•	10'	ξ (-) =	-1.0	ξ (-) =	-3.3
+		-	1	2	
10-1 10 0	10 <sup>1</sup> 10 <sup>2</sup> 10 <sup>3</sup>	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
tD		$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected repres	•	_	
Elapsed time [h]		$dt_1$ (min) =	0.78	$C (m^3/Pa) =$	1.9E-10
10	ł	$dt_2$ (min) =		$C_D(-) =$	2.1E-0
	10 3	$T_T (m^2/s) =$	7.3E-10		-1.0
+		S (-) =	1.0E-06		
10 °	300	$K_s$ (m/s) =	7.3E-12		
		$S_s (1/m) =$	1.0E-08		
	10 2	© Comments:			
	į			f 7.3E-10 m2/s was	
10-1	30	analysis of the CIT		fidence range for the	
				-10 m2/s to 3E-9 m2	
		dimension displace	ad during the test	ic ? The etetie need	
	10 1	dimension displayed be extrapolated due			ssure could not
	10 1	dimension displaye be extrapolated due			ssure could not

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			CHi
Area:	Laxemar	Test no:			1
Borehole ID:	KLX08	Test start:	06100		061008 07:04
Test section from - to (m):	104.00-124.00 m	Pesnonsible for		Paind	er van der Wal
, ,		test execution:	Philipp V		
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	3+
1150 KLX08_104.00-124.00_061008_1_CHir_Q_r	● P section 60	p <sub>0</sub> (kPa) =	999		
1100	• P above • P bdow • Q	p <sub>i</sub> (kPa ) =	1003		
-   -	50	$p_p(kPa) =$	1091	p <sub>F</sub> (kPa ) =	100:
1050	140	$Q_p (m^3/s) =$	4.73E-04		
<u> </u>		tp (s) =	1200	t <sub>F</sub> (s) =	1200
P esure	pheeou general services of the pheeous services of the service	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	og o	EC <sub>w</sub> (mS/m)=		` '	1
	- 20	Temp <sub>w</sub> (gr C)=	8.4		
900		Derivative fact.=	0.07	Derivative fact.=	0.0
850 -	10				
800 0.00 0.20 0.40 0.60 0.80	1.00 120 1.40				
Elapsed Tims [b]		Results	E 0E 0E	Results	
		Q/s $(m^2/s)=$	5.3E-05		
Log-Log plot incl. derivates- flo	w period	$T_{\rm M} (m^2/s) =$	5.5E-05		
Elapsed time [h]		Flow regime:	transient	Flow regime:	transient
10 2 10 10 10 10 10 10 10 10 10 10 10 10 10		$dt_1$ (min) =	#NV	$dt_1 (min) =$	#NV
	10 -1	$dt_2$ (min) =	#NV	$dt_2$ (min) =	#NV
		$T (m^2/s) =$		$T (m^2/s) =$	1.9E-0
are the not	0.03	S (-) =	1.0E-06		1.0E-0
10		$K_s$ (m/s) =		$K_s$ (m/s) =	9.5E-0
	10 -2	$S_s (1/m) =$	5.0E-08	$S_s(1/m) =$	5.0E-0
	vq) (Imm	C (m <sup>3</sup> /Pa) =	NA	C (m <sup>3</sup> /Pa) =	6.6E-0
10 0	0.003	$C_D(-) =$	NA	$C_D(-) =$	7.3E+0
	10 3	ξ(-) =	7.0	ξ (-) =	-2.
	1	$T_{GRF}(m^2/s) =$	NA	T (2/-)	NA
10 <sup>11</sup> 10 <sup>12</sup>	10 <sup>15</sup> 10 <sup>16</sup> 10 <sup>15</sup>	$S_{GRF}(m/s) = S_{GRF}(-) =$	NA	$T_{GRF}(m^2/s) = S_{GRF}(-) =$	NA
10 10 ED	10 10 10		NA		NA
Log-Log plot incl. derivatives- re	acovery period	D <sub>GRF</sub> (-) = Selected represe		Ora ( )	INA
Log-Log plot ilici. delivatives- il	ecovery period	dt <sub>1</sub> (min) =	NA	. * . * . * . * . * . * . * . * . * . *	6.6E-0
Elapsed time [h]		$dt_1 (min) =$ $dt_2 (min) =$	NA	$C (m^3/Pa) = C_D (-) =$	7.3E+0
	10 2	_ ` '			
32-Leavenger William St. Comments of the Comme		$T_T (m^2/s) =$ $S(-) =$	2.0E-04	ξ (-) =	7.0
	30	0()	1.0E-06		
10 0	10 1	$K_s$ (m/s) =	1.0E-05		
*		$S_s (1/m) =$	5.0E-08		
a ·	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Comments:			
	المسين			f 2.0E-4 m2/s was de	
10 1	10 °			hows the better derival transmissivity is e	
†				ai transmissivity is e limension displayed	
1	0.3			t transducer depth, v	
1	10.3				
	0.3			ine extrapolation in	

	Test Si	umr	nary Sheet			
Project:	Oskarshamn site investig	ation	Test type:[1]			CHir
Area:	Lax	emar	Test no:			1
Borehole ID:	KI	LX08	Test start:	061008 09		061008 09:13
Test section from - to (m):	125.00-145.	00 m	Responsible for		Reinde	er van der Wal
Section diameter, 2·r <sub>w</sub> (m):		0.076	test execution: Responsible for		Crist	Philipp Wol
cocaen diameter, 2 m (m).			test evaluation:		0.100	iair Eriaoriococ
Linear plot Q and p			Flow period		Recovery period	
			Indata		Indata	
1500	• P sertion	6	p <sub>0</sub> (kPa) =	1179		
KLX08_125.00-145.00_061008_1_CHir_Q_r	P above P below Q		p <sub>i</sub> (kPa ) =	1176		
1400		- 5	$p_p(kPa) =$	1377	p <sub>F</sub> (kPa ) =	1170
1350 -			$Q_p (m^3/s) =$	2.96E-05		
· ·		· 4	tp (s) =	1200	t <sub>F</sub> (s) =	1200
2 n n n n n n n n n n n n n n n n n n n		Rate [Vm]	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
6 1200 -		injection Rate [Vmin]	EC <sub>w</sub> (mS/m)=		( )	
		2	Temp <sub>w</sub> (gr C)=	8.9		1
1150	and the second s		Derivative fact.=		Derivative fact.=	0.03
1100 -		11		****		
1050	and the second section of the section of					
1000 0.00 0.20 0.40 0.60 Elapsed	000 0.00 0.40 0.60 0.50 100 1.20 1.40 Elapsed Time [h]		Results		Results	<u> </u>
			Q/s $(m^2/s)=$	1.4E-06		
Log-Log plot incl. derivates- fl	low period		$T_{\rm M} (m^2/s) =$	1.5E-06		
gg p			Flow regime:	transient	Flow regime:	transient
Elapsed time [h	10. <sup>-1</sup> 10. <sup>0</sup>		dt <sub>1</sub> (min) =		dt <sub>1</sub> (min) =	2.34
10 2			$dt_2 \text{ (min)} =$		$dt_2 \text{ (min)} =$	6.47
1		10 °			2	7.3E-06
10 1			$T (m^2/s) = S (-) =$	1.0E-06		1.0E-06
• •			$K_s (m/s) =$		$K_s (m/s) =$	3.7E-07
		10 -1			$S_s(11/s) =$	5.0E-08
10 °	1.25 .05 .44	Į.	$S_s (1/m) =$	5.0E-06	, ,	8.3E-10
- 1/8 J		q. (1/q)'[m	$C (m^3/Pa) =$		$C (m^3/Pa) =$	ļ
•		10 <sup>-2</sup>	C <sub>D</sub> (-) =	NA F.O	$C_D(-) =$	9.1E-02
10 -1	·		ξ (-) =	5.3	ξ (-) =	0.0
		10 -3	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>8</sup> 10 <sup>9</sup>	10 10 10 11 10 12		S <sub>GRF</sub> (-) =	NA	$S_{GRF}(-) =$	NA
			D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period		Selected represe	ntative paran	neters.	
Elapsed time (	hi .		$dt_1$ (min) =	2.34	C (m <sup>3</sup> /Pa) =	8.3E-10
10 <sup>4</sup> 10 <sup>3</sup>	10,-2	}	$dt_2$ (min) =		$C_D(-) =$	9.1E-02
		10 3	$T_T (m^2/s) =$	7.3E-06		0.0
		ļ"	S (-) =	1.0E-06		1
10 1			$K_s$ (m/s) =	3.7E-07		
بستعفور:		10 <sup>2</sup>	$S_s (1/m) =$	5.0E-08		
		ī,	Comments:			•
10°	**	(p-bg), [kg	The recommended	ransmissivity of	f 7.3E-6 m2/s was d	erived from the
		10 ' &	analysis of the CHir	phase (outer zo	one), which shows th	ne better data
10 -1	· · · · · · · · · · · · · · · · · · ·		and derivative quali			
1			transmissivity is est			
+		10 °	dimension displayed at transducer depth,			
10 ° 10 ° tD/C	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>	ļ	line extrapolation in			
turc	=		т.		>,- / 0	

	Test Sumi	mary Sheet			
Project:	Oskarshamn site investigation				CHir
Area:	Laxema	r Test no:			1
Borehole ID:	KLX08	Test start:			061008 11:12
Test section from - to (m):	144.00-164.00 m	Responsible for	 	Reinde	er van der Wal
		test execution:			Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
KLX08_144.00-164.00_061008_1_CHir_Q_r	60	p <sub>0</sub> (kPa) =	1341		
	55	p <sub>i</sub> (kPa ) =	1339		
1350	50	$p_p(kPa) =$	1373	p <sub>F</sub> (kPa ) =	1340
,	P section P above P below 40	$Q_p (m^3/s) =$	4.86E-04		13
<u>2</u> 1300	· Q	tp (s) =		t <sub>F</sub> (s) =	1200
Pressure	30 Google Sept. 100 Sept.	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0
-g o g - 1250 -	- <u>S</u>	EC <sub>w</sub> (mS/m)=	1.00L-00	S el S (-)=	1.00L-00
	20	Temp <sub>w</sub> (gr C)=	8.8		
1200 •	15	Derivative fact.=		Derivative fact.=	0.04
	10	Delivative lact.	0.00	Derivative fact.	0.0
1150					
0,00 0,20 0,40 0,60 Elapsed Ti	0,80 1,00 1,20 1,40 me (h)	Results		Results	
		Q/s $(m^2/s)=$	1.4E-04		
Log-Log plot incl. derivates- fl	ow period	$T_{\rm M} (m^2/s) =$	1.5E-04		
	·	Flow regime:	transient	Flow regime:	transient
Elapsed time [h]	19. 219. 19. 19	$dt_1 \text{ (min)} =$	2.18	$dt_1 \text{ (min)} =$	0.80
10 ]	10 -1	$dt_2 \text{ (min)} =$		$dt_2 \text{ (min)} =$	1.52
		$T (m^2/s) =$		$T(m^2/s) =$	3.4E-04
	0.03	S (-) =	1.0E-06	\ /	1.0E-06
10 1		$K_s (m/s) =$		$K_s (m/s) =$	1.7E-05
	10 -2	S <sub>s</sub> (1/m) =		$S_s(1/m) =$	5.0E-08
i do la companya da companya d		$C (m^3/Pa) =$	NA	C (m <sup>3</sup> /Pa) =	1.6E-0
<u> </u>	0.003	$C_D(-) =$	NA	$C_D(-) =$	1.8E+01
10 0	10 S	ξ(-) =		ξ(-) =	3.5
	10	5()	0.7	5()	0.0
	3E-4	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>12</sup> 10 <sup>13</sup> 10 <sup>14</sup>	10 <sup>15</sup> 10 <sup>16</sup> 10 <sup>17</sup>	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran		
	- · · · · · · · · · · · · · · · · · · ·	$dt_1$ (min) =		$C (m^3/Pa) =$	1.6E-07
10 -4 10 -3 Elapsed time [h]	10,2	$dt_2 \text{ (min)} =$		$C_D(-) =$	1.8E+01
	10 <sup>2</sup>	$T_T (m^2/s) =$	4.3E-04		8.7
	[10	S (-) =	1.0E-06		
	30	$K_s (m/s) =$	2.1E-05		
10 1		S <sub>s</sub> (1/m) =	5.0E-08		
	10 '	Comments:			ı
			transmissivity o	f 4.3E-4 m2/s was d	erived from the
, ,	1 S	analysis of the CHi			
	<b>∵</b>	horizontal stabilizat	tion. The confid	ence range for the ir	nterval
	110 0	transmissivity is est			
1/		dimension displayed at transducer depth,			
10 ° 10 ° tD/CD	10 2 10 3 10 4	line extrapolation in			
tD/CD			pio		

	Test Sur	nmary Sheet			
Project:	Oskarshamn site investigati	on Test type:[1]			CHi
Area:	Laxem	nar Test no:			1
Borehole ID:	KIX	08 Test start:			061008 13:19
Borenole ID.	KLX	oo rest start.			001000 13.18
Test section from - to (m):	164.00-184.00	m Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.0	76 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation:		Recovery period	
Linear plot Q and p		Indata		Indata	
1600	60	p <sub>0</sub> (kPa) =	1511		<u> </u>
KLX08_164.00-184.00_061008_1_CHir_Q_r	P section P above P below * 55	p <sub>i</sub> (kPa ) =	1511		
1550	-0	$p_p(kPa) =$	_	p <sub>F</sub> (kPa ) =	1512
	45	- 1	4.79E-04		1312
1500	40	$\frac{Q_p (m^3/s)=}{tp (s)} =$		t <sub>F</sub> (s) =	1200
egi uns	35 (July 200 )				1.00E-0
50 1450 - 4 20 00	25 Feb 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	S el S* (-)=	1.00E-00	S el S <sup>*</sup> (-)=	1.00E-0
Down	25 출	EC <sub>w</sub> (mS/m)=	0.1		
1400 -	20	Temp <sub>w</sub> (gr C)=	9.1		
1350	10	Derivative fact.=	0.07	Derivative fact.=	0.
:	5				
1300	0,80 1,00 1,20 1,40	Results		Results	
Lupas a Trin	ייין	Q/s $(m^2/s)=$	2.8E-04		
Log-Log plot incl. derivates- flo	ow period	$T_{\rm M} (m^2/s) =$	2.9E-04		
		Flow regime:	transient	Flow regime:	transient
Elapsed time [h]	10,-2	$dt_1 \text{ (min)} =$	NA	dt <sub>1</sub> (min) =	0.43
		$dt_2 \text{ (min)} =$	NA	$dt_2 \text{ (min)} =$	3.20
	10 -1	2		$T (m^2/s) =$	4.2E-04
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	MA NAME OF THE PARTY OF THE PAR	$T (m^2/s) = $ $S (-) = $	1.0E-06		1.0E-0
	10 -2	$K_s (m/s) =$		$K_s (m/s) =$	2.1E-0
		$S_s (1/m) =$		$S_s(1/m) =$	5.0E-0
10 °	and the state of t	5	3.0L-00		9.7E-0
		•	NA	$C (m^3/Pa) = C_D (-) =$	1.1E+0
*:		C <sub>D</sub> (-) -		<b>O</b> D ( )	
•••	A A	ξ (-) =	0.2	ξ (-) =	1.
·.	<b>^ .</b>	T ( 2( )		T ( . 2( . )	NΛ
· .		$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA NA
10 <sup>7</sup> 10 <sup>8</sup> 10	10 0 10 10 10 10 11	$S_{GRF}(-) =$	NA NA	$S_{GRF}(-) =$	NA
10	10 9 10 10 10 10 10 11	$S_{GRF}(-) = D_{GRF}(-) =$	NA NA NA	$S_{GRF}(-) = D_{GRF}(-) =$	
10	10 9 10 10 10 10 10 11	S <sub>GRF</sub> (-) =  D <sub>GRF</sub> (-) =  Selected represe	NA NA NA entative paran	S <sub>GRF</sub> (-) = D <sub>GRF</sub> (-) = neters.	NA NA
10	10 9 10 10 10 10 10 11	$S_{GRF}(-) = D_{GRF}(-) = $ Selected represent $dt_1 \text{ (min)} = $	NA NA NA entative paran	$S_{GRF}(-) = D_{GRF}(-) = $ <b>neters.</b> $C (m^3/Pa) = $	NA NA 9.7E-0
10	10 9 10 10 10 10 10 11	$S_{GRF}(-) = D_{GRF}(-) = Selected representation                                     $	NA NA NA entative paran 0.43 3.20	$S_{GRF}(-) = D_{GRF}(-) = 0$ The entire of the entire o	NA NA 9.7E-0 1.1E+0
10	recovery period	$S_{GRF}(-) = D_{GRF}(-) = Selected representations of the selected representation of the se$	NA NA NA entative paran 0.43 3.20 4.2E-04	$S_{GRF}(-) = D_{GRF}(-) = 0$ <b>neters.</b> $C (m^3/Pa) = D_{CD}(-) = 0$ $\xi (-) = 0$	NA NA 9.7E-0 1.1E+0
10	recovery period	$S_{GRF}(-) = D_{GRF}(-) = Selected representations of the selected representation of the se$	NA NA NA entative paran 0.43 3.20 4.2E-04 1.0E-06	$S_{GRF}(-) = D_{GRF}(-) = 0$ <b>eters.</b> $C(m^3/Pa) = C_D(-) = 0$ $\xi(-) = 0$	9.7E-0
10	recovery period	$S_{GRF}(-) = D_{GRF}(-) = Selected representations of the selected representation of the se$	NA NA NA entative paran 0.43 3.20 4.2E-04 1.0E-06 2.1E-05	$S_{GRF}(-) = D_{GRF}(-) = 0$ neters. $C (m^3/Pa) = C_D (-) = 0$ $\xi (-) = 0$	9.7E-08
Log-Log plot incl. derivatives-	recovery period	$S_{GRF}(-) = D_{GRF}(-) = Selected repressor dt_1 (min) = dt_2 (min) = T_T (m^2/s) = S (-) = K_s (m/s) = S_s (1/m) = S_s (1/$	NA NA NA entative paran 0.43 3.20 4.2E-04 1.0E-06	$S_{GRF}(-) = D_{GRF}(-) = 0$ neters. $C (m^3/Pa) = C_D (-) = 0$ $\xi (-) = 0$	NA
10	recovery period	$S_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = Selected representation of the selected representati$	NA NA NA entative paran 0.43 3.20 4.2E-04 1.0E-06 2.1E-05 5.0E-08	$S_{GRF}(-) = D_{GRF}(-) = 0$ <b>eters.</b> $C (m^3/Pa) = C_D(-) = 0$ $\xi (-) = 0$	9.7E-08 1.1E+0
10	recovery period	$S_{GRF}(-)$ = $D_{GRF}(-)$ = $Selected\ represent formula for the selected represent for the selecte$	NA NA NA NA entative paran 0.43 3.20 4.2E-04 1.0E-06 2.1E-05 5.0E-08	$S_{GRF}(-) = D_{GRF}(-) = D_{$	NA  9.7E-0  1.1E+0  1.  erived from the
10	recovery period	$S_{GRF}(-)$ = $D_{GRF}(-)$ = $S_{elected}(-)$ =	NA NA NA entative paran 0.43 3.20 4.2E-04 1.0E-06 2.1E-05 5.0E-08 transmissivity or phase (inner zo	$S_{GRF}(-) = D_{GRF}(-) = D_{$	NA  9.7E-00  1.1E+0  1.  erived from the horizontal
10	recovery period	$S_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = Selected represent                                     $	NA NA NA entative paran 0.43 3.20 4.2E-04 1.0E-06 2.1E-05 5.0E-08 transmissivity or phase (inner zo	$S_{GRF}(-) = D_{GRF}(-) = D_{$	9.7E-0 1.1E+0 1. erived from the horizontal smissivity is
10	recovery period	$S_{GRF}(-)$ = $D_{GRF}(-)$ = $D_{GRF}(-)$ = $S_{elected}(-)$ = $S_{e$	NA NA NA NA entative paran 0.43 3.20 4.2E-04 1.0E-06 2.1E-05 5.0E-08 transmissivity or r phase (inner zo confidence range 4 m2/s to 8E-4 m. The static press	$S_{GRF}(-) = D_{GRF}(-) = D_{$	9.7E-00 1.1E+0 1. erived from the horizontal smissivity is ension displayed siducer depth,
10	recovery period	$S_{GRF}(-)$ = $D_{GRF}(-)$ = $D_{GRF}(-)$ = $S_{elected}(-)$ = $S_{e$	NA NA NA NA entative paran 0.43 3.20 4.2E-04 1.0E-06 2.1E-05 5.0E-08 transmissivity or r phase (inner zo onfidence range 4 m2/s to 8E-4 mass to 8E-4	$S_{GRF}(-) = D_{GRF}(-) = D_{$	9.7E-08 1.1E+0 1.7 1.7 erived from the horizontal smissivity is ension displayed seducer depth,

	Test Sum	mary Sheet				
Project:	Oskarshamn site investigation				CHiı	
Area:	Laxem	ar Test no:			1	
Borehole ID:	KLX	08 Test start:		061008 15:1		
Test section from - to (m):	183.50-203.50	m Responsible for		Reinde	er van der Wal	
Section diameter, 2·r <sub>w</sub> (m):	0.05	test execution: 76 Responsible for		Criet	Philipp Wolian Enachescu	
Section diameter, 2 I <sub>W</sub> (III).	0.07	test evaluation:		Onst	ian Enachesco	
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
	• B resting	p <sub>0</sub> (kPa) =	1679			
KLX08_183.50-203.50_061008_1_CHir_Q_r	- F securit - P above - P below - Q	p <sub>i</sub> (kPa ) =	1679			
:	- 40	$p_p(kPa) =$	1690	p <sub>F</sub> (kPa ) =	1679	
1700		$Q_p (m^3/s) =$	4.61E-04			
ē	30 =	$\frac{Q_p (m / s)^{-}}{tp (s)} =$		t <sub>F</sub> (s) =	1200	
[ed] 1650 - 88 8 8	as Brimin	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-06	
with to be Pr	ripe close Remital	S el S (-)= EC <sub>w</sub> (mS/m)=	1.00E-00	୦ଥା୦ (-)=	1.0015-00	
å <sub>1600</sub> .	20 ≦	Temp <sub>w</sub> (gr C)=	9.2		1	
		Derivative fact.=		Derivative fact.=	0.07	
1550 -	10	Denvative fact.	0.01	Derivative fact.	0.0	
1500	0,80 1,00 1,20 1,40 Time (h)	Results		Results	<u>I</u>	
		Q/s $(m^2/s)=$	4.1E-04			
Log-Log plot incl. derivates- f	low period	$T_{\rm M} (m^2/s) =$	4.3E-04			
		Flow regime:	transient	Flow regime:	transient	
Elapsed time [h		$dt_1$ (min) =	2.65	$dt_1 \text{ (min)} =$	0.37	
10 - 1	0.3	$dt_2$ (min) =		$dt_2 \text{ (min)} =$	98.57	
		$T (m^2/s) =$		$T(m^2/s) =$	1.1E-04	
1	10 -1	S (-) =	1.0E-06	\ /	1.0E-06	
10 1		$K_s$ (m/s) =		$K_s (m/s) =$	5.5E-06	
0 0 0 0 0 0 000000000	0.03	S <sub>s</sub> (1/m) =	1	S <sub>s</sub> (1/m) =	5.0E-08	
(dbn)	- 2	$C (m^3/Pa) =$	NA	C (m <sup>3</sup> /Pa) =	1.1E-08	
GB.	10 2	$C_D(-) =$	NA	$C_D(-) =$	1.2E+00	
10 0	0.003	ξ(-) =		ξ(-) =	-6.5	
		5()	0.1	5()	0.0	
	10 3	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA	
10 <sup>3</sup> 10 <sup>4</sup>	10 5 10 6 10 7	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA	
		D <sub>GRF</sub> (-) =	NA	$D_{GRF}$ (-) =	NA	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.		
		$dt_1$ (min) =	2.65	$C (m^3/Pa) =$	1.1E-08	
Elapsed time 10 1 10 1 10 1 10 1 10 1 10 1 10 1 10	10,1	$dt_2 \text{ (min)} =$		$C_D(-) =$	1.2E+00	
		$T_T (m^2/s) =$	5.0E-04		-3.1	
•	30	S (-) =	1.0E-06			
^	10 1	K <sub>s</sub> (m/s) =	2.5E-05		<del>                                     </del>	
10 °		$S_s (1/m) =$	5.0E-08		<del> </del>	
	* *	Comments:	0.02 00			
		星	transmissivity o	f 5E-4 m2/s was der	ived from the	
•	10 °			lows the better data		
•		quality. The confide	ence range for th	ne interval transmiss	ivity is	
	0.3	estimated to be 9E-	5 m2/s to 9E-4 r	m2/s. The flow dime	nsion displayed	
				ure measured at tran		
	L .	1 1 1 6 4	CIII 1	عبيم مسئل عملم تمسعم سيبي	ranolation in the	
10 <sup>1</sup> 10 <sup>2</sup>	10 <sup>1</sup>	was derived from the Horner plot to a val			rapolation in the	

	Test Sumn	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			CHi
Area:	Laxemar	Test no:			1
D 1 1 1D	141 7400	<del>-</del>			201222 17 27
Borehole ID:	KLX08	Test start:			061008 17:07
Test section from - to (m):	203.00-223.00 m	Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation: Flow period		Recovery period	
Linear plot Q and p		Indata		Indata	
1950 KLX08_203.00-223.00_061008_1_CHir_Q_r	• P section	p <sub>0</sub> (kPa) =	1846		<u> </u>
KLA08_203.00-223.00_061000_1_0-HIF_Q_F	P bbow 45	p <sub>i</sub> (kPa ) =	1847		
1900	40	$p_p(kPa) =$		p <sub>F</sub> (kPa ) =	1847
	35	$Q_p (m^3/s) =$	5.30E-04	p <sub>r</sub> (m u )	101
1850	30 2	tp (s) =		t <sub>F</sub> (s) =	1200
e 1930 -	# # # # # # # # # # # # # # # # # # #			S el S <sup>*</sup> (-)=	1.00E-06
w m) oie p	20 (4 4 m) 9 20 M (2 1 1 2 1 2 1 M) 1 20 M (2 1 1 2 1 M) 1 20 M (2 1 1 1 1 1 M) 1 20 M (2 1 1 1 1 1 M) 1 20 M (2 1 1 1 1 1 M) 1 20 M (2 1 1 1 1 1 1 M) 1 20 M (2 1 1 1 1 1 1 1 M) 1 20 M (2 1 1 1 1 1 1 1 1 M) 1 20 M (2 1 1 1 1 1 1 1 1 1 M) 1 20 M (2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	$S \text{ el } S^* (-)=$ $EC_w (mS/m)=$	1.00E-00	S el S (-)=	1.00E-00
1750	20		9.5		
	† 15	Temp <sub>w</sub> (gr C)=		Demissatissa faat –	0.0
1700 -	10	Derivative fact.=	0.01	Derivative fact.=	0.04
	5				
1650	0,80 1,00 1,20 1,40	Results		Results	
		Q/s $(m^2/s)=$	1.6E-04	riodunio	
Log-Log plot incl. derivates- flo	w neriod	$T_{\rm M} (m^2/s) =$	1.7E-04		
Log Log plot mon derivates no	W portou	Flow regime:	transient	Flow regime:	transient
Elapsed time (h)		dt <sub>1</sub> (min) =		dt <sub>1</sub> (min) =	0.82
10 2		$dt_1 (min) =$ $dt_2 (min) =$		$dt_1 (min) =$ $dt_2 (min) =$	3.73
1	10 -1			2	1.8E-04
		$T (m^2/s) =$	1.0E-06	/	1.0E-0
10	0.03	S (-) =		K <sub>s</sub> (m/s) =	
1	10-2	$K_s (m/s) =$		. ,	9.0E-06
	• at/mmvi	$S_s (1/m) =$		$S_s(1/m) =$	5.0E-08
	0.003	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	1.1E-07
		C <sub>D</sub> (-) =	NA	C <sub>D</sub> (-) =	1.2E+01
	[10]	ξ(-) =	3.5	ξ (-) =	-2.4
10 0 10 10	3E-4	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
tD		$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives- r	ecovery period	Selected represe	ntative paran	<b></b>	
		$dt_1$ (min) =	0.82	C (m <sup>3</sup> /Pa) =	1.1E-07
Elapsed time [h]		$dt_2$ (min) =		$C_D(-) =$	1.2E+0
10	300	$T_T (m^2/s) =$	1.8E-04		-2.4
1		S (-) =	1.0E-06	5()	
İ	10 <sup>2</sup>	$K_s (m/s) =$	9.0E-06		
10 1	30	$S_s (1/m) =$	5.0E-08		
· · · · · · · · · · · · · · · · · · ·	 	Comments:	3.32 30		<u> </u>
	10 1 104-01 0		transmissivity of	f 1.8•10-4 m2/s was	derived from
10 %				ch shows the better of	
	3			range for the interva	
	10°	is estimated to be 7	E-5 m2/s to 5E-	4 m2/s. The flow dir	nension
		displayed during th		tatic pressure measu	
· · · · · · · · · · · · · · · · · · ·					
10 ° 10 ' 10 'CD	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>	transducer depth, w		the CHir phase using value of 1,846.7 kl	

	Test Sumi	nary Sheet			
Project:	Oskarshamn site investigation				CHiı
Area:	Laxema	Test no:			1
Borehole ID:	KLX08	Test start:			061008 19:00
Test section from - to (m):	223.50-243.50 m			Reinde	er van der Wal
Section diameter, 2·r <sub>w</sub> (m):	0.076	test execution: Responsible for		Criet	Philipp Wol
occion dameter, 2 1 <sub>w</sub> (m).	0.070	test evaluation:		Onst	ian Enachesee
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
2400 KLX08_223.50-243.50_061008_1_CHir_Q_r	• P section	p <sub>0</sub> (kPa) =	2021		
	P above P below Q	p <sub>i</sub> (kPa ) =	2021		
2300	16	$p_p(kPa) =$	2220	p <sub>F</sub> (kPa ) =	202
2200		$Q_p (m^3/s) =$	1.55E-04		
2000 Teg	• 12 <u>s</u>	tp (s) =	1200	t <sub>F</sub> (s) =	1200
2100	Rate [hm]	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-06
- sea page and a sea	b perform Rate (mm) 21	EC <sub>w</sub> (mS/m)=		<u> </u>	
2000		Temp <sub>w</sub> (gr C)=	9.9		
		Derivative fact.=		Derivative fact.=	0.02
1900 -	14	20	0.11	2 31114411 3 14341	0.02
1					
0,00 0,20 0,40 0,60 (Elapsed Tim	0,80 1,00 1,20 1,40 o (h)	Results		Results	
		Q/s $(m^2/s)=$	7.6E-06		
Log-Log plot incl. derivates- flo	ow period	$T_{\rm M} (m^2/s) =$	8.0E-06		
33 p		Flow regime:	transient	Flow regime:	transient
Elapsed time [h]		$dt_1 \text{ (min)} =$		$dt_1 \text{ (min)} =$	0.63
10 2	.10,	$dt_2 \text{ (min)} =$		$dt_2$ (min) =	3.2
1		$T (m^2/s) =$		$T (m^2/s) =$	3.4E-05
10 1	10 -1	S (-) =	1.0E-06		1.0E-06
		$K_s (m/s) =$		$K_s (m/s) =$	1.7E-06
	4	S <sub>s</sub> (1/m) =		$S_s (1/m) =$	5.0E-08
10 0	io point	$C_s(7/11) = C_s(7/11)$	NA	C (m <sup>3</sup> /Pa) =	4.1E-09
		$\frac{C(m/Pa) = C_D(-)}{C_D(-)}$	NA	$C(m/Pa) = C_D(-) =$	4.5E-0
10 11	10 3	$\xi(-)$ =		ξ(-) =	18.8
	•	S (-) -	5.9	ς (-) –	10.0
	10 <sup>4</sup>	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>10</sup> 10 <sup>11</sup>	10 <sup>12</sup> 10 <sup>13</sup> 10 <sup>14</sup>	$S_{GRF}(m/s) = S_{GRF}(-) =$	NA	$S_{GRF}(III/S) =$ $S_{GRF}(-) =$	NA
		$D_{GRF}(-) =$	NA	$D_{GRF}(\cdot) =$	NA
Log-Log plot incl. derivatives-	recovery period	Selected represe			
	Tool very period	dt <sub>1</sub> (min) =		C (m <sup>3</sup> /Pa) =	4.1E-09
Elapsed time (h)		$dt_1 (min) =$ $dt_2 (min) =$		$C_D(-) =$	4.1E-03
1			3.4E-05		4.5E-0 5.9
-	300	$T_{T} (m^{2}/s) = S (-) =$	1.0E-06		5.8
	10°	$K_s (m/s) =$	1.7E-06		
10	··.	$S_s (11/s) =$ $S_s (1/m) =$	5.0E-08		
	30 =	Comments:	J.U⊑-U0		I
	7.		tranomicai-it	f 3 /E 5 m2/2 1	arived from the
10 0	10 1 8	analysis of the CHi		f 3.4E-5 m2/s was d ne), which shows the	
	· · · · · · · · · · · · · · · · · · ·	derivative stabilizat			
	3	transmissivity is est	imated to be 1E	-5 m2/s to 6E-5 m2/	s. The flow
		dimension displayed			
10 0 10 1	10 2 10 3 10 4	at transducer depth,		om the CHir phase u t to a value of 2,020	
tD/CD					1 K E 2

	Test Sumi	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			CHi
Area:	Laxemai	Test no:			1
Borehole ID:	KLX08	Test start:			061008 21:09
Test section from - to (m):	243.50-264.50 m	Responsible for		Reinde	er van der Wal
. ,		test execution:			Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for test evaluation:		Crist	ian Enachescı
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
KLX08_243.50-263.50_061008_1_CHir_Q_r	P section	$p_0 (kPa) =$	2191		
2450	P above P below Q	p <sub>i</sub> (kPa ) =	2191		
2400	0.3	$p_p(kPa) =$	2391	p <sub>F</sub> (kPa ) =	219
2350	0,3	$Q_p (m^3/s) =$	3.43E-06		
<u>§</u> 2300 ·		tp (s) =	1200	t <sub>F</sub> (s) =	120
2250	R 201	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
2200	h je ction	$EC_w (mS/m) =$		0 0. 0 ( )	
2150		Temp <sub>w</sub> (gr C)=	10.2		
	0,1	Derivative fact.=	0.07	Derivative fact.=	0.0
2100 -					
2000	0,0 1,00 1,20 1,40				
0,00 0,20 0,40 0,60 Elapsed T		Results		Results	
		Q/s $(m^2/s)=$	1.7E-07		
Log-Log plot incl. derivates- fl	low period	$T_{\rm M} (m^2/s) =$	1.8E-07		
Consulting to		Flow regime:	transient	Flow regime:	transient
10. <sup>-5</sup> 10. <sup>-5</sup> 2apsective in	19, 2 10, 1	$dt_1$ (min) =	47.93	$dt_1$ (min) =	1.1
	T <sub>10</sub> '	$dt_2$ (min) =	64.58	$dt_2$ (min) =	16.4
1		$T (m^2/s) =$	3.3E-07	$T (m^2/s) =$	5.8E-0
	3	S (-) =	1.0E-06		1.0E-0
10 1		$K_s$ (m/s) =		$K_s$ (m/s) =	2.9E-0
	10 °	S <sub>s</sub> (1/m) =		S <sub>s</sub> (1/m) =	5.0E-0
[D. (1/49)]		$C (m^3/Pa) =$	NA	C (m <sup>3</sup> /Pa) =	8.3E-1
*	0.3 E	$C_D(-) =$	NA	$C_D(-) =$	9.1E-0
10 10	· · · · · · · · · · · · · · · · · · ·			ξ(-) =	15.0
• • •	10 -1	ξ (-) =	12.9	ς (-) =	15.0
•		$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>15</sup> 10 <sup>14</sup> 10 <sup>15</sup> tD	10 16 10 17 10 18	S <sub>GRF</sub> (-) =	NA	S <sub>GRF</sub> (-) =	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.	
		$dt_1$ (min) =	1.17	$C (m^3/Pa) =$	8.3E-1
Elapsed time (h)		$dt_2 \text{ (min)} =$		$C_D(-) =$	9.1E-0
10 2	ţ.				
10 2		_ , ,	5.8F-07	= (-) ع	15
10 2	300	$T_T (m^2/s) =$	5.8E-07 1.0F-06		15.0
10 3	300	$T_T (m^2/s) = S (-) =$	1.0E-06		15.0
10	300 10 <sup>2</sup>	$T_T (m^2/s) = S (-) = K_s (m/s) =$	1.0E-06 2.9E-08		15.0
10	A P. D.	$T_T (m^2/s) = S (-) = K_s (m/s) = S_s (1/m) = S_s (1$	1.0E-06		15.0
10 6	A P. D.	$T_T (m^2/s) = S (-) = K_s (m/s) = S_s (1/m) = Comments:$	1.0E-06 2.9E-08 5.0E-08		
10 0	10 <sup>2</sup>	$T_T (m^2/s) =$ $S (-) =$ $K_s (m/s) =$ $S_s (1/m) =$ Comments: The recommended	1.0E-06 2.9E-08 5.0E-08 transmissivity of	f 5.8E-7 m2/s was do	erived from the
10	102	$T_T$ (m <sup>2</sup> /s) = S (-) = K <sub>s</sub> (m/s) = S <sub>s</sub> (1/m) = Comments: The recommended analysis of the CHin	1.0E-06 2.9E-08 5.0E-08 transmissivity of r phase, which sl	f 5.8E-7 m2/s was do	erived from the
10 10 10 10 10 10 10 10 10 10 10 10 10 1	10 <sup>2</sup>	$T_T$ (m <sup>2</sup> /s) = S (-) = K <sub>s</sub> (m/s) = S <sub>s</sub> (1/m) = Comments: The recommended analysis of the CHillate times. The constitution	1.0E-06 2.9E-08 5.0E-08 transmissivity of r phase, which slidence range for	f 5.8E-7 m2/s was do hows a derivative star the interval transm	erived from the abilization at issivity is
10 10	10 <sup>2</sup>	$T_T$ (m <sup>2</sup> /s) = S (-) = K <sub>s</sub> (m/s) = S <sub>s</sub> (1/m) = Comments: The recommended analysis of the CHillate times. The consestimated to be 1E-	1.0E-06 2.9E-08 5.0E-08 transmissivity of r phase, which stidence range for 7 m2/s to 1E-6 r	f 5.8E-7 m2/s was do	erived from the abilization at issivity is nsion displayed
10 <sup>2</sup>	10 <sup>2</sup>	T <sub>T</sub> (m <sup>2</sup> /s) = S (-) = K <sub>s</sub> (m/s) = S <sub>s</sub> (1/m) = Comments: The recommended analysis of the CHillate times. The consestimated to be 1E-during the test is 2.	1.0E-06 2.9E-08 5.0E-08 transmissivity of r phase, which slidence range for 7 m2/s to 1E-6 r The static pressure CHir phase us	f 5.8E-7 m2/s was do hows a derivative star the interval transm m2/s. The flow dime ure measured at tran sing straight line extra	abilization at issivity is insion displayed sducer depth,

	Test Su	mmary Sheet			
Project:	Oskarshamn site investiga				CHiı
Area:	Laxe	mar Test no:			1
Borehole ID:	KL	X08 Test start:			061008 23:10
Test section from - to (m):	264.00-284.0	0 m Responsible for		Reinde	er van der Wal
OtiditO ()		test execution:		0	Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.	076 Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
2600	12,0	Indata	*************************	Indata	-1
KLX08_264.00-284.00_061008_1_CHir_Q_r	P section     P above     P below	p <sub>0</sub> (kPa) =	2365		
ļ :	· q	p <sub>i</sub> (kPa ) =	2364		
2500	• 1,5	$p_p(kPa) =$	2564	p <sub>F</sub> (kPa ) =	2364
2450		$Q_p (m^3/s) =$	9.65E-06		1
g 200		tp (s) =		t <sub>F</sub> (s) =	1200
g 2350	1,0	S el S* (-)=		S el S <sup>*</sup> (-)=	1.00E-0
2200	×.	EC <sub>w</sub> (mS/m)=	1.501 00	∪ <del>∈</del>   ∪ (-)−	1.501.00
	0.5	Temp <sub>w</sub> (gr C)=	10.5		
2250 -		Derivative fact.=		Derivative fact.=	0.03
2200		Delivative fact.	0.04	Denvative fact.	0.0.
2150 0,00 0,20 0,40 0,60	0,0 0,80 1,00 1,20 1,40				
Elapsed Time	o [h]	Results		Results	
		Q/s $(m^2/s)=$	4.7E-07		
Log-Log plot incl. derivates- flo	ow period	$T_M (m^2/s) =$	5.0E-07		
-5 -5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	r	Flow regime:	transient	Flow regime:	transient
Elapsed time [h]	10,-1	$dt_1 (min) =$	<u>l</u>	$dt_1 \text{ (min)} =$	0.14
		$dt_2 \text{ (min)} =$		$dt_2 \text{ (min)} =$	0.62
		$T (m^2/s) =$		$T (m^2/s) =$	3.8E-07
		S (-) =	1.0E-06		1.0E-06
10 1		$K_s (m/s) =$		$K_s (m/s) =$	1.9E-08
2 0 5 70 7	·	C (1/m) -		$S_s(1/m) =$	5.0E-08
	** **	$C (m^3/Pa) =$	NA	C (m <sup>3</sup> /Pa) =	8.1E-1
	11/21/21	, · · · · ·	NA	` '	8.9E-03
10 °		-0()		<b>9</b> D ( )	-1.1
		ξ(-) =	-1.0	ξ (-) =	-1.
	- T. A.	_ , 2, ,	NA	_ , 2, ,	NA
102 103	10 4 10 5 10 6	$T_{GRF}(m^2/s) =$	NA NA	$T_{GRF}(m^2/s) =$	NA
1D		OGRF(-) –	NA	$S_{GRF}(-) = D_{GRF}(-) =$	NA
Log Log plot incl. derivatives	rocovery period	- OKI ( )		- OKI ( )	
Log-Log plot incl. derivatives-	recovery period	Selected represe		-	0 4 5 4 4
Elapsed time [h]	10,-2	at ()		$C (m^3/Pa) =$	8.1E-11
-		$dt_2 (min) =$		$C_D(-) =$	8.9E-03
	a sala sala di sala sala sala sala sala sala sala sal	$T_T (m^2/s) =$	3.8E-07		-1.1
	111	S (-) =	1.0E-06		
10 0		$K_s (m/s) =$	1.9E-08		
	3	O <sub>s</sub> (1/111) –	5.0E-08		
	10	Comments:		62 OF 5 2'	
	Maria de la companya della companya	The recommended		f 3.8E-7 m2/s was d	
10 -1	3			one), which shows a for the interval trans	
				n2/s. The flow dime	
1	11		The static press	ure measured at tran	sducer depth,
	•				
10 0 10	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>	was derived from the Horner plot to a va			rapolation in the

	Test Su	ımr	nary Sheet			
Project:	Oskarshamn site investiga					CHi
Area:	Laxe	mar	Test no:			1
Borehole ID:	KL	X08	Test start:	061009 01:		
Test section from - to (m):	284.00-304.0	00 m	Responsible for		Reinde	er van der Wal
			test execution:			Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0	.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p	1		Flow period		Recovery period	
			Indata		Indata	
2800		В	p <sub>0</sub> (kPa) =	2536		
2750 . KLX08_284.00-304.00_061009_1_CHir_Q_r	P section P above P below		p <sub>i</sub> (kPa ) =	2534		
2700 -	P below Q	,	$p_p(kPa) =$	2734	p <sub>F</sub> (kPa ) =	253-
2650	:	6	$Q_p (m^3/s) =$	4.16E-05		200
_	:	5	tp (s) =		t <sub>F</sub> (s) =	120
<u>g</u> 2000	<u>:</u>	de [l/min]			S el S <sup>*</sup> (-)=	1.00E-0
2550 6	<u></u>	njection Rate [[/min]	S el S <sup>*</sup> (-)= EC <sub>w</sub> (mS/m)=	1.00E-00	S el S (-)=	1.00L-0
2500 ·		3	Temp <sub>w</sub> (gr C)=	10.7		
2450	Activity of the second second second	2			Demissatissa faat –	0.0
2400			Derivative fact.=	0.04	Derivative fact.=	0.0
2350		1				
0,00 0,20 0,40 0,60	0,80 1,00 1,20 1,40	0				
Elapsed Ti	me [h]		Results		Results	Ţ
	<del></del>		Q/s $(m^2/s)=$	2.0E-06		
Log-Log plot incl. derivates- flo	ow period		$T_M (m^2/s) =$	2.1E-06		
Elapsed time (h)			Flow regime:	transient	Flow regime:	transient
10 2	101010.		$dt_1$ (min) =		$dt_1 (min) =$	0.94
			$dt_2$ (min) =	17.14	$dt_2$ (min) =	11.02
10 1		10 0	$T (m^2/s) =$	6.6E-06	$T (m^2/s) =$	6.6E-0
0.3 0.00 0.000 0.000			S (-) =	1.0E-06	S (-) =	1.0E-0
10 °		10 -1	$K_s$ (m/s) =	3.3E-07	$K_s$ (m/s) =	3.3E-0
		_	$S_s (1/m) =$	5.0E-08	S <sub>s</sub> (1/m) =	5.0E-0
by) del		54 17q)'[mirrl	C (m³/Pa) =	NA	C (m³/Pa) =	1.2E-09
10		10 9	$C_D(-) =$	NA	$C_D(-) =$	1.3E-0
			ξ(-) =	-1.8	ξ (-) =	1.0
10 2		10 -3				
			$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>2</sup> 10 <sup>3</sup> tD	10 4 10 5 10 6	10 4	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
			D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period		Selected represe			
gg p			$dt_1$ (min) =		C (m <sup>3</sup> /Pa) =	1.2E-09
Elapsed time [h	J 10. <sup>2</sup>	1	$dt_1 \text{ (min)} =$ $dt_2 \text{ (min)} =$		$C_D(-) =$	1.3E-0
10				6.6E-06		1.3L-0
		10 <sup>3</sup>	$T_{T} (m^{2}/s) = S (-) =$	1.0E-06		1.1
10 1						
- Annual Control of the Control of t		10 <sup>2</sup>	$K_s (m/s) =$ $S_s (1/m) =$	3.3E-07		<u> </u>
			-5 ()	5.0E-08		
e 10 °		(). [kPa]	Comments:		0.6.F. 6. <b>0</b> /	. 10 1
*	<b>!</b>	10 1 00	The recommended to analysis of the CHir		f 6.6E-6 m2/s was d	
	A	_	derivative quality.			
	**• * · ·	-			6 m2/s. The flow di	
10 -1			is estillated to be 2.			
10 4		10 °	displayed during the	e test is 2. The s	tatic pressure measu	
10 "	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>			e test is 2. The s as derived from	tatic pressure measu the CHir phase usin	g straight line

	Test	Sumn	nary Sheet				
Project:	Oskarshamn site inves					CHi	
Area:	La	axemar	Test no:			1	
Borehole ID:		KLX08	Test start:		061009 06:		
Test section from - to (m):	304.00-32	4.00 m	Responsible for		Reinde	er van der Wal	
Section diameter, 2·r <sub>w</sub> (m):	oter 2·r (m)· 0.076		test execution: Responsible for		Criet	Philipp Wol	
Section diameter, 2 1 <sub>W</sub> (III).		0.070	test evaluation:		Olist	iaii Liiaciiesco	
Linear plot Q and p			Flow period		Recovery period		
			Indata		Indata		
3200		0,08	p <sub>0</sub> (kPa) =	2706			
3100	KLX08_304.00-324.00_061009_1_CHir_Q_r	- 0,07	p <sub>i</sub> (kPa ) =	2705			
:	P section P above P below		$p_p(kPa) =$	2905	p <sub>F</sub> (kPa ) =	2704	
3000	· Q	- 0.06	$Q_p (m^3/s) =$	6.17E-07	F1 ( 5. )	-,*	
	•	- 0,05	tp (s) =		t <sub>F</sub> (s) =	1200	
2900		Rate Pmin	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0	
9. 2800	Commence of the second	In je ction	EC <sub>w</sub> (mS/m)=	1.002 00	3 61 3 (-)-	1.002 0	
ă		0,03	Temp <sub>w</sub> (gr C)=	11.0 €			
2700		- 0,02	Derivative fact.=		Derivative fact.=	0.04	
2600		- 0,01	Denvative lact.	0.00	Denvative fact.	0.0	
-	<u>i</u>						
2500 0,00 0,20 0,40 0,60 0,80 Flanced Ti	1,00 1,20 1,40 me fb1	1,60	Results		Results		
				3.0E-08		1	
Log-Log plot incl. derivates- fl	ow pariod		Q/s $(m^2/s)=$	3.0E-08			
Log-Log plot incl. derivates- in	ow period		T <sub>M</sub> (m <sup>2</sup> /s)= Flow regime:	transient	Flow regime:	transient	
10.4 10.3 Elapsed time [	h) 10. <sup>-1</sup>		<u> </u>		-		
10 1			GC1 ()		dt <sub>1</sub> (min) =	2.98	
			$dt_2$ (min) =		dt <sub>2</sub> (min) =	13.90	
		10 1	$T (m^2/s) =$		$T (m^2/s) =$	1.8E-07	
10 7	^ <u>^</u>		S (-) =	1.0E-06		1.0E-06	
			$K_s$ (m/s) =		$K_s$ (m/s) =	9.0E-09	
D 10 -1		10 °	$S_s (1/m) =$		$S_s(1/m) =$	5.0E-08	
O day			C (m <sup>3</sup> /Pa) =	NA	$C (m^3/Pa) =$	4.6E-1	
	* * * **	10 -1	$C_D(-) =$	NA	$C_D(-) =$	5.1E-03	
10 2			ξ(-) =	-0.1	ξ (-) =	2.7	
		10 -2	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA	
10 1 10 2 ED	10 3 10 4	10 5	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA	
			D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA	
Log-Log plot incl. derivatives-	recovery period		Selected represe	ntative paran	neters.		
Elapsed time [h]	1		dt <sub>1</sub> (min) =		C (m <sup>3</sup> /Pa) =	4.6E-1	
10 1	10,"	10.	$dt_2$ (min) =		$C_D(-) =$	5.1E-03	
		300	$T_T (m^2/s) =$	1.3E-07		-0.	
Par sa			S (-) =	1.0E-06			
		10 2	$K_s$ (m/s) =	6.5E-09			
10 0			$S_s (1/m) =$	5.0E-08		1	
		30	Comments:			1	
		10 1	The recommended t	ransmissivity of	f 1 3E-7 m2/s was d	erived from the	
10 -1		1	analysis of the CHi				
	.;,	3	derivative quality. T	he confidence i	ange for the interva	l transmissivity	
			is estimated to be 21				
		10 °	zone transmissivity)				
10 ° 10 tDICD	10 <sup>2</sup> 10 <sup>3</sup>	10 4	The static pressure in CHir phase using st				
			Lerm phase using St	iaigin iiiic talla	polation in the HOII	ioi piùi io a	

	Test Sum	mary Sheet			
Project:	Oskarshamn site investigation	n Test type:[1]			CHir
Area:	Laxema	ar Test no:			1
Borehole ID:	KLX0	8 Test start:			061009 08:23
Test section from - to (m):	324 00-344 00	n Responsible for		Reinde	er van der Wall
	324.00-044.001	test execution:			Philipp Wolf
Section diameter, 2·r <sub>w</sub> (m):	0.07	6 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation:		Recovery period	
		Indata		Indata	
3150 KLX08_324.00-344.00_061009_1_CHir_Q_r	0,010	p <sub>0</sub> (kPa) =	2877		
KLX08_324.00-344.00_061009_1_CHIr_Q_F	P above P below 0,009	p <sub>i</sub> (kPa ) =	2887		
3050	0,008	$p_p(kPa) =$	3087	p <sub>F</sub> (kPa ) =	2893
3000	0,007	$Q_p (m^3/s) =$	5.17E-08		20%
<u></u>	0,006 5	tp (s) =		t <sub>F</sub> (s) =	1200
2000	0.00.0 B			S el S <sup>*</sup> (-)=	1.00E-06
of the state of th	To log	S el S <sup>*</sup> (-)= EC <sub>w</sub> (mS/m)=	1.00E-00	S el S (-)=	1.00E-00
8 2850 ·	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		11.2		
2800	0,003	Temp <sub>w</sub> (gr C)=	11.2		0.00
2750	0,002	Derivative fact.=	NA	Derivative fact.=	0.02
2700	0,001				
2650	1,00 1,20 1,40 1,60 1,80				
Elapsed Tin	ne (h)	Results		Results	
		Q/s $(m^2/s)=$	2.5E-09		
Log-Log plot incl. derivates- fl	ow period	$T_{\rm M} (m^2/s) =$	2.7E-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	$T (m^2/s) =$	2.7E-09
		S (-) =	NA	S (-) =	1.0E-06
		$K_s$ (m/s) =	NA	$K_s$ (m/s) =	1.4E-10
Not A	nalysed	$S_s$ (1/m) =	NA	$S_s (1/m) =$	5.0E-08
1101111	iaiyseu	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	7.1E-1
		$C_D(-) =$	NA	$C_D(-) =$	7.8E-03
		ξ (-) =	NA	ξ (-) =	2.4
		$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
		S <sub>GRF</sub> (-) =	NA	S <sub>GRF</sub> (-) =	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected repres	entative paran	neters.	
Phys. 141 - 24		$dt_1$ (min) =	NA	$C (m^3/Pa) =$	7.1E-1
10 1 10, 3 10, 2 Elapsed time [h]	10,-1	$dt_2$ (min) =	NA	$C_D(-) =$	7.8E-03
	300	$T_T (m^2/s) =$	2.7E-09		2.4
1	10 <sup>2</sup>	S (-) =	1.0E-06		
	i da	$K_s (m/s) =$	1.4E-10		
10 0	30	S <sub>s</sub> (1/m) =	5.0E-08		
		Comments:			
i   /	10 1	<u> 원</u>	transmissivity o	f 2.7E-9 m2/s was d	erived from the
10 41		analysis of the CHi	ir phase (inner zo	one). The confidence	e range for the
	3			to be 9E-10 m2/s to	
	10 °	static pressure coul	ld not be extrapo	lated due to the low	transmissivity.
	10				
10 ·1 10 ° (D)CD	10 <sup>1</sup> 10 <sup>2</sup> 10 <sup>3</sup>				
tD/CD					

	Test Sun	mary Sheet			
Project:	Oskarshamn site investigation				CHi
Area:	Laxem	ar Test no:			1
Borehole ID:	KLX	08 Test start:			061009 10:41
Test section from - to (m):	344.00-364.00	m Responsible for		Reinde	er van der Wal
Section diameter, 2·r <sub>w</sub> (m):	0.0	test execution: '6 Responsible for		Criet	Philipp Wol
Section diameter, 24 <sub>w</sub> (iii).	0.07	test evaluation:		Clist	iaii Eliaciiesci
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
3300	0,12	p <sub>0</sub> (kPa) =	3048		
KLX08_344.00-364.00_061009_1_CHir_Q_r	P above P below Q	p <sub>i</sub> (kPa ) =	3048		
3200 1	0,10	$p_p(kPa) =$	3248	p <sub>F</sub> (kPa ) =	304
	:	$Q_p (m^3/s) =$	7.27E-07		
3150	• • • • • • • • • • • • • • • • • • • •	tp (s) =	1200	t <sub>F</sub> (s) =	120
€ 3100 - # 8	3 800 t	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0
g 3050	nipector Reab (kmm)	EC <sub>w</sub> (mS/m)=	1.002 00	3 61 3 (-)-	1.002 0
3000	004	Temp <sub>w</sub> (gr C)=	11.5		
2950		Derivative fact.=		Derivative fact.=	0.0
:	0,02	Denvative lact.	0.10	Derivative lact.	0.0
2900					<del> </del>
2850 0,00 0,20 0,40 0,60 Elapsed Tim	0,00 1,00 1,20 1,40 a fbl	Results		Results	
Espect in	e (ii)		3.6E-08		1
Log-Log plot incl. derivates- flo	ow poriod	Q/s $(m^2/s)=$	3.7E-08		
Log-Log plot ilici. derivates- ili	ow period	T <sub>M</sub> (m <sup>2</sup> /s)= Flow regime:	transient	Flow regime:	transient
10, -3 Elapsed time [h]		dt <sub>1</sub> (min) =		dt <sub>1</sub> (min) =	#NV
10 10 10 10 10 10 10 10 10 10 10 10 10 1	30			` ′	
.:.	10 <sup>1</sup>	$dt_2 (min) =$		dt <sub>2</sub> (min) =	#NV
		$T (m^2/s) =$		$T (m^2/s) =$	6.2E-0
10 0		S (-) =	1.0E-06	` '	1.0E-0
		$K_s$ (m/s) =	1	$K_s (m/s) =$	3.1E-0
: .	10 °	S <sub>s</sub> (1/m) =		$S_s(1/m) =$	5.0E-0
	-	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	5.7E-1
10 -1	0.3	$C_D(-) =$	NA	$C_D(-) =$	6.3E-0
÷	10 -1	ξ(-) =	-1.0	ξ (-) =	7.
		$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>3</sup> 10 <sup>4</sup> tD	10 5 10 6 10 7	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
		$D_{GRF}$ (-) =	NA	$D_{GRF}$ (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.	
Elapsed time (h		$dt_1$ (min) =	0.82	$C (m^3/Pa) =$	5.7E-1
10 2 10, 3 10, 3		$dt_2$ (min) =		$C_D(-) =$	6.3E-0
	10 3	$T_T (m^2/s) =$	4.0E-08	ξ (-) =	-1.0
		S (-) =	1.0E-06		
10 1	10	$K_s$ (m/s) =	2.0E-09		
	10	$S_s (1/m) =$	5.0E-08		
	\	₹ Comments:	<u> </u>		
	10 1	The recommended	transmissivity o	f 4.0E-8 m2/s was d	erived from the
		analysis of the CHi	phase, which sh	ows a horizontal sta	bilization of the
10 -1				or the interval transm	
	10 °			m2/s. The flow dime	
				ure measured at trar sing straight line ext	
10 ° 10 °	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>	Horner plot to a val			apoianon in the
tD/CD		riomer prot to a var	0. 0,0 10.1 KI		

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			CHiı
Area:	Laxemar	Test no:			1
Borehole ID:	KLX08	Test start:			061009 12:57
Total continue for an included	204.00.004.00	D		D I	
Test section from - to (m):	364.00-384.00 m	test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for		Crist	ian Enachescu
		test evaluation:			
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
3500 KLX08 384.00-384.00 061009 1 CHir Q r	• P section 12	p <sub>0</sub> (kPa) =	3218		
3450	Patove 11 Patowe 11	p <sub>i</sub> (kPa ) =	3218		
3400	- 10	$p_p(kPa) =$	3419	p <sub>F</sub> (kPa ) =	3219
3350	9	$Q_p (m^3/s) =$	7.96E-05		
<u>~</u> 3300 -	* - =	tp (s) =	1200	t <sub>F</sub> (s) =	1200
2350	e e e	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
	7 Tollow Carlos Balling St.	EC <sub>w</sub> (mS/m)=		()	
\$ 3300	14	Temp <sub>w</sub> (gr C)=	11.6		
3150	3	Derivative fact.=	0.07	Derivative fact.=	0.0
3100	72				
3050	1				
3000 0,00 0,20 0,40 0,60 0,80 Elapsed Tii		Results		Results	
Empare : •	p	Q/s $(m^2/s)=$	3.9E-06		1
Log-Log plot incl. derivates- fl	ow period	$T_{\rm M} (m^2/s) =$	4.1E-06		
	on ponou	Flow regime:	transient	Flow regime:	transient
Elapsed time [h]		dt <sub>1</sub> (min) =		dt <sub>1</sub> (min) =	0.80
10 2	10 °	$dt_1 \text{ (min)} =$ $dt_2 \text{ (min)} =$		$dt_1 (min) =$ $dt_2 (min) =$	5.2
1	10			= , ,	3.9E-0
10 1		$T (m^2/s) =$		$T (m^2/s) = S(-) =$	
	E 10 -1	S (-) =	1.0E-06	( )	1.0E-0
		$K_s$ (m/s) =		$K_s$ (m/s) =	2.0E-0
- 10°	i ii	$S_s(1/m) =$		$S_s(1/m) =$	5.0E-0
) del	E. (2):1:10 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	C (m <sup>3</sup> /Pa) =	NA	$C (m^3/Pa) =$	4.0E-10
	ا ﷺ	$C_D(-) =$	NA	$C_D(-) =$	4.4E-02
10 1	** A A A A A A A A A A A A A A A A A A	ξ (-) =	2.3	ξ (-) =	1.6
1	10 -3				
	•	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 ° 10 7	10 <sup>6</sup> 10 <sup>9</sup> 10 <sup>99</sup>	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	neters.	
Elapsed time (h	al a	$dt_1$ (min) =	0.79	$C (m^3/Pa) =$	4.0E-10
10 <sup>2</sup> 10, <sup>3</sup> 10, <sup>2</sup>		$dt_2$ (min) =		$C_D(-) =$	4.4E-02
1	10 3	$T_T (m^2/s) =$	2.3E-05	ξ(-) =	2.3
10 1		S (-) =	1.0E-06		
• • • • • • • • • • • • • • • • • • • •	10 <sup>2</sup>	$K_s$ (m/s) =	1.2E-06		
		$S_s (1/m) =$	5.0E-08		•
10		Comments:			
	10 10 10 10 10 10 10 10 10 10 10 10 10 1		transmissivity o	f 2.3E-5 m2/s was d	erived from the
10 -1	97 Odd	analysis of the CHi			
	10 °	derivative quality.	The confidence	ange for the interva	l transmissivity
		is estimated to be 5			
10 -2	<u> </u>				
10 2	10 -1	zone transmissivity)			
10 10 10 2 10 10 10 2	10.5 10.4 10.5	The static pressure	measured at trar	ension displayed dur isducer depth, was d polation in the Horn	erived from the

	Test Sum	mary Sheet					
Project:	Oskarshamn site investigation Test type:[1]			CHi			
Area:	Laxema	ar Test no:					
Borehole ID:	KLX0	8 Test start:			061009 15:01		
Test section from - to (m):	385.00-405.00 r	n Responsible for		Reinde	er van der Wal		
, ,		test execution:	Philipp W				
Section diameter, 2·r <sub>w</sub> (m):	0.07	6 Responsible for test evaluation:		Crist	ian Enachescu		
Linear plot Q and p		Flow period		Recovery period			
		Indata		Indata			
3500 KLX08_385.00-405.00_061009_1_CHir_Q_r	• P section	$p_0 (kPa) =$	3397				
	P above P below Q	p <sub>i</sub> (kPa ) =	3398				
3450	40	$p_p(kPa) =$	3450	p <sub>F</sub> (kPa ) =	3399		
3400		$Q_p (m^3/s) =$	4.97E-04				
[663]	30 [iii	tp (s) =	1200	t <sub>F</sub> (s) =	1200		
e	by cities Ress (Renic)	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0		
Домици от пределения пределения пределения пределения пределения пределения пределения пределения пределения п	20 st	$EC_w (mS/m)=$					
3300 -		Temp <sub>w</sub> (gr C)=	11.4				
-	10	Derivative fact.=	0.02	Derivative fact.=	0.0		
3250							
3200							
0,00 0,20 0.40 0,60 Elapsed Tin	0,80 1,00 1,20 1,40 me [h]	Results	esults		Results		
		Q/s $(m^2/s)=$	9.4E-05				
Log-Log plot incl. derivates- flo	ow period	$T_M (m^2/s) =$	9.8E-05				
		Flow regime:	transient	Flow regime:	transient		
10, 4 10, 3 Elapsed time (h)		$dt_1$ (min) =	2.00	$dt_1 (min) =$	0.3		
1	10 -1	$dt_2$ (min) =	18.06	$dt_2$ (min) =	2.2		
1		$T (m^2/s) =$	3.0E-04	$T (m^2/s) =$	2.4E-0		
• • • • • • •	0.03	S (-) =	1.0E-06	S (-) =	1.0E-0		
10		$K_s (m/s) =$	1.5E-05	$K_s$ (m/s) =	1.2E-0		
. 1	10 -2	$S_s (1/m) =$	5.0E-08	$S_s(1/m) =$	5.0E-0		
	0.003	C (m <sup>3</sup> /Pa) =	NA	$C (m^3/Pa) =$	3.2E-0		
10.0		$C_D(-) =$	NA	$C_D(-) =$	3.5E+0		
	10 <sup>-3</sup>	ξ (-) =	9.7	ξ (-) =	6.3		
	1 1 2 1 1 1 1						
	3E-4	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA		
10 <sup>14</sup> 10 <sup>15</sup> tD	10 16 10 17	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA		
		$D_{GRF}$ (-) =	NA	D <sub>GRF</sub> (-) =	NA		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.			
Elapsed time [h]		$dt_1$ (min) =	0.38	C (m <sup>3</sup> /Pa) =	3.2E-0		
10 2 10 10 10 10 10 10 10 10 10 10 10 10 10		$dt_2$ (min) =	2.27	$C_D(-) =$	3.5E+0		
†		$T_T (m^2/s) =$	2.4E-04	ξ (-) =	6.3		
	10 2	S (-) =	1.0E-06				
A A A A A A A A A A A A A A A A A A A		$K_s$ (m/s) =	1.2E-05				
	30	$S_s (1/m) =$	5.0E-08				
10	30	<b>S</b> ()					
10 .		Comments:	•				
10 T	10 '	Comments: The recommended		f 2.4E-4 m2/s was do			
10 T		Comments: The recommended analysis of the CHi	r phase (inner zo	one), which shows th	ne better data		
10 To		Comments: The recommended analysis of the CHi and derivative qual	r phase (inner zo	one), which shows the	ne better data erval		
50 T		Comments: The recommended analysis of the CHi and derivative qual transmissivity is est	r phase (inner zo ity. The confider imated to be 8E	one), which shows the nee range for the inter-5 m2/s to 6E-4 m2/	ne better data erval s. The flow		
10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	10°	Comments: The recommended analysis of the CHi and derivative qual transmissivity is est dimension displaye	r phase (inner zo ity. The confident imated to be 8E d during the test	one), which shows the	ne better data erval s. The flow ssure measured		

	Test Sumi	nary Sheet				
Project:	Oskarshamn site investigation Test type:		CHi			
Area:	Laxema	Test no:				
Borehole ID:	KLX08	Test start:			061009 16:55	
T. ( ( . )				D. C. I		
Test section from - to (m):	403.00-423.00 m	test execution:		Reinde	er van der Wal Philipp Wol	
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Q and p		test evaluation: Flow period		Recovery period		
		Indata		Indata		
	50	p <sub>0</sub> (kPa) =	3550			
KLX08_403.00-423.00_061009_1_CHir_Q_r 3620	P section P above P below	p <sub>i</sub> (kPa ) =	3550			
·	•Q	$p_p(kPa) =$	3561	p <sub>F</sub> (kPa ) =	355	
3570		$Q_p (m^3/s) =$	4.01E-04			
	30 =	tp (s) =	1200	t <sub>F</sub> (s) =	120	
3520	tele (Imir	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0	
A de de como a decomo a de como a de como a de como a decomo a de como a decomo a de como a decomo	St.	EC <sub>w</sub> (mS/m)=		0 0 0 ( )		
3470	. 120 =	Temp <sub>w</sub> (gr C)=	12.3			
		Derivative fact.=	0.01	Derivative fact.=	0.0	
3420	10	20	0.01	20	0.0	
3370	0					
0,00 0,20 0,40 0,60 C Elapsed Tim	l,80 1,00 1,20 1,40 <b>a [h]</b>	Results		Results		
		Q/s $(m^2/s)=$	3.6E-04			
Log-Log plot incl. derivates- flo	ow period	$T_{\rm M} (m^2/s) =$	3.7E-04			
		Flow regime:	transient	Flow regime:	transient	
Elapsed time [h]	10.°	$dt_1$ (min) =	#NV	$dt_1$ (min) =	0.69	
10	F10 -1	$dt_2$ (min) =	#NV	$dt_2$ (min) =	6.5	
1		$T (m^2/s) =$	2.3E-04	$T (m^2/s) =$	1.3E-0	
	0.03	S (-) =	1.0E-06	S (-) =	1.0E-0	
10 1		$K_s$ (m/s) =	1.2E-05	$K_s (m/s) =$	6.5E-0	
1	10-2	$S_s (1/m) =$	5.0E-08	$S_s (1/m) =$	5.0E-0	
1	0.003	C (m <sup>3</sup> /Pa) =	NA	$C (m^3/Pa) =$	5.5E-0	
10 -		C <sub>D</sub> (-) =	NA	C <sub>D</sub> (-) =	6.1E-0	
<u> </u>	10 3	ξ (-) =	8.6	ξ (-) =	-6.	
10 14 10 15	3E-4	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA	
tD .		$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA	
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA	
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	neters.		
		$dt_1$ (min) =	0.69	$C (m^3/Pa) =$	5.5E-09	
Elapsed time [h]	19, 210, 1	$dt_2 \text{ (min)} =$	6.59	$C_D(-) =$	6.1E-0	
10	30	$T_T (m^2/s) =$	1.3E-04		-6.	
		S (-) =	1.0E-06	- \ /	<del> </del>	
	10	$K_s (m/s) =$	6.5E-06			
10 °	m 3.000	$S_s (1/m) =$	5.0E-08			
1	3	Comments:	0.0∟-00		<u> </u>	
'	10° s		tranemiceivity of	f 1.3E-4 m2/s was d	erived from the	
10-1:	89			f 1.3E-4 m2/s was difidence range for th		
	0.3	transmissivity is est				
		dimension displaye				
10 1		at transducer depth, was derived from the CHir phase using straight				
	ı.					
10 ° 10 10 10 10 10 10 10 10 10 10 10 10 10	10 <sup>3</sup> 10 <sup>4</sup> 10 <sup>5</sup>	line extrapolation in	n the Horner plo	t to a value of 3,550	.9 kPa.	

	Test S	umr	nary Sheet						
Project:	Oskarshamn site investigation  Laxemar  KLX08  423.00-443.00 m					CHi			
Area:			Test no:			1			
Borehole ID:					Test start:	061009 18:50  Reinder van der Wal			
Test section from - to (m):									
Section diameter, 2·r <sub>w</sub> (m):		0 076	test execution: Responsible for	Philipp W Cristian Enaches					
occuon diameter, 2 i <sub>w</sub> (iii).		0.070	test evaluation:		Olist	ian Enachesee			
Linear plot Q and p			Flow period		Recovery period				
			Indata		Indata				
4000 VI Y09 423 00 443 00 004000 4 CNIs O .		T 0,6	p <sub>0</sub> (kPa) =	3719					
3950	P section P above P below		p <sub>i</sub> (kPa ) =	3719					
3900			$p_p(kPa) =$	3919	p <sub>F</sub> (kPa ) =	3719			
3850			$Q_p (m^3/s) =$	6.08E-06					
<u>₹</u> 3800	And the second s	0,4	tp (s) =	1200	t <sub>F</sub> (s) =	1200			
2 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	•	Rate (Il/mir	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0			
į		injection Rate [l/min]	EC <sub>w</sub> (mS/m)=		S 51 S (-)-				
\$ 3700 -		0,2	Temp <sub>w</sub> (gr C)=	12.6					
3650			Derivative fact.=		Derivative fact.=	0.00			
3800 -			Bonvairo laci.	0.02	Donvative ract.	0.0.			
3550									
3500 0,00 0,20 0,40 0,60 0 Elapsed Time		1,0,0	Results		Results				
Lapace I III	· ••1		$Q/s (m^2/s)=$	3.0E-07	1004110	1			
Log-Log plot incl. derivates- flo	ow period		$T_{\rm M} (m^2/s) =$	3.1E-07					
log log plot mon dontated me	, ponou		Flow regime:	transient	Flow regime:	transient			
Elapsed time (h)			dt <sub>1</sub> (min) =		dt <sub>1</sub> (min) =	0.33			
10		10 1	$dt_2 \text{ (min)} =$		$dt_2 \text{ (min)} =$	12.94			
					2	1.3E-0			
	2 0.001.00000000000000000000000000000000	3	$T (m^2/s) = S (-) =$	1.0E-06	. ,	1.0E-0			
10 1		10 °	$K_s (m/s) =$		$K_s (m/s) =$	6.5E-0			
		10				5.0E-0			
( control of the cont		0.3 [wim]	S <sub>s</sub> (1/m) =		95 ()	7.7E-1			
<u> </u>		1/4, (1/4)	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$				
10 0		10 -1	C <sub>D</sub> (-) =	NA 10.1	C <sub>D</sub> (-) =	8.5E-03			
			ξ (-) =	13.4	ξ (-) =	20.8			
.		0.03	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA			
10 <sup>14</sup> 10 <sup>15</sup> tD	10 16 10 17 10	18	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA			
			D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA			
Log-Log plot incl. derivatives-	recovery period		Selected represe	ntative paran					
	- ·		dt <sub>1</sub> (min) =		C (m <sup>3</sup> /Pa) =	7.7E-1			
Elapsed time [h]		1	$dt_2$ (min) =		$C_D(-) =$	8.5E-0			
			$T_T (m^2/s) =$	1.3E-06		20.8			
		300	S (-) =	1.0E-06					
/.		10 2	$K_s$ (m/s) =	6.5E-08					
10			$S_s(1/m) =$	5.0E-08					
		30 =	Comments:						
À	•	)-p0/ [kPa		ransmissivity	f 1.3E-6 m2/s was de	erived from the			
		10 1 8	analysis of the CHir						
••••			quality. The confide	ence range for th	e interval transmiss	ivity is			
		estimated to be 7E-7 m2/s to 4E-6 m2/s. The flo							
			during the test is 2.						
10 <sup>1</sup> 10 <sup>2</sup>	10 <sup>3</sup> 10 <sup>4</sup> 10	10 °	was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,718.9 kPa.			raporanon in the			
tD/CD			Troiner process a var	01 J, / 10.J KI	···				

	Test Sumi	mary Sheet			
Project:	Oskarshamn site investigation				CHi
Area:	Laxema	r Test no:			1
Borehole ID:	KLX08	Test start:	061009 21:0		
Test section from - to (m):	443.00-463.00 m	Responsible for		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.076	test execution: Responsible for	Philipp Cristian Enac		
		test evaluation:			
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
4200	P sertion	$p_0 (kPa) =$	3889		
KLX08_443.00-463.00_061009_1_CHir_Q_r 4150	P above     P below     O	p <sub>i</sub> (kPa ) =	3889		
4100	4.000 mm. Andrews Contract Con	$p_p(kPa) =$	4089	p <sub>F</sub> (kPa ) =	388
4050	1,2	$Q_p (m^3/s) =$	1.48E-05		
- *** - ***		tp (s) =	1200	t <sub>F</sub> (s) =	120
• • • • • • • • • • • • • • • • • • •	R 8 0 0	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
8 3900	· · · · · · · · · · · · · · · · · · ·	EC <sub>w</sub> (mS/m)=		( )	
ā		Temp <sub>w</sub> (gr C)=	12.9		
3800 -	- 0.4	Derivative fact.=	0.02	Derivative fact.=	0.0
3750					
3700 0,00 0,40 0,80 Elapsed Tim	0,0 0,0 1,00 1,20 1,40	Results		Results	
		Q/s $(m^2/s)=$	7.2E-07		
Log-Log plot incl. derivates- flo	ow period	$T_{\rm M} (m^2/s) =$	7.6E-07		
	•	Flow regime:	transient	Flow regime:	transient
Elapsed time (h) 10, 3 10, 2		dt <sub>1</sub> (min) =	0.73	$dt_1 \text{ (min)} =$	0.58
10	10 5	$dt_2 \text{ (min)} =$	17.05	$dt_2 \text{ (min)} =$	3.7
		$T (m^2/s) =$		$T(m^2/s) =$	3.1E-0
	3	S (-) =	1.0E-06	, ,	1.0E-0
10 1		$K_s (m/s) =$		$K_s (m/s) =$	1.6E-0
	10 "	S <sub>s</sub> (1/m) =		S <sub>s</sub> (1/m) =	5.0E-0
(nbu) r	L (Julia)	$C (m^3/Pa) =$	NA	C (m <sup>3</sup> /Pa) =	2.0E-1
	0.3 PBD:41	$C_D(-) =$	NA	$C_D(-) =$	2.2E-0
10 0	10 -1	ξ(-) =		ξ(-) =	20.3
		S (-) -	1.0	S (-) -	20.
	0.03	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>4</sup> 10 <sup>5</sup> tD	10 <sup>6</sup> 10 <sup>7</sup> 10 <sup>8</sup>	$S_{GRF}(-) =$	NA	S <sub>GRF</sub> (-) =	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran		
	•	$dt_1$ (min) =		C (m <sup>3</sup> /Pa) =	2.0E-10
Elapsed time [h] 10, 3 10, 3		$dt_2 \text{ (min)} =$		$C_D(-) =$	2.2E-0
		$T_T (m^2/s) =$	3.1E-06		20.
	300	S (-) =	1.0E-06		
	710 <sup>2</sup>	K <sub>s</sub> (m/s) =	1.6E-07		
10		S <sub>s</sub> (1/m) =	5.0E-08		
	30	Comments:	3.0L-00		
		×.	transmissivity o	f 3.3E-6 m2/s was d	arived from the
.\	10 1	analysis of the CHir			
10	· · · · · ·			ne interval transmiss	
	3	estimated to be 8E-	7 m2/s to 5E-6 r	n2/s. The flow dime	ension displayed
+		during the test is 2. The static pressure measured at transd			
		was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,888.9 kPa.			rapolation in the
		I Horner plot to a val	TIP OT 3 XXX 9 KI	*3	

	Test Sum	mary Sheet				
Project:	Oskarshamn site investigation	Test type:[1]	CHir			
Area:	Laxema	r Test no:				
Borehole ID:	KI X08	B Test start:		061009 23:3		
Test section from - to (m):	463.00-483.00 m	Responsible for test execution:		Reinder van der Wa Philipp Wo		
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for	Cristian Enaches			
Linear plot Q and p		test evaluation: Flow period		Recovery period		
Linear plot & and p		Indata	Indata			
	8	p <sub>0</sub> (kPa) =	4060			
. KLX08_463.00-483.00_061009_2_CHir_Q_	• P section • P above • P below • 7	p <sub>i</sub> (kPa ) =	4060			
	• P below • 7 • Q	$p_p(kPa) =$	4260	p <sub>F</sub> (kPa ) =	4059	
4250	• 6	$Q_p (m^3/s) =$	6.82E-05			
- i	+ 5	tp(s) =		t <sub>F</sub> (s) =	1200	
8 4150	• Immin)	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-06	
3 m 1950 1 m	the form Rese pinning	EC <sub>w</sub> (mS/m)=	1.002 00	3 61 3 (-)-	1.002 0	
4050	3	Temp <sub>w</sub> (gr C)=	13.2			
	12	Derivative fact.=		Derivative fact.=	0.0:	
3950		Denvative ract.	0.03	Derivative fact.	0.0.	
3850	0,60 0,70 0,80 0,90 1,00 [h]	Results	Results			
		Q/s $(m^2/s)=$	3.3E-06			
Log-Log plot incl. derivates- flo	w period	$T_{\rm M} (m^2/s) =$	3.5E-06			
		Flow regime:	transient	Flow regime:	transient	
Elapsed fime [h]		$dt_1$ (min) =	0.70	$dt_1$ (min) =	0.7	
10		$dt_2$ (min) =	18.95	$dt_2$ (min) =	18.67	
	10 °	$T (m^2/s) =$	5.8E-06	$T (m^2/s) =$	8.7E-06	
		S (-) =	1.0E-06	\ -/	1.0E-06	
10 1	0.3	$K_s (m/s) =$	2.9E-07	K <sub>s</sub> (m/s) =	4.4E-0	
	10 -1	$S_s (1/m) =$		S <sub>s</sub> (1/m) =	5.0E-0	
A Comment		C (m <sup>3</sup> /Pa) =	NA	C (m <sup>3</sup> /Pa) =	1.3E-09	
	0.03	$C_D(-) =$	NA	$C_D(-) =$	1.4E-0	
10 °		ξ(-) =		ξ(-) =	7.9	
	10 2	S (-) -	-0.0	S (-) -	7.	
+	0.003	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA	
10 ° 10 7	10 <sup>8</sup> 10 <sup>9</sup> 10 <sup>10</sup>	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA	
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA	
Log-Log plot incl. derivatives- r	ecovery period	Selected represe	entative paran	neters.		
Elapsed time [h]		$dt_1$ (min) =	0.71	$C (m^3/Pa) =$	1.3E-09	
10. <sup>-5</sup> 10. <sup>-4</sup> 10, <sup>-3</sup>	10,12	$dt_2$ (min) =	18.67	,	1.4E-0°	
1		$T_T (m^2/s) =$	8.7E-06	ξ(-) =	7.9	
1	300	S (-) =	1.0E-06			
	g-a-000 00000000000000000000000000000000	$K_s (m/s) =$	4.4E-07		†	
10 ]	10 2	$S_s(1/m) =$	5.0E-08			
		Comments:	1		<u>I</u>	
· .	30	ě	transmissivity of	f 8.7E-6 m2/s was d	erived from the	
90 0	· · · · · · · · · · · · · · · · · · ·			hows the better data		
	10			ne interval transmiss		
	and a second of the second of	estimated to be 5E-	6 m2/s to 1E-5 r	n2/s. The flow dime	nsion displayed	
1	3	during the test is 2. The static pressure measured at transducer dep				
					1	
10 ° 10 ' 1D/CO	10 2 10 3 10 4	was derived from the Horner plot to a val			rapolation in the	

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation				CHi
Area:	Laxemar	Test no:			1
Borehole ID:	KLX08	Test start:			061010 01:14
Test section from - to (m):	483.00-503.00 m	Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for		Crist	ian Enachescu
		test evaluation:			
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
KLX08_483.00-503.00_061010_1_CHir_Q_r	■ Receive	p <sub>0</sub> (kPa) =	4227		
4500	A P above - P below 0.9	p <sub>i</sub> (kPa ) =	4227		
	0,8	$p_p(kPa) =$	4427	p <sub>F</sub> (kPa ) =	422
4400	• • • • • • • • • • • • • • • • • • • •	$Q_p (m^3/s) =$	6.45E-06		
	· 10.6 <u>-</u>	tp (s) =	1200	t <sub>F</sub> (s) =	1200
Te d. 1.000 -	0.5 United age of 0.5 No. 5 No	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
	la l	EC <sub>w</sub> (mS/m)=		. ,	
<b>a</b> 4200	10,4 =	Temp <sub>w</sub> (gr C)=	13.4		1
	0.3	Derivative fact.=	0.08	Derivative fact.=	0.02
4100	. +02				
	. 0,1				
4000 0,00 0,40 0,60 Elapsed	0,0 0,80 1,00 1,20 1,40 Time (h)	Results		Results	1
		Q/s $(m^2/s)=$	3.2E-07		
Log-Log plot incl. derivates- f	low period	$T_M (m^2/s) =$	3.3E-07		
- <b>5</b> - <b>6</b>	Profes	Flow regime:	transient	Flow regime:	transient
Elapsed time (	h] 10, 10, 10, 10, 10, 10, 10, 10, 10, 10,	$dt_1 (min) =$		dt <sub>1</sub> (min) =	1.07
10 2	-	$dt_2 \text{ (min)} =$		$dt_2$ (min) =	8.8
	10 '	$T (m^2/s) =$		$T (m^2/s) =$	1.3E-06
10 12		S (-) =	1.0E-06	` '	1.0E-06
		$K_s (m/s) =$		$K_s (m/s) =$	6.5E-08
	10 °	$S_s (1/m) =$		$S_s(1/m) =$	5.0E-0
(10 0)	and a		NA	$C (m^3/Pa) =$	1.0E-10
·	110 the trial to the trial tri	$C (m^3/Pa) = C_D (-) =$	NA	, ,	1.1E-0
	3	- 5 ( )		$C_{D}(-) = \xi(-) =$	4.0
10 -1	•	ξ(-) =	2.2	ς (-) =	4.0
•	- 10 <sup>-2</sup>	<b>-</b> , 2, ,	NA	<b>-</b> , 2, ,	NA
10 <sup>5</sup> 10 <sup>6</sup>	10 <sup>7</sup> 10 <sup>8</sup> 10 <sup>9</sup>	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$ $S_{GRF}(-) =$	NA
.0		$S_{GRF}(-) = D_{GRF}(-) =$	NA	- ORT C	NA
Log-Log plot incl. derivatives	roccyony poriod	D <sub>GRF</sub> (-) = Selected represe		- OKI ( )	INA
Log-Log plot ilici. delivatives	- recovery period				1.0E-10
Elapsed time	[h]10, 2	GC1 ()		$C (m^3/Pa) =$	
10 4	F 40 3	$dt_2 (min) =$		$C_D(-) =$	1.1E-02
		$T_T (m^2/s) =$	1.0E-06		2.2
10 1	0 0 00 000 000 0000	S (-) =	1.0E-06		
, , ,	10 <sup>2</sup>	K <sub>s</sub> (m/s) =	6.5E-08		
		$S_s (1/m) =$	5.0E-08		
a 10°	7 pg 96	Comments:		24.05.6.51	
	101 1 90 100	The recommended t			
1/		analysis of the CHi derivative quality. T			
	ł				
10 -1		is estimated to be 7	E-/ m2/s to 4E-	o m2/s. The now an	
10 1	10 °	displayed during the	e test is 2. The s	tatic pressure measu	red at
10 ° 10 ° 10 °	10°		e test is 2. The s as derived from	tatic pressure measu the CHir phase usin	red at g straight line

	Test Sumi	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Р
A	1	T4			
Area:	Laxema	Test no:			1
Borehole ID:	KLX08	Test start:			061010 06:13
Test section from - to (m):	503.00-523.00 m			Reinde	er van der Wal
Section diameter, 2·r <sub>w</sub> (m):	0.076	test execution: Responsible for		Criet	Philipp Wol
Section diameter, 21 <sub>w</sub> (iii).	0.076	test evaluation:		Clist	ian Enachescu
Linear plot Q and p	•	Flow period		Recovery period	
		Indata		Indata	
4700 KLX08_503.00-523.00_061010_1_Pi_Q_r	• P section 0,004	p <sub>0</sub> (kPa) =	4396		
4650	• P above • P below • Q	p <sub>i</sub> (kPa ) =	4410		
4600		$p_p(kPa) =$	4627	p <sub>F</sub> (kPa ) =	447
4550 -	0,003	$Q_p (m^3/s) =$	#NV		
<u>€</u> 4500 -		tp (s) =	10	t <sub>F</sub> (s) =	366
0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	i i i i i i i i i i i i i i i i i i i	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0
	Physician (1999)	$EC_w (mS/m) =$		0 0.0 ( )	
8 4400		Temp <sub>w</sub> (gr C)=	13.7		
4350		Derivative fact.=	NA	Derivative fact.=	0.0
4300		Derivative lact.	IVA	Denvative fact.	0.0
4250 -	• •				
	0,000	Results		Results	
Elapsed Ti	me (h)	Q/s $(m^2/s)=$	NA	resuits	
Log-Log plot incl. derivates- f	low period		NA		
Log-Log plot ilici. delivates- il	low period	T <sub>M</sub> (m <sup>2</sup> /s)= Flow regime:	transient	Flow regime:	transient
		_			
		$dt_1 (min) =$	NA	dt <sub>1</sub> (min) =	#NV
		$dt_2$ (min) =	NA	dt <sub>2</sub> (min) =	#NV
		$T (m^2/s) =$	NA	$T (m^2/s) =$	4.9E-1
		S (-) =	NA	S (-) =	1.0E-0
		$K_s$ (m/s) =	NA	$K_s$ (m/s) =	2.5E-1
Not A	nalysed	$S_s (1/m) =$	NA	$S_s(1/m) =$	5.0E-0
		$C (m^3/Pa) =$	NA	C (m <sup>3</sup> /Pa) =	5.9E-1
		$C_D(-) =$	NA	$C_D(-) =$	6.5E-0
		ξ (-) =	NA	ξ (-) =	-1.
		$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
		$S_{GRF}(-) =$	NA	S <sub>GRF</sub> (-) =	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected repres	entative paran		
Elaosed time (	ini	$dt_1$ (min) =	NA	C (m <sup>3</sup> /Pa) =	5.9E-1
10 1 10 3 10 2 10 10 10 10 10 10 10 10 10 10 10 10 10	10,-1	$dt_2 \text{ (min)} =$	NA	$C_D(-) =$	6.5E-0
	3	$T_T (m^2/s) =$	4.9E-11		-1.3
+		S (-) =	1.0E-06		
	10°	$K_s (m/s) =$	2.5E-12		
10 °		$S_s (11/s) =$	5.0E-08		
* A Social Section of the Contract of the Cont	0.3	Comments:	J.JL-00		
, server of the same	and the second s		transmississits: =:	f 4.9E11 m2/s was d	larized from 44
· · · · · · · · · · · · · · · · · · ·	10 1 10 1 10 10 10 10 10 10 10 10 10 10			ence range for the in	
10 -1				-11 to 9E-11 m2/s.	
+ / ·/ ·	0.03			is 2. The static pres	
		difficilision dispiaye			
		be extrapolated due			
	10 2				

	Test S	Sumr	nary Sheet				
Project:	Oskarshamn site invest	tigation	Test type:[1]			CHi	
Area:	1 :	exemar	Test no:				
Aica.							
Borehole ID:		KLX08	Test start:		061010 08:3		
Test section from - to (m):	523.00-54	523.00-543.00 m F t			Reinde	er van der Wal Philipp Wol	
Section diameter, 2·r <sub>w</sub> (m):		0.076	Responsible for		Crist	ian Enachescu	
Linear plot Q and p			test evaluation: Flow period		Recovery period		
Linear plot & and p			Indata		Indata		
4850 <b>T</b>		0,030	p <sub>0</sub> (kPa) =	4567			
KLX08_623.00-543.00_061010_1_CHir_Q_r	P section P above P below		p <sub>i</sub> (kPa ) =	4574			
4750	•	0,025	$p_p(kPa) =$	4775	p <sub>F</sub> (kPa ) =	4604	
	\		$Q_p (m^3/s) =$	1.70E-07	,		
T 4000	}	0,020	tp (s) =	1200	t <sub>F</sub> (s) =	1200	
€ 4650 ·		ate [l/min]	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-06	
£ 400 -	<del></del>	njection Rate [l/min]	EC <sub>w</sub> (mS/m)=		( )		
\$ 450 · V	· Samuel Company	0,010	Temp <sub>w</sub> (gr C)=	14.0			
4500 -	:		Derivative fact.=	0.07	Derivative fact.=	0.0	
4450 -	•	0,005					
4400							
4350 0,00 0,20 0,40 0,60 0,80 Elapsed Tin		1,80	Results		Results		
			Q/s $(m^2/s)=$	8.3E-09			
Log-Log plot incl. derivates- fl	ow period		$T_M (m^2/s) =$	8.7E-09			
			Flow regime:	transient	Flow regime:	transient	
Elapsed time  10 -4 10 -3 10 -2 10 -	[h]		$dt_1$ (min) =	3.52	$dt_1$ (min) =	#NV	
***		10 3	$dt_2$ (min) =	17.54	$dt_2$ (min) =	#NV	
***	•		$T (m^2/s) =$	5.1E-09	$T (m^2/s) =$	8.8E-0	
10 1	•	-	S (-) =	1.0E-06	S (-) =	1.0E-0	
		10 2	$K_s$ (m/s) =	2.6E-10	$K_s$ (m/s) =	4.4E-1	
			$S_s (1/m) =$	5.0E-08	S <sub>s</sub> (1/m) =	5.0E-0	
10 0	9° , 10° , 1		C (m³/Pa) =	NA	C (m³/Pa) =	1.4E-10	
,	* * *	10	$C_D(-) =$	NA	$C_D(-) =$	1.5E-0	
10 -1	• •		ξ (-) =	-0.9	ξ (-) =	-3.	
	•	10 0					
			$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA	
10 0 10 1	10 <sup>2</sup> 10 <sup>3</sup>	10 4	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA	
			$D_{GRF}$ (-) =	NA	$D_{GRF}$ (-) =	NA	
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative paran	neters.		
Elapsed time (h)			$dt_1$ (min) =	3.52	$C (m^3/Pa) =$	1.4E-10	
10 0 10,4	10,-1	300	$dt_2$ (min) =		$C_D(-) =$	1.5E-02	
		7	$T_T (m^2/s) =$	5.1E-09	ξ (-) =	-0.9	
	The state of the s	10 <sup>2</sup>	S (-) =	1.0E-06			
		-	$K_s$ (m/s) =	2.6E-10			
		30	$S_s (1/m) =$	5.0E-08			
		10 1 9	Comments:				
		00. (P-p0)*			f 5.1E-9 m2/s was d		
10 2		3			ows a horizontal sta		
		1			insmissivity is estim		
			m2/s to 0E 0 m2/s	The flow dimen	gion dignistrad duese	of the test is /	
		10 °	m2/s to 9E-9 m2/s. The static pressure				
10.2 10.4	10° 10 10	10 °			sion displayed during rapolated due to the		

	Test Sui	nmary Sheet			
Project:	Oskarshamn site investigat	ion Test type:[1]			CHi
Area:	Laxen	nar Test no:			
Borehole ID:	KI X	(08 Test start:	061010 10:5		
					001010 10.58
Test section from - to (m):	543.00-563.00	m Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.0	76 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation:		Recovery period	
Emedi piot & and p		Indata		Indata	
KLX08_543.00-563.00_061010_1_CHir_Q_r	• P section	$p_0 (kPa) =$	4737		
4950	Pabove Pbelow - Q	p <sub>i</sub> (kPa ) =	4746		
4900 -	14	$p_p(kPa) =$	4952	p <sub>F</sub> (kPa ) =	478
4850		$Q_p (m^3/s) =$	8.33E-08		.,,
(a) 4800		ω <sub>ε</sub> tp (s) =		t <sub>F</sub> (s) =	120
and the same of th		S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0
2 4750 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	\	S el S (-)= EC <sub>w</sub> (mS/m)=	1.00L-00	S el S (-)=	1.00L-0
å 4700 ·	A Comment	Temp <sub>w</sub> (gr C)=	14.2		
4650 -		Derivative fact.=		Derivative fact.=	0.0
4600 -		Derivative fact	0.13	Denvalive fact.=	0.0
4590 · .: 注 语					
4500 0,00 0,20 0,40 0,60 0,80	1,00 1,20 1,40 1,60 1,8	Results		Results	
Elapsed Ti	me [h]	Q/s $(m^2/s)=$	4.0E-09		
Log-Log plot incl. derivates- flo	w period	$T_{\rm M} (m^2/s) =$	4.2E-09		
-5 -5	• • • • • • • • • • • • • • • • • • • •	Flow regime:	transient	Flow regime:	transient
Elapsed time [h]	10,1	$dt_1 \text{ (min)} =$		$dt_1 \text{ (min)} =$	1.5
10 1		$dt_2 \text{ (min)} =$		$dt_2 \text{ (min)} =$	6.3
	300	2		2	6.6E-0
	100	$T (m^2/s) = $ $S (-) = $	1.0E-06	/	1.0E-0
10 0		$K_s (m/s) =$		$K_s (m/s) =$	3.3E-1
:	30	$S_s (1/m) =$		$S_s(1/m) =$	5.0E-0
(10)			3.0L-00		8.6E-1
ode .	10	$C (m^3/Pa) = C_D (-) =$	NA	$C (m^3/Pa) = C_D (-) =$	9.5E-0
10 -1	••	-0()		<b>O</b> D ( )	
•	3	ξ (-) =	-0.9	ξ (-) =	1.:
•	10 5	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10° 10¹	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
tD tD		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives- i	ecovery period	Selected represe			
33	, μ	dt <sub>1</sub> (min) =	1.57	C (m <sup>3</sup> /Pa) =	8.6E-1
Elapsed time (h) 3 .10. <sup>3</sup> .10. <sup>3</sup>		$dt_2 \text{ (min)} =$		$C_D(-) =$	9.5E-0
		$T_T (m^2/s) =$	6.6E-09		1.3
	10 *	S (-) =	1.0E-06		1
af Juniter	Maria Commence of the Commence	$K_s (m/s) =$	3.3E-10		
10°	30	$S_s (1/m) =$	5.0E-08		
	10 1		0.02 00		
i /	[10	2	transmiceivity of	f 6.6E-9 m2/s was d	erived from the
<i>_</i>	19			one), which shows the	
10 -1				range for the interva	
	10 °	is estimated to be 1	E-9 m2/s to 9E-	9 m2/s. The static pr	
<i> </i>		not be extrapolated	due to the low t	ransmissivity.	
10 -1 10 0	10 <sup>1</sup> 10 <sup>2</sup> 10 <sup>3</sup>				
10 10 EDICD	. 10	I			

	Test Sumn	nary Sheet			
Project: Oska	rshamn site investigation	Test type:[1]			CHir
Area:	Laxemar	Test no:			1
Borehole ID:	KI XU8	Test start:			061010 13:25
Test section from - to (m):	563.00-583.00 m	Responsible for test execution:		Reinde	er van der Wall Philipp Wolf
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation:		Recovery period	
Elliear plot & and p		Indata		Indata	
5000	0,016	p <sub>0</sub> (kPa) =	4906		
KLX08_563.00-583.00_061010_1_CHir_Q_r	• P section • P above • P below • Q • 0,014	p <sub>i</sub> (kPa ) =	4912		<u> </u>
5100		$p_p(kPa) =$	5113	p <sub>F</sub> (kPa ) =	4920
5050	0,012	$Q_p (m^3/s) =$	9.00E-08	F1 ( 5. )	
<u>€</u> 5000	0,010	tp (s) =		t <sub>F</sub> (s) =	1200
1	. Rate @mini	S el S <sup>*</sup> (-)=	1	S el S <sup>*</sup> (-)=	1.00E-06
04 490 0 1	b	EC <sub>w</sub> (mS/m)=	1.00L-00	S el S (-)=	1.00L-00
8 4900	0.006	Temp <sub>w</sub> (gr C)=	14.5		
4850	0,004	Derivative fact.=		Derivative fact.=	0.04
4800		Denvalive lact	0.1	Denvalive fact	0.02
4750	0,002				
4700 0.00 0.20 0.40 0.60 0.50 1.00 Elspeed Time [h]	1,20 1,40 1,60	Results		Results	
		Q/s $(m^2/s)=$	4.4E-09		
Log-Log plot incl. derivates- flow peri	nd	$T_{\rm M} (m^2/s) =$	4.6E-09		
Log-Log plot mei. derivates- new peri		Flow regime:	transient	Flow regime:	transient
Elapsed time [h]	10,0	dt <sub>1</sub> (min) =		$dt_1$ (min) =	#NV
10 2		$dt_1 (min) =$ $dt_2 (min) =$		$dt_1 (min) =$ $dt_2 (min) =$	#NV
	10 3				4.7E-09
10 15		$T (m^2/s) =$	1.0E-06	$T (m^2/s) = S(-) =$	1.0E-06
		$S(-) = K_s(m/s) =$		$K_s (m/s) =$	2.4E-10
	10 2		l .	$S_s(11/s) = S_s(1/m) = S_s(1/m)$	<u> </u>
10 0	**************************************	S <sub>s</sub> (1/m) =		- 1	5.0E-08
• • • • • • • • • • • • • • • • • • • •		$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	9.3E-1
	10	$C_D(-) =$	NA	$C_D(-) =$	1.0E-02
10 1		ξ(-) =	0.2	ξ (-) =	1.2
	10 °	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>1</sup> 10 <sup>2</sup> 10 <sup>3</sup>	10 4 10 5	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives- recove	ry period	Selected represe	entative paran		
Flanound Sima (h)		dt <sub>1</sub> (min) =	NA	C (m <sup>3</sup> /Pa) =	9.3E-11
10 1 10 1 10 1 10 1 10 1 10 1 10 1 10	10,°	$dt_2 \text{ (min)} =$	NA	$C_D(-) =$	1.0E-02
	300	$T_T (m^2/s) =$	4.7E-09		1.2
	10 2	S (-) =	1.0E-06		<del>                                     </del>
	<b>4</b>	$K_s$ (m/s) =	2.4E-10		
10 0	30	S <sub>s</sub> (1/m) =	5.0E-08		
.:;//	Į.	Comments:	3.02 00		
<u> </u>	10 1		transmissivity of	f 4.7E-9 m2/s was d	erived from the
10 -1	1			hows the better data	
	3	quality. The confide	ence range for th	ne interval transmiss	ivity is
/	F10 °			m2/s. The flow dime	
				ure could not be ext	rapolated due to
10 <sup>-1</sup> 10 <sup>0</sup> 10 <sup>1</sup>	10 2 10 3	the low transmissiv	ııy.		

	Test Sur	nmary Sheet				
Project:	Oskarshamn site investigati				CHi	
Area:	Laxen	nar Test no:			1	
Borehole ID:	KLX	08 Test start:		061010 15:3		
Test section from - to (m):	583.00-603.00	m Responsible for		Reinder van der Wa		
Section diameter, 2·r <sub>w</sub> (m):	0.0	test execution: 76 Responsible for		Criet	Philipp Wolian Enachescu	
Section diameter, 21 <sub>w</sub> (iii).	0.0	test evaluation:		Clist	iaii Eliacilesci	
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
5400	1 006	p <sub>0</sub> (kPa) =	5076			
KLX08_583.00-603.00_061010_1_CHir_Q_r	P section     Pabove     Pbelow	p <sub>i</sub> (kPa ) =	5077			
5000	· Q	$p_p(kPa) =$	5278	p <sub>F</sub> (kPa ) =	507	
		$Q_p (m^3/s) =$	4.17E-07			
5200	0,04	tn (s) =		t <sub>F</sub> (s) =	120	
[Edy] ens:	Ration -	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0	
20 5100	1962 003 RB 1003	EC <sub>w</sub> (mS/m)=	1.002 00	3 61 3 (-)-	1.002 0	
5000	002	Temp <sub>w</sub> (gr C)=	14.7			
		Derivative fact.=		Derivative fact.=	0.0	
4900	- 001	Denvative lact.	0.07	Denvative fact.	0.0	
			<del> </del>			
4800 0,00 0,20 0,40 0,60 0,0	30 1,00 1,20 1,40	Results		Results		
Elapsed Time	(h)		2.0E-08		1	
Log-Log plot incl. derivates- flo	w poriod	Q/s $(m^2/s)=$	2.0E-08			
Log-Log plot ilici. delivates- lic	ow period	T <sub>M</sub> (m <sup>2</sup> /s)= Flow regime:	transient	Flow regime:	transient	
10.4 10.3 Elapsed time [h]	10.1	dt <sub>1</sub> (min) =		dt <sub>1</sub> (min) =	3.3	
10 2	300			, ,		
1	10 °	$dt_2 (min) =$		$dt_2 (min) =$	13.8	
	•	$T (m^2/s) =$		$T (m^2/s) =$	6.9E-0	
10.1	30	S (-) =	1.0E-06	. ,	1.0E-0	
• • • •	••	$K_s$ (m/s) =		$K_s (m/s) =$	3.4E-0	
•	10 1	$S_s(1/m) =$		$S_s(1/m) =$	5.0E-0	
	•	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	5.1E-1	
10 0	3	$^{2}$ $C_{D}$ (-) =	NA	$C_D(-) =$	5.6E-0	
1	* * * *	ξ (-) =	7.2	ξ (-) =	15.3	
1	10°					
	•	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA	
10 <sup>si</sup> 10 <sup>si</sup>	10 10 11 10 12	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA	
		$D_{GRF}$ (-) =	NA	$D_{GRF}$ (-) =	NA	
Log-Log plot incl. derivatives-	recovery period	Selected represe				
Elapsed time [h]	10.1	$dt_1$ (min) =		C (m <sup>3</sup> /Pa) =	5.1E-1	
10 2		$dt_2$ (min) =	13.85	$C_D(-) =$	5.6E-0	
		$T_T (m^2/s) =$	6.9E-08	ξ (-) =	15.3	
-	300	S (-) =	1.0E-06			
10.1	10 <sup>2</sup>	$K_s$ (m/s) =	1.4E-08			
		$S_s (1/m) =$	2.0E-07			
<i>//</i>	30	ু Comments:	-	-	-	
	· .			f 6.9E-8 m2/s was d		
10 0	10 '	analysis of the CHi	r phase, which s	hows the better data	and derivative	
	an approximately			ne interval transmiss		
	3			m2/s. The flow dime ure measured at tran		
				sing straight line ext		
10 <sup>0</sup> 10 <sup>1</sup> 1D/CD	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup> 10 °	Horner plot to a val			r	

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			CHi
Area:	Laxemar	Test no:			
D	141 V00	T ( . ) . (			001010 17 00
Borehole ID:	KLX08	Test start:			061010 17:32
Test section from - to (m):	603.00-623.00 m	603.00-623.00 m Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.076	Responsible for		Crist	ian Enachescı
Linear plot Q and p		test evaluation:		Recovery period	
Linear plot Q and p		Indata		Indata	
5500	2,0	p <sub>0</sub> (kPa) =	5245		
KLX08_603.00-623.00_061010_1_CHir_Q_r	P sedion P above P bebw Q	p <sub>i</sub> (kPa ) =	5246		
5400	٠٩	$p_p(kPa) =$		p <sub>F</sub> (kPa ) =	524
5350	1,5		1.93E-05	ρ <sub>F</sub> (KFα ) -	324
<u> </u>	· .	$Q_p (m^3/s) =$		t= (s) =	1200
<u>6</u> 5300	Loan Dimini	tp (s) =	l .	4 (9)	
5250	1.0 M	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
§ 5200 ·	_ <u>*</u>	EC <sub>w</sub> (mS/m)=			
5150 -	0.5	Temp <sub>w</sub> (gr C)=	15.0		
5100	,	Derivative fact.=	0.05	Derivative fact.=	0.0
5050					
5000 0,20 0,40 0,60 Elaosed Tir	0,0 1,00 1,20 1,40	Results		Results	
		Q/s $(m^2/s)=$	9.5E-07	resuits	
Log-Log plot incl. derivates- fl	ow period		9.9E-07		
Log-Log plot incl. derivates- in	ow period	T <sub>M</sub> (m <sup>2</sup> /s)= Flow regime:	transient	Flow regime:	transient
Elapsed time (*	n] 10.1 10.0	dt <sub>1</sub> (min) =		dt <sub>1</sub> (min) =	0.6
10 2		, ,		, ,	17.9
	3	a ( )	1	G. ( )	
	•	$T (m^2/s) =$		$T (m^2/s) =$	2.4E-0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	10	S (-) =	1.0E-06		1.0E-0
	-	$K_s$ (m/s) =	1	$K_s (m/s) =$	1.2E-0
. (db)	:	S <sub>s</sub> (1/m) =		S <sub>s</sub> (1/m) =	5.0E-0
or o	10 1	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	3.5E-1
10 °		$C_D(-) =$	NA	$C_D(-) =$	3.9E-0
	0.03	ξ (-) =	7.3	ξ (-) =	8.
		2		2	N. A
•	10 2	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>10</sup> 10 <sup>11</sup>	10 <sup>12</sup> 10 <sup>13</sup> 10 <sup>14</sup>	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period	Selected represe			
Elapsed time [h]		$dt_1$ (min) =	0.62	C (m³/Pa) =	3.5E-1
10 2	10 3	$dt_2$ (min) =		$C_D(-) =$	3.9E-0
		$T_T (m^2/s) =$	2.4E-06	ξ (-) =	8.
	300	S (-) =	1.0E-06		
10 1		$K_s$ (m/s) =	4.8E-07		
	10 2	$S_s (1/m) =$	2.0E-07		
		Comments:			
	30 8			f 2.4E-6 m2/s was de	
10 0	أولاً والمعرفية			nows the better data	
	10			ne interval transmiss	
		actimated to be 7E	7 m2/s to 5F-6 r	n2/s. The flow dime	nsion displayed
	مساید،				
	3	during the test is 2.	The static press	ure measured at tran	sducer depth,
10 <sup>1</sup> 10 <sup>2</sup> 10 CD	3 10 <sup>2</sup> 10 <sup>4</sup> 10 <sup>2</sup>	during the test is 2.	The static press ne CHir phase us	ure measured at tran sing straight line ext	sducer depth,

	Test Su	mmary Sheet				
Project:	Oskarshamn site investiga				CHi	
Area:	Laxe	mar Test no:			1	
Borehole ID:	KL	X08 Test start:		061010 19:2		
Test section from - to (m):	623.00-643.0	0 m Responsible for		Reinde	er van der Wal	
Section diameter, 2·r <sub>w</sub> (m):	0	test execution: 076 Responsible for	<u> </u>	Criet	Philipp Wol	
Section diameter, 21 <sub>w</sub> (iii).	0.	test evaluation:		Clist	ian Enachesci	
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
KLX08_623.00-643.00_061010_1_CHir_Q_r	A.D. analona	p <sub>0</sub> (kPa) =	5415			
KLX08_623.00-643.00_061010_1_CHIr_Q_r	P section P above P blow O	p <sub>i</sub> (kPa ) =	5418			
5600		$p_p(kPa) =$	5618	p <sub>F</sub> (kPa ) =	541	
5550	**************************************	$Q_p (m^3/s) =$	3.33E-07			
<u>\$</u> 5500	* " - " - " - " - " - " - " - " - " - "	to (a) =	1200	t <sub>F</sub> (s) =	120	
	\	S el S <sup>*</sup> (-)=  EC <sub>w</sub> (mS/m)=		S el S <sup>*</sup> (-)=	1.00E-0	
A 5400 to 000 to		EC <sub>w</sub> (mS/m)=	00	5 51 5 (- <i>j</i> -	۷	
· ·	. •	Temp <sub>w</sub> (gr C)=	15.3			
5350		Derivative fact.=			0.0	
5300		2011141110 1464	0.02	20	0.0	
5250	the second secon		+			
5000 0,00 0,20 0,40 0,60 Elapsed T	0,80 1,00 1,20 1,40	Results	<u> </u>	Results		
Евраси -	initia (n)	Q/s $(m^2/s)=$	1.6E-08			
Log-Log plot incl. derivates- fl	low period		1.7E-08			
Log-Log plot mei. denvates- n	low period	T <sub>M</sub> (m <sup>2</sup> /s)= Flow regime:	transient	Flow regime:	transient	
Elapsed time [h]	10 -1	dt <sub>1</sub> (min) =		$dt_1 \text{ (min)} =$	6.3	
10 2				` ,	16.6	
	300	G-()				
	110	$T (m^2/s) =$		$T (m^2/s) =$	7.1E-0	
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		S ( <del>-</del> ) =	1.0E-06	` '	1.0E-0	
	30	$K_s (m/s) =$		$K_s (m/s) =$	3.6E-0	
d characteristics		$S_s (1/m) =$		$S_s (1/m) =$	5.0E-0	
Total I		Ę ,	NA	$C (m^3/Pa) =$	7.4E-1	
10 0		<sup>g</sup> C <sub>D</sub> (-) =	NA	$C_D(-) =$	8.2E-0	
•	3	ξ (-) =	5.1	ξ(-) =	20.	
•	10	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA	
10 <sup>6</sup> 10 <sup>7</sup>	10 <sup>8</sup> 10 <sup>9</sup> 10 <sup>10</sup>	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA	
n		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA	
Log-Log plot incl. derivatives-	recovery period	Selected repres				
20g 20g plot mon dont dait o		dt <sub>1</sub> (min) =		C (m <sup>3</sup> /Pa) =	7.4E-1	
Elapsed time [h]		$dt_2 \text{ (min)} =$		$C_D(-) =$	8.2E-0	
10 1		$T_T (m^2/s) =$	7.1E-08		20.	
	300	S(-) =	1.0E-06		20.	
/		K (m/s) =	3.6E-09			
10.7	>×_	$S_s (1/m) =$	5.0E-08			
Jan San San San San San San San San San S	**	Comments	J.UE-00			
	30	g.	transmissivity	f7.1E 2 m2/aa d	arivad fram tha	
	, , , <sub>10</sub>			f 7.1E-8 m2/s was d hows the better data		
10 0	where "			ne interval transmiss		
/ .	3	estimated to be 1E	-8 m2/s to 1E-7 i	m2/s. The flow dime	ension displayed	
1 /	Ţ	during the test is 2	The static press	ure measured at tran	sducer depth,	
100 100	10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>	was derived from t	he CHir phase us	sing straight line ext		

	Test S	Sumi	nary Sheet			
Project:	Oskarshamn site invest	igation	Test type:[1]			CHi
Area:	La	axema	Test no:			1
Borehole ID:		KLX08	Test start:		061010 21:	
Test section from - to (m):	643.00-663	3.00 m	Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):		0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p			test evaluation:		Recovery period	
			Indata		Indata	
5600		T*	p <sub>0</sub> (kPa) =	5585		
KLX08_643.00-663.00_061010_1_CHir_Q_r	Paction Pabore Polow Q  - Polow Q  - Polow Q  - Polow Q  - Polow - Po		p <sub>i</sub> (kPa ) =	5587		
5800	· q		$p_p(kPa) =$	5789	p <sub>F</sub> (kPa ) =	5600
5750		- 6	$Q_p (m^3/s) =$	4.37E-05		
<u> </u>	1	=	tp (s) =	1200	t <sub>F</sub> (s) =	1200
ems ea_c 5650		h jection Rate [l/min]	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-06
of of the second		hjection	$EC_w (mS/m)=$			
5550	Barrier Contract Cont		Temp <sub>w</sub> (gr C)=	15.5		
5500		- 2	Derivative fact.=	0.03	Derivative fact.=	0.0
5460						
5400	Martin Community of the					
0,00 0,20 0,40 0,60 Elapsed Tir	0,80 1,00 1,20 1,40 me [h]		Results	0.45.00	Results	1
l and an ulational devices as fle			Q/s (m <sup>2</sup> /s)=	2.1E-06		
Log-Log plot incl. derivates- flo	ow period		T <sub>M</sub> (m <sup>2</sup> /s)= Flow regime:	2.2E-06	Clau ragima:	transiant
Elapsed time [h]	101 100	10.1	dt <sub>1</sub> (min) =	transient	Flow regime: dt <sub>1</sub> (min) =	transient
10 2			$dt_1 (min) =$ $dt_2 (min) =$		$dt_1 (min) =$ $dt_2 (min) =$	1.67
		3			2	7.4E-07
			$T (m^2/s) = S (-) =$	1.0E-06	/	1.0E-06
10 1	•	10 0	$K_s (m/s) =$		$K_s (m/s) =$	3.7E-08
	·		S <sub>s</sub> (1/m) =		S <sub>s</sub> (1/m) =	5.0E-08
		0.3 [win] fbt	C (m <sup>3</sup> /Pa) =	NA	C (m <sup>3</sup> /Pa) =	4.4E-10
		10 -1 42	$C_D(-) =$	NA	$C_D(-) =$	4.8E-02
10	Special Commence of the Commen		ξ(-) =		ξ(-) =	-4.8
		0.03	3 ( )		3 ( )	
	•		$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>1</sup> 10 <sup>2</sup>	10 3 10 4	10 5	$S_{GRF}(-) =$	NA	S <sub>GRF</sub> (-) =	NA
			D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period		Selected repres	entative paran	neters.	
Electric 83			$dt_1$ (min) =	0.83	$C (m^3/Pa) =$	4.4E-10
10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>3</sup>		7	$dt_2$ (min) =	17.71	D ( )	4.8E-02
			$T_T (m^2/s) =$	1.5E-06		-3.1
10 1		10 <sup>3</sup>	S (-) =	1.0E-06		
			$K_s$ (m/s) =	7.5E-08		
10°		10 <sup>2</sup>	S <sub>s</sub> (1/m) =	5.0E-08		
10 4		[ed. 4], (od. d) ; od. d	of the CHi phase, w. The confidence rang m2/s to 3E-6 m2/s ( CHir phase). The flo	hich shows the slig ge for the interval tr This range includes ow dimension displ	iE-6 m2/s was derived ht better data and deri- ansmissivity is estima the derived transmiss ayed during the test is	vative quality. ted to be 7E-7 ivity from the 2. The static
			pressure measured a straight line extrapo		was derived from the plot to a value of 5,5	

	Test Sumn	nary Sheet				
Project:	Oskarshamn site investigation				CHi	
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX08	Test start:		061010 23:2		
Test section from - to (m):	663.00-683.00 m			Reinde	er van der Wal	
Section diameter, 2·r <sub>w</sub> (m):	0.076	test execution: Responsible for		Crist	Philipp Wol	
		test evaluation:				
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
6100	8 A Departure	p <sub>0</sub> (kPa) =	5755			
KLX08_663.00-683.00_061010_1_CHir_Q_r	Patone Patone Posiow O	p <sub>i</sub> (kPa ) =	5764			
6000		$p_p(kPa) =$	5964	p <sub>F</sub> (kPa ) =	5774	
5600	6	$Q_p (m^3/s) =$	4.68E-05			
5000 ·	\ +s	tp (s) =	1200	$t_F$ (s) =	1200	
8 5500 V	hyperon Rea plans)	S el S <sup>*</sup> (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0	
	hjection	EC <sub>w</sub> (mS/m)=		` ` ` `		
5700	3	Temp <sub>w</sub> (gr C)=	15.8			
5600 -	72	Derivative fact.=	0.06	Derivative fact.=	0.0	
5500						
5500 0,00 0,20 0,40 0,60 Elapsed	0,80 1,00 1,20 1,40 Time [h]	Results		Results		
		Q/s $(m^2/s)=$	2.3E-06			
Log-Log plot incl. derivates- fl	ow period	$T_M (m^2/s) =$	2.4E-06			
		Flow regime:	transient	Flow regime:	transient	
Elapsed time [h]		$dt_1$ (min) =	0.31	$dt_1$ (min) =	#NV	
10		$dt_2$ (min) =	2.80	$dt_2$ (min) =	#NV	
	0.3	$T (m^2/s) =$	1.3E-06	$T(m^2/s) =$	1.5E-06	
· · · · · · · · · · · · · · · · · · ·		S (-) =	1.0E-06	S (-) =	1.0E-0	
10 °	10 -1	$K_s (m/s) =$	6.6E-08	$K_s (m/s) =$	7.5E-08	
The state of the s		S <sub>s</sub> (1/m) =	5.0E-08	$S_s(1/m) =$	5.0E-08	
	0.03	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	5.5E-09	
	(A)	$C_D(-) =$	NA	$C_D(-) =$	6.1E-0	
• 1	10 2	ξ (-) =	-3.7	ξ (-) =	-5.0	
-	0.003	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA	
10 <sup>1</sup> 10 <sup>2</sup>	10 3 10 4 10 5 10 -3	$S_{GRF}(-) =$	NA	S <sub>GRF</sub> (-) =	NA	
		D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA	
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	neters.		
Elapsed time (f	1	$dt_1$ (min) =	0.31	$C (m^3/Pa) =$	5.5E-09	
10 1 Elapsed time [	, 10,-1	$dt_2$ (min) =		C <sub>D</sub> (-) =	6.1E-0	
		$T_T (m^2/s) =$	1.3E-06	ξ (-) =	-3.7	
	300	S (-) =	1.0E-06			
		K <sub>s</sub> (m/s) =	6.6E-08			
10 °	10 <sup>2</sup>	$S_s (1/m) =$	5.0E-08			
ث مستعمد عو	and the same of th	Comments:			•	
	30	The recommended that analysis of the CHi				
10 -1	10 1	horizontal stabilizat	ion. The confid	ence range for the ir	nterval	
		transmissivity is est				
	3	dimension displayed				
//		at transducer depth,		om the CHir phase u t to a value of 5,747		
10 <sup>-1</sup> 10 <sup>0</sup>	10 1 10 2 10 3	line extranciation "				

	Test S	Sumr	nary Sheet				
Project:	Oskarshamn site investi					CHi	
Area:	Lax	xemar	Test no:			1	
Borehole ID:		KLX08	Test start:		061011 01:2		
Test section from - to (m):	683.00-703	3.00 m	Responsible for		Reinder van der V		
Section diameter, 2·r <sub>w</sub> (m):		0.076	test execution: Responsible for		Criet	Philipp Wol	
Section diameter, 21 <sub>w</sub> (iii).		0.070	test evaluation:		Clist	iaii Liiaciiescu	
Linear plot Q and p			Flow period		Recovery period		
			Indata		Indata		
6200	1	0,010	p <sub>0</sub> (kPa) =	5925			
KLX08_683.00-703.00_061011_1_CHir_Q_r	P section P above P below	0,009	p <sub>i</sub> (kPa ) =	5931			
6100	<b>)</b>	0,008	$p_p(kPa) =$	6114	p <sub>F</sub> (kPa ) =	592	
6050		0,007	$Q_p (m^3/s) =$	5.50E-08			
₹ 6000 -		. o ms —	tp (s) =		t <sub>F</sub> (s) =	360	
2 min se		ate [[/min]]	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-0	
d of the state of	-	ujection &	EC <sub>w</sub> (mS/m)=	1.00E 00	3 el 3 (-)-	1.00L 0	
8 5000 ·		0,004 ≦	Temp <sub>w</sub> (gr C)=	16.0			
5850	<u>.</u>	0,003	Derivative fact.=		Derivative fact.=	0.0	
5800		0,002	Delivative lact.=	0.19	Denvative fact.=	0.0	
5790		0,001					
5700 TO	1,25 1,50 1,75 2,00 2,3	0,000	Results		Results		
Elapsed Time	(h)			2.9E-09			
Log-Log plot incl. derivates- flo	ow paried		Q/s $(m^2/s)=$	3.1E-09			
Log-Log plot incl. derivates- in	ow period		$T_M (m^2/s) =$			transiant	
Blapsed time [h]	1 0		Flow regime:	transient	Flow regime:	transient	
10 2	10.		$dt_1 (min) =$	#NV	dt <sub>1</sub> (min) =	3.0	
·		3000	$dt_2 (min) =$	#NV	dt <sub>2</sub> (min) =	6.8	
, o o o o			$T (m^2/s) =$		$T (m^2/s) =$	4.6E-0	
	,	10 <sup>3</sup>	S (-) =	1.0E-06		1.0E-0	
10	· · ·		$K_s$ (m/s) =		$K_s$ (m/s) =	2.3E-1	
		300	$S_s (1/m) =$	5.0E-08	$S_s (1/m) =$	5.0E-0	
		10 2 July (by)	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	7.2E-1	
10 0	<u>.</u>	Ę	$C_D(-) =$	NA	$C_D(-) =$	7.9E-0	
	<u> </u>	30	ξ (-) =	0.3	ξ (-) =	4.	
:		1	_ 2, 2, 3	NA	2	NA	
10 1 10 2	10 3 10 4 10 5	10 '	$T_{GRF}(m^2/s) =$	NA NA	$T_{GRF}(m^2/s) =$	NA	
10 tD	10 10 10		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
			D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA	
Log-Log plot incl. derivatives-	recovery period		Selected represe				
Elapsed time [h]			dt <sub>1</sub> (min) =	3.07	0 (III /I u)	7.2E-1	
10 2 10, 10, 2	10,	7	$dt_2 (min) =$		C <sub>D</sub> (-) =	7.9E-0	
		10 3	$T_T (m^2/s) =$	4.6E-09		4.	
		-	S (-) =	1.0E-06			
10 1		┨.	$K_s$ (m/s) =	2.3E-10			
		10 2	$S_s (1/m) =$	5.0E-08			
3	A.	· ·	Comments:				
a "		5 - 0-p0, (p-p07 (kPa)			f 4.6E-9 m2/s was d		
9,		- 00d	analysis of the CHi				
10 1			and derivative quali transmissivity is est				
		10 °	dimension displayed				
			at transducer depth,				
10 4 10 0	10 <sup>1</sup> 10 <sup>2</sup> 1	10 3	line extrapolation in		-		
tD/CD			Ī	-			

	Test S	Sumn	nary Sheet			
Project:	Oskarshamn site invest	tigation	Test type:[1]			CHir
Area:	La	axemar	Test no:			1
Borehole ID:		KLX08	Test start:	<u> </u>		061011 05:22
Test section from - to (m):	703.00-72	3.00 m	Responsible for test execution:		Reinde	er van der Wall Philipp Wolf
Section diameter, 2·r <sub>w</sub> (m):		0.076	Responsible for		Crist	ian Enachescu
			test evaluation:			
Linear plot Q and p			Flow period		Recovery period	
			Indata	•	Indata	
KLX08_703.00-723.00_061011_1_CHir_Q_r	• P section • P above	0,003	p <sub>0</sub> (kPa) =	6091		
*			p <sub>i</sub> (kPa ) =	NA	- (I-D- )	27.4
6200 -			$p_p(kPa) =$	NA	p <sub>F</sub> (kPa ) =	NA
6450 4		0,002	$Q_p (m^3/s) = tp (s) = $	NA NA	t <sub>r</sub> (s) =	NA
F 000 000 000 000 000 000 000 000 000 0			<del>(°)</del>		t <sub>r</sub> (0)	
\$ eco   1.		injection Rate [[/min]	S el S <sup>*</sup> (-)= EC <sub>w</sub> (mS/m)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
• 90:		- 0,001	Temp <sub>w</sub> (gr C)=	16.4		
6000 -			Derivative fact.=		Derivative fact.=	NA
5950 •			20111411110 1401	- 1/ 1		- 14.1
5050						
0.000 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.50 Elbased Time Ini			Results	<u> </u>	Results	
			$Q/s (m^2/s)=$	NA		
Log-Log plot incl. derivates- flo	ow period		$T_{\rm M}$ (m <sup>2</sup> /s)=	NA		
<u> </u>	•		Flow regime:	transient	Flow regime:	transient
			$dt_1 \text{ (min)} =$	NA	$dt_1 (min) =$	NA
			$dt_2$ (min) =	NA	$dt_2 (min) =$	NA
			$T (m^2/s) =$	1.00E-11	$T (m^2/s) =$	NA
			S (-) =	NA	S (-) =	NA
			$K_s$ (m/s) =	NA	$K_s (m/s) =$	NA
Ni. ( A .	.11		$S_s (1/m) =$	NA	$S_s(1/m) =$	NA
Not An	arysea		C (m <sup>3</sup> /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 <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period		Selected represe		_	Tana
			dt <sub>1</sub> (min) =	NA	$C (m^3/Pa) =$	NA
			$dt_2 (min) =$	NA	$C_D(-) =$	NA
			$T_T (m^2/s) = $ $S (-) = $	1.00E-11	ξ (-) =	NA
			- ( )	NA		
			$K_s (m/s) =$ $S_s (1/m) =$	NA NA		
•••			S <sub>s</sub> (1/m) = Comments:	INA		
Not An	aryseu				ged packer complian 11 m2/s.	ce) the interval

Project: Oskarshamn s	site investigatio	mary Sheet Test type:[1]			Chi
Area:	Lavema	r Test no:			
Alea.	Laxema	il rest no.			!
Borehole ID:	KLX0	8 Test start:			061011 06:43
Test section from - to (m): 7.	23.00-743.00 r	n Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.07	6 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation: Flow period		Recovery period	
Linear plot Q and p		Indata		Indata	
KLX88_723.00-743.00_061011_1_CHir_Q_r	0,010	p <sub>0</sub> (kPa) =	6261		
6500	• P above • P bdow 0,009	p <sub>i</sub> (kPa ) =	6272		
6450	800,0	$p_p(kPa) =$	6477	p <sub>F</sub> (kPa ) =	631
6400	0,007	$Q_p (m^3/s) =$	4.50E-08	,	
<u> </u> 5500	0,006 =	tp(s) =		t <sub>F</sub> (s) =	1200
\$ 6000	0,000 Was 6 m h h	S el S* (-)=		S el S <sup>*</sup> (-)=	1.00E-0
ê (200 )	0,004	$EC_w (mS/m) =$		0 0.0 ( )	
6200	0,003	Temp <sub>w</sub> (gr C)=	16.6		
1 A A E E	0,002	Derivative fact.=	0.07	Derivative fact.=	0.0
· · · · · · · · · · · · · · · · · · ·	0,001				
600	0,000				
0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 Ebpsed Time [h]	2,00 2,25	Results	•	Results	
		Q/s $(m^2/s)=$	2.2E-09		
Log-Log plot incl. derivates- flow period		$T_{\rm M} (m^2/s) =$	2.3E-09		
Florand from M.		Flow regime:	transient	Flow regime:	transient
10 1 10 1 10 1 10 1 10 1 10 1 10 1 10	<del></del>	$dt_1$ (min) =	0.46	$dt_1$ (min) =	6.32
· · · · · · · · · · · · · · · · · · ·		$dt_2$ (min) =	15.13	$dt_2$ (min) =	16.6
and the same of th	300	$T (m^2/s) =$	1.6E-09	$T (m^2/s) =$	2.2E-09
	10 2	S (-) =	1.0E-06	S (-) =	1.0E-0
10		$K_s$ (m/s) =	8.0E-11	$K_s (m/s) =$	1.1E-10
à	30	$S_s (1/m) =$	5.0E-08	$S_s (1/m) =$	5.0E-08
	(Hov/fmir	$C (m^3/Pa) =$	NA	C (m <sup>3</sup> /Pa) =	8.4E-1
10 -1	10 1 - 5	$C_D(-) =$	NA	$C_D(-) =$	9.3E-0
		ξ (-) =	0.5	ξ (-) =	1.2
	3				
	10 °	$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 <sup>1</sup> 10 <sup>2</sup> 10 <sup>3</sup> 10 <sup>4</sup>	10 5	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
		$D_{GRF}$ (-) =	NA	$D_{GRF}$ (-) =	NA
Log-Log plot incl. derivatives- recovery period	ı	Selected represe	entative paran		
Elapsed time [h]	10 1	$dt_1$ (min) =	6.32	$C (m^3/Pa) =$	8.4E-1
10 2		$dt_2$ (min) =		$C_D(-) =$	9.3E-0
1	10 3	$T_T (m^2/s) =$	2.2E-09		1.2
10 -		S (-) =	1.0E-06		
10		$K_s$ (m/s) =	1.1E-10		
and the same of th	10 <sup>2</sup>	$S_s (1/m) =$	5.0E-08		
a 10°	3	Comments:	<u> </u>		
	10 1 6			f 2.2E-9 m2/s was d	
923-25-	F10 1 6	unarysis of the Citi		one), which shows th	
10 1				nce range for the int -10 m2/s to 5E-9 m2	
1 • /					
	10 0	dimension displaye	a auring the test	18 2. THE Static DIES	saic could not
	10 °	dimension displaye be extrapolated due			saire could not

	Test	Sumr	nary Sheet			
Project:	Oskarshamn site inves	tigation	Test type:[1]			CHi
Area:	La	axemar	Test no:			1
D I. I. ID		T. d. d. d.			001011 00 0	
Borehole ID:		KLX08	Test start:			061011 09:27
Test section from - to (m):	743.00-76	3.00 m	Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):		0.076	Responsible for		Crist	ian Enachescı
Linear plat O and p			test evaluation:		Recovery period	
Linear plot Q and p			Flow period Indata		Indata	
6700		0,006	p <sub>0</sub> (kPa) =	6432		
KLX08_743.00-763.00_061011_1_CHir_Q_r	Pabove Pabove Pabove		p <sub>i</sub> (kPa ) =	6439		
		0,005	$p_p(kPa) =$		p <sub>F</sub> (kPa ) =	657:
6600			•	2.33E-08	p <sub>F</sub> (Ki a ) −	037.
650		0,004	$Q_p (m^3/s) =$		t /-\	120
R 6500		Rate [[/min]]	tp (s) =		t <sub>F</sub> (s) =	1200
6450	······································	0,003 Rate	S el S* (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
© € 600 -	į. Š	Injection	EC <sub>w</sub> (mS/m)=			
6350	<u> </u>	0,002	Temp <sub>w</sub> (gr C)=	16.9		
6300	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Derivative fact.=	0.08	Derivative fact.=	0.0
6250		- 0,001				
6000 Q.50 1,00	1,50 2,00	0,000				
0,00 0,50 1,00 Elapsed Time		2,50	Results		Results	
			Q/s $(m^2/s)=$	1.1E-09		
Log-Log plot incl. derivates- flo	w period		$T_M (m^2/s)=$	1.2E-09		
Flansed time (ii)			Flow regime:	transient	Flow regime:	transient
10.4		10.0	$dt_1$ (min) =	4.64	$dt_1$ (min) =	#NV
		10	$dt_2$ (min) =	14.15	$dt_2$ (min) =	#NV
			$T (m^2/s) =$	4.8E-10	$T (m^2/s) =$	2.2E-0
10 1	. • %	10 3	S (-) =	1.0E-06	/	1.0E-0
	The second secon		$K_s (m/s) =$		$K_s$ (m/s) =	1.1E-1
***		į	S <sub>s</sub> (1/m) =	1	S <sub>s</sub> (1/m) =	5.0E-0
10°		10 <sup>2</sup>	C (m <sup>3</sup> /Pa) =	NA	- ,	1.5E-1
•			, ,	NA	$C (m^3/Pa) = C_D (-) =$	1.7E-0
·	***		-0()		<b>O</b> D ( )	
10 -1		10 1	ξ(-) =	0.7	ξ (-) =	0.9
			$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
10 ° 10 ° 10	10 <sup>2</sup> 10 <sup>3</sup>	10 4	$S_{GRF}(-) =$	NA	$S_{GRF}(-) =$	NA
			D <sub>GRF</sub> (-) =	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives-	recovery period		Selected represe			
Log Log plot mon derivatives	coordiy period		$dt_1$ (min) =	#NV		1.5E-1
Elapsed time [h]			$dt_1 (min) =$ $dt_2 (min) =$	#NV	$C (m^3/Pa) = C_D (-) =$	1.7E-0
10 1			_ ` /			
		10 <sup>2</sup>	$T_T (m^2/s) =$	2.2E-09		0.
	A STATE OF THE STA		S (-) =	1.0E-06		
o.I.		30	$K_s$ (m/s) =	1.1E-10		
10 °			$S_s (1/m) =$	5.0E-08		
a		10 1	Comments:			
. به الأرادي					f 2.2E-9 m2/s was d	
10 1		3 9			one), which shows th	
. : //		10 0			nce range for the int	
		10			-10 m2/s to 5E-9 m2	
					is 2. The static pres	sure courd not
		ł	he extranolated due	e to the low trans	missivity	
10 <sup>-2</sup> 10 <sup>-1</sup> IDICD	10° 10¹	0.3	be extrapolated due	e to the low trans	smissivity.	

	Test Sum	mary Sheet			
Project:	Oskarshamn site investigatio	n Test type:[1]			CHi
Area:	Laxema	ar Test no:			1
Borehole ID:	KI X0	8 Test start:			061011 12:33
Test section from - to (m):	763.00-783.00 r	n Responsible for test execution:		Reinde	er van der Wal Philipp Wol
Section diameter, 2·r <sub>w</sub> (m):	0.07	6 Responsible for		Crist	ian Enachescu
Linear what O and w		test evaluation:			40.00.000.000.000.000.000.000
Linear plot Q and p		Flow period Indata		Recovery period Indata	
6650	· T 410	p <sub>0</sub> (kPa) =	6603		
KLX08_763.00-783.00_061011_1_CHir_Q_r	P section P above P below	p <sub>i</sub> (kPa ) =	6604		
•	· · · · · · · · · · · · · · · · · · ·	$p_p(kPa) =$		p <sub>F</sub> (kPa ) =	671
6750 -			2.17E-07	ρ <sub>F</sub> (KFα ) -	071.
6700 -		$Q_p (m^3/s) =$		<b>4</b> (a) –	120
\$\frac{a}{a}\$ 6650	006 PG 000 PG 00	tp (s) =		t <sub>F</sub> (s) =	120
2 600	405 %	S el S* (-)=	1.00E-06	S el S <sup>*</sup> (-)=	1.00E-0
• •	Q04 E	EC <sub>w</sub> (mS/m)=			
6550	0,03	Temp <sub>w</sub> (gr C)=	17.2		
6600 -	0,02	Derivative fact.=	0.07	Derivative fact.=	0.0
6450	Q01				
6400	1,50 2,00 2,50	Results		Results	
Elapsed Time	nj		1.1E-08		1
Log-Log plot incl. derivates- flo	w pariod	Q/s $(m^2/s)=$	1.1E-08		
Log-Log plot ilici. derivates- lic	w period	T <sub>M</sub> (m <sup>2</sup> /s)= Flow regime:	transient	Flow regime:	transiant
Elapsed time [h]	d e				transient
10 2		` ,		dt <sub>1</sub> (min) =	#NV
		$dt_2$ (min) =		$dt_2 (min) =$	#NV
		$T (m^2/s) =$		$T (m^2/s) =$	3.5E-0
10 \$	102	S (-) =	1.0E-06		1.0E-0
	Commercial	$K_s$ (m/s) =		$K_s (m/s) =$	1.8E-1
3 10 °	101	$S_s (1/m) =$		S <sub>s</sub> (1/m) =	5.0E-0
	10	$C (m^3/Pa) =$	NA	$C (m^3/Pa) =$	6.8E-1
and the first of the state of t		${}^{\sharp}C_{D}(-) =$	NA	$C_D(-) =$	7.5E-0
10 -1	10°	ξ (-) =	-3.9	ξ (-) =	-3.
		$T_{GRF}(m^2/s) =$	NA	T (==2/=)	NA
10 -2 10 -1	10 ° 10 10 2	$S_{GRF}(m/s) =$ $S_{GRF}(-) =$	NA	$T_{GRF}(m^2/s) = S_{GRF}(-) =$	NA
tD		$D_{GRF}(-) =$	NA	D <sub>GRF</sub> (-) =	NA
Log-Log plot incl. derivatives- ı	ecovery period	Selected represe			
Log-Log plot men den van ves- i	ccovery period	$dt_1 \text{ (min)} =$	2.82		6.8E-1
Elapsed time [h]	.10,-1	$dt_1 (min) =$ $dt_2 (min) =$		$C (m^3/Pa) = C_D (-) =$	7.5E-0
	300		2.1E-09		-3.9
		$T_T (m^2/s) = S(-1) = -1$			-3.
	10 2	0 ( )	1.0E-06		
10 °		$K_s$ (m/s) =	4.2E-10		
· ·	30	$S_{s} (1/m) =$	2.0E-07		
		₃Comments:			1
	F 1	ä		00 4 40 0 5 1	
	10 '	The recommended		f 2.1•10-9 m2/s was	
10.1	10 °	The recommended the analysis of the O	CHi phase, which	h shows the clearest	horizontal
10.2	10 '	The recommended the analysis of the C stabilization. The co	CHi phase, which onfidence range	h shows the clearest for the interval trans	horizontal smissivity is
10° 1	10°	The recommended the analysis of the 0 stabilization. The cestimated to be 9.00	CHi phase, which onfidence range 10-10 m2/s to 9	h shows the clearest	horizontal smissivity is ow dimension
10 <sup>4</sup>	3	The recommended the analysis of the 0 stabilization. The cestimated to be 9.00	CHi phase, which onfidence range •10-10 m2/s to 9 e test is 2. The s	h shows the clearest for the interval trans .0•10-9 m2/s. The fl tatic pressure could	horizontal smissivity is ow dimension

Project:   Oskarshamn site investigation   Test type   1		Test Sumr	nary Sheet			
Borehole ID:	Project:	Oskarshamn site investigation	Test type:[1]			Pi
Borehole ID:	Δrea:	Laveman	Test no:			1
Test section from - to (m): 783.00-803.00 m Responsible for self-execution: Reinder van der V Philipp V Section diameter, $2\tau_w$ (m): 0.076 Responsible for test excution: Responsible for test exclusion: Cristian Enache test evaluation: Indata Ind	Alea.	Laxemai	restrio.			'
test execution:	Borehole ID:	KLX08	Test start:			061011 15:28
Linear plot Q and p	Test section from - to (m):	783.00-803.00 m			Reinde	er van der Wall Philipp Wolf
Indata	Section diameter, 2·r <sub>w</sub> (m):	0.076			Crist	ian Enachescu
Indata	I inear nlot Ω and n				Recovery period	
	Linear plot & and p				*1*1*1*1*1*1*1*1*1*1*1*1*1*1*1*1	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				6770		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	KLX08_783.00-803.00_061011_1_Pi_Q_r	P above P below Q 0,9				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	6900 -	- 0.8				692
Topic   Not Analysed   Topic   Not Analysed	6850 -	0,7	•		F1 ( 5. )	**-
	- E 6800				t <sub>r</sub> (s) =	3630
	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ato (km)				1.00E-0
Temp <sub>sk</sub> (gr C)= 17.5   Derivative fact.= $NA$	e e e e e e e e e e e e e e e e e e e	njecton		1.00L 00	3 el 3 (-)-	1.002 00
Derivative fact. NA Derivative fact. On Derivative fact. Derivative fact. On Perpeture fact. On Derivative fact. On Derivativ				17.5		<del> </del>
Results $O/s  (m^2/s) = NA$ Flow regime: transient flow period: transient dt <sub>1</sub> (min) = MNV dt <sub>2</sub> (min) = NA dt <sub>3</sub> (min) = MNV dt <sub>4</sub> (min) = MNV dt <sub>2</sub> (min) = NA dt <sub>4</sub> (min) = MNV dt <sub>4</sub> (min) = NA dt <sub>4</sub> (min) = MNV dt <sub>4</sub> (min) = NA dt <sub>5</sub> (min) = NA dt <sub>6</sub> (min) = MNV dt <sub>6</sub> (min) =	6650 -	0,3				0.00
Results  Q/S (m²/S)= NA  Log-Log plot incl. derivates- flow period $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	6600	0.2	Delivative lact	NA	Denvalive fact.=	0.00
Results $Q/s$ $(m^2/s)=$ NA $Q/s$ $(m^2/s)=$ $(m^2/s$	6550	0,1				
	0,00 0,20 0,40 0,60 0,80	1,00 1,20 1,40 1,60 1,80	Results		Results	
Log-Log plot incl. derivates- flow period				NA	recuito	1
Flow regime: transient Flow regime: transient $dt_1(min) = NA $ $dt_1(min) = MNV $ $dt_2(min) = NA $ $dt_2(min) = MNV $ $dt_2($	l og-l og plot incl. derivates- fl	low period				
$\frac{dt_1  (\text{min}) =  NA                  $	20g 20g piot mon donivatoo n	peneu			Flow regime:	transient
$ \frac{dt_2  (\text{min})  =  \text{NA}  \qquad dt_2  (\text{min})  =  \text{\#NV} }{T  (m^2/s)  =  \qquad 2.8E} \\ S  (\cdot)  =  \text{NA}  \qquad T  (m^2/s)  =  \qquad 2.8E \\ S  (\cdot)  =  \text{NA}  \qquad S  (\cdot)  =  \qquad 1.0E \\ K_s  (m/s)  =  \text{NA}  \qquad S_s  (\cdot)  =  \qquad 1.0E \\ K_s  (m/s)  =  \text{NA}  \qquad S_s  (1/m)  =  \qquad 5.0E \\ S_s  (1/m)  =  \text{NA}  \qquad S_s  (1/m)  =  \qquad 5.0E \\ C  (m^3/Pa)  =  \text{NA}  \qquad C_c  (m^3/Pa)  =  \qquad 4.8E \\ C_D  (\cdot)  =  \text{NA}  \qquad C_D  (\cdot)  =  \qquad 5.3E \\ \xi  (\cdot)  =  \text{NA}  \qquad S_{GRF}(\cdot)  =  \qquad NA \\ S_{GRF}(\cdot)  =  \text{NA}  \qquad S_{GRF}(\cdot)  =  \qquad NA \\ D_{GRF}  (\cdot)  =  \text{NA}  \qquad D_{GRF}  (\cdot)  =  \qquad NA \\ D_{GRF}  (\cdot)  =  \text{NA}  \qquad D_{GRF}  (\cdot)  =  \qquad NA \\ D_{GRF}  (\cdot)  =  \text{NA}  \qquad D_{GRF}  (\cdot)  =  \qquad NA \\ D_{GRF}  (\cdot)  =  \text{NA}  \qquad D_{GRF}  (\cdot)  =  \qquad NA \\ D_{GRF}  (\cdot)  =  \text{NA}  \qquad D_{GRF}  (\cdot)  =  \qquad NA \\ D_{GRF}  (\cdot)  =  \text{NA}  \qquad D_{GRF}  (\cdot)  =  \qquad NA \\ D_{GRF}  (\cdot)  =  \text{NA}  \qquad D_{GRF}  (\cdot)  =  \qquad NA \\ D_{GRF}  (\cdot)  =  \text{NA}  \qquad D_{GRF}  (\cdot)  =  \qquad D_{GRF}  (\cdot)  =  \qquad D_{GRF}  (\cdot)  =  D_{GRF}$			_			
Not Analysed			` ,		, ,	
$ S(\cdot) = NA \qquad S(\cdot) = 1.0E \\ K_s(m/s) = NA \qquad K_s(m/s) = 1.4E \\ S_s(1/m) = NA \qquad S_s(1/m) = 5.0E \\ C(m^3/Pa) = NA \qquad C(m^3/Pa) = 4.8E \\ C_D(\cdot) = NA \qquad C_D(\cdot) = 5.3E \\ \xi(\cdot) = NA \qquad \xi(\cdot) = 1.0E \\ K_s(m/s) = NA \qquad C_{m^3/Pa} = 4.8E \\ C_D(\cdot) = NA \qquad C_D(\cdot) = NA \\ S_{GRF}(\cdot) = NA \qquad S_{GRF}(\cdot) = NA \\ S_{GRF}(\cdot) = NA \qquad S_{GRF}(\cdot) = NA \\ D_{GRF}(\cdot) = NA \qquad D_{GRF}(\cdot) = NA \qquad D_{GRF}(\cdot) = NA \\ D_{GRF}(\cdot) = NA \qquad D_{GRF}(\cdot) $						2.8E-12
Not Analysed			_ ` /		` '	
Not Analysed						
Not Analysed $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$						
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Not A	nalysed	- ,		- ,	
$\xi\left(-\right) = NA \qquad \xi\left(-\right) = NA$ $T_{GRF}(m^2/s) = NA$ $T_{GRF}(m^2/s) = NA$ $S_{GRF}(-) = NA$ $D_{GRF}(-)					, ,	
$T_{GRF}(m^2/s) = NA \qquad T_{GRF}(m^2/s) = NA$ $S_{GRF}(-) = NA \qquad D_{GRF}(-) = NA$ $D_{GRF}(-) = NA \qquad D_{GRF}(-) = NA$ $T_{GRF}(m^2/s) = NA \qquad D_{GRF}(m^2/s) = NA$ $T_{GRF}(m^2/s) = NA \qquad D_{GRF}(m^2/s) = NA$ $T_{GRF}(m^2/s) = NA \qquad D_{GRF}(m^2/s) = NA$ $T_{GRF}(m^2/s) = NA \qquad D_{GRF}(m^2/s)$						-1.4
$S_{GRF}(-) = NA \qquad S_{GRF}(-) = NA$ $D_{GRF}(-) = NA \qquad D_{GRF}(-)			ς (-) <b>-</b>	INA	S (-) -	-1
$S_{GRF}(-) = NA \qquad S_{GRF}(-) = NA$ $D_{GRF}(-) = NA \qquad D_{GRF}(-)			T (m²/a) -	NΔ	T (m²/a) -	NΔ
Log-Log plot incl. derivatives- recovery period Selected representative parameters. $ \frac{dt_1 \text{ (min)}}{dt_2 \text{ (min)}} = \frac{\#NV}{NV} C_0 C_0 C_0 C_0 C_0 C_0 C_0 C_0 C_0 C_0$						
Log-Log plot incl. derivatives- recovery period  Selected representative parameters. $ \frac{dt_1 \text{ (min)}}{dt_2 \text{ (min)}} = \frac{\#\text{NV}}{\#\text{NV}} \text{ C } (\text{m}^3/\text{Pa}) = \frac{4.8\text{E}}{4.8\text{E}} \text{ and } \frac{1}{4.8\text{E}} \text{ and } \frac{1}{4.8$						
$\frac{dt_1 \text{ (min)}}{dt_2 \text{ (min)}} = \frac{\#\text{NV}}{\text{C}} \frac{\text{C} \text{ (m}^3/\text{Pa)}}{\text{C}} = \frac{4.8\text{E}}{4.8\text{E}}$ $\frac{dt_2 \text{ (min)}}{dt_2 \text{ (min)}} = \frac{\#\text{NV}}{\text{C}} \frac{\text{C} \text{ (m}^3/\text{Pa)}}{\text{C}} = \frac{5.3\text{E}}{5.3\text{E}}$ $\frac{dt_2 \text{ (min)}}{\text{T}} = \frac{\#\text{NV}}{10^3} \frac{\text{C}}{\text{C}} = \frac{5.3\text{E}}{5.3\text{E}}$ $\frac{dt_2 \text{ (min)}}{\text{C}} = \frac{\#\text{NV}}{1.0\text{E}} \frac{\text{C}}{\text{C}} = \frac{5.3\text{E}}{5.3\text{E}}$ $\frac{dt_2 \text{ (min)}}{\text{C}} = \frac{4.8\text{E}}{5.3\text{E}} \frac{\text{C}}{\text{C}} = \frac{5.3\text{E}}{5.3\text{E}}$ $\frac{dt_2 \text{ (min)}}{\text{C}} = \frac{1.0\text{E}}{5.3\text{E}} = \frac{1.0\text{E}}{5.3\text{E}}$ $\frac{dt_2 \text{ (min)}}{C$	l og-l og plot incl. derivatives-	recovery period	= GRF ( )			
$\frac{dt_2 \text{ (min)}}{dt_2 \text{ (min)}} = \frac{\#\text{NV}}{\text{Tr}} \frac{C_D (-)}{\text{Co}} = \frac{5.3\text{E}}{\text{Tr}} \frac{m^2/\text{s}}{\text{s}} = \frac{2.8\text{E}}{-12} \xi (-) = \frac{5.3\text{E}}{-12} \frac{m^2/\text{s}}{\text{s}} = \frac{1.0\text{E}}{-06} \frac{m^2/\text{s}}{\text{s}} = \frac{1.4\text{E}}{-13} \frac{m^2/\text{s}}{\text{s}} = \frac$						4.8E-1
$T_{T} (m^2/s) = 2.8E-12 \xi (-) = S(-) = 1.0E-06$ $K_{S} (m/s) = 1.4E-13$ $S_{S} (1/m) = 5.0E-08$ $Comments:$ The recommended transmissivity of 2.3E-12 m2/s was derived from analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 9E-13 to 5E-12 m2/s. The flow	10 0 10, 3	0,110,1				5.3E-0
$S(-) = 1.0E-06$ $K_s (m/s) = 1.4E-13$ $S_s (1/m) = 5.0E-08$ $Comments:$ The recommended transmissivity of 2.3E-12 m2/s was derived from analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 9E-13 to 5E-12 m2/s. The flow						-1.4
$K_{\rm s}$ (m/s) = 1.4E-13 $S_{\rm s}$ (1/m) = 5.0E-08 $S_{\rm s}$ (1/m) = 5.0E-08 $S_{\rm s}$ (1/m) = 5.0E-08 $S_{\rm s}$ (1/m) = 5.0E-12 m2/s was derived from analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 9E-13 to 5E-12 m2/s. The flow		, in the second				· · ·
S <sub>s</sub> $(1/m) = 5.0E-08$ Comments:  The recommended transmissivity of 2.3E-12 m2/s was derived from analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 9E-13 to 5E-12 m2/s. The flow	· · ·	Affilia 110°				
Comments:  The recommended transmissivity of 2.3E-12 m2/s was derived from analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 9E-13 to 5E-12 m2/s. The flow	10					
The recommended transmissivity of 2.3E-12 m2/s was derived from analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 9E-13 to 5E-12 m2/s. The flow		0.3 Per 90 x		0.0∟-00		<u> </u>
analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 9E-13 to 5E-12 m2/s. The flow		xweduled p		transmissivity	f 2.3E-12 m2/s was	derived from the
transmissivity is estimated to be 9E-13 to 5E-12 m2/s. The flow	10 2	10 1 8				
[U.U.S. ]			transmissivity is es	timated to be 9E	-13 to 5E-12 m2/s.	The flow
dimension displayed during the test is 2. The static pressure could n	• •	0.03				sure could not
be extrapolated due to the very low transmissivity.		10 -2	be extrapolated due	e to the very low	transmissivity.	
10 2 10 7 10 7 10	10 <sup>3</sup> 10 <sup>2</sup>	10 -1 10 0 10 1				

Project:  Area:  Borehole ID:  Test section from - to (m):  Section diameter, 2·r <sub>w</sub> (m):	Oskarshamn site investigation  Laxema	mary Sheet on Test type:[1] ar Test no:  8 Test start:			CHir
Borehole ID:  Test section from - to (m):	KLX0				
Borehole ID:  Test section from - to (m):	KLX0				1
Test section from - to (m):		08 Test start:			ı
• •	803.00-823.00				061011 17:47
Section diameter, 2·r <sub>w</sub> (m):		m Responsible for test execution:		Reinde	er van der Wall Philipp Wolf
	0.07	6 Responsible for		Crist	ian Enachescu
Linear plot Q and p		test evaluation:		Recovery period	
Linear plot & and p		Indata		Indata	
7150	10	p <sub>0</sub> (kPa) =	6939		
KLX08_803.00-823.00_061011_1_CHir_Q_r	P section P above P below 9	p <sub>i</sub> (kPa ) =	NA		
7050	8	$p_p(kPa) =$	NA	p <sub>F</sub> (kPa ) =	NA
	7	$Q_p (m^3/s) =$	NA	F1 ( 5. )	
7000 ·		tp(s) =	NA	t <sub>F</sub> (s) =	NA
2 coso	um/d we:	S el S <sup>*</sup> (-)=		S el S <sup>*</sup> (-)=	1.00E-06
Fed. 1 10000 1	in piection Rate (Immin)	EC <sub>w</sub> (mS/m)=	1.001 00	∪ <del> </del>	1.001 00
6850 ·	14 =	Temp <sub>w</sub> (gr C)=	17.7		-
	3	Derivative fact.=		Derivative fact.=	NA
6800 -	2	Delivative fact.	IVA	Denvative fact.	INA
6750	-1		+		
6700 0,00 0,10 0,20 0,30 0,40 Elapsed Time	0,50 0,60 0,70 0,80	Results		Results	
		$Q/s (m^2/s)=$	NA		
Log-Log plot incl. derivates- flo	w period	$T_{\rm M} ({\rm m}^2/{\rm s}) =$	NA		1
33 p		Flow regime:	transient	Flow regime:	transient
		$dt_1 \text{ (min)} =$	NA	$dt_1$ (min) =	NA
		$dt_2 \text{ (min)} =$	NA	$dt_2 \text{ (min)} =$	NA
		$T (m^2/s) =$		$T (m^2/s) =$	NA
		S (-) =	NA	S (-) =	NA
		$K_s (m/s) =$	NA	$K_s (m/s) =$	NA
		S <sub>s</sub> (1/m) =	NA	S <sub>s</sub> (1/m) =	NA
Not Ana	llysed	$C (m^3/Pa) =$	NA	C (m <sup>3</sup> /Pa) =	NA
		$C_D(-) =$	NA	$C_D(-) =$	NA
		ξ(-) =	NA	ξ(-) =	NA
		2 (-) —	10/1	۵ (-) –	1.0.
		$T_{GRF}(m^2/s) =$	NA	$T_{GRF}(m^2/s) =$	NA
		$S_{GRF}(m/s) =$ $S_{GRF}(-) =$	NA	$S_{GRF}(III/S) =$ $S_{GRF}(-) =$	NA
		$D_{GRF}(\cdot) =$	NA	$D_{GRF}(\cdot) =$	NA
Log-Log plot incl. derivatives- r	ecovery period	Selected repres			
J . J p / 2	- <b>3</b> F 2	dt <sub>1</sub> (min) =	NA	C (m <sup>3</sup> /Pa) =	NA
		$dt_2 \text{ (min)} =$	NA	$C_D(-) =$	NA
		$T_T (m^2/s) =$	1.0E-11		1
		S (-) =	NA	7 \ /	
		$K_s$ (m/s) =	NA		
		$S_s (1/m) =$	NA		
Not Ana	dweed	Comments:			<u> </u>
	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Based on the test retransmissivity is lo		ed packer complian 11 m2/s.	ce) the interval

Borehole: KLX08

## **APPENDIX 4**

Nomenclature

Character	SICADA designation	Explanation	Dimension	Unit
Variables,	constants		•	
$A_{w}$		Horizontal area of water surface in open borehole, not	[L <sup>2</sup> ]	m <sup>2</sup>
		including area of signal cables, etc.		
b		Aquifer thickness (Thickness of 2D formation)	[L]	m
В		Width of channel	[L]	m
L		Corrected borehole length	[L]	m
L <sub>0</sub>		Uncorrected borehole length	[L]	m
L <sub>p</sub>		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 <sub>w</sub>		Test section length.	[L]	m
dL		Step length, Positive Flow Log - overlapping flow logging. (step length, PFL)	[L]	m
r		Radius	[L]	m
r <sub>w</sub>		Borehole, well or soil pipe radius in test section.	[L]	m
r <sub>we</sub>		Effective borehole, well or soil pipe radius in test section. (Consideration taken to skin factor)	[L]	m
r <sub>s</sub>		Distance from test section to observation section, the shortest distance.	[L]	m
r <sub>t</sub>		Distance from test section to observation section, the <b>interpreted</b> shortest distance via conductive structures.	[L]	m
$r_D$		Dimensionless radius, r <sub>D</sub> =r/r <sub>w</sub>	=	-
Z		Level above reference point	[L]	m
Z <sub>r</sub>		Level for reference point on borehole	[L]	m
Z <sub>wu</sub>		Level for test section (section that is being flowed), upper limitation	[L]	m
Z <sub>wl</sub>		Level for test section (section that is being flowed), lower limitation	[L]	m
Z <sub>ws</sub>		Level for sensor that measures response in test section (section that is flowed)	[L]	m
Z <sub>ou</sub>		Level for observation section, upper limitation	[L]	m
Z <sub>ol</sub>		Level for observation section, lower limitation	[L]	m
Z <sub>os</sub>		Level for sensor that measures response in observation section	[L]	m
_			34-12-	ļ.,
E		Evaporation:	[L³/(T L²)]	mm/y, mm/d,
		hydrological budget:	[L <sup>3</sup> /T]	m <sup>3</sup> /s
ET		Evapotranspiration	[L <sup>3</sup> /(T L <sup>2</sup> )]	mm/y, mm/d, m <sup>3</sup> /s
		hydrological budget:	[L <sup>3</sup> /T]	
Р		Precipitation	[L <sup>3</sup> /(T L <sup>2</sup> )]	mm/y, mm/d,
-		hydrological budget:	[L <sup>3</sup> /T]	m <sup>3</sup> /s
R		Groundwater recharge	[L <sup>3</sup> /(T L <sup>2</sup> )]	mm/y, mm/d,
		hydrological budget:	[L <sup>3</sup> /T]	m <sup>3</sup> /s
D		Groundwater discharge	[L <sup>3</sup> /(T L <sup>2</sup> )]	mm/y, mm/d,
		hydrological budget:	[L <sup>3</sup> /T]	m <sup>3</sup> /s
$Q_R$		Run-off rate	[L <sup>3</sup> /T]	m³/s
$Q_p$		Pumping rate	[L <sup>3</sup> /T]	m³/s
$Q_I$		Infiltration rate	[L <sup>3</sup> /T]	m³/s
Q		Volumetric flow. Corrected flow in flow logging $(Q_1 - Q_0)$	[L <sup>3</sup> /T]	m³/s
$Q_0$		(Flow rate) Flow in test section during undisturbed conditions (flow	[L <sup>3</sup> /T]	m³/s
Q <sub>p</sub>		logging). Flow in test section immediately before stop of flow.	[L <sup>3</sup> /T]	m³/s
•		Stabilised pump flow in flow logging.	_	

Character	SICADA designation	Explanation	Dimension	Unit
Q <sub>m</sub>		Arithmetical mean flow during perturbation phase.	[L <sup>3</sup> /T]	m <sup>3</sup> /s
Q <sub>1</sub>		Flow in test section during pumping with pump flow Q <sub>p1</sub> , (flow logging).	[L <sup>3</sup> /T]	m³/s
Q <sub>2</sub>		Flow in test section during pumping with pump flow $Q_{p1}$ , (flow logging).	[L <sup>3</sup> /T]	m³/s
ΣQ	SumQ	Cumulative volumetric flow along borehole	[L <sup>3</sup> /T]	m <sup>3</sup> /s
$\Sigma Q_0$	SumQ0	Cumulative volumetric flow along borehole, undisturbed conditions (ie, not pumped)	[L³/T]	m³/s
$\Sigma Q_1$	SumQ1	Cumulative volumetric flow along borehole, with pump flow Q <sub>p1</sub>	[L <sup>3</sup> /T]	m³/s
$\Sigma Q_2$	SumQ2	Cumulative volumetric flow along borehole, with pump flow Q <sub>p2</sub>	[L <sup>3</sup> /T]	m³/s
$\Sigma Q_{C1}$	SumQC1	Corrected cumulative volumetric flow along borehole, $\Sigma Q_1$ - $\Sigma Q_0$	[L <sup>3</sup> /T]	m³/s
$\Sigma Q_{C2}$	SumQC2	Corrected cumulative volumetric flow along borehole, $\Sigma Q_2$ - $\Sigma Q_0$	[L <sup>3</sup> /T]	m³/s
q		Volumetric flow per flow passage area (Specific discharge (Darcy velocity, Darcy flux, Filtration velocity)).	([L <sup>3</sup> /T*L <sup>2</sup> ]	m/s
V		Volume	[L <sup>3</sup> ]	m <sup>3</sup>
$V_{w}$		Water volume in test section.	[L <sup>3</sup> ]	m <sup>3</sup>
V <sub>p</sub>		Total water volume injected/pumped during perturbation phase.	[L <sup>3</sup> ]	m <sup>3</sup>
V		Velocity	$([L^3/T*L^2]$	m/s
V <sub>a</sub>		Mean transport velocity (Average linear velocity (Average linear groundwater velocity, Mean microscopic velocity));. $v_a=q/n_e$	([L <sup>3</sup> /T*L <sup>2</sup> ]	m/s
t		Time	[T]	hour,mi n,s
t <sub>o</sub>		Duration of rest phase before perturbation phase.	[T]	S
t <sub>p</sub>		Duration of perturbation phase. (from flow start as far as $p_p$ ).	[T]	s
t <sub>F</sub>		Duration of recovery phase (from $p_p$ to $p_F$ ).	[T]	S
t <sub>1</sub> , t <sub>2</sub> etc		Times for various phases during a hydro test.	[T]	hour,mi n,s
dt		Running time from start of flow phase and recovery phase respectively.	[T]	s
dt <sub>e</sub>		$dt_e = (dt \cdot tp) / (dt + tp)$ Agarwal equivalent time with dt as running time for recovery phase.	[T]	S
t <sub>D</sub>		$t_D = T \cdot t / (S \cdot r_w^2)$ . Dimensionless time	-	-
р		Static pressure; including non-dynamic pressure which depends on water velocity. Dynamic pressure is normally ignored in estimating the potential in groundwater flow relations.	[M/(LT) <sup>2</sup> ]	kPa
p <sub>a</sub>		Atmospheric pressure	$[M/(LT)^2]$	kPa
p <sub>t</sub>		Absolute pressure; p <sub>t</sub> =p <sub>a</sub> +p <sub>g</sub>	$[M/(LT)^2]$	kPa
p <sub>g</sub>		Gauge pressure; Difference between absolute pressure and atmospheric pressure.	[M/(LT) <sup>2</sup> ]	kPa
p <sub>0</sub>		Initial pressure before test begins, prior to packer expansion.	[M/(LT) <sup>2</sup> ]	kPa
p <sub>i</sub>		Pressure in measuring section before start of flow.	$[M/(LT)^2]$	kPa
P <sub>f</sub>		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) <sup>2</sup> ]	kPa
p <sub>F</sub>		Pressure in measuring section at end of recovery.	[M/(LT) <sup>2</sup> ]	kPa
p <sub>D</sub>		$p_D = 2\pi \cdot T \cdot p/(Q \cdot \rho_w g)$ , Dimensionless pressure		-
dp		Pressure difference, drawdown of pressure surface between two points of time.	[M/(LT) <sup>2</sup> ]	kPa

Character	SICADA designation	Explanation	Dimension	Unit
dp <sub>f</sub>	usoig	$dp_f = p_i - p_f$ 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) <sup>2</sup> ]	kPa
dp <sub>s</sub>		$dp_s = p_s - p_p$ 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) <sup>2</sup> ]	kPa
dp <sub>p</sub>		$dp_p = p_i - p_p$ or $= p_p - p_i$ , <b>maximal</b> pressure increase/drawdown of pressure surface between two points of time during perturbation phase. $dp_p$ expressed positive.	[M/(LT) <sup>2</sup> ]	kPa
dp <sub>F</sub>		$dp_F = p_p - p_F$ or $= p_F - p_p$ , <b>maximal</b> pressure increase/drawdown of pressure surface between two points of time during recovery phase. $dp_F$ expressed positive.	[M/(LT) <sup>2</sup> ]	kPa
Н		Total head; (potential relative a reference level) (indication of h for phase as for p). H=h <sub>e</sub> +h <sub>p</sub> +h <sub>v</sub>	[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 <sub>e</sub> +h <sub>p</sub>	[L]	m
h <sub>e</sub>		Height of measuring point (Elevation head); Level above reference level for measuring point.	[L]	m
h <sub>p</sub>		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 <sub>v</sub>		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 <sub>o</sub> , positive)	[L]	m
Sp		Drawdown in measuring section before flow stop.	[L]	m
h <sub>0</sub>		Initial above reference level before test begins, prior to packer expansion.	[L]	m
h <sub>i</sub>		Level above reference level in measuring section before start of flow.	[L]	m
h <sub>f</sub>		Level above reference level during perturbation phase.	[L]	m
h <sub>s</sub>		Level above reference level during recovery phase.	[L]	m
h <sub>p</sub>		Level above reference level in measuring section before flow stop.	[L]	m
h <sub>F</sub>		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 <sub>f</sub>		$dh_f = h_i - h_f$ 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 <sub>s</sub>		$dh_s = h_s - h_p$ 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 <sub>p</sub>		$dh_p = h_i - h_p$ 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 <sub>F</sub>		$dh_F = h_p - h_F$ 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 <sub>w</sub>		Temperature in the test section (taken from temperature logging). Temperature		°C
Te <sub>w0</sub>		Temperature in the test section during undisturbed conditions (taken from temperature logging).		°C

Character	SICADA designation	Explanation	Dimension	Unit
Te <sub>o</sub>	area gradien	Temperature in the observation section (taken from temperature logging). Temperature		°C
EC <sub>w</sub>		Electrical conductivity of water in test section.		mS/m
EC <sub>w0</sub>		Electrical conductivity of water in test section during		mS/m
0		undisturbed conditions.		
EC <sub>o</sub>		Electrical conductivity of water in observation section		mS/m
TDS <sub>w</sub>		Total salinity of water in the test section.	[M/L <sup>3</sup> ]	mg/L
TDS <sub>w0</sub>		Total salinity of water in the test section during undisturbed conditions.	[M/L <sup>3</sup> ]	mg/L
TDS₀		Total salinity of water in the observation section.	[M/L <sup>3</sup> ]	mg/L
g		Constant of gravitation (9.81 m*s <sup>-2</sup> ) (Acceleration due to gravity)	[L/T <sup>2</sup> ]	m/s <sup>2</sup>
π	pi	Constant (approx 3.1416).	[-]	
π 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 <sub>MAX</sub> -x <sub>MIN</sub> ), x: measured variable considered.		
MAE		Mean absolute error. $MAE = \frac{1}{n} \sum_{i=1}^{n}  r_i $		
NMAE		Normalized MAE. NMAE=MAE/(x <sub>MAX</sub> -x <sub>MIN</sub> ), 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 <sub>MAX</sub> -x <sub>MIN</sub> ), 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.		
		$SEMR = \left(\frac{1}{n(n-1)} \sum_{i=1}^{n} (r_i - ME)^2\right)^{0.5}$		
Parameter:	S			
Q/s		Specific capacity $s=dp_p$ or $s=s_p=h_0-h_p$ (open borehole)	[L <sup>2</sup> /T]	m²/s
D		Interpreted flow dimension according to Barker, 1988.	[-]	-
dt₁		Time of starting for semi-log or log-log evaluated characteristic counted from start of flow phase and recovery phase respectively.	[T]	S
dt <sub>2</sub>		End of time for semi-log or log-log evaluated characteristic counted from start of flow phase and recovery phase respectively.	[T]	S
dt <sub>L</sub>		Response time to obtain 0.1 m (or 1 kPa) drawdown in observation section counted from start of recovery phase.	[T]	S
ТВ		Flow capacity in a one-dimensional structure of width B and transmissivity T. Transient evaluation of one-dimensional structure	[L <sup>3</sup> /T]	m³/s
T		Transmissivity	[L <sup>2</sup> /T]	m²/s
T <sub>M</sub>		Transmissivity according to Moye (1967)	[L <sup>2</sup> /T]	m²/s
T <sub>Q</sub>		Evaluation based on Q/s and regression curve between Q/s and T, as example see Rhén et al (1997) p. 190.	[L <sup>2</sup> /T]	m²/s
Ts		Transmissivity evaluated from slug test	[L <sup>2</sup> /T]	m²/s

Character	SICADA designation	Explanation	Dimension	Unit
T <sub>D</sub>		Transmissivity evaluated from PFL-Difference Flow Meter	[L <sup>2</sup> /T]	m²/s
Tı		Transmissivity evaluated from Impeller flow log	[L <sup>2</sup> /T]	m²/s
$T_{Sf}$ , $T_{Lf}$		Transient evaluation based on semi-log or log-log	[L <sup>2</sup> /T]	m²/s
		diagram for perturbation phase in injection or pumping.	2	2.
$T_{Ss}, T_{Ls}$		Transient evaluation based on semi-log or log-log diagram for recovery phase in injection or pumping.	[L <sup>2</sup> /T]	m²/s
T <sub>T</sub>		Transient evaluation (log-log or lin-log). Judged best evaluation of T <sub>Sf</sub> , T <sub>Lf</sub> , T <sub>Ss</sub> , T <sub>Ls</sub>	[L <sup>2</sup> /T]	m²/s
T <sub>NLR</sub>		Evaluation based on non-linear regression.	[L <sup>2</sup> /T]	m²/s
T <sub>Tot</sub>		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).	[L²/T]	m²/s
K		Hydraulic conductivity	[L/T]	m/s
K <sub>s</sub>		Hydraulic conductivity based on spherical flow model	[L/T]	m/s
K <sub>m</sub>		Hydraulic conductivity matrix, intact rock	[L/T]	m/s
k		Intrinsic permeability	[L <sup>2</sup> ]	m <sup>2</sup>
kb		Permeability-thickness product: kb=k·b	[L <sup>3</sup> ]	m <sup>3</sup>
NO.		T criticability trilokticso product. No 10 b	[ <u>-</u> ]	1
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 <sub>y</sub>		Theoretical specific yield of water (Specific yield; unconfined storage. Defined as total porosity (n) minus retention capacity (S <sub>r</sub> )	[-]	-
S <sub>ya</sub>		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 <sub>r</sub>		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 <sub>f</sub>		Fracture storage coefficient	[-]	-
S <sub>m</sub>		Matrix storage coefficient	[-]	-
S <sub>NLR</sub>		Storage coefficient, evaluation based on non-linear regression	[-]	
S <sub>Tot</sub>		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).	[-]	-
2		Specific storage coefficient: confined storage	[ 1/L]	1/m
S <sub>s</sub>		Specific storage coefficient; confined storage.		1/m
S <sub>s</sub> *		Assumed specific storage coefficient; confined storage.	[ 1/L]	1/m
C <sub>f</sub>		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 <sub>i</sub> =b'/K' where b' is thickness of the aquitard and K' its hydraulic conductivity across the aquitard.	[T]	S
L <sub>f</sub>		Leakage factor: $L_f = (K \cdot b \cdot c_f)^{0.5}$ where K represents characteristics of the aquifer.	[L]	m

Character	SICADA designation	Explanation	Dimension	Unit
٤*	Skin	Assumed skin factor	[-]	-
ξ* C		Wellbore storage coefficient	$[(LT^2)\cdot M^2]$	m³/Pa
C <sub>D</sub>		$C_D = C \cdot \rho_w g / (2\pi \cdot S \cdot r_w^2)$ , Dimensionless wellbore storage coefficient	[-]	_
ω	Stor-ratio	$ω$ = $S_f$ /( $S_f$ + $S_m$ ), storage ratio (Storativity ratio); the ratio of storage coefficient between that of the fracture and total storage.	[-]	-
λ	Interflow-coeff	$\lambda$ = $\alpha$ · (K <sub>m</sub> / K <sub>f</sub> ) · $r_w^2$ interporosity flow coefficient.	[-]	-
$T_GRF$		Transmissivity interpreted using the GRF method	[L <sup>2</sup> /T]	m²/s
S <sub>GRF</sub>		Storage coefficient interpreted using the GRF method	[ 1/L]	1/m
D <sub>GRF</sub>		Flow dimension interpreted using the GRF method	[-]	-
C <sub>w</sub>		Water compressibility; corresponding to β in hydrogeological literature.	[(LT <sup>2</sup> )/M]	1/Pa
C <sub>r</sub>		Pore-volume compressibility, (rock compressibility); Corresponding to α/n in hydrogeological literature.	[(LT <sup>2</sup> )/M]	1/Pa
Ct		$c_t = c_r + c_w$ , 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 <sup>2</sup> )/M]	1/Pa
nc <sub>t</sub>		Porosity-compressibility factor: nc <sub>t</sub> = n·c <sub>t</sub>	[(LT <sup>2</sup> )/M]	1/Pa
nc <sub>t</sub> b		Porosity-compressibility-thickness product: nc <sub>t</sub> b= n·c <sub>t</sub> ·b	$[(L^2T^2)/M]$	m/Pa
n		Total porosity	_	-
n <sub>e</sub>		Kinematic porosity, (Effective porosity)	-	-
е		Transport aperture. e = n <sub>e</sub> ·b	[L]	m
	Danish	Describe	FR 4 /1 31	1 // 3\
ρ	Density	Density	[M/L <sup>3</sup> ]	kg/(m³)
ρ <sub>w</sub>	Density-w	Fluid density in measurement section during pumping/injection	[M/L <sup>3</sup> ]	kg/(m³)
$\rho_0$	Density-o	Fluid density in observation section	[M/L <sup>3</sup> ]	kg/(m³)
$ ho_{\sf sp}$	Density-sp	Fluid density in standpipes from measurement section	[M/L <sup>3</sup> ]	kg/(m <sup>3</sup> )
μ	my	Dynamic viscosity  Dynamic viscosity (Fluid density in measurement section	[M/LT]	Pa s Pa s
μ <sub>w</sub>	my	during pumping/injection)	[M/LT]	
FC <sub>T</sub>		Fluid coefficient for intrinsic permeability, transference of k to K; K=FC <sub>T</sub> ·k; FC <sub>T</sub> = $\rho_w$ ·g/ $\mu_w$	[1/LT]	1/(ms)
FCs		Fluid coefficient for porosity-compressibility, transference of $c_t$ to $S_s$ ; $S_s$ = $FC_S$ · $n$ · $c_t$ ; $FC_S$ = $\rho_w$ · $g$	[ M/T <sup>2</sup> L <sup>2</sup> ]	Pa/m
Index on K	, T and S	10. o(10 03; 03 . 03 o(; 1 03 pw g		
S		S: semi-log		
L		L: log-log		
f		Pump phase or injection phase, designation following S or L (withdrawal)		
S		Recovery phase, designation following S or L (recovery)		
NLR		NLR: Non-linear regression. Performed on the entire test sequence, perturbation and recovery		
М		Moye		
GRF		Generalised Radial Flow according to Barker (1988)		
m		Matrix		
f		Fracture		
Т		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		
е		Effective property (constant) within a domain in a		
C		numerical groundwater flow model.		
Index on p	and Q	Transcriber groundwater new meder.	1	
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		
р		Pressure or flow in measuring section at end of perturbation period		
F		Pressure in measuring section at end of recovery period.		
m		Arithmetical mean value		
С		Estimated value. The index is placed last if index for "where" and "what" are used. Simulated value		
m		Measured value. The index is placed last if index for "where" and "what" are used. Measured value		
Some misc	ellaneous inde	xes on p and h		
W		Test section (final difference pressure during flow phase in test section can be expressed dp <sub>wp</sub> ; First index shows "where" and second index shows "what")		
0		Observation section (final difference pressure during flow phase in observation section can be expressed dp <sub>op</sub> ; 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 <sub>opf</sub> ; the first index shows "where" and the second index shows "what" and the last one "recalculation")		

Borehole: KLX08A

## **APPENDIX 5**

SICADA data tables



## **SICADA/Data Import Template**

SKB & Ergodata AB 2004

(Simplified version v1.4)

File Identity	
Created By	Stephan Rohs
Created	2006-09-22

Compiled By	
Quality Check For Delivery	
Delivery Approval	

Activity Type	KLX 08
	KLX 08 - Injection test

Project	AP PS 400-06-001

Activity Info	ormation					Additional Activity Data								
						C10	P20	P200	P220	R25				
							Field crew		evaluating					
Idcode	Start Date	Stop Date	Secup (m)	Seclow (m)	Section No	Company	manager	Field crew	data	Report				
KLX 08	2006-09-28 07:55	2006-09-28 21:27	103.00	503.00		Golder Associates	Reinder van	Reinder van	Reinder van	Stephan				
							der Wall	der Wall,	der Wall,	Rohs				
								Philipp Wolf,	Philipp Wolf,					
								Mesgena	Stephan					
								Gebrezghi,	Rohs					
								Nikolaj						
								Sokrut						
KLX 08	2006-10-06 09:32	2006-10-11 18:34	104.00	963.00		Golder Associates	Reinder van	Reinder van	Reinder van	Stephan				
							der Wall	der Wall,	der Wall,	Rohs				
								Philipp Wolf,	Philipp Wolf,					
								Mesgena	Stephan					
								Gebrezghi,	Rohs					
								Nikolaj						
								Sokrut						

Table	plu_s_hole_test_d
	PLU Injection and pumping, General information

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

										flow rate o	value type	mean_flow_rate_		1	
idcode s	start date	stop date	secup	seclow	section no	test type	formation type	start_flow_period	stop_flow_period	nd qp	ap		a meast I	q_measlu t	ot volume vn
KLX 08	2006-09-28 07:55:00	2006-09-28 10:12:00		203.00	occion_nc	3	1	2006-09-28 09:09:54	2006-09-28 09:40:04	8.92E-04	0		1.67E-08		1.63E+00
KLX 08	2006-09-28 11:37:00	2006-09-28 14:04:00		303.00		3	1	2006-09-28 13:02:15	·	6.86E-04	0		1.67E-08		1.29E+00
KLX 08	2006-09-28 15:27:00	2006-09-28 17:28:00		405.00		3	\$	2006-09-28 16:25:53		4.70E-04	0	·	1.67E-08	·	8.79E-01
KLX 08	2006-09-28 19:13:00	2006-09-28 21:27:00	<u> </u>	503.00		3		2006-09-28 20:25:46		5.69E-04	0	<u> </u>	1.67E-08	<u> </u>	1.10E+00
KLX 08	2006-10-06 09:32:00	2006-10-06 12:05:00		603.00		3	1	2006-10-06 11:03:11	2006-10-06 11:33:21	6.53E-07	0	7.32E-07	1.67E-08		1.32E-03
KLX 08	2006-10-06 14:05:00	2006-10-06 16:06:00	603.00	703.00		3	1	2006-10-06 15:04:09		6.08E-05	0	6.98E-05	1.67E-08		6.98E-05
KLX 08	2006-10-06 17:48:00	2006-10-06 20:40:00		803.00		3	1	2006-10-06 19:38:49		2.33E-07	0	1	1.67E-08		5.91E-04
KLX 08	2006-10-06 22:17:00	2006-10-07 00:54:00	<del></del>	903.00		3	1	2006-10-06 23:52:28		1.48E-06	0	· · · · · · · · · · · · · · · · · · ·	1.67E-08		3.10E-03
KLX 08	2006-10-07 06:04:00	2006-10-07 09:02:00	863.00	963.00		3	1	2006-10-07 08:00:40	2006-10-07 08:30:50	3.17E-08	0	4.11E-08	1.67E-08	8.33E-04	7.40E-05
KLX 08	2006-10-08 07:04:00	2006-10-08 08:32:00	104.00	124.00		3	1	2006-10-08 07:50:25	2006-10-08 08:10:35	4.73E-04	0	4.94E-04	1.67E-08	8.33E-04	5.93E-01
KLX 08	2006-10-08 09:13:00	2006-10-08 10:41:00	125.00	145.00		3	1	2006-10-08 09:59:04	2006-10-08 10:19:14	2.96E-05	0	3.08E-05	1.67E-08	8.33E-04	3.70E-02
KLX 08	2006-10-08 11:12:00	2006-10-08 12:38:00	144.00	164.00		3	1	2006-10-08 11:56:19	2006-10-08 12:16:29	4.86E-04	0	5.03E-04	1.67E-08	8.33E-04	6.04E-01
KLX 08	2006-10-08 13:19:00	2006-10-08 14:42:00	164.00	184.00		3	1	2006-10-08 14:00:33	2006-10-08 14:20:43	4.79E-04	0	5.05E-04	1.67E-08	8.33E-04	6.06E-01
KLX 08	2006-10-08 15:14:00	2006-10-08 16:36:00	183.50	203.50		3	1	2006-10-08 15:54:25	2006-10-08 16:14:35	4.61E-04	0	5.06E-04	1.67E-08	8.33E-04	6.07E-01
KLX 08	2006-10-08 17:07:00	2006-10-08 18:30:00	203.00	223.00		3	1	2006-10-08 17:48:01	2006-10-08 18:08:11	5.30E-04	0	5.51E-04	1.67E-08	8.33E-04	6.62E-01
KLX 08	2006-10-08 19:00:00	2006-10-08 20:26:00	223.50	243.50		3		2006-10-08 19:44:15	2006-10-08 20:04:25	1.55E-04	0	1.60E-04	1.67E-08	8.33E-04	1.92E-01
KLX 08	2006-10-08 21:09:00	2006-10-08 22:36:00	243.50	263.50		3		2006-10-08 21:54:54	2006-10-08 22:15:04	3.43E-06	0	3.62E-06	1.67E-08	8.33E-04	4.34E-03
KLX 08	2006-10-08 23:10:00	2006-10-09 00:33:00	264.00	284.00		3		2006-10-08 23:51:26	2006-10-09 00:11:36	9.65E-06	0	1.07E-05	1.67E-08	8.33E-04	1.28E-02
KLX 08	2006-10-09 01:07:00	2006-10-09 02:31:00		304.00		3	£	2006-10-09 01:49:38		4.16E-05	0		1.67E-08		5.11E-02
KLX 08	2006-10-09 06:17:00	2006-10-09 07:50:00		324.00		3		2006-10-09 07:08:22		6.17E-07	0		1.67E-08		7.50E-04
KLX 08	2006-10-09 08:23:00	2006-10-09 10:04:00		344.00		3			2006-10-09 09:42:31	5.17E-08			1.67E-08		7.27E-05
KLX 08	2006-10-09 10:41:00	2006-10-09 12:08:00		364.00		3		<u> </u>		7.27E-07	0	·	1.67E-08		9.53E-04
KLX 08	2006-10-09 12:57:00	2006-10-09 14:27:00		384.00		3		2006-10-09 13:45:22		7.96E-05	0		1.67E-08		9.76E-02
KLX 08	2006-10-09 15:01:00	2006-10-09 16:25:00		405.00		3	1	2006-10-09 15:43:03		4.97E-04	0		1.67E-08		6.11E-01
KLX 08	2006-10-09 16:55:00	2006-10-09 18:19:00		423.00		3	1	2006-10-09 17:37:42		4.01E-04	0	4.47E-04	1.67E-08	<u> </u>	5.36E-01
KLX 08	2006-10-09 18:50:00	2006-10-09 20:17:00		443.00		3	<u> </u>	2006-10-09 19:35:12		6.08E-06	0	0.202 00	1.67E-08		7.50E-03
KLX 08	2006-10-09 21:00:00	2006-10-09 22:23:00	<u> </u>	463.00		3		, 2000 10 00 21111120		1.48E-05	0		1.67E-08	<del>\                                    </del>	1.81E-02
KLX 08	2006-10-09 23:36:00	2006-10-10 00:35:00		483.00		3		2006-10-09 23:53:44		6.82E-05	<u> </u>	(	1.67E-08	·	8.60E-02
KLX 08	2006-10-10 01:14:00	2006-10-10 02:38:00		503.00		3		2006-10-10 01:56:17	2006-10-10 02:16:27	6.45E-06	0	(	1.67E-08	.,	7.99E-03
KLX 08	2006-10-10 06:13:00	2006-10-10 08:07:00	<b></b>	523.00		4B	1	2006-10-10 07:00:31	2006-10-10 07:00:41	#NV	0	<u>}</u>	1.67E-08	·;	#NV
KLX 08	2006-10-10 08:37:00	2006-10-10 10:22:00		543.00		3	1	2006-10-10 09:40:38	ļ	1.70E-07	0	ļ	1.67E-08		2.45E-04
KLX 08	2006-10-10 10:59:00	2006-10-10 12:41:00		563.00 583.00		3		2006-10-10 11:58:53		8.33E-08 9.00E-08	0	·	1.67E-08 1.67E-08		1.37E-04
KLX 08 KLX 08	2006-10-10 13:25:00 2006-10-10 15:33:00	2006-10-10 15:01:00 2006-10-10 16:58:00		603.00		3	<i></i>	2006-10-10 14:19:13 2006-10-10 16:15:54		9.00E-08 4.17E-07	0 -1	\$	1.67E-08 1.67E-08		1.36E-04 5.20E-04
KLX 08 KLX 08	2006-10-10 15:33:00	2006-10-10 16:58:00	<del></del>	623.00		3	}	·		4.17E-07 1.93E-05	-1	·	1.67E-08 1.67E-08		5.20E-04 2.38E-02
KLX 08 KLX 08	2006-10-10 17:32:00	2006-10-10 18:55:00		643.00		3		<del>}</del>		1.93E-05 3.33E-07	-1	<u> </u>	1.67E-08 1.67E-08		4.20E-04
KLX 08	2006-10-10 19.25.00	2006-10-10 20:50:00		663.00		3		2006-10-10 20:08:43		3.33E-07 4.37E-05	-1		1.67E-08		5.98E-02
KLX 08	2006-10-10 21:30:00	2006-10-10 22:34:00		683.00		3	1	2006-10-10 22.12.45		4.68E-05	0	5.28E-05	1.67E-08		6.34E-02
KLX 08	2006-10-10 23:25:00	2006-10-11 00:49:00	\$	703.00		3	1	2006-10-11 00:00:39	2006-10-11 00:27:09	5.50E-08	1 0	}	1.67E-08	-{	7.78E-05
KLX 08	2006-10-11 01:23:00	2006-10-11 05:01:00		723.00		3	£		#NV	#NV	0	(	1.67E-08		#NV
KLX 08	2006-10-11 05:22:00	2006-10-11 08:51:00		743.00		3			ģ	4.50E-08			1.67E-08		6.08E-05
KLX 08	2006-10-11 00:43:00	2006-10-11 08:31:00		763.00		3				2.33E-08	0		1.67E-08		3.50E-05
KLX 08	2006-10-11 03:27:00	2006-10-11 11:47:00		783.00		3	1	2006-10-11 14:10:45		2.17E-07	0		1.67E-08		6.34E-04
KLX 08	2006-10-11 15:28:00	2006-10-11 17:14:00		803.00		4B	1	2006-10-11 16:12:36			0	<u> </u>	1.67E-08		#NV
KLX 08	2006-10-11 17:47:00	2006-10-11 18:34:00		823.00		3	1		#NV	#NV	0	<	1.67E-08		#NV

			dur_flow_ph	dur rec ph		low_end_			press_at_flow_en	final press p	fluid temp te	fluid elcond ec	fluid salinity td	fluid salinity td			
idcode	secup				initial head hi		final head hf	initial press pi		f	w	w	sw	swm	reference	comments	lp
KLX 08	103.00	203.00	1800	1800				1696	1707	1697	9.2						153.00
KLX 08	203.00	303.00	1800	1800				2526	2568	2529	10.6						253.00
KLX 08	305.00	405.00	1800	1800				3393	3439	3394	11.3						355.00
KLX 08	403.00	503.00	1800	1800				4226	4251	4227	13.5						453.00
KLX 08	503.00	603.00	1800	1800				5077	5278	5082	14.8						553.00
KLX 08	603.00	703.00	1800	1800				5923	6123	5938							653.00
KLX 08	703.00	803.00	1800	1800				6775		6864	17.5						753.00
KLX 08	803.00	903.00	1800	1800				7607	7804	7616							853.00
KLX 08	863.00	963.00	1800	1800				8116		8221	19.7						913.00
KLX 08	104.00	124.00	1200	1200				1003	1091	1005							114.00
KLX 08	125.00	145.00	1200	1200				1176		1176							135.00
KLX 08	144.00	164.00	1200	1200		ļ		1339	1373								154.00
KLX 08	164.00	184.00	1200	1200		ļ		1511	1528	1512							174.00
KLX 08	183.50	203.50	1200	1200				1679		1679							193.50
KLX 08	203.00	223.00	1200	1200				1847					-				213.00
KLX 08	223.50	243.50	1200	1200				2021	2220	2021	9.9						233.50
KLX 08	243.50	263.50	1200	1200		ļ		2191	2391	2190							253.50
KLX 08	264.00	284.00	1200	1200		-		2364	2564	2364	10.5						274.00
KLX 08	284.00	304.00	1200	1200		ļ		2534	2734	2534	10.7				1		294.00
KLX 08	304.00	324.00	1200	1200 1200				2705 2887	2905 3087	2704 2893							314.00
KLX 08 KLX 08	324.00	344.00 364.00	1200	1200		ļ		3048		2893 3048			<b>-</b>		ļ	<u> </u>	334.00 354.00
KLX 08	344.00	384.00	1200	1200				3048						-	ļ	-	354.00
KLX 08	364.00 385.00	405.00	1200 1200	1200		<b> </b>		3398	3419	3399			<del> </del>		-		395.00
KLX 08	403.00	423.00	1200	1200		-		3550	3561	3551	12.3				-	-	413.00
KLX 08	423.00	443.00	1200	1200		÷		3719					-		+	-	433.00
KLX 08	443.00	463.00	1200	1200				3889					1		-	+	453.00
KLX 08	463.00	483.00	1200	1200		<u> </u>		4060	4260	4059					1		473.00
KLX 08	483.00	503.00	1200	1200		<b>†</b>		4227	4427	4227	13.4		<b>†</b>		<b>†</b>	<b>—</b>	493.00
KLX 08	503.00	523.00	10			<b>†</b>		4410		4479			<b>†</b>		1	<b>-</b>	513.00
KLX 08	523.00	543.00	1200	1200		l		4574	4775		14.0				1		533.00
KLX 08	543.00	563.00	1200	1200				4746		4788							553.00
KLX 08	563.00	583.00	1200	1200				4912		4920			1	<u> </u>	1		573.00
KLX 08	583.00	603.00	1200	1200				5077	5278	5077	14.7						593.00
KLX 08	603.00	623.00	1200	1200				5246	5446	5247			1				613.00
KLX 08	623.00	643.00	1200	1200				5418	5618	5418							633.00
KLX 08	643.00	663.00	1200	1200				5587	5789	5600							653.00
KLX 08	663.00	683.00	1200	1200				5764	5964	5774	15.8						673.00
KLX 08	683.00	703.00	1200	3600				5931		5925							693.00
KLX 08	703.00	723.00	#NV	#NV				#NV	#NV	#NV	16.4						713.00
KLX 08	723.00	743.00	1200	1200				6272		6317							733.00
KLX 08	743.00	763.00	1200	1200				6439		6575							753.00
KLX 08	763.00	783.00		1200				6604	6805								773.00
KLX 08	783.00	803.00	10	3630				6786	6959	6927	17.5						793.00
KLX 08	803.00	823.00	#NV	#NV				#NV	#NV	#NV	17.7	1					813.00

Table plu\_s\_hole\_test\_ed1

PLU Single hole tests, pumping/injection. Basic evaluation

Calumn	Datatuna	Unit	Column Description
Column site	Datatype CHAR	Unit	Column Description
activity_type	CHAR		Investigation site name Activity type code
start_date	DATE		Date (yymmdd hh:mm:ss)
stop_date	DATE		Date (yymmdd hh:mm:ss)
project	CHAR		project code
idcode	CHAR		Object or borehole identification code
secup	FLOAT	m	Upper section limit (m)
seclow	FLOAT	m	Lower section limit (m)
section no	INTEGER	number	Section number
test_type	CHAR	Tidinibo.	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</lower>
transmissivity_tq	FLOAT	m**2/s	Tranmissivity based on Q/s, see table description
value_type_tq	CHAR		0:true value,-1:TQ <lower meas.limit,1:tq="">upper meas.limit.</lower>
bc_tq	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.</lower>
hydr_cond_moye	FLOAT	m/s	K M: Hydraulic conductivity based on Moye (1967)
formation_width_b	FLOAT	m	b:Aquifer thickness repr. for T(generally b=Lw) ,see descr.
width_of_channel_b	FLOAT	m	B:Inferred width of formation for evaluated TB
tb	FLOAT	m**3/s	TB:Flow capacity in 1D formation of T & width B, see descr.
I_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,</lower>
bc_tt	CHAR		Best choice code. 1 means TT is best choice of T, else 0
I_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,</lower>
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 FLOAT	s	Estimated stop time of evaluation, see table description
t1 t2	FLOAT	S	Start time for evaluated parameter from start flow period  Stop time for evaluated parameter from start of flow period
dte1	FLOAT	s 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 parameter norm start or recovery
transmissivity_t_nlr	FLOAT	m**2/s	T NLR Transmissivity based on None Linear Regression
storativity_s_nlr	FLOAT	=.0	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</lower>
bc_t_nlr	CHAR		Best choice code. 1 means T_NLR is best choice of T, else 0
c_nlr	FLOAT	m**3/pa	Wellbore storage coefficient, based on NLR, see descr.
cd_nlr	FLOAT	•	Dimensionless wellbore storage constant, see table descrip.
skin_nlr	FLOAT		Skin factor based on Non Linear Regression,see desc.
transmissivity_t_grf	FLOAT	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</lower>
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)

				1			formation t	l le	oclon c	spec capacity of		transmissivity_t	value type t	l	transmissivity m			hydr cond	formation w	width of ch
idcode	start date	stop date	secup	seclow	section no	test type	vpe	1	_	spec_capacity_t	value_type_q_s	n		bc_tq	ove	bc tm	value_type_tm	move		annel b
KLX 08		2006-09-28 10:12:00		203.00		toot_type	1	153.00	100			14	4	DC_14	1.04E-03		0 0	1.04E-05		uniter_b
KLX 08		2006-09-28 14:04:00		303.00		3	1	253.00	100	1.60E-04			l		2.09E-04		0 0	2.09E-06		
KLX 08		2006-09-28 17:28:00	305.00	405.00		1 3	1	355.00	100	1.00E-04					1.31E-04		0 0	1.31E-06		
KLX 08		2006-09-28 21:27:00				3	1	453.00	100	2.23E-04					2.91E-04		0 0	2.91E-06		
KLX 08	2006-10-06 09:32:00	2006-10-06 12:05:00	503.00	603.00		3	1	553.00	100	3.19E-08	(				4.15E-08		0 0	4.15E-10		
KLX 08	2006-10-06 14:05:00	2006-10-06 16:06:00	603.00	703.00		3	1	653.00	100	2.98E-06	(				3.89E-06	(	0 0	3.89E-08	8	
KLX 08	2006-10-06 17:48:00	2006-10-06 20:40:00	703.00	803.00		3	1	753.00	100	1.17E-08	(				1.53E-08	(	0 0	1.53E-10	)	
KLX 08	2006-10-06 22:17:00	2006-10-07 00:54:00	803.00	903.00		3	1	853.00	100	7.39E-08	(				9.62E-08	(	0 0	9.62E-10		
KLX 08		2006-10-07 09:02:00	863.00	963.00		3	1	913.00	100	1.51E-09	(				1.96E-09	(	0 0	1.96E-11		
KLX 08		2006-10-08 08:32:00	104.00	124.00		3		114.00	20	5.27E-05					5.52E-05		0 0	2.76E-06		
KLX 08		2006-10-08 10:41:00		145.00		3	1	100.00	20	1.45E-06	(	· 1			1.51E-06	<del></del>	0 0	7.55E-08	<del></del>	
KLX 08		2006-10-08 12:38:00	144.00	164.00		3		154.00	20	1.40E-04	(	·			1.47E-04		0			ļ
KLX 08		2006-10-08 14:42:00	164.00	184.00		3	<u> </u>	174.00	20	2.76E-04		<u> </u>			2.89E-04		0 0	1.45E-05		
KLX 08		2006-10-08 16:36:00	183.50	203.50		1 3	1	193.50	20	4.11E-04	(				4.30E-04		0 0	2.15E-05		
KLX 08		2006-10-08 18:30:00				3	1	213.00	20	1.62E-04	(	)			1.70E-04		0 0	8.50E-06		
KLX 08		2006-10-08 20:26:00	223.50	243.50		-	1	233.50	20	7.63E-06	l l	)			7.98E-06	<u> </u>	0 0	3.99E-07		
KLX 08 KLX 08		2006-10-08 22:36:00 2006-10-09 00:33:00	243.50 264.00	263.50 284.00		-	1	253.50 274.00	20 20	1.68E-07 4.73E-07	(	)			1.76E-07 4.95E-07			8.80E-09 2.48E-08		
KLX 08		2006-10-09 00:33:00	284.00	304.00			1	294.00	20	2.04E-06		7			2.13E-06		0 0	1.07E-07		
KLX 08		2006-10-09 02:51:00	304.00	324.00	ļ		1	314.00	20	3.02E-08		1	-		3.16E-08		0 0	1.58E-09		
KLX 08		2006-10-09 07:50:00	324.00	344.00			1	334.00	20	2.53E-09		/	-		2.65E-09	***********	0 0	1.33E-10		·
KLX 08		2006-10-09 10:04:00		364.00		1 3	1	354.00	20	3.56E-08					3.73E-08		0 0	1.87E-09		
KLX 08		2006-10-09 14:27:00	364.00	384.00		1	<u> </u>	374.00	20	3.88E-06					4.06E-06		0 0	2.03E-07		
KLX 08		2006-10-09 16:25:00		405.00		3	1	395.00	20	9.38E-05					9.81E-05		0 0	4.91E-06		
KLX 08		2006-10-09 18:19:00		423.00		1 3	1	413.00	20	3.57E-04		)	l	-	3.74E-04		0 0	1.87E-05		
KLX 08		2006-10-09 20:17:00				1 3	1	433.00	20	2.98E-07					3.12E-07		0 0	1.56E-08		
KLX 08		2006-10-09 22:23:00				1 3	1	453.00	20	7.23E-07				<b></b>	7.57E-07		0 0			
KLX 08	2006-10-09 23:36:00	2006-10-10 00:35:00	463.00	483.00		3	1	473.00	20	3.34E-06	(				3.50E-06	(	0 0	1.75E-07		
KLX 08	2006-10-10 01:14:00	2006-10-10 02:38:00	483.00	503.00		3	1	493.00	20	3.16E-07	(				3.31E-07	(	0 0	1.66E-08	l .	
KLX 08	2006-10-10 06:13:00	2006-10-10 08:07:00	503.00	523.00		4E	1	513.00	20	#NV	-1	1			#NV	(	0 -1	#NV		
KLX 08		2006-10-10 10:22:00	523.00	543.00		3	1	533.00	20	8.30E-09	(				8.68E-09	(	0	4.34E-10		
KLX 08		2006-10-10 12:41:00	543.00	563.00		3	1	553.00	20	3.97E-09	(				4.15E-09		0	2.08E-10		
KLX 08		2006-10-10 15:01:00	563.00	583.00		3	1	573.00	20	4.39E-09	(	1			4.59E-09		0 0	2.30E-10		
KLX 08		2006-10-10 16:58:00	583.00			3	<u> </u>	593.00	20	2.03E-08	(				2.13E-08	***********	0 0	1.07E-09		
KLX 08		2006-10-10 18:55:00		623.00		3	1	613.00	20	9.48E-07	(	1			9.92E-07		0 0	4.96E-08	<u> </u>	
KLX 08		2006-10-10 20:50:00	623.00			3	1	633.00	20	1.64E-08					1.71E-08		0 0	8.55E-10		
KLX 08		2006-10-10 22:54:00	643.00	663.00		3	1	653.00	20	2.12E-06	(	· 1			2.22E-06		0 0	1.11E-07		
KLX 08		2006-10-11 00:49:00	663.00	683.00		3	4	673.00	20	2.30E-06					2.40E-06	***********	0 0	1.20E-07		ļ
KLX 08		2006-10-11 03:01:00				3		693.00	20	2.95E-09				ļ	3.08E-09		0 0	1.54E-10	<u> </u>	
KLX 08		2006-10-11 06:11:00		723.00		1 3	4	713.00	20	#NV	-1				#NV	***********	0 -1			
KLX 08		2006-10-11 08:51:00				3	1	733.00	20	2.15E-09					2.25E-09		0 0			·
KLX 08		2006-10-11 11:47:00	743.00	763.00		3	1	753.00	20	1.11E-09		1			1.16E-09	<u> </u>	0 0	5.80E-11		l
KLX 08		2006-10-11 14:52:00	763.00	783.00		1 3	1	773.00	20	1.06E-08	(	1			1.11E-08		0 0	5.55E-10		
KLX 08		2006-10-11 17:14:00	783.00	803.00		4E		793.00	20	#NV	-1	'			#NV	`	0 -1	#NV		
KLX 08	∠∪∪6-10-11 17:47:00	2006-10-11 18:34:00	803.00	823.00	1	3	1	813.00	20	#NV	-1	11			#NV	(	0 -1	#NV		

	I I			l measi u measi	ı	accumed	lookaga fa		value tune				I					lookogo	hydr oor	lualua tu	l mosel	u moasi	spec storage	accumed
idcode	secup	seclow	41-	I_measi_u_measi_	sb	assumed_ sb	leakage_fa ctor If	transmissivity tt	value_type_	L			-4		bc s		ri index		d ksf	e ksf	ksf	u_measi_ ksf	spec_storage_	assumed_ ssf
			LD	נט נט	SD	SD	ctor_ii		u	bc_tt		u_measl_q_s							u_ksi	e_ksi	KSI	KSI	SSI	SSI
KLX 08	103.00	203.00			-			4.15E-04			1.00E-04	8.00E-04				432.57		)	ļ		ļ			
KLX 08	203.00							3.16E-04	0		9.00E-05	7.00E-04				112.37			ļ	ļ	ļ			
KLX 08	305.00	405.00			-			1.74E-04	0	·	7.00E-05	4.00E-04				348.09	<u> </u>		ļ		ļ			
KLX 08	403.00	503.00			╄	1		2.54E-04	0		9.00E-05	5.00E-04				382.61					ļ			
KLX 08	503.00	603.00			-			4.10E-08	0		2.00E-08	7.00E-08				43.13								
KLX 08	603.00				<del> </del>			1.48E-06	0		8.00E-07	4.00E-06				32.52	-1		ļ		-			
KLX 08	703.00		_		-			4.50E-09	0		1.00E-09	6.00E-09				9.65	1			-	<u> </u>			
KLX 08	803.00				-			5.95E-08	0	1	2.00E-08	9.00E-08				47.33								-
KLX 08	863.00		_		-			7.30E-10	0	<u> </u>	2.00E-10	3.00E-09				15.75				-	<u> </u>			
KLX 08	104.00				-			2.00E-04		ļ	9.00E-05	7.00E-04				294.28	-1							-
KLX 08	125.00		_		-			7.30E-06	0	1 .	5.00E-06	5.00E-05				128.63	-1	-						
KLX 08	144.00				-			4.28E-04	0		1.00E-04	8.00E-04				196.08		1	ļ	-	ļ			-
KLX 08	164.00				-			4.20E-04	0		1.00E-04	8.00E-04				141.70			ļ		ļ			
KLX 08	183.50	203.50			-			4.98E-04	0		9.00E-05	9.00E-04				369.67								
KLX 08	203.00	223.00			-			1.83E-04	0	·	7.00E-05	5.00E-04				287.82		<del>_</del>						
KLX 08	223.50	243.50			-			3.36E-05	0		1.00E-05	6.00E-05				188.40	-1		-					
KLX 08	243.50	263.50			-			5.83E-07	0		1.00E-07	1.00E-06				68.38								
KLX 08	264.00				ـ			3.76E-07	0		1.00E-07	1.00E-06				10.79	-1	<del></del>			-			
KLX 08	284.00				-			6.60E-06	0		2.00E-06	9.00E-06				125.43	-1							
KLX 08	304.00							1.30E-07	0		2.00E-08	3.00E-07				28.46	-1			-				
KLX 08	324.00				╄			2.70E-09	0		9.00E-10	5.00E-09				17.84	-1				<u> </u>			
KLX 08	344.00				-			3.98E-08	0	1	1.00E-08	7.00E-08				34.95	C			-				
KLX 08	364.00				-			2.30E-05	0	ļ	5.00E-06	6.00E-05				171.37	-1		ļ	-	-	-		
KLX 08	385.00				-			2.41E-04	0	1	8.00E-05	6.00E-04				103.87	1			-				
KLX 08	403.00	423.00			<del> </del>			1.27E-04	0	<u> </u>	7.00E-05	5.00E-04				262.70					-			
KLX 08	423.00				-			1.30E-06	0		7.00E-07	4.00E-06				83.56								
KLX 08	443.00	463.00			-			3.13E-06	0	·	8.00E-07	5.00E-06				104.09								
KLX 08	463.00	483.00			-			8.67E-06	0		5.00E-06					134.28	C		-					
KLX 08	483.00	503.00			-			1.00E-06		·	7.00E-07	4.00E-06				78.25	-1							
KLX 08	503.00	523.00	_		ــــ			4.90E-11	1	<u> </u>	1.00E-11	9.00E-11				11.43					ļ		<u> </u>	
KLX 08	523.00				ـ			5.10E-09			1.00E-09	9.00E-09				20.93	<u> </u>	<del>_</del>			-			
KLX 08	543.00				<del> </del>	ļ		6.60E-09			1.00E-09	9.00E-09				12.56			ļ	4	ļ	ļ		4
KLX 08	563.00	583.00			-			4.70E-09	0		1.00E-09	9.00E-09				20.49	-1			-	-			
KLX 08	583.00	603.00			-			6.85E-08	0	4	1.00E-08	1.00E-07	1.00E-06			40.03				-				
KLX 08	603.00	623.00			_			2.41E-06	0	<u> </u>	7.00E-07	5.00E-06				97.50								
KLX 08	623.00	643.00			-	ļ		7.11E-08	0	1	1.00E-08	1.00E-07	1.00E-06			40.41				-	-			
KLX 08	643.00	663.00			_			1.53E-06	0	1 .	7.00E-07	3.00E-06				87.03	C			-				
KLX 08	663.00	683.00			-			1.31E-06	0		7.00E-07	3.00E-06				31.32	-1		-	-	-			<del> </del>
KLX 08	683.00	703.00			-			4.60E-09	0	·	1.00E-09	9.00E-09				11.94	-1							
KLX 08	703.00	723.00			-			1.00E-11	-1		1.00E-13	1.00E-11				#NV	#NV	1						
KLX 08	723.00	743.00			-			2.20E-09	0		8.00E-10	5.00E-09				15.45	1							
KLX 08	743.00	763.00			ļ			2.19E-09	0		8.00E-10					#NV	1							
KLX 08	763.00				<u> </u>			2.08E-09			9.00E-10					16.71	1							
KLX 08	783.00	803.00						2.75E-12	-1		9.00E-13	5.00E-12				5.54	1	1						
KLX 08	803.00	823.00						1.00E-11	-1	1 1	1.00E-13	1.00E-11	1.00E-06	1.00E-06	i	#NV	#NV	1						

	1 1		-					1	1 1		1	1	4	-4		ı		1				1	-4	d	
ideede		seclow c		d s	skin d	lt1	dt2		42	dte1	dte2	p horner	transmissivity_t nlr	storativity_ s nlr		bc_t_nlr			alda ala	transmissivity_1		bc_t_grf	storativity_	grf	comment
idcode			4.55E-07	5.01E+01	-6.00			0	ιz	ater	utez	1696.5	_	S_IIII	<u> </u>	DC_L_IIII	C_nir	ca_nir	SKIII_IIII	_gri	ı_grı	bc_t_gri	s_gri	gri	comment
KLX 08 KLX 08	103.00	203.00 303.00	1.71E-07	1.88E+01	0.84	25.8 49.8	139		+			2528.2		-	<del> </del>	-		+	-	<u> </u>					
KLX 08	305.00		4.03E-08	4.44E+00	1.57	45.6	278		+			3394.0				-	-	-	-						+
KLX 08	403.00	503.00	7.68E-08	8.46E+00	-5.11	21.0	260					4226.5				-	-	+	<b></b>					-	·
KLX 08	503.00	603.00	3.97E-10	4.38E-02	2.18	249.0	1446					5070.9					1	+				-			
KLX 08	603.00	703.00	7.64E-09	8.42E-01	-4.50	37.2	170					5914.3					1	+	<b></b>						
KLX 08	703.00	803.00	3.85E-10	4.24E-02	-1.79	271.8	1513					#NV					<b>†</b>								1
KLX 08	803.00	903.00	2.10E-09	2.31E-01	-1.56	#NV	#N	V				7591.3					Ì								
KLX 08	863.00	963.00	1.91E-10	2.11E-02	-0.95	46.8	787	2				#NV			1		1	1	1					<u> </u>	
KLX 08	104.00	124.00	6.62E-08	7.30E+00	7.00	#NV	#N	V				1003.6													
KLX 08	125.00	145.00	8.33E-10	9.18E-02	0.05	140.4	388	2				1176.3					T	T							
KLX 08	144.00	164.00	1.57E-07	1.73E+01	8.71	130.8	364					1339.6													
KLX 08	164.00	184.00	9.69E-08	1.07E+01	1.13	25.8	192					1511.6													
KLX 08	183.50	203.50	1.11E-08	1.22E+00	-3.08	159.0	1198					1679.3					ļ								
KLX 08	203.00	223.00	1.11E-07	1.22E+01	-2.39	49.2	223					1846.7													
KLX 08	223.50	243.50	4.13E-09	4.55E-01	5.90	92.4	982					2020.3													
KLX 08	243.50	263.50	8.34E-11	9.19E-03	15.02	70.2	984					2198.7					-	-	ļ						
KLX 08	264.00	284.00	8.11E-11	8.94E-03	-1.09	8.4	37		$\perp$			2361.3					-								
KLX 08	284.00	304.00	1.21E-09	1.33E-01	1.00	56.4	661		-			2553.2				-	-	-	-						
KLX 08 KLX 08	304.00	324.00 344.00	4.64E-11 7.09E-11	5.11E-03 7.81E-03	-0.11 2.44	288.0	1075 #N					2703.6 #NV			ļ	ļ	<del> </del>	-	ļ	ļ	-				
KLX 08	324.00 344.00	364.00	5.69E-11	6.27E-03	-0.96	#NV 49.2	1172		+		-	3048.7			-	-	-	-	-						
KLX 08	364.00	384.00	3.97E-10	4.38E-02	2.28	49.2	711		-			3218.8	***************************************	ļ	ļ		┼	+	<del> </del>						
KLX 08	385.00	405.00	3.19E-08	3.52E+00	6.29	22.8	136					3398.8			<del> </del>		<del> </del>	+	<del> </del>	<del> </del>				<del> </del>	
KLX 08	403.00	423.00	5.51E-09	6.07E-01	-6.10	41.4	395		+			3550.9		-	<del> </del>	-	<del> </del>	-	<del> </del>	ł	-	ļ	ļ		
KLX 08	423.00	443.00	7.69E-11	8.48E-03	20.82	19.8	776		-			3718.9			<del> </del>	-	+	+	-	<u> </u>		<u> </u>			
KLX 08	443.00	463.00	1.98E-10	2.18E-02	20.30	34.8	222		+			3888.9	***************************************		<u> </u>	<b></b>	╁───	+	<del> </del>	-		<u> </u>			************************
KLX 08	463.00	483.00	1.33E-09	1.47E-01	7.88	42.6	1120		+			4054.0				<b></b>	<del>                                     </del>	+	<b></b>						
KLX 08	483.00	503.00	1.03E-10	1.14E-02	2.20	346.8	967		+			4226.9			<b>†</b>	<b></b>	1	+	<b>†</b>	T					
KLX 08	503.00	523.00	5.89E-11	6.49E-03	-1.25	#NV	#N					#NV					<b>†</b>		<b> </b>						1
KLX 08	523.00	543.00	1.37E-10	1.51E-02	-0.88	211.2	1052	.4				#NV													
KLX 08	543.00	563.00	8.59E-11	9.47E-03	1.19	94.2	380					#NV													
KLX 08	563.00	583.00	9.31E-11	1.03E-02	1.15	#NV	#N					#NV					T								
KLX 08	583.00	603.00	5.07E-11	5.59E-03	15.27	199.2	831					5074.5													
KLX 08	603.00	623.00	3.53E-10	3.89E-02	8.54	37.2	1077					5241.9													
KLX 08	623.00	643.00	7.42E-11	8.18E-03	20.80	383.4	1001					5413.0													
KLX 08	643.00	663.00	4.36E-10	4.81E-02	-3.05	49.8	1062					5583.9													
KLX 08	663.00	683.00	5.50E-09	6.06E-01	-3.73	18.6	168					5747.7			ļ		ļ		ļ	ļ					
KLX 08	683.00	703.00	7.18E-11	7.91E-03	4.73	184.2	411		44			5921.1				-		-	ļ						<u></u>
KLX 08	703.00	723.00	#NV	#NV	#NV	#NV	#N					#NV	ļ		<b></b>	ļ	<del> </del>		ļ	ļ	ļ				
KLX 08	723.00	743.00	8.41E-11	9.27E-03	1.20	379.2	997				ļ <u>.</u>	#NV			ļ	-			-	ļ					
KLX 08	743.00	763.00	1.46E-10	1.61E-02	0.92	#NV	#N		+			#NV		-	-	-		-	-	1	-				-
KLX 08	763.00	783.00	6.79E-10	7.48E-02	-3.91	169.2	1046		+			#NV		-	-	-	<del> </del>	-	-			-			
KLX 08	783.00	803.00	4.77E-11	5.26E-03	-1.41	#NV	#N		+		-	#NV			-		-	-	-		-	-			
KLX 08	803.00	823.00	#NV	#NV	#NV	#NV	#N	V				#NV					1			1			1		1

Tab			ole_test_obs sections of single hole test
Column	Datatype	Unit	Column Description
site	CHAR	Ullit	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 08	060928 07:55:00	060928 10:12:00	103.00	203.00		204.00	1000.41	854	852	856	1727	1730	1728	
KLX 08	060928 11:37:00	060928 14:04:00	203.00	303.00		304.00	1000.41	1682	1684	1681	2556	2556	2556	
(LX 08	060928 15:27:00	060928 17:28:00	305.00			406.00		2550	2549	2549	3420		÷	
KLX 08	060928 19:13:00	060928 21:27:00	403.00			504.00		3380	3380	3379	4250	4251	4251	
(LX 08	061006 09:32:00	061006 12:05:00	503.00	603.00		604.00	1000.41	4224	4224	4224	5096	5096	5096	
(LX 08	061006 14:05:00	061006 16:06:00	603.00			704.00		5071	5071	5071	5939	. <del>.</del>	÷	
LX 08	061006 17:48:00	061006 20:40:00	703.00			804.00	·}·····	5916	<b>{</b>	5916	6783			
LX 08	061006 22:17:00	061007 00:54:00	803.00			904.00		6758	}	6758	7637		¢	
LX 08	061007 06:04:00	061007 09:02:00	863.00	~k~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		964.00	.,	7263	}	7263	8279		A	
(LX 08	061008 07:04:00	061008 08:32:00		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		125.00	··j·······	837	\$	839	1028			
LX 08	061008 09:13:00	061008 10:41:00	125.00	·^		146.00		1017	1017	1017	1207	1207		
LX 08	061008 11:12:00	061008 12:38:00	144.00			165.00		1179	{	1177	1370			
LX 08	061008 13:19:00	061008 14:42:00	164.00			185.00		1345	\$	1345	1541	1544		
LX 08	061008 15:14:00	061008 16:36:00	183.50			204.50		1511	1513		1708			
LX 08	061008 17:07:00	061008 18:30:00	203.00			224.00		1678	\$	1678	1876		ó	
LX 08	061008 19:00:00	061008 20:26:00	223.50			244.50		1853	3	1853	2050			
LX 08	061008 21:09:00	061008 22:36:00	243.50			264.50		2022		2022	2220			
LX 08	061008 23:10:00	061009 00:33:00	264.00	~ <del>~</del> ~~~~~~	·····	285.00		2196	<u> </u>	2196	}	<u> </u>	<u> </u>	
LX 08	061009 01:07:00	061009 02:31:00	284.00			305.00		2366	۵	2366	2564	2564	ó	
LX 08	061009 06:17:00	061009 07:50:00	304.00			325.00		2537	2537	2537	2735			
LX 08	061009 08:23:00	061009 10:04:00	<b></b>	·ۇ		345.00		2706	}	·····	ş	·\$	·	
(LX 08	061009 10:41:00	061009 12:08:00	344.00	~j		365.00	·••	2877	2877	2877	3075	·	<del>,</del>	
LX 08	061009 10:41:00	061009 12:08:00	364.00			385.00		3046	3047	3047	3245		÷	
LX 08	061009 12:37:00	061009 14:27:00	385.00			406.00		3225	3047	3047	3423		3425	
LX 08	061009 15:01:00	061009 18:19:00	403.00			424.00	·}·····	3378	3378	3378	3576		3577	
LX 08	061009 18:50:00	0001009 18.19.00	423.00	-3		444.00		3546	3546	3576 3546	3745		<u> </u>	
LX 08	061009 18:30:00	061009 22:23:00	443.00			464.00		3716	}		3914			
LX 08	061009 21:00:00	061010 00:35:00	463.00			484.00		3884	3884	3884	4083		÷	
LX 08	061010 01:14:00	061010 00:33:00	483.00			504.00		4053	4053	4053	4252		4	
LX 08	061010 01:14:00	061010 02:38:00	503.00			524.00		4221	4000	4000	4421	4421	4421	
LX 08	061010 08:37:00	061010 08.07.00				544.00	.,	4392	}	4392	4591	4591	4591	
LX 08	061010 08.37.00	061010 10.22.00				544.00	··j·······	4592 4561	4392 4561	4392 4561	4591 4760			
LX 08	061010 10.59.00	061010 12.41.00	{	·^				4730	\$	4730	4760	å		
***************************************	061010 13.25.00		{	~{~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		584.00 604.00	.,	4730	}	4730	4929 5098			
LX 08 LX 08	061010 15.33.00	061010 16:58:00 061010 18:55:00	603.00					5068	\$	5068	5096 5267	5267		
						624.00 644.00		5238	3	5238	5437			
LX 08 LX 08	061010 19:25:00 061010 21:30:00	061010 20:50:00 061010 22:54:00	623.00					5236 5407	5407	5236 5407	5437 5607		å	
			643.00			664.00			3		¿			
LX 08	061010 23:25:00	061011 00:49:00	663.00	·}		684.00		5577 5745	5577 5745	·····	5776	å	·	
LX 08	061011 01:25:00	061011 03:01:00	683.00			704.00	·/······	5745	}	<u> </u>	}	<u> </u>	<u> </u>	
LX 08	061011 05:22:00	061011 06:11:00	703.00			724.00		5912	\$	ó	6110		ó	· · · · · · · · · · · · · · · · · · ·
LX 08	061011 06:43:00	061011 08:51:00	723.00			744.00		6083	6083	6083	6279		·	
LX 08	061011 09:27:00	061011 11:47:00	743.00			764.00		6254		6254	6449			
LX 08	061011 12:33:00	061011 14:52:00	763.00	~j		784.00		6422	\$	<del>,</del>	6617			
(LX 08	061011 15:28:00	061011 17:14:00	<u> </u>	~}~~~~~		804.00	~/~~~~~~~~~	6591	6591	6591	6787	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	·····	
(LX 08	061011 17:47:00	061011 18:34:00	803.00	823.00		824.00	1000.41	6759	6759	6759	6955	6955	6955	